WALSH
ENGINEERING ASSOCIATES, INC.

January 14, 2025

Maine Coastal Program
32 Blossom Lane
21 State House Station
Augusta, Maine 04330

**RE: CZMA Federal Consistency Review Submission
Yachtsman Marina Dredging
Kennebunkport, Maine 04046**

To Whom it May Concern,

On behalf of KPT Marine, LLC (Applicant), Walsh Engineering Associates, Inc. (WEA), is pleased to submit the enclosed Coastal Zone Management Act (CZMA) Federal Consistency Review submission for the proposed dredging project to take place in the Kennebunk River, at the Yachtsman Marina. A Federal Consistency Review is required because two federal permits from the U.S. Army Corps of Engineers (USACE) are necessary to conduct the dredging/disposal work. This project also requires a state permit from the Maine Department of Environmental Protection (DEP) and local permits from the Town of Kennebunkport. A list of all permits required for the project, the associated regulatory entities, and the status of permit application submissions are shown in the table below:

Required Permit/Approval	Regulatory Entity	Status
Section 408	USACE	Submitted11/22/2024
Individual Standard Permit	USACE	Submitted 11/22/2024
Natural Resources Protection Act Individual Permit	Maine DEP	Submitted 11/22/2024
Kennebunk River Committee Approval	Town of Kennebunkport/Kennebunk	To be submitted February/ March 2025
Kennebunk River Harbor Master Approval	Town of Kennebunkport/Kennebunk	To be submitted February/ March 2025
Activities and Land Use Permit	Town of Kennebunkport	To be submitted following River Committee/Harbor Master approval
Site Plan Review	Town of Kennebunkport	To be submitted following River Committee/Harbor Master approval
Flood Hazard Development Permit	Town of Kennebunkport	To be submitted following River Committee/Harbor Master approval

A Federal Consistency Submission Form is included with this letter, as well as copies of the USACE Section 408 and Individual Standard Permit applications that were submitted on November 22, 2024, and the Maine DEP Natural Resources Protection Act (NRPA) Individual Permit application that was also submitted on November 22, 2024.

On behalf of the applicant, thank you in advance for your review of this submission. We look forward to working with you and the Maine Coastal Program to make this project successful.

Respectfully,

Leyna L Tobey

Leyna Tobey, PE – Project Manager
Walsh Engineering Associates, Inc.

cc. KPT Marine, LLC – Shawn Dumas
USACE – Heather Stukas
Maine DEP – Alison Sirois

Enc. Federal Consistency Submission Form
USACE Section 408 Permit Application (Submitted on November 22, 2024)
USACE Individual Standard Permit Application (Submitted on November 22, 2024)
Maine DEP NRPA Individual Permit Application (Submitted on November 22, 2024)

Federal Consistency Submission Form

Maine Coastal Program
Coastal Zone Management Act
Federal Consistency Submission Form

The Maine Coastal Program (MCP) is the lead agency for Coastal Zone Management in Maine. MCP strongly suggests that applicants for a federal consistency determination or certification use this form for activities regulated under the Coastal Zone Management Act (CZMA) of 1972, as amended, and the National Oceanic and Atmospheric Administration (NOAA) Federal Consistency Regulations under 15 CFR Part 930. Although use of this form is not required, it is provided to applicants to facilitate the submission and timely review of a consistency determination or certification. Federal agencies and applicants are only required to provide the information listed in NOAA's Federal Consistency Regulations unless otherwise described in the Maine Guide to Federal Consistency Review, as approved by NOAA.

I. Applicant Information:

Project/Activity Name: Yachtsman Marina Dredging		
Contact Name: Shawn Dumas (on behalf of KPT Marine, LLC, Applicant)	Authorized Agent (if applicable): Walsh Engineering Associates, Inc. (c/o - Leyna Tobey)	
Federal Agency: N/A		
Address: 57 Ocean Avenue		
City: Kennebunkport	State: Maine	Zip Code: 04046
Email: leyna@walsh-eng.com (Authorized Agent)	Phone Number: 207-553-9898 (Authorized Agent)	

II. Federal Consistency Category:

☐	Federal Agency Activity (15 CFR Part 930, subpart C)
☒	Federal License or Permit Activity (15 CFR Part 930, subpart D)
☐	Outer Continental Shelf Activity (15 CFR Part 930, subpart E)
☐	Federal Financial Assistance Activity to State/Local Government (15 CFR Part 930, subpart F)

III. Summary Description:

The project includes dredging of the Kennebunk River at the Yachtsman Marina to provide adequate depth for navigation.

IV. Select enforceable policies relevant to project or activity:

☑	Natural Resources Protection Act (38 M.R.S. §§480-A to 480-S; and 480-U to 480-HH)
☐	Site Location of Development Law (38 M.R.S. §§481 to 485-A; 486-A, -B; 487-A to 490-FF)
☐	Maine Metallic Mineral Mining Act (38 M.R.S. §§490-LL to 490-TT)
☐	MaineDOT Traffic Movement Permit Law (23 M.R.S. §704-A)
☐	Erosion Control and Sedimentation Law (38 M.R.S. §420-C)
☐	Expedited Permitting of Grid-scale Wind Energy Development (35-A M.R.S. §§3451-3459)
☐	Solar Energy Development Decommissioning Law (35-A M.R.S. chapter 34-D)
☐	Storm Water Management Law (38 M.R.S. §420-D)
☐	Maine Waterway Development and Conservation Act (38 M.R.S. §§630 to 636-A; 640)
☐	Protection and Improvement of Air Law (38 M.R.S. §§581 to 610-A, -B)
☐	Protection and Improvement of Waters Act (38 M.R.S. §§361-A, 362, 362-A, 363-D, 372; 410-N; 411 to 424; 451, 451-A, 452; 464 to 470)
☐	Nutrient Management Act (7 M.R.S. §§4201 to 4214)
☐	Land Use Regulation Law (12 M.R.S. §§681 to 689)
☐	Maine Hazardous Waste, Septage and Solid Waste Management Act (38 M.R.S. §§1301 to 1310-BB; 1316 to 1316-L; 1317 to 1319-Y)
☐	Uncontrolled Hazardous Substance Sites Law (38 M.R.S. §§1362, 1367, 1367-B)
☐	Asbestos Law (38 M.R.S. §§1273 and 1281)
☐	Lead Abatement Law (38 M.R.S. §§1296 and 1298(3))
☐	Sale of Consumer Products Affecting the Environmental Law (38 M.R.S. §§1608 and 1609-10)
☐	Mercury-Added Products and Services Law (38 M.R.S. §§1661 to 1661-C; 1665-A, -B; 1672
☐	Solid Waste Management and Recycling Law (38 M.R.S. §§2101; 2133, sub-§2(A); 2165
☐	Priority Toxic Chemical Use Reduction Law (38 M.R.S. §§2321 to 2330)
☐	Wellhead Protection Law (38 M.R.S. §§1391 to 1399)
☐	Nuclear Facility Decommissioning Laws (PL 1999 c. 739; PL 1999 c. 741)
☐	Oil Discharge Prevention & Pollution Control Law (38 M.R.S. §§541 to 560)
☐	Oil Storage Facilities and Ground Water Protection Law (38 M.R.S. §§561; 562-A; 563, sub-§1(A) and 2; 563-A to -B; 564; 565-A; 566-A; 568; 568-A to -B; 569-C; 570; 570-C to -G, I to M
☑	Maine Endangered Species Act (12 M.R.S. §12801 to 12810; 12 M.R.S. §6971 to 6976; 12 M.R.S. §10001, sub-§§19 and 62)
☐	General Licensing and Enforcement Authorities; Fees (38 M.R.S. §§341-D; 344 to 349; 352 to 353; 353-A, -B)
☐	Maine Rivers Act (12 M.R.S. §§403; 407)
☐	Marine Resources Law (12 M.R.S. §§6171 to 6192; 6432-A)
☐	Importing of Certain Marine Organisms (12 M.R.S. §6071)
☐	Aquaculture Leasing Laws (12 M.R.S. §6071-A; 12 M.R.S. §6072; 12 M.R.S. §6072-A; 12 M.R.S. §6073)
☐	Subdivision Law (30-A M.R.S. §§4401 to 4408)
☐	Mandatory Shoreland Zoning Law (38 M.R.S. §§435 to 448)
☐	Coastal Management Policies Act (38 M.R.S. §§1801 to 1802)
☐	Coastal Barrier Resources System Act (38 M.R.S. §§1901 to 1905)

V. Supporting Documentation. Please list all maps, diagrams, reports, and other materials below:

Copies of the U.S. Army Corps of Engineers Section 408 Permit and Individual Standard Permit applications and the Maine Department of Environmental Protection Natural Resources Protection Act (NRPA) Individual Permit application are attached to this Federal Consistency Submission Form. These applications include a project description, dredging plans, an alternatives analysis, and more.

VI. Other Coordination. Please list all agencies and contacts required to review this project below:

U.S. Army Corps of Engineers: Section 408 Permit, Individual Standard Permit
Maine DEP: NRPA Individual Permit Application
Town of Kennebunkport: Kennebunk River Committee Approval, Harbor Master Approval, Activities and Land Use Permit, Site Plan Review, Flood Hazard Development Permit Review

VII. Statement of Determination/Certification and Signature. Check one and sign below:

☐	FEDERAL AGENCY CONSISTENCY DETERMINATION. Based upon the information, data, and analysis included herein, the federal agency or its authorized agent finds the proposed activity is consistent to the maximum extent practicable with the enforceable policies of the Maine Coastal Program.
☐	FEDERAL AGENCY NEGATIVE DETERMINATION. Based upon the information, data, and analysis included herein, the federal agency or its authorized agent finds the proposed activity will not have any reasonably foreseeable effects on Maine's coastal uses or resources.
☒	NON-FEDERAL APPLICANT CONSISTENCY CERTIFICATION. Based upon the information, data, and analysis included herein, the non-federal applicant certifies that the proposed activity complies with the enforceable policies of Maine Coastal Program and will be conducted in a manner consistent with such program.

Signature: Leyna L Tobey	Digitally signed by Leyna Tobey, PE Date: 2025.01.14 13:31:41-05'00'
Printed Name: Leyna Tobey	Date: 1/14/2025

USACE Section 408 Permit Application
(Submitted on November 22, 2024)

Army Corp of Engineers
Section 408

For

Yachtsman Marina
57 Ocean Ave
Kennebunkport, ME 04046

November 22, 2024

Applicant
KPT Marine, LLC
P.O. Box 2734
Kennebunkport, Maine

Prepared By:

WALSH
ENGINEERING ASSOCIATES, INC.

One Karen Drive, Suite 2A
Westbrook, Maine
207.553.9898

WALSH
ENGINEERING ASSOCIATES, INC.

November 22, 2024

U.S. Army Corps of Engineers – Maine Project Office
Heather S. Stukas – Project Manager
442 Civic Center Drive, Suite 350
Augusta, ME 04330

RE: Section 408 Permit
Yachtsman Marina Dredging
57 Ocean Avenue
Kennebunkport, Maine

Dear Ms. Stukas:

Walsh Engineering Associates, Inc. (WEA) is requesting permission for a single-phased review for a private entity (KPT Marine, LLC; Applicant) to make alterations adjacent to, and to temporarily occupy, a U.S. Army Corps of Engineers (USACE) Federally Authorized Civil Work Project under 33 USC 408 (Section 408). The applicant is proposing to mechanically dredge a portion of the Kennebunk River adjacent to, but not within, the Kennebunk River Federal Navigation Project (FNP). The proposed dredging actions are not anticipated to be injurious to the public interest or impair the usefulness of the USACE project.

The Yachtsman Marina is located at 57 Ocean Avenue in Kennebunkport, Maine with 600 feet of frontage on the Kennebunk River. The Town of Kennebunkport Assessor's Office identifies the parcel as Map 10, Block 1, Lot 3. The facility consists of an active marina with 58 boat slips.

The shoaling that is occurring in the Yachtsman Marina area makes vessels more susceptible to groundings and exposes them to hazardous conditions when tides and weather create rough seas. Bathymetric surveys of the FNP have identified sufficient shoaling that presents a navigational hazard.

Proposed Action

The Applicant is proposing to mechanically dredge the following:

- Proposed dredged volume = 6,400 cubic yards of silt and sand
- Area of dredge = 61,000 square feet (1.4 acres)
- Proposed dredge depth = elevation -6.0 feet mean low water, with about 1 foot of over-dig

The purpose of this project is to dredge the shoaled areas of the FNP to restore safe vessel navigation at the Yachtsman Marina, and to dispose of dredged material in the most appropriate location. The dredged material will be transported by barge to an open water placement disposal site known as the Isle of Shoals North Disposal Site. Please refer to Figure 1 – Plan View, Figure

2 – Section Views, and Figure 3 – Section 408 Plan, attached to this letter, for detailed dredging information.

Alteration, Occupation, and Use of the FNP
Federal Navigation Projects are authorized, constructed, and maintained on the premise that they will be accessible and available to all on equal terms. These Projects include a wide array of channels and harbors that provide for the needs of fishing vessels, commercial shippers, recreational boaters, and national defense.

Given the anticipated timing for receiving USACE Individual Standard Permit Approval, Maine Department of Environmental Protection (DEP) Natural Resources Protection Act (NRPA) Approval, and a Disposal Authorization, WEA anticipates that the dredging equipment would temporarily occupy the area during the winter 2025-2026 dredge window. WEA will be working closely with the Yachtsman Marina and the designated dredging company to ensure the alteration of the FNP by dredging will be in the manner and amount that has been designated and approved. The dredge will only temporarily occupy the FNP for the amount of time needed to dredge the area (anticipated to be two days).

A 1976 USACE map showing the original limits of the Kennebunk River FNP is attached to this letter, as well as an updated map from 2020 showing revised coordinates for the upstream limits of the FNP.

Operation, Maintenance, and Repair
Sand shoals accumulate rapidly in this area of the Kennebunk River, creating the need for regular maintenance dredging. The Yachtsman Marina site has an extensive history of dredging. The proposed dredge area is coincidental with the area that was previously permitted under Maine DEP Permit #L-18612-4E-A-N in 1994. Since that time, the Yachtsman Marina was dredged in 2005 under Permit ##L-18612-4E-B-N, and in Winter 2015-2016 under Maine DEP's Permit by Rule (PBR) process and U.S. Army Corps of Engineers (USACE) Permit #NAE-2004-319. Any dredging that takes place is only a temporary measure until the Yachtsman Marina identifies the need for additional dredging in the future.

Potential Impacts to Usefulness of the FNP
No potential impacts to the usefulness of the FNP are anticipated. The project is not anticipated to be injurious to the public interest.

Statement of No Objection
Please see the Statement of No Objection Letter from the project's Non-Federal Sponsor, the Town of Kennebunkport, attached to this letter.

Endangered Species
The National Marine Fisheries Service and the U.S. Fish and Wildlife Service have been consulted to ensure that the proposed activity will not significantly affect any species or critical habitat designated as endangered or threatened pursuant to the Endangered Species Act (ESA) of 1973. It

2 – Section Views, and Figure 3 – Section 408 Plan, attached to this letter, for detailed dredging information.

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Statement of No Objection

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Endangered Species

The National Marine Fisheries Service and the U.S. Fish and Wildlife Service have been consulted to ensure that the proposed activity will not significantly affect any species or critical habitat designated as endangered or threatened pursuant to the Endangered Species Act (ESA) of 1973. It is our determination that the project is not likely to adversely affect threatened or endangered species.

Cultural Resources
The Maine Historic Preservation Commission (MHPC) and the Tribal Historic Preservation Officers (THPO) of Maine have been notified regarding this project. Copies of these notifications are included with this letter. Any responses received from the MHPC and THPO will be forwarded to the project manager assigned to this project.

Essential Fish Habitat Assessment
According to the National Oceanic and Atmospheric Administration (NOAA) Fisheries Essential Fish Habitat (EFH) Mapper, the project location is mapped within a New England/Mid-Atlantic EFH for the following species: Acadian redfish (larvae); haddock (juvenile); little skate (adult); monkfish (eggs, larvae, juvenile, adult); silver hake (eggs, larvae, adult); and winter flounder (eggs). The project is likely to have short-term and localized impacts to EFH, with no significant impacts to these habitats anticipated.

Additional Requirements – Water Quality Certification
The Maine DEP "*has combined the decision concerning water quality certification with the review of an application for a state permit that already requires compliance with state water quality standards…the issuance of the order approving the project constitutes both the state permit and the water quality certification.*" The project team is planning to file a Maine DEP NRPA Permit Application concurrently with this Section 408 Application. In accordance with the statement quoted above, the NRPA Permit Approval will constitute both the state permit and the Water Quality Certification and can be provided to the USACE upon receipt.

This Section 408 Permit Application is being submitted concurrently with a USACE Individual Standard Permit Application for the project. If you have any questions or concerns with this project, please feel free to contact me at (207) 553-9898 or by e-mail at leyna@walsh-eng.com. We look forward to working with you on this project.

Respectfully,

Leyna L Tobey

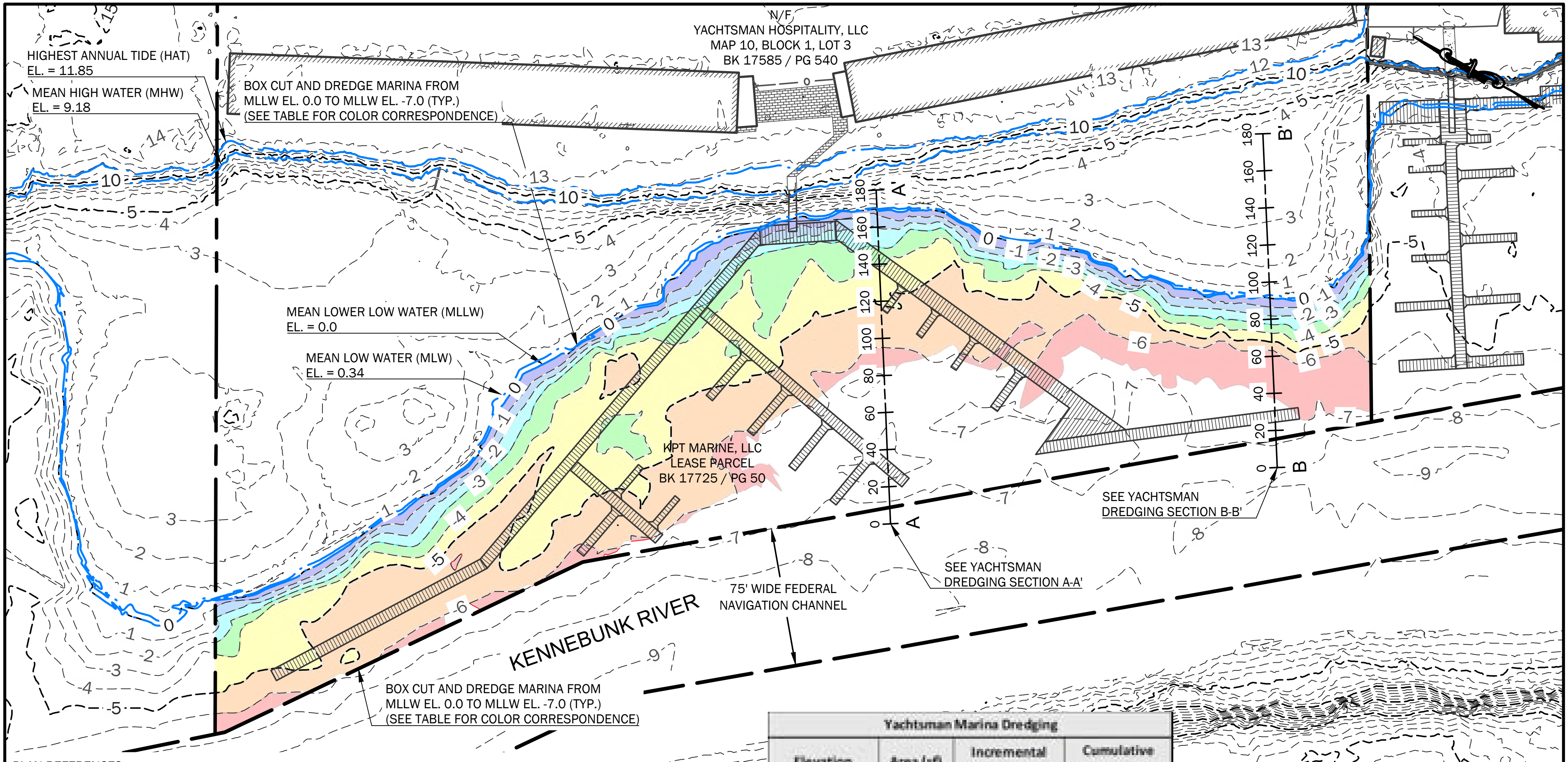
Leyna Tobey, PE – Project Manager
Walsh Engineering Associates, Inc.

cc. KPT Marine, LLC; Shawn Dumas
Enc. Section 408 Project Plans
    Figure 1 – Dredging Plan View, Figure 2 – Dredging Section View, Figure 3 – Section 408 Plan
  Kennebunk River FNP Maps
    USACE 1976 Kennebunk River FNP Map, USACE 202 Kennebunk River FNP Map
  Statement of No Objection Letter from Non-Federal Sponsor
    Town of Kennebunkport Letter dated October 31, 2024

WALSH
ENGINEERING ASSOCIATES, INC.

Cultural Resources Correspondence

- MHPC Notification Letter dated October 25, 2024
- THPO Notification Letter dated October 25, 2024
- Passamaquoddy Tribe Response Letter dated November 5, 2024
- MHPC Response Letter dated November 6, 2024



Yachtsman Marina Dredging			
Elevation	Area (sf)	Incremental Volume (cu. yd.)	Cumulative Volume (cu. yd.)
0 to -1	2,610	55	55
-1 to -2	5,415	160	215
-2 to -3	8,635	285	500
-3 to -4	14,310	455	955
-4 to -5	26,850	795	1,750
-5 to -6	43,420	1,350	3,100
-6 to -7	49,740	2,020	5,120
Total Dredge Volume w/ 25% Bulking Factor			6,400 cu. yd.

PLAN REFERENCES:

1. BATHYMETRY CONDUCTED BY WEA ON NOVEMBER 17, 2023 USING A HYDROLITE SONARMITE ECHOSOUNDER AND CARLSON BRx7 GNSS RECEIVER.
2. TOPOGRAPHIC DATA COLLECTED BY WEA VIA A DJI M300 DRONE EQUIPPED WITH A ZENMUSE L1 LIDAR CAMERA ON NOVEMBER 21, 2023.
3. ALL ELEVATIONS ON THIS PLAN ARE BASED ON THE MLLW VERTICAL DATUM. ELEVATIONS IN NAVD88 HAVE BEEN RAISED BY 5.15 FEET TO THE MLLW DATUM.A PLAN TITLED "BOUNDARY SURVEY AT YACHTSMAN LODGE & MARINA" PREPARED BY OWEN HASKELL, INC. OF 390 U.S. ROUTE ONE, UNIT 10, FALMOUTH, MAINE 04105, DATED APRIL 26, 2018.
4. A PLAN TITLED "SITE PLAN SHOWING THE PROPERTY OF THE KENNEBUNKPORT MARINA" PREPARED BY WILLIAM PIERCE OF 6 WATERHOUSE ROAD, DAYTON, MAINE 04005, DATED NOVEMBER 1, 1995
5. A PLAN TITLED " KENNEBUNK RIVER KENNEBUNK AND KENNEBUNKPORT MAINE AFTER DREDGE SURVEY" PREPARED BY U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DISTRICT DATED MARCH 9, 2020.
6. A PLAN TITLED "DOCK PLAN" PREPARED BY REILLY STUDIOS OF 959 ISLINGTON STREET, PORTSMOUTH, NEW HAMPSHIRE 03801, DATED MARCH 4, 2008.

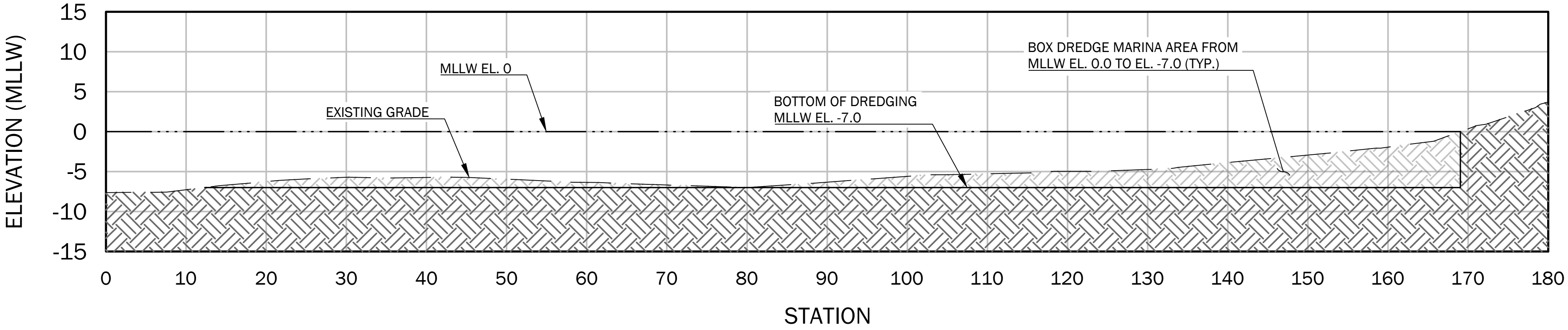
WALSH
ENGINEERING ASSOCIATES, INC.
One Karen Dr., Suite 2A | Westbrook, Maine 04092
ph: 207.553.9898 | www.walsh-eng.com

YACHTSMAN MARINA DREDGING

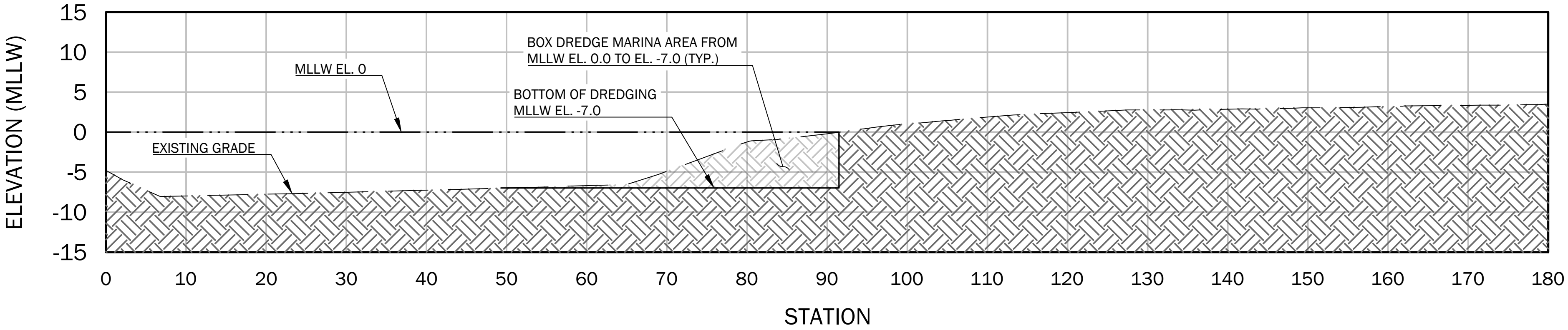
57 OCEAN AVE.
KENNEBUNKPORT, ME 04046

Sheet Title:
FIG 1:
PLAN VIEW

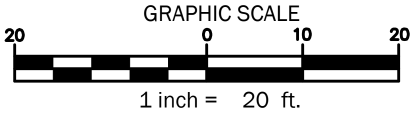
Job No.:	643.1
Date:	OCT. 29, 2024
Scale:	1" = 80'
Drawn:	CAR/MNW
Checked:	WRW



Yachtsman Dredging Section A-A'



Yachtsman Dredging Section B-B'



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ph: 207.553.9898 | www.walsh-eng.com

YACHTSMAN MARINA DREDGING

57 OCEAN AVE.
KENNEBUNKPORT, ME 04046

Sheet Title:
FIG 2:
SECTION VIEW

Job No.:	643.1
Date:	OCT. 29, 2024
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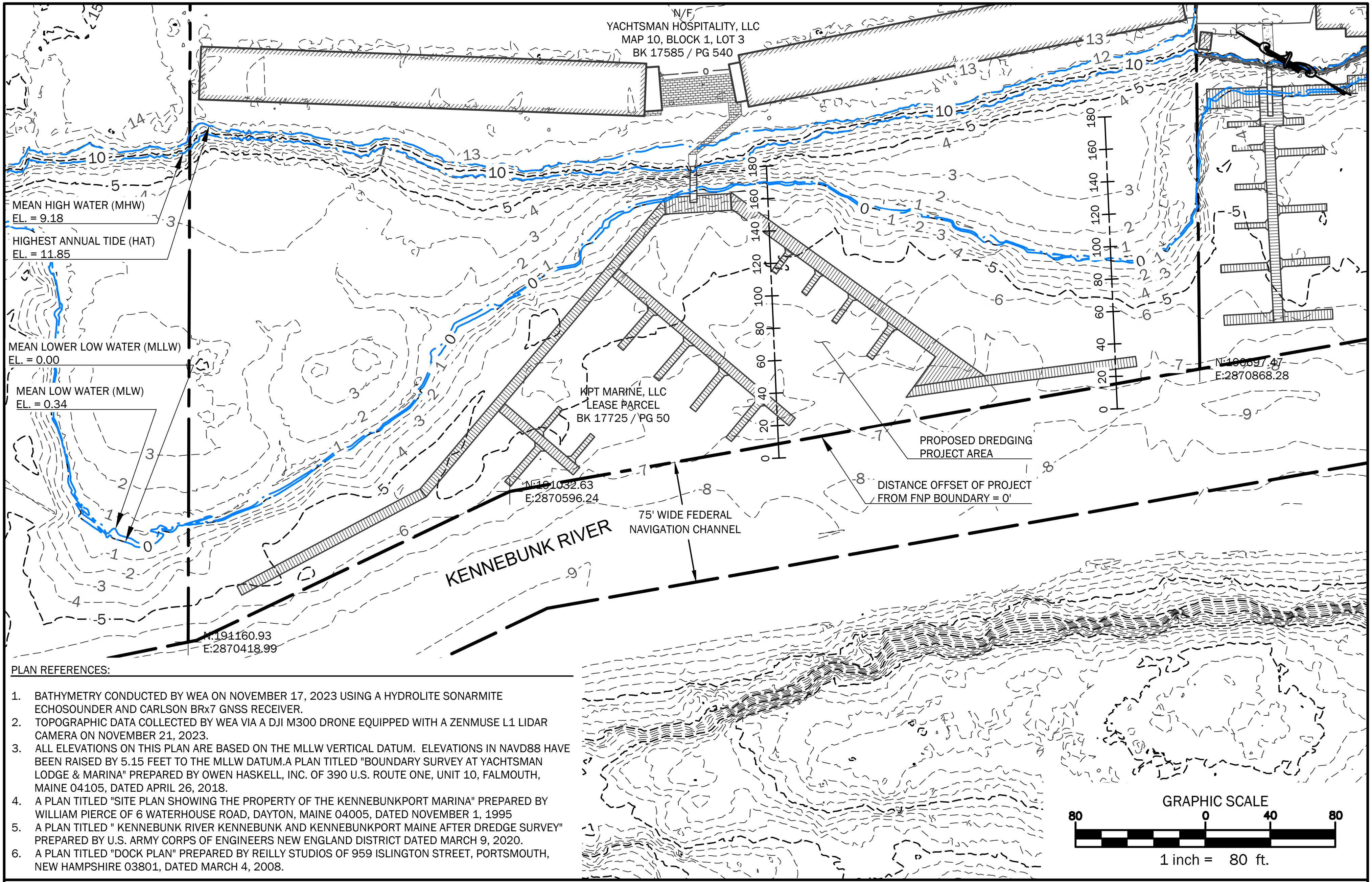
Checked:	WRW



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ph: 207.553.9898 | www.walsh-eng.com

YACHTSMAN MARINA DREDGING

57 OCEAN AVE.
KENNEBUNKPORT, ME 04046

Sheet Title:
FIG 3:
SEC. 408 PLAN

Job No.:	643.1
Date:	OCT. 29, 2024
Scale:	1" = 80'
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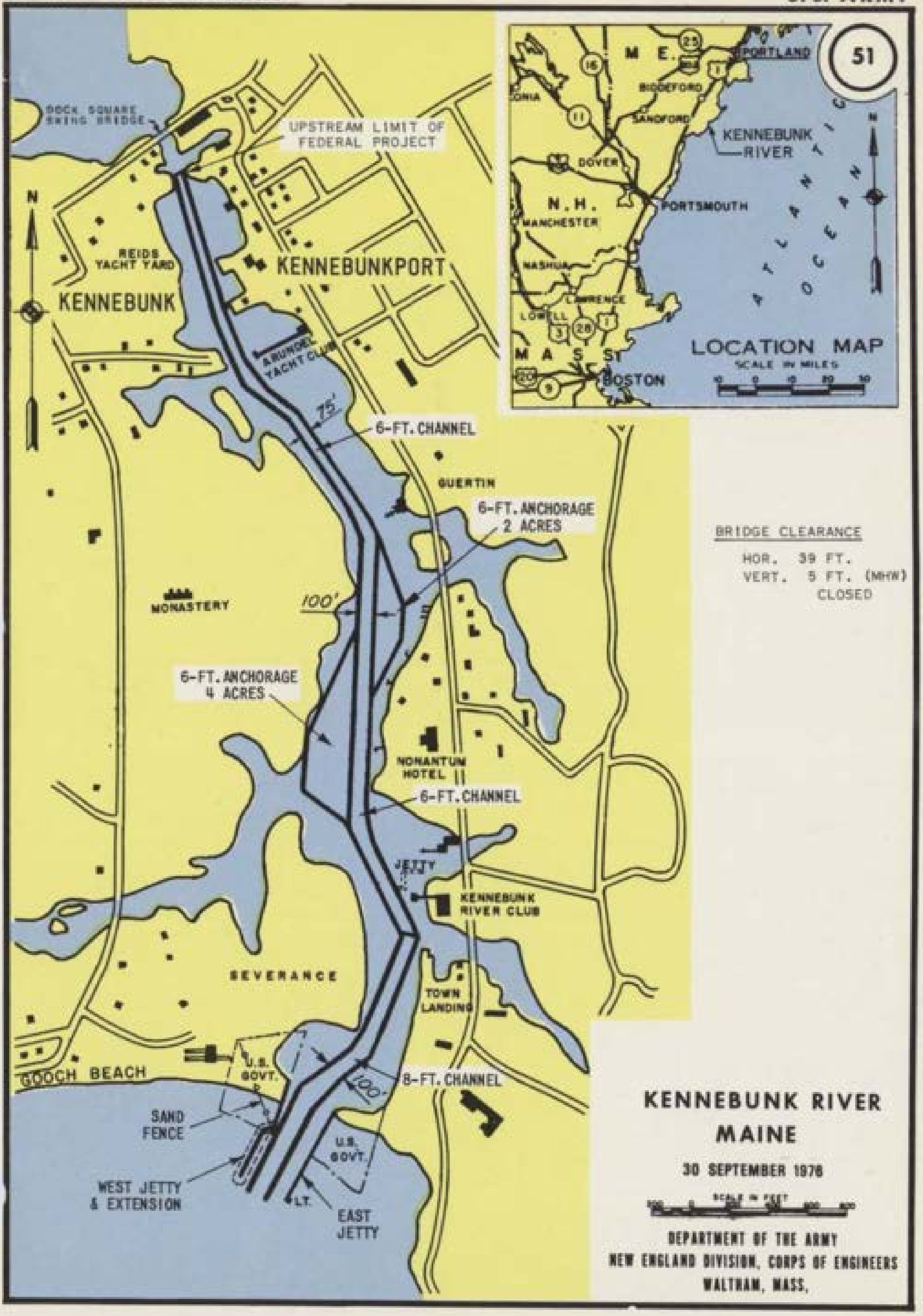
Checked:	WRW



BRIDGE CLEARANCE

HOR. 39 FT.
VERT. 5 FT. (MHW)
CLOSED

KENNEBUNK RIVER
MAINE

30 SEPTEMBER 1976

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

KENNEBUNK RIVER
MAINE
6 AND 8-FOOT CHANNELS
6-FOOT ANCHORAGE
STATE PLANE COORDINATES NAD 83
MAINE WEST ZONE (1802)

#	EASTING	NORTHING
1	2870190.46	186839.76
2	2870613.60	187634.56
3	2870822.49	187767.06
4	2870900.74	187871.89
5	2871053.72	188410.19
6	2871149.91	188382.86
7	2870991.89	187826.84
8	2870891.61	187692.48
9	2870752.79	187604.42
10	2870654.23	187498.07
11	2870278.73	186792.77
12	2871021.73	188297.62
13	2871010.07	188447.20
14	2870782.53	188940.19
15	2870818.94	189593.56
16	2870881.55	189933.12
17	2870870.45	190521.09
18	2870841.68	190609.23
19	2870581.42	190929.12
20	2870480.44	191024.34

#	EASTING	NORTHING
21	2870294.03	191158.63
22	2870151.82	191445.64
23	2870219.02	191478.94
24	2870317.45	191280.29
25	2870417.87	191161.85
26	2870589.15	191038.46
27	2870935.01	190613.36
28	2870970.80	190503.71
29	2870971.94	190443.03
30	2870981.72	189924.92
31	2870918.43	189581.67
32	2870889.33	189059.31
33	2870925.66	188868.73
34	2870615.35	189085.40
35	2870645.97	189634.89
36	2870738.62	189838.12
37	2870801.55	189838.12
38	2871085.67	190066.77
39	2871078.16	189932.05

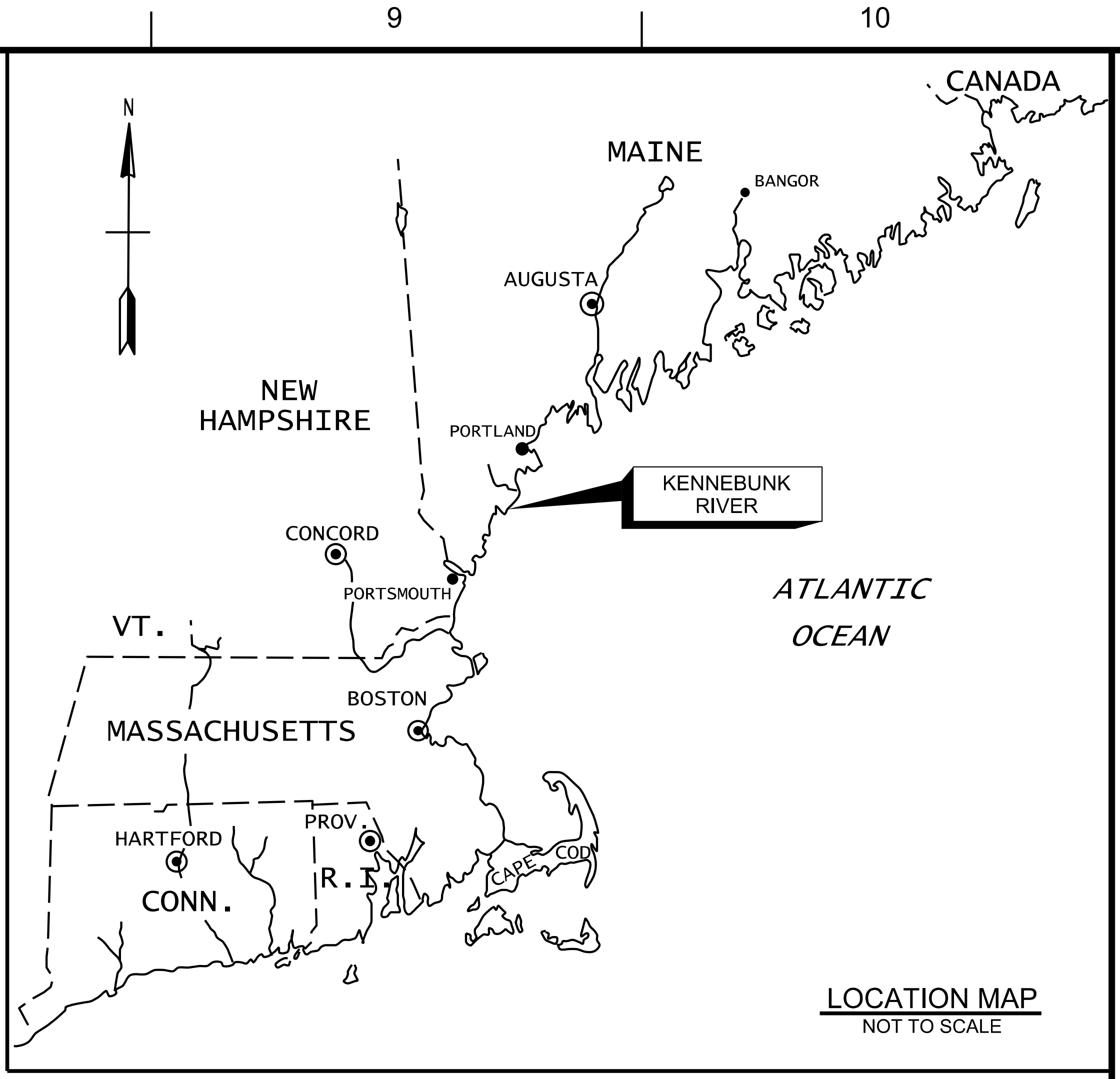
GENERAL NOTES:

1. KENNEBUNK RIVER (CENAE_ME_63_KNR) SEE SHEET V-001.
   REACH NAMES: 8-FOOT CHANNEL, 6-FOOT CHANNEL REACH 1, 6-FOOT CHANNEL REACH 2, 6-FOOT EAST ANCHORAGE, AND 6-FOOT WEST ANCHORAGE.

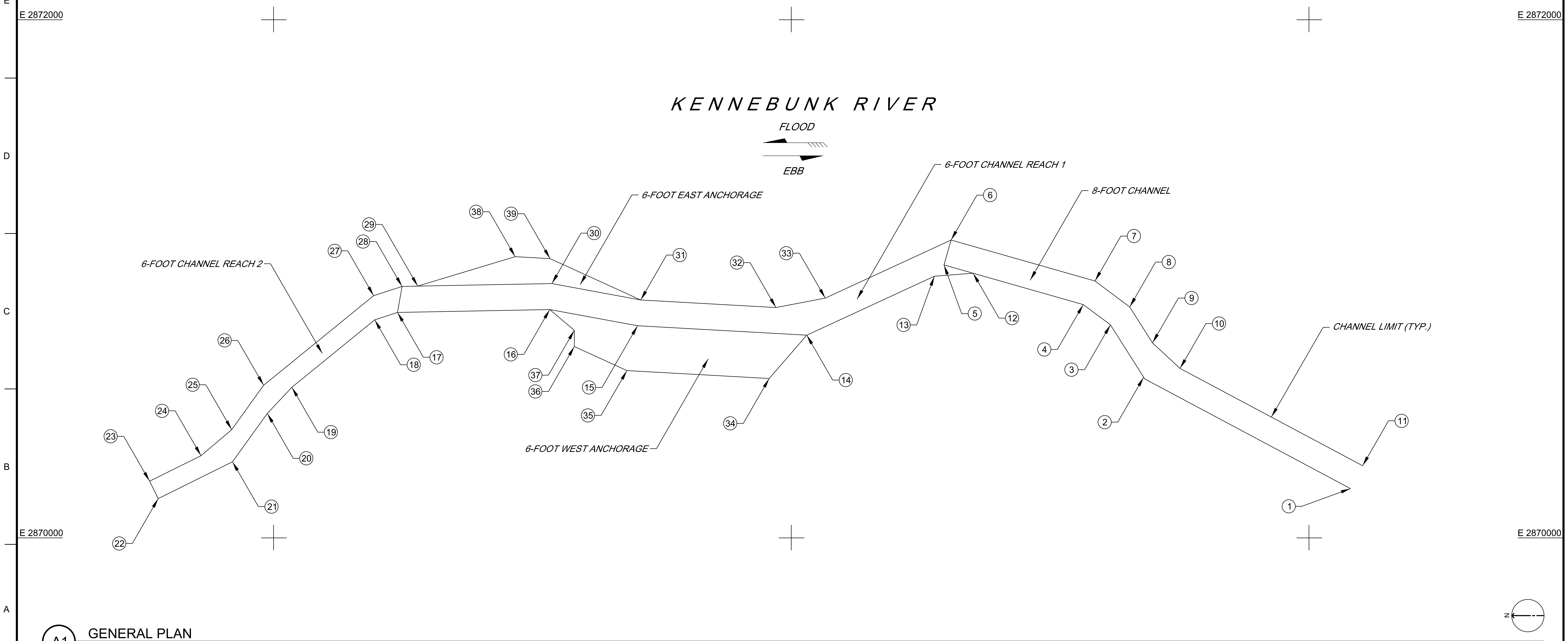
2. FOR HYDROGRAPHIC SURVEY INFORMATION SEE USACE HYRDROGRAPHIC SURVEYS (EHYDRO) WEB SITE:

USACE DISTRICT	USACE CHANNEL	CHANNEL ID
NAE	KENNEBUNK RIVER	CENAE_ME_63_KNR

3. COORDINATES SHOWN ARE BASED ON THE LAMBERT GRID SYSTEM FOR THE STATE OF MAINE WEST ZONE (1802), NAD 1983 AND ARE BASED ON U.S. SURVEY FEET.



LOCATION MAP
NOT TO SCALE



A1 GENERAL PLAN
SCALE: 1" = 200'

U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD, MA 01742-2751

DWN BY: EMA	CHK BY:	ISSUE DATE:
REVIEWED BY: ZSM Asst. Chief, Survey Sec.		SOLICITATION NO.:
APPROVED BY: Chief, Survey Section		CONTRACT NO.:
SIZE: ANSI D	SCALE: 1:1	DRAWING CODE: ME_63_KNR_NP_2020 SHEET 1 OF 1

MARK	DESCRIPTION	DATE

KENNERBUNK RIVER
KENNEBUNKC AND KENNEBUNKPORT, MAINE
FEDERAL NAVIGATION PROJECT

6 AND 8-FOOT CHANNELS
6-FOOT ANCHORAGE

SHEET ID
V-001

pw://COE-NAEPWP01CON.nae.ds.usace.army.mil:coe-naepwp01con.nae.ds.usace.army.mil/Documents/Civil Works/Navigation/ME/Kennebunk River/_2020 Federal Navigation Project (ME_63_KNR_NP_2020)/ProjectData/CAD_BIM/_Sheets/ME_63_KNR_NP_2020_V-001.dgn
10:31:39 AM 3/9/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

TOWN OF KENNEBUNKPORT, MAINE

– INCORPORATED 1653 –

October 31, 2024

U.S. Army Corps of Engineers – Maine Project Office
Heather S. Stukas – Project Manager
442 Civic Center Drive, Suite 350
Augusta, ME 04330

RE: Statement of No Objection from the Non-Federal Sponsor

Dear Ms. Stukas:

Walsh Engineering Associates, Inc. (WEA) is requesting permission for a private entity (the Yachtsman Marina, Applicant) to make alterations adjacent to, and temporarily occupy, a U.S. Army Corps of Engineers (USACE) Federally Authorized Civil Work Project under 33 USC 408 (Section 408).

As I understand, the Yachtsman Marina (YM) is seeking to mechanically dredge the shoaled areas of the Kennebunk River within the Yachtsman Marina, which is adjacent to the USACE's Federal Navigation Project, in order to restore safe vessel navigation at the marina. The shoaling that is occurring in the YM's area makes vessels more susceptible to groundings and exposes them to hazardous conditions when tides and weather create rough seas. Bathymetric surveys of the Federal Navigation Project have identified sufficient shoaling that presents a navigational hazard.

The proposed dredging actions are not anticipated to be injurious to the public interest or impair the usefulness of the USACE Federal Navigation Project. This Statement of No Objection does not grant the project permission to move forward with construction. Once the AYC receives USACE Section 408 Approval, they will proceed with filing the following project permits: USACE General Permit Pre-Construction Notification; Maine DEP Natural Resources Protection Act (NRPA) Permit; and Town of Kennebunkport Activities and Land Use, Site Plan Review, Flood Hazard Development, River Committee Approval, and Harbor Master Approval applications.

Sincerely,

Laurie Smith

Laurie A. Smith
Town Manager

Cc: Jamie Houtz, Kennebunk River Harbormaster

6 Elm Street, P.O. Box 566, Kennebunkport, Maine 04046
Tel: (207) 967-4243 Fax: (207) 967-8470

WALSH
ENGINEERING ASSOCIATES, INC.

October 25, 2024

Maine Historic Preservation Commission
Mr. Kirk F. Mohney, Director
65 State House Station
Augusta, Maine 04333-0065
MHPCprojectreview@maine.gov

VIA: Transmitted via email as noted above

RE: Yachtsman Marina Dredging – Project Review Request
57 Ocean Ave, Kennebunkport, ME 04046
Map 10, Block 1, Lot 3

On behalf of the Yachtsman Marina (Applicant), Walsh Engineering Associates, Inc. (WEA) intends to file permit applications with the Maine Department of Environmental Protection (DEP) and the U.S. Army Corps of Engineers (USACE) for maintenance dredging activities in the Kennebunk River at 57 Ocean Avenue in Kennebunkport, Maine. WEA is requesting that the Maine Historic Preservation Commission (MHPC) review the area for any known historic and/or archaeological resources. A site location map is attached for your review.

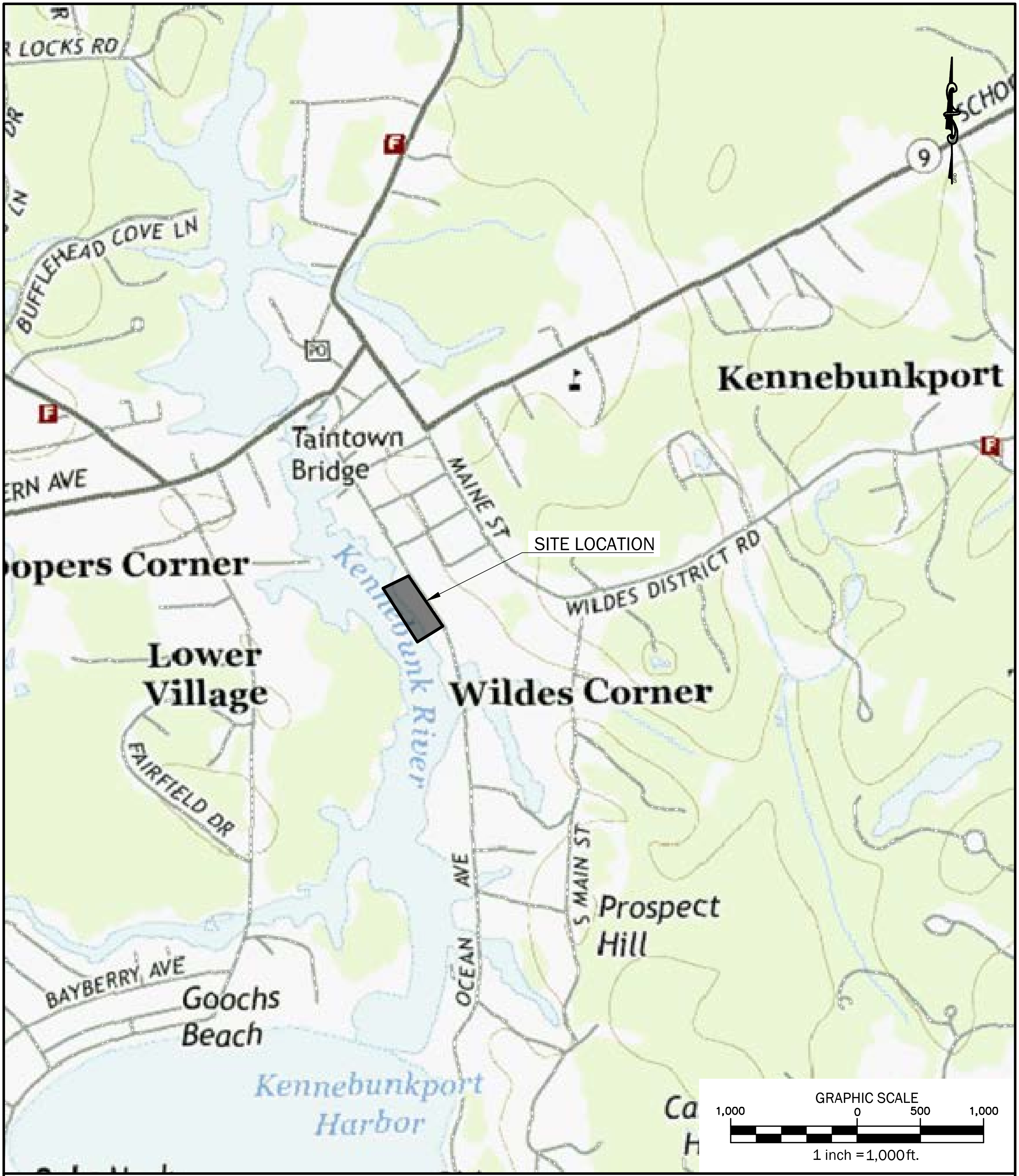
If you have any questions or concerns with this project, please feel free to contact me at (207) 553-9898 or by e-mail at leyna@walsh-eng.com. Thank you in advance for your time.

Respectfully,

Leyna L. Tobey

Leyna Tobey, Project Manager
Walsh Engineering Associates, Inc.

Enc: Site Location Map



WALSH
ENGINEERING ASSOCIATES, INC.

One Karen Dr., Suite 2A | Westbrook, Maine 04092
ph: 207.553.9898 | www.walsh-eng.com

Yachtsman Marina Dredging

Yachtsman Marina
57 Ocean Avenue
Kennebunkport, Maine 04046

Sheet Title:

Site Location

Job No.:	643.5
Date:	OCTOBER 2024
Scale:	1" = 1,000'
Drawn:	LLT
Checked:	WRW

P:\782 - Arundel Yacht Club Dredging\3. CAD\782 - Base.dwg plot date: 10/24/2024 11:02 AM

WALSH
ENGINEERING ASSOCIATES, INC.

October 25, 2024

Houlton Band of Maliseet Indians
Isaac St. John, THPO
88 Bell Road, Littleton, Maine 04730
istjohn@maliseets.com

Passamaquoddy Tribe of Indians
Donald Soctomah, THPO
Pleasant Point Reservation
P.O. Box 343, Perry, Maine 04667
soctomah@gmail.com

Passamaquoddy Tribe of Indians
Donald Soctomah, THPO
Indian Township Reservation
P.O. Box 301, Princeton, Maine 04668
soctomah@gmail.com

Mi'kmaq Nation
Jenny Gaenzle, THPO
7 Northern Road, Presque Isle, Maine 04769
jgaenzle@micmac-nsn.gov

Penobscot Nation
Chris Sockalexis, THPO
Cultural and Historic Preservation Dept.
12 Wabanaki Way, Indian Island, Maine 04468
chris.sockalexis@penobscotnation.org

VIA: Transmitted via email as noted above

RE: Yachtsman Marina Dredging – Project Review Request
57 Ocean Ave, Kennebunkport, ME 04046
Map 10, Block 1, Lot 3

On behalf of the Yachtsman Marina (Applicant), Walsh Engineering Associates, Inc. (WEA) intends to file permit applications with the Maine Department of Environmental Protection (DEP) and the U.S. Army Corps of Engineers (USACE) for maintenance dredging activities in the Kennebunk River at 57 Ocean Avenue in Kennebunkport, Maine. WEA is requesting that the Maine Tribal Historic Preservation Offices (THPO) review the area for any known historic and/or archaeological resources. A site location map is attached for your review.

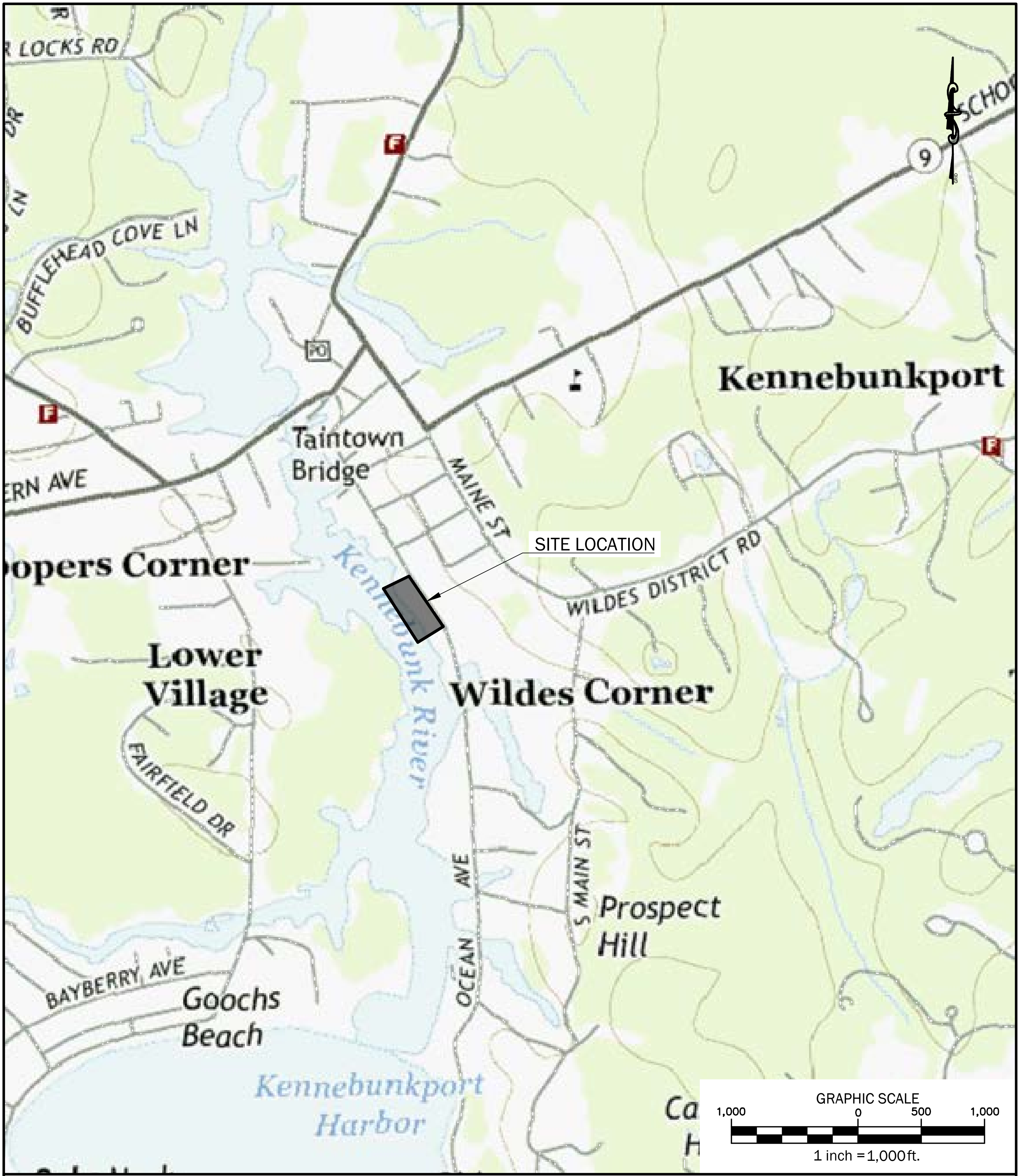
If you have any questions or concerns with this project, please feel free to contact me at (207) 553-9898 or by e-mail at leyna@walsh-eng.com. Thank you in advance for your time.

Respectfully,

Leyna L Tobey

Leyna Tobey, Project Manager
Walsh Engineering Associates, Inc.

Enc: Site Location Map



WALSH

ENGINEERING ASSOCIATES, INC.

One Karen Dr., Suite 2A | Westbrook, Maine 04092
ph: 207.553.9898 | www.walsh-eng.com

Yachtsman Marina Dredging

Yachtsman Marina
57 Ocean Avenue
Kennebunkport, Maine 04046

Sheet Title:

Site Location

Job No.:	643.5
Date:	OCTOBER 2024
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Drawn:	LLT
Checked:	WRW

P:\782 - Arundel Yacht Club Dredging\3. CAD\782 - Base.dwg plot date: 10/24/2024 11:02 AM

Tribal Historic Preservation Office
Passamaquoddy Tribe
PO Box 159 Princeton, Me. 04668
207-214-4051

November 5, 2024

Leyna Tobey, PE*

Project Manager | Civil Engineer

Walsh

One Karen Drive, Suite 2A

Westbrook, ME 04092

- Re: Kennebunk River at 57 Ocean Avenue in Kennebunkport

Dear ***Leyna*** ;

The Passamaquoddy THPO has reviewed the following application regarding the historic properties and significant religious and cultural properties in accordance with NHPA, NEPA, AIRFA, NAGPRA, ARPA, Executive Order 13007 Indian Sacred Sites, Executive Order 13175 Consultation and Coordination with Indian Tribal Governments, and Executive Order 12898 Environmental Justice.

The Project listed above will not have an impact on cultural concerns. If any artifacts or human remains are uncovered please stop and notify this office and the State Historic Preservation Office.

Sincerely;

Donald Soctomah THPO
Soctomah@gmail.com

WALSH
ENGINEERING ASSOCIATES, INC.

October 25, 2024

RECEIVED
OCT 25 2024
By 1921-24

Maine Historic Preservation Commission
Mr. Kirk F. Mohney, Director
65 State House Station
Augusta, Maine 04333-0065
MHPCprojectreview@maine.gov

VIA: Transmitted via email as noted above

RE: Yachtsman Marina Dredging – Project Review Request
57 Ocean Ave, Kennebunkport, ME 04046
Map 10, Block 1, Lot 3

On behalf of the Yachtsman Marina (Applicant), Walsh Engineering Associates, Inc. (WEA) intends to file permit applications with the Maine Department of Environmental Protection (DEP) and the U.S. Army Corps of Engineers (USACE) for maintenance dredging activities in the Kennebunk River at 57 Ocean Avenue in Kennebunkport, Maine. WEA is requesting that the Maine Historic Preservation Commission (MHPC) review the area for any known historic and/or archaeological resources. A site location map is attached for your review.

If you have any questions or concerns with this project, please feel free to contact me at (207) 553-9898 or by e-mail at leyna@walsh-eng.com. Thank you in advance for your time.

Respectfully,

Leyna L. Tobey

Leyna Tobey, Project Manager
Walsh Engineering Associates, Inc.

Enc: Site Location Map

Based on the information submitted, I have concluded that there will be no historic properties affected by the proposed undertaking, as defined by Section 106 of the National Historic Preservation Act. Consequently, pursuant to 36 CFR 800.4(d)(1), no further Section 106 consultation is required unless additional resources are discovered during project implementation pursuant to 36 CFR 800.13.

Kirk F. Mohney

Kirk F. Mohney,
State Historic Preservation Officer
Maine Historic Preservation Commission

11/6/24
Date

USACE Individual Standard Permit Application
(Submitted on November 22, 2024)

New England District of the U.S. Army Corps of Engineers Individual Standard Permit Application

For

Yachtsman Marina
57 Ocean Ave
Kennebunkport, Maine

November 22, 2024

Applicant
KPT Marine, LLC
P.O. Box 2734
Kennebunkport, Maine

Prepared By:

WALSH
ENGINEERING ASSOCIATES, INC.

One Karen Drive, Suite 2A
Westbrook, Maine
207.553.9898

WALSH
ENGINEERING ASSOCIATES, INC.

November 22, 2024

U.S. Army Corps of Engineers – New England District
c/o Ms. Heather S. Stukas
442 Civic Center Drive, Suite 350
Augusta, ME 04330

RE: New England District of USACE
Individual Standard Permit Application
Yachtsman Marina
Kennebunkport, Maine 04046

Dear Heather,

On behalf of KPT Marine, LLC (Applicant), Walsh Engineering Associates, Inc. (WEA), is pleased to submit the enclosed Individual Standard Permit Application to the New England District of the United States Army Corps of Engineers (USACE) for the proposed dredging activities to take place in the Kennebunk River located adjacent to the Yachtsman Marina.

The Yachtsman Marina is located at 57 Ocean Ave in Kennebunkport, Maine, with 600 feet of frontage along the Kennebunk River. The Town of Kennebunkport Assessor's Office identifies the parcel as Map 10, Block 1, Lot 3. The facility consists of an active marina with 58 boat slips. The proposed dredge area is coincidental with the area that was previously permitted under Maine DEP Permit #L-18612-4E-A-N in 1994. Since that time, the Yachtsman Marina was dredged in 2005 under Permit ##L-18612-4E-B-N, and in Winter 2015-2016 under Maine DEP's Permit by Rule (PBR) process and U.S. Army Corps of Engineers (USACE) Permit #NAE-2004-319.

As described in this application, a USACE Section 408 Permit is required to conduct the dredging work, as the project is located adjacent to the Kennebunk River Federal Navigation Project; a Section 408 Permit application for the project was submitted to the USACE concurrently with this Individual Standard Permit Application. In addition, this application is being submitted concurrently with a Maine DEP Natural Resources Protection Act (NRPA) Application.

On behalf of the applicant, thank you in advance for your review of this application. We look forward to working with you and the department to make this project successful.

Respectfully,

Leyna L Tobey

Leyna Tobey, PE – Project Manager
Walsh Engineering Associates, Inc.

cc. KPT Marine, LLC; Shawn Dumas
Enc. Individual Standard Permit Application & Supporting Documents

Table of Contents
USACE – Individual Standard Permit Application

Yachtsman Marina
Kennebunkport, ME 04046

Application for Department of the Army Permit (ENG Form 4345)

U.S. Army Corps of Engineers (USACE)

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

For use of this form, see 33 CFR 325. The proponent agency is CECW-CO-R.

Form Approved - OMB No. 0710-0003 Expires: 08-31-2023

The public reporting burden for this collection of information, OMB Control Number 0710-0003, is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR APPLICATION TO THE ABOVE EMAIL.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned. System of Record Notice (SORN). The information received is entered into our permit tracking database and a SORN has been completed (SORN #A1145b) and may be accessed at the following website: http://dpcld.defense.gov/Privacy/SORNsIndex/DOD-wide-SORN-Article-View/Article/570115/a1145b-ce.aspx

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME

First - Shawn Middle - Last - Dumas

Company - KPT Marine, LLC

E-mail Address - shawn@kennebunkportmarina.com

8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)

First - Leyna Middle - L. Last - Tobey

Company - Walsh Engineering Associates, Inc.

E-mail Address - leyna@walsh-eng.com

6. APPLICANT'S ADDRESS:

Address- P.O. Box 2734

City - Kennebunkport State - Maine Zip - 04046 Country - USA

9. AGENT'S ADDRESS:

Address- 1 Karen Drive, Suite 2A

City - Westbrook State - Maine Zip - 04092 Country - USA

7. APPLICANT'S PHONE NOs. w/AREA CODE

a. Residence 207-590-1658 b. Business c. Fax

10. AGENTS PHONE NOs. w/AREA CODE

a. Residence 207-553-9898 b. Business c. Fax

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Walsh Engineering Associates, Inc. to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

See Attached Agent Authorization

SIGNATURE OF APPLICANT DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
Yachtsman Marina Dredging

13. NAME OF WATERBODY, IF KNOWN (if applicable)
Kennebunk River

14. PROJECT STREET ADDRESS (if applicable)

Address 57 Ocean Ave

City - Kennebunkport State- Maine Zip- 04046

15. LOCATION OF PROJECT

Latitude: ◦N 43°21'25.51" Longitude: ◦W 70°28'28.17"

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID Map 10, Block 1, Lot 3 Municipality Kennebunkport

Section - Township - Range -

17. DIRECTIONS TO THE SITE
From Portland, take I-95 South; Exit 32, Route ME-111, then onto Precourt Street; turn right onto US-1 South, then left onto Log Cabin Road; left onto Maine Street; right onto ME-9; then 2nd left onto Ocean Ave.

18. Nature of Activity (Description of project, include all features)
The Applicant is proposing to mechanically dredge the following:
•Proposed dredged volume = 6,400± cubic yards of silt and sand
•Area of dredge = 61,000 square feet (1.4 acres)
•Proposed dredge depth = elevation -6.0 plus a one foot overdig
The dredged material would be transported by barge to the Isle of Shoals North (IOSN) open water disposal site. Please refer to Figure 1 - Plan View and Figure 2 - Section Views for detailed information.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)
The applicant is proposing to mechanically dredge approximately 6,400± cubic yards of sediment from the area in front of the Yachtsman Marina, including in and around the boat slips, to provide adequate depth for navigation and berthing. Silt, sand, and other natural deposits have impacted the marina of the Yachtsman Marina and have limited boat navigation and berthing depths, especially during periods of low tide.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge
An alternatives analysis is attached to this application, describing how onshore disposal and beneficial use of dredged materials are infeasible for this project. As a result, the dredged material is proposed to be transported by barge to the Isle of Shoals North (IOSN) open water disposal site.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
6,400 CY - silt and sand		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres 61,000 square feet (1.4 acres)
or
Linear Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)
Walsh Engineering Associates will be working closely with the Yachtsman Marina and the selected dredging contractor to ensure the dredging will be conducted in the manner and amount that has been designated and approved.

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- See attached 150-foot abutters list

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
Maine DEP	NRPA				
Town of Kennebunkpor	Site Plan Review				
Town of Kennebunkpor	Flood Hazard Developmen				
Town of Kennebunkpor	Activities and Land Use				

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Leyna L Tobey Digitally signed by Leyna Tobey, PE Date: 2024.11.20 08:14:19-05'00'

SIGNATURE OF APPLICANT

11/20/2024

DATE

See Attached Agent Authorization

SIGNATURE OF AGENT

DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Agent Authorization

To Whom It May Concern,

By this letter, the undersigned, a representative of KPT Marine, LLC, authorizes Walsh Engineering Associates, Inc. to act as the agent for the undersigned in the preparation and submission of all Federal, State, and Local permit applications and relevant documents and correspondence for all necessary permits for the maintenance dredging of the property at 57 Ocean Avenue in Kennebunkport, Maine; to attend meetings and site visits; to appear before all boards, commissions, and committees, and to provide such other services as are necessary and appropriate in furtherance of the aforementioned project.

Sincerely,

Shawn Dumas

Signature

Shawn Dumas Operations Manager

Printed Name and Title

10/31/2024

Date

Attachment 1 – Activities Description

1.1 – Site Location Plan

1.2 – Photo Log

1.3 – Disposal Site Locus (Isle of Shoals North)

1.4 – Kennebunk River FNP Map (1976)

1.5 – Updated Kennebunk River FNP Map (2020)

1.0 Activities Description

The Yachtsman Marina is located at 57 Ocean Avenue in Kennebunkport, Maine, with 600 feet of frontage along the Kennebunk River. The Town of Kennebunkport's Assessor's Office identifies the parcel as Map 10, Block 1, Lot 3. The facility consists of an active marina with 58 boat slips.

Existing Conditions

The Yachtsman Marina is located approximately 0.75-mile from the mouth of the Kennebunk River. The Kennebunk River flows generally southeast, past the towns of Lyman, Arundel, Kennebunk, and Kennebunkport. It enters the Atlantic Ocean in Kennebunkport, approximately 0.5-mile downstream from the town center. The surrounding area, with its high density of marinas and other waterfront uses, has an extensive history of dredging. The Yachtsman Marina dredging activities date back to the 1970s, with the most recent permits issued for maintenance dredging in 2016. Silt, sand, and other natural deposits have impacted the marina of the Yachtsman Marina and have limited boat navigation and berthing depths, especially during periods of low tide.

Proposed Project

The applicant is proposing to mechanically dredge approximately 6,400± cubic yards of sediment from the area in front of the Yachtsman Marina, including in and around the boat slips, to provide adequate depth for navigation and berthing.

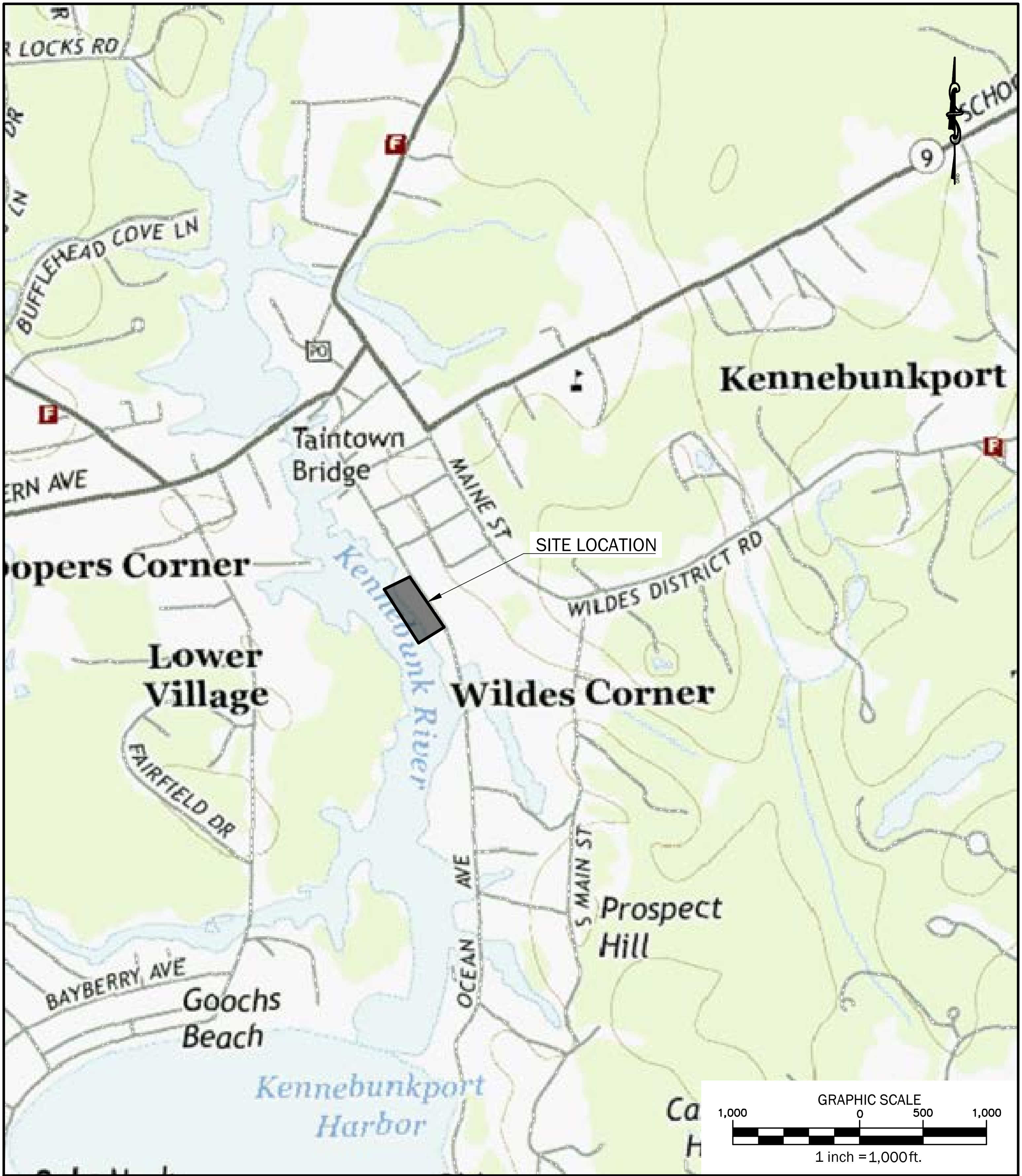
The area of the dredge will be approximately 61,000 square feet (1.4-acres). The proposed dredge depth will be to elevation -6.0 feet mean low water, with about one foot of over-dig. It is anticipated that dredging will coincide with neighboring marinas performing dredging at the same approximate time (see "Adjacent Dredging Projects" section below). The material will be transported by barge to the Isle of Shoals North Disposal Site (IOSN). The IOSN is located approximately 15 nautical miles east of Portsmouth, New Hampshire, in the Gulf of Maine.

The proposed dredge area is coincidental with the area that was previously permitted under Maine DEP Permit #L-18612-4E-A-N in 1994. Since that time, the Yachtsman Marina was dredged in 2005 under Permit ##L-18612-4E-B-N, and in Winter 2015-2016 under Maine DEP's Permit by Rule (PBR) process and U.S. Army Corps of Engineers (USACE) Permit #NAE-2004-319.

Given the timing for receiving permit approvals from Maine DEP and USACE, WEA anticipates that the work will occur during the winter 2025-2026 dredge window.

Adjacent Dredging Projects

The dredging of the Yachtsman Marina will coincide with similar dredging work at three adjacent marinas on the Kennebunk River, including the Arundel Yacht Club, the Kennebunkport Marina, and the Kennebunk River Club.



WALSH
ENGINEERING ASSOCIATES, INC.

One Karen Dr., Suite 2A | Westbrook, Maine 04092
ph: 207.553.9898 | www.walsh-eng.com

Yachtsman Marina Dredging

Yachtsman Marina
57 Ocean Avenue
Kennebunkport, Maine 04046

Sheet Title:

Site Location

Job No.:	643.5
Date:	OCTOBER 2024
Scale:	1" = 1,000'
Drawn:	LLT
Checked:	WRW

Yachtsman Marina Dredge

Kennebunkport, ME

Photo No. 1

Date: 10/20/2020

Site Location:
Yachtsman Marina

Description:
View from the south-east side of the marina.

Photo No. 2

Date: 10/20/2020

Site Location:
Yachtsman Marina

Description:
View from north-west side of the marina.

Photo No. 3

Date: 10/20/2020

Site Location:
Yachtsman Marina

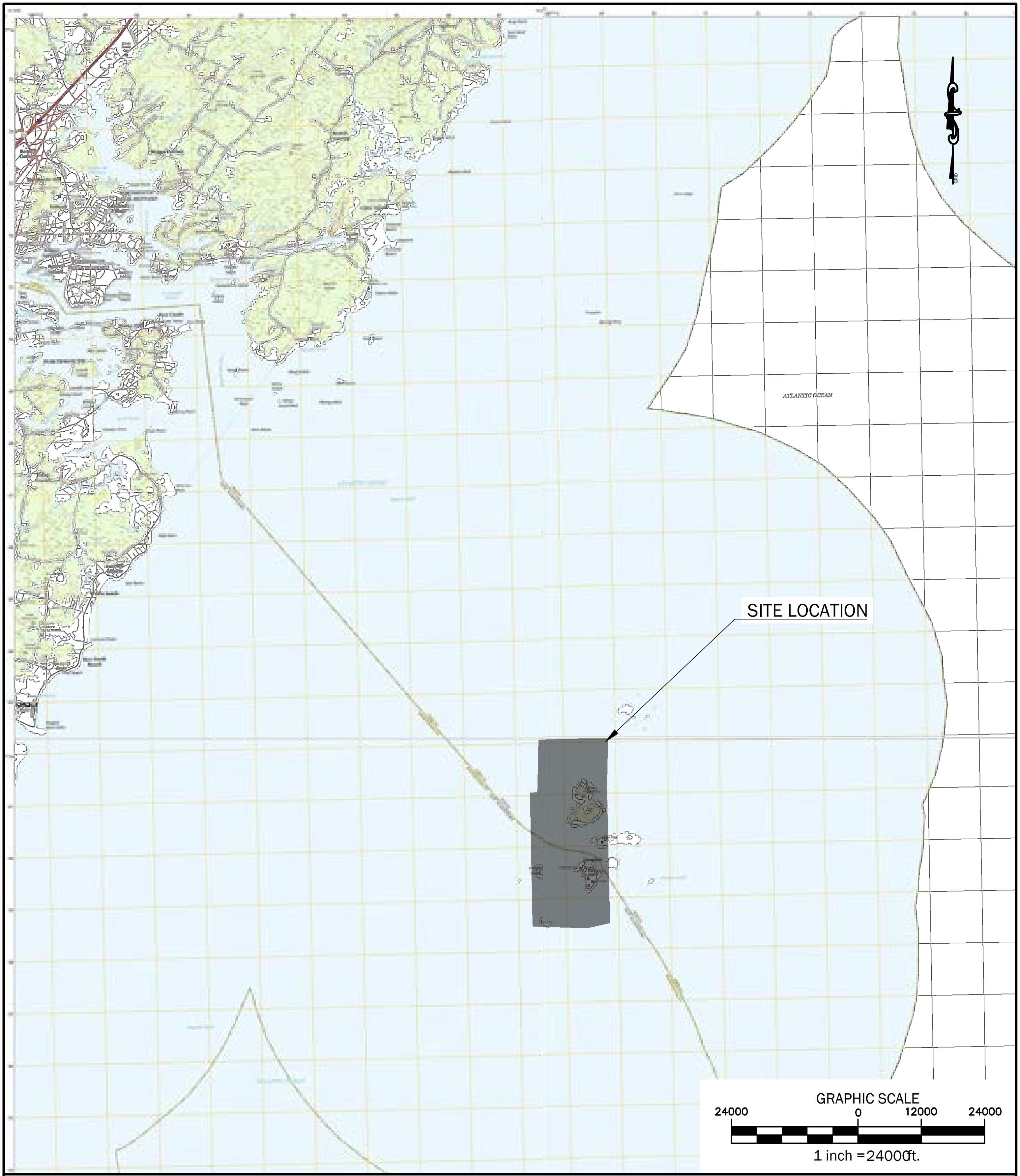
Description:
Aerial view of marina.

Photo No. 4

Date:
2021

Site Location:
Yachtsman Marina

Description:
Boat slips in the marina.



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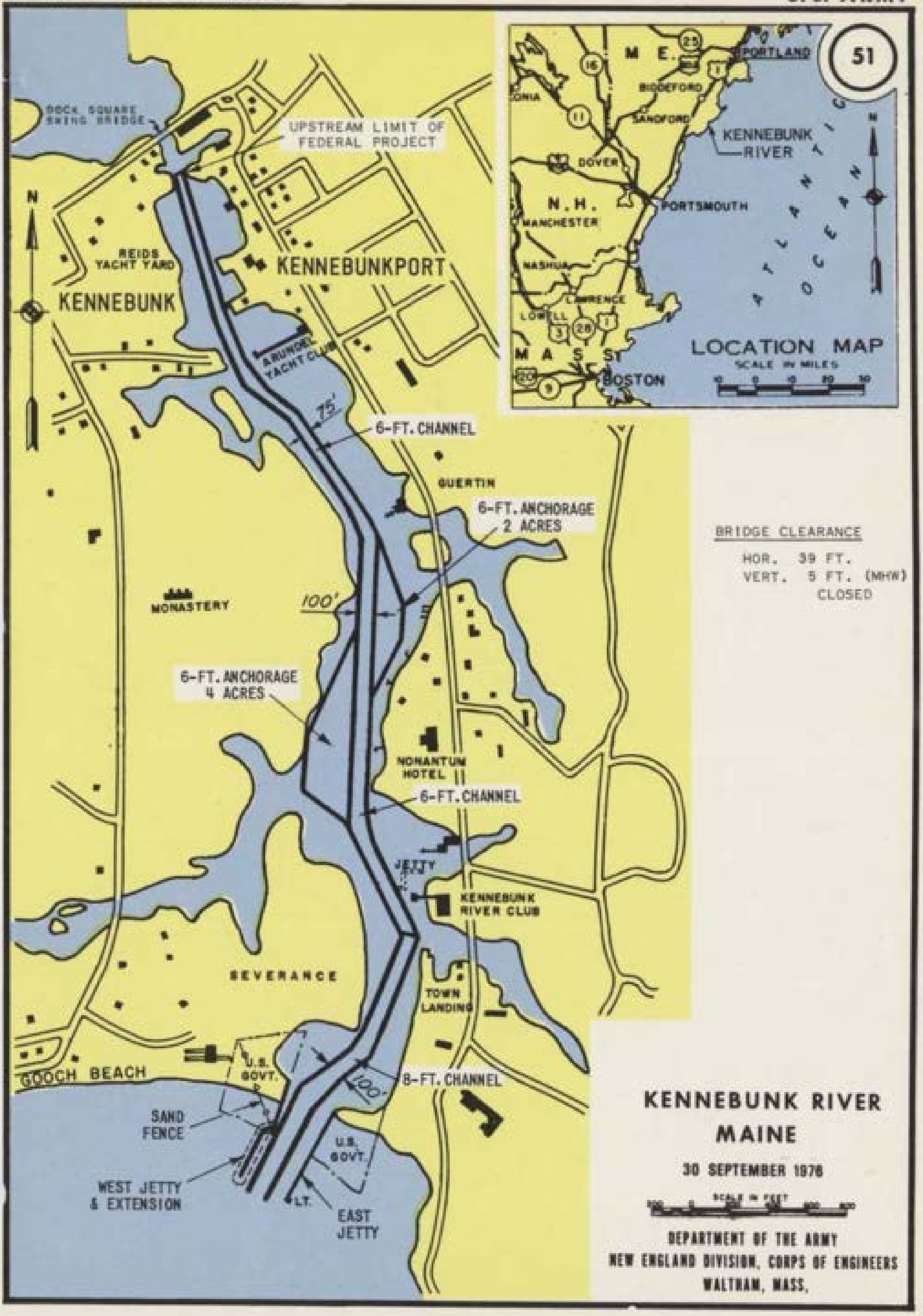
ph: 207.553.9898 | www.walsh-eng.com

Arundel Yacht Club Dredging

Arundel Yacht Club
51 Ocean Avenue
Kennebunkport, Maine 04046

Sheet Title:
Dredge Disposal Site Location

Job No.:	782
Date:	January 2022
Scale:	1" = 24,000'
Drawn:	KEW
Checked:	WRW



BRIDGE CLEARANCE

HOR. 39 FT.
VERT. 5 FT. (MHW)
CLOSED

KENNEBUNK RIVER
MAINE

30 SEPTEMBER 1976

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

KENNEBUNK RIVER
MAINE
6 AND 8-FOOT CHANNELS
6-FOOT ANCHORAGE
STATE PLANE COORDINATES NAD 83
MAINE WEST ZONE (1802)

#	EASTING	NORTHING
1	2870190.46	186839.76
2	2870613.60	187634.56
3	2870822.49	187767.06
4	2870900.74	187871.89
5	2871053.72	188410.19
6	2871149.91	188382.86
7	2870991.89	187826.84
8	2870891.61	187692.48
9	2870752.79	187604.42
10	2870654.23	187498.07
11	2870278.73	186792.77
12	2871021.73	188297.62
13	2871010.07	188447.20
14	2870782.53	188940.19
15	2870818.94	189593.56
16	2870881.55	189933.12
17	2870870.45	190521.09
18	2870841.68	190609.23
19	2870581.42	190929.12
20	2870480.44	191024.34

#	EASTING	NORTHING
21	2870294.03	191158.63
22	2870151.82	191445.64
23	2870219.02	191478.94
24	2870317.45	191280.29
25	2870417.87	191161.85
26	2870589.15	191038.46
27	2870935.01	190613.36
28	2870970.80	190503.71
29	2870971.94	190443.03
30	2870981.72	189924.92
31	2870918.43	189581.67
32	2870889.33	189059.31
33	2870925.66	188868.73
34	2870615.35	189085.40
35	2870645.97	189634.89
36	2870738.62	189838.12
37	2870801.55	189838.12
38	2871085.67	190066.77
39	2871078.16	189932.05

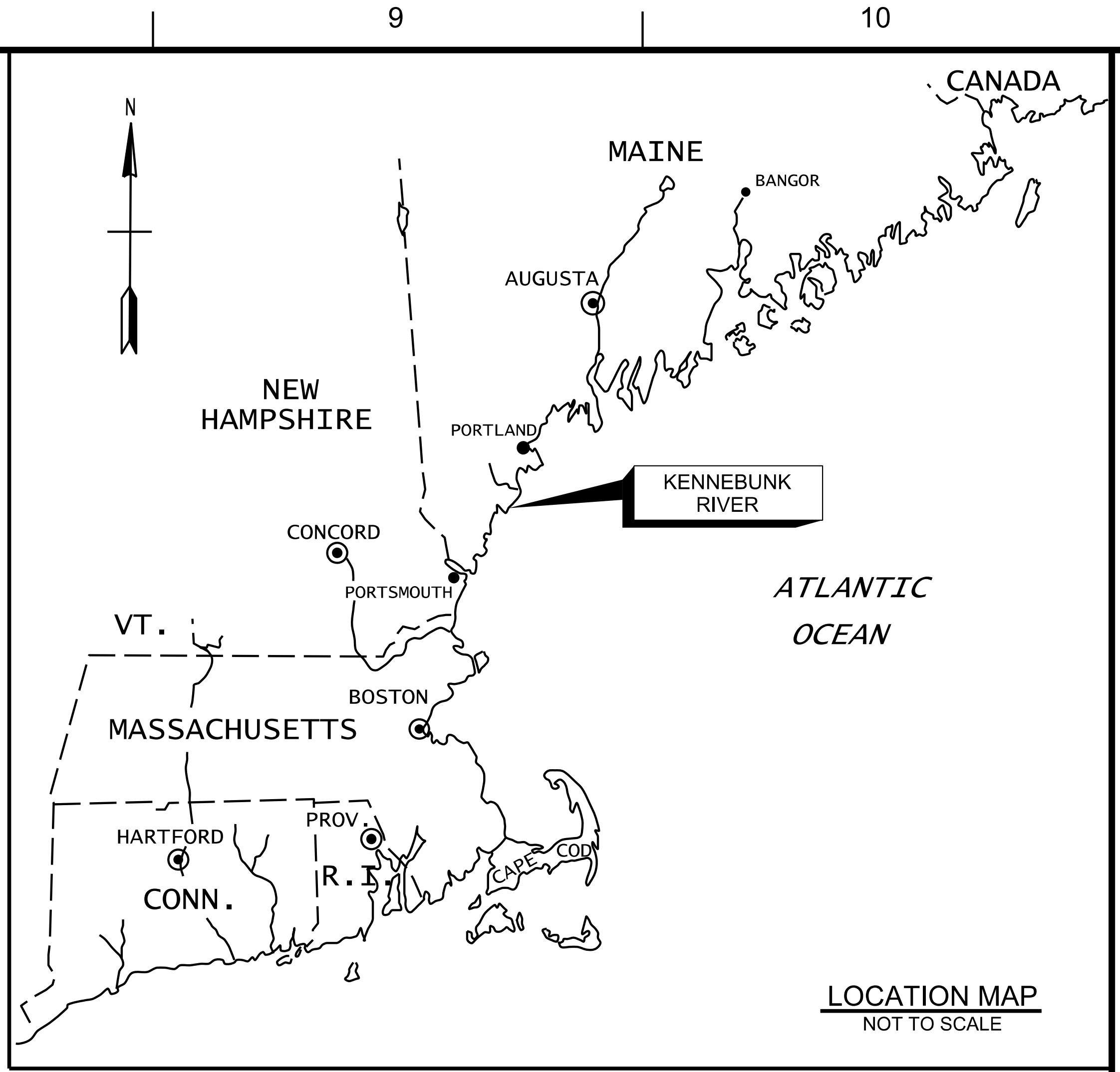
GENERAL NOTES:

1. KENNEBUNK RIVER (CENAE_ME_63_KNR) SEE SHEET V-001. REACH NAMES: 8-FOOT CHANNEL, 6-FOOT CHANNEL REACH 1, 6-FOOT CHANNEL REACH 2, 6-FOOT EAST ANCHORAGE, AND 6-FOOT WEST ANCHORAGE.

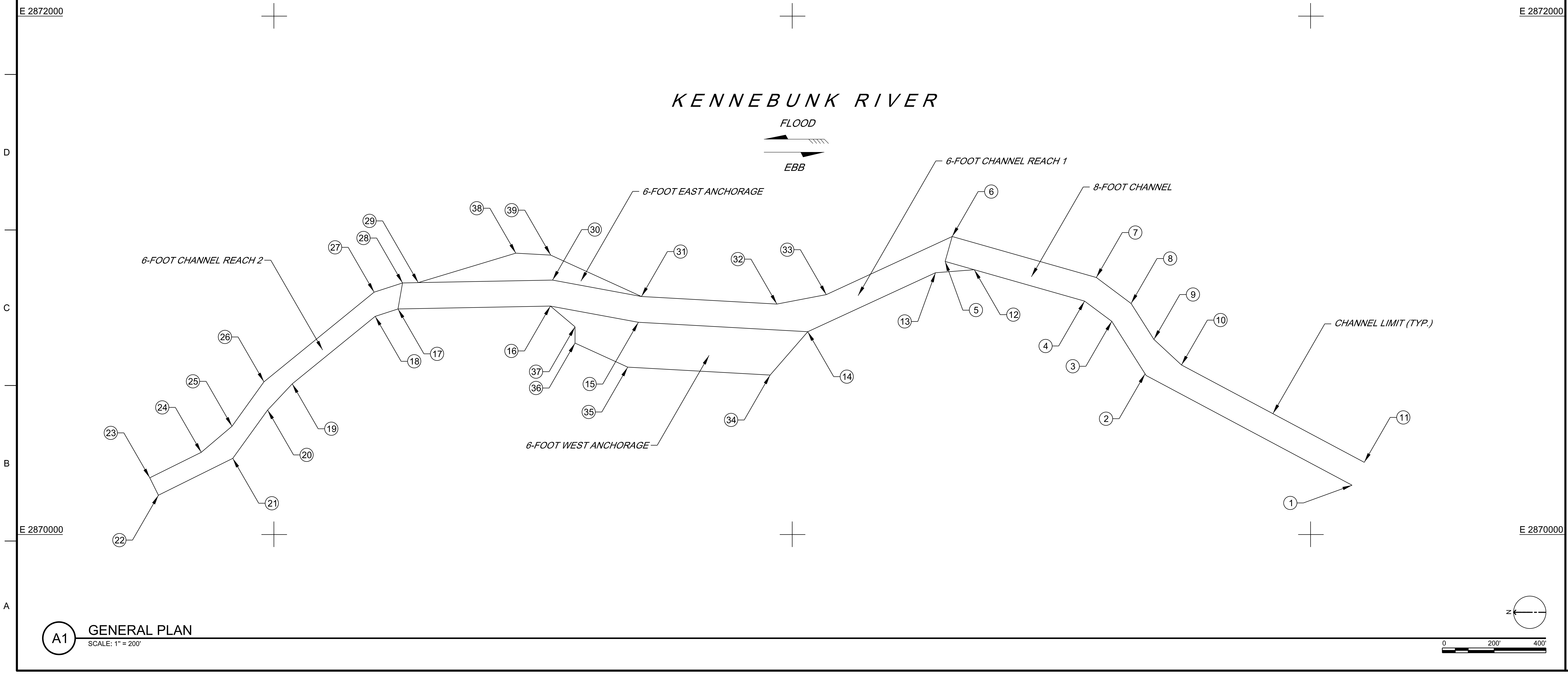
2. FOR HYDROGRAPHIC SURVEY INFORMATION SEE USACE HYRDROGRAPHIC SURVEYS (EHYDRO) WEB SITE:

USACE DISTRICT	USACE CHANNEL	CHANNEL ID
NAE	KENNEBUNK RIVER	CENAE_ME_63_KNR

3. COORDINATES SHOWN ARE BASED ON THE LAMBERT GRID SYSTEM FOR THE STATE OF MAINE WEST ZONE (1802), NAD 1983 AND ARE BASED ON U.S. SURVEY FEET.



LOCATION MAP
NOT TO SCALE



A1 GENERAL PLAN
SCALE: 1" = 200'

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD, MA 01742-2751

DWN BY: EMA
CHK BY:
ISSUE DATE:
REVIEWED BY: ZSM
Asst. Chief, Survey Sec.
SOLICITATION NO.:
APPROVED BY:
Chief, Survey Section
CONTRACT NO.:
SIZE: ANSI D
SCALE: 1:1
DRAWING CODE: ME_63_KNR_NP_2020
SHEET 1 OF 1

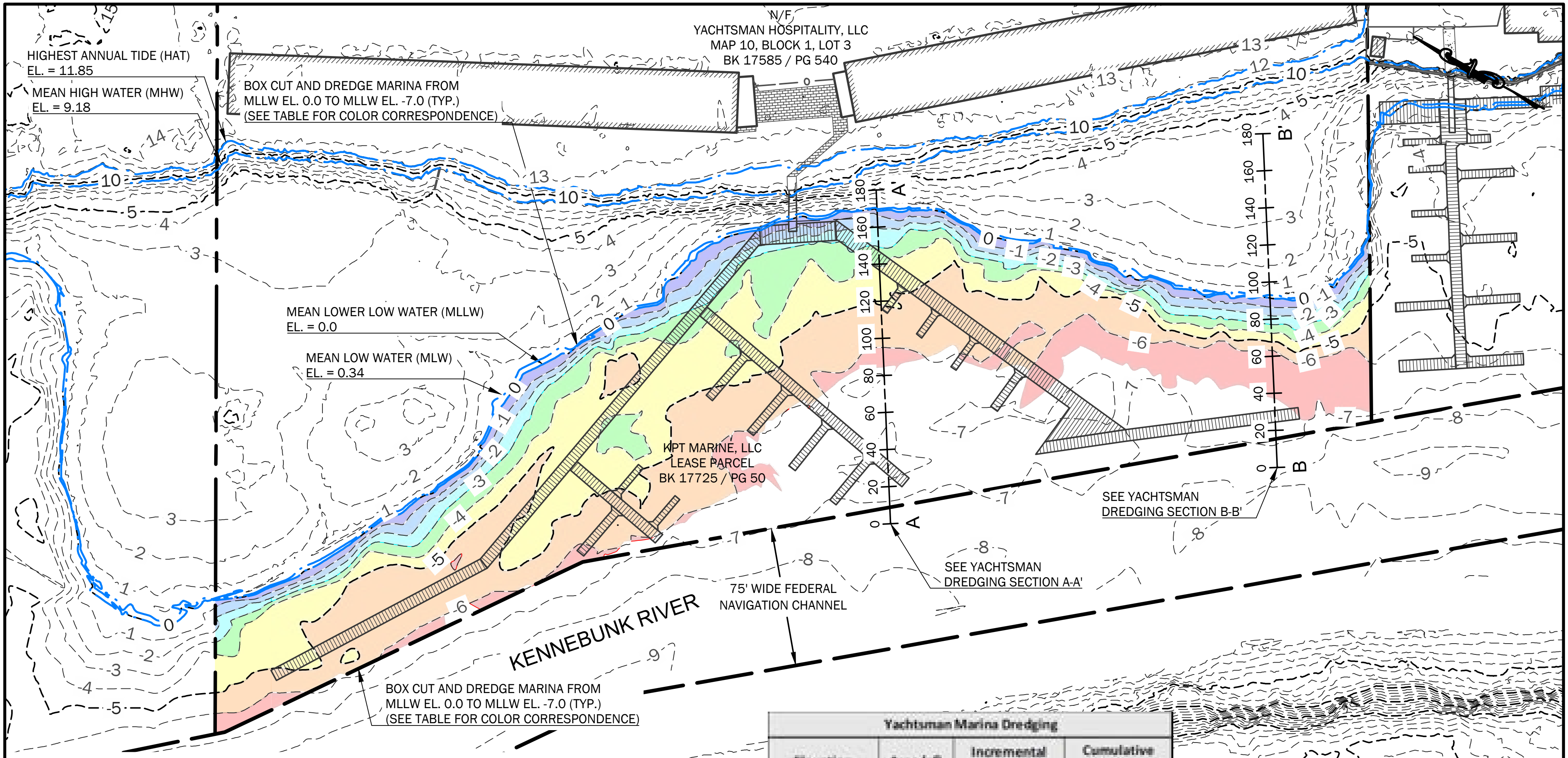
KENNERBUNK RIVER
KENNEBUNKC AND KENNEBUNKPORT, MAINE
FEDERAL NAVIGATION PROJECT

6 AND 8-FOOT CHANNELS
6-FOOT ANCHORAGE

SHEET ID
V-001

pw://COE-NAEPWP01CON.nae.ds.usace.army.mil:coe-naepwp01con.nae.ds.usace.army.mil/Documents/Civil Works/Navigation/ME/Kennebunk River/_2020 Federal Navigation Project (ME_63_KNR_NP_2020)/ProjectData/CAD_BIM/_Sheets/ME_63_KNR_NP_2020_V-001.dgn
10:31:39 AM 3/9/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

Attachment 2 – Dredging Figures



Yachtsman Marina Dredging			
Elevation	Area (sf)	Incremental Volume (cu. yd.)	Cumulative Volume (cu. yd.)
0 to -1	2,610	55	55
-1 to -2	5,415	160	215
-2 to -3	8,635	285	500
-3 to -4	14,310	455	955
-4 to -5	26,850	795	1,750
-5 to -6	43,420	1,350	3,100
-6 to -7	49,740	2,020	5,120
Total Dredge Volume w/ 25% Bulking Factor			6,400 cu. yd.

PLAN REFERENCES:

1. BATHYMETRY CONDUCTED BY WEA ON NOVEMBER 17, 2023 USING A HYDROLITE SONARMITE ECHOSOUNDER AND CARLSON BRx7 GNSS RECEIVER.
2. TOPOGRAPHIC DATA COLLECTED BY WEA VIA A DJI M300 DRONE EQUIPPED WITH A ZENMUSE L1 LIDAR CAMERA ON NOVEMBER 21, 2023.
3. ALL ELEVATIONS ON THIS PLAN ARE BASED ON THE MLLW VERTICAL DATUM. ELEVATIONS IN NAVD88 HAVE BEEN RAISED BY 5.15 FEET TO THE MLLW DATUM.A PLAN TITLED "BOUNDARY SURVEY AT YACHTSMAN LODGE & MARINA" PREPARED BY OWEN HASKELL, INC. OF 390 U.S. ROUTE ONE, UNIT 10, FALMOUTH, MAINE 04105, DATED APRIL 26, 2018.
4. A PLAN TITLED "SITE PLAN SHOWING THE PROPERTY OF THE KENNEBUNKPORT MARINA" PREPARED BY WILLIAM PIERCE OF 6 WATERHOUSE ROAD, DAYTON, MAINE 04005, DATED NOVEMBER 1, 1995
5. A PLAN TITLED " KENNEBUNK RIVER KENNEBUNK AND KENNEBUNKPORT MAINE AFTER DREDGE SURVEY" PREPARED BY U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DISTRICT DATED MARCH 9, 2020.
6. A PLAN TITLED "DOCK PLAN" PREPARED BY REILLY STUDIOS OF 959 ISLINGTON STREET, PORTSMOUTH, NEW HAMPSHIRE 03801, DATED MARCH 4, 2008.

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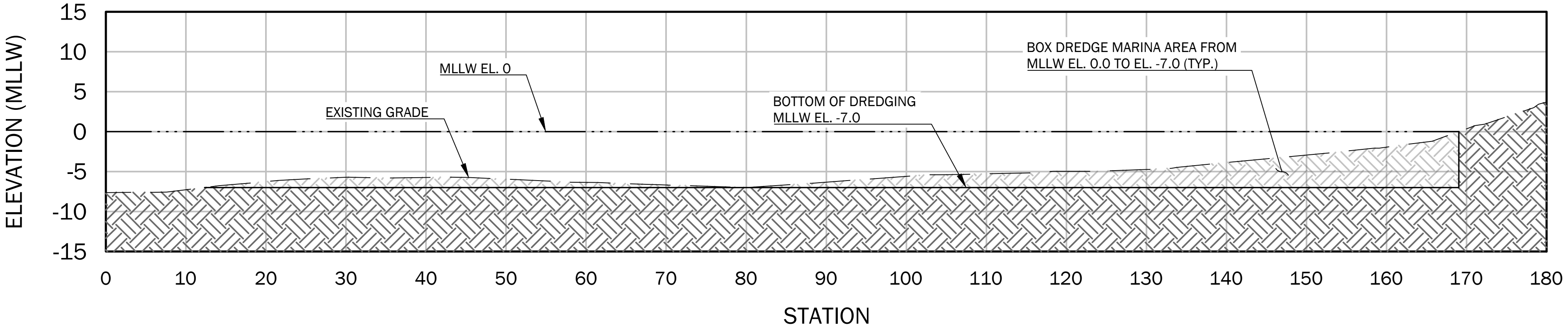
YACHTSMAN MARINA DREDGING

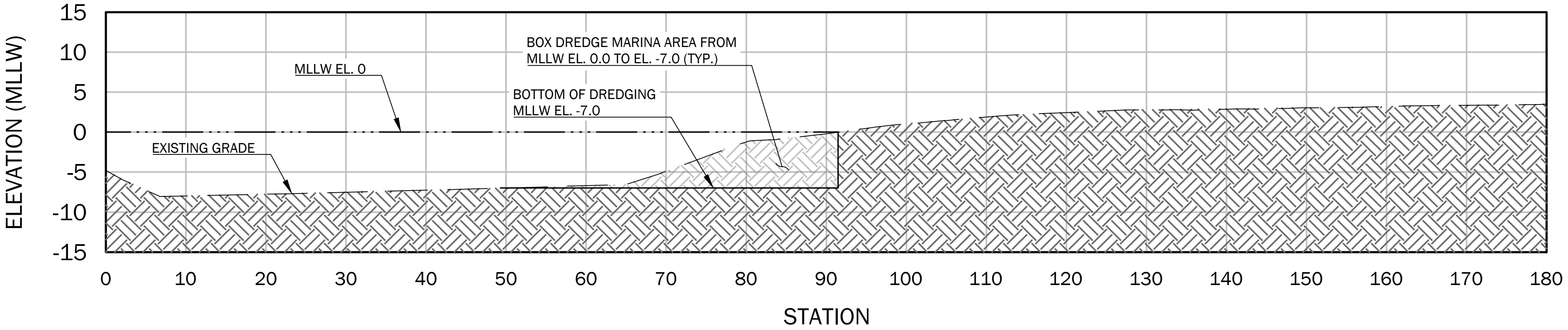
57 OCEAN AVE.
KENNEBUNKPORT, ME 04046

Sheet Title:
FIG 1: PLAN VIEW

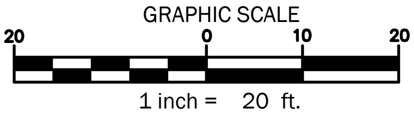
Job No.:	643.1
Date:	OCT. 29, 2024
Scale:	1" = 80'
Drawn:	CAR/MNW
Checked:	WRW



Yachtsman Dredging Section A-A'



Yachtsman Dredging Section B-B'



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YACHTSMAN MARINA DREDGING

57 OCEAN AVE.
KENNEBUNKPORT, ME 04046

Sheet Title:
FIG 2:
SECTION VIEW

Job No.:	643.1
Date:	OCT. 29, 2024
Scale:	1" = 20'
Drawn:	CAR/MNW
Checked:	WRW

Attachment 3 – Alternatives Analysis

3.0 Alternatives Analysis

Dredging Alternatives Analysis

WEA studied several alternatives for the Yachtsman Marina dredging project, all evaluated against its purpose and need. The project's purpose is to dredge and dispose of dredged material from the site in an efficient, environmentally cautious, and effective manner; the project's need is to provide the Yachtsman Marina with safe navigation and anchoring conditions for watercraft.

The existing conditions and dredging alternatives analysis are described in the following narrative:

Existing Conditions

The Yachtsman Marina (site) encompasses approximately 1.70 acres of land. Ocean Avenue and Silas Perkins Park border the property to the north; Ocean Avenue borders the site to the east; the Kennebunkport Marina is located south of the property; and the Kennebunk River borders the property to the west.

Alternative 1 – No Action

WEA investigated the possibility of not dredging, however, the project's purpose is to provide effective navigation for watercraft and boat slips at the Yachtsman Marina. If Alternative 1 is utilized, the club members and guest mariners will not be able to safely navigate to the boat slips. The area would continue to fill in with sediment and eventually the mooring and docking space would become unusable. Alternative 1 is not practicable as it would eventually force the Yachtsman Marina to close due to unsafe navigation and does not satisfy the project need.

Alternative 2 – Reduced Dredge

WEA investigated the option of dredging 50% less than the proposed amount of 6,400 cubic yards. Though there may be a slight environmental benefit to dredging less (a smaller area would be disturbed and the length of dredging activities would be reduced), the dredged area would quickly fill in again within a few years, requiring the area to be dredged again sooner than if the area was dredged to elevation -6.0 feet. Again, this would not allow the club members and others to navigate or use the docks in a safe manner. Alternative 2 would not advance the project's need.

Alternative 3 – Full Dredge

WEA investigated the option of fully dredging the marina to the proposed elevation of -6.0 feet mean low water, totaling 6,400 cubic yards of dredge material. The dredging will provide adequate sediment removal for boat owners to navigate safely for 6-8 years at the current rate of sedimentation, and therefore has been selected as the most appropriate alternative for this project to meet the project's purpose and need.

Selection

Given the information above, Alternative 3 was selected as the most appropriate alternative for the project. This alternative will provide the maximum efficiency of dredging and will optimize the time between necessary dredging events.

Dredge Material Disposal Alternatives Analysis

The USACE approved a Sampling and Analysis Plan (SAP) for the project on January 21, 2022, which provided proposed sediment sampling locations, methods, and testing criteria to determine disposal suitability. The sampling results were submitted to the USACE for the Yachtsman Marina and the nearby Arundel Yacht Club, Kennebunkport Marina, and Kennebunk River Club. The USACE issued a Suitability Determination for all 4 sites on June 10, 2024, which documents the suitability of the dredged material for disposal at the Isle of Shoals North (IOSN) open water disposal site.

It is WEA's understanding that the USACE requires Individual Standard Permit applicants to conduct an alternatives analysis to evaluate options for disposal of dredged material. In order of disposal method preference, the USACE favors onshore disposal, followed by beneficial use, and then open water placement.

The dredge material disposal alternatives analysis is described in the following narrative:

Alternative A – Onshore Disposal

Onshore Disposal – Storage of Material at the Yachtsman Marina

WEA investigated the option of onshore disposal of the 6,400 cubic yards of dredged materials from the Yachtsman Marina. The Yachtsman Marina encompasses approximately 1.70 acres of land, as shown in the aerial site map attached to this Alternatives Analysis as Figure 1. Due to the layout of the Yachtsman Marina lot, there is minimal space available to conduct onshore disposal operations at the site.

Logistically, to conduct onshore disposal of the dredged material, the following steps would need to be taken:

- Use barge-mounted dredging equipment to dredge sediment.
- Place the dredged material onshore into a stockpile or a large container from the dredge barge.
  - As shown in the attached aerial site map, the largest area available for a stockpile of dredged materials is located within a 26-foot by 26-foot grassed area between the Yachtsman Marina/Hotel buildings. If a 4-foot walkway is kept clear around the stockpile, the allowable diameter of the stockpile would be 18 feet (therefore the allowable radius would be 9 feet). Using the following standard soil stockpile volume equation, the required height of a 6,400 cubic yard (172,800 cubic feet) stockpile would need to be 2,037 feet tall, which is infeasible.
    - $Volume = \frac{1}{3} \times \pi \times Radius^2 \times Height \rightarrow$
    - $Height = Volume \times 3 \times \frac{1}{\pi} \times \frac{1}{Radius^2} \rightarrow$
    - $Height = 172{,}800 ft^3 \times 3 \times \frac{1}{\pi} \times \frac{1}{(9ft)^2} = 2{,}037\ ft$
  - In addition, this step is infeasible due to the layout of the Yachtsman Marina's dock/boat slips; the closest a dredge barge could get to the "open space" located to the between the Yachtsman Marina buildings is at least 70 feet away, requiring the dredging equipment to have a very large reach.

- Give the dredged sediment appropriate time to dewater.
- Load dried dredged sediment into dump trucks or roll-off containers and haul offsite to a final disposal location.
    - Dump trucks have an approximately 20 cubic yard capacity and roll-off containers have a maximum capacity of 40 cubic yards. With these capacities, the hauling and disposal of the dried dredged sediment would require approximately 320 or 160 truckloads, respectively. The hauling of sediment would be infeasible due to major increases in project duration and costs.
    - In addition, because the proposed and allowable dredging window occurs during winter, local roadways will be posted for heavy truck traffic, which would likely require hauling vehicles to reduce the quantity of sediment they can transport at once.

As documented above, onshore disposal of dredged sediment using the Yachtsman Marina site is infeasible due to site constraints and sediment hauling duration/costs. As mentioned, an aerial map of the site is included as Figure 1 in this Alternatives Analysis for reference.

Onshore Disposal – Storage of Material at Alternative Locations on the Kennebunk River

The proposed dredge volume for the Yachtsman Marina is 6,400 cubic yards, or 172,800 cubic feet. Area estimates for storing the dredged material in a stockpile or in roll-off dumpsters for dewatering are described below. Dewatering the dredged sediment could take anywhere from a couple days to a couple weeks.

Storage via Stockpile

It is assumed that acceptable side slopes for a stockpile of wet, silty sediment would be between 4:1 and 5:1 (horizontal to vertical), and an acceptable stockpile height would be between 20 and 25 feet. Using these criteria and the estimated dredge volume of 172,800 cubic feet, the diameter of the stockpile needed to store the dredged material would be approximately 180 feet. It is assumed that around 20 feet of additional space would be required around the perimeter of the stockpile for erosion and sedimentation controls, dewatering materials, and equipment access, increasing the diameter of the storage area to 220 feet. Figure 2, included with this Alternatives Analysis, shows what a 220-foot diameter stockpile would look like on nearby facilities with open space along the Kennebunk River; there are no facilities with adequate space to accommodate the stockpile storage area. In addition, the Yachtsman Marina does not have control or interest in any of the nearby facilities along the Kennebunk River shown in Figure 2, with the exception of the Kennebunkport Marina at 67 Ocean Avenue, which also does not have adequate space to accommodate the stockpile storage area.

Storage via Roll-Off Dumpster

The largest readily available roll-off dumpster size is 40 cubic yards. It is assumed that wet sediment dumped into a roll-off dumpster to dewater would contain about 20-percent water, which would reduce the soil capacity in the dumpster to 32 cubic yards. With this assumption, it would require 200 dumpsters to store 6,400 cubic yards of sediment. Each roll-off dumpster is 22 feet long by 7.5 feet wide; adding a 5-foot walking area around the roll-off would increase the footprint of each roll-off to 27 feet by 12.5 feet, or 337.5 square feet. The total space required for 200 roll-off dumpsters would be approximately 67,500 square feet. Figure 3, included with this Alternatives

Analysis, shows what an 67,500 square foot roll-off dumpster storage area would look like on nearby facilities with open space along the Kennebunk River; there are no facilities with adequate space to accommodate the roll-off storage area. In addition, the Yachtsman Marina does not have control or interest in any of the nearby facilities along the Kennebunk River shown in Figure 3, with the exception of the Kennebunkport Marina at 67 Ocean Avenue, which also does not have adequate space to accommodate the roll-off storage area.

Onshore Disposal – Disposal Location Alternatives

As stated above, it is infeasible to get the dredged material onshore for dewatering and subsequent hauling to a disposal location at the Yachtsman Marina and other nearby facilities along the Kennebunk River. As a result, the following onshore disposal location alternatives are also considered infeasible:

- Landfill
    - This alternative is also infeasible due to the estimated cost to dispose of the material at a landfill. Tipping and hauling fees for material disposal would likely be between $75 and $100 per cubic yard, totaling around $480,000 to $640,000 for disposal of 6,400 cubic yards of material.
    - The Juniper Ridge Landfill in Alton/Old Town, Maine and the Waste Management Crossroads Landfill in Norridgewock, Maine currently do not have sufficient capacity to accommodate the dredge materials and the increase in daily traffic to dispose of the dredge materials. The Waste Management Turnkey Landfill in Rochester, NH could accommodate the materials, however, as documented above, this option is both infeasible due to inability to get the dredge material upland, and cost prohibitive.
- Well injection
    - The Environmental Protection Agency's "General Information About Injection Wells" webpage states that injected fluids may include "water, wastewater, brine (salt water), or water mixed with chemicals." The dredged materials will consist of silty sediment and therefore well injection is not a feasible disposal alternative.
    - In addition, the Maine Department of Environmental Protection's Underground Injection Control (UIC) Program webpage states that Class I, II, III, and IV injections wells are prohibited in Maine.
- Incineration
    - This alternative is also infeasible due to the estimated cost to incinerate soils. Hauling and incineration fees would likely be around $700 per cubic yard, totaling around $4.5M for the incineration of 6,400 cubic yards of material. (Source: Federal Remediation Technologies Roundtable Screening Matrix and Reference Guide, Version 4.0, Section 4.22 Incineration.) In addition, it appears that the closest soil incineration facilities to the Yachtsman Marina are in Illinois or Arkansas.
- Spread of material over open ground
    - This alternative is also infeasible because the Yachtsman Marina does not have access to a land area appropriate for spreading the material over open ground. Spreading 172,800 cubic feet of soil across a land area would consist of: 1 foot of sediment spread across a 172,800 square foot (~4 acre) land area; or 6 inches of sediment spread across a 345,600 square foot (~7.9 acre) land area.

- Additional biological, chemical, or physical treatment of intermediate or final waste streams
    - Additional treatment of the dredged sediment would not increase the feasibility of onshore disposal.

Alternative B – Beneficial Use

WEA used the USACE's New England District Beneficial Use Planning Tool (Tool) to identify potential beneficial use dredge material disposal sites within a 30-mile radius of the project site, which is the distance from the Yachtsman Marina to the IOSN open water disposal site. The Tool identified 17 potential beneficial use sites; an analysis of the suitability of each of these sites is as follows:

- Beach Nourishment (4 sites – Wells Beach, Drakes Island Beach, Camp Ellis, Western Beach)
    - A representative from the USACE confirmed that all beach nourishment projects require sand, whereas the dredged material from the Kennebunk River will be primarily silt. Therefore, beneficial use of dredged material at the beach nourishment sites is infeasible.
- Construction and Industrial or Commercial Uses (2 sites – Cobble Berm in Ogunquit, ME and Dune Erosion/Stormwater Improvements in Wells, ME)
    - The two construction projects require cobble and sand materials, respectively, whereas the material dredged from the Kennebunk River will be primarily silt. Therefore, beneficial use of dredged material at the construction sites is infeasible.
- Nearshore Berm (6 sites – Wallis Sands, Wells, Goochs Beach, Kennebunk River, Saco, and Little River Rock Disposal Sites)
    - A representative from the USACE confirmed that all nearshore berm projects require sand, whereas the dredged material from the Kennebunk River will be primarily silt. Therefore, beneficial use of dredged material at nearshore berm sites is infeasible.
- Salt Marshes (5 sites – Piscataqua, Ogunquit/Rachel Carson National Wildlife Refuge, Webhannet, and Little River Salt Marsh Priority Areas Accepting Sediment; and Goosefare Salt Marsh)
    - Piscataqua Salt Marsh Priority Area: A representative from the New Hampshire Division of Environmental Services (NHDES) stated that the Piscataqua Salt Marsh is not a potential dredge disposal site.
    - Ogunquit/Rachel Carson National Wildlife Refuge, Webhannet, and Little River Salt Marsh Priority Areas Accepting Sediment and Goosefare Salt Marsh: A representative from the U.S. Fish and Wildlife Service (USFWS) stated that the State of Maine's current regulations and permitting processes do not allow the use of dredged materials on salt marshes.
    - Beneficial use of dredged material at salt marsh sites is infeasible.

A summary of the 17 potential beneficial use sites is included as Table 1, attached to this Alternatives Analysis along with a list of references and copies of relevant email communications.

Alternative C – Open Water Placement

Open Water Placement – Saco Bay Open Water Disposal Site

In order to get Maine DEP's approval for disposal at the Saco Bay Open Water Disposal Site, additional benthic environment testing of the river sediment is required. The time it will take to conduct the additional sediment testing and analysis, to receive an updated Suitability Determination for Saco Bay from the USACE, and to receive permit approvals for dredging from the USACE and Maine DEP would push the dredging activities to the Winter 2026-2027 dredge window. The Yachtsman Marina has a critical need to conduct their maintenance dredging in the Winter 2025-2026 dredge window, as boats at their marina are already experiencing navigation challenges due to river sediment accumulation at the marina. As a result, consideration of the Saco Bay Disposal Site is not a feasible alternative for this round of maintenance dredging.

Open Water Placement – Isle of Shoals North Open Water Disposal Site

As stated above, the USACE issued a Suitability Determination for the Yachtsman Marina and the nearby Arundel Yacht Club, Kennebunkport Marina, and Kennebunk River Club on June 10, 2024, which documents the suitability of the dredged material for disposal at the IOSN open water disposal site.

Selection

Due to the infeasibility of disposing of dredged material onshore and there being no beneficial use sites suitable for disposal, Alternative C, open water placement at IOSN, was selected as the most appropriate alternative for the project.

Figures

Yachtsman Marina

57 Ocean Avenue, Kennebunkport, ME

Approximate limits of "open space" for stockpile placement

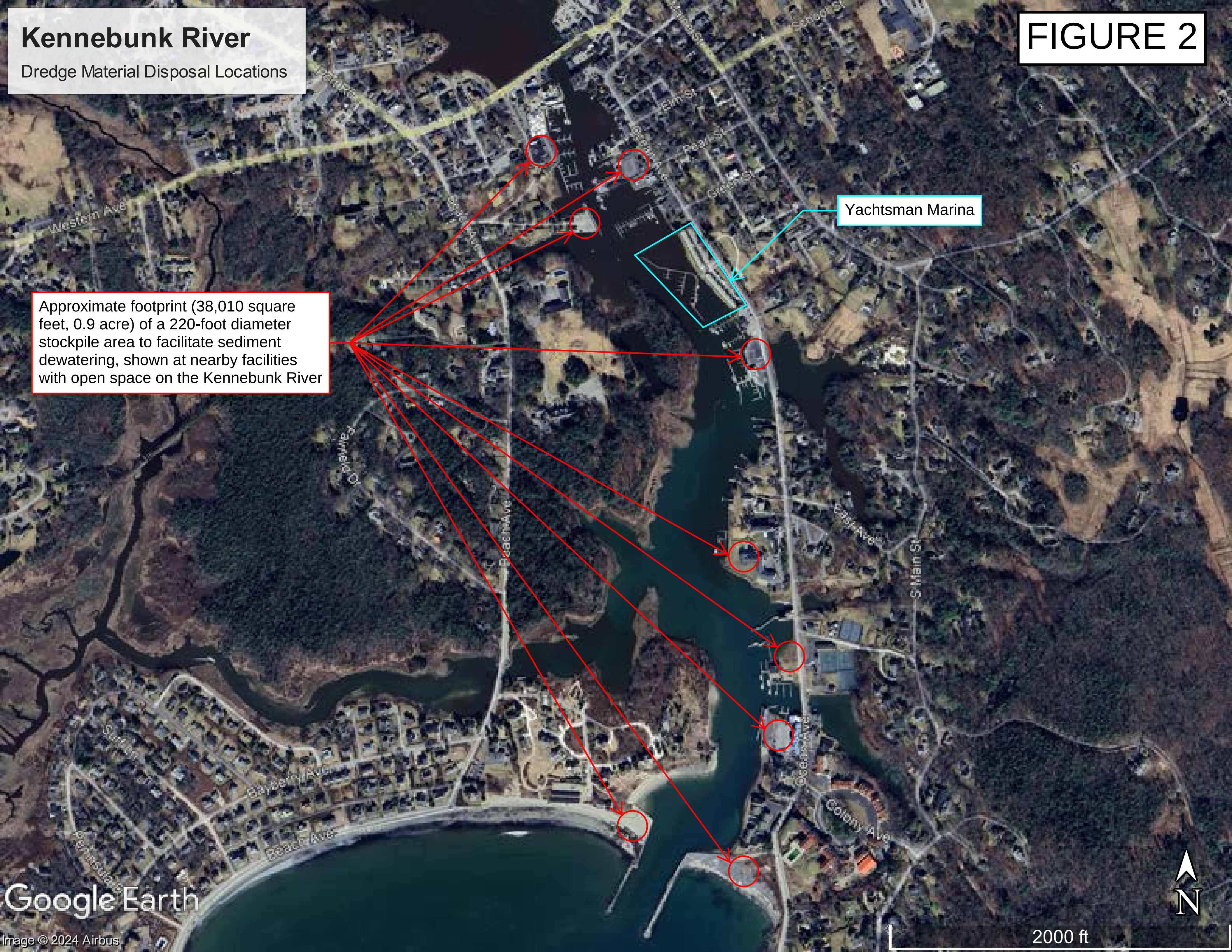
Approximate limits of 9-foot radius stockpile

Approximate location of the closest a dredge barge could get to the site

Kennebunk River

Dredge Material Disposal Locations

FIGURE 2



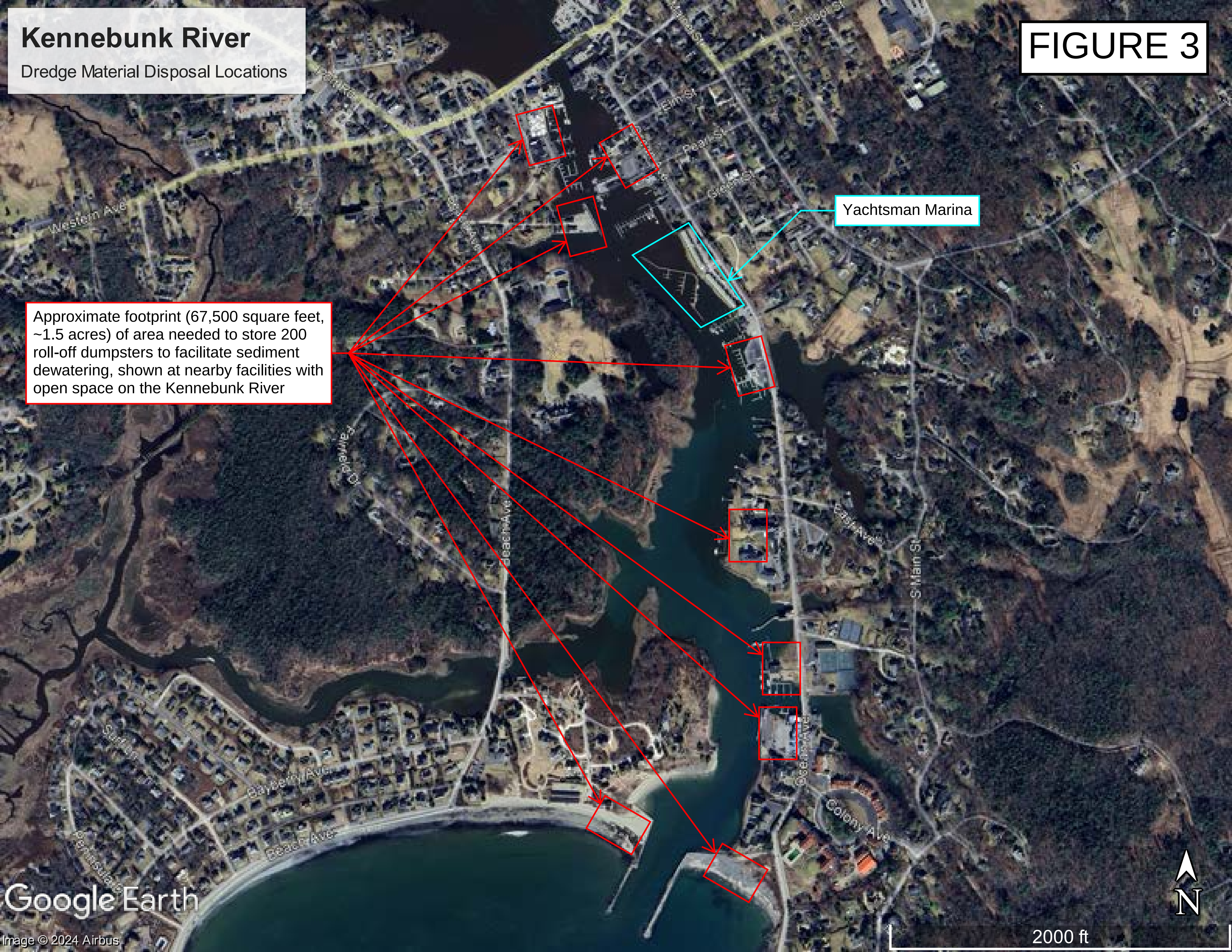
Approximate footprint (38,010 square feet, 0.9 acre) of a 220-foot diameter stockpile area to facilitate sediment dewatering, shown at nearby facilities with open space on the Kennebunk River

Yachtsman Marina

FIGURE 3

Kennebunk River

Dredge Material Disposal Locations



Approximate footprint (67,500 square feet, ~1.5 acres) of area needed to store 200 roll-off dumpsters to facilitate sediment dewatering, shown at nearby facilities with open space on the Kennebunk River

Tables

Table 1: Dredge Material Disposal Beneficial Use Alternatives – Yachtsman Marina

Table 1
Dredge Material Disposal Beneficial Use Alternatives - Yachtsman Marina
Summary Table & References

Project Name[1]	Project Category	Location	Coordinates	Contact	Feasible Disposal Location?	Reasoning
Wells Beach	Beach Nourishment	Wells, ME	43.311208N -70.561063W	USACE	No	Beach nourishment projects require sand; dredged material from the Kennebunk River will be primarily silt.[4,5]
Drakes Island Beach	Beach Nourishment	Wells, ME	43.321900N -70.552082W	USACE	No	Beach nourishment projects require sand; dredged material from the Kennebunk River will be primarily silt.[4,5]
Camp Ellis	Beach Nourishment	Saco, ME	43.466204N -70.381264W	USACE	No	This beach nourishment project requires "sandy shoal material," and dredged material from the Kennebunk River will be primarily silt.[4,5,6]
Western Beach	Beach Nourishment	Scarborough, ME	43.539528N -70.321888W	USACE	No	Beach nourishment projects require sand; dredged material from the Kennebunk River will be primarily silt.[4,5]
Cobble Berm	Construction and Industrial or Commercial Uses	Ogunquit, ME	43.236523N -70.589087W	USACE	No	Project requires cobble, and dredged material from the Kennebunk River will be primarily silt.
Dune Erosion and Stormwater Improvements	Construction and Industrial or Commercial Uses	Wells, ME	43.248998N -70.595158W	USACE	No	Dune requires sand, and dredged material from the Kennebunk River will be primarily silt.
Wallis Sands Disposal Site	Nearshore Berm	Rye, NH	43.020324N -70.726276W	USACE	No	Nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5]
Wells Nearshore Disposal Site	Nearshore Berm	Wells, ME	43.307605N -70.560229W	USACE	No	20,000 CY of dredged "sandy" material from the 2020 Wells Harbor federal navigation project was placed here; however, nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5,6]
Goochs Beach Nearshore Site	Nearshore Berm	Kennebunkport, ME	43.345503N -70.481053W	USACE	No	20,000 CY of dredged material from the 2020 Kennebunk/Kennebunkport federal navigation project was placed here; however, nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5,6]
Kennebunk River Disposal Site	Nearshore Berm	Kennebunkport, ME	43.345134N -70.479100W	USACE	No	Nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5]
Saco Nearshore Disposal Site	Nearshore Berm	Saco, ME	43.467543N -70.366173W	USACE	No	Nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5]
Little River Rock Nearshore	Nearshore Berm	Saco, ME	43.518925N -70.364468W	USACE	No	Nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5]
Piscataqua Salt Marsh Priority Area[2]	Salt Marsh Priority Area	Rye, NH	--	USFWS	No	Piscataqua Salt Marsh is not a potential dredge disposal site.[7]
Ogunquit Salt Marsh Priority Area/Rachel Carson National Wildlife Refuge[3]	Salt Marsh Priority Area	Ogunquit/Wells, ME	--	USFWS	No	Maine state permitting does not allow the use of dredged materials on salt marshes.[8]

Table 1
Dredge Material Disposal Beneficial Use Alternatives - Yachtsman Marina
Summary Table & References

Project Name[1]	Project Category	Location	Coordinates	Contact	Feasible Disposal Location?	Reasoning
Webhannet Salt Marsh Priority Area[3]	Salt Marsh Priority Area	Wells, ME	--	USFWS	No	Maine state permitting does not allow the use of dredged materials on salt marshes.[8]
Little River Salt Marsh Priority Area[3]	Salt Marsh Priority Area	Wells, ME	--	USFWS	No	Maine state permitting does not allow the use of dredged materials on salt marshes.[8]
Goosefare Salt Marsh	Wetland Habitats/Salt Marsh	Saco, ME	43.493752N -70.392875W	USFWS	No	Maine state permitting does not allow the use of dredged materials on salt marshes.[8]

References:

1. USACE New England District Beneficial Use Planning Tool: https://www.arcgis.com/apps/dashboards/4f1c828081684605af2972cb6297dacf
2. New Hampshire Saltmarsh Restoration Priorities for the Saltmarsh Sparrow: https://acjv.org/documents/NH_SALS_comp_guidance_doc.pdf
3. Maine Saltmarsh Restoration Priorities for the Saltmarsh Sparrow: https://acjv.org/documents/ME_SALS_comp_guidance_doc.pdf
4. Email Correspondence Between WEA and USACE, dated August 13, 2024 (attached).
5. Email Correspondence Between WEA and USEPA, dated August 14, 2024 (attached).
6. USACE Update Report - Maine, dated January 31, 2024: https://www.nae.usace.army.mil/Portals/74/ME-UpdateReport_31Jan2024.pdf
7. Email Correspondence Between WEA and NHDES, dated August 19, 2024 (attached).
8. Email Correspondence Between WEA and USFWS, dated August 14, 2024 (attached).

References

1. **Email Correspondence Between WEA and USACE, dated August 13, 2024.**
2. **Email Correspondence Between WEA and USEPA, dated August 14, 2024.**
3. **Email Correspondence Between WEA and NHDES, dated August 19, 2024.**
4. **Email Correspondence Between WEA and USFWS, dated August 14, 2024.**

Leyna Tobey

From: Hopkins, Aaron D CIV USARMY CENAE (USA) <Aaron.D.Hopkins@usace.army.mil>
Sent: Tuesday, August 13, 2024 12:44 PM
To: Leyna Tobey; Saloio, Gabriella J CIV USARMY CEHQ (USA)
Subject: RE: Beneficial Use Sites for Dredging

Hi Leyna,

I got your voicemail the other day and I apologize for not returning your call yet.

Great to see that you used the Beneficial Use of Dredged Material Planning Tool as a screening step for your project. You are correct about the beach nourishment sites needing sandy material – and the same can be said for the nearshore berm sites you identified in the Planning Map as those are intended to be feeder berms for the adjacent beaches. The openwater sites in your list are included in the Planning Map to compare openwater disposal alternatives and are not considered beneficial use themselves. That leaves the five salt marsh sites on your list which are all potential restoration sites from the USFWS. I would suggest you reach out to the contacts in the Atlantic Coast Joint Venture reference at USFWS or Maine Dept of Inland Fisheries and Wildlife to see if there are any potential beneficial uses for your project at those sites. We were able to provide some dredged material recently to the Rachel Carson National Wildlife Refuge in Wells, ME for a small beneficial use project.

Aaron

Aaron Hopkins
DAMOS Program Manager
US Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742
978.318.8973

From: Leyna Tobey <leyna@Walsh-eng.com>
Sent: Tuesday, August 13, 2024 10:54 AM
To: Saloio, Gabriella J CIV USARMY CEHQ (USA) <Gabriella.J.Saloio@usace.army.mil>; Hopkins, Aaron D CIV USARMY CENAE (USA) <Aaron.D.Hopkins@usace.army.mil>
Subject: [Non-DoD Source] Beneficial Use Sites for Dredging

Good morning Gabriella and Aaron,

I am working on permitting a dredging project for several marinas on the lower Kennebunk River in Kennebunk, ME, and am currently conducting an alternatives analysis on where to dispose of the 25,000 CY of silty dredge material. I used the Army Corp's Beneficial Use of Dredged Material Planning Tool and found the potential disposal locations in the attached spreadsheet within a 30-mile radius of the project site.

As Gabriella is listed as the ACOE contact for several of the disposal locations and Aaron is listed at the contact for the DAMOS Beneficial Use Planning Map, I was hoping either of you would be able to provide me with some details for the disposal sites listed in the attached spreadsheet (e.g. if they are accepting materials, what types of materials they are accepting, timeline for acceptance, etc.) or could point me in the right direction to another contact to reach out to. (Note that the attached spreadsheet does not include any beach nourishment projects, as those projects are assumed to need sand and the material we will be dredging is primarily silt.)

Please give me a call to discuss if that would be easier. Thanks in advance!

Leyna

Leyna Tobey, PE*
Project Manager | Civil Engineer
*Licensed in MA

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Leyna Tobey

From: Wolf, Steven <Wolf.Steven@epa.gov>
Sent: Wednesday, August 14, 2024 10:18 AM
To: Leyna Tobey
Cc: Sterling, Alexa
Subject: FW: Dredged Material Disposal Inquiry
Attachments: 2024-08-12 Dredge Disposal Alternatives Analysis_to EPA.xlsx

Hi Leyna, EPA co-manages the ocean dredged material disposal sites with the Army Corps – the goal of the alternatives analysis is to evaluate other uses of the dredged material rather than just straight disposal. The nearshore sites are considered "beneficial" in that material placed at those sites is integrated into coastal sediment transport and can actually nourish beaches with material under the right hydrodynamic conditions. Unfortunately, as I recall, the material from the projects you referenced contains too high a percentage of fine-grained material to be placed at the nearshore sites. For evaluating the feasibility of using the material as part of salt marsh restoration, I'd direct you back to the Corps and to ME and NH state agencies. I'd suggest starting with Todd Randall at the New England District Corps (todd.a.randall@usace.army.mil) who could provide information on any federal marsh restoration projects as well as the contact information for the states folks involved in marsh restoration. Feel free to reach back it you need additional information - Steve

Steven Wolf | US Environmental Protection Agency, Region 1 (New England)
5 Post Office Square, Suite 100, Mail Code OEP06-1 Boston, MA 02109-3912
Office: 617-918-1617 Mobile: 978-201-1928 wolf.steven@epa.gov

---

From: Leyna Tobey <leyna@Walsh-eng.com>
Sent: Tuesday, August 13, 2024 12:12 PM
To: Sterling, Alexa <Sterling.Alexa@epa.gov>; Wolf, Steven <Wolf.Steven@epa.gov>
Subject: Dredged Material Disposal Inquiry

Good afternoon Alexa and Steven,

I am working on permitting a dredging project for several marinas on the lower Kennebunk River in Kennebunk, ME, and am currently conducting an alternatives analysis on where to dispose of the 25,000 CY of silty dredge material. I used the Army Corp's Beneficial Use of Dredged Material Planning Tool and found the potential disposal locations in the attached spreadsheet within a 30-mile radius of the project site.

As you are both listed on the EPA's website for dredged material disposal, I was hoping either of you would be able to provide me with some details for the disposal sites listed in the attached spreadsheet (e.g. if they are accepting materials, what types of materials they are accepting, timeline for acceptance, etc.) or could point me in the right direction to another contact to reach out to. (Note that the attached spreadsheet does not include any beach nourishment projects, as those projects are assumed to need sand and the material we will be dredging is primarily silt.)

Please give me a call to discuss if that would be easier. Thanks in advance!

Leyna

Leyna Tobey, PE*
Project Manager | Civil Engineer
*Licensed in MA

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Leyna Tobey

From:	Lucey, Kevin <kevin.p.lucey@des.nh.gov>
Sent:	Monday, August 19, 2024 11:59 AM
To:	Leyna Tobey; tracy@rockinghamccd.org
Subject:	RE: Piscataqua Saltmarsh Restoration Inquiry
Follow Up Flag:	Follow up
Flag Status:	Flagged

Hi Leyna,
There are only 3 NH sites listed as Beneficial Use Sites (Seabrook Beach, Hampton Beach, and Wallis Sands Offshore Berm). The "Piscataqua Salt Marsh" is not a potential dredge disposal site. Its included on the USACE mapper because it is a USFWS Priority for Salt Marsh. NH has not yet undertaken any sediment placement projects on tidal wetlands.

I don't know much about it, but I understand that there is a dredge sediment reuse project at the Webhannet Salt Marsh in Wells.

Good luck,
Kevin Lucey, Habitat Coordinator
Coastal Program | Watershed Management Bureau | Water Division
New Hampshire Department of Environmental Services
222 International Drive, Suite 175
Portsmouth, NH 03801
603-559-0026
kevin.p.lucey@des.nh.gov

From: Leyna Tobey <leyna@Walsh-eng.com>
Sent: Tuesday, August 13, 2024 1:53 PM
To: Lucey, Kevin <kevin.p.lucey@des.nh.gov>; tracy@rockinghamccd.org
Subject: Piscataqua Saltmarsh Restoration Inquiry

Good afternoon Tracy and Kevin,

I am working on permitting a dredging project for several marinas on the lower Kennebunk River in Kennebunk, ME, and am currently conducting an alternatives analysis on where to dispose of the 25,000 CY of silty dredge material. I used the Army Corp's Beneficial Use of Dredged Material Planning Tool (here) and found that the Piscataqua Saltmarsh is listed as a potential dredge material disposal location.

I saw that you were both listed as contacts for the project on the New Hampshire Saltmarsh Restoration Priorities for the Saltmarsh Sparrow document, and I was hoping either of you would be able to provide me with some details regarding whether you are accepting materials for the Saltmarsh, what types of materials are being accepted, timeline for material acceptance, etc. Or, if you are not the right contacts to be reaching out to, could you please point me in the right direction of who I should be contacting?

Please give me a call to discuss if that would be easier. Thanks in advance!

Leyna

Leyna Tobey, PE*
Project Manager | Civil Engineer
*Licensed in MA

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Leyna Tobey

From: Sanders, Nicole A <nicole_sanders@fws.gov>
Sent: Wednesday, August 14, 2024 9:50 AM
To: Leyna Tobey; danielle.dauria@maine.gov
Cc: Adamowicz, Susan; Stromayer, Karl
Subject: RE: [EXTERNAL] Webhannet Saltmarsh Restoration Inquiry

Hi Leyna,

Thank you for reaching out! Right now, in Maine, state permitting does now allow the use of dredged materials on salt marshes. We are going to pilot the first thin-layer placement on Refuge land in Maine but the reason we are able to do this is because ours is a true pilot study permitted under an innovate pilot program with the Maine DEP. This permitting pathway operates under a pilot solid waste permit. We initiated conversations with the Army Corps and regulators years prior to getting our small (~1,000 cy) amount of clean, sandy sediment. Though it's certainly not out of the question to apply for another thin-layer placement project, it will not be a fast process, and DEP may not permit it at all based on the current regulatory processes. Usually for a pilot, there is only a small amount of sediment used 1-2,000 cubic yards over a ~2 acre area. Still, they may consider scaling up, which is an important part of learning and attempting new restoration techniques in Maine. And, there are salt marsh areas that we have conceptually considered for future thin-layer projects. All comes down to the permitting process! Once our refuge manager, Karl, has returned from annual leave myself, Sue, and Karl can discuss viable options and get back to you. Thanks again for reaching out and thinking of us.

Best,
Nicole

From: Leyna Tobey <leyna@Walsh-eng.com>
Sent: Tuesday, August 13, 2024 2:00 PM
To: Sanders, Nicole A <nicole_sanders@fws.gov>; danielle.dauria@maine.gov
Subject: [EXTERNAL] Webhannet Saltmarsh Restoration Inquiry

Good afternoon Nicole and Danielle,

I am working on permitting a dredging project for several marinas on the lower Kennebunk River in Kennebunk, ME, and am currently conducting an alternatives analysis on where to dispose of the 25,000 CY of silty dredge material. I used the Army Corp's Beneficial Use of Dredged Material Planning Tool (here) and found that the Webhannet River Complex Saltmarsh is listed as a potential dredge material disposal location.

I saw that you were both listed as contacts for the project on the Maine Saltmarsh Restoration Priorities for the Saltmarsh Sparrow document, and I was hoping either of you would be able to provide me with some details regarding whether you are accepting materials for the project(s), what types of materials are being accepted, timeline for material acceptance, etc. Or, if you are not the right contacts to be reaching out to, could you please point me in the right direction of who I should be contacting?

Please give me a call to discuss if that would be easier. Thanks in advance!

Leyna

Leyna Tobey, PE*
Project Manager | Civil Engineer
*Licensed in MA

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Attachment 4 – Site Conditions Report

4.1 – Maine IF&W Beginning with Habitat Map

4.2 – USFWS IPaC Official Species List

4.3 – NOAA Fisheries EFH Mapper Report

4.4 – NOAA Fisheries Greater Atlantic Region ESA Section 7 Map

4.0 Site Conditions Report

The dredging activity will occur at the Yachtsman Marina within the Kennebunk River, which is located approximately 0.75 miles from the mouth of the Kennebunk River.

The shoreline area southeast of the Yachtsman Marina consists of medium riprap placed to prevent bank erosion. The sandy area in front of those walls is completely covered at high tide and is partially exposed at low tide. Minimal rockweed was observed in this area, but no other plant or marine species were noted.

According to the Maine Department of Inland Fisheries & Wildlife (IF&W) Beginning with Habitat website (https://www.maine.gov/ifw/fish-wildlife/wildlife/beginning-with-habitat/maps/index.html), the dredging location is bordered to the northwest and southeast by wetlands identified by the National Wetland Inventory (NWI). The area of the dredging is located in a relatively small area of the Kennebunk River's shellfish growing area.

According to the U.S. Department of Fish & Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) website (https://ipac.ecosphere.fws.gov/), the following are listed species that may occur in the area of the property: the Northern Long-eared Bat, Tricolored Bat, and the Monarch Butterfly.

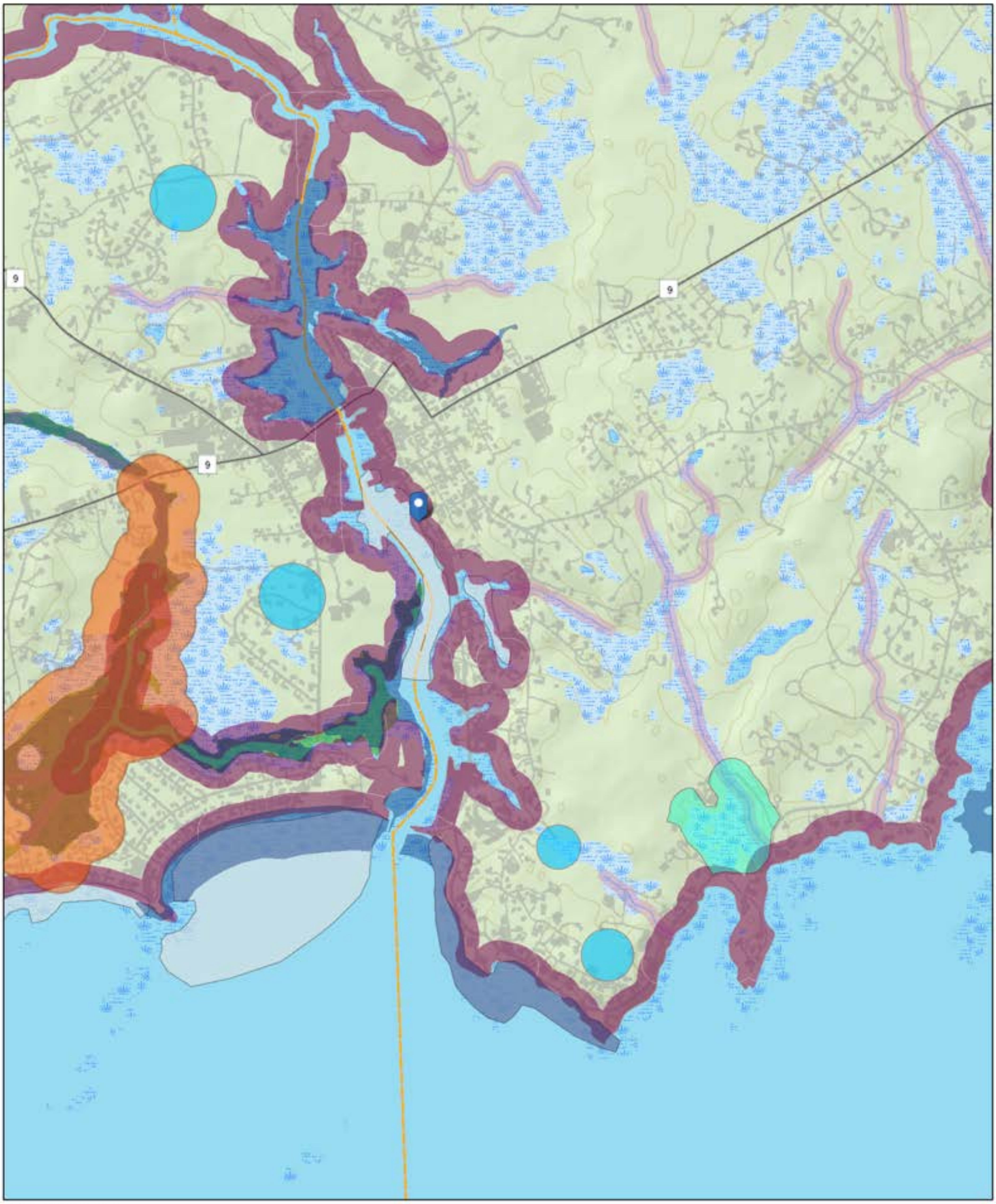
According to the National Oceanic and Atmospheric Administration (NOAA) Fisheries Essential Fish Habitat (EFH) Mapper, the project location is mapped within a New England/Mid-Atlantic EFH for the following species: Acadian redfish (larvae); haddock (juvenile); little skate (adult); monkfish (eggs, larvae, juvenile, adult); silver hake (eggs, larvae, adult); and winter flounder (eggs). The project is likely to have short-term and localized impacts to EFH, with no significant impacts to these habitats anticipated.

According to the NOAA Fisheries Greater Atlantic Region Endangered Species Act (ESA) Section 7 Mapper (Section 7 Mapper), adult and subadult Atlantic sturgeon (threatened/endangered) and adult shortnose sturgeon (endangered) migrate and forage in the Kennebunk River within the limits of the project boundary. The migrating and foraging time of year for the Atlantic sturgeon is identified as all year, however, the Section 7 Mapper notes that the Atlantic sturgeon exhibit seasonal coastal movements in the spring and fall; the migrating and foraging time of year for the shortnose sturgeon is identified as April 1 to November 30.

The Yachtsman Marina dredging work is proposed to take place in winter 2025-2026 and to avoid disturbances to EFH and sturgeon populations to the maximum extent possible. Based on the resource mapping shown, the project will have minimal impact on existing natural resources.

The Kennebunk River (Assessment Unit ID ME0106000301_622 R01) is listed on the Maine Department of Environmental Protection's (DEP's) Final 2018/2020/2022 Integrated Water Quality Report as a Delisted Category 5 Waterbody, as a Total Maximum Daily Load (TMDL) for E. coli was approved for the river in 2009. The proposed dredging activities will not discharge any bacteria into the river.

Beginning With Habitat



October 25, 2024

- Shellfish Beds
- Stream Buffer (75 feet)
- Great Ponds, Rivers and Coastal Buffer (250 feet)
- Atlantic Salmon Habitat
- Shorebird Habitat
- Seabird Nesting Island
- Tidal Waterfowl / Wading Bird Habitat
- Inland Waterfowl / Wading Bird Habitat
- Significant Vernal Pools
- Deer Wintering Areas
- Essential Wildlife Habitats
- Endangered, Threatened, and Special Concern Species
- Natural Communities
- Rare Plants and Natural Communities

1:18,056

0 0.15 0.3 0.6 mi

0 0.23 0.45 0.9 km

Beginning with Habitat Program for Planning Purposes Only
Map Created With BWH Map Viewer

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
Phone: (207) 469-7300 Fax: (207) 902-1588

In Reply Refer To: 10/25/2024 18:30:18 UTC
Project Code: 2025-0011334
Project Name: Yachtsman Marina Dredging

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
(207) 469-7300

PROJECT SUMMARY

Project Code:	2025-0011334
Project Name:	Yachtsman Marina Dredging
Project Type:	Navigation Channel Improvement
Project Description:	Maintenance dredge of Kennebunk River

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.3569549,-70.47482428275957,14z

Counties: York County, Maine

ENDANGERED SPECIES ACT SPECIES

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.

3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (🟩)

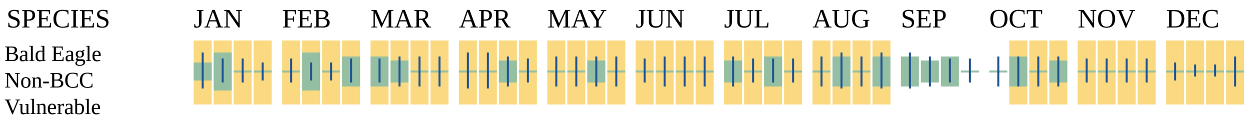
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (🟨)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)
A week is marked as having no data if there were no survey events for that week.

🟩 probability of presence 🟨 breeding season | survey effort — no data



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Oystercatcher *Haematopus palliatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8935	Breeds Apr 15 to Aug 31

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Blue-winged Warbler *Vermivora cyanoptera* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9509	Breeds May 1 to Jun 30
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9643	Breeds May 20 to Aug 10
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20
Grasshopper Sparrow *Ammodramus savannarum perpallidus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8329	Breeds Jun 1 to Aug 20
Hudsonian Godwit *Limosa haemastica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9482	Breeds elsewhere
Least Tern *Sternula antillarum antillarum* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/11919	Breeds Apr 25 to Sep 5

NAME	BREEDING SEASON
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Pectoral Sandpiper *Calidris melanotos* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere
Prairie Warbler *Setophaga discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Purple Sandpiper *Calidris maritima* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9574	Breeds elsewhere
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Ruddy Turnstone *Arenaria interpres morinella* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10633	Breeds elsewhere
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Saltmarsh Sparrow *Ammospiza caudacuta* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9719	Breeds May 15 to Sep 5
Scarlet Tanager *Piranga olivacea* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11967	Breeds May 10 to Aug 10

NAME	BREEDING SEASON
Semipalmated Sandpiper *Calidris pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9603	Breeds elsewhere
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Whimbrel *Numenius phaeopus hudsonicus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11991	Breeds elsewhere
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10669	Breeds Apr 20 to Aug 5
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (🟩)

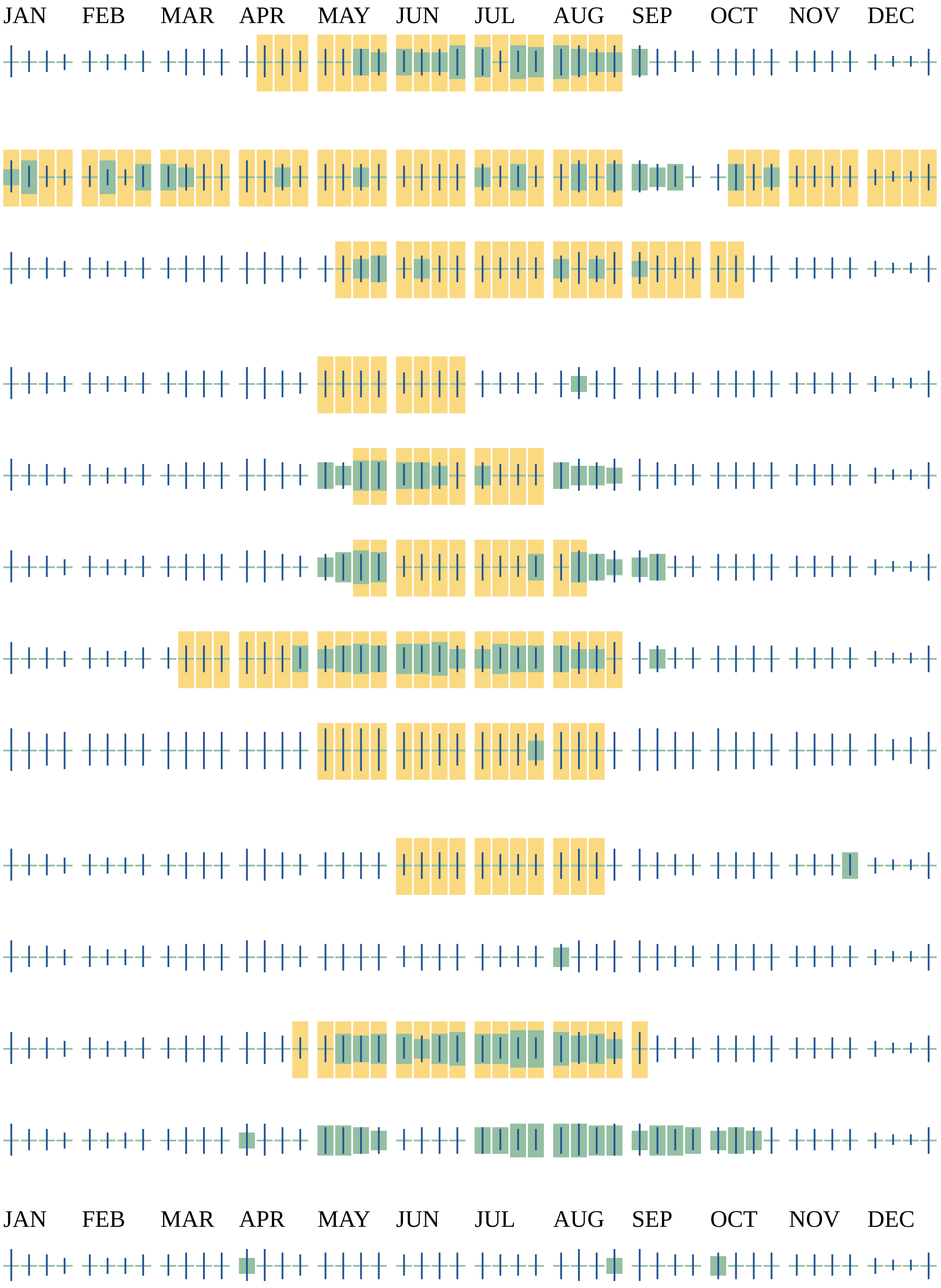
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (🟨)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

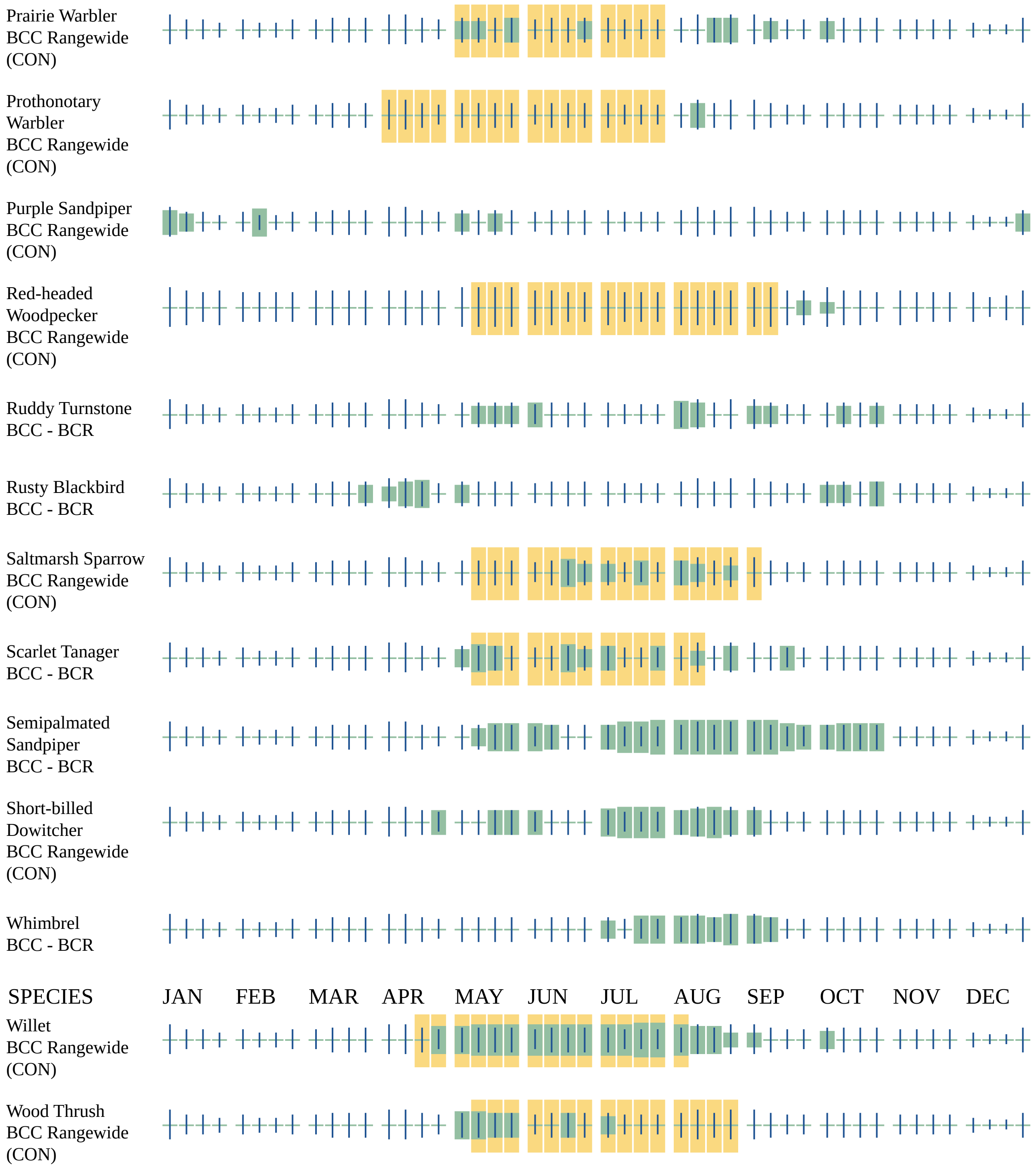
Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

🟩 probability of presence 🟨 breeding season | survey effort — no data



SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
American Oystercatcher BCC Rangewide (CON)												
Bald Eagle Non-BCC Vulnerable												
Black-billed Cuckoo BCC Rangewide (CON)												
Blue-winged Warbler BCC - BCR												
Bobolink BCC Rangewide (CON)												
Canada Warbler BCC Rangewide (CON)												
Chimney Swift BCC Rangewide (CON)												
Eastern Whip-poor-will BCC Rangewide (CON)												
Grasshopper Sparrow BCC - BCR												
Hudsonian Godwit BCC Rangewide (CON)												
Least Tern BCC Rangewide (CON)												
Lesser Yellowlegs BCC Rangewide (CON)												
SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Pectoral Sandpiper BCC Rangewide (CON)												



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds

- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

ESTUARINE AND MARINE DEEPWATER

- E1UBL

ESTUARINE AND MARINE WETLAND

- E2US3N

IPAC USER CONTACT INFORMATION

Agency:	Private Entity
Name:	Leyna Tobey
Address:	One Karen Drive
Address Line 2:	Suite 2A
City:	Westbrook
State:	ME
Zip:	04092
Email	leyna@walsh-eng.com
Phone:	2075539898

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

Greater Atlantic Regional Office
Atlantic Highly Migratory Species Management Division

Query Results

Degrees, Minutes, Seconds: Latitude = 43º 21' 26" N, Longitude = 71º 31' 30" W
Decimal Degrees: Latitude = 43.357, Longitude = -70.475

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

*** W A R N I N G ***

Please note under "Life Stage(s) Found at Location" the category "ALL" indicates that all life stages of that species share the same map and are designated at the queried location.

EFH

Link	Data Caveats	Species/ Management Unit	Lifestage(s) Found at Location	Management Council	FMP
📄	?	Acadian Redfish	Larvae	New England	Amendment 14 to the Northeast Multispecies FMP
📄	?	Haddock	Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
📄	?	Little Skate	Adult	New England	Amendment 2 to the Northeast Skate Complex FMP
📄	?	Monkfish	Adult, Eggs/Larvae, Juvenile	New England	Amendment 4 to the Monkfish FMP
📄	?	Silver Hake	Adult, Eggs/Larvae	New England	Amendment 14 to the Northeast Multispecies FMP
📄	?	Winter Flounder	Eggs	New England	Amendment 14 to the Northeast Multispecies FMP

Pacific Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

Atlantic Salmon

No Atlantic Salmon were identified at the report location.

HAPCs

No Habitat Areas of Particular Concern (HAPC) were identified at the report location.

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.
****For links to all EFH text descriptions see the complete data inventory: [open data inventory -->]()**

All EFH species have been mapped for the Greater Atlantic region,
Atlantic Highly Migratory Species EFH,
Bigeye Sand Tiger Shark,
Bigeye Sixgill Shark,
Caribbean Sharpnose Shark,
Galapagos Shark,
Narrowtooth Shark,
Sevengill Shark,
Sixgill Shark,
Smooth Hammerhead Shark,
Smalltail Shark

Drawn Action Area & Overlapping S7 Consultation Areas

Area of Interest (AOI) Information

Area : 5.69 acres

Oct 25 2024 10:31:05 Eastern Daylight Time

Summary

Name	Count	Area(acres)	Length(mi)
Atlantic Sturgeon	2	9.37	N/A
Shortnose Sturgeon	1	4.69	N/A
Atlantic Salmon	0	0	N/A
Sea Turtles	0	0	N/A
Atlantic Large Whales	0	0	N/A
In or Near Critical Habitat	0	0	N/A

Atlantic Sturgeon

#	Feature ID	Species	Lifestage	Behavior	Zone	From	Until	From (2)	Until (2)	Area(acres)
1	ANS_C50_ADU_MAF	Atlantic sturgeon	Adult	Migrating & Foraging	N/A	01/01	12/31	N/A	N/A	4.68
2	ANS_C50_SUB_MAF	Atlantic sturgeon	Subadult	Migrating & Foraging	N/A	01/01	12/31	N/A	N/A	4.68

Shortnose Sturgeon

#	Feature ID	Species	Life Stage	Behavior	Zone	From	Until	From (2)	Until (2)	Area(acres)
1	SNS_C50_ADU_MAF	Shortnose sturgeon	Adult	Migrating & Foraging	N/A	04/01	11/30	N/A	N/A	4.69

Attachment 5 – Historic Sites

5.1 – MHPC Notification

5.2 – MHPC Response

5.3 – THPO Notification

5.4 – THPO Responses Received to Date

5.0 Historic Sites

As required by the U.S. Army Corps of Engineers (USACE), the Maine Historic Preservation Commission (MHPC) and the Tribal Historic Preservation Officers (THPO) of Maine have been notified regarding this project. Copies of these notifications are included with this section. Any responses received from the MHPC and THPO will be forwarded to the project manager assigned to this project.

WALSH
ENGINEERING ASSOCIATES, INC.

October 25, 2024

Maine Historic Preservation Commission
Mr. Kirk F. Mohney, Director
65 State House Station
Augusta, Maine 04333-0065
MHPCprojectreview@maine.gov

VIA: Transmitted via email as noted above

RE: Yachtsman Marina Dredging – Project Review Request
57 Ocean Ave, Kennebunkport, ME 04046
Map 10, Block 1, Lot 3

On behalf of the Yachtsman Marina (Applicant), Walsh Engineering Associates, Inc. (WEA) intends to file permit applications with the Maine Department of Environmental Protection (DEP) and the U.S. Army Corps of Engineers (USACE) for maintenance dredging activities in the Kennebunk River at 57 Ocean Avenue in Kennebunkport, Maine. WEA is requesting that the Maine Historic Preservation Commission (MHPC) review the area for any known historic and/or archaeological resources. A site location map is attached for your review.

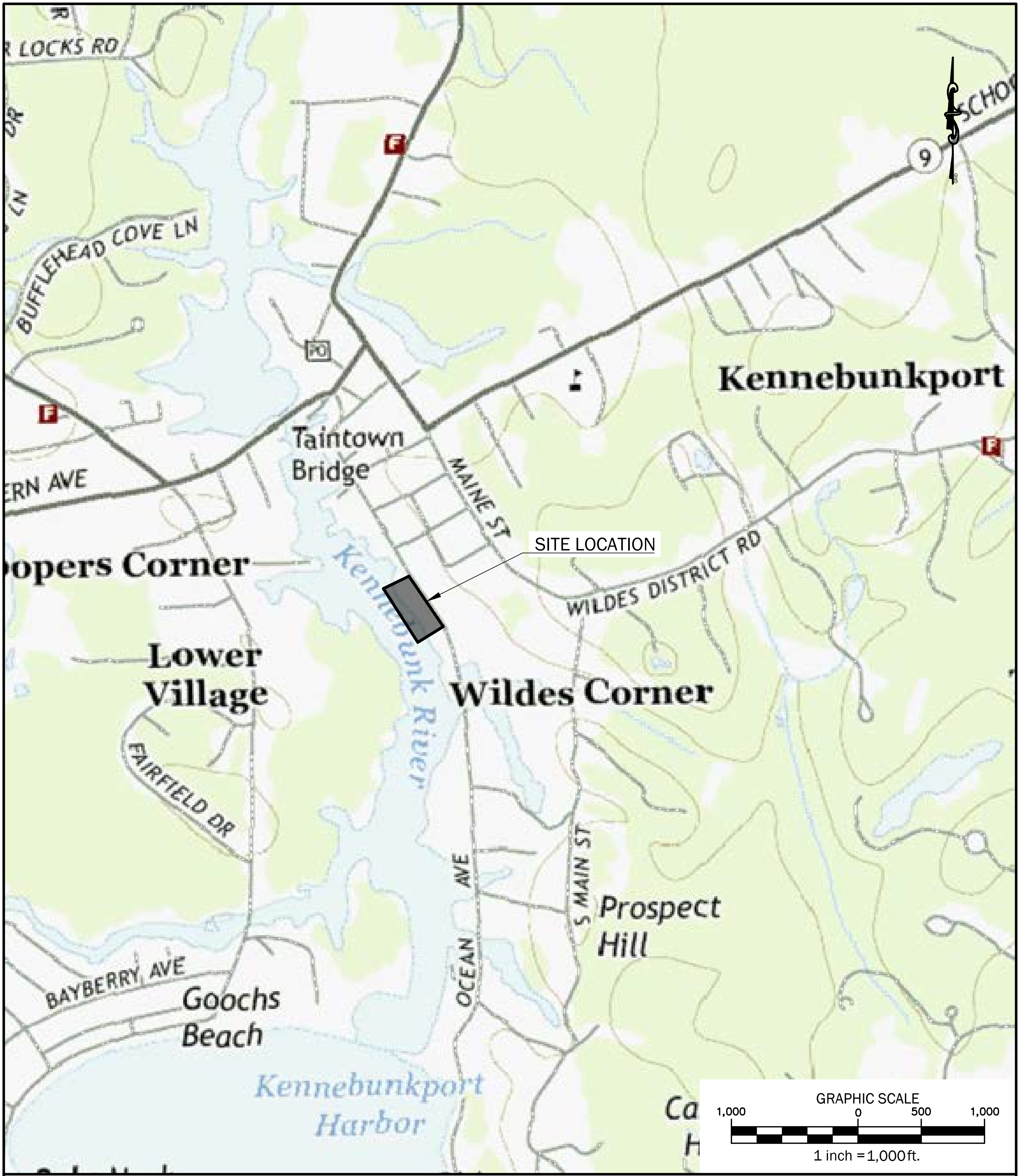
If you have any questions or concerns with this project, please feel free to contact me at (207) 553-9898 or by e-mail at leyna@walsh-eng.com. Thank you in advance for your time.

Respectfully,

Leyna L. Tobey

Leyna Tobey, Project Manager
Walsh Engineering Associates, Inc.

Enc: Site Location Map



WALSH
ENGINEERING ASSOCIATES, INC.

One Karen Dr., Suite 2A | Westbrook, Maine 04092
ph: 207.553.9898 | www.walsh-eng.com

Yachtsman Marina Dredging

Yachtsman Marina
57 Ocean Avenue
Kennebunkport, Maine 04046

Sheet Title:

Site Location

Job No.:	643.5
Date:	OCTOBER 2024
Scale:	1" = 1,000'
Drawn:	LLT
Checked:	WRW

WALSH
ENGINEERING ASSOCIATES, INC.

October 25, 2024

Maine Historic Preservation Commission
Mr. Kirk F. Mohney, Director
65 State House Station
Augusta, Maine 04333-0065
MHPCprojectreview@maine.gov

RECEIVED
OCT 25 2024
By 1921-24

VIA: Transmitted via email as noted above

RE: Yachtsman Marina Dredging – Project Review Request
57 Ocean Ave, Kennebunkport, ME 04046
Map 10, Block 1, Lot 3

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If you have any questions or concerns with this project, please feel free to contact me at (207) 553-9898 or by e-mail at leyna@walsh-eng.com. Thank you in advance for your time.

Respectfully,

Leyna L. Tobey

Leyna Tobey, Project Manager
Walsh Engineering Associates, Inc.

Enc: Site Location Map

Based on the information submitted, I have concluded that there will be no historic properties affected by the proposed undertaking, as defined by Section 106 of the National Historic Preservation Act. Consequently, pursuant to 36 CFR 800.4(d)(1), no further Section 106 consultation is required unless additional resources are discovered during project implementation pursuant to 36 CFR 800.13.

Kirk F. Mohney 11/6/24

Kirk F. Mohney,
State Historic Preservation Officer
Maine Historic Preservation Commission

Date

WALSH
ENGINEERING ASSOCIATES, INC.

October 25, 2024

Houlton Band of Maliseet Indians
Isaac St. John, THPO
88 Bell Road, Littleton, Maine 04730
istjohn@maliseets.com

Passamaquoddy Tribe of Indians
Donald Soctomah, THPO
Pleasant Point Reservation
P.O. Box 343, Perry, Maine 04667
soctomah@gmail.com

Passamaquoddy Tribe of Indians
Donald Soctomah, THPO
Indian Township Reservation
P.O. Box 301, Princeton, Maine 04668
soctomah@gmail.com

Mi’kmaq Nation
Jenny Gaenzle, THPO
7 Northern Road, Presque Isle, Maine 04769
jgaenzle@micmac-nsn.gov

Penobscot Nation
Chris Sockalexis, THPO
Cultural and Historic Preservation Dept.
12 Wabanaki Way, Indian Island, Maine 04468
chris.sockalexis@penobscotnation.org

VIA: Transmitted via email as noted above

RE: Yachtsman Marina Dredging – Project Review Request
57 Ocean Ave, Kennebunkport, ME 04046
Map 10, Block 1, Lot 3

On behalf of the Yachtsman Marina (Applicant), Walsh Engineering Associates, Inc. (WEA) intends to file permit applications with the Maine Department of Environmental Protection (DEP) and the U.S. Army Corps of Engineers (USACE) for maintenance dredging activities in the Kennebunk River at 57 Ocean Avenue in Kennebunkport, Maine. WEA is requesting that the Maine Tribal Historic Preservation Offices (THPO) review the area for any known historic and/or archaeological resources. A site location map is attached for your review.

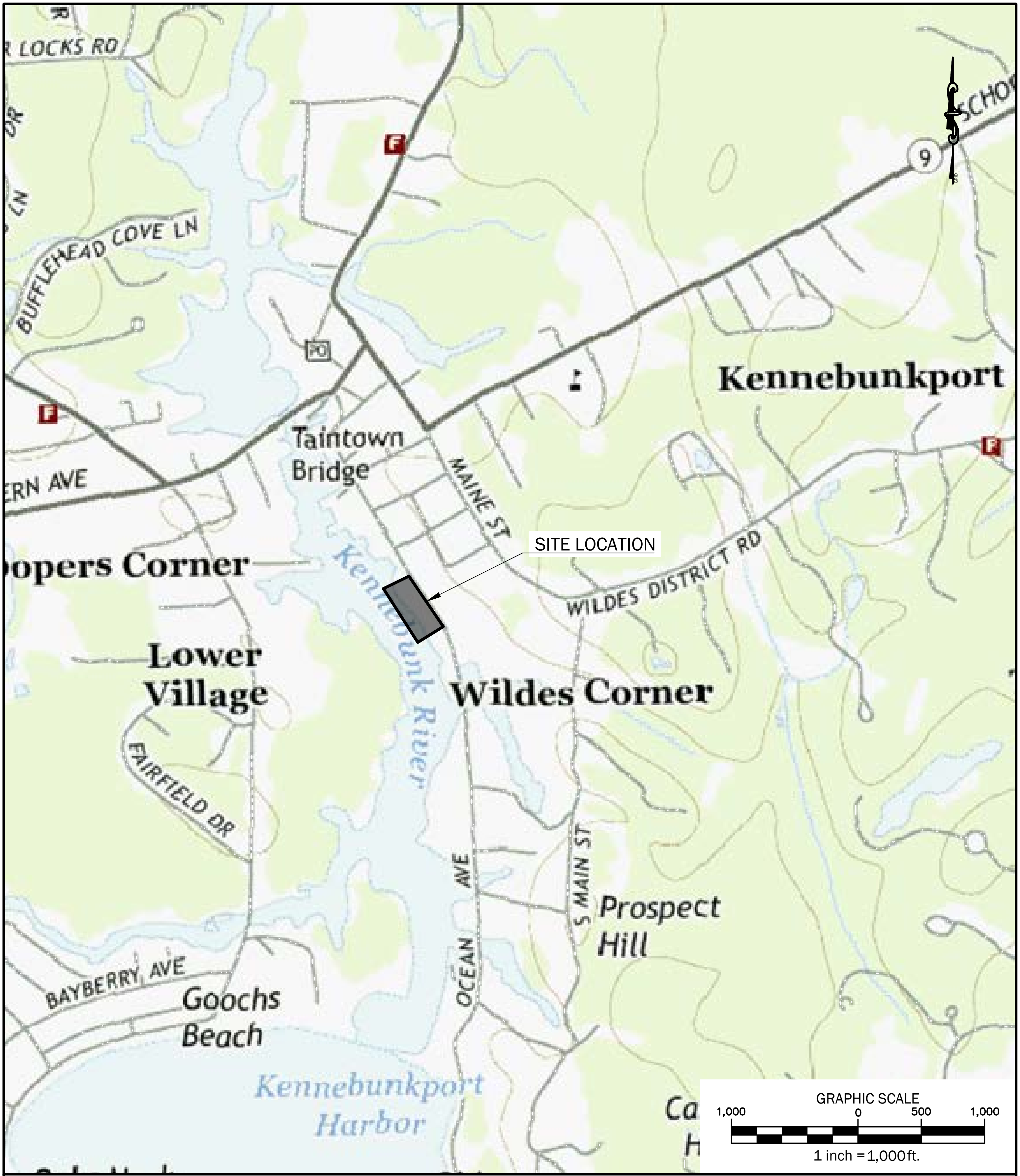
If you have any questions or concerns with this project, please feel free to contact me at (207) 553-9898 or by e-mail at leyna@walsh-eng.com. Thank you in advance for your time.

Respectfully,

Leyna L Tobey

Leyna Tobey, Project Manager
Walsh Engineering Associates, Inc.

Enc: Site Location Map



WALSH
ENGINEERING ASSOCIATES, INC.

One Karen Dr., Suite 2A | Westbrook, Maine 04092
ph: 207.553.9898 | www.walsh-eng.com

Yachtsman Marina Dredging

Yachtsman Marina
57 Ocean Avenue
Kennebunkport, Maine 04046

Sheet Title:

Site Location

Job No.:	643.5
Date:	OCTOBER 2024
Scale:	1" = 1,000'
Drawn:	LLT
Checked:	WRW

P:\782 - Arundel Yacht Club Dredging\3. CAD\782 - Base.dwg plot date: 10/24/2024 11:02 AM

Tribal Historic Preservation Office
Passamaquoddy Tribe
PO Box 159 Princeton, Me. 04668
207-214-4051

November 5, 2024

Leyna Tobey, PE*

Project Manager | Civil Engineer

Walsh

One Karen Drive, Suite 2A

Westbrook, ME 04092

- Re: Kennebunk River at 57 Ocean Avenue in Kennebunkport

Dear ***Leyna*** ;

The Passamaquoddy THPO has reviewed the following application regarding the historic properties and significant religious and cultural properties in accordance with NHPA, NEPA, AIRFA, NAGPRA, ARPA, Executive Order 13007 Indian Sacred Sites, Executive Order 13175 Consultation and Coordination with Indian Tribal Governments, and Executive Order 12898 Environmental Justice.

The Project listed above will not have an impact on cultural concerns. If any artifacts or human remains are uncovered please stop and notify this office and the State Historic Preservation Office.

Sincerely;

Donald Soctomah THPO
Soctomah@gmail.com

Attachment 6 – Abutters List

150 feet Abutters List Report

Kennebunkport, ME
October 28, 2024

Subject Property:

Parcel Number: 10-1-3
CAMA Number: 10-1-3
Vision ID: 3427
Property Address: 57 OCEAN AVENUE

Mailing Address: YACHTSMAN HOSPITALITY, LLC
2 LIVEWELL DRIVE, #203
KENNEBUNK, ME 04043

Abutters:

Parcel Number: 10-1-15
CAMA Number: 10-1-15
Vision ID: 3441
Property Address: 53 OCEAN AVENUE

Mailing Address: KENNEBUNKPORT, TOWN OF
PO BOX 566
KENNEBUNKPORT, ME 04046

Parcel Number: 10-1-2
CAMA Number: 10-1-2
Vision ID: 3426
Property Address: 67 OCEAN AVENUE

Mailing Address: KPT MARINE, LLC
PO BOX 2734
KENNEBUNKPORT, ME 04046

Parcel Number: 10-1-4
CAMA Number: 10-1-4
Vision ID: 525
Property Address: OCEAN AVENUE

Mailing Address: KENNEBUNKPORT, TOWN OF
PO BOX 566
KENNEBUNKPORT, ME 04046

Parcel Number: 10-1-5
CAMA Number: 10-1-5
Vision ID: 3428
Property Address: 51 OCEAN AVENUE

Mailing Address: ARUNDEL YACHT CLUB
PO BOX 328
KENNEBUNKPORT, ME 04046-0328

Parcel Number: 10-2-2
CAMA Number: 10-2-2
Vision ID: 546
Property Address: OCEAN AVENUE

Mailing Address: KENNEBUNKPORT CONSERVATION TRUST
PO BOX 7004
CAPE PORPOISE, ME 04014-07004

Parcel Number: 10-5-10
CAMA Number: 10-5-10
Vision ID: 587
Property Address: 52 OCEAN AVENUE

Mailing Address: MAHONEY FAMILY REVOCABLE TRUST
52 OCEAN AVENUE
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-11
CAMA Number: 10-5-11
Vision ID: 588
Property Address: 5 GREENE STREET

Mailing Address: STOHLMAN, SUZANNE
PO BOX 127
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-12
CAMA Number: 10-5-12
Vision ID: 3465
Property Address: 60 OCEAN AVENUE

Mailing Address: MARQUIS, ALFRED C JR & JULIE A
PO BOX 1835
KENNEBUNKPORT, ME 04046

150 feet Abutters List Report

Kennebunkport, ME
October 28, 2024

Parcel Number: 10-5-13
CAMA Number: 10-5-13
Vision ID: 590
Property Address: 66 OCEAN AVENUE

Mailing Address: DORAN, WILLIAM M & SUSAN L
4807 MARBLE HILL DRIVE
LAFAYETTE HILL, PA 19444

Parcel Number: 10-5-14
CAMA Number: 10-5-14
Vision ID: 3466
Property Address: 68 OCEAN AVENUE

Mailing Address: WINSTANLEY, ADAM D
150 BAKER AVENUE SUITE 303
CONCORD, MA 01742

Attachment 7 – Construction and Erosion Control Plan

7.0 Construction & Erosion Control Plan

Construction

The dredging will be conducted utilizing a floating barge and dredging crane with a clamshell bucket. The barge will access the project area from traveling upriver from the Kennebunk River Breakwater. The area of the dredge will be approximately 61,000 square feet (1.4 acres). The proposed dredge depth will be to elevation -6.0 feet mean low water, with about one foot of over-dig. It is anticipated that dredging will coincide with neighboring marinas performing dredging at the same approximate time, including the Arundel Yacht Club, the Kennebunkport Marina, and the Kennebunk River Club. The material will be transported by barge to the Isle of Shoals North Disposal Site (IOSN). The IOSN is located approximately 15 nautical miles east of Portsmouth, New Hampshire, in the Gulf of Maine.

Erosion & Sedimentation Control

The dredging will be conducted from a floating barge using a dredging crane with a clamshell bucket. The dredged material will be placed on the barge and brought to the IOSN open water placement site for disposal. There will be no storage of the dredged material on land which negates the need for erosion and sedimentation control measures in this regard. No formal erosion control measures are proposed for the project. However, turbidity curtains will be implemented, if deemed necessary, around the proposed dredging area to mitigate the travel of sediment during the in-water disturbance.

Attachment 8 – Sampling and Analysis Plan

8.1 – Final Sampling and Analysis Plan

8.2 – Suitability Determination for IOSN

8.0 Sampling and Analysis Plan

The U.S. Army Corps of Engineers (USACE) approved a Sampling and Analysis Plan (SAP) for the project on January 21, 2022, which provided proposed sediment sampling locations, methods, and testing criteria to determine disposal suitability. The sampling results were submitted to the USACE for the Yachtsman Marina and the nearby Arundel Yacht Club, Kennebunkport Marina, and Kennebunk River Club. The USACE issued a Suitability Determination for all 4 sites on June 10, 2024, which documents the suitability of the dredged material for disposal at the Isle of Shoals North (IOSN) open water disposal site.

The SAP and USACE's Suitability Determination are included as an attachment to this permit section for reference.

CENAE–PDE 21 January 2022

FINAL Sampling and Analysis Plan for Yachtsman Marina, Kennebunkport, ME, File Number NAE-2004-00319

1. **Project Description:** The applicant is proposing to mechanically dredge approximately 6,300 cubic yards (CY) of material from shoaled areas totaling 1.4 acres within the property's marina basin located in the town of Kennebunkport, ME (Figures 1 and 2). This area will be dredged to the proposed depth of -6 feet at mean lower low water (MLLW) plus one foot of allowable overdepth. The applicant proposes to dispose of this material at the Isles of Shoals North Disposal Site (IOSN).

This sampling and analysis plan (SAP) has been developed by the New England District (NAE) U.S. Army Corps of Engineers (USACE) to gather information to support a dredged material suitability determination for the open water disposal alternative associated with this project. This sampling and analysis effort will be divided into two phases. The first phase will include sampling and testing of dredge site sediment for grain size and bulk chemistry in order to identify contaminants of concern. The second phase will include sampling of dredge site sediment and water for elutriate and biological testing in order to evaluate the material for placement at IOSN. The results of biological testing will be evaluated against the most recent NAE dataset for the IOSN reference area. All sampling and analysis activities described in this plan shall follow the requirements set forth in the "*Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters*" (RIM) dated May 6, 2004. A copy of the RIM may be downloaded from the NAE website: http://www.nae.usace.army.mil/Missions/Regulatory/DredgedMaterialProgram/RegionalImplementationManual.aspx

2. **Conceptual Site Model:** NAE reviewed historic testing data, water quality data, spill records, and adjacent land use information to develop a conceptual site model (CSM) for the proposed project. The CSM was used to characterize the system and identify potential sources of contamination, site-specific contaminants of concern, exposure pathways, and biological receptors in order to inform this sampling and analysis plan.

Project Setting: The property is associated with the Yachtsman Hotel & Marina Club located on the eastern bank of the Kennebunk River approximately 0.3 miles north of the river's mouth in Kennebunkport, ME (Figure 1). The marina offers boat dockage to the Yachtsman Hotel's guests. The Marina is now leased to and managed by the adjacent Kennebunkport Marina located to the south. The Applicant is proposing to dredge the leased area to connect the two Marinas. Land use in the surrounding area includes a mix of residential properties and marina facilities. The adjacent Kennebunkport Marina offers boat slips and full mechanical services and repairs and has a boat ramp. The Arundel Yacht Club is approximately 500 feet north of the property. Chicks Marina, which has a fuel dock, is adjacent to the southern property boundary of the Kennebunkport Marina, approximately 800 feet south of the Yachtsman property. Downtown Kennebunkport, an area with several restaurants, retail shops, and marine services, is approximately 1,500 feet north of the property. The Kennebunkport River Federal Navigation Project (FNP) -6 foot MLLW channel is located directly adjacent to the western boundary of the project area.

Water Quality: Water Quality in the project area is dictated by tidal exchange with the Gulf of Maine with freshwater input from the Kennebunk River to the north and a series of overboard discharge pipes within the Yachtsman Marina property (Figure 3). The 2014 Environmental Assessment for dredging of the Kennebunk River FNP noted that there have been reported increases of bacterial counts in the water, attributed to faulty septic systems, agriculture, and overboard discharges. Tidal waters of the Kennebunk River are classified as SB by the Maine Department of Environmental Protection (MEDEP). Class SB waters must be of such quality that they are suitable for the designated uses of recreation in and on the water, fishing, aquaculture, propagation and harvesting of shellfish, industrial process and cooling water supply, hydroelectric power generation, navigation and as habitat for fish and other estuarine and marine life (38 M.R.S. § 465(B)(2) https://www.mainelegislature.org/legis/statutes/38/title38sec465-B.html).

Dredge History and Existing Testing Data: The project area was last dredged in 2015 when approximately 3,914 CY of material were removed to a depth of -5 feet Mean Low Water (MLW) and placed at the Cape Arundel Disposal Site (CADS). Sampling and testing of this material in 2014 documented sediments from two samples along the shoreline in the middle of the basin to be predominately fine grained (passing the No. 200 sieve) while the remaining four samples, located away from the shoreline, were predominately sand with some silt. A review of the associated chemistry data found elevated levels of pesticides (total DDX [4,4'-DDD + 4,4'-DDE + 4,4'-DDT]) and total high molecular weight polyaromatic hydrocarbons (HPAHs). A review of the associated biological testing data found sediment from the project area not likely to be acutely toxic to benthic organisms. A suitability determination from 2014 for the project area found sediments suitable for open water disposal at CADS. A residual dredging event of 100 CY was authorized by USACE in 2020 and the material was placed upland.

Spill Data: Based on information provided by the applicant and a review of the Maine Department of Environmental Protection (MEDEP) Oil and Hazardous Waste Spill Database (https://www.maine.gov/dep/spills/index.html), NAE determined that there have been several small diesel, gasoline, and oil spills within the surrounding area of the project site since the area was last dredged.
Risk Ranking: Following the tier one review of the site characteristics, location,

and the available historical data, the proposed project was given a **low-moderate** risk ranking according to the following matrix.

Table 1: Project Risk Ranking

Rank	Guidelines
Low	Few or no sources of contamination. Data available to verify no significant potential for adverse biological effects.
Low-Moderate	Few or no sources of contamination but existing data is insufficient to confirm ranking.
Moderate	Contamination sources exist within the vicinity of the project with the potential to produce chemical concentrations that may cause adverse biological effects.
High	Known sources of contamination within the project area and historical data exists that has previously failed biological testing.

3. **Sample Collection:** In the first phase of testing the applicant shall collect sediment cores from five locations within the proposed dredge areas as specified in Table 2 (also see Figure 3). These locations were selected based on information from the CSM described above, the low to moderate risk ranking for the project, and shoaled areas identified in the project conditions survey submitted by the applicant. All core samples shall be collected to the proposed dredge depth plus overdredge amount using inert core liners. Estimated core lengths based on the bathymetry provided by the applicant are provided in Table 2, but the actual required core lengths shall be determined at the time of the sampling effort using measured water depths at each location corrected to MLLW. In order to ensure that the core samples adequately represent the dredge interval at each location, all cores to be used for this project shall have a recovered length that is within 75% of the core penetration depth. In addition, any cores that display significant disturbance such as compaction or wash out shall be disregarded. If the cores from any location do not meet the acceptability criteria after six attempts, then the applicant should retain the best core from that location and contact NAE for further guidance. The penetration and recovery for the core used for the chemistry and grain size samples should be recorded on the sample log.

Upon collection, all cores shall be measured and maintained in an upright position for a minimum of 15 minutes to allow any fine-grained material to settle. After a core has settled, it shall be re-measured before any overlying water is drained, taking care to not include overlying water with sediment flocculant in the measurement. All cores shall be split lengthwise, photographed with a stadia rod for scale, and described in accordance with ASTM D 2488 (Standard Practice for Description and Identification of Soils). Samples shall be collected from the dredge interval (dredge depth + overdepth) within each core for grain size and bulk chemical analysis as described in the sections below. If the dredge interval within a core is homogenous then the entire length may be composited as a single sample with the chemistry/grain size sample interval noted on the sampling log. If any core shows significant stratification or obvious signs of contamination, then subsamples shall be collected from each layer and noted on the sampling log and the applicant shall consult NAE for guidance prior to the start of analysis. The term “significant stratification” includes any distinct change in sediment composition that could represent a change in depositional history or waterway usage such as a change in color or lithology. Compositing of dissimilar sediment layers without prior approval from NAE will result in the rejection of any resulting data products.

All sediments held for testing shall be stored in accordance with the requirements in Table 3 (from Table 8-9 in *Evaluation of Dredged Material Proposed for Ocean Disposal, Testing Manual, 1991).* Sample chain of custody forms shall be maintained by the applicant and submitted to NAE with the data package described in section 5 of this SAP.

Based on the results of the grain size and bulk chemistry sediment testing, NAE will provide the applicant with a biological testing compositing plan. In the second phase of testing, dredge area sediment shall be collected from the same sample locations described in Table 2 and composited according to NAE’s biological testing compositing plan. Sufficient amounts of sediment and water shall be collected for elutriate preparation and analysis, water column toxicity testing, 10-day whole sediment toxicity testing, and 28-day bioaccumulation testing according to the sections below. Sediment cores from each station shall be collected using inert core liners and may be transferred directly into food grade polyethylene pails after core recovery has been measured. In addition, the applicant shall collect dredge site water from a central location within the proposed project area. All water samples shall be collected from the middle of the water column using either a non-contaminating pump or a discrete water sampler.

Please note that the applicant is not required to collect sediment or water samples from the IOSN reference site as the results of the biological testing will be compared to recent reference site data collected by NAE.

Again, all sediment and water samples held for testing shall be stored in accordance with the requirements in Table 3 (from Table 8-2 in Evaluation of Dredged Material Proposed for Ocean Disposal, Testing Manual, 1991). Sample chain of custody forms shall be maintained by the applicant and submitted to NAE with the data package described in section 5 of this SAP.

Vessel positioning shall be achieved using a Global Positioning System (GPS) that has been calibrated on site using a known reference point. The required horizontal accuracy at each sample location shall be 10 feet or less. All coordinate data shall be reported in geographic NAD 83 decimal degree format. All depth data shall be reported in tenths of feet. Water depths at each location are to be determined with an accuracy of ±0.1 feet (relative to MLLW). All depth data shall be reported in tenths of feet.

For phase one sampling, sample data including date, time, latitude, longitude, GPS accuracy at each sample station, measured water depth, tidal correction, core penetration, recovery, and chemistry sample intervals(s) shall be recorded in a sampling log (Figure 4 or equivalent) and provided to NAE with the applicant's core descriptions and photographs.

For phase two sampling, all sample data including date, time, latitude, longitude, GPS accuracy at each sample station, measured water depth, tidal correction, number of cores collected at each station, core lengths, and a general description of the sediment shall be recorded in a sampling log and provided to NAE. Note that if any of the phase two cores are significantly different from the material that was sampled during phase one, a representative core should be photographed and described and NAE should be consulted for guidance.

4. **Sample Analysis:** Sediment and water samples from the dredge area shall undergo physical, chemical, and biological analysis as described in the sections below. All laboratories used for this project shall have an approved Laboratory Quality Assurance Plan (LQAP) on file with NAE. Any data produced by a lab without an approved LQAP will not be accepted. The RIM, a list of laboratories with approved LQAPs, and the reporting format and requirements for electronic submission of data are available for download through the NAE website: http://www.nae.usace.army.mil/Missions/Regulatory/Dredged-Material-Program/.

Grain Size and Bulk Sediment Chemistry: All samples from the proposed dredge footprint shall be individually analyzed for grain size and bulk sediment chemistry. Testing parameters, analytical methods, and reporting limits to be used are outlined in Table 4. The listed analytical methods are recommended but can be replaced by other methods that will provide the required reporting limits. Additional guidance on the physical and chemical analysis of sediments can be found in chapter 5 of the RIM. NAE will provide the applicant with a compositing plan for biological testing based on sample proximity, physical characteristics recorded during the core description process, and the results of grain size and bulk chemistry analysis.

Elutriate Chemistry: Elutriate samples shall be prepared from the dredge area water and sediments according to the project compositing plan. The elutriate samples and clean seawater (provided by the applicant's testing facility) used for dilutions in the suspended phase particulate bioassays shall undergo chemical analysis according to the testing parameters, analytical methods, and reporting limits outlined in Table 5. The listed analytical methods are recommended but can be replaced by other methods that will give the required reporting limits.

Additional guidance can be found in Section 6.1 of the RIM and Section 9.4 of the Green Book.

Water Column Toxicity Testing: Suspended phase particulate bioassays shall be performed on each composite sample in accordance with the requirements specified in Section 6.2 of the RIM, and Section 11.1 of the Green Book. Refer to the RIM for guidance in selecting the test species. Clean seawater provided by the applicant's testing facility shall be used as both control and dilution water.

Please note that excessive ammonia concentrations in the elutriate samples may cause a toxic response that is not of interest to the SPP bioassay, which focuses on persistent contaminants. To account for this scenario, the US Environmental Protection Agency (EPA) and NAE have devised a protocol to determine if ammonia is the driver of toxicity in situations where unionized ammonia is present at concentrations above the applicable water quality criteria (WQC). In order to facilitate this protocol, the applicant may choose to have their laboratory measure total ammonia in the undiluted elutriate samples prior to SPP bioassay initiation and calculate the unionized ammonia concentrations based on measurements of pH, temperature, and salinity. If the calculated unionized ammonia concentrations are greater than the applicable WQC, the testing facility should immediately notify the applicant and seek guidance from NAE on project-specific procedures for preparation of additional elutriate samples requiring treatment for ammonia reduction and the need for additional SPP testing. This protocol is not a requirement, but NAE recommends it to prevent a 'false positive' toxicity result that would limit the applicant's disposal alternatives.

10-Day Whole Sediment Toxicity Testing: 10-day whole sediment toxicity testing shall be performed on each composite sample in accordance with the requirements specified in Chapter 7.1 of the RIM, Section 11.2 of the Green Book, and Methods for Assessing the Toxicity of Sediment-Associated Contaminants with Estuarine and Marine Amphipods, 1994. The bioassay test shall use two species of test animals, the amphipod *Leptocheirus plumulosus* and the mysid shrimp *Americamysis bahia*. If alternate species are selected from the RIM then contact NAE prior to sampling to coordinate necessary reference data collection.

28-Day Bioaccumulation Testing: 28-day bioaccumulation testing shall be performed on each composite sample in accordance with the requirements specified in Chapter 7.2 of the RIM and Section 12.1 of the Green Book. The bioaccumulation test shall use a bivalve, Macoma nasuta, and the polychaete Nereis virens as test animals. If alternate species are selected from the RIM then contact NAE prior to sampling to coordinate necessary reference data collection. At the end of the 28–day test, the tissues of the survivors shall be tested for the project contaminants of concern according to Tables 8 and 9 of the RIM. The contaminants of concern will be determined from the bulk sediment chemistry testing described above.

5. **Reporting requirements:** All sediment testing data is required to be submitted electronically in the electronic data deliverable (EDD) format available on the NAE website (http://www.nae.usace.army.mil/Missions/Disposal-Area-Monitoring-System-DAMOS/Electronic-Data-Deliverables.aspx). Hard copy data submission is also required but may be substituted with a printer friendly, easy-to-read format (e.g., PDF, MS Word). Any analytes not detected shall be reported as half the method detection limit (MDL) and qualified with a "U". RIM quality control summary tables are required to be submitted with each project dataset. These tables are found in Appendix II of the RIM.

6. **Contact Information:** Questions about this plan should be directed to Gabriella Saloio (phone: 978-318-8138 e-mail: Gabriella.J.Saloio@usace.army.mil)

Gabriella Saloio

Gabriella Saloio
Biologist
New England District
U.S. Army Corps of Engineers

Table 2: Yachtsman Marina Sample Locations

Station	Latitude (NAD 83)	Longitude (NAD 83)	Survey Depth (Feet MLLW)	Project Depth (Feet MLLW)	Overdepth (Feet)	Estimated Core length (Feet)
Y-1	-70.475778	43.357352	-1.2	-6.0	1.0	5.8
Y-2	-70.475316	43.357253	-0.8	-6.0	1.0	6.2
Y-3	-70.474885	43.357021	-4.1	-6.0	1.0	2.9
Y-4	-70.474671	43.356732	-4.3	-6.0	1.0	2.7
Y-5	-70.474369	43.356289	-1.0	-6.0	1.0	6.0

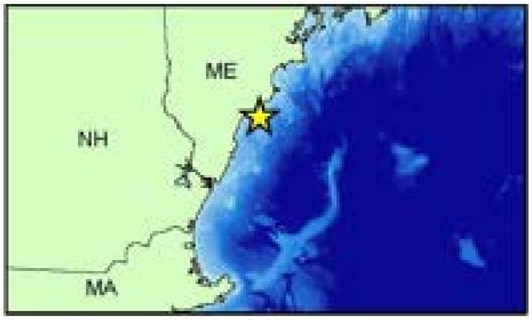
US Army Corps
of Engineers
New England District

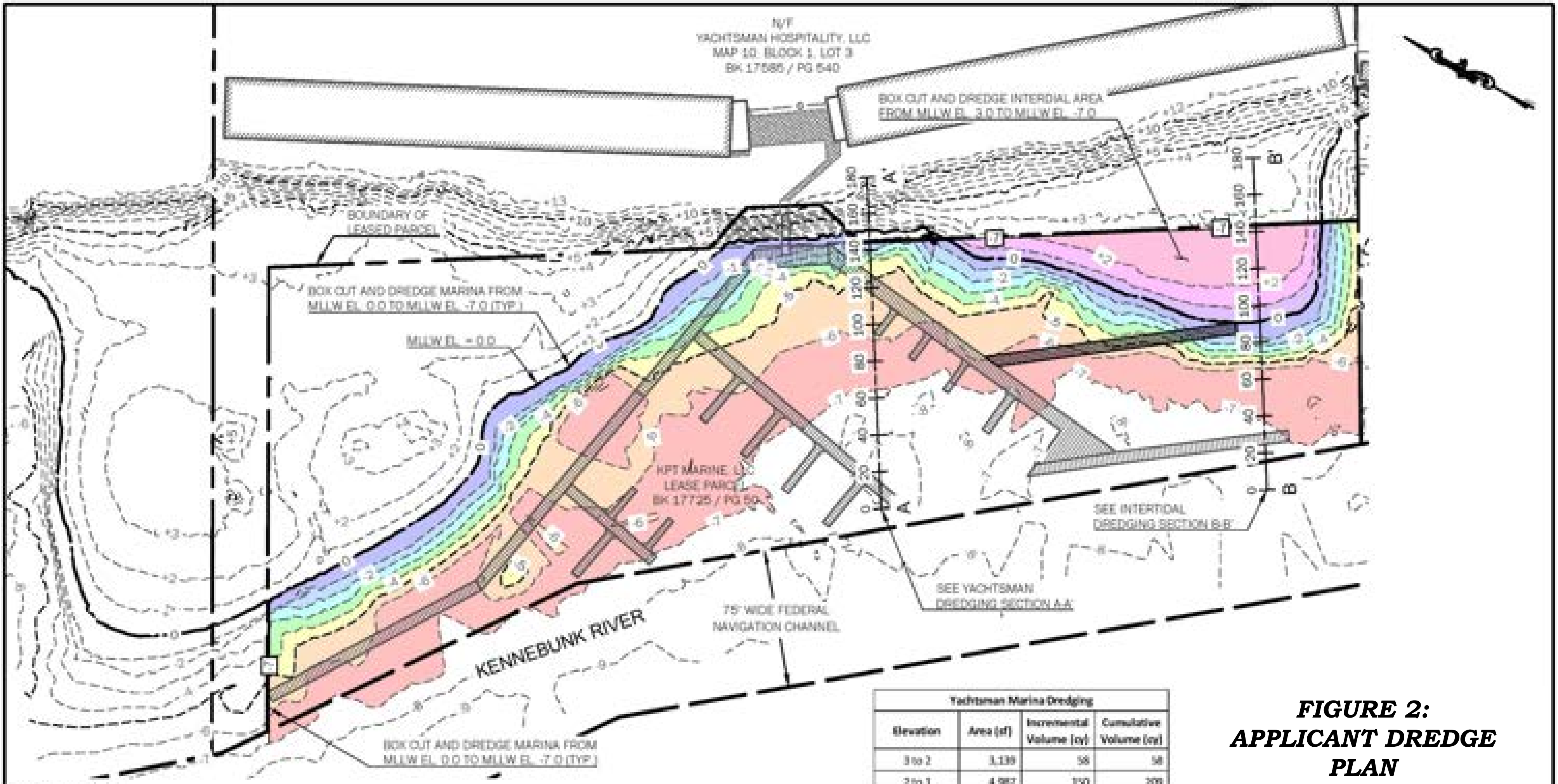
FIGURE 1
YACHTSMAN MARINA
KENNEBUNKPORT, ME

1:10,000

2015 NAIP AERIAL IMAGERY

GCS NAD 1983





PLAN REFERENCES

1. BATHYMETRY CONDUCTED BY WEA ON OCTOBER 27, 2020 USING HYDROLITE SONARMITE ECHOSOUNDER AND CARLSON BRx6 GNSS RECEIVER
2. A PLAN TITLED "BOUNDARY SURVEY AT YACHTSMAN LODGE & MARINA" PREPARED BY OWEN HASKELL, INC. OF 390 U.S. ROUTE ONE, UNIT 10, FALMOUTH, MAINE 04105, DATED APRIL 26, 2018.
3. A PLAN TITLED "SITE PLAN SHOWING THE PROPERTY OF THE KENNEBUNKPORT MARINA" PREPARED BY WILLIAM PIERCE OF 6 WATERHOUSE ROAD, DAYTON, MAINE 04005, DATED NOVEMBER 1, 1995
4. A PLAN TITLED " KENNEBUNK RIVER KENNEBUNK AND KENNEBUNKPORT MAINE AFTER DREDGE SURVEY" PREPARED BY U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DISTRICT DATED MARCH 9, 2020
5. ALL ELEVATIONS ON THIS PLAN ARE BASED ON MLLW. THE MLLW TO NAVD88 CORRECTIONS FOR THIS PROJECT IS 5.09 FEET
6. A PLAN TITLED "DOCK PLAN" PREPARED BY REILLY STUDIOS OF 959 ISLINGTON STREET, PORTSMOUTH, NEW HAMPSHIRE 03801, DATED MARCH 4, 2008

Yachtsman Marina Dredging

Elevation	Area (sf)	Incremental Volume (cy)	Cumulative Volume (cy)
3 to 2	3,139	58	58
2 to 1	4,987	150	209
1 to 0	6,383	211	419
0 to -1	11,064	323	742
-1 to -2	13,955	463	1,206
-2 to -3	17,176	577	1,782
-3 to -4	20,926	706	2,488
-4 to -5	25,701	863	3,351
-5 to -6	37,075	1,163	4,514
-6 to -7	59,304	1,783	6,297

FIGURE 2: APPLICANT DREDGE PLAN

GRAPHIC SCALE
80 0 40 80
1 inch = 80 ft.

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Yachtsman Marina Dredging

Kennebunkport Marina
59 Ocean Ave
Kennebunkport, Maine 04046

Sheet Title:
Plan View

Job No.:	643.1
Date:	May 2021
Scale:	1" = 20'
Drawn:	CAR
Checked:	WRW

P:\643.1 - Yachtsman Marina Dredge\3. CAD\643.1 - BASE.dwg plot date: 5/28/2021 3:49 PM

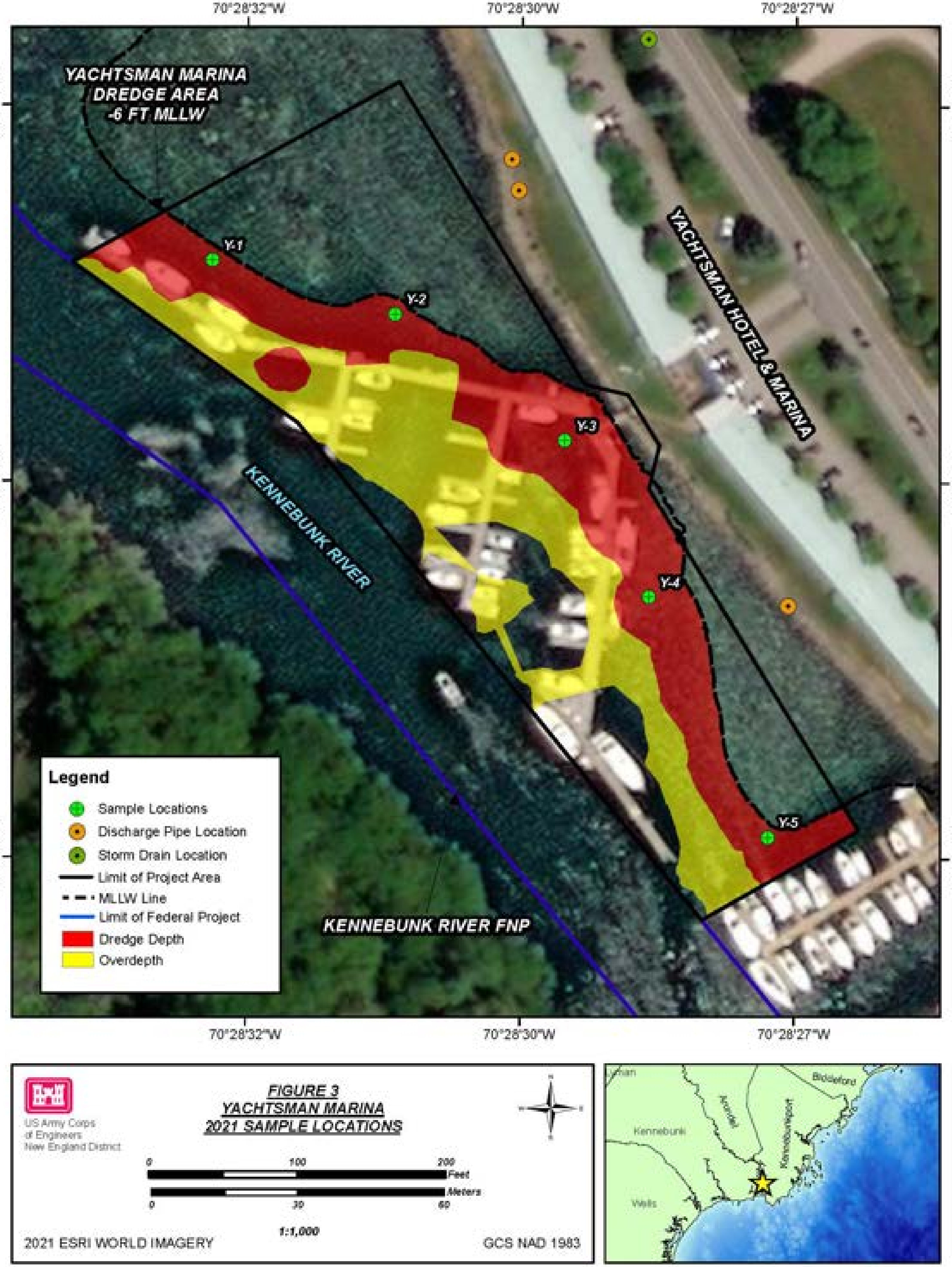


FIGURE 3
YACHTSMAN MARINA
2021 SAMPLE LOCATIONS

TABLE 3: RECOMMENDED PROCEDURES FOR SAMPLE COLLECTION, PRESERVATION, AND STORAGE

Analyses	Collection Method	Sample Volume	Container	Preservation Technique	Storage Conditions	Holding Time[b]
Sediment						
Chemical/Physical Analyses						
Metals	Grab/corer	200 mL	Precleaned polyethylene jar[c]	Refrigerate. Dry ice[b] or freezer storage is recommended for extended holding times.	≤ 4° C[c]	Hg - 28 days Others - 6 Months[d]
Organic Compounds	Grab/corer	475 mL	Solvent-rinsed glass jar with Teflon lid[c]	Refrigerate. Dry ice[b] or freezer storage is recommended for extended holding times.	≤ 4° C/dark[d]	14 days[e]
Particle Size	Grab/corer	75 mL	Whirl-pac bag[b]	Refrigerate	≤ 4° C	Undetermined
Total Organic Carbon	Grab/corer	3 L	Heat treated glass vial with Teflon lined lid[c]	Refrigerate. Dry ice[c] or freezer storage is recommended for extended holding times.	≤ 4° C[c]	14 days
Sediment from Which Elutriate is Prepared	Grab/corer	Dependent on tests performed	Glass with Teflon lined lid	Completely fill and Refrigerate	≤ 4° C/dark/airtight	Undetermined
Biological Tests						
Dredged Material	Grab/corer	12-15 L per sample	Plastic bag or container[e]	Completely fill and Refrigerate; sieve	≤ 4° C/dark/airtight	14 days[i][f]
Reference Sediment	Grab/corer	45-50 L per test	Plastic bag or container[e]	Completely fill and Refrigerate; sieve	≤ 4° C/dark/airtight	14 days[i][f]
Control Sediment	Grab/corer	21-25 L per test	Plastic bag or container[e]	Completely fill and Refrigerate; sieve	≤ 4° C/dark/airtight	14 days[i][f]
Water and Elutriate						
Chemical/Physical Analyses						
Metals		Discrete sampler or pump	1 L	Acid-rinsed polyethylene or glass jar	pH <2 with HNO_3[d]	4° C ± 2° C[d]

TABLE 3: RECOMMENDED PROCEDURES FOR SAMPLE COLLECTION, PRESERVATION, AND STORAGE (CONTINUED)

Organics	Discrete sampler or pump	4 L	Amber glass bottle[d]	Airtight seal; refrigerate	4° C ± 2° C[d]	5 days[d]
Tissue						
Metals	Trawl/ Teflon coated grab	30 g	Double Ziploc[c]	Handle with non-metallic forceps; plastic gloves; dry ice[c]	≤ -20° C[C]	Hg - 14 days Others - 6 months[i]
PCBs and Chlorinated Pesticides	Trawl/ Teflon coated grab	100 g	Hexane-rinsed double aluminum foil and double Ziploc[c]	Handle with hexane-rinsed stainless steel forceps; dry ice[c]	≤ -20° C[C]	10 days[i] [e]
Volatile Organic Compounds	Trawl/ Teflon coated grab	50 g	Heat cleaned aluminum foil and watertight plastic bag[i]	Covered ice chest[d]	≤ -20° C[i]	10 days[i] [e]
PAHs	Trawl/ Teflon coated grab	50 g	Hexane-rinsed double aluminum foil and double Ziploc[c]	Handle with hexane-rinsed stainless steel forceps; dry ice[c]	≤ -20° C[i]	10 days[i] [e]
Lipids	Trawl/ Teflon coated grab	50 g	Hexane-rinsed aluminum foil	Handle with hexane-rinsed stainless steel forceps; quick freeze	20° C	Undetermined

[a] *This table contains only a summary of collection, preservation, and storage procedures for samples. The cited references should be consulted for a more detailed description of these procedures.*

[b] *These holding times are for sediment, water, and tissue based on guidance that is sometimes administrative rather than technical in nature. There are no promulgated, scientifically based holding time criteria for sediments, tissues, or elutriates. References should be consulted if holding times for sample extracts are desired. Holding times are from the time of sample collection.*

[c] *NOAA (1989).*

[d] *Tetra Tech (1986a)*

[e] *Sample may be held for up to one year if maintained ≤ -20° C*

[f] *Two weeks is recommended; sediments must not be held for longer than 8 weeks prior to biological testing.*

[g] *NOAA (1989).*

[h] *Plumb (1981).*

[i] *Tetra Tech (1986b)*

TABLE 4: BULK SEDIMENT TESTING PARAMETERS

Parameter	Analytical Method	Reporting Limit (ppm)
Metals		
Arsenic	6010B, 6020, 7060, 7061	0.4
Cadmium	6010B, 6020, 7130, 7131	0.07
Chromium	6010B, 6020, 7190, 7191	0.5
Copper	6010B, 6020, 7210	0.5
Lead	6010B, 6020, 7420, 7421	0.5
Mercury	7471	0.02
Nickel	6010B, 6020, 7520	0.5
Zinc	6010B, 6020, 7950	1.0
PCBs (total by NOAA summation of congeners)		
See next page	8082A	0.001
Pesticides	NOAA (1993), 8081B	0.001
Aldrin	Heptachlor epoxide	
cis- & trans-Chlordane	Hexachlorobenzene	
4,4'-DDT, DDD, DDE	Lindane	
Dieldrin	Methoxychlor	
α & β Endosulfan	cis- & trans-Nonachlor	
Endrin	Oxychlordane	
Heptachlor	Toxaphene	0.025
Polycyclic Aromatic Hydrocarbons (PAHs)	8270C-SIM	0.01
Acenaphthene	Chrysene	
Acenaphthylene	Dibenzo(a,h)anthracene	
Anthracene	Fluoranthene	
Benzo(a)anthracene	Fluorene	
Benzo(a)pyrene	Indeno(1, 2, 3-cd)pyrene	
Benzo(b)fluoranthene	Naphthalene	
Benzo(k)fluoranthene	Phenanthrene	
Benzo(g, h, i)perylene	Pyrene	
Total Organic Carbon	Plumb (1981), APHA (1995)	0.1%
Percent Moisture	Plumb (1981), EPA (1992), PSEP (1986)	1.0%
Grain Size	Wet Sieve (#4, 10, 40, 200)	

TABLE 4: BULK SEDIMENT TESTING PARAMETERS (CONTINUED)

PCB CONGENERS

Analytical Method: NOAA (1993), 8082A

Reporting Limit: 1 ppb

Congeners:

8*	2,4’ diCB
18*	2,2’,5 triCB
28*	2,4,4’ triCB
44*	2,2’,3,5’ tetraCB
49	2,2’,4’,5 tetraCB
52*	2,2’,5,5’ tetraCB
66*	2,3’,4,4’ tetraCB
87	2,2’,3,4,5’ pentaCB
101*	2,2’,4,5,5’ pentaCB
105*	2,3,3’,4,4’ pentaCB
118*	2,3’,4,4’,5 pentaCB
128*	2,3,3’,4,4’ hexaCB
138*	2,2’,3,4,4’,5’ hexaCB
153*	2,2’,4,4’,5,5’ hexaCB
170*	2,2’,3,3’,4,4’,5 heptaCB
180*	2,2’,3,4,4’,5,5’ heptaCB
183	2,2’,3,4,4’,5’,6 heptaCB
184	2,2’,3,4,4’,6,6’ heptaCB
187*	2,2’,3,4’,5,5’,6 heptaCB
195*	2,2’,3,3’,4,4’,5,6 octaCB
206*	2,2’,3,3’,4,4’,5,5’,6 nonaCB
209*	2,2’,3,3’,4,4’,5,5’,6,6’ decaCB

* denotes a congener to be used in estimating Total PCB. To calculate Total PCB, sum the concentrations of all eighteen congeners marked with a “*” and multiply by 2.

The specified methods are recommendations only. Other acceptable methodologies capable of meeting the Reporting Limits can be used. Sample preparation methodologies (e.g. extraction and cleanup) and sample size may need to be modified to achieve the required Reporting Limits.

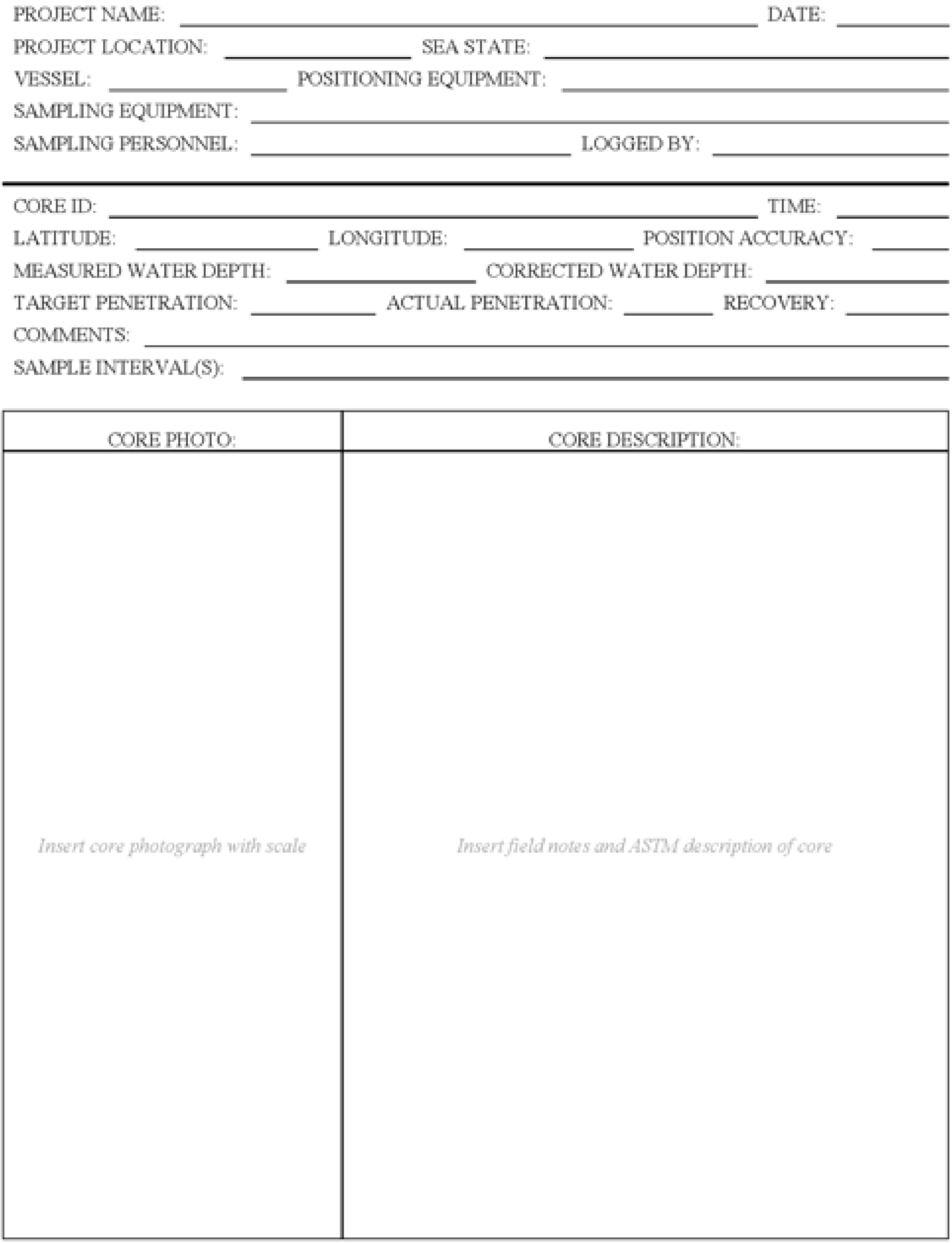
TABLE 5: ELUTRIATE TESTING PARAMETERS

Parameter	Recommended Analytical Method	Reporting Limit (µg/L)
Metals		
Arsenic	200.9, 1632	1.0
Cadmium	200.9, 1637	1.0
Chromium (VI)	218.6, 1636	1.0
Copper	200.9, 1639, 1640	0.6
Lead	200.9, 1639, 1640	1.0
Mercury	245.7, 1631	0.4
Nickel	200.9, 1639, 1640	1.0
Selenium	200.9, 1639	1.0
Silver	200.9	0.5
Zinc	200.9, 1639	1.0
PCBs (total, by either of these methods)		
	3510B, 8080A, NYSDEC	0.006
Pentachlorophenol	3501B, 8270C	2.60
Pesticides	3510B, 8080A	
Aldrin		0.26
Chlordane		0.02
Chloropyrifos		0.002
Dieldrin		0.14
4, 4'-DDT		0.03
α & β Endosulfan		0.007
Endrin		0.007
Heptachlor		0.01
Heptachlor epoxide		0.01
Lindane		0.26
Toxaphene		0.04

Reference:

NYSDEC. 1991. Analytical Method for the Determination of PCB Congeners by Fused Silica Capillary Column Gas Chromatography with Electron Capture Detector. NYSDEC #91-11.

FIGURE 4: EXAMPLE CORE LOG DATA SHEET



PROJECT NAME: ______________________ DATE: __________

PROJECT LOCATION: __________ SEA STATE: ______________

VESSEL: __________ POSITIONING EQUIPMENT: ______________

SAMPLING EQUIPMENT: ______________________

SAMPLING PERSONNEL: ______________ LOGGED BY: __________

CORE ID: ______________________ TIME: __________

LATITUDE: __________ LONGITUDE: __________ POSITION ACCURACY: ______

MEASURED WATER DEPTH: __________ CORRECTED WATER DEPTH: __________

TARGET PENETRATION: ________ ACTUAL PENETRATION: ______ RECOVERY: ______

COMMENTS: ______________________

SAMPLE INTERVAL(S): ______________________

CORE PHOTO:	CORE DESCRIPTION:
Insert core photograph with scale	*Insert field notes and ASTM description of core*

CENAE-PDE **10 June 2024**

FINAL Suitability Determination for Maintenance Dredging of the Kennebunk River Projects, Kennebunkport, Maine

Summary:

This determination addresses the suitability of shoaled sediments within four project areas along the Kennebunk River, in Kennebunkport, Maine (ME): Arundel Yacht Club (AYC), Yachtsman Marina, Kennebunkport Marina, and Kennebunk River Club (KBRC) for unconfined open water disposal at the Isle of Shoals North Disposal Site (IOSN) (Figure 1). The New England District (NAE) of the US Army Corps of Engineers (USACE) finds that sufficient data have been provided to satisfy the evaluation and testing requirements of Section 103 of the Marine Protection Research and Sanctuaries Act (MPRSA). Based on an evaluation of the project sites and the material proposed to be dredged, NAE finds these sediments suitable for unconfined open water disposal at IOSN as proposed.

1. Project Description:

The applicants are proposing to mechanically dredge shoaled areas from four project areas along the Kennebunk River in Kennebunkport, ME.

- The Arundel Yacht Club is proposing to dredge approximately 8,031 cubic yards (cy) from shoaled areas totaling just over 1 acre within the property's marina basin (Figures 1, 2, and 6).
- The Yachtsman Marina is proposing to dredge approximately 6,400 cy of shoaled material from areas totaling 1.4 acres within the property's marina basin (Figures 1, 3, and 7).
- The Kennebunkport Marina is proposing to dredge approximately 3,675 cy of shoaled material from 0.8 acres within the property's marina basin (Figures 1, 4, and 8).
- The Kennebunk River Club is proposing to dredge a total of approximately 8,935 cy of shoaled material: 3,026 cy of material will be removed from the 0.4 acre north marina basin, and 5,909 cy will be removed from the 0.8 acre south marina basin (Figures 1, 5, and 9).

All areas will be dredged to the authorized project depth of -6 feet at mean lower low water (MLLW) plus 1 foot of allowable overdepth. The applicant requested that disposal of the proposed dredge material be evaluated for IOSN as a potential alternative for this project.

Table 1: Project Area Summary

Project Area	File Number	Project Depth (ft MLLW) plus 1 ft OD	Dredge Volume (cy)	Acreage
Arundel Yacht Club	NAE-2022-00288	-6.0	8,031	1.0
Yachtsman Marina	NAE-2004-00319	-6.0	6,400	1.4
Kennebunkport Marina	NAE-2005-00280	-6.0	3,675	0.8
Kennebunk River Club – North Marina Basin	NAE-2007-2704	-6.0	3,026	0.4
Kennebunk River Club – South Marina Basin		-6.0	5,909	0.8

2. Conceptual Site Model:

USACE reviewed historic testing data, previous environmental assessments, water quality data, and adjacent land use information to develop a conceptual site model (CSM) for the Kennebunk River projects (Figure 10). NAE used this CSM to characterize the system and to identify potential sources of contamination, site-specific contaminants of concern, exposure pathways, and biological receptors to inform this suitability determination.

Project Setting: All four projects are located along the eastern shoreline of the Kennebunk River in Kennebunkport, ME. The Arundel Yacht Club is located farthest upriver (approximately 0.8 miles from the river's mouth), the Yachtsman Marina and Kennebunkport Marina are adjacent to each other just to the south of Arundel Yacht Club, and the Kennebunk River Club is located farther down river, about 0.25 miles from the mouth of the river (Figure 1).

The Arundel Yacht Club building was constructed in 1806 and served as a rope making facility until 1816. Sanborn maps from 1911 show that the property was used as a boat house, carriage house, and wagon shed prior to the establishment of the yacht club in 1957. The yacht club provides dockage for up to fifty recreational boats and has a launch for small sailboats. There are no repair or fuel facilities on the property. The Yachtsman Marina offers boat dockage to the Yachtsman Hotel guests. The Marina is now leased to and managed by the adjacent Kennebunkport Marina, located directly to the south. The applicant is proposing to dredge the leased area to connect the two marinas. The Kennebunkport Marina is a year-round facility offering slips, full mechanical services, a ship store, engine sales, power boat and canoe rentals, as well as a boat ramp. The Kennebunk River Club provides seasonal dockage for recreational vessels, as well as shoreside facilities for social and recreational functions.

Land use in the surrounding area is largely a mix of residential property, many with private docks, and other marina facilities. Chicks Marina, which has a fuel dock, is adjacent to Kennebunkport Marina. Downtown Kennebunkport, which has several restaurants, retail shops, and marine services, is approximately 1,000 feet north of Arundel Yacht Club. The Kennebunkport River Federal Navigation Project (FNP) -6 foot MLLW channel is located directly adjacent to the western boundary of the project areas.

Water Quality: Water Quality in the project area is dictated by tidal exchange with the Gulf of Maine with freshwater input from the Kennebunk River to the north and a series of stormwater discharge pipes within the marina properties along the river (Figures 6-9). Tidal waters of the Kennebunk River are classified as SB by the Maine Department of Environmental Protection (MEDEP). Class SB waters must be of such quality that they are suitable for the designated uses of recreation in and on the water, fishing, aquaculture, propagation and harvesting of shellfish, industrial process and cooling water supply, hydroelectric power generation, navigation and as habitat for fish and other estuarine and marine life (38 M.R.S. § 465(B)(2) https://www.mainelegislature.org/legis/statutes/38/title38sec465-B.html).

Dredge History and Existing Testing Data: The Arundel Yacht Club was last dredged in 2017 when approximately 1,800 cy of material were removed to a depth of -6 feet at Mean Low Water (MLW) and placed at the Cape Arundel Disposal Site (CADS). Sampling and testing of this material in 2003 documented sediments to be predominately fine grained. A review of the associated chemistry data found cadmium, copper, and mercury detected at concentrations with the potential to cause toxicity based on current sediment screening guidelines. Based on the results of elutriate, toxicity, and bioaccumulation studies, NAE found the material from the Arundel Yacht Club suitable for placement at CADS in a 2015 suitability determination.

The Yachtsman Marina was last dredged in 2015 when approximately 3,914 cy of material were removed to a depth of -5 feet MLW and placed at CADS. Sampling and testing of this material in 2014 documented sediments from two samples along the shoreline in the middle of the basin to be predominately fine grained while the remaining four samples, located away from the shoreline, were predominately sand with some silt. A review of the associated chemistry data found levels of total DDX (sum of 4,4'-DDD + 4,4'-DDE +4,4'-DDT) and total high molecular weight polyaromatic hydrocarbons (HPAHs) detected at concentrations with the potential to cause toxicity based on current sediment screening guidelines. Based on the results of elutriate, toxicity, and bioaccumulation studies, NAE found the material from the Yachtsman Marina suitable for placement at CADS in a 2014 suitability determination. In addition, a residual dredging event of 100 cy was authorized by USACE in 2020 and this material was placed upland.

The Kennebunkport Marina was last dredged in 2015 when approximately 1,500 cy of material were removed to a depth of -5 feet MLW and placed at CADS. Sampling and testing of this material in 2014 documented predominately fine grained sediments with little sand. A review of the associated chemistry data found total DDX and total HPAHs detected at concentrations with the potential to cause toxicity based on current sediment screening guidelines. Based on the results of elutriate, toxicity, and bioaccumulation studies, NAE found the material from the Kennebunkport Marina suitable for placement at CADS in a 2014 suitability determination.

The Kennebunk River Club was last dredged in 2009 when 7,609 cy of fine grained material were mechanically removed and placed at CADS. A review of the associated chemistry data found cadmium, total HPAHs, total DDX, and total chlordane detected at concentrations with the potential to cause toxicity based on current sediment screening guidelines. Based on the results of elutriate, toxicity, and bioaccumulation studies, NAE found the material from the Kennebunk River Club suitable for placement at CADS in a 2009 suitability determination.

<u>Spill Data:</u> Based on information provided by the applicant and a review of the MEDEP Oil and Hazardous Waste Spill Database (https://www.maine.gov/dep/spills/index.html) and the U.S. Coast Guard's National Response Center website, NAE determined that there have been several small sheens, diesel, gasoline, and oil spills within the vicinity of the project sites since 2009.

<u>Disposal Site:</u> IOSN is located approximately 23 miles south of the project locations. IOSN is regularly monitored by the NAE Disposal Area Monitoring System (DAMOS) Program. The most recent DAMOS report on IOSN was based on a 2022 survey of the site (USACE, 2023).

<u>Risk Ranking:</u> Based on the site characteristics and the available testing data outlined above, all four projects were given a **low-moderate** risk ranking according to the following matrix in Table 2.

Table 2: Project Risk Ranking

Rank	Guidelines
Low	Few or no sources of contamination. Data available to verify no significant potential for adverse biological effects.
Low-Moderate	Few or no sources of contamination but existing data is insufficient to confirm ranking.
Moderate	Contamination sources exist within the vicinity of the project with the potential to produce chemical concentrations that may cause adverse biological effects.
High	Known sources of contamination within the project area and historical data exists that has previously failed biological testing.

3. Sampling, Testing, and Analysis:

NAE prepared sampling and analysis plans (SAPs) in January of 2022 for the Kennebunkport (three samples) and Yachtsman Marinas (five samples) and in May 2022 for the Arundel Yacht Club (four samples) that called for the collection of samples for bulk sediment chemistry and grain size, as well as full biological testing, including elutriate preparation and analysis, water column toxicity testing, 10-day whole sediment toxicity testing, and 28-day bioaccumulation testing. The applicants collected sediment cores from these three marina basins in July of 2022 (Table 3, Figures 6 through 8) for chemistry and grain size analysis. In addition, NAE prepared a biological testing SAP in June of 2020 for the Kennebunk River Club using bulk sediment chemistry and grain size data collected in December of 2018 which was also used in this evaluation (Table 3, Figure 9).

Table 3: Core Locations

Sample Location	Latitude	Longitude	Project Depth with Overdepth (ft MLLW)	Water Depth (ft MLLW)	Required Core Length (ft)	Recovery/ Penetration (ft)	Sample Interval (ft)
Arundel Yacht Club							
AYC-1	43.35831	-70.47582	-7.0	-3.9	3.1	3.2/3.2	0-3.2
AYC-2	43.35800	-70.47561	-7.0	-2.1	4.9	2.4/2.4	0-2.4
AYC-3	43.35793	-70.47634	-7.0	-3.2	3.8	0.75/1.0	0-0.75
AYC-4	43.35811	-70.47638	-7.0	-3.0	4.0	4.0/4.1	0-4.0
Yachtsman Marina							
Y-1	43.35735	-70.47578	-7.0	-1.5	5.5	3.5/3.5	0-3.5
Y-2	43.35724	-70.47533	-7.0	-1.2	5.8	2.5/2.5	0-2.5
Y-3	43.35701	-70.47488	-7.0	-4.2	2.8	2.7/2.7	0-2.7
Y-4	43.35673	-70.47467	-7.0	-4.4	2.6	3.4/3.4	0-2.6
Y-5	43.35629	-70.47437	-7.0	-1.0	6.0	6.1/6.1	0-6.0
Kennebunkport Marina							
K-1	43.35587	-70.47367	-7.0	-1.8	5.2	4.2/4.2	0-4.2
K-2	43.35607	-70.47394	-7.0	-4.8	2.2	3.1/3.1	0-2.2
K-3	43.35634	-70.47400	-7.0	-1.7	5.3	4.2/4.3	0-4.2
Kennebunk River Club							
KBRC-A	43.34975	-70.47269	-7.0	-2.5	5.0	4.5/4.5	0-4.5
KBRC-B	43.34982	-70.47327	-7.0	-4.0	3.0	3.0/3.0	0-3.0
KBRC-C	43.35007	-70.47322	-7.0	-2.0	4.0	5.0/5.0	0-5.0
KBRC-D	43.35008	-70.47340	-7.0	-5.0	1.0	2.0/2.0	0-2.0
KBRC-E	43.35046	-70.47323	-7.0	-2.5	6.0	4.5/4.5	0-4.5
KBRC-F	43.35039	-70.47352	-7.0	-2.0	4.0	5.0/5.0	0-5.0
KBRC-G	43.35063	-70.47326	-7.0	-1.0	2.0	6.0/6.0	0-6.0
KBRC-H	43.35055	-70.47354	-7.0	-4.0	3.0	3.0/3.0	0-3.0
KBRC-I	43.35082	-70.47331	-7.0	-1.5	6.0	5.5/5.5	0-5.5

Physical and Chemical Analysis of Sediments

Samples were largely composed of fines with little to some fine sand though several stations from the Yachtsman Marina and Kennebunk River Club were composed of fine sand with little to some fines. Grain size data are presented in Table 4 and core logs are provided in Appendix A.

Table 4: Grain Size Results

Sample ID	**%Gravel**	**%Sand**			**%Fines**
		Coarse	*Medium*	*Fine*	
Arundel Yacht Club					
AYC-1	0.1	1.7	6.4	13.1	78.7
AYC-2	3.1	2.2	12.5	31.4	50.8
AYC-3	0.4	0.9	5.2	14.4	79.1
AYC-4	3.6	0.8	4.5	10.7	80.4
Yachtsman Marina					
Y-1	4.9	0.8	6.0	64.7	23.6
Y-2	0.3	1.5	9.8	60.6	27.8
Y-3	2.3	1.7	5.7	20.6	69.7
Y-4	0.0	0.8	5.4	26.5	67.3
Y-5	1.0	1.2	4.4	80.6	12.8
Kennebunkport Marina					
K-1	0.1	0.6	4.4	43.9	51.0
K-2	0.0	1.2	7.9	28.9	62.0
K-3	2.4	1.5	8.0	19.7	68.4
Kennebunk River Club					
KBRC-A	0.0	1.0	4.0	32.0	62.7
KBRC-B	0.1	1.0	7.0	40.0	51.6
KBRC-C	0.0	1.0	2.0	61.0	35.6
KBRC-D	0.0	1.0	4.0	56.0	38.6
KBRC-E	0.0	0.0	3.0	71.0	25.9
KBRC-F	0.2	1.0	1.0	81.0	16.6
KBRC-G	0.2	1.0	4.0	61.0	33.8
KBRC-H	0.6	2.0	4.0	64.0	29.7
KBRC-I	0.7	2.0	10.0	45.0	43.4

As no project specific contaminants of concern were identified in the CSM, samples were analyzed for the standard suite of contaminants specified in the Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters (RIM) (EPA/USACE, 2004).

To examine the sediment concentrations in an ecologically meaningful context, NAE used Sediment Quality Guidelines (SQGs) to screen the chemical concentrations found in the sediment samples from the Kennebunk River project areas samples. Applicable SQG screening values for marine and estuarine sediments are the National Oceanic and Atmospheric Administration (NOAA) effects-range low (ERL) and effects-range median (ERM). It is important to understand that these values were not derived as toxicity pass-fail thresholds. Rather, ERL and ERM values are empirically derived guidelines based on a large number of studies nationwide that identify contaminant levels that indicate probability of toxic effects to inform decision making (Long et al., 1998). Effects are considered unlikely at concentrations below the ERL with an increased probability of toxic effects as concentrations increase. At concentrations above the ERM toxic effects are considered likely. For samples with sediment concentrations that fall between the ERL and ERM levels, consideration is given to both the number of contaminants that exceed ERL values and where the concentrations fall in the range between ERL and ERM values in assessing the probability of toxic effects and the potential need for additional testing.

Metals concentrations were largely below the ERL with many concentrations also less than the IOSN reference concentrations in all four project areas. Arsenic was detected at concentrations just above the ERL and reference value at stations AYC-1 and AYC-4, though both stations were below the established natural background level, 16 mg/kg, in Maine sediments (MEDEP, 2018). Nickel concentrations at Arundel Yacht Club stations AYC-1 and AYC-4 and Yachtsman Marina station Y-3 were also slightly greater than the ERL and IOSN reference value. The lead concentration in the Kennebunkport Marina station K-1 was greater than both the ERL and reference value. All metal concentrations in the Kennebunk River Club samples were below the ERL.

A few individual low molecular weight polyaromatic hydrocarbons (LPAHs) were found at concentrations above their respective ERLs, including acenaphthene and fluorene at station K-2 in the Kennebunkport Marina, acenaphthene, anthracene, and fluorene at stations KBRC-A and B in the Kennebunk River Club, and all individual LPAHs except for naphthalene at the Arundel Yacht Club station AYC-2. Additionally, the total LPAH concentration at AYC-2 was greater than the ERL and IOSN reference value. Individual HPAHs benzo(a)anthracene and fluoranthene were found at concentrations greater than their respective ERLs at stations AYC-2, KBRC-A, and KBRC-B. Pyrene and chrysene were also found above the ERL at KBRC-B and pyrene was found above the ERL in station KBRC-C. Total HPAH concentrations were found above the ERL at stations AYC-2 at the Arundel Yacht Club and stations KBRC-A, B, and C in the Kennebunk River Club. All PAH concentrations were below ERL values in all samples from the Yachtsman Marina.

The pesticides 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT as well as total DDX concentrations were found at concentrations greater than the ERL at stations K-1 and 2 at the Kennebunkport Marina and stations AYC-1 and 2 at the Arundel Yacht Club, where station AYC-4 also had 4,4'-DDE, 4,4'-DDT, and total DDX at concentrations over the ERL. Stations Y-1 and 2 at the Yachtsman Marina contained concentrations of 4,4'-DDE and total DDX that were greater than the ERL and the concentration of 4,4'-DDD was also above the ERL at station Y-2. Total DDX was found in concentrations above the ERL in all the Kennebunk River Club stations except for KBRC-F. 4,4`-DDT concentrations were also greater than the ERL in stations KBRC-B, KBRC-C, and KBRC-I and 4,4`-DDD exceeded the ERL in station KBRC-C. Dieldrin was found at concentrations greater than the ERL at Kennebunk River Club stations KBRC-A, B, D, E, and I and total chlordane was found at concentrations greater than the ERL at all stations in the Kennebunk River Club project area except for KBRC-E and KBRC-G.

Individual polychlorinated biphenyls (PCBs) were generally not detected. Where detected, total PCBs were found at concentrations well below the ERL at all stations sampled.

A summary of the bulk sediment chemistry data is presented in Table 5 with comparison to the ERL/ERM values and reference concentrations for IOSN. The full bulk chemistry results are presented in Appendix B.

Table 5. Summary of Bulk Sediment Chemistry Results

							Kennebunkport Marina						*Yachtsman Marina*									
					IOSN		K-1		K-2		K-3		Y-1		Y-2		Y-3		Y-4		Y-5	
Parameter	CAS Number	Units	ERL	ERM	Value	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Physical																						
Total organic carbon	14762744	%			1.28		0.37		3.04		2.32		0.93		0.72		1.90		1.19		0.20	
Metals																						
Arsenic	7440382	mg/kg	8.2	70	9.66		2.85		6.68		6.34		6.65		3.20		7.96		4.54		0.984	
Cadmium	7440439	mg/kg	1.2	9.6	0.072		0.295		0.410		0.344		0.225		0.235		0.388		0.430		0.093	
Chromium	7440473	mg/kg	81	370	31.5		21.9		27.1		26.4		17.7		14.7		33.6		23.1		6.71	
Copper	7440508	mg/kg	34	270	10.9		14.2		16.7		15.4		12.5		8.64		18.3		9.82		1.59	
Lead	7439921	mg/kg	46.7	218	18.1		134		21.9		17.1		12.4		12.9		20.2		7.79		1.81	
Mercury	7439976	mg/kg	0.150	0.710	0.032		0.051		0.063		0.047		0.045		0.051		0.052		0.011	J	0.005	J
Nickel	7440020	mg/kg	20.9	51.6	20.8		9.17		15.6		15.4		11.3		8.37		21.4		15.1		3.81	
Zinc	7440666	mg/kg	150	410	60.6		56.6		67.4		57.2		42.2		37.6		71.2		45.2		10.2	
PAHs																						
Total LPAH	*SUMLPAH*	ug/kg	552	3,160	48.2		185		225		225		188		191		118		7.87		8.67	
Total HPAH	*SUMHPAH*	ug/kg	1,700	9,600	260		1238		1697		1664		1336		1338		863		33.3		48.3	
Pesticides																						
4,4`-DDD	72548	ug/kg	2	20	0.020	U	4.98	J	4.66	J	0.112	UJ	1.16	J	2.86	J	0.093	UJ	0.016	UJ	0.013	UJ
4,4`-DDE	72559	ug/kg	2.2	27	0.066		2.23		4.53	J	0.068	U	2.50	J	2.78		0.057	U	0.010	U	0.008	U
4,4`-DDT	50293	ug/kg	1	7	0.026	U	1.44		1.44		0.148	U	0.960		0.808		0.123	U	0.020	U	0.017	U
Total DDX	SUMDDX	ug/kg	1.58	46.1	0.112		8.65		10.6		0.328	U	4.62		6.45		0.272	U	0.045	U	0.038	U
Dieldrin	60571	ug/kg	0.02	8	0.040	U	0.031	U	0.038	U	0.226	U	0.038	U	0.031	U	0.187	U	0.031	U	0.026	U
Total Chlordane	*SUMCHLOR*	ug/kg	0.5	6	0.300	U	0.233	U	0.289	U	1.710	U	0.285	U	0.234	U	1.42	U	0.233	U	0.198	U
PCBs																						
Total PCBs	*SumNOAA18*	ug/kg	22.7	180	4.02	U	8.34		3.98		2.77		1.92		2.33		3.56		1.56	U	1.33	U

Table 5. Summary of Bulk Sediment Chemistry Results, cont.

							Arundel Yacht Club							
					IOSN		AYC-1		AYC-2		AYC-3		AYC-4	
Parameter	CAS Number	Units	ERL	ERM	Value	Q	Result	Q	Result	Q	Result	Q	Result	Q
Physical														
Total organic carbon	14762744	%			1.28		1.14		1.15		8.46		2.64	
Metals														
Arsenic	7440382	mg/kg	8.2	70	9.66		9.75		6.72		7.78		10.3	
Cadmium	7440439	mg/kg	1.2	9.6	0.072		0.335		0.330		0.453		0.613	
Chromium	7440473	mg/kg	81	370	31.5		41.6		26.2		25.6		38.1	
Copper	7440508	mg/kg	34	270	10.9		29.4		15.7		25.6		24.3	
Lead	7439921	mg/kg	46.7	218	18.1		30.9		26.1		21.4		33.7	
Mercury	7439976	mg/kg	0.150	0.710	0.032		0.064		0.086		0.059	J	0.108	
Nickel	7440020	mg/kg	20.9	51.6	20.8		25.4		13.0		15.0		22.7	
Zinc	7440666	mg/kg	150	410	60.6		101		58.1		68.6		98.0	
PAHs														
Total LPAH	*SUMLPAH*	ug/kg	552	3,160	48.2		189		654		90.9		104	
Total HPAH	*SUMHPAH*	ug/kg	1,700	9,600	260		1482		3341		411		986	
Pesticides														
4,4`-DDD	72548	ug/kg	2	20	0.020	U	3.87	J	4.34	J	0.274	UJ	1.99	J
4,4`-DDE	72559	ug/kg	2.2	27	0.066		7.51	J	5.74		0.167	U	4.37	J
4,4`-DDT	50293	ug/kg	1	7	0.026	U	1.62	J	2.60		0.360	U	1.51	J
Total DDX	SUMDDX	ug/kg	1.58	46.1	0.112		13.0		12.7		0.801	U	7.87	
Dieldrin	60571	ug/kg	0.02	8	0.040	U	0.23	U	0.15	U	0.550	U	0.225	U
Total Chlordane	*SUMCHLOR*	ug/kg	0.5	6	0.300	U	1.72	U	1.11	U	4.2	U	1.7	U
PCBs														
Total PCBs	*SumNOAA18*	ug/kg	22.7	180	4.02	U	3.95		8.87		5.59	U	2.29	U

Table 5. Summary of Bulk Sediment Chemistry Results, cont.

							Kennebunk River Club																	
					IOSN		KBRC-A		KBRC-B		KBRC-C		KBRC-D		KBRC-E		KBRC-G		KBRC-H		KBRC-I		KBRC-F	
Parameter	CAS Number	Units	ERL	ERM	Value	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Physical																								
Total organic carbon	14762744	%			1.28		-		-		-		-		-		-		-		-		-	
Metals																								
Arsenic	7440382	mg/kg	8.2	70	9.66		5.34		4.98		3.52		3.30		2.47		3.34		2.82		5.12		1.58	
Cadmium	7440439	mg/kg	1.2	9.6	0.072		0.463		0.433		0.300		0.350		0.229		0.277		0.237		0.451		0.119	
Chromium	7440473	mg/kg	81	370	31.5		27.5		26.0		20.0		20.5		15.6		18.0		16.5		24.8		11.0	
Copper	7440508	mg/kg	34	270	10.9		13.7		13.8		9.34		9.52		18.6		8.28		7.16		13.6		5.32	
Lead	7439921	mg/kg	46.7	218	18.1		18.8		17.8		12.2		13.3		8.67		11.5		9.29		17.7		4.81	
Mercury	7439976	mg/kg	0.150	0.710	0.032		0.062		0.054		0.052		0.053		0.032		0.067		0.046		0.056		0.023	
Nickel	7440020	mg/kg	20.9	51.6	20.8		15.9		14.5		11.4		11.3		8.57		9.92		8.67		13.4		6.12	
Zinc	7440666	mg/kg	150	410	60.6		68.9		67.7		48.3		50.9		37.2		50.5		39.9		78.2		28.9	J
PAHs																								
Total LPAH	*SUMLPAH*	ug/kg	552	3,160	48.2		316		321		208		106		114		101		127		217		104	
Total HPAH	*SUMHPAH*	ug/kg	1,700	9,600	260		2644		4212		2028		866		838		756		653		1301		567	
Pesticides																								
4,4`-DDD	72548	ug/kg	2	20	0.020	U	1.30		1.90		2.10		1.30		1.00		1.20		0.880		1.70		0.680	
4,4`-DDE	72559	ug/kg	2.2	27	0.066		1.90		1.30		1.40		1.30		0.790		1.40		1.30		2.00		0.400	
4,4`-DDT	50293	ug/kg	1	7	0.026	U	0.850		1.50		4.00		0.750		0.620		0.900		0.530		2.20		0.028	U
Total DDX	SUMDDX	ug/kg	1.58	46.1	0.112		4.05		4.70		7.50		3.35		2.41		3.50		2.71		5.90		1.11	
Dieldrin	60571	ug/kg	0.02	8	0.040	U	0.460		0.850		0.026	U	1.00		1.20		0.026	U	0.026	U	0.610		0.026	U
Total Chlordane	*SUMCHLOR*	ug/kg	0.5	6	0.300	U	1.4		0.95		1.8		1.8		0.044	U	0.265		1.54		1.04		1.25	
PCBs																								
Total PCBs	*SumNOAA18*	ug/kg	22.7	180	4.02	U	1.4		2.1		1.2		0.751		0.326	U	0.326	U	0.831		1.3		0.706	

Notes:
Yellow indicates an exceedance of the ERL
Red indicates an exceedance of the ERM
U= Compound was analyzed for but was not detected (non-detect)
J= Indicates an estimated value
Non-detects reported as half the MDL
Reference site data from DAMOS monitoring surveys (2019 IOSN)
Total PCBs were calculated using the NOAA 18 method
Total Chlordane is a sum of alpha and gamma chlordane, cis and trans nonachlor, and oxychlordane; IOSN value is a sum of only alpha and gamma chlordane

Elutriate Chemistry and Biological Analysis of Sediments

Based on the lithology, chemistry results, and location of sample stations, NAE provided the applicant with a compositing plan for biological testing following the tiered testing protocol outlined in the Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual (Green Book, EPA/USACE, 1991). Sediment and water for biological testing were collected by the applicant in February of 2023 to characterize the potential risk associated with open water placement of the dredged material from the four Kennebunk River projects. Sediment was collected from ten representative sample locations across all four project areas to create one composite sample (Table 2 and Figures 6 through 9). The composite sample for biological testing was comprised of sediment from stations AYC-1, 2, and 4 from the Arundel Yacht Club, Y-2 and 3 from the Yachtsman Marina, K-1 and 2 from the Kennebunkport Marina, and KBRC-B, C, and E from the Kennebunk River Club. Site water was also collected from a central location within each proposed project area and composited. The biological testing samples were collected according to the compositing plan to determine the potential for the dredged sediment to cause adverse effects to the biological receptors identified in the CSM. Compliance with water quality criteria was determined through elutriate testing, sediment toxicity was measured through a 10-day whole sediment acute toxicity test, human health risk was determined through a 28-day bioaccumulation test, and water column toxicity was determined through a suspended particulate phase test as described in the Green Book (USEPA/USACE, 1991).

Evaluating Potential Effects to Benthic Organisms

The CSM identified the uptake of contaminants from placed dredged material at IOSN as a primary exposure pathway for project sediments and the potential for acute toxicity was determined through a 10-day whole sediment acute toxicity test as described in the Green Book (EPA/USACE, 1991).

Mean mortality in the control samples of the 10-day whole sediment acute toxicity tests was less than 10% for the amphipod (*Leptocheirus plumulosus*) and the mysid (*Americamysis bahia*); therefore, the tests were valid based on criteria established in the testing protocol.

Mean survivability for *A. bahia* and *L. plumulosus* was 97% and 95%, respectively. Results were not statistically different when compared to survivability in the IOSN reference sediment. The material proposed to be dredged is not considered acutely toxic to the mysids or amphipods used in this assessment.

Results from the 10-day whole sediment toxicity test are summarized in Table 6.

Table 6: Mean Survivability in the 10-day Whole Sediment Toxicity Test

Organism	Lab Control	IOSN Reference	Comp 1
A. bahia	98%	98%	97%
L. plumulosus	98%	93%	95%

Evaluating Potential Effects to Human Health

In order to assess the potential risk to human health through the exposure pathways identified in the CSM, a 28-day bioaccumulation test was performed with the clam, *Macoma nasuta,* and marine polychaete worm, *Nereis virens,* using sediments from the composite sample.

Results showed statistically significant increases of certain contaminants of concern (COCs) in tissue samples from clams exposed to project sediments when compared to tissue samples from clams exposed to reference area sediments including three metals (copper, lead, and nickel), several individual PAHs, three PCB congeners, and two pesticides (4,4'-DDD and 4,4'-DDE). Generally, COC concentrations were only slightly higher in the composite tissue sample than in the pre-test or IOSN reference tissue. Anthracene, benzo(a)anthracene, benzo(b)fluoranthene, and chrysene concentrations were 5 times higher in the composite tissue sample than in the IOSN reference site tissue concentrations. Fluoranthene, pyrene and 4,4'-DDD concentrations were more than 10 times higher in the composite tissue sample than in the IOSN reference site tissue concentrations. Copper, nickel, fluorene, naphthalene, and PCB 52 were detected at concentrations less than were detected in the pre-test tissue, which reflects the initial contaminant load in the wild caught specimens prior to the test initiation, suggesting that these contaminants may not be attributable to site conditions. However, these analytes were conservatively included in subsequent risk modeling.

Significant increases in worm tissue samples as compared to reference area tissue samples included five metals (cadmium, chromium, lead, nickel, and zinc), several individual PAHs, two PCB congeners, and one pesticide (4,4'-DDD). Generally, COC concentrations were only slightly higher in the composite tissue sample than in the pre-test or IOSN reference tissue. Pyrene was 5 times higher in the composite tissue sample than the IOSN reference site tissue concentrations. Benzo(k)fluoranthene, fluoranthene, and PCB 105 were more than 10 times higher in the composite tissue sample than the IOSN reference site tissue concentrations. Chromium, lead, nickel, anthracene, naphthalene, and 4,4'-DDD were detected at concentrations less than were detected in the pre-test tissue, which reflects the initial contaminant load in the wild caught specimens prior to the test initiation, suggesting that these contaminants may not be attributable to site conditions, however these analytes were conservatively included in the subsequent risk modeling.

Based on these results, the tissue burden data were analyzed with the EPA Bioaccumulation Evaluation Screening Tool (BEST) model to determine the toxicological significance of bioaccumulation from exposure to the dredged sediment. The BEST model includes an evaluation of the non-carcinogenic risk, carcinogenic risk, and any observed exceedances of Food and Drug Administration (FDA) thresholds to determine potential adverse impacts to human health from the consumption of lobster, fish, or shellfish exposed to project sediments. Consideration was also given to the number of contaminants that were statistically elevated in comparison to the reference tissue concentrations and to the magnitude of those concentrations in comparison to the reference tissue concentrations and comparable organisms living in the vicinity of the disposal site according to the factors outlined in the Ocean Testing Manual (USEPA/USACE, 1991).

For both *Macoma nasuta* and *Alitta virens*, modeling based on the tissue contaminant loads measured in the composite sample found that all contaminants were below the EPA Hazard Quotient for non-carcinogenic risk of 1.0, below the EPA carcinogenic risk threshold (1×10^{-4}), and were also less than established FDA action levels. Statistically elevated concentrations of contaminants in the tissue samples that could not be evaluated using the BEST model were compared to background invertebrate concentrations in the NOAA Mussel Watch dataset (NCCOS, 2023) and all concentrations were found to be less than the dataset concentrations.

Based on this analysis, there is no unacceptable risk to the receptors identified in the CSM from the bioaccumulation of contaminants through exposure to the dredged material from the projects. BEST model outputs and tissue data are provided in Appendix C.

Evaluating Potential Effects to Fish and Marine Invertebrates

The CSM identified the uptake of contaminants from the water column during the placement of dredged material at IOSN as a primary exposure pathway for project sediments. Elutriate samples were prepared from the site composite sediment sample and site water and the potential for water column toxicity was determined through a suspended particulate phase (SPP) toxicity test as described in the Green Book (USEPA/USACE, 1991).

The results from the SPP toxicity test were used to determine the median lethal concentration (LC_{50}) for the three target species exposed to the sediment elutriates. All three species, the mysid, *A. bahia*, the minnow, *Menidia beryllina*, and the mussel, *Mytilus edulis,* showed no adverse effects on survival after exposure to the elutriate from the composite sample (Table 7).

Table 7: LC$_{50}$ Values in Suspended Phase Toxicity Test

Composite	***A. bahia*** **LC$_{50}$ (%)**	***M. beryllina*** **LC$_{50}$ (%)**	***M. edulis*** **LC$_{50}$ (%)**
Composite 1	>100%	>100%	>100%

To determine if the discharge of dredged material would meet the limiting permissible concentration (LPC), NAE utilized the Short-Term Fate (STFATE) numerical model to analyze the disposal cloud as it descends through the water column after release from a scow. Results of the STFATE evaluation using the lowest LPC (LC$_{50}$ of 100% and an application factor of 0.01) predicted that the water column would attain the LPC within four hours of disposal at IOSN. Additionally, all contaminants of concern in the elutriate samples were below the federal and Maine water quality criteria. Elutriate chemistry concentrations are presented in Appendix D.

4. Suitability Determination:

Based on the weight of evidence, including the CSM, sediment chemistry results, biological testing results, and the subsequent risk modeling, no significant adverse impacts through the exposure pathways identified in the conceptual site model were found for the Arundel Yacht Club, Kennebunkport Marina, Yachtsman Marina, and Kennebunk River Club. Based on the testing and evaluation requirements set forth in Section 103 of the MPRSA, the sediments to be dredged are considered suitable for unconfined open water disposal at IOSN.

This suitability determination was coordinated with EPA Region 1 and MEDEP. MEDEP concurred with the determination and EPA Region 1 conducted an individual evaluation of the project and documented their findings in a separate memo.

Briley K. Barra

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Briley K. Barra
Technical Specialist
Dredged Material Management Team
USACE-New England District

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Richard B. Loyd
Chief
Environmental Resources and
Marine Programs Section
USACE-New England District

5. References:

Long E.R & MacDonald D.D. 1998. Recommended Uses of Empirically Derived, Sediment Quality Guidelines for Marine and Estuarine Ecosystems, Human and Ecological Risk Assessment: An International Journal, 4:5, 1019-1039.

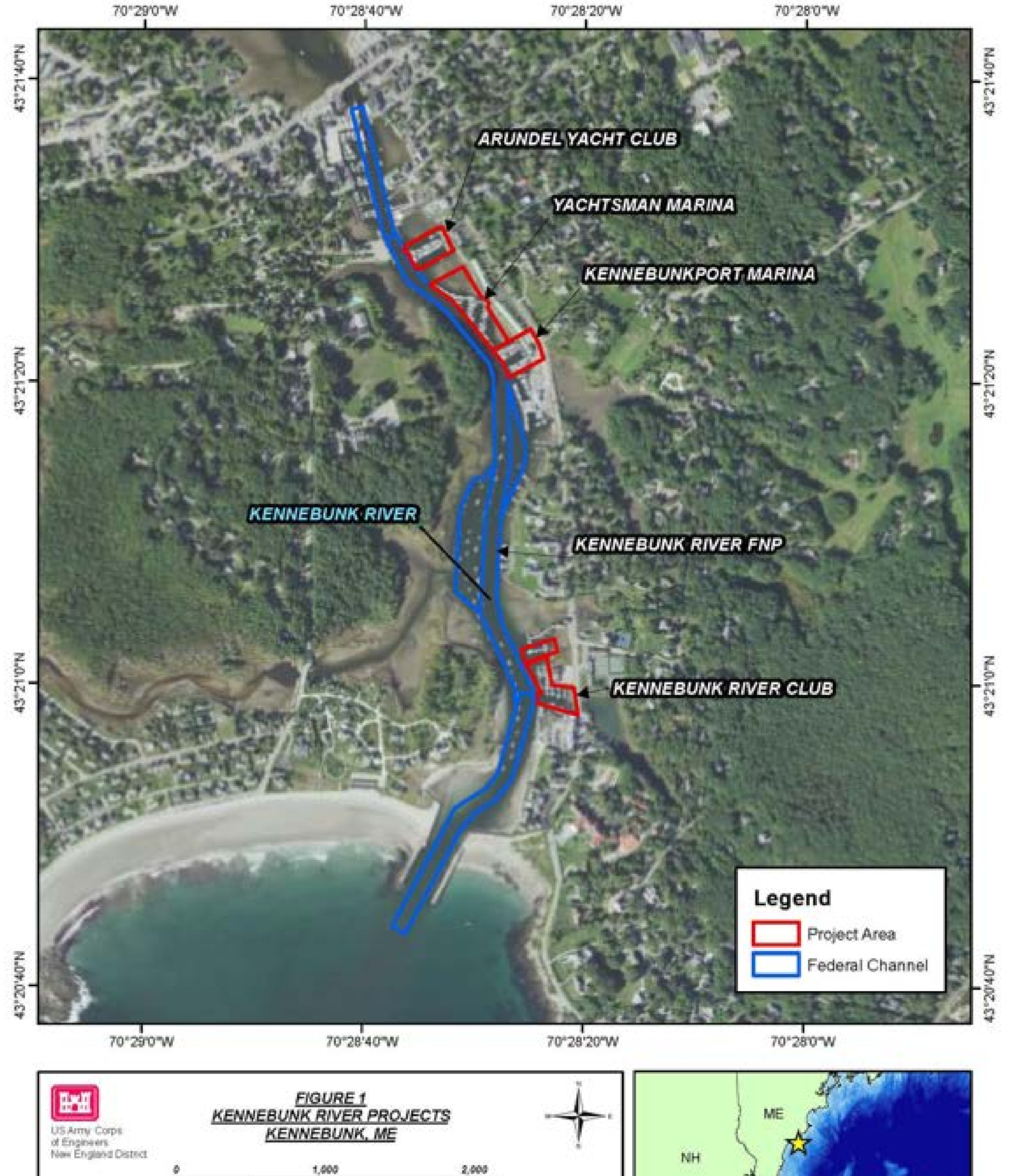
MEDEP 2018. Maine Remedial Action Guidelines (RAGS) for Sites Contaminated with Hazardous Substances. Maine Department of Environmental Protection, Bureau of Remediation and Waste Management. 19 October 2018.

National Centers for Coastal Ocean Science, 2023: National Status and Trends: Mussel Watch Program, https://www.fisheries.noaa.gov/inport/item/39400.

USACE 2022. Monitoring Survey at the Isles of Shoals North Disposal Site, October 2021. DAMOS Contribution No. 214. Prepared by INSPIRE Environmental, Newport, RI for the U.S. Army Corps of Engineers, New England District, Concord, MA. 46 pp plus Figures and Appendices.

USEPA/USACE 2004. Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters. U.S. EPA Region 1, Boston, MA/U.S. Army Corps of Engineers, New England District, Concord, MA.

USEPA/USACE 1991. Evaluation of Dredged Material Proposed for Ocean Disposal Testing Manual. Environmental Protection Agency, Office of Water and Department of the Army, United States Army Corps of Engineers. Washington, D.C.

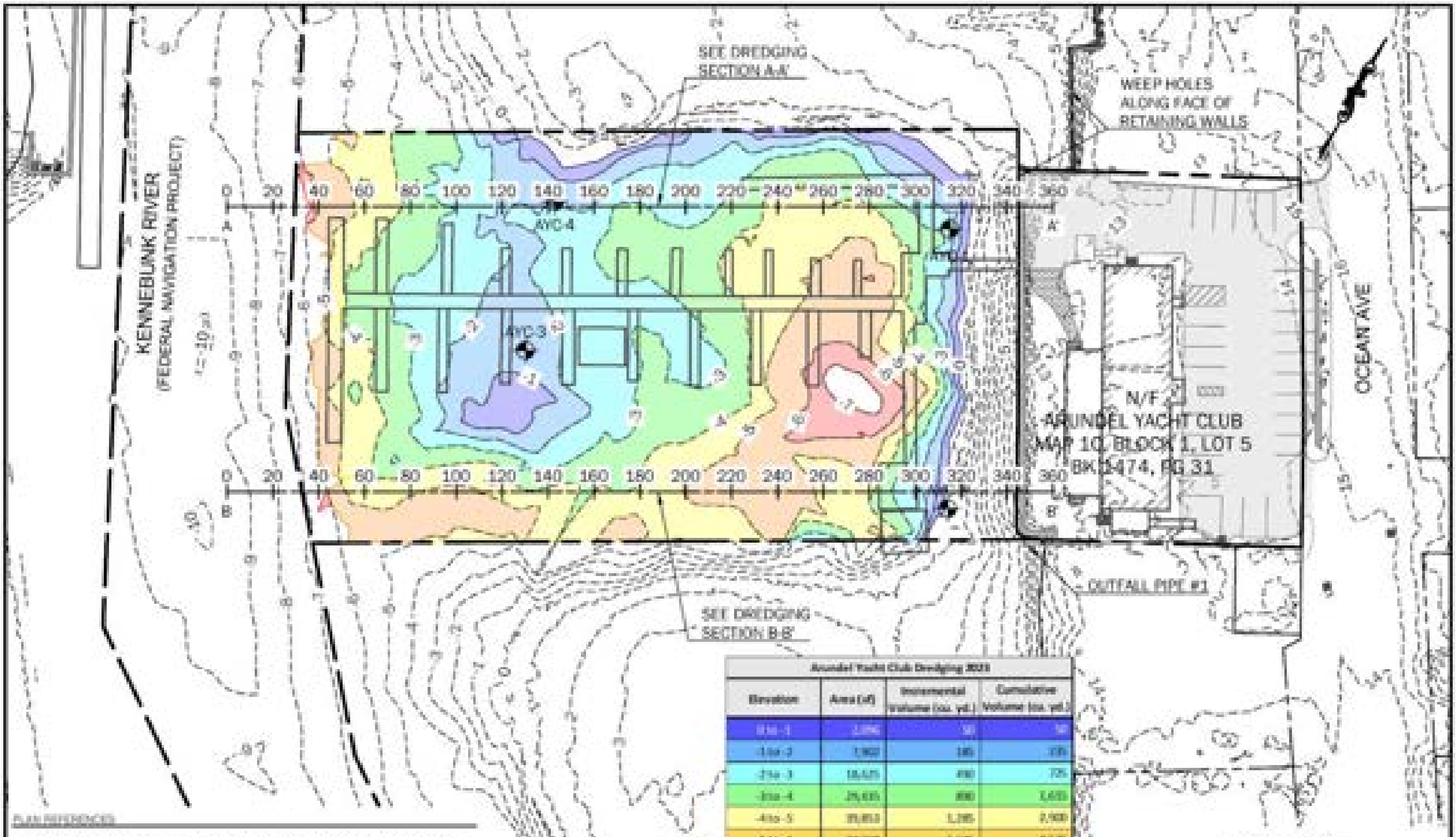


US Army Corps of Engineers New England District

FIGURE 1
KENNEBUNK RIVER PROJECTS
KENNEBUNK, ME

2015 NAIP AERIAL IMAGERY

GCS NAD 1983



Arundel Yacht Club Dredging 2023			
Elevation	Area (sf)	Incremental Volume (cu. yd.)	Cumulative Volume (cu. yd.)
0 to -1	2,090	50	50
-1 to -2	7,902	185	235
-2 to -3	18,625	490	725
-3 to -4	29,635	890	1,615
-4 to -5	35,853	1,285	2,900
-5 to -6	47,368	1,635	4,535
-6 to -7	86,620	1,890	6,425
Total Dredge Volume w/ 25% Bulking Factor			8,031 cu. yd.

PLAN REFERENCES:

1. BATHYMETRY CONDUCTED BY WEA ON NOVEMBER 17, 2023 USING A HYDROLITE SONARMITE ECHOSOUNDER AND CARLSON BRX7 GNSS RECEIVER
2. TOPOGRAPHIC DATA COLLECTED BY WEA VIA A DJI M300 DRONE EQUIPPED WITH A ZENMUSE L1 LIDAR CAMERA ON NOVEMBER 21, 2023.
3. ALL ELEVATIONS ON THIS PLAN ARE BASED ON THE MLLW VERTICAL DATUM. ELEVATIONS IN NAVD88 HAVE BEEN RAISED BY 5.14 FEET TO THE MLLW DATUM.

WALSH
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One Karen Dr., Suite 2A | Westbrook, Maine 04092
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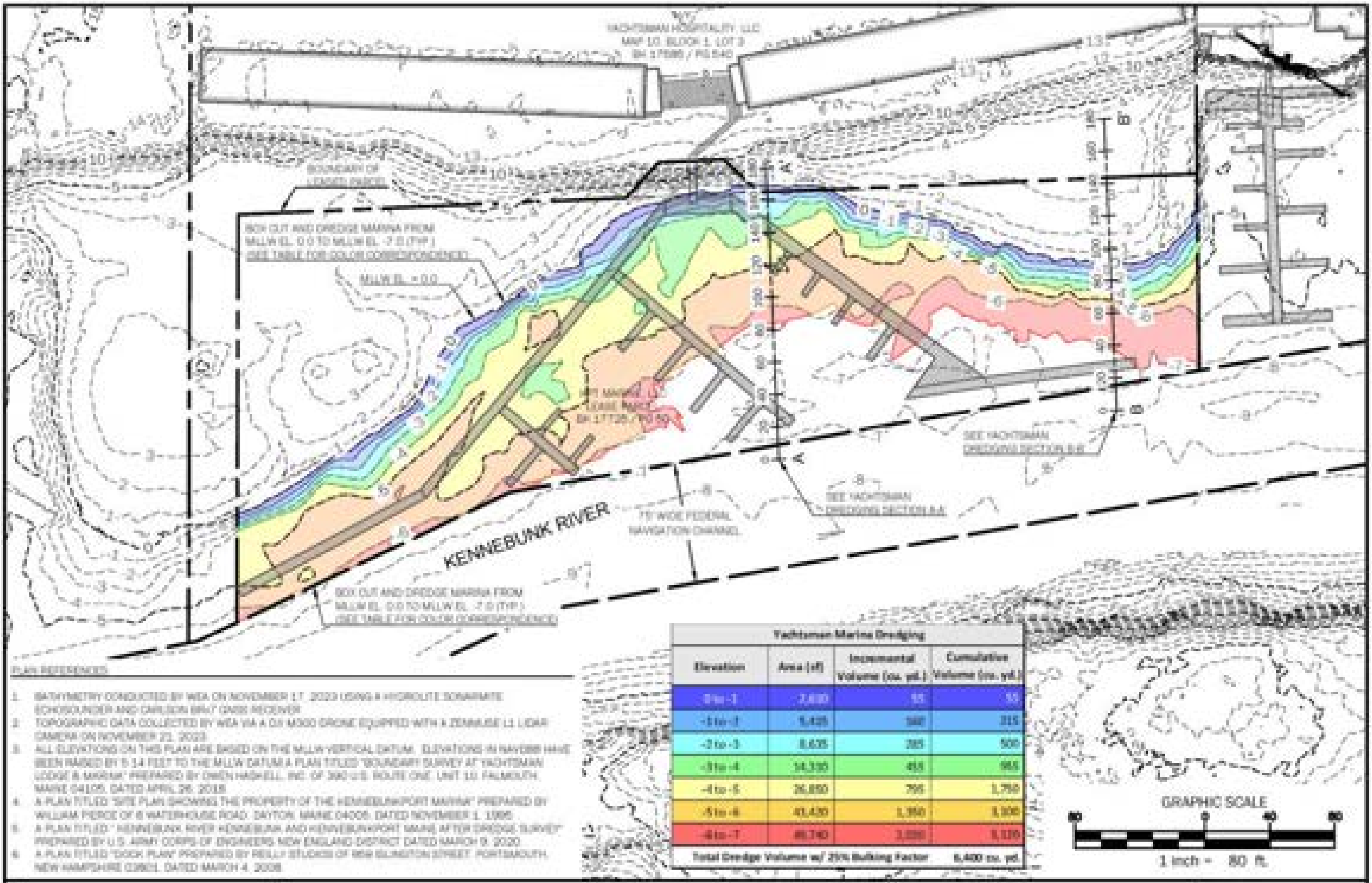
Arundel Yacht Club Dredging: 2023 Bathymetry

Arundel Yacht Club
51 Ocean Ave
Kennebunkport, Maine 04046

Figure 2:
Arundel Yacht Club
Applicant Dredge Plan



PLAN REFERENCES

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2. TOPOGRAPHIC DATA COLLECTED BY WEA VIA A DJI M300 DRONE EQUIPPED WITH A ZENMUSE L1 LIDAR CAMERA ON NOVEMBER 21, 2023.
3. ALL ELEVATIONS ON THIS PLAN ARE BASED ON THE MLLW VERTICAL DATUM. ELEVATIONS IN NAVD88 HAVE BEEN RAISED BY 5.14 FEET TO THE MLLW DATUM A PLAN TITLED "BOUNDARY SURVEY AT YACHTSMAN LODGE & MARINA" PREPARED BY OWEN HASKELL, INC. OF 390 U.S. ROUTE ONE, UNIT 10, FALMOUTH, MAINE 04105, DATED APRIL 26, 2018.
4. A PLAN TITLED "SITE PLAN SHOWING THE PROPERTY OF THE KENNEBUNKPORT MARINA" PREPARED BY WILLIAM PIERCE OF 8 WATERHOUSE ROAD, DAYTON, MAINE 04005, DATED NOVEMBER 1, 1995
5. A PLAN TITLED " KENNEBUNK RIVER KENNEBUNK AND KENNEBUNKPORT MAINE AFTER DREDGE SURVEY" PREPARED BY U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DISTRICT DATED MARCH 9, 2020.
6. A PLAN TITLED "DOCK PLAN" PREPARED BY REILLY STUDIOS OF 959 ISLINGTON STREET, PORTSMOUTH, NEW HAMPSHIRE 03801, DATED MARCH 4, 2008.

Yachtsman Marina Dredging

Elevation	Area (sf)	Incremental Volume (cu. yd.)	Cumulative Volume (cu. yd.)
0 to -1	2,630	55	55
-1 to -2	5,415	160	215
-2 to -3	8,635	285	500
-3 to -4	14,310	455	955
-4 to -5	26,850	795	1,750
-5 to -6	43,430	1,350	3,100
-6 to -7	49,740	2,020	5,120
Total Dredge Volume w/ 25% Bulking Factor			6,400 cu. yd.

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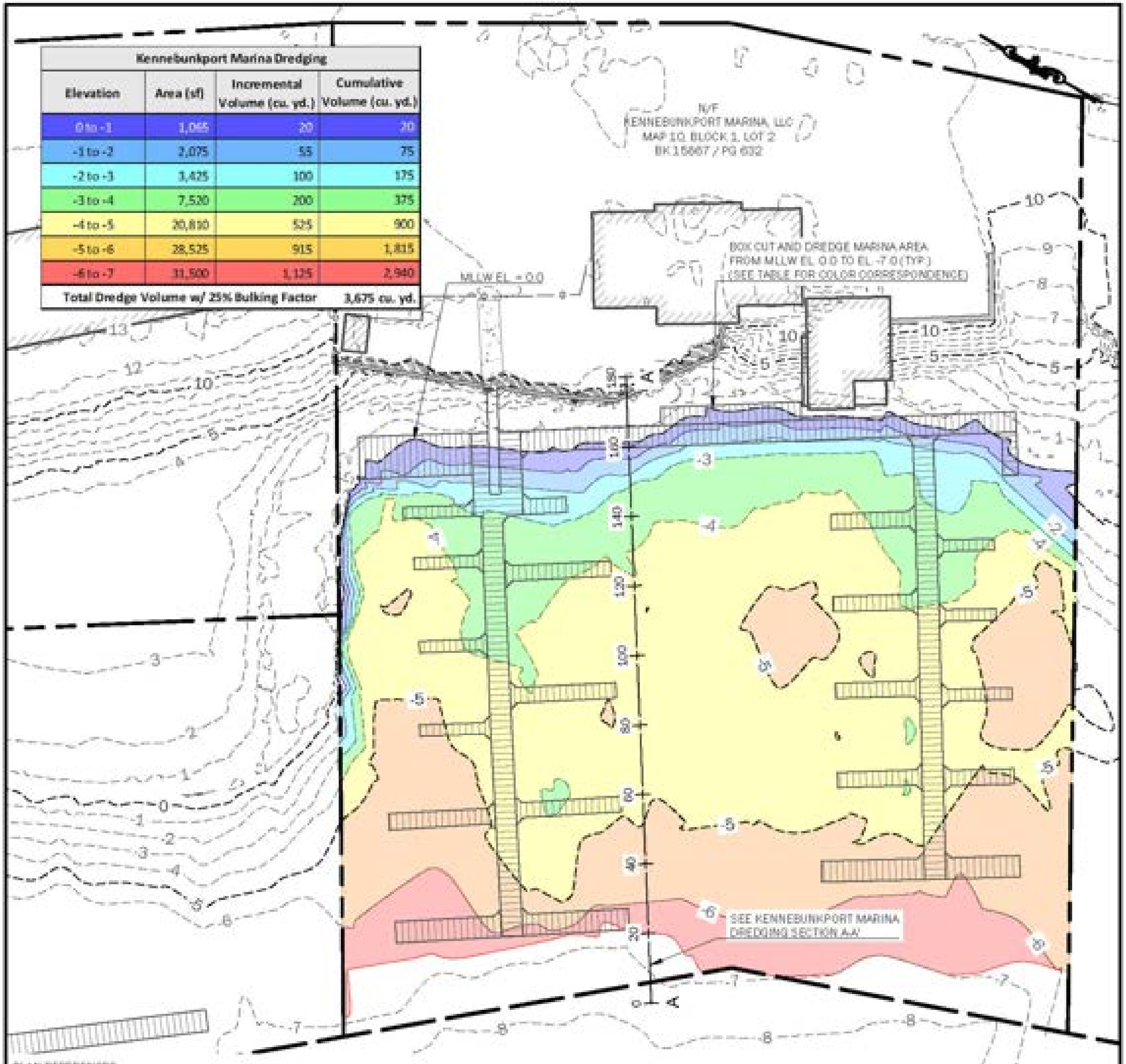
ph: 207.553.9898 | www.walsh-eng.com

Yachtsman Marina Dredging: 2023 Bathymetry

Kennebunkport Marina
59 Ocean Ave
Kennebunkport, Maine 04046

Figure 3:
Yachtsman Marina
Applicant Dredge Plan



Kennebunkport Marina Dredging			
Elevation	Area (sf)	Incremental Volume (cu. yd.)	Cumulative Volume (cu. yd.)
0 to -1	1,065	20	20
-1 to -2	2,075	55	75
-2 to -3	3,425	100	175
-3 to -4	7,520	200	375
-4 to -5	20,810	525	900
-5 to -6	28,525	915	1,815
-6 to -7	31,500	1,125	2,940
Total Dredge Volume w/ 25% Bulking Factor			3,675 cu. yd.

PLAN REFERENCES

1. BATHYMETRY CONDUCTED BY WEA ON NOVEMBER 17, 2023 USING A HYDROLITE SONARMITE ECHOSOUNDER AND CARLSON BRx7 GNSS RECEIVER.
2. TOPOGRAPHIC DATA COLLECTED BY WEA VIA A DJI M300 DRONE EQUIPPED WITH A ZENMUSE L1 LIDAR CAMERA ON NOVEMBER 21, 2023.
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KENNEBUNK RIVER
(75' WIDE FEDERAL NAVIGATION CHANNEL)

GRAPHIC SCALE
40 0 20 40
1 inch = 40 ft.

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Kennebunkport Marina Dredging: 2023 Bathymetry

Kennebunkport Marina
67 Ocean Ave
Kennebunkport, Maine 04046

Figure 4: Kennebunkport Marina Applicant Dredge Plan

PLAN REFERENCES:
1. KENNEBUNK RIVER FEDERAL CHANNEL INFORMATION TAKEN FROM DIGITAL FILE FROM A.C.O.E. WEBSITE. FILE KNR_CS_2018_006.
2. CONTOURS SET TO M.L.L.W. = 0.00 FEET.
3. AERIAL IMAGE FROM M.E.G.I.S. WEBSITE, 2018

ECO-ANALYSTS, INC.
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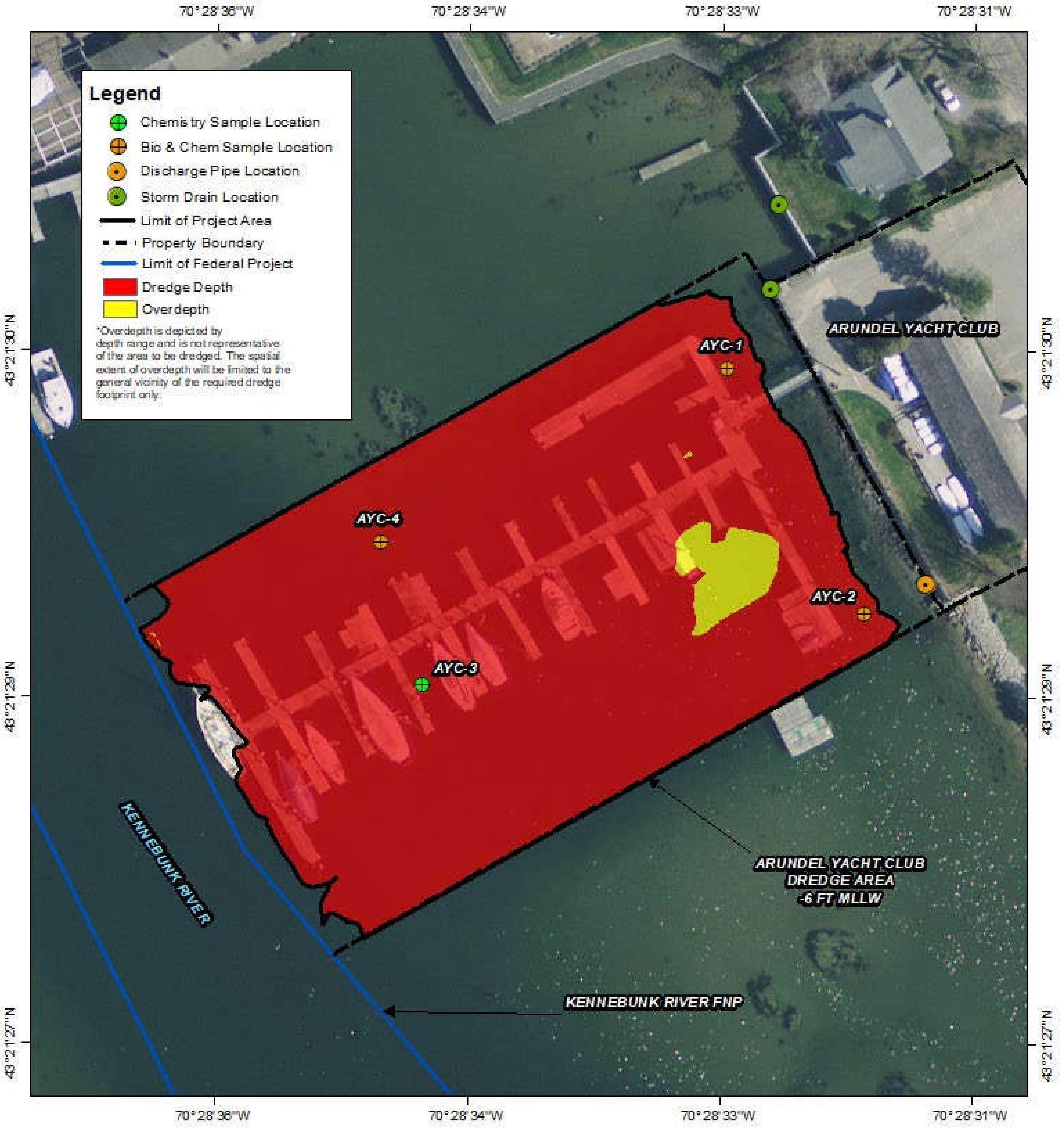
Date: 12/9/2019
Project: KRC
Drafted By: TF/SS

Plan View of the Existing Condition and the proposed dredge window for the Kennebunk River Club, 116 Ocean Ave in Kennebunkport, Maine

Figure 5:
Kennebunk River Club Applicant Dredge Plan



US Army Corps of Engineers
New England District

FIGURE 6
ARUNDEL YACHT CLUB
SAMPLE LOCATIONS

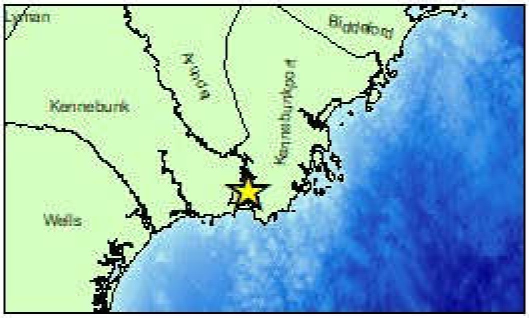
0 70 140 Feet

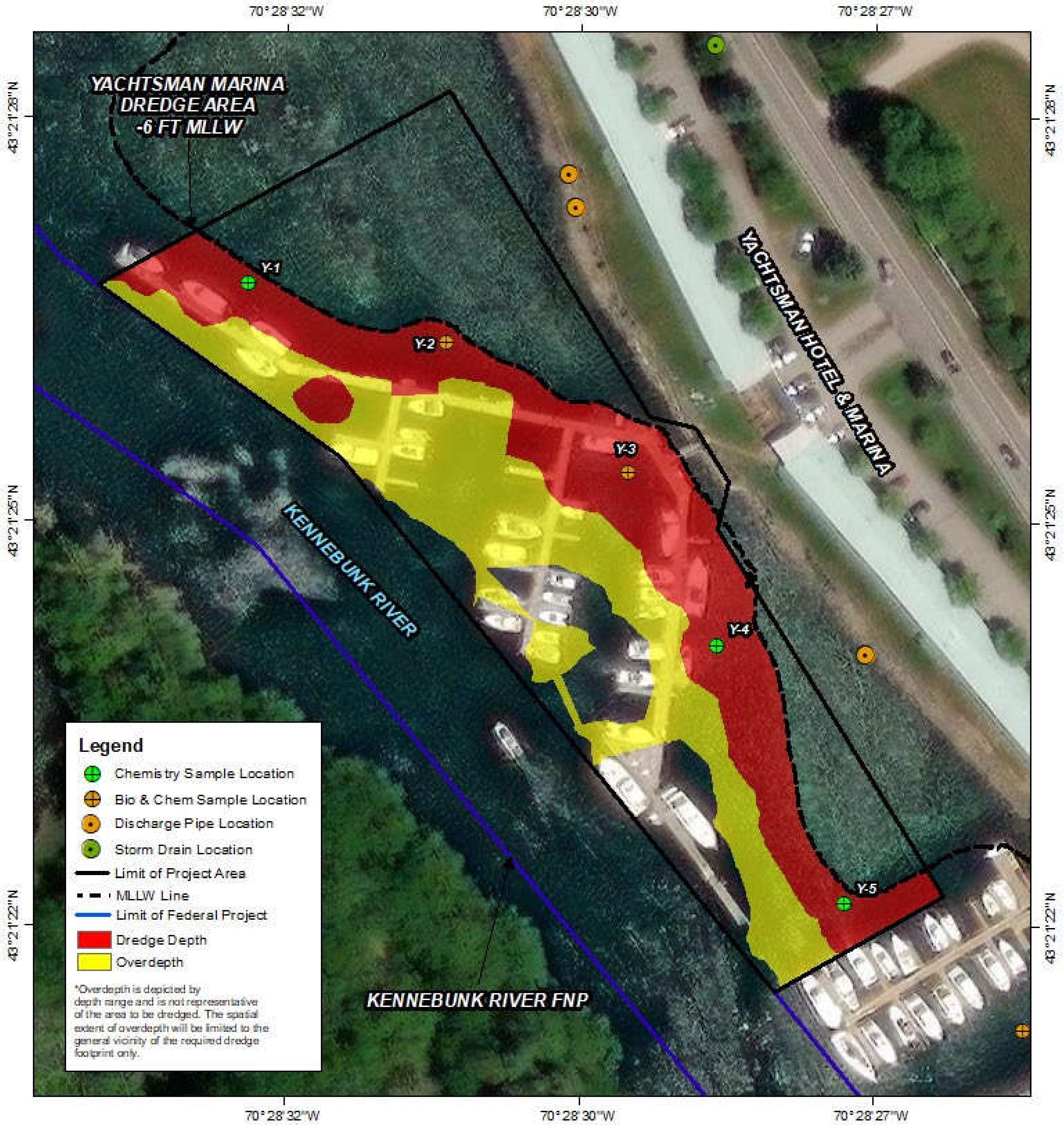
0 20 40 Meters

1:700

2024 ESRI WORLD IMAGERY

GCS NAD 1983





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of Engineers
New England District

FIGURE 7
YACHTSMAN MARINA
SAMPLE LOCATIONS

0 100 200 Feet

0 30 60 Meters

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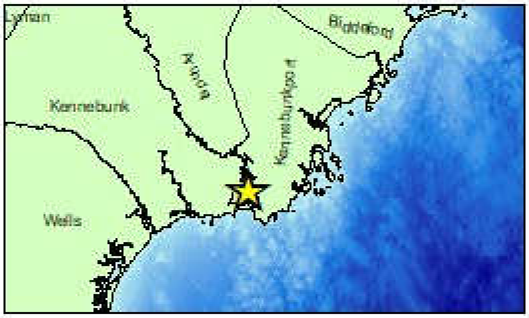
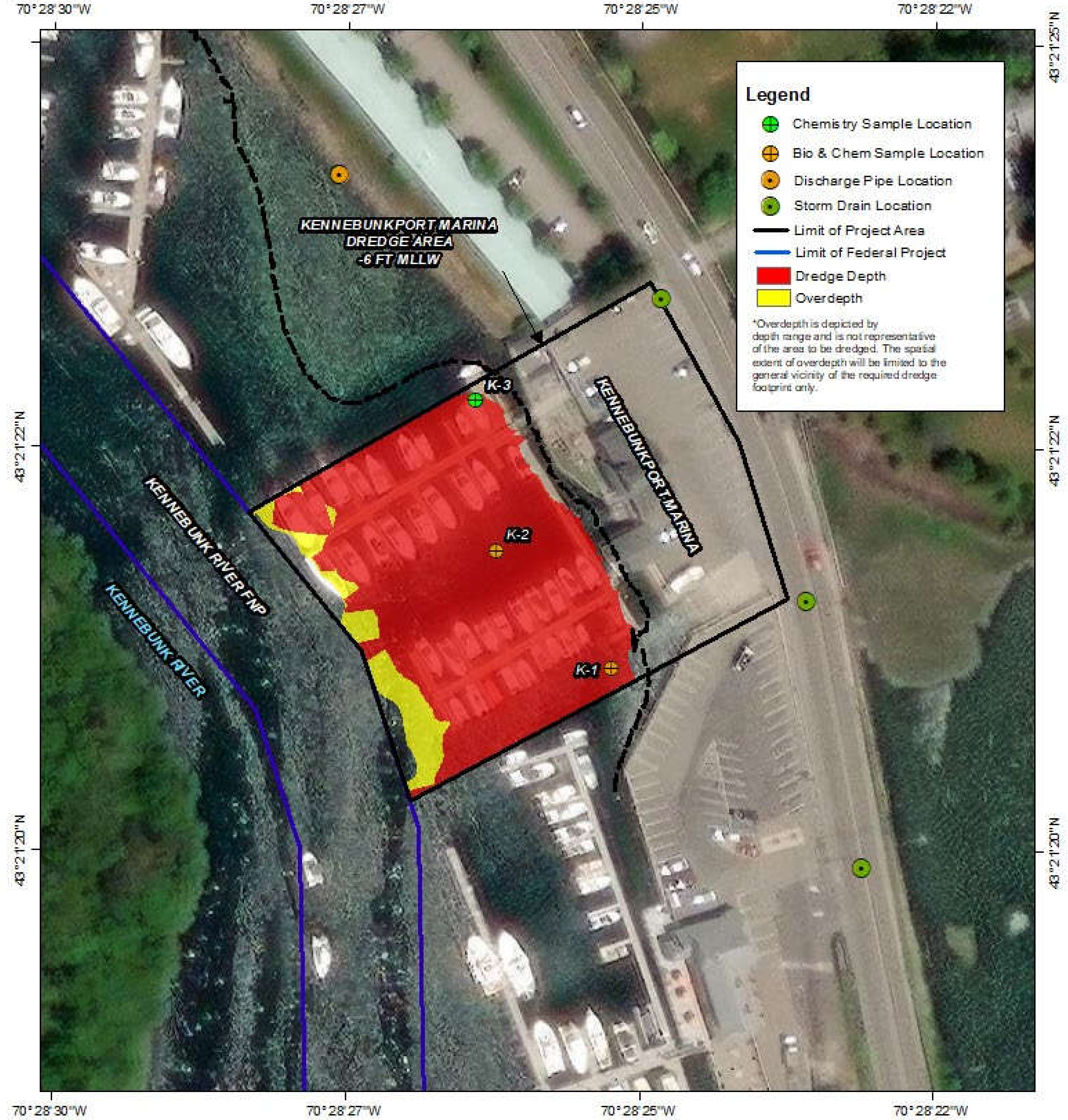
GCS NAD 1983





*Overdepth is depicted by depth range and is not representative of the area to be dredged. The spatial extent of overdepth will be limited to the general vicinity of the required dredge footprint only.

FIGURE 8
KENNEBUNKPORT MARINA
SAMPLE LOCATIONS

US Army Corps
of Engineers
New England District

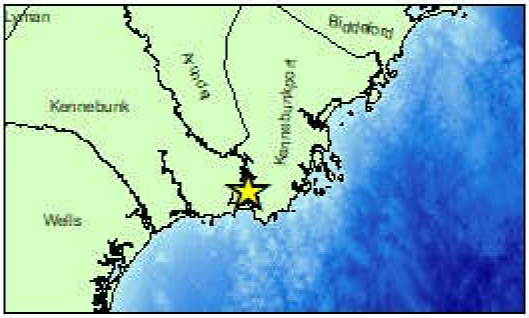
0 100 200 Feet

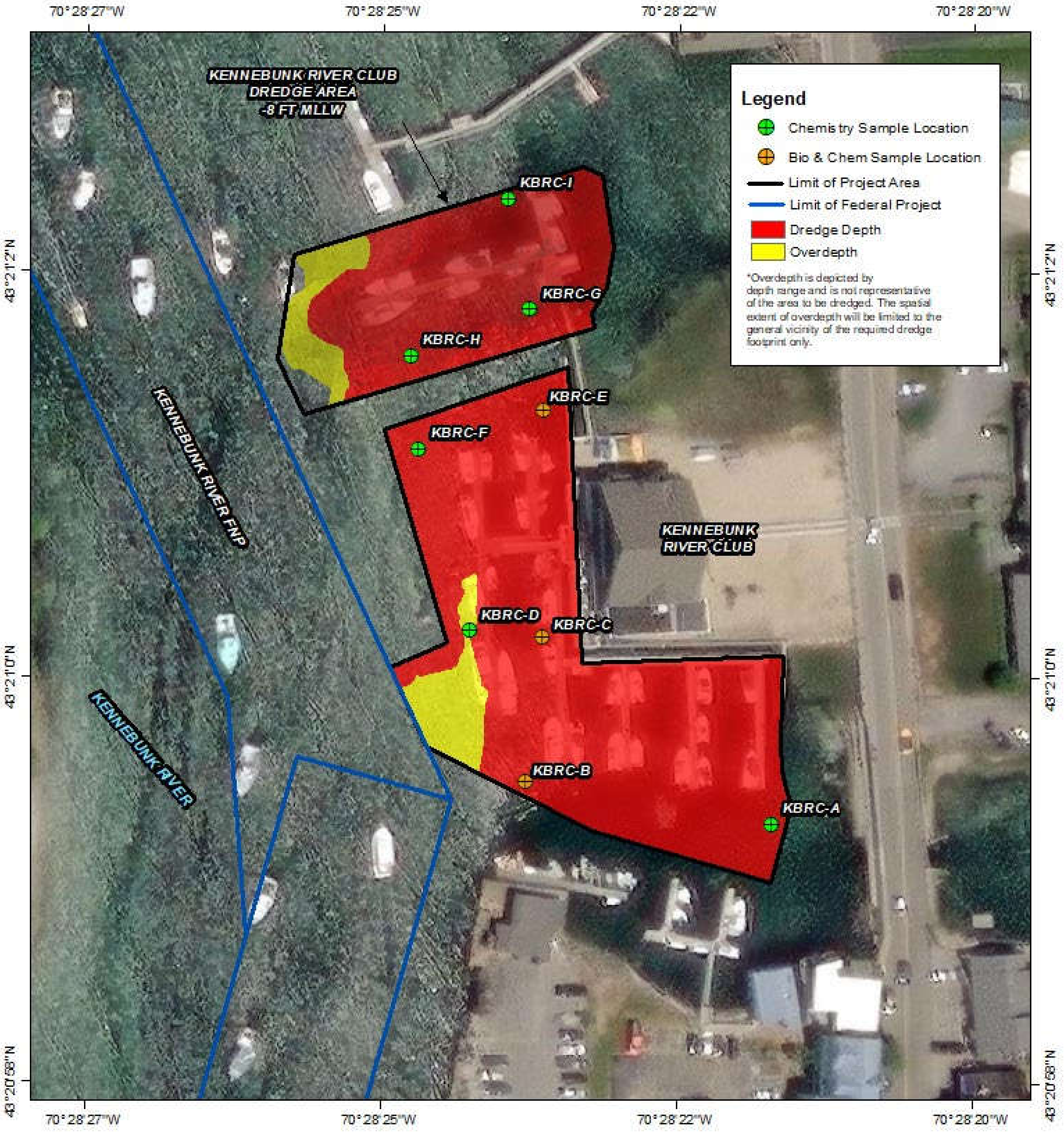
0 20 40 60 Meters

1:1,000

2024 ESRI WORLD IMAGERY

GCS NAD 1983





US Army Corps of Engineers
New England District

FIGURE 9
KENNEBUNK RIVER CLUB SAMPLE LOCATIONS

1:1,000

2024 ESRI WORLD IMAGERY

GCS NAD 1983

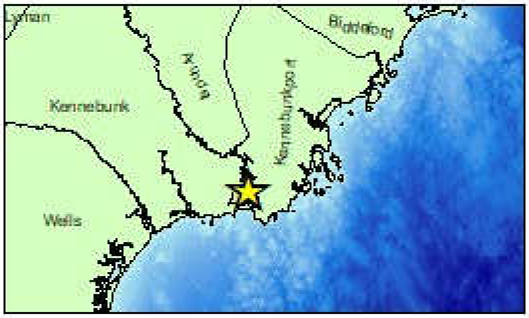
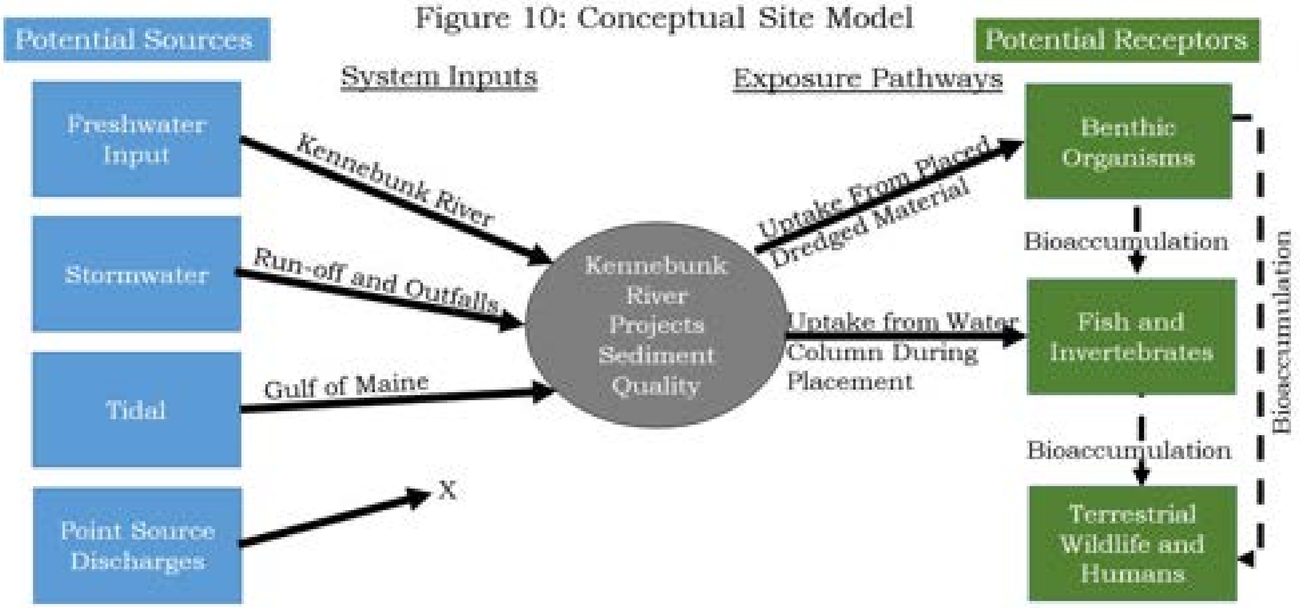


Figure 10: Conceptual Site Model



Appendix A
Core Logs and Photographs

Coastline Consulting & Development Core Log

Project: Arundel Yacht Club **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: AYC-1 **Time:** 1:06 pm

Sampler Type: VibraCore Sampler

Depth: -3.9’ MLLW

Coordinates: **Latitude:** 43.35831 **Longitude:** -70.47582

Penetration: 3.2’ **Recovery:** 3.2’ **No. Attempts:** 3

Material Description: 0-3.1, composited. Dark silt/mud with shell debris.

Core Photo

Coastline Consulting & Development Core Log

Project: Arundel Yacht Club

Date: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: AYC-2

Time: 12:20 pm

Sampler Type: VibraCore Sampler

Depth: -2.1' MLLW

Coordinates: **Latitude:** 43.35800 **Longitude:** -70.47561

Penetration: 2.4'

Recovery: 2.4'

No. Attempts: 9

Material Description: 0-2.4' composited. Hard packed sand with shell debris. Multiple attempts were made refusal was reached after 2.4' penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Arundel Yacht Club

Date: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: AYC-3

Time: 12:55 pm

Sampler Type: VibraCore Sampler

Depth: -3.2’ MLLW

Coordinates: **Latitude:** 43.35793 **Longitude:** -70.47634

Penetration: 1’ **Recovery:** 9” **No. Attempts:** 16

Material Description: 0-9” composited. Hard substrate encountered a lot of wood debris and shell material. We attempted to call ACOE contacts during sampling, messages were left but no one returned the calls that day. We kept the largest core and did not cut it because we did not want to lose any material. Sample was extruded directly into bucket for compositing. We attempted multiple cores within a 10’ radius of the location and saved the best one. Multiple attempts were made refusal was reached after 1’ penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Arundel Yacht Club **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: AYC-4 **Time:** 12:35 pm

Sampler Type: VibraCore Sampler

Depth: -3.0’ MLLW

Coordinates: **Latitude:** 43.35811 **Longitude:** -70.47638

Penetration: 4.1’ **Recovery:** 4.0’ **No. Attempts:** 5

Material Description: 0-4.0 composited. Dark silt with hard packed sand at bottom of core.

Core Photo

Coastline Consulting & Development Core Log

Project: Kennebunkport Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: K-1 **Time:** 9:38 am

Sampler Type: VibraCore Sampler

Depth: -1.8’ MLLW

Coordinates: **Latitude:** 43.35587 **Longitude:** -70.47367

Penetration: 4.2’ **Recovery:** 4.2’ **No. Attempts:** 6

Material Description: 0-4.2’ composited. Dark silt with hard packed sand at bottom of core. Multiple attempts were made refusal was reached after 4.2’ penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Kennebunkport Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: K-2 **Time:** 9:47 am

Sampler Type: VibraCore Sampler

Depth: -4.8' MLLW

Coordinates: **Latitude:** 43.35607 **Longitude:** -70.47394

Penetration: 3.1' **Recovery:** 3.1' **No. Attempts:** 3

Material Description: 0-2.2' composited. Dark silt with hard packed sand towards bottom of core.

Core Photo

Coastline Consulting & Development Core Log

Project: Kennebunkport Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: K-3 **Time:** 10:05 am

Sampler Type: VibraCore Sampler

Depth: -1.7' MLLW

Coordinates: **Latitude:** 43.35634 **Longitude:** -70.474

Penetration: 4.3' **Recovery:** 4.2' **No. Attempts:** 7

Material Description: 0-4.2' composited. Dark silt with hard packed sand at bottom of core. Multiple attempts were made refusal was reached after 4.3' penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Yachtsman Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: Y-1 **Time:** 11:29 am

Sampler Type: VibraCore Sampler

Depth: -1.5' MLLW

Coordinates: **Latitude:** 43.35735 **Longitude:** -70.47578

Penetration: 3.5' **Recovery:** 3.5' **No. Attempts:** 8

Material Description: 0-3.5' composited. Compact sand with shell debris. Multiple attempts were made refusal was reached after 3.5' penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Yachtsman Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: Y-2 **Time:** 11:15 am

Sampler Type: VibraCore Sampler

Depth: -1.2' MLLW

Coordinates: **Latitude:** 43.35724 **Longitude:** -70.47533

Penetration: 2.5' **Recovery:** 2.5' **No. Attempts:** 8

Material Description: 0-2.5' composited. Hard packed sand. Multiple attempts were made refusal was reached after 2.5' penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Yachtsman Marina

Date: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: Y-3

Time: 11:02 am

Sampler Type: VibraCore Sampler

Depth: -4.2' MLLW

Coordinates: **Latitude:** 43.35701 **Longitude:** -70.47488

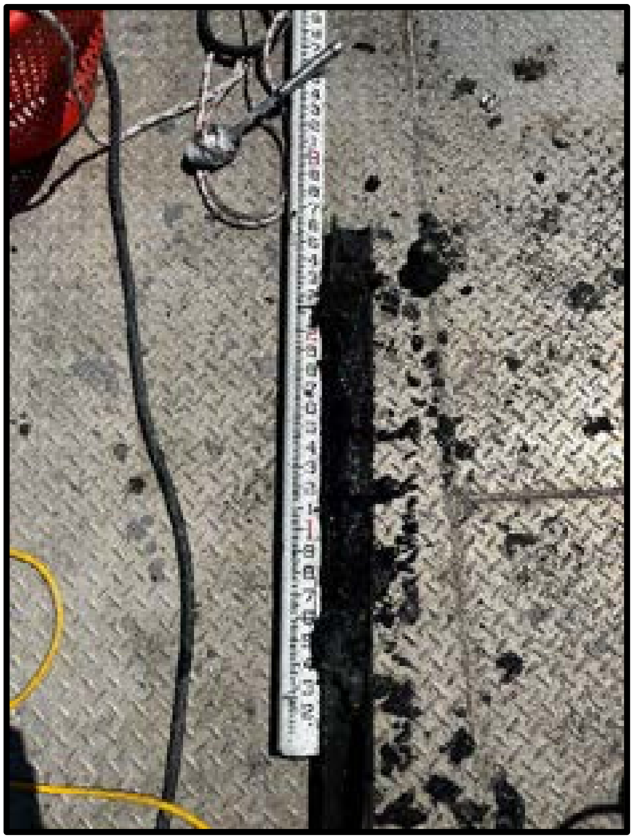
Penetration: 2.7'

Recovery: 2.7'

No. Attempts: 5

Material Description: 0-2.7' composited. Dark silt with hard packed sand at bottom of core.

Core Photo



Coastline Consulting & Development Core Log

Project: Yachtsman Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: Y-4 **Time:** 10:54 am

Sampler Type: VibraCore Sampler

Depth: -4.4' MLLW

Coordinates: **Latitude:** 43.35673 **Longitude:** -70.47467

Penetration: 3.4' **Recovery:** 3.4' **No. Attempts:** 4

Material Description: 0-2.6' composited. Dark silt with hard packed sand at bottom of core.

Core Photo

Coastline Consulting & Development Core Log

Project: Yachtsman Marina

Date: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: Y-5

Time: 10:40 am

Sampler Type: VibraCore Sampler

Depth: -1.0’ MLLW

Coordinates: **Latitude:** 43.35629 **Longitude:** -70.47437

Penetration: 6.1’

Recovery: 6.1’

No. Attempts: 3

Material Description: 0-6.0’ composited. Dark silt with hard packed sand at bottom of core.

Core Photo

Appendix B
Bulk Sediment Chemistry Results

							Kennebunkport Marina (NAE-2005-00280)						Yachtsman Marina (NAE-2004-00319)										Arundel Yacht Club (NAE-2022-00288)								Kennebunk River Club (NAE-2007-2704)																	
					IOSN		K-1		K-2		K-3		Y-1		Y-2		Y-3		Y-4		Y-5		AYC-1		AYC-2		AYC-3		AYC-4		KBRC-A		KBRC-B		KBRC-C		KBRC-D		KBRC-E		KBRC-G		KBRC-H		KBRC-I		KBRC-F	
Parameter	CAS Number	Units	ERL	ERM	Value	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Physical																																																
Total organic carbon	14762744	%			1.28		0.37		3.04		2.32		0.93		0.72		1.90		1.19		0.20		1.14		1.15		8.46		2.64		-		-		-		-		-		-		-		-		-	
Metals																																																
Arsenic	7440382	mg/kg	8.2	70	9.66		2.85		6.68		6.34		6.65		3.20		7.96		4.54		0.984		9.75		6.72		7.78		10.3		5.34		4.98		3.52		3.30		2.47		3.34		2.82		5.12		1.58	
Cadmium	7440439	mg/kg	1.2	9.6	0.072		0.295		0.410		0.344		0.225		0.235		0.388		0.430		0.093		0.335		0.330		0.453		0.613		0.463		0.433		0.300		0.350		0.229		0.277		0.237		0.451		0.119	
Chromium	7440473	mg/kg	81	370	31.5		21.9		27.1		26.4		17.7		14.7		33.6		23.1		6.71		41.6		26.2		25.6		38.1		27.5		26.0		20.0		20.5		15.6		18.0		16.5		24.8		11.0	
Copper	7440508	mg/kg	34	270	10.9		14.2		16.7		15.4		12.5		8.64		18.3		9.82		1.59		29.4		15.7		25.6		24.3		13.7		13.8		9.34		9.52		18.6		8.28		7.16		13.6		5.32	
Lead	7439921	mg/kg	46.7	218	18.1		134		21.9		17.1		12.4		12.9		20.2		7.79		1.81		30.9		26.1		21.4		33.7		18.8		17.8		12.2		13.3		8.67		11.5		9.29		17.7		4.81	
Mercury	7439976	mg/kg	0.150	0.710	0.032		0.051		0.063		0.047		0.045		0.051		0.052		0.011	J	0.005	J	0.064		0.086		0.059	J	0.108		0.062		0.054		0.052		0.053		0.032		0.067		0.046		0.056		0.023	
Nickel	7440020	mg/kg	20.9	51.6	20.8		9.17		15.6		15.4		11.3		8.37		21.4		15.1		3.81		25.4		13.0		15.0		22.7		15.9		14.5		11.4		11.3		8.57		9.92		8.67		13.4		6.12	
Zinc	7440666	mg/kg	150	410	60.6		56.6		67.4		57.2		42.2		37.6		71.2		45.2		10.2		101		58.1		68.6		98.0		68.9		67.7		48.3		50.9		37.2		50.5		39.9		78.2		28.9	J
PAHs																																																
Acenaphthene	83329	ug/kg	16	500	1.48		3.96	J	20.4		15.1		5.30		3.46	J	2.97	J	1.75	J	1.32	J	11.3		23.4		1.40	U	4.94	J	21.7		18.2		1.35	U	1.35	U	1.35	U	1.35	U	1.35	U	1.35	U	1.35	U
Acenaphthylene	208968	ug/kg	44	640	7.06		30.1		20.6		12.6		9.97		17.0		12.6		0.241	U	0.884	J	23.8		71.1		7.60	J	15.3		10.0		1.25	U	1.25	U	1.25	U	1.25	U	1.25	U	1.25	U	11.9		1.25	
Anthracene	120127	ug/kg	85.3	1,100	4.14		32.5		34.5		40.4		26.3		32.5		18.1		0.692	J	0.640	J	25.0		119		7.96	J	18.6		90.3		143.0		46.3		19.6		26.2		18.9		25.2		29.1		15.4	U
Fluorene	86737	ug/kg	19	540	2.40		8.08		25.5		17.1		6.97		9.01		5.98		0.218	U	0.186	U	12.9		37.4		3.53	J	4.86	J	37.8		30.6		15.9		1.45	U	1.45	U	1.45	U	10.9		14.2		1.45	
Naphthalene	91203	ug/kg	160	2,100	6.25		8.30		10.2		11.6		5.13		8.99		9.39		2.35	UJ	2.26	UJ	14.5		21.8		29.7		7.95		1.15	U	1.15	U	1.15	U	1.15	U	1.15	U	1.15	U	1.15	U	1.15	U	1.15	U
Phenanthrene	85018	ug/kg	240	1500	26.9		102		114		128		134	J	120		69.4		2.62	J	3.38	J	101		381		40.7		52.2		155		127		142		81.5		82.9	J	76.5		87.1		159		82.9	
Total LPAH	*SUMLPAH*	ug/kg	552	3,160	48.2		185		225		225		188		191		118		7.87		8.67		189		654		90.9		104		316		321		208		106		114		101		127		217		104	
Benzo(a)anthracene	56553	ug/kg	261	1,600	21.3		115		157		133		127		128		74.0		2.98	J	3.97		136		326		31.0		77.3		311		522		257		92		97.2		78.7		67.0		136		55.8	
Benzo(a)pyrene	50328	ug/kg	430	1,600	23.4		129		160		130		132	J	130		85.3		3.12	J	4.60		140		328		35.7		90.0		171	J	226	J	146	J	80	J	76.8		71.4	J	58	J	129	J	51.8	J
Benzo(b)fluoranthene	205992	ug/kg			36.4		126		180		137		116	J	141		95.8		3.61	J	5.28		163		320		42.7		93.5		282	J	303	J	210	J	109	J	87.2		86.6	J	86.2	J	201	J	63.6	J
Benzo(g,h,i)perylene	191242	ug/kg			23.1		88.0		112		90.4		87.6	J	83.3		63.9		2.36	J	3.32	J	101		206		28.2		61.9		73.1	J	82.4	J	60.7	J	38.2	J	39.7		31.0	J	23.7	J	50	J	26.8	J
Benzo(k)fluoranthene	207089	ug/kg			18.5		91		131		117		106	J	94.6		61.4		2.23	J	3.38	J	120		231		31.1		75.7		174	J	251	J	139	J	77.7	J	67.3		78.9	J	52.5	J	110	J	40.5	J
Chrysene	218019	ug/kg	384	2,800	21.7		132		164		138		136	J	140		88.9		3.32	J	4.68		148		362		42.9		94.7		321		455		216		102		95.7		86.1		79.0		169		58.6	
Dibenz(a,h)anthracene	53703	ug/kg	63.4	260	4.41		19.6		24.4		20.4		19.6		21.2		15.2		0.253	U	0.723	J	25.3		56.6		8.33	J	14.7		11.6	J	15.5	J	10.0	UJ	9.9	UJ	10.2		10.1	UJ	10.2	UJ	10.1	UJ	9.90	UJ
Fluoranthene	206440	ug/kg	600	5,100	42.1		239		364		474		297	J	269		167		7.05		6.58		291		702		92.7		233		618		1130		264		152		162	J	136		127		209		123	
Indeno(1,2,3-cd)pyrene	193395	ug/kg			23.6		83.5		108		94.6		90.1	J	86.5		67.2		2.39	J	3.20	J	102		215		27.4		64.2		71.2	J	87.5	J	60.5	J	39.5	J	43.8		33.4	J	27.2	J	51.0	J	28.1	J
Pyrene	129000	ug/kg	665	2,600	45.2		215		297		330		225		244		144		5.99		12.6		256		594		71.2		181		611		1140		665		166		158		144		122		236		109	
Total HPAH	*SUMHPAH*	ug/kg	1,700	9,600	260		1238		1697		1664		1336		1338		863		33.3		48.3		1482		3341		411		986		2644		4212		2028		866		838		756		653		1301		567	
Pesticides																																																
4,4`-DDD	72548	ug/kg	2	20	0.020	U	4.98	J	4.66	J	0.112	UJ	1.16	J	2.86	J	0.093	UJ	0.016	UJ	0.013	UJ	3.87	J	4.34	J	0.274	UJ	1.99	J	1.30		1.90		2.10		1.30		1.00		1.20		0.880		1.70		0.680	
4,4`-DDE	72559	ug/kg	2.2	27	0.066		2.23		4.53	J	0.068	U	2.50	J	2.78		0.057	U	0.010	U	0.008	U	7.51	J	5.74		0.167	U	4.37	J	1.90		1.30		1.40		1.30		0.790		1.40		1.30		2.00		0.400	
4,4`-DDT	50293	ug/kg	1	7	0.026	U	1.44		1.44		0.148	U	0.960		0.808		0.123	U	0.020	U	0.017	U	1.62	J	2.60		0.360	U	1.51	J	0.850		1.50		4.00		0.750		0.620		0.900		0.530		2.20		0.028	U
Total DDX	SUMDDX	ug/kg	1.58	46.1	0.112		8.65		10.6		0.328	U	4.62		6.45		0.272	U	0.045	U	0.038	U	13.0		12.7		0.801	U	7.87		4.05		4.70		7.50		3.35		2.41		3.50		2.71		5.90		1.11	
Aldrin	309002	ug/kg			0.066	U	0.051	U	0.063	U	0.374	U	0.063	U	0.051	U	0.311	U	0.051	U	0.044	U	0.378	U	0.243	U	0.915	U	0.374	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.200	UJ
Alpha-Chlordane (cis)	5103719	ug/kg			0.142	U	0.110	U	0.137	U	0.810	U	0.135	U	0.111	U	0.670	U	0.110	U	0.094	U	0.815	U	0.525	U	1.97	U	0.810	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
cis-Nonachlor	5103731	ug/kg			0.019	U	0.015	U	0.019	U	0.109	U	0.018	U	0.015	U	0.090	U	0.015	U	0.013	U	0.110	U	0.071	U	0.265	U	0.109	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U
Dieldrin	60571	ug/kg	0.02	8	0.040	U	0.031	U	0.038	U	0.226	U	0.038	U	0.031	U	0.187	U	0.031	U	0.026	U	0.23	U	0.15	U	0.550	U	0.225	U	0.460		0.850		0.026	U	1.00		1.20		0.026	U	0.026	U	0.610		0.026	U
Endosulfan I	959988	ug/kg			0.036	U	0.028	U	0.035	U	0.206	U	0.035	U	0.029	U	0.171	U	0.028	U	0.024	U	0.208	U	0.134	U	0.500	U	0.206	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U
Endosulfan II	33213659	ug/kg			0.019	U	0.015	U	0.018	U	0.106	U	0.018	U	0.015	U	0.088	U	0.015	U	0.013	U	0.107	U	0.069	U	0.260	U	0.106	U	0.019	U	0.019	U	0.019	U	1.20		0.019	U	0.019	U	0.019	U	0.740		0.019	U
Endrin	72208	ug/kg			0.022	U	0.017	U	0.021	U	0.123	U	0.021	U	0.017	U	0.102	U	0.017	U	0.014	U	0.124	U	0.080	U	0.300	U	0.123	U	0.027	U	0.027	U	0.430		0.760		0.027	U	0.027	U	0.770		1.90		0.027	U
Gamma-Chlordane (trans)	5103742	ug/kg			0.040	U	0.031	U	0.039	U	0.228	U	0.038	U	0.031	U	0.189	U	0.031	U	0.027	U	0.23	U	0.15	U	0.555	U	0.228	U	0.710		0.910		0.220		1.8		0.009	U	0.009	U	1.50		0.720		0.830	J
Heptachlor	76448	ug/kg			0.041	U	0.032	U	0.040	U	0.235	U	0.039	U	0.032	U	0.195	U	0.032	U	0.027	U	0.237	U	0.152	U	0.570	U	0.234	U	0.470		0.300		0.310		0.230		0.220		0.009	U	0.009	U	0.820		0.009	U
Heptachlor epoxide	1024573	ug/kg			0.085	U	0.066	U	0.082	U	0.482	U	0.081	U	0.066	U	0.400	U	0.066	U	0.056	U	0.487	U	0.312	U	1.18	U	0.482	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.200	UJ
Hexachlorobenzene	118741	ug/kg			0.354	U	0.274	U	0.341	U	2.015	U	0.337	UJ	0.276	U	1.670	U	0.274	U	0.234	U	2.035	U	1.305	U	4.92	U	2.02	U	0.009	U	0.450		0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.009	U
Lindane	58899	ug/kg			0.059	U	0.046	U	0.057	U	0.338	U	0.057	UJ	0.047	U	0.281	U	0.046	U	0.039	U	0.342	U	0.219	U	0.825	U	0.338	U	0.013	U	0.670		0.540		0.013	U	0.013	U	0.013	U	0.013	U	0.013	U	0.400	J
Methoxychlor	72435	ug/kg			0.913	U	0.073	U	0.090	U	0.530	U	0.089	U	0.073	U	0.442	U	0.073	U	0.062	U	0.540	U	0.345	U	1.30	U	0.530	U	0.125	U	0.125	U	0.125	U	0.125	U	0.125	U	0.125	U	0.125	U	0.125	U	0.125	U
Oxychlordane	27304138	ug/kg			0.082	U	0.063	U	0.079	U	0.464	U	0.078	U	0.064	U	0.385	U	0.063	U	0.054	U	0.469	U	0.301	U	1.13	U	0.464	U	0.710		0.010	U	1.60		0.010	U	0.010	U	0.230		0.010	U	0.290		0.200	UJ
Toxaphene	8001352	ug/kg			1.71	U	1.33	U	1.65	U	9.70	U	1.63	U	1.34	U	8.10	U	1.33	U	1.13	U	9.80	U	6.30	U	23.8	U	9.70	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
trans-Nonachlor	39765805	ug/kg			0.018	U	0.014	U	0.017	U	0.100	U	0.017	U	0.014	U	0.083	U	0.014	U	0.012	U	0.101	U	0.065	U	0.244	U	0.100	U	0.009	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.200	UJ
Total Chlordane	*SUMCHLOR*	ug/kg	0.5	6	0.300	U	0.233	U	0.289	U	1.710	U	0.285	U	0.234	U	1.42	U	0.233	U	0.198	U	1.72	U	1.11	U	4.2	U	1.7	U	1.4		0.95		1.8		1.8		0.044	U	0.265		1.54		1.04		1.25	
PCBs																																																
PCB 008	34883437	ug/kg			0.104	U	0.041	U	0.050	U	0.059	U	0.050	U	0.041	U	0.049	U	0.041	U	0.035	U	0.060	U	0.039	U	0.145	U	0.06	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U
PCB 018	37680652	ug/kg			0.076	U	0.030	U	0.037	U	0.043	U	0.036	U	0.030	U	0.036	U	0.030	U	0.025	U	0.044	U	0.028	U	0.105	U	0.043	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U
PCB 028	7012375	ug/kg			0.129	U	0.050	U	0.062	U	0.074	U	0.062	U	0.050	U	0.061	U	0.050	U	0.043	U	0.074	U	0.048	U	0.179	U	0.073	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U
PCB 044	41464395	ug/kg			0.144	U	0.056	U	0.069	U	0.082	U	0.069	U	0.056	U	0.068	U	0.056	U	0.048	U	0.083	U	0.393		0.200	U	0.082	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
(PCB 049)	41464408	ug/kg			0.140	U	0.055	U	0.068	U	0.080	U	0.067	U	0.055	U	0.067	U	0.055	U	0.047	U	0.081	U	0.052	U	0.195	U	0.080	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U
PCB 052	35693993	ug/kg			0.080	U	0.308	J	0.248	J	0.046	U	0.038	U	0.031	U	0.038	U	0.031	U	0.027	U	0.046	U	0.506		0.111	U	0.046	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
PCB 066	32598100	ug/kg			0.075	U	0.029	U	0.036	U	0.043	U	0.036	U	0.030	U	0.036	U	0.029	U	0.025	U	0.043	U	0.028	U	0.105	U	0.043	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U
(PCB 087)	38380028	ug/kg			0.061	U	0.302	J	0.030	U	0.035	U	0.029	U	0.024	U	0.029	U	0.024	U	0.020	U	0.035	U	0.023	U	0.085	U	0.035	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U
PCB 101	37680732	ug/kg			0.123	U	0.819		0.059	U	0.070	U	0.059	U	0.048	U	0.270	J	0.048	U	0.041	U	0.357	J	0.747		0.170	U	0.070	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
PCB 105	32598144	ug/kg			0.110	U	0.043	U	0.053	U	0.063	U	0.053	U	0.043	U	0.052	U	0.043	U	0.037	U	0.063	U	0.041	U	0.153	U	0.063	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.200	
PCB 118	31508006	ug/kg			0.116	U	0.571		0.056	U	0.066	U	0.056	U	0.046	U	0.055	U	0.045	U	0.039	U	0.067	U	0.590		0.162	U	0.066	U	0.011	U	0.250		0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U
PCB 128	38380073	ug/kg			0.137	U	0.053	U	0.066	U	0.078	U	0.066	U	0.054	U	0.065	U	0.053	U	0.046	U	0.079	U	0.051	U	0.191	U	0.078	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U
PCB 138	35065282	ug/kg			0.088	U	0.922		0.625		0.290	J	0.042	U	0.278	J	0.453	J	0.034	U	0.029	U	0.389	J	1.07		0.122	U	0.050	U	0.280		0.360		0.230		0.220		0.008	U	0.008	U	0.260		0.290		0.008	U
PCB 153	35065271	ug/kg			0.183	U	0.597		0.316	J	0.104	U	0.087	U	0.206	J	0.292	J	0.071	U	0.061	U	0.300	J	0.657		0.254	U	0.104	U	0.260		0.310		0.220		0.006	U	0.006	U	0.006	U	0.006	U	0.220		0.006	U
PCB 170	35065306	ug/kg			0.067	U	0.026	U	0.033	U	0.039	U	0.032	U	0.027	U	0.032	U	0.026	U	0.022	U	0.039	U	0.025	U	0.094	U	0.039	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U
PCB 180	35065293	ug/kg			0.069	U	0.256	J	0.033	U	0.039	U	0.033	U	0.027	U	0.033	U	0.027	U	0.023	U	0.040	U	0.026	U	0.096	U	0.039	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U
(PCB 183)	52663691	ug/kg			0.037	U	0.015	U	0.018	U	0.021	U	0.018	U	0.015	U	0.018	U	0.015	U	0.012	U	0.022	U	0.014	U	0.052	U	0.021	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
(PCB 184)	74472483	ug/kg			0.076	U	0.030	U	0.037	U	0.043	U	0.036	U	0.030	U	0.036	U	0.030	U	0.025	U	0.044	U	0.028	U	0.105	U	0.043	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U
PCB 187	52663680	ug/kg			0.099	U	0.213	J	0.048	U	0.056	U	0.047	U	0.039	U	0.047	U	0.039	U	0.033	U	0.057	U	0.037	U	0.138	U	0.056	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
PCB 195	52663782	ug/kg			0.129	U	0.050	U	0.062	U	0.074	U	0.062	U	0.051	U	0.061	U	0.050	U	0.043	U	0.075	U	0.048	U	0.180	U	0.074	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U
PCB 206	40186729	ug/kg			0.132	U	0.051	U	0.064	U	0.075	U	0.063	U	0.052	U	0.063	U	0.051	U	0.044	U	0.076	U	0.049	U	0.184	U	0.075	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U
PCB 209	2051243	ug/kg			0.151	U	0.059	U	0.073	U	0.086	U	0.072	U	0.059	U	0.072	U	0.059	U	0.050	U	0.087	U	0.056	U	0.211	U	0.086	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U
Total PCBs	*SumNOAA18*	ug/kg	22.7	180	4.02	U	8.34		3.98		2.77		1.92		2.33		3.56		1.56	U	1.33	U	3.95		8.87		5.59	U	2.29	U	1.4		2.1		1.2		0.751		0.326	U	0.326	U	0.831		1.3		0.706	

Notes:

Yellow indicates an exceedance of the ERL

Red indicates an exceedance of the ERM

U= Compound was analyzed for but was not detected (non-detect)

J= Indicates an estimated value

J+= Indicates an estimated value biased high

Non-detects reported as half the MDL

Reference site data from DAMOS monitoring surveys (2019 IOSN)

Total PCBs were calculated using the NOAA 18 method

Total Chlordane is a sum of alpha and gamma chlordane, cis and trans nonachlor, and oxychlordane; IOSN value is a sum of only alpha and gamma chlordane

Appendix C
Tissue Concentrations and BEST Model Output

TABLE C-1 STATISTICAL COMPARISONS OF *N. virens* BODY BURDENS VS. IOSN 2019 REFERENCE DATA

Compound	**Units**	**Pre-Test** [d]		**IOSN 2019**		**Composite**	
		Mean	Qual	Mean	Qual	Mean	Qual
Trace Metals							
Arsenic, total	mg/Kg	2.00		2.25		2.02	NS
Cadmium, total	mg/Kg	0.0300	b	0.0252	b	0.0338	bS
Chromium, total	mg/Kg	0.620	b	0.0686	b	0.551	bS
Copper, total	mg/Kg	1.49		1.20		1.12	NS
Lead, total	mg/Kg	0.195		0.0744		0.191	S
Mercury, total	mg/Kg	0.0110	b	0.0156	b	0.00662	abNS
Nickel, total	mg/Kg	0.476		0.168		0.232	S
Zinc, total	mg/Kg	13.1		18.6		14.1	NS/S e
PAH Compounds							
Acenaphthene	µg/Kg	0.620	a	0.563	ab	0.883	abNS
Acenaphthylene	µg/Kg	0.381	a	0.286	a	4.22	aNS
Anthracene	µg/Kg	0.903	ab	0.310	a	0.610	abS
Benzo(a)anthracene	µg/Kg	0.775	a	0.581	a	0.766	ac
Benzo(a)pyrene	µg/Kg	0.813	a	0.610	a	0.805	ac
Benzo(b)fluoranthene	µg/Kg	1.08	a	0.807	a	2.43	aS
Benzo(k)fluoranthene	µg/Kg	0.493	a	0.371	a	6.45	aS
Benzo(g,h,i)perylene	µg/Kg	0.345	a	0.259	a	0.427	abS
Chrysene	µg/Kg	0.752	a	0.564	a	1.14	abS
Dibenz(a,h)anthracene	µg/Kg	0.400	a	0.300	a	0.396	ac
Fluoranthene	µg/Kg	0.610	a	0.569	ab	6.71	bS
Fluorene	µg/Kg	1.07	b	0.431	ab	2.05	bS
Indeno(1,2,3-cd)pyrene	µg/Kg	0.810	a	0.608	a	0.802	ac
Naphthalene	µg/Kg	1.64	b	0.651	ab	1.60	abS
Phenanthrene	µg/Kg	0.677	a	2.04	b	0.861	abNS
Pyrene	µg/Kg	0.898	a	0.674	a	6.23	bS
Total PAHs	µg/Kg	12.3		9.63		36.4	
PCB Congeners							
PCB 008	µg/Kg	0.0638	a	0.0480	a	0.0632	ac
PCB 018	µg/Kg	0.0465	a	0.0349	a	0.0460	ac
PCB 028	µg/Kg	0.0790	a	0.0593	a	0.0784	ac
PCB 044	µg/Kg	0.0880	a	0.0661	a	0.0873	ac
PCB 052	µg/Kg	0.0491	a	0.0369	a	0.136	abS
PCB 066	µg/Kg	0.0462	a	0.0347	a	0.0457	ac
PCB 101	µg/Kg	0.0752	a	0.0564	a	0.0745	ac
PCB 105	µg/Kg	0.0675	a	0.0506	a	0.810	aS
PCB 118	µg/Kg	0.0713	a	0.0534	a	0.0706	ac
PCB 128	µg/Kg	0.0842	a	0.0632	a	0.0834	ac
PCB 138	µg/Kg	0.305	ab	0.331	ab	0.462	aNS
PCB 153	µg/Kg	0.628	b	0.763		0.857	aNS
PCB 170	µg/Kg	0.0413	a	0.0310	a	0.0409	ac
PCB 180	µg/Kg	0.0423	a	0.0318	a	0.0419	ac
PCB 187	µg/Kg	0.256	a	0.0456	a	0.0601	ac
PCB 195	µg/Kg	0.0795	a	0.0596	a	0.0786	ac
PCB 206	µg/Kg	0.0810	a	0.0608	a	0.0802	ac
PCB 209	µg/Kg	0.0928	a	0.0697	a	0.0920	ac
Total PCBs	µg/Kg	4.39		3.79		6.42	
Pesticides							
Aldrin	µg/Kg	0.0404	a	0.0605	a	0.0400	ac
cis-Chlordane	µg/Kg	0.0870	a	0.131	a	0.0863	ac
trans-Chlordane	µg/Kg	0.0245	a	0.0369	a	0.0243	ac
cis-Nonachlor	µg/Kg	0.0117	a	0.0176	a	0.0116	ac
trans-Nonachlor	µg/Kg	0.0108	a	0.0161	a	0.0106	ac
Oxychlordane	µg/Kg	0.0501	a	0.0752	a	0.0495	ac
Total Chlordanes	µg/Kg	0.184		0.277		0.182	
4,4'-DDT	µg/Kg	0.0159	a	0.0238	a	0.0158	ac
4,4'-DDD	µg/Kg	3.29	ab	0.0182	a	0.665	S
4,4'-DDE	µg/Kg	0.00737	a	0.0111	a	0.00728	ac
Total DDT	µg/Kg	3.32		0.0531		0.688	
Dieldrin	µg/Kg	0.0243	a	0.0365	a	0.0241	ac
alpha-Endosulfan	µg/Kg	0.0222	a	0.0334	a	0.0220	ac
beta-Endosulfan	µg/Kg	0.0115	a	0.0173	a	0.0113	ac
Total Endosulfans	µg/Kg	0.0337		0.0507		0.0333	
Endrin	µg/Kg	0.0132	a	0.0199	a	0.0131	ac
Heptachlor	µg/Kg	0.0253	a	0.0379	a	0.0250	ac
Heptachlor epoxide	µg/Kg	0.0520	a	0.0780	a	0.0515	ac
Hexachlorobenzene	µg/Kg	0.217	a	0.326	a	0.215	ac
Lindane (gamma-BHC)	µg/Kg	0.0365	a	0.0548	a	0.0361	ac
Methoxychlor	µg/Kg	0.0575	a	0.843	a	0.0568	ac
Toxaphene	µg/Kg	1.05	a	1.58	a	1.04	ac

Notes:

Mean concentrations are reported to 3 significant figures.

a = COC not detected (below MDL) in at least one replicate; mean value was calculated using one-half of the project specific MDL for non-detected values.
b = COC concentration estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c = COC was not detected in either the dredge tissue replicates or in the historic reference tissue, therefore was eliminated from further evaluation.
[d] Pre-test tissue represents the mean of three replicates, whereas the reference and site composites represent a mean of 5 replicates.
[e] Analysis conducted after removal of a statistical outlier.

NS = Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.
S = Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05.

TABLE C-2 STATISTICAL COMPARISONS OF *M. nasuta* BODY BURDENS VS. IOSN 2019 REFERENCE DATA

Compound	Units	Pre-Test [d]		IOSN 2019		Composite	
		Mean	Qual	Mean	Qual	Mean	Qual
Trace Metals							
Arsenic, total	mg/Kg	2.59		3.49		2.54	NS
Cadmium, total	mg/Kg	0.0297	b	0.0290	b	0.0266	bNS
Chromium, total	mg/Kg	0.465		0.334	b	0.434	bNS
Copper, total	mg/Kg	3.10		1.77		2.71	S
Lead, total	mg/Kg	0.129		0.349		0.452	S
Mercury, total	mg/Kg	0.00185	a	0.00170	a	0.00208	ac
Nickel, total	mg/Kg	0.713		0.521		0.570	NS/S[c]
Zinc, total	mg/Kg	11.6		11.8		12.8	NS
PAH Compounds							
Acenaphthene	µg/Kg	1.07	ab	0.453	a	1.56	abNS
Acenaphthylene	µg/Kg	0.378	a	0.279	a	0.381	ac
Anthracene	µg/Kg	0.853	ab	0.302	a	2.69	bS
Benzo(a)anthracene	µg/Kg	1.32	ab	0.565	a	5.40	bS
Benzo(a)pyrene	µg/Kg	0.805	a	0.594	a	1.74	abS
Benzo(b)fluoranthene	µg/Kg	1.07	a	0.786	a	4.41	bS
Benzo(k)fluoranthene	µg/Kg	0.490	a	0.455	ab	1.25	abS
Benzo(g,h,i)perylene	µg/Kg	0.342	a	0.518	ab	0.820	abNS
Chrysene	µg/Kg	2.01	b	0.550	a	2.92	bS
Dibenz(a,h)anthracene	µg/Kg	0.559	ab	2.97	b	0.400	aNS
Fluoranthene	µg/Kg	2.57	b	2.12	b	26.6	S
Fluorene	µg/Kg	2.11	b	0.253	a	1.74	bS
Indeno(1,2,3-cd)pyrene	µg/Kg	0.803	a	3.54	b	0.985	abNS
Naphthalene	µg/Kg	3.78	b	0.390	a	1.77	bS
Phenanthrene	µg/Kg	4.09	b	1.97	b	6.92	bS
Pyrene	µg/Kg	2.86	b	1.63	b	20.8	S
Total PAHs	µg/Kg	25.1		17.4		80.4	
PCB Congeners							
PCB 008	µg/Kg	0.0633	a	0.0467	a	0.0639	ac
PCB 018	µg/Kg	0.0461	a	0.0340	a	0.0465	ac
PCB 028	µg/Kg	0.0783	a	0.0578	a	0.0791	ac
PCB 044	µg/Kg	0.0873	a	0.0644	a	0.0883	ac
PCB 052	µg/Kg	2.09		0.0359	a	0.172	aS
PCB 066	µg/Kg	0.0457	a	0.0338	a	0.0462	ac
PCB 101	µg/Kg	0.0745	a	0.0550	a	0.0754	ac
PCB 105	µg/Kg	0.0668	a	0.0493	a	0.0675	ac
PCB 118	µg/Kg	0.0708	a	0.0522	a	0.142	abS
PCB 128	µg/Kg	0.0835	a	0.0616	a	0.0843	ac
PCB 138	µg/Kg	0.392	a	0.0394	a	0.0539	ac
PCB 153	µg/Kg	0.111	a	0.0820	a	0.142	abS
PCB 170	µg/Kg	0.0410	a	0.0303	a	0.0414	ac
PCB 180	µg/Kg	0.0419	a	0.0309	a	0.0423	ac
PCB 187	µg/Kg	0.0603	a	0.0445	a	0.0607	ac
PCB 195	µg/Kg	0.0787	a	0.0580	a	0.0794	ac
PCB 206	µg/Kg	0.0803	a	0.0594	a	0.0810	ac
PCB 209	µg/Kg	0.0920	a	0.0680	a	0.0929	ac
Total PCBs	µg/Kg	7.22		1.81		2.92	
Pesticides							
Aldrin	µg/Kg	0.0200	a	0.0296	a	0.0202	ac
cis-Chlordane	µg/Kg	0.0432	a	0.0638	a	0.0436	ac
trans-Chlordane	µg/Kg	0.0122	a	0.0180	a	0.0123	ac
cis-Nonachlor	µg/Kg	0.00582	a	0.00870	a	0.00587	ac
trans-Nonachlor	µg/Kg	0.00533	a	0.00780	a	0.00538	ac
Oxychlordane	µg/Kg	0.0248	a	0.0366	a	0.0250	ac
Total Chlordanes	µg/Kg	0.0913		0.135		0.0922	
4,4'-DDT	µg/Kg	0.00788	a	0.0117	a	0.00796	ac
4,4'-DDD	µg/Kg	0.00598	a	0.00880	a	0.391	S
4,4'-DDE	µg/Kg	0.00365	a	0.219	b	0.499	S
Total DDT	µg/Kg	0.0175		0.240		0.898	
Dieldrin	µg/Kg	0.0121	a	0.0178	a	0.0122	ac
alpha-Endosulfan	µg/Kg	0.0110	a	0.0163	a	0.0111	ac
beta-Endosulfan	µg/Kg	0.00568	a	0.00840	a	0.00573	ac
Total Endosulfans	µg/Kg	0.0167		0.0247		0.0168	
Endrin	µg/Kg	0.00653	a	0.00970	a	0.00662	ac
Heptachlor	µg/Kg	0.0125	a	0.0186	a	0.0127	ac
Heptachlor epoxide	µg/Kg	0.0257	a	0.0381	a	0.0260	ac
Hexachlorobenzene	µg/Kg	0.108	a	0.159	a	0.109	ac
Lindane (gamma-BHC)	µg/Kg	0.0181	a	0.0267	a	0.0183	ac
Methoxychlor	µg/Kg	0.0285	a	0.411	a	0.0287	ac
Toxaphene	µg/Kg	0.518	a	0.767	a	0.524	ac

Notes:

Mean concentrations are reported to 3 significant figures.

a = COC not detected (below MDL) in at least one replicate; mean value was calculated using one-half of the project specific MDL for non-detected values.
b = COC concentration estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c = COC was not detected in either the dredge tissue replicates or in the historic reference tissue, therefore was eliminated from further evaluation.
[d] Pre-test tissue represents the mean of three replicates, whereas the reference and site composites represent a mean of 5 replicates.
[e] Analysis conducted after removal of a statistical outlier.

NS = Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.
S = Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05.

BRAMS

BEST EPA Report

Project name:	**Yachtsman Marina, Kennebunkport, ME**
Project number:	
Model filename:	**EPA Reg 1 Template wChemical List.best**
Chemical filename:	**Chemical_List_for_EPA_Reg1_template (in progress).xlsx**

Table Of Contents

Human Subreport

Human: Adult Angler

Total Estimated Risks From Organics(see EPA Table Xa)

Receptor: Adult Angler

Organism: Macoma nasuta

		Cancer Risk	**Non-Cancer Risk**
Composite (10 Stations at		Fish Fillet	
	Test	6.01E-6	3.72E-2
	Reference	1.66E-6	1.74E-2
		Nereis virens	
	Test	0	0
	Reference	0	0
		Macoma nasuta	
	Test	6.23E-6	3.84E-2
	Reference	1.72E-6	1.8E-2
		Total Lobster	
	Test	3.1E-5	1.92E-1
	Reference	8.57E-6	9E-2

		Cancer Risk	**Non-Cancer Risk**
		Lobster Hepatopancreas	
	Test	2.14E-5	1.33E-1
	Reference	5.91E-6	6.21E-2
		Lobster Muscle	
	Test	9.62E-6	5.96E-2
	Reference	2.66E-6	2.79E-2

Total Estimated Risks From Organics(see EPA Table Xa)

Receptor: Adult Angler

Organism: Nereis virens

		Cancer Risk	Non-Cancer Risk
Composite (10 Stations at		Fish Fillet	
	Test	5.09E-6	8.9E-2
	Reference	1.63E-6	3.72E-2
		Nereis virens	
	Test	6.12E-6	1.08E-1
	Reference	1.97E-6	4.51E-2
		Macoma nasuta	
	Test	0	0
	Reference	0	0
		Total Lobster	
	Test	2.63E-5	4.59E-1
	Reference	8.39E-6	1.92E-1
		Lobster Hepatopancreas	
	Test	1.81E-5	3.17E-1
	Reference	5.79E-6	1.32E-1
		Lobster Muscle	
	Test	8.14E-6	1.42E-1
	Reference	2.6E-6	5.95E-2

Seafood Non-Cancer Risks (see EPA Table 6a, Columns F & G)

Receptor: Adult Angler

Organism: Macoma nasuta

			Non-Cancer Risk
Composite (10 Stations at 4 Marinas Mud)	Copper	**Test**	0
		Reference	0
	Lead	**Test**	0
		Reference	0
	Nickel	**Test**	0
		Reference	0

Seafood Non-Cancer Risks (see EPA Table 6a, Columns F & G)

Receptor: Adult Angler

Organism: Nereis virens

			Non-Cancer Risk
Composite (10 Stations at 4 Marinas Mud)	Cadmium	**Test**	2.9E-3
		Reference	2.16E-3
	Chromium	**Test**	1.57E-2
		Reference	1.96E-3
	Lead	**Test**	0
		Reference	0
	Nickel	**Test**	0
		Reference	0
	Zinc	**Test**	4.02E-3
		Reference	5.31E-3

FDA Action Limit/Tolerance (see EPA Table 3, Columns D & E)

Receptor: Adult Angler

Organism: Macoma nasuta

	Contaminant	FDA Action Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Total PCBs	2E3	6.47E0
Composite (10 Stations	Mercury	1E0	2.08E-3
Composite (10 Stations	Total DDT	5E3	1.56E0
Composite (10 Stations	Total Chlordanes	3E2	1.53E-1

FDA Action Limit/Tolerance (see EPA Table 3, Columns D & E)

Receptor: Adult Angler

Organism: Nereis virens

	Contaminant	FDA Action Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Total PCBs	2E3	1.42E1
Composite (10 Stations	Mercury	1E0	6.62E-3
Composite (10 Stations	Total DDT	5E3	1.36E0
Composite (10 Stations	Total Chlordanes	3E2	3.04E-1

Ecological Effects Level (see EPA Table 8a.1, Columns D & E)

Receptor: Adult Angler

Organism: Macoma nasuta

	Contaminant	Ecological Effect Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Anthracene	3.75E3	2.69E0
Composite (10 Stations	Benzo(a)pyrene	8E3	3.47E0
Composite (10 Stations	PAH Total	1E4	8.04E1
Composite (10 Stations	Total PCBs	4E3	6.47E0
Composite (10 Stations	Aldrin	2.99E2	2.02E-2
Composite (10 Stations	Dieldrin	4.37E0	1.64E-2
Composite (10 Stations	Endosulfans	2.86E0	1.69E-2
Composite (10 Stations	Arsenic	1.26E1	2.54E0
Composite (10 Stations	Cadmium	3.03E0	2.66E-2
Composite (10 Stations	Chromium	1.18E1	4.34E-1
Composite (10 Stations	Copper	9.6E0	2.71E0
Composite (10 Stations	Lead	1.19E1	4.52E-1
Composite (10 Stations	Mercury	2E-1	2.08E-3
Composite (10 Stations	Nickel	3.8E0	5.7E-1
Composite (10 Stations	Zinc	1.52E3	1.28E1
Composite (10 Stations	Total DDT	3E3	1.56E0

Ecological Effects Level (see EPA Table 8a.1, Columns D & E)

Receptor: Adult Angler

Organism: Nereis virens

	Contaminant	Ecological Effect Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Anthracene	3.75E3	6.1E-1
Composite (10 Stations	Benzo(a)pyrene	8E3	1.61E0
Composite (10 Stations	PAH Total	1E4	3.64E1
Composite (10 Stations	Total PCBs	4E3	1.42E1
Composite (10 Stations	Aldrin	2.99E2	4E-2
Composite (10 Stations	Dieldrin	4.37E0	3.25E-2
Composite (10 Stations	Endosulfans	2.86E0	3.33E-2
Composite (10 Stations	Arsenic	1.26E1	2.02E0
Composite (10 Stations	Cadmium	3.03E0	3.38E-2
Composite (10 Stations	Chromium	1.18E1	5.51E-1
Composite (10 Stations	Copper	9.6E0	1.12E0
Composite (10 Stations	Lead	1.19E1	1.91E-1
Composite (10 Stations	Mercury	2E-1	6.62E-3
Composite (10 Stations	Nickel	3.8E0	2.32E-1
Composite (10 Stations	Zinc	1.52E3	1.41E1
Composite (10 Stations	Total DDT	3E3	1.36E0

FDA Level of Concern (see EPA Table 7a, Columns B & D)

Receptor: Adult Angler

Organism: Macoma nasuta

	Contaminant	FDA Level of Concern(mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Arsenic	8.6E1	2.54E0
Composite (10 Stations	Cadmium	3.7E0	2.66E-2
Composite (10 Stations	Chromium	1.3E1	4.34E-1
Composite (10 Stations	Lead	1.7E0	4.52E-1
Composite (10 Stations	Nickel	8E1	5.7E-1

FDA Level of Concern (see EPA Table 7a, Columns B & D)

Receptor: Adult Angler

Organism: Nereis virens

	Contaminant	FDA Level of Concern(mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Arsenic	8.6E1	2.02E0
Composite (10 Stations	Cadmium	3.7E0	3.38E-2
Composite (10 Stations	Chromium	1.3E1	5.51E-1
Composite (10 Stations	Lead	1.7E0	1.91E-1
Composite (10 Stations	Nickel	8E1	2.32E-1

Selected Chemicals

Invertebrate Name Macoma nasuta

	Composite (10
118	X
153	X
4,4'-DDD	X
4,4'-DDE	X
Anthracene	X
Benzo(a)anthracene	X
Benzo(a)pyrene	X
Benzo(b)fluoranthene	X
Benzo(k)fluoranthene	X
Chrysene	X
Fluoranthene	X
Fluorene	X
Naphthalene	X
PAH Total	X
Phenanthrene	X
Pyrene	X
Total DDT	X
Total PCBs	X
Copper	X
Lead	X
Nickel	X

Invertebrate Name Nereis virens

	Composite (10
105	X
4,4'-DDD	X
52	X
Anthracene	X
Benzo(b)fluoranthene	X
Benzo(g,h,i)perylene	X
Benzo(k)fluoranthene	X
Chrysene	X
Fluoranthene	X
Fluorene	X
Naphthalene	X
PAH Total	X
Pyrene	X
Total DDT	X
Total PCBs	X
Cadmium	X
Chromium	X
Lead	X
Nickel	X
Zinc	X

Software version:	BRAMS 4.0
Last date:	11/28/2023
User name:	*

Appendix D
Elutriate Chemistry Results

Kennebunkport River Projects			ME WQC	Elutriate Average	Q	Site Water Average	Q	Lab Water Average	Q
Parameter	CAS Number	Units							
Metals									
Arsenic	7440382	ug/L	69	3.67		1.22		0.140	U
Cadmium	7440439	ug/L	33	0.295	U	0.30	U	0.295	U
Hexavalent Chromium	18540299	ug/L	1108	1.50	U	1.50	U	1.50	U
Copper	7440508	ug/L	5.78	1.92	U	1.92	U	1.92	U
Lead	7439921	ug/L	221	1.72	U	1.72	U	1.72	U
Mercury	7439976	ug/L	2.1	0.010	U	0.010	U	0.010	U
Nickel	7440020	ug/L	75	2.78	U	2.78	U	2.78	U
Selenium	7782492	ug/L	291	0.115	*	0.065	U	0.560	U
Silver	7440224	ug/L	2.24	0.815	U	0.82	U	0.815	U
Zinc	7440666	ug/L	95	17.1	U	17.1	U	17.1	U
Industrial Chemicals									
Pentachlorophenol	87865	ug/L	13	0.290	U	0.224	U	0.222	U
Pesticides									
4,4`-DDT	50293	ug/L	0.13	0.00012	U	0.00008	U	0.00008	U
Aldrin	309002	ug/L	1.3	0.00023	U	0.00016	U	0.00016	U
Alpha-Chlordane (cis)	5103719	ug/L		0.00011	U	0.00008	U	0.00008	U
Dieldrin	60571	ug/L	0.71	0.00006	U	0.00004	U	0.00004	U
Chlorpyrifos	2921882	ug/L	0.011*	0.00011	U	0.00008	U	0.00008	U
Endosulfan I	959988	ug/L	0.034	0.00011	U	0.00008	U	0.00008	U
Endosulfan II	33213659	ug/L	0.034	0.00010	U	0.00007	U	0.00007	U
Endrin	72208	ug/L	0.037	0.00012	U	0.00008	U	0.00008	U
Gamma-Chlordane (trans)	5103742	ug/L		0.00005	U	0.00004	U	0.00004	U
Heptachlor	76448	ug/L	0.053	0.00008	U	0.00006	U	0.00006	U
Heptachlor epoxide	1024573	ug/L	0.053	0.00010	U	0.00007	U	0.00007	U
Lindane	58899	ug/L	0.16	0.00007	U	0.00005	U	0.00005	U
Toxaphene	8001352	ug/L	0.21	0.00365	U	0.00257	U	0.00257	U
Chlordane (alpha + gamma)	*SUMCHLOR*	ug/L	0.09	0.00016	U	0.00011	U	0.00011	U
PCBs									
PCB 008	34883437	ug/L		0.00010	U	0.00007	U	0.00007	U
PCB 018	37680652	ug/L		0.00013	U	0.00009	U	0.00009	U
PCB 028	7012375	ug/L		0.00013	U	0.00009	U	0.00009	U
PCB 044	41464395	ug/L		0.00008	U	0.00006	U	0.00006	U
(PCB 049)	41464408	ug/L		0.00028	J	0.00005	U	0.00005	U
PCB 052	35693993	ug/L		0.00037	J	0.00005	U	0.00005	U
PCB 066	32598100	ug/L		0.00010	U	0.00007	U	0.00007	U
(PCB 087)	38380028	ug/L		0.00013	U	0.00009	U	0.00009	U
PCB 101	37680732	ug/L		0.00016	U	0.00011	U	0.00011	U
PCB 105	32598144	ug/L		0.00011	U	0.00008	U	0.00008	U
PCB 118	31508006	ug/L		0.00009	U	0.00006	U	0.00006	U
PCB 128	38380073	ug/L		0.00011	U	0.00008	U	0.00008	U
PCB 138	35065282	ug/L		0.00008	U	0.00005	U	0.00005	U
PCB 153	35065271	ug/L		0.00009	*	0.00004	U	0.00004	U
PCB 170	35065306	ug/L		0.00012	U	0.00008	U	0.00008	U
PCB 180	35065293	ug/L		0.00010	U	0.00007	U	0.00007	U
(PCB 183)	52663691	ug/L		0.00011	U	0.00007	U	0.00007	U
(PCB 184)	74472483	ug/L		0.00010	U	0.00007	U	0.00007	U
PCB 187	52663680	ug/L		0.00007	U	0.00005	U	0.00005	U
PCB 195	52663782	ug/L		0.00006	U	0.00004	U	0.00004	U
PCB 206	40186729	ug/L		0.00013	U	0.00009	U	0.00009	U
PCB 209	2051243	ug/L		0.00006	U	0.00004	U	0.00004	U
Total PCBs	*SumNOAA18*	ug/L	0.03	0.00416		0.00243	U	0.00243	U
Notes									

U: Compound was analyzed for but was not detected (non-detect)
J: Indicates an estimated value
* indicates average includes detects and non-detects
Non-detects are reported as 1/2 the MDL
Half the MDL was used for U-qualified values to calculate summary and average values
Yellow=exceedance of water quality criteria
Total PCBs were calculated using the NOAA 18 method
Total PCB WQC is for chronic exposure as no acute exposure value available

Attachment 9 – List of Authorizations Required for Project

9.0 List of Authorizations Required for Project

The following authorizations are required by federal, state, and local agencies to conduct the proposed dredging work at the Yachtsman Marina:

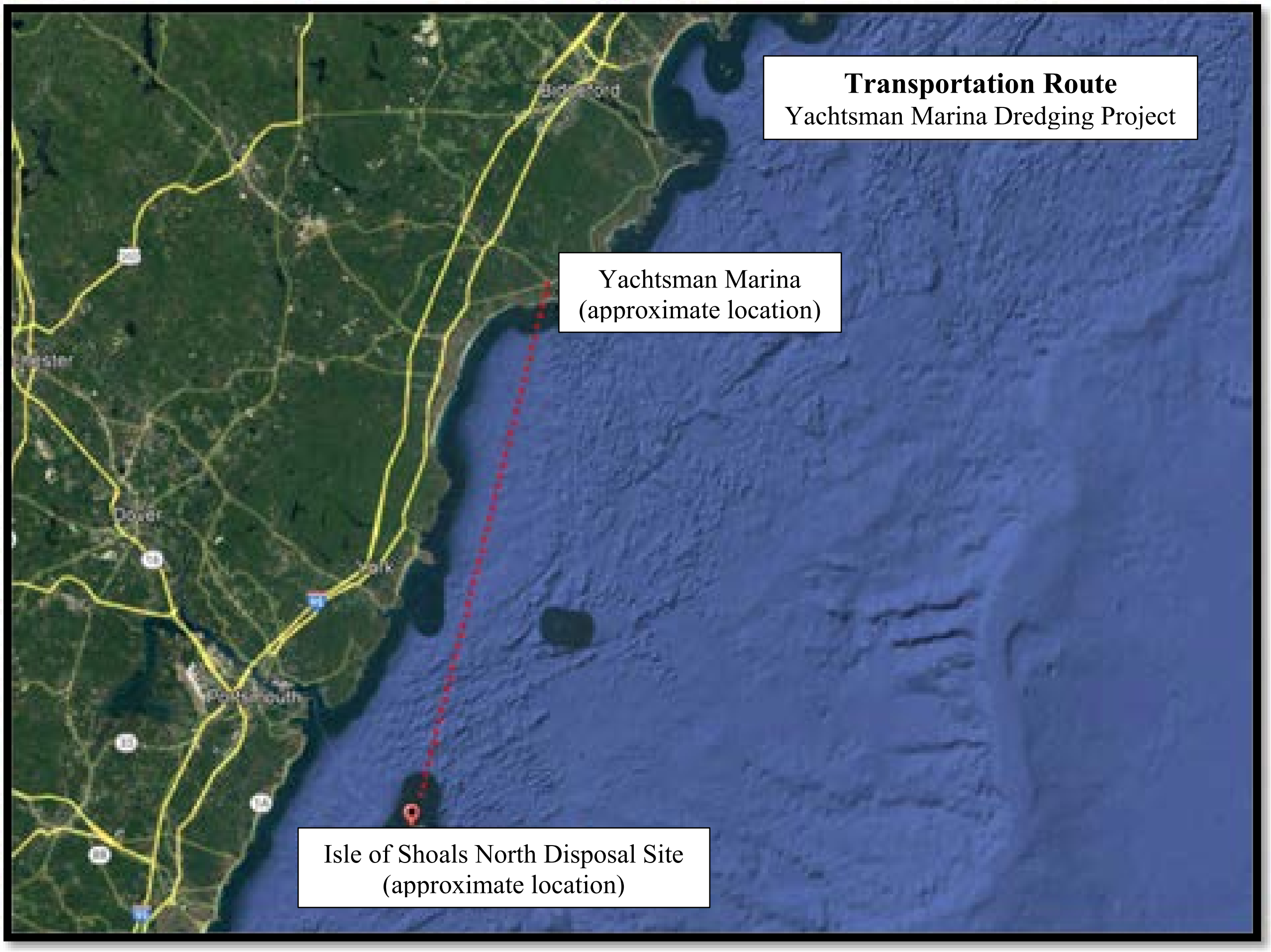
Authorization	Regulatory Entity	Status
Individual Standard Permit	U.S. Army Corps of Engineers	Application included herein
Section 408	U.S. Army Corps of Engineers	Submitted concurrently with this Individual Standard Permit
Individual NRPA Permit	Maine Department of Environmental Protection	Submitted concurrently with this Individual Standard Permit
Kennebunk River Committee Approval	Town of Kennebunkport/Kennebunk	To be submitted in late winter/early spring 2025
Kennebunk River Harbor Master Approval	Town of Kennebunkport/Kennebunk	To be submitted in late winter/early spring 2025
Activities and Land Use Permit	Town of Kennebunkport	To be submitted following Kennebunk River Committee/ Harbor Master approval
Site Plan Review	Town of Kennebunkport	To be submitted following Kennebunk River Committee/ Harbor Master approval
Flood Hazard Development Permit	Town of Kennebunkport	To be submitted following Kennebunk River Committee/ Harbor Master approval

Water Quality Certification

The Maine Department of Environmental Protection (DEP) “has combined the decision concerning water quality certification with the review of an application for a state permit that already requires compliance with state water quality standards…the issuance of the order approving the project constitutes both the state permit and the water quality certification.” The project team is filing a Maine DEP Natural Resources Protection Act (NRPA) Permit Application concurrently with this Pre-Construction Notification Application. In accordance with the statement quoted above, the NRPA Permit Approval will constitute both the state permit and the Water Quality Certification and can be provided to the USACE upon receipt.

Attachment 10 – Transportation Route

10.0 Isle of Shoals North Disposal Site Transportation Route



<u>Location:</u> The Isle of Shoals North (IOSN) Disposal Site is located in the Gulf of Maine, approximately 20 km (10.8 nmi) east of Portsmouth, New Hampshire, 17.7 km (9.55 nmi) southeast of Kittery, Maine, and 11.2 km (6.04 nmi) north of Eastern Island, the closest within the Isle of Shoals. The site is defined as a 2,600 m (8,530 ft) diameter circle on the seafloor with its center located at 70° 26.995' W and 43° 1.142' N.

<u>Route:</u> From the Yachtsman Marina, navigate in a southerly direction towards the mouth of the Kennebunk River, then in a southwestern direction through the Gulf of Maine to the IOSN Disposal Site. The total transportation route distance from the Kennebunkport Marina to the IOSN Disposal Site is 23 nautical miles.

<u>Estimated Number of Trips to IOSN:</u> The estimated quantity of dredge material expected to be removed from the Yachtsman Marina is 6,400 cubic yards. It is estimated that the dredge scow that will be used to transport sediment to the IOSN Disposal Site will have between 500 and 600 cubic yards of capacity, which would result in 11 to 13 trips to the IOSN Disposal Site.

Maine DEP NRPA Individual Permit Application
(Submitted on November 22, 2024)

Maine DEP
Natural Resources Protection Act (NRPA)
Permit Application

For

Yachtsman Marina
57 Ocean Ave
Kennebunkport, Maine

November 22, 2024

Applicant
KPT Marine, LLC
P.O. Box 2734
Kennebunkport, Maine

Prepared By:

WALSH
ENGINEERING ASSOCIATES, INC.

One Karen Drive, Suite 2A
Westbrook, Maine
207.553.9898

WALSH
ENGINEERING ASSOCIATES, INC.

November 22, 2024

Maine Department of Environmental Protection
312 Canco Road
Portland, Maine 04103

RE: Individual NRPA Permit Application
Yachtsman Marina
Kennebunkport, Maine 04046

To Whom it May Concern,

On behalf of KPT Marine, LLC (Applicant), Walsh Engineering Associates, Inc. (WEA), is pleased to submit the enclosed Natural Resources Protection Act (NRPA) application for the proposed dredging activities to take place in the Kennebunk River located adjacent to the Yachtsman Marina.

The Yachtsman Marina is located at 57 Ocean Ave in Kennebunkport, Maine, with 600 feet of frontage along the Kennebunk River. The Town of Kennebunkport Assessor's Office identifies the parcel as Map 10, Block 1, Lot 3. The facility consists of an active marina with 58 boat slips. The proposed dredge area is coincidental with the area that was previously permitted under Maine DEP Permit #L-18612-4E-A-N in 1994. Since that time, the Yachtsman Marina was dredged in 2005 under Permit ##L-18612-4E-B-N, and in Winter 2015-2016 under Maine DEP's Permit by Rule (PBR) process and U.S. Army Corps of Engineers (USACE) Permit #NAE-2004-319.

A copy of this application has been sent to the USACE Maine Project Office, as well as the Town of Kennebunkport Planning & Code Enforcement Department. WEA has notified the applicable abutting parties of the proposed development and has provided the notice of intent to file to the *Portland Press Herald* for publication. On behalf of the applicant, thank you in advance for your review of this application. We look forward to working with you and the department to make this project successful.

Respectfully,

Leyna L Tobey

Leyna Tobey, PE – Project Manager
Walsh Engineering Associates, Inc.

cc. KPT Marine, LLC; Shawn Dumas
Enc. NRPA Application & Supporting Documents

Table of Contents
Maine DEP – NRPA Application
Yachtsman Marina
Kennebunkport, ME 04046

<u>Appendices</u>

Department of Environmental Protection
Bureau of Land Resources
17 State House Station
Augusta, Maine 04333
Telephone: 207-287-7688

FOR DEP USE
ATS #____________
L- ____________
Total Fees: __________
Date Received: ________

APPLICATION FOR A NATURAL RESOURCES PROTECTION ACT PERMIT

[1] **Name of Applicant:** KPT Marine, LLC (c/o Shawn Dumas)	[5] **Name of Agent:** Walsh Engineering Associates, Inc.
[2] **Applicant's Mailing Address:** PO Box 2734, Kennebunkport, ME 04046	[6] **Agent's Mailing Address:** 1 Karen Drive, Suite 2A Westbrook, Maine 04092
[3] **Applicant's Daytime Phone:** 207-590-1658	[7] **Agent's Daytime Phone:** 207-553-9898
[4] **Applicant's Email Address:** shawn@kennebunkportmarina.com	[8] **Agent's Email Address:** leyna@walsh-eng.com

[9] **Location of Activity (nearest Road, Street, Rt.#):** 57 Ocean Avenue
[10] **Town:** Kennebunkport
[11] **County:** York

[12] **Type of Resource: (Check all that apply)**
- ☐ River, stream or brook
- ☐ Great Pond
- ☒ Coastal Wetland
- ☐ Freshwater Wetland
- ☐ Wetland Special Significance
- ☐ Significant Wildlife Habitat
- ☐ Fragile Mountain

[13] **Name of Resource:** Kennebunk River

[14] **Amount of Impact (sq. ft.):** 61,000 SF (1.4 acres)
Fill: 0 CY
Dredging/Veg Removal/Other: 6,400 CY

[15] **Type of Wetland: (Check all that apply)**
- ☐ Forested
- ☐ Scrub Shrub
- ☐ Emergent
- ☐ Wet Meadow
- ☐ Peatland
- ☒ Open Water
- ☐ Other________

FOR FRESHWATER WETLANDS

Tier 1	*Tier 2*	*Tier 3*
☐ 0 – 4,999 sq. ft. ☐ 5,000 – 9,999 sq. ft. ☐ 10,000 – 14,999 sq. ft.	☐ 15,000 – 43,560 sq. ft.	☐ > 43,560 sq. ft. or ☐ Smaller than 43,560 sq. ft., not eligible for Tier 1

[16] **Proposed Start Date and Brief Activity Description:**
Dredging of the Kennebunk River at the Yachtsman Marina to provide adequate depth for navigation; Winter 2025-2026.

[17] **Size of Lot or Parcel & UTM Locations:** ☐ ______ square feet, or 1.70 acres UTM Northing: 4801524.69 m N, UTM Easting: 19 T 380503.11 m E

[18] **Title, Right or Interest:**
☐ Own ☒ Lease ☐ Purchase Option ☐ Written Agreement

[19] **Deed Reference Numbers:**
Book: 17585 Page: 540

[20] **Map and Lot Numbers:**
Map: 10 Block: 1 Lot: 3

[21] **DEP Staff Previously Contacted:** Alison Sirois
Alex Groblewski

[22] **Part of a larger project:** ☐ Yes ☒ No
After-the-Fact: ☐ Yes ☒ No

[23] **Resubmission of Application?** ☒ Yes ☐ No
If yes, previous application #:
Previous project manager:

[24] **Written Notice of Violation?** ☐ Yes ☒ No
If yes, name of DEP enforcement staff involved:

[25] **Previous Wetland Alteration:** ☐ Yes ☒ No

[26] **Detailed Directions to the Project Site:** From Portland, take I-95 South; exit 32, route ME-111, then onto Precourt Street; turn right onto US-1 South, then left onto Log Cabin Road; left onto Maine Street;right onto ME-9; then 2nd left onto Ocean Ave

[27]

TIER 1	TIER 2/3 AND INDIVIDUAL PERMITS	
☐ Title, right or interest documentation ☐ Topographic Map ☐ Narrative Project Description ☐ Plan or Drawing (8 1/2" x 11") ☐ Photos of Area ☐ Statement of Avoidance & Minimization ☐ Statement/Copy of cover letter to MHPC	☒ Title, right or interest documentation ☒ Topographic Map ☒ Copy of Public Notice/Public Information Meeting Documentation ☐ Wetlands Delineation Report (Attachment 1) that contains the Information listed under Site Conditions ☒ Alternatives Analysis (Attachment 2) including description of how wetland impacts were Avoided/Minimized	☒ Erosion Control/Construction Plan ☒ Functional Assessment (Attachment 3), if required ☒ Compensation Plan (Attachment 4), if required ☒ Appendix A and others, if required ☒ Statement/Copy of cover letter to MHPC ☐ Description of Previously Mined Peatland, if required

FEES, CERTIFICATIONS AND SIGNATURES LOCATED ON PAGE 2

28 FEES

FEE: I will pay the Natural Resources Protection Act Permit fee (https://www.maine.gov/dep/feeschedule.pdf) by:

☒ **Credit Card –** Pay online through the **Payment Portal. (Attach payment confirmation when filing this application form.)**

☐ **Check** – Fill in all the information below and mail a copy of this form (without attachments) and a check made payable to "Treasurer, State of Maine," to: Maine DEP, 17 State House Station, Augusta, ME 04333-0017.

Name: **Phone:** **Ext.** **Check #:** **Email Filing Date:**

IMPORTANT
IF THE SIGNATURE BELOW IS NOT THE APPLICANT'S SIGNATURE, ATTACH LETTER OF AGENT AUTHORIZATION SIGNED BY THE APPLICANT.

By signing below the applicant (or authorized agent), certifies that he or she has read and understood the following:

DEP SIGNATORY REQUIREMENT

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10; 1413, Section 404. Principal Purpose: These laws require permits authorizing activities in or affecting navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor a permit be issued.

CORPS SIGNATORY REQUIREMENT

USC Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry shall be fines not more than $10,000 or imprisoned not more than five years or both. I authorize the Corps to enter the property that is subject to this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein.

DEP SIGNATORY REQUIREMENT

"I certify under penalty of law that I have personally examined the information submitted in this document and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete. I authorize the Department to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Further, I hereby authorize the DEP to send me an electronically signed decision on the license I am applying for with this application by emailing the decision to the address located on the front page of this application (see #4 for the applicant and #8 for the agent)."

Leyna L Tobey Digitally signed by Leyna Tobey, PE
Date: 2024.11.20 07:51:34-05'00'

SIGNATURE OF AGENT/APPLICANT Date: 11/20/2024

Signature of Agent: See Attached Agent Authorization Date:

NOTE: Any changes in activity plans must be submitted to the DEP and the Corps in writing and must be approved by both agencies prior to implementation. Failure to do so may result in enforcement action and/or the removal of the unapproved changes to the activity.

State of Maine DEP Payment Receipt

Contact Informa

Leyna Tobey - 1 Karen Drive, Suite 2A, Westbrook, ME, 04092

(207) 553-9898

leyna@walsh-eng.com

Product	Reference Number	Customer Number	Payment Amount	Comments
Natural Resources Protection Act (Individual Permit)	New Application		$679.00	Yachtsman Marina Dredging NRPA Individual Permit Code: 4E. Processing Fee: $543; Licensing Fee: $136; Total: $679

Receipt ID: 8322

Transaction Date: 11/11/2024 2:50:39 PM

Transaction Summary

Payment	$679.00
Service Fee	$2.00
Total	**$681.00**

Thank you for your successful transaction.

If you have questions or concerns, please call (207) 287-7688

or Email: Payments.DEP@maine.gov

Print

To Whom It May Concern,

By this letter, the undersigned, a representative of KPT Marine, LLC, authorizes Walsh Engineering Associates, Inc. to act as the agent for the undersigned in the preparation and submission of all Federal, State, and Local permit applications and relevant documents and correspondence for all necessary permits for the maintenance dredging of the property at 57 Ocean Avenue in Kennebunkport, Maine; to attend meetings and site visits; to appear before all boards, commissions, and committees, and to provide such other services as are necessary and appropriate in furtherance of the aforementioned project.

Sincerely,

Shawn Dumas

Signature

Shawn Dumas Operations Manager

Printed Name and Title

10/31/2024

Date

MAINE
Department of the Secretary of State
Bureau of Corporations, Elections and Commissions

Corporate Name Search

Information Summary

Subscriber activity report

This record contains information from the CEC database and is accurate as of: Fri Oct 25 2024 13:54:31. Please print or save for your records.

Legal Name	Charter Number	Filing Type	Status
KPT MARINE, LLC	20102989DC	LIMITED LIABILITY COMPANY	GOOD STANDING

Filing Date	Expiration Date	Jurisdiction
05/04/2010	N/A	MAINE

Other Names	(A=Assumed ; F=Former)
KENNEBUNKPORT BOAT CLUB	A
KENNEBUNKPORT MARINA	A
KENNEBUNKPORT YACHT CLUB	A
WEBHANNET RIVER BOAT YARD	A

Principal Home Office Address

Physical	Mailing
67 OCEAN AVENUE	PO BOX 2734
KENNEBUNKPORT, ME 04046	KENNEBUNKPORT, ME 04046

Clerk/Registered Agent

Physical	Mailing
STEPHEN Y HODSDON HODSDON & AYER 56 PORTLAND ROAD KENNEBUNK, ME 04043	STEPHEN Y HODSDON HODSDON & AYER 56 PORTLAND ROAD KENNEBUNK, ME 04043

New Search

Click on a link to obtain additional information.

List of Filings	View list of filings	
Obtain additional information:		
Certificate of Existence (Good Standing) (more info)	Short Form without amendments ($30.00)	Long Form with amendments ($30.00)
Certificate of Legal Existence (more info)	Short Form without amendments ($30.00)	Long Form with amendments ($30.00)

You will need Adobe Acrobat version 3.0 or higher in order to view PDF files.
If you encounter problems, visit the troubleshooting page.

Downloa

If you encounter technical difficulties while using these services, please contact the Webmaster. If you are unable to find the information you need through the resources provided on this web site, please contact the Division of Corporations, UCC & Commissions Reporting and Information Section at 207-624-7752 or e-mail.

DEBRA L. ANDERSON, REGISTER OF DEEDS
Bk 17585 PG 540
Instr # 2017044719
10/19/2017 03:42:54 PM
Pages 3 YORK CO

MAINE SHORT FORM QUITCLAIM DEED WITH QUITCLAIM COVENANT

KNOW ALL BY THESE PRESENTS that US HOTELS NEW ENGLAND, LLC , a Delaware limited liability company, formerly known as HIOS HOSPITALITY LLC, a Delaware limited liability company, of Coral Gables, Florida, for consideration paid, hereby grants to YACHTSMAN HOSPITALITY, LLC, a Maine limited liability company, with a mailing address of 7 Drydock Avenue, Boston, Massachusetts 02210, with QUITCLAIM COVENANT, a certain lot or parcel of land together with all buildings and improvements situated thereon, located in the Town of Kennebunkport, York County, Maine, being more particularly described in **Exhibit A** attached hereto and made a part hereof.

ALSO HEREBY conveying all rights, easements and privileges pertaining thereto.

Meaning and intending to convey the property conveyed to HIOS Hospitality, LLC by virtue of that certain deed from The Yachtsman Lodge & Marina, LLC recorded on January 14 2005 in the York County Registry of Deeds in Book 14350, Page 113.

IN WITNESS WHEREOF the US HOTELS NEW ENGLAND, LLC has caused this this instrument to be executed by Frank Espinosa, its duly authorized President this 11th day of October, 2017.

	US HOTELS NEW ENGLAND, LLC , a Delaware limited liability company, formerly known as HIOS HOSPITALITY LLC, a Delaware limited liability company By: ______________________ Frank Espinosa, President

Maine R.E. Transfer Tax Paid

⑤ W
Old Republic National Title
57 Exchange St
Portland, Me. 04101
3p →

STATE OF FLORIDA)
)SS:
COUNTY OF MIAMI-DADE)

The foregoing instrument was acknowledged before me this 11th day of October, 2017, by Frank Espinosa, as President of and for US HOTELS NEW ENGLAND, LLC , a Delaware limited liability company, formerly known as HIOS HOSPITALITY LLC, a Delaware limited liability company, who is personally known to me ~~or has produced the following identification~~ __________________________.

(NOTARY SEAL)

____
Signature of Notary Public-State of Florida
Print Name:________________________
Expires:___________________________

JORGE DEL VALLE
Commission # FF 045037
Expires November 5, 2017
Bonded Thru Troy Fain Insurance 800-385-7019

Exhibit A
(Yachtsman)

A certain lot or parcel of land together with the buildings thereon, situated in the Town of Kennebunkport, in said County of York, and State of Maine, on the westerly side of Ocean Avenue, formerly known as Water Street, bounded and described as follows:

Beginning at an iron pipe driven into the ground on the westerly side of said Ocean Avenue (formerly Water Street), at the southeasterly corner of land now or formerly of one Day, formerly of one Maling; thence South 15° 32' East by said street, 618.23 feet, more or less, to an iron pipe driven into the ground and land formerly of one Talbot, later of one Timson, and now or formerly of one Rafaniello; thence South 77° 14' West by said Rafaniello land 83.2 feet to an iron pipe driven into the ground at the top of the bank of the Kennebunk River; thence in the same course and by said Rafaniello land to the channel of Kennebunk River or as far westerly as I may own; thence northerly by and up said river to said Day land; thence about North 78° 09' East by said Day land to an iron pipe driven into the ground near the top of the bank; thence same course and by said Day land 13.33 feet to the point of beginning.

The above bearings refer to the 1961 magnetic meridian.

MARINA LAND LEASE

from

YACHTSMAN HOSPITALITY LLC

LANDLORD

to

KPT MARINE, LLC

TENANT

This Marina Land Lease (the "Lease") is made and entered into as of May 1, 2018 (the "Effective Date"), by and between YACHTSMAN HOSPITALITY LLC, a Maine limited liability company, having a mailing address of 2 Livewell Drive, Suite 201, Kennebunk, Maine 04043 (the "Landlord") and KPT MARINE, LLC, a Maine limited liability company with a place of business at 69 Ocean Avenue, Kennebunkport, Maine (the "Tenant").

RECITALS

WHEREAS, Landlord owns certain property formerly operated as the Yachtsman Lodge & Marina, consisting of a one-story motel building with an accompanying marina located on an approximately 1.7± acre parcel with an address of 57 Ocean Avenue, Kennebunkport, Maine, which real property is more particularly described in that certain deed from US Hotels New England, LLC to Landlord, dated October 11, 2017 and recorded in the York County Registry of Deeds in Book 17585, Page 540 (the "Yachtsman Property").

WHEREAS, pursuant to the terms and conditions of that certain Amendment and Restatement of Marina Purchase and Sale Agreement between Landlord and Tenant of even date herewith ("Purchase Agreement") the Landlord has agreed to lease to Tenant that portion of the Yachtsman Property depicted in Exhibit A attached hereto ("Survey"), which portion has been used for marina purposes and consists of certain land situated between the shore of the Yachtsman Property and the channel of the Kennebunk River, which portion is as generally depicted on the Survey (the "Marina Land").

WHEREAS, the Landlord has agreed to grant to Tenant, its successors and assigns, certain easements, which easements are appurtenant to Tenant's leasehold estate established under this Lease over the remaining portion of the Yachtsman Property (hereinafter, the "Hotel Property") for (a) the maintenance, operation, repair and replacement of any portion of the docks, ramps and related appurtenances not situated on the Marina Land, (b) pedestrian access from the Hotel Property to the Marina Land, (c) parking spaces for users of the Marina Land, all as more particularly described herein (the "Marina Easements," and referred to together with this Lease as the "Marina Real Property").

WHEREAS, in addition to acquiring the rights to the Marina Land under this Lease, Tenant is simultaneously herewith purchasing the existing floating docks and ramps and related appurtenances associated with marina operations as operated during the 2017 season, (collectively, the "Marina Assets," and referred to together with the Marina Real Property as the "Marina Property").

AGREEMENT

NOW, THEREFORE, in consideration of the mutual promises hereinafter set forth, and for other good and valuable consideration, the receipt and sufficiency whereof is hereby acknowledged, the Landlord and the Tenant hereby agree as follows:

1. **Definitions**. In addition to the terms defined in the Recitals, the following terms shall have the meanings hereinafter set forth:

"Base Rent" means the minimum annual Base Rent for the applicable portion of the term as set forth in Section 4.

"Consent" means any party's written consent to any action which by this Lease such party must give or may withhold.

"Financial Institution" means a bank, national bank, savings bank, trust company, insurance company, real estate investment trust, pension fund or any other institutional banking, lending or other similar financial institution, together with the financial institutions involved in any public offering, so called, of a securitized mortgage with respect to the Tenant's leasehold interest in the Premises.

"Governmental Authorities" means all federal, state, municipal and local governments, and all agencies, departments, instrumentalities, commissions, boards, bureaus and offices thereof having or claiming jurisdiction over the Premises or the Improvements.

"Impositions" is defined in Section 6.1.

"Improvements" means existing floating docks and ramps and related appurtenances associated with marina operations, utilities, structures and other improvements constructed on the Premises by or on behalf of the Tenant, excluding signs, trade fixtures, movable machinery and equipment.

"Leasehold Mortgage" means any mortgage, deed of trust or other form of collateral assignment or collateral security instrument pursuant to which Tenant's interest in this Lease and in the Property is mortgaged, collaterally assigned or otherwise encumbered or conveyed to a Leasehold Mortgagee to secure any obligation of Tenant to the Tenant of such mortgage, deed of trust or other instrument, together with all amendments, modifications or extensions thereto and all consolidations or refinancings thereof.

"Leasehold Mortgagee" means any Tenant (and subsequent assignees thereof) of a Leasehold Mortgage which is a Financial Institution.

"Premises" means the Marina Land leased to Tenant pursuant to this Lease, which is more particularly described in Exhibit A attached hereto.

"Property" means the Premises and the Improvements, if any.

"Public Improvements" means those certain water, sewerage, drainage, electric, gas, telephone and other applicable utility lines or conduits located on the Premises, all of which serve or are intended to serve the Premises.

"Purchase Option" is defined in Section 35.

"Unavoidable Delays" means delays which result from fire or other casualty, acts of God, war, civil commotion, governmental regulations, embargo, riots, strikes, picketing and all other causes or events which are beyond the reasonable control of any party hereto. The lack of funds shall not be considered as an Unavoidable Delay.

2. Lease of Premises.

2.1 Demise. For and in consideration of the rents hereinafter reserved by Landlord and the covenants, terms and agreements hereinafter contained on the part of Tenant to be paid, kept and performed, Landlord hereby leases to Tenant and Tenant hereby leases from Landlord the Premises.

2.2 Disclaimer. The foregoing demise is made "AS IS, WHERE AS, AND WITH ALL FAULTS." The Landlord provides no representations, warranties or assurances of any nature with respect to the Premises, including express or implied warranties of habitability or suitability of the Premises for any purpose of any nature whatsoever. The foregoing demise is subject to:

(a) All restrictions, regulations and statutes, and amendments and additions thereto, of any and all Governmental Authorities having jurisdiction thereof;

(b) All covenants, restrictions, easements, reservations and agreements affecting the Premises, whether or not of record;

(c) Any state of facts which an accurate survey may show;

(d) Building restrictions and regulations, land use, subdivision and zoning laws, ordinances and regulations and any amendments thereto in force and effect;

(e) All taxes, assessments, water charges and sewer rents accrued or unaccrued, fixed or not fixed; and

(f) The condition and state of repair of the Premises and the existing structures located thereon.

2.3 Due Diligence. Tenant further acknowledges that Tenant has been provided with the opportunity to investigate and inspect the Premises, the status of approvals, environmental compliance and Public Improvements, and that Tenant is relying solely on its own opinion as to the status of the Premises. The Lease of the Property is made on "AS IS WHERE IS" basis and Landlord makes no representations, express or implied regarding the Premises or its suitability for Tenant. Landlord disclaims all warranties, expressed or implied, as to the condition of the Property. The location of the boundaries of the Premises is as set forth on the Survey. Tenant further acknowledges and agrees that any inaccuracy or noncompliance is at Tenant's risk, and that such variances shall not constitute grounds for any actions for rescission, damages or diminution of the Tenant's obligations under this Lease.

3. Term.

3.1 Term. The term of this Lease shall commence as of the Effective Date, and, subject to the terms herein, shall continue for an initial term of thirty (30) years ("Initial Term").

3.2 Extended Term. The term of this Lease shall be automatically extended for six additional terms of ten (10) years each (each an "Extended Term") without any further notice to or action by the parties, unless the Tenant shall provide the Landlord with written notice of termination of this Lease on or before the expiration of the Initial Term or any Extended Term. The Initial Term and each Extended Term are collectively referred to herein as the "Term."

4. Base Rent.

4.1 Initial Term Base Rent. The Base Rent for the Initial Term shall be $____________. The Base Rent has been fully paid under the Purchase Agreement in a single installment paid at Closing of the transaction contemplated thereby.

4.2 Extended Term Base Rent. The Base Rent for each Extended Term shall be One Dollar ($1.00) payable at any time during the first year of the Extended Term.

5. Additional Rent.

It is the intention and agreement of the parties that the Base Rent shall be net to Landlord, and free from all set-off or deductions. Tenant agrees to pay or cause to be paid as additional rent, ("Additional Rent") and shall save Landlord harmless from and against, all Impositions (as defined herein), insurance premiums, utilities, maintenance and repair costs, and expenses and obligations of every kind and nature whatsoever relating to the Premises which may arise or become due after the Effective Date.

6. Payment of Taxes, Assessments, Etc.

6.1 Impositions. Tenant shall pay or cause to be paid, before the same become delinquent, all real estate taxes, general or special assessments and all other assessments and other similar charges assessed against or levied upon or payable with respect to the Premises, as well as all water and sewer bills, rates and charges for public utilities, and all other governmental charges in the nature of real estate taxes, general and special, of any kind and nature whatsoever which at any time during the term of this Lease may be assessed, levied, imposed upon, or become due or payable out of or in respect of, or become a lien on the Premises or any part thereof (all such charges described in this Subsection 6.1 being hereinafter collectively referred to as "Impositions", and any of the same being hereinafter referred to as an "Imposition." In the event any Impositions are not assessed, taxed or otherwise charged to the Premises as a separate parcel, then the parties shall exercise reasonable, good faith efforts to apportion the Impositions based on the relative acreage of the Premises and the Hotel Property, the value if improvements located on each parcel and the use or consumption of any services by each parcel. Good faith efforts shall include, without limitation, setting up separate metering for utilities, considering assessed values or taxes for similar marina assets taxed by the municipality or other taxing authorities, and taking other commercially customary measures to segregate Impositions related to the Premises from Impositions related to the Hotel Property. In the event the parties cannot agree as to the allocation of Impositions, the parties shall exercise good faith, commercially reasonable efforts to have the imposition separately assessed, taxed or charged to the Premises and the Hotel Property.

6.2 Evidence of Payment. Tenant shall furnish (or cause to be furnished) to Landlord with respect to each payment of Impositions within ten (10) days of the Tenant's receipt of Landlord's request for same the official receipt of the appropriate taxing authority, if any, or other evidence reasonably satisfactory to Landlord, evidencing the full payment of all Impositions on a timely basis.

6.3 Tax Abatement and Protest. Upon prior notice to Landlord, Tenant shall have the right to contest the amount or validity, in whole or in part, of any Imposition, or to seek a reduction in the valuation of the Property (or any portion thereof) as assessed for taxation purposes by appropriate proceedings diligently conducted in good faith so long as neither the Property nor any part thereof would by reason of such postponement or deferment be in imminent danger of being forfeited or any tax lien ripening, and provided that the amount of the contested Imposition shall be deposited with Landlord.

6.4 Landlord's Cooperation with Tenant. Landlord shall join in any proceeding referred to in Subsection 6.3 if, in Tenant's reasonable opinion, the provisions of any law, rule or regulation at the time in effect shall require that such a proceeding be brought by and/or in the name of Landlord, in which event Landlord shall, upon Tenant's written request and at no cost to Landlord, join in such proceedings or permit the same to be brought by Tenant in the Landlord's name and on the Landlord's behalf. The Landlord agrees to cooperate fully, and at no cost to Landlord, with the Tenant in connection with the foregoing including, without limitation, in the furnishing of such documents, information and other materials as Tenant shall reasonably deem necessary with respect to the foregoing tax abatement and/or protest. Tenant covenants that Landlord shall not suffer or sustain any costs or expenses or any liabilities in connection with Landlord's participation at Tenant's request in any such proceedings relating to the Improvements and the Property, with the Tenant's obligations to pay all of same to be deemed additional rent hereunder. In the event that a credit, refund or award is obtained by the Tenant, the Tenant shall be entitled to retain out of such award payment of all costs and expenses incurred by the Tenant including, without limitation, professional, appraisal, consulting and legal fees incurred in obtaining such refund or award. Tenant shall be also entitled to the full amount of any refund of any Imposition and penalties and interest thereon received by Landlord which shall have been paid by or on behalf of the Tenant or for Tenant's account or which shall have been paid by Landlord and previously reimbursed in full by Tenant.

7. **Surrender of the Property.**

7.1 Surrender of Premises and Property. Tenant shall, upon the expiration or sooner termination of this Lease, surrender and deliver up the Property into the possession and use of Landlord, free and clear of all leases and occupancies and free and clear of all liens, encumbrances and rights of any third parties other than those created by the Landlord apart from this Lease, without any payment or allowance whatever by Landlord for the Property.

7.2 Title to Improvements. Until the expiration or sooner termination of this Lease, title to, and ownership of, the Improvements shall vest in Tenant. Upon the expiration or sooner termination of this Lease, Tenant's title to and ownership of the Improvements shall automatically terminate and absolute and unconditional title to and ownership of the Improvements shall automatically vest in Landlord free and clear of all interests of Tenant and of all those otherwise claiming by through or under Tenant, and without any payment therefor and Landlord's title thereto shall be unlimited. Notwithstanding the foregoing, if requested by Landlord, Tenant will execute, acknowledge and deliver such documents and instruments in recordable form which Landlord may at any time reasonably require to confirm the aforesaid termination of Tenant's title, interest and estates and Landlord may, at its cost, record or cause the same to be recorded, but the execution, acknowledgment and delivery of such documents or instruments by Tenant or the failure of Tenant to execute, acknowledge, delivery or record any of the same shall not be a condition precedent to Landlord securing unlimited and absolute fee title to the aforesaid Improvements.

7.3 Rights of Leasehold Mortgagee, Etc. The provisions of this Section 7 shall survive the expiration or termination of this Lease, and, in the event there is a Leasehold Mortgagee, shall be subject to the provisions of Section 20. In the event this Lease terminates and a new lease is executed under Section 20, title to the Improvements will automatically be deemed conveyed to and vested in the Tenant under the new lease with the Landlord (subject to the provisions of this Section) and subject however to the terms of the new replacement lease. No landlord's lien, so called, shall attach or apply to such removable items.

8. Repairs and Maintenance.

8.1 Maintenance of the Property. Throughout the Term of this Lease, Tenant shall maintain the Property in good order, condition and repair consistent with industry standards for similar properties and in compliance with the requirements of all Governmental Authorities, excepting reasonable wear and tear and damage by fire, insured against casualty or condemnation.

8.2 Provisions Applicable to the Landlord. Landlord shall not be required to furnish any services or facilities or to make or perform any maintenance, repairs or replacements in, to or about the Premises.

8.3 Landlord's Liability. Tenant is and shall be in exclusive control and possession of the Premises and of all Improvements on the Premises as provided herein, and Landlord shall not in any event whatsoever be liable for any injury or damage to any property or to any person happening on, in or about the Premises or the appurtenances thereto, or for any injury or damage to the Premises or the Improvements, or to any property, whether belonging to Tenant or any other person, caused by any fire, breakage, leakage, defect or bad condition in any part or portion of the Premises or of the Improvements on the Premises or appurtenances, or from gas, electricity, water, rain or snow that may leak into, issue or flow from or onto any part of the Premises or the Improvements from the drains, pipes or plumbing work of the same, or from any place or quarter, or due to the use, misuse or abuse of all or any of the Improvements any kind whatsoever which may exist or hereafter be erected or constructed in or on the Premises, or from any kind of injury which may arise from any other cause whatsoever on the Premises or in or on the Improvements or appurtenances, including defects in construction of any Improvements, latent or otherwise.

8.4 Right to Repair.

(a) Tenant shall keep the Marina Property in good condition and repair. In the event Tenant is not maintaining the Marina Property in good condition and repair, Landlord shall provide notice of such failure to Tenant, and Tenant shall have thirty (30) days to undertake repairs and maintenance necessary to return the Marina Property to good condition. Any dispute regarding maintenance of the Marina Property will be resolved as provided below.

(b) Landlord shall keep the Hotel Property in good condition and repair. In the event Landlord is not maintaining the Hotel Property in good condition and repair, Tenant shall provide notice of such failure to Landlord, and Landlord shall have thirty (30) days to undertake repairs and maintenance necessary to return the Hotel Property to good condition. Any dispute regarding maintenance of the Hotel Property will be resolved as provided below.

(c) In the event there is a dispute regarding the maintenance of the Marina Property pursuant to subsection (c) above or the Hotel Property pursuant to subsection (d) above, then the dispute shall be subject to resolution in accordance with the following procedure. Either party may send the other a written dispute notice invoking the procedure set forth in this subsection and describing in reasonable detail the nature of nature of the dispute ("Dispute Notice"). The parties shall meet in person within thirty (30) days following receipt of the Dispute Notice and exercise good faith efforts to resolve the dispute to the parties mutual satisfaction ("Negotiation Period"). In the event the parties are unable to reach agreement prior to expiration of the Negotiation Period, then the parties shall appoint a mutually acceptable independent expert to determine whether maintenance is required and the nature and extent of the maintenance order to put, and keep, the Marina Property ("Marina Expert") or the Hotel Property ("Hospitality Expert"), as applicable, in good condition and repair, based upon the general condition at which the best maintained properties of similar nature are maintained in Kennebunkport, Maine ("Maintenance Determination"). The Marina Expert and the Hospitality Expert are generally referred to herein as the "Maintenance Expert," as applicable. In the event the parties cannot agree upon the Maintenance Expert within twenty (20) days following expiration of the Negotiation Period, then each shall appoint an expert and the two experts so chosen shall select a Maintenance Expert, who shall be responsible for making a written report to the parties setting forth the Maintenance Determination within a reasonable time following his appointment, but not longer than sixty (60) days. The determination of the Maintenance Expert shall be final and binding upon the parties. The party upon which the Dispute Notice was served shall promptly perform all maintenance and repairs work in accordance with the Maintenance Determination with such work to be completed within ninety (90) days, seasonal and weather conditions permitting. In the event the work is not timely completed, the other party shall have the right (but not the obligation) to perform the work and be reimbursed by the owner of the property subject to the maintenance and repair work upon demand.

9. Compliance with Laws.

9.1 Compliance. Throughout the Term of this Lease, Tenant, at its own sole cost and expense, shall comply with all present and future laws, ordinances, orders, rules, regulations and requirements of all Governmental Authorities with respect to the Premises, it being the intention of the parties that Tenant shall and does hereby assume the entire responsibility for, and shall and does hereby relieve Landlord from the responsibility of complying with all such laws, ordinances, orders, rules, regulations and requirements of all Governmental Authorities.

9.2 Right to Contest. Notwithstanding anything contained herein to the contrary, Tenant may, at its sole cost and expense, contest by due legal proceedings diligently prosecuted in good faith the validity of any such law, ordinance, order, rule, regulation or requirement and may postpone compliance therewith during such contest; provided, however, that such postponement shall not subject Landlord to any fine or penalty or to prosecution for a crime, or cause the Premises, the Improvements or any part thereof, to be condemned or vacated and the enforcement of such contested law, ordinance, rule, regulation or requirement is stayed or enjoined during such contest. In connection with any contest permitted by this Section, Landlord, without any cost or expense to it, shall provide its reasonable cooperation with respect to any such contest to the extent requested by Tenant, and in connection therewith, Landlord agrees that Tenant may join Landlord in such proceedings as a co-party with Tenant; provided, however, that Tenant shall indemnify and hold Landlord harmless from any damages, costs, expenses (including Landlord's reasonable attorneys' fees and expenses and other fees of third parties), judgments, settlements, losses and any other amounts of a similar nature which Landlord may incur or may be imposed upon Landlord to the extent the same shall arise in connection with any such cooperation or prosecution.

9.3 Hazardous Use Restriction. Tenant shall not use or occupy, or permit or suffer the Premises, or the Improvements on the Premises or any part thereof to be used or occupied, (i) for any use other than a lawful use, or (ii) for any non-retail or non-commercial use considered extra-hazardous by Tenant's or Landlord's insurance carrier or based upon industry standards unless, in the case of such hazardous use, insurance reasonably satisfactory to Landlord consistent with industry practice covering any such hazard is provided for the benefit of Landlord and Tenant.

10. Public Liability Insurance.

10.1 Public Liability Insurance. Tenant, at no cost or expense to the Landlord, shall, throughout the Term of this Lease, and all extensions thereof, procure and maintain or cause any other occupant to procure and maintain comprehensive general public liability insurance against claims for bodily injury, death or property damage occurring upon, in or about the Property, with commercially reasonable coverage limits based upon industry standards for real estate premises of the same type as the Premises.

10.2 Fire and Extended Coverage Insurance. Tenant, at no cost or expense to the Landlord, shall, throughout the Term of this Lease, and any extensions thereof, keep (or cause any other occupant to keep) the Improvements insured against loss or damage by fire, windstorm, and other elements, and against loss or damage by such other, further and additional risks as now are or hereafter may be embraced by the standard extended coverage forms, or endorsements, in each case to full insurable value. The policy shall also contain a so-called "Agreed Amount Endorsement" which shall waive any and all co-insurance provisions under the policy as it applies to any of the coverages.

10.3 Insurance Policy. All insurance provided for in this Section shall, as applicable, be effected under valid and enforceable policies issued by financially sound insurance companies having a Best's rating of at least A and which are authorized to do business in the jurisdiction in which the Property is located. Within thirty (30) days following the Effective Date, and thereafter throughout the Term, prior to the expiration dates of the expiring policies theretofore furnished pursuant to this Section, a certificate of insurance shall be delivered by or on behalf of the Tenant to Landlord.

10.4 Insured Parties. Any policies of insurance provided for or contemplated by Section 10.1 shall name Tenant as the named insured and Landlord and Landlord's mortgagees as additional insureds as their interests may appear. Any policies of insurance provided for or contemplated by Section 10.2 shall name Tenant as the named insured. No other person shall be named as an insured or additional named insured with respect to the fire and extended coverage insurance except the holder of a Leasehold Mortgage may also be named as an additional named insured. Tenant may also name the Leasehold Mortgagee, as mortgagee and loss payee on the fire and extended coverage insurance, and additional insured with respect to public liability insurance. Landlord shall at all times be named as a certificate holder entitled to at least 30 days notice of cancellation.

10.5 Release and Waiver. Each of Landlord and Tenant hereby releases the other from any and all liability for any loss or damage caused by fire or any of the extended coverage casualties or any other casualty or risk insured against, even if such fire, loss or other casualty shall be brought about by the fault or negligence of the other party, or any persons claiming under such other party.

10.6 Adjustment of Loss. Losses under each policy of insurance provided for or contemplated by Section 10.2 in an amount greater than $50,000 shall be adjusted with the insurers and/or underwriters by Tenant, with the Consent of Landlord if the loss occurs during Landlord's Fire Loss Period. All costs and expenses of Tenant of collecting or recovering any insurance proceeds under such policies including, but not limited to, any and all reasonable fees of attorneys, appraisers and adjusters, shall be deducted from such insurance proceeds (the resulting proceeds after such cost shall be referred to as "Net Proceeds") before being applied as provided herein.

10.7 Additional Insurance. At all times during the Term of this Lease, at its own cost and expense, Tenant shall provide and keep in force such other reasonably obtainable insurance and in such amounts as may from time to time be reasonably required by Landlord consistent with general industry standards against other insurable hazards which, at the time, are commonly insured against in the case of construction and alteration of Improvements and/or in the case of Premises similarly situated to the Premises, due regard being or to be given to the type of Improvements their construction, use, occupancy and location.

10.8 Easement and Purchase Insurance Requirements. The foregoing shall be in addition to and not in limitation of the insurance required under the Purchase Agreement and the Marina Easements.

11. Damage or Destruction by Fire or other Casualty.

11.1 Damage to Property. In the event of any damage to the Improvements caused by fire, the elements or any other casualty to an extent not covered by Section 11.2, Tenant shall promptly give notice to Landlord and shall, upon request by Landlord, then, with reasonable diligence (subject to Unavoidable Delays), repair and restore, or cause subtenants or occupants thereof to repair and restore, the Improvements or the portion thereof so damaged, as nearly as possible, to the condition, size and value the same were in immediately prior to such damage, provided that such obligation to restore shall not be limited to the amount of the insurance proceeds available to Tenant.

11.2 No Rent Abatement. Upon the occurrence of any such fire, casualty or other damage to the Improvements or any other similar cause, there shall be no abatement of Base Rent or other payments hereunder, and the obligations of Tenant hereunder shall continue in full force and effect. Tenant agrees, if necessary, to utilize all loss of rent insurance proceeds to pay the Base Rent and other charges due under this Lease.

11.3. Proceeds Payable to Mortgagee. Any Mortgagee holding a Leasehold Mortgage, may, in accordance with the terms of any such mortgage, require that the insurance proceeds be paid to it; provided however, if any Mortgagee receives insurance proceeds in accordance with this Section 11.3, the Tenant shall still be required to (i) create the complete fund described above by depositing into the joint escrow account sufficient amounts to assure and complete the payment for the reconstruction and repair work, and (ii) complete the reconstruction and repair work as described in this Article 11.

12. Tenant Improvements and Alterations.

12.1 Right to Make Tenant Alterations. Tenant shall have the right at any time and from time to time during the term of this Lease to make, or to permit any other occupant to make, at no cost or expense to Landlord, Tenant Alterations (as that term is hereinafter defined) without any consent or approval from Landlord. No alterations may be made other than Tenant Alterations. Provided however Tenant may not make any Tenant Alterations which would impair the structural integrity of the Improvements or materially diminish its value.

12.2 Provisions Applicable to Tenant Alterations. Tenant will comply (and cause any other occupant to comply) with each of the following provisions:

(a) All Improvements and all Tenant Alterations shall be commenced and completed in a reasonable and timely manner (subject to Unavoidable Delays) using good quality materials and in a good and workmanlike manner.

(b) All Improvements and all Tenant Alterations shall be made in compliance with all applicable laws and ordinances and with all applicable licenses, permits, authorizations and approvals and with all applicable rules, regulations, orders and requirements of all Governmental Authorities.

(c) Prior to the commencement of the construction of any Improvements, Tenant shall prepare or cause to be prepared plans and specifications, copies of which shall be submitted to Landlord for its consent prior to the commencement of construction together with evidence of ability to fund the cost of such construction satisfactory to Landlord, and shall procure (or cause any other occupant to procure) all applicable permits, consents and approvals of all Governmental Authorities, as may be required or customary in connection therewith, including, without limitation, the payment of any charges in connection therewith, and shall promptly deliver copies thereof to Landlord. Tenant shall pay or cause to be paid all costs, expenses and liabilities arising out of or in connection with or by reason of any Improvements or any Tenant's Alterations.

(d) Title to all Improvements and all Tenant Alterations when made, erected, constructed, installed or placed upon or under the Premises shall be governed by the terms and provisions of Section 7.2 of this Lease.

12.3 Cooperation of Landlord. Landlord agrees that, at the request of Tenant, and at Tenant's sole cost, Landlord will either (a) file any appropriate applications or petitions in which Tenant will join or (b) join in any applications or petitions filed by Tenant required to obtain all necessary public and final approvals, zoning and other permits, consents or approvals required at any time from Governmental Authorities to permit construction of the Improvements or any Tenant's Alterations. Tenant shall be solely responsible for the preparation, filing and processing of all such applications or petitions.

13. Leasehold Mortgages; Prohibition against Liens.

13.1 Leasehold Mortgages. In connection with the provision of financing for the Premises by a Financial Institution, the Tenant is hereby given the right by the Landlord in addition to any other rights herein granted, without the Landlord's prior written consent, to mortgage, collaterally assign, or otherwise encumber and grant security interests in all or any part of its interests in this Lease, or any part or parts thereof, under one or more Leasehold Mortgage(s), and to assign this Lease, or any part or parts thereof, and any subleases as collateral security for such Leasehold Mortgage(s), upon the condition that all rights acquired under such Leasehold Mortgage(s) shall be subject to each and all of the covenants, conditions and restrictions set forth in this Lease, and to all rights and interests of the Landlord herein, none of which covenants, conditions or restrictions is or shall be waived by the Landlord by reason of the right given to Tenant to grant Leasehold Mortgages with respect to such interest in this Lease, except as expressly provided herein. Notwithstanding anything contained herein to the contrary, no Leasehold Mortgage may be obtained by Tenant or any of its successors or assigns without Landlord's consent other than in connection with the provision of financing for the Project by a Financial Institution. No Leasehold Mortgage given by the Tenant under the provisions of this paragraph shall be deemed to be an assignment of this Lease so as to require the assumption of said obligations and liabilities by the Financial Institution until and unless the Financial Institution, or any third party obtaining the Tenant's interest under this Lease through foreclosure of the Leasehold Mortgage takes possession of all or any portion of the Premises as a successor to the Tenant, in which case the Financial Institution, or any such third party, shall assume all Tenant's obligations hereunder.

13.2 Discharge of Lien. Except in the case of a Leasehold Mortgage granted to a Leasehold Mortgagee, and except for liens, encumbrances or charges created with the agreement of Landlord (which agreement may be given or withheld in Landlord's sole discretion), Tenant shall not create or permit to be created or to remain, and shall discharge or bond in a manner reasonably satisfactory to Landlord (or cause to be so discharged or bonded) any mechanic's, laborer's or materialman's lien, or any other lien or encumbrance which constitutes a lien, encumbrance or charge upon the Property. Any mechanic's, laborer's or materialman's lien shall be discharged or bonded in accordance with Section 13.2 hereof.

13.3 Utility Easements. Landlord agrees to join in the execution of any utility easement required for the development, use or operation of the proposed provided such easement is an easement on the customary terms generally utilized by such utility company which do not affect the use and enjoyment or market value of the Property, and if obtainable, has a non-recourse provision for the benefit of Landlord (with any liability of Landlord thereunder being limited to Landlord's interest in the Property and with no personal liability on the part of Landlord or its partners, shareholders, members or other beneficial owners) and with Landlord to not have any liabilities, obligations or duties until Landlord becomes the owner of the Improvements. Such easement must also be reasonably satisfactory to Landlord and, if obtainable, expire and terminate at Landlord's option upon the expiration or termination of the term of this Lease.

13.4 Landlord's Right to Discharge. If any mechanic's, laborer's or materialman's lien or attachment, levy, judgment lien or writ of execution shall at any time be filed against the Property or any part thereof, for labor, work, materials or supplies provided or alleged to have been provided by or on behalf of Tenant or any other creditor's claim against Tenant, Tenant, within thirty (30) days after written notice from Landlord or any other party to Tenant of the filing of same, shall cause the same to be discharged or bonded in full in such a manner that any title insurance company will either not take an exception for same or will insure over such mechanic's lien. If Tenant shall fail to cause such lien, attachment, levy, judgment lien or writ of execution to be discharged or bonded, then, in addition to any other right or remedy, upon thirty (30) days notice to Tenant, Landlord may, but shall not be obligated to, procure the discharge of such lien, attachment, levy, judgment lien or writ of execution by payment or by bonding proceedings.

However, so long as Tenant is contesting in good faith, by virtue of appropriate proceedings, the validity or amount of such lien and has bonded the same, then Landlord agrees not to discharge such lien by payment to the lienor. Any and all amounts so paid and all other costs incurred by Landlord including, but not limited to, reasonable counsel fees, together with interest thereon at two percent over the prime rate as published in the Wall Street Journal, or any successor thereto from the respective dates of Landlord's making of such payments, shall be paid by Tenant to Landlord on demand as additional rent hereunder.

13.5 Consent of Landlord Not Implied. Nothing contained in this Lease shall be deemed or construed in any way as constituting the knowledge, approval, consent or request of Landlord, express or implied by inference or otherwise, to any contractor, subcontractor, laborer, materialman, architect or engineer for the performance of any labor or the furnishing of any materials or services for or in connection with the Property or any part thereof. Notice is hereby given that Landlord shall not be liable for any labor or materials or services furnished or to be furnished to Tenant upon credit, and that no mechanic's or other lien for any such labor, materials or services shall attach to or affect the fee or reversionary or other estate or interest of Landlord in the Property or in this Lease.

14. Cooperation of Landlord.

Landlord covenants and agrees that Landlord will from time to time upon Tenant's reasonable request and at the Tenant's sole cost as additional rent join with Tenant in all applications, petitions and proceedings required for Tenant to secure all permits, consents and approvals for the construction and operation of the Improvements and any Tenant Alterations from Governmental Authorities provided that the same shall be at no cost to Landlord, and subject to Tenant's compliance with the terms of the Lease.

15. Unavoidable Delays.

In any case where either party hereto is required to do any act, delays caused by or resulting from Act of God, war, civil commotion, fire or other casualty, labor difficulties, general shortages of labor, materials or equipment, government regulations or any other Unavoidable Delays shall not be counted in determining the time when the performance of such act must be completed, whether such time be designated by a fixed time, a fixed period of time or "a reasonable time." In any case where work is to be paid for out of insurance proceeds or condemnation awards, due allowance shall be made, both to the party required to perform such work and to the party required to make such payment, for delays in the collection of such proceeds and awards. Notwithstanding the foregoing or any other provision of this Lease, the concept of Unavoidable Delay shall not apply to the payment of Base Rent, Impositions, additional rent or any other payments under this Lease.

16. Indemnification of Landlord.

Tenant shall indemnify, defend with counsel reasonably satisfactory to Landlord and hold Landlord harmless from and against all liabilities, obligations, damages, suits, fines, penalties, claims, demands, costs, charges, judgments and expenses, including, but not limited to, reasonable attorneys' fees, which may be imposed upon or asserted against Landlord or Landlord's interest in the Property by reason of or in connection with (a) any default by Tenant under this Lease or (b) any act or omission of Tenant and its respective agents, servants, contractors or employees during the term of this Lease on or about the Property, or (c) any act arising out of the use Premises not caused by Landlord. This indemnity shall survive the termination of this Lease.

17. Condemnation.

19.1 Voluntary Conveyance. Neither party to this Lease will voluntarily convey any interest related to this Lease to any Governmental Authority or public utility under threat of a taking of all or any portion of the Property under power of eminent (a "Taking") in lieu of formal proceedings without first providing at least 10 days prior written notice to the other of any request or intention to do so. For the purposes of this Section, all amounts paid pursuant to any agreement with any condemning authority which has been made in settlement of or under threat of any condemnation or other eminent domain proceeding affecting the Property shall be deemed to constitute an award made in such proceeding.

19.2 Effect of Taking. If during the term hereof there shall be a Taking which prevents or substantially impairs the use of the Property in whole or part for the uses and purposes then being made or proposed to be made by Tenant, then the Tenant's Leasehold Estate shall cease and terminate as of the Date of Taking as to the Property so taken. If Tenant's Leasehold Estate is so terminated in whole or in part, all Rent and other charges payable by Tenant to Landlord hereunder attributable to the Land, or portion thereof taken, shall be paid by Tenant up to and prorated through the Date of Taking.

19.3 Allocation of Award.

(a) If, at any time during the continuance of this Lease, all or any portion of the Property is taken, appropriated or condemned by reason of eminent domain, the Landlord and Tenant shall divide the proceeds and awards in the condemnation proceedings, abate the rent, and make other adjustments in a just and equitable manner under the circumstances. If the parties cannot agree on a just and equitable division, annual abatement of rent, or other adjustments within 30 days after the award has been made, the disputed matters shall be submitted to arbitration in accordance with the dispute resolution provisions of Section 38 of this Lease. If legal title to the entire Property is wholly taken by condemnation, the Lease shall be cancelled.

(b) Although title to the Improvements placed by the Tenant upon the Property will pass to the Landlord, for purpose of condemnation, the fact that Tenant placed the Improvements on the Property shall be taken into account. The deprivation of the Tenant's use of the Improvements shall, together with the remaining term of the Lease, be an item of damage in determining the Tenant's portion of the condemnation award; provided, however, the projected revenues (or other sources of income) from the business operations of the Tenant over the remaining term of the Lease shall not be considered items of damages for such purposes.

The deprivation of the Landlord's income stream for the remaining term of the Lease and the residual value of the Improvements shall be items of damage in determining the Landlord's portion of the condemnation award. It is the general intent of this Section that, upon condemnation, the parties shall share in their awards to the extent that their respective interests are depreciated, damaged, or destroyed by the exercise of the right of eminent domain. If the condemnation is total, the condemnation award shall be allocated so that the then value of the property, as if it were unimproved property, is allocated to the Landlord, and the then value of the Improvements thereon is allocated between the Landlord and Tenant after giving due consideration to the number of years remaining in the term of this Lease and the condition of the Improvements at the time of commendation.

(c) A Leasehold Mortgagee shall have the right to participate in any condemnation proceeding affecting the Property.

18. Landlord's Mortgages.

18.1 Fee Mortgagees of Landlord. Landlord shall not have the right to mortgage its interest in the Property and shall exercise best efforts to have any existing mortgage modified to exclude the Premises.

18.2 Sale or Transfer of Landlord's Interest in the Premises. Subject to Section __ ("Tenant's Purchase Option") set forth below, nothing contained in this Lease shall be deemed in any way to limit, restrict or otherwise affect Landlord's absolute right at any time or times to convey its interest in the Property, subject to this Lease, and, in connection therewith, to assign its interest in this Lease, and the rent or other sums and charges payable hereunder by Tenant to Landlord, to a transferee designated by Landlord in a notice to Tenant. In such case, upon receipt of such notice, Tenant shall pay the rent and the other sums and charges payable by Tenant to Landlord at the address mentioned in any such notice; provided, however, that the Tenant or assignee shall assume and perform all of the obligations of Landlord under this Lease arising thereafter, subject to the limitations on the personal liability of Landlord set forth herein, and thereafter the prior Landlord shall be released from any further liability for the performance of Landlord's obligations under this Lease arising thereafter.

19. Assignments and Transfer of Tenant's Interest.

Tenant may, with the Consent of Landlord which such Consent may not be unreasonably withheld, sell, assign, transfer or otherwise convey its interest in the Improvements or in this Lease or the term hereof or the leasehold estate created hereunder or any interest in any of the same or permit any other person to use and occupy the Property pursuant to the terms hereof. Tenant agrees to promptly give written notice to Landlord of any such sale, assignment, transfer or other conveyance, provided that such right shall not be deemed to be a consent to any liens or encumbrances otherwise prohibited hereunder. Tenant shall also provide Landlord upon request with complete and accurate copies of all executed documents with respect to the foregoing transfers (including, without limiting the generality of the foregoing, all riders, exhibits, addenda, letter agreements or other documents executed with respect thereto). Notwithstanding the foregoing, Tenant is obligated to provide Landlord with a copy of the documents which are recorded in the Registry of Deeds or other applicable recording office. In connection with any such sale, assignment, transfer or other conveyance (excluding all Leasehold Mortgages), the assignee or other transferee shall execute and deliver to Landlord an assumption instrument pursuant to which such assignee or other transferee agrees that it has effective as of the effective date of such instrument assumed all of the obligations, liabilities and duties of Tenant under this Lease and has become liable therefor to Landlord, including all obligations of Tenant which arose or accrued prior to the date of the sale, assignment, transfer or other conveyance. In the event for any reason any such assignee or other transferee fails to execute such assumption instrument, the acceptance of any such assignment or other transfer shall establish that such assignee or other transferee has agreed to the foregoing and has assumed all such liabilities, obligations and duties. Notwithstanding the foregoing, no lease of all or any portion of the Premises, nor any sublease of all or any portion of the Premises, nor any assignment of this Lease shall release or discharge Tenant from any liability, whether past, present, or future, under this Lease and Tenant shall continue to remain primarily liable under this Lease.

20. Estoppel Certificates.

20.1 Estoppel Certificate of Tenant. Tenant agrees at any time and from time to time, within twenty (20) days of written request from Landlord, to execute, acknowledge and deliver, without charge, to Landlord, or to any person designated by Landlord, a statement in writing certifying that this Lease is unmodified (or if there have been modifications, identifying the same by the date thereof and specifying the general nature thereof), that Tenant has not received in the sixty (60) days prior to the date of the certificate any notice of default or notice of termination of this Lease (or if Tenant has received such a notice, that it has been revoked or the default cured, as applicable, if such be the case), that to Tenant's knowledge Landlord is not in default in the payment or performance of any of Landlord's obligations under this Lease (or if a default does exist, specifying the same), that Tenant, to its knowledge, has no claims or offsets against Landlord hereunder (or if Tenant has any such claims, specifying the same), and the dates to which the rent and other sums and charges payable by Tenant hereunder have been paid, and to such other matters as Landlord may reasonably request.

20.2 Estoppel Certificate of Landlord. Landlord agrees at any time and from time to time, within twenty (20) days of written request from Tenant, to execute, acknowledge and deliver, without charge, to Tenant, or to any person designated by Tenant (including, without limitation, any Leasehold Mortgagee), a statement in writing certifying that this Lease is unmodified (or if there be modifications, identifying the same by the date thereof and specifying the general nature thereof), that no notice of default or notice of termination of this Lease has been served on Tenant in the sixty (60) days prior to the date of the certificate (or if Landlord has served such notice, that the same has been revoked or, if Landlord has knowledge of same, that the default has been cured, as applicable, if such be the case), that to Landlord's knowledge no Event of Default does exist (or if a default does exist, specifying the same) and the dates to which the rent and other sums and charges payable by Tenant hereunder have been paid, and to such other matters as Tenant may reasonably request. Such certificate may be relied upon by any person to whom it is addressed

21. Events of Default, Lease Termination.

21.1 Events of Default. If default shall be made by Tenant in the performance of or compliance with any of the covenants, agreements, terms or conditions contained in this Lease ("Event of Default") and such default shall continue for a period of thirty (30) days after written notice thereof from Landlord to Tenant, or, in the case of a default or a contingency, although curable, which cannot with due diligence be cured within such period of thirty (30) days, Tenant fails to proceed with all due diligence within such period of thirty (30) days to commence to cure the same and thereafter to prosecute the curing of such default with all due diligence (it being intended that in connection with a default not susceptible of being cured with due diligence within thirty (30) days that the time for Tenant within which to cure the same shall be extended for such period as may reasonably be necessary to complete the curing thereof with all due diligence), then and in any such Event of Default, Landlord, at any time thereafter during the continuance of such Event of Default, may exercise all rights and remedies permitted hereunder for such default and breach, including without limitation, any summary eviction proceedings, and may, in its discretion, give written notice to Tenant stating that this Lease and the term hereby demised shall terminate on the date specified in such notice without waiving any claims for Base Rent and, subject to the exercise of any rights of a Leasehold Mortgagee pursuant to Section 19 and/or 35 of this Lease and the expiration of any cure period, so-called, set forth therein, this Lease shall terminate and all rights of Tenant under this Lease shall terminate and the remaining provisions of this Article with respect to the remedies of Landlord shall apply.

21.2 Remedies of Landlord. Upon any termination of this Lease pursuant to Section 21.1, Tenant shall quit and peaceably surrender the Property to Landlord, without any payment therefor by Landlord. Landlord, in addition to all other remedies herein reserved to it and all other remedies permitted hereunder, upon or at any time after such termination may, without further notice, enter upon and re-enter the Premises and Property and possess and repossess itself thereof by summary proceedings, ejectment or other legal proceedings, and may dispossess Tenant and remove Tenant from the Property and may have, hold and enjoy the Property and the right to receive all rental income of and from the same, and Tenant shall have no further right, title and interest thereof of any kind whatsoever.

21.4 Waiver Not Implied. No failure by Landlord or Tenant to insist upon the strict performance of any covenant, agreement, term or condition of this Lease or to exercise any right or remedy consequent upon a breach thereof, and no acceptance by Landlord of full or partial rent during the continuance of any breach, shall constitute a waiver of any such breach or such covenant, agreement, term or condition. No acceptance of rent by Landlord at any time shall be deemed to constitute a waiver by Landlord of any breach of this Lease by Tenant whether or not Landlord shall be aware of such breach at the time of such acceptance. No covenant, agreement, term or condition of this Lease to be performed or complied with by either party, and no breach thereof, shall be waived, altered or modified except by a written instrument executed by the other party. No waiver of any breach shall affect or alter this Lease, but each and every covenant, agreement, term and condition of this Lease shall continue in full force and effect with respect to any other then existing or subsequent breach thereof.

21.5 Remedies Cumulative. Each right and remedy of Landlord or Tenant provided for in this Lease shall be distinct, separate and cumulative and shall be in addition to every other right or remedy provided for in this Lease, or available at law or in equity, and the exercise or beginning of the exercise by Landlord or Tenant of any one or more of the rights or remedies provided for in this Lease shall not preclude the simultaneous or later exercise by Landlord or Tenant of any or all other rights or remedies provided for in this Lease or available at law or in equity.

22. Invalidity of Particular Provisions.

If any term or provision of this Lease or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, the remainder of this Lease, or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be effected thereby, and each term and provision of this Lease shall be valid and be enforced to the fullest extent permitted by law.

23. Notices.

All notices, requests, demands, consents, approvals, and other communications which may or are required to be served or given hereunder (for the purposes of this Section collectively called "Notices") shall be in writing and shall be sent by registered or certified mail, return receipt requested, postage prepaid, or by overnight courier requiring a signed receipt, addressed to the party to receive such Notice at the address set forth below:

If to Landlord, to: Yachtsman Hospitality LLC
2 Livewell Drive, Suite 201,
Kennebunk, Maine 04043

If to Tenant, to: KPT Marine, LLC
69 Ocean Avenue
Kennebunkport, Maine 04046

All Notices given by either party shall also be given to the holder of a Leasehold Mortgage. Either party may, by Notice given as aforesaid, change its address or add a second address for all subsequent Notices, except that neither party may require Notices to it to be sent to more than two (2) addresses. Tenant shall be entitled to two (2) addressees in addition to the Notices given to the holder of any Leasehold Mortgage, and the holder of any such Leasehold Mortgage shall be entitled to two (2) addressees. Notices shall be deemed given when received or as of the date the addressee refuses receipt or acceptance. All Notices by or on behalf of Landlord shall be deemed sufficient if signed by one (1) or more of Landlord's officers, partners, members or other owners or by its counsel and if otherwise given or made in compliance with this Section.

All Notices by or on behalf of Tenant shall be deemed sufficient if signed by Tenant or by its counsel and if otherwise given or made in compliance with this Section.

24. Use.

The Premises shall be use for Commercial and retail purposes only.

25. Quiet Enjoyment.

Landlord covenants that Tenant shall quietly have and enjoy the Premises during the term of this Lease, without hindrance or molestation by anyone claiming by, through or under Landlord.

26. Captions.

The captions and table of contents, if any, in this Lease are inserted only as a matter of convenience and for reference and in no way define, limit, enlarge or describe the scope or intent of this Lease nor in any way shall affect this Lease or the construction of any provision hereof.

27. Oral Change or Termination.

This Lease and the documents referred to herein contain the entire agreement between the parties pertaining to the subject matter hereof, and any executory agreement hereafter made shall be ineffective to change, modify or discharge it in whole or in part unless such executory agreement is in writing and signed by the party against whom enforcement of the change, modification or discharge is sought. This Lease cannot be changed or terminated orally.

28. Limitation on Liability.

The term "Landlord" as used in this Lease so far as covenants or obligations on the part of Landlord are concerned shall be limited to mean and include only the owner or owners at the time in question of the fee of the Property. In the event of any transfer or transfers of the title to such fee, Landlord herein named (and in case of any subsequent transfers or conveyances the then Landlord) shall be automatically freed and relieved from and after the date of such transfer or conveyance of all personal liability as respects the performance of any covenants or obligations on the part of Landlord contained in this Lease thereafter to be performed, provided that any funds in the hands of such Landlord or the then Landlord at the time of such transfer, in which Tenant has an interest, shall be turned over to the Tenant and any amount then due and payable to Tenant by Landlord shall, subject as aforesaid, be binding on Landlord, its successors and assigns, only during and in respect of their respective periods of ownership.

Anything in this Lease to the contrary notwithstanding, Tenant shall look solely to the estate and interest of Landlord in and to the fee interest in the Property for the satisfaction of Tenant's remedies or the collection of a judgment against Landlord in the event of any default or breach by Landlord with respect to any of the terms, covenants and conditions of this Lease to be performed by Landlord and no other property or assets of Landlord or any officer, director, shareholder, member, manager, partner, parent, subsidiary or affiliate of Landlord shall be liable for any obligation of Landlord hereunder. The provisions of this Section shall survive the termination of this Lease.

29. Successors and Assigns.

The covenants, conditions and agreements in this Lease shall bind and inure to the benefit of Landlord and Tenant and, except as otherwise provided in this Lease, their respective legal representatives, successors and assigns.

30. No Merger.

It is the intent and purpose of the parties hereto that this Lease shall remain in full force and effect until duly terminated and shall not be deemed to have merged with the interest of Landlord created by virtue of any lien upon the Property or any other interest therein or any portion thereof held by Landlord or by the purchase by Tenant of Landlord's interest in the Premises.

31. Governing Law.

This Lease shall be construed in accordance with and shall be governed by the laws of the State of Maine.

32. Waivers.

Failure of either party to complain of any act or omission on the part of the other party, no matter how long the same may continue, shall not be deemed to be a waiver by said party of any of its rights hereunder. No waiver by either party at any time, express or implied, of any breach of any provision of this Lease shall be deemed a waiver of a breach of any other provision of this Lease or a consent to any subsequent breach of the same or any other provision. If any action by either party shall require the consent or approval of the other party, the other party's consent to or approval of such action on any one occasion shall not be deemed a consent to or approval of said action on any subsequent occasion or a consent to or approval of any other action on the same or any subsequent occasion.

33. Environmental Provisions.

33.1 Definitions. The following definitions shall apply for purposes of this Section:

(i) "Environmental Laws" shall mean and include each and every federal, state or local statute, regulation or ordinance or any judicial or administrative decree or decision, whether now existing or hereafter enacted, promulgated or issued, with respect to any Hazardous Materials (as hereinafter defined), drinking water, groundwater, wetlands, landfills, open dumps, storage tanks, underground storage tanks, solid waste, waste water, storm water run-off, waste emissions or wells. Without limiting the generality of the foregoing, the term shall encompass each of the following statutes and regulations promulgated thereunder as well as any amendments and successors to such statutes and regulations, as may be enacted and promulgated from time to time: (i) the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (codified in scattered sections of 26 U.S.C., 33 U.S.C., 42 U.S.C. and 42 U.S.C. §9601 et seq.); (ii) the Resource Conservation and Recovery Act of 1976 (42 U.S.C. §6901 et seq.); (iii) Hazardous Materials Transportation Act (49 U.S.C. §1801 et seq.); (iv) the Toxic Substances Control Act (15 U.S.C. §2061 et seq.); (v) the Clean Water Act (33 U.S.C. §1251 et seq.); (vi) the Clean Air Act (42 U.S.C. §7401 et seq.); (vii) the Safe Drinking Water Act (21 U.S.C. §349; 42 U.S.C. §201 and §300f et seq.); (viii) the Maine Environmental Policy Act of 1969 (42 U.S.C. §4321); (ix) the Superfund Amendment and Reauthorization Act of 1986 (codified in scattered sections of 10 U.S.C., 29 U.S.C., 33 U.S.C. and 42 U.S.C.); (x) Title III of the Superfund Amendment and Reauthorization Act (40 U.S.C. §1101 et seq.); (xi) the Uncontrolled Hazardous Substance Sites Law, 38 M.R.S.A. §1361 et seq.; (xii) the Hazardous Matter Control Law, 38 M.R.S.A. §1317, et seq.; (xiii) the Maine Hazardous Waste, Septage and Solid Waste Management Act, 38 M.R.S.A. §1301 et seq.; (xiv) the Reduction of Toxics Use, Waste and Release Law, 38 M.R.S.A. §2301 et seq.; and (xv) the Site Location of Development Law, 38 M.R.S.A. §481 et seq.

(ii) "Hazardous Materials" shall mean each and every element, compound, chemical mixture, contaminant, pollutant, material, waste or other substance which is defined, determined or identified as hazardous or toxic under any Environmental Law. Without limiting the generality of the foregoing, the term shall mean and include:

(A) "hazardous substances" as defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, the Superfund Amendment and Reauthorization Act of 1986, or Title III of the Superfund Amendment and Reauthorization Act, each as amended, and regulations promulgated thereunder;

(B) "hazardous waste" as defined in the Resource Conservation and Recovery Act of 1976, as amended, and regulations promulgated thereunder;

(C) "hazardous materials" as defined in the Hazardous Materials Transportation Act, as amended, and regulations promulgated thereunder;

(D) "chemical substance or mixture" as defined in the Toxic Substances Control Act, as amended, and regulations promulgated thereunder;

(E) "hazardous matter" as defined in the Hazardous Matter Control Law as amended, and regulations promulgated thereunder; and

(F) "hazardous waste" as defined in the Maine Hazardous Waste, Septage and Solid Waste Management Act, as amended, and regulations promulgated thereunder.

(iii) "Indemnified Parties" shall mean Landlord, Landlord's parent, subsidiaries and affiliates, each of their respective shareholders, members, managers, partners, directors, officers, employees and agents, and the successors and assigns of any of them; and "Indemnified Party" shall mean any one of the Indemnified Parties.

(iv) "Release" shall mean any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, storing, escaping, leaching, dumping, or discarding, burying, abandoning, or disposing into the environment.

(v) "Threat of Release" shall mean a substantial likelihood of a Release which requires action to prevent or mitigate damage to the environment which may result from such Release.

33.2 Environmental Covenants of Tenant. Tenant covenants and agrees with Landlord that Tenant shall:

(i) comply with all Environmental Laws; and

(ii) not store (except in compliance with all Environmental Laws pertaining thereto), dispose of, Release or allow the Release of any Hazardous Materials on the Property, except to the extent inherent in the operation of the service station located on the Premises.

33.3 Environmental Indemnity. Tenant covenants and agrees, at Tenant's sole cost and expense, to indemnify, defend (at trial and appellate levels, and with attorneys, consultants and experts reasonably acceptable to Landlord) and hold each Indemnified Party harmless from and against any and all liens, damages, losses, liabilities, obligations, settlement payments, penalties, assessments, citations, directives, claims, litigation, demands, defenses, judgments, suits, proceedings, costs, disbursements or expenses of any kind or of any nature whatsoever (including, without limitation, reasonable attorneys', consultants' and experts' fees and disbursements incurred in investigating, defending, settling or prosecuting any claim, litigation or proceeding) which may at any time be imposed upon, incurred by or asserted or awarded against such Indemnified Party or the Property and arising directly or indirectly from or out of: (A) the Release or Threat of Release of any Hazardous Materials on, in, under or affecting all or any portion of the Property or any surrounding areas, regardless of whether or not caused by or within the control of Tenant; (B) the violation of any Environmental Laws relating to or affecting the Property or the Tenant or any person holding under Tenant, whether or not caused by or within the control of Tenant; (C) the failure of Tenant or any person holding under Tenant to comply fully with the terms and conditions of this Section; (D) the breach of any representation or warranty contained in this Section; or (E) the enforcement of this Section, including. Landlord's rights under this Section shall be in addition to all other rights of Landlord under this Lease and shall survive the termination of this Lease.

33.4 Notice to Landlord. If Tenant receives any written notice or obtains knowledge of (i) any potential or known Release or Threat of Release of any Hazardous Materials at or from the Property, notification of which must be given to any governmental agency under any Environmental Law, or notification of which has, in fact, been given to any governmental agency, or (ii) any complaint, order, citation or notice with regard to air emissions, water discharges, or any other environmental health or safety matter affecting Tenant or the Property (an "Environmental Complaint") from any person or entity (including, without limitation, the Environmental Protection Agency), then Tenant shall promptly notify Landlord orally and in writing of said Release or Threat of Release or Environmental Complaint.

35. Tenant's Right to Purchase.

35.1 Purchase Option. Notwithstanding any provision in this Lease to the contrary, Tenant shall have the absolute right, at any time, to purchase the Premises for a purchase price of One Hundred Dollars ($100) ("Purchase Option"). Tenant may exercise its Purchase Option at any time by written notice to Landlord.

35.2 Closing. The closing on the Purchase Option shall take place at 10 a.m. at the offices of Landlord's attorney or at such other place as shall be mutually agreed to by both Landlord and Tenant on the date that is twenty (20) days following receipt of the notice of exercise of the Purchase Option, or at such earlier date as is mutually agreeable to Landlord and Tenant. TIME IS OF THE ESSENCE. At Closing, Landlord shall convey the Premises to Tenant by good and sufficient Maine statutory short form Quitclaim Deed with Covenant (the "Deed"). Title to the Marina Property shall be good and marketable and shall be free and clear of all liens and encumbrances except the following (collectively, the "Permitted Encumbrances"): (i) zoning restrictions and land use matters, including without limitation, all terms and conditions of local, state and federal ordinances or regulations and permits relating to the Premises; (ii) current taxes and assessments; (iii) all easements, restrictions and conditions of record, including all such matters identified in that Old Republic Title Insurance Policy obtained by Landlord with an effective date of October 19, 2017, except that Landlord shall obtain a partial release from any Landlord Mortgage; and (iv) all matters that an accurate survey or physical inspection of the Property would disclose. The following shall occur at the Closing, each being a condition precedent to the others and all being considered as occurring simultaneously:

(i) Landlord shall execute, have acknowledged and deliver to Tenant, the Deed and Bill of Sale subject only to Permitted Encumbrances;

(ii) Landlord shall deliver an Affidavit indicating that Landlord is not a foreign person and that the transaction is exempt from the requirements of 26 U.S.C. § 1445, or in lieu thereof, Tenant shall be entitled to withhold and account for a portion of the Purchase Price as required by such statute and corresponding regulations;

(iii) Landlord shall deliver an Affidavit indicating that Landlord is a Maine resident, or in lieu thereof or of another applicable exemption, Tenant shall be entitled to withhold and account for a portion of the Purchase Price as required by 33 M.R.S.A. §5250-A;

(iv) Tenant shall cure any then outstanding Event of Default that is susceptible of being cured by the payment of money.

(v) Each party shall deliver to the other such other documents, certificates and the like as may be required herein or as may be necessary or helpful to carry out its obligations under this Agreement.

(vi) Landlord and Tenant shall execute a settlement statement satisfactory to all parties itemizing the various payments and prorations contemplated hereby.

35.3 Sale "As-Is, Where-Is." The acceptance of the Deed by Tenant at the Closing shall be deemed to be the full performance and discharge of every agreement, obligation and representation made on the part of Landlord, except as expressly set forth in the Deed. No provisions, agreements or representations herein shall survive the Closing except as specifically stated herein. The Premises will be sold and will be conveyed "as is" without any representation or warranties as to habitability, merchantability, fitness, condition or otherwise. Neither party is relying upon any statements or representations not embodied in this Agreement. Landlord makes no representations or warranties regarding the adequacy of permits or approvals for the installation, maintenance or operation of the docks and marina facilities at the marina property, and Tenant assumes all risk associated with obtaining and maintaining all required governmental permits and approvals associated with the same.

35.4 Amendment to Declaration of Easements. At Closing, Landlord and Tenant shall execute and deliver an amendment to the Declaration of Easement granting the Marina Easements that establishes the Marina Easements as appurtenant to the Marina Land and provides for the Marina Easements to run with the Marina Land.

36. Recording.

Landlord agrees to execute a Memorandum of this Lease, which Tenant may record at the York County Registry of Deeds and which shall be substantially in the form of the Memorandum of Lease attached hereto as Exhibit B unless otherwise mutually agreed by the parties hereto.

[signature page to follow]

IN WITNESS WHEREOF, the parties hereto have duly executed this instrument as a sealed instrument on the day and year first above written.

LANDLORD:
YACHTSMAN HOSPITALITY, LLC

Witness

By: ______________________
its ______________

TENANT:
KPT MARINE, LLC

Witness

By: ______________________
its member

EXHIBIT A
Lease Area

A certain lot or parcel of situated on the westerly side of Ocean Avenue in the Town of Kennebunkport, County of York, and State of Maine, depicted as “Proposed Lease Parcel” on plan entitled “Boundary Survey at Yachtsman Lodge & Marina, made for Yachtsman Hospitality, LLC” prepared by Owen Haskell, Inc., dated April 26, 2018. OHI Job# 2017-261 KP-Y, bounded and described as follows:

Commencing on the westerly sideline of Ocean Avenue at a one and a quarter inch iron pipe marking the common corner of the grantee and grantor;

Thence, S77°14’00”W along the common line of the grantee and grantor 170.00 feet to the point of beginning;

Thence, from said point of beginning the following courses and distances through land of the grantor:

N14°35’22”W a distance of 270.00 feet;
N30°24’38”E a distance of 30.00 feet;
N14°35’22”W a distance of 40.00 feet;
N59°35’22”W a distance of 30.00 feet;
N14°35’22”W a distance of 239.08 feet to a point 30 feet southerly from the southerly line of land now or formerly of the Town of Kennebunkport (deed book 2115 page 237);

Thence, S78°03’29”W running parallel with and holding 30 feet from said land of the Town of Kennebunkport to the channel of the Kennebunk River;

Thence, southeast along the channel of the Kennebunk River to the common line of the grantee and grantor;

Thence, N77°14’00”E along the common line of the grantee and grantor to the point of beginning.

Bearings are magnetic 1961.

Exhibit B

MEMORANDUM OF LEASE

PARTIES TO LEASE: LESSOR: Yachtsman, LLC

LESSEE: KPT Marine, LLC

PREMISES: The premises shown in Exhibit A hereto located at 57 Ocean Avenue, Kennebunkport, Maine, and being a portion of the parcel conveyed by that certain deed from US Hotels New England, LLC to Seller, dated October 11, 2017 and recorded in the York County Registry of Deeds in Book 17585, Page 540.

TERM OF LEASE: 30 Years.

EXTENSION TERM: Six 10-Year Extensions

TENANT OPTION TO PURCHASE: Tenant has an option to purchase the Premises at any time

DATED this _______ day of April, 2018.

WITNESS:

____

LESSOR(S):

Yachtsman, LLC

By: ________________________
Name: TIMOTHY HARRINGTON
Title:

STATE OF MAINE
COUNTY OF YORK

On this day of April, 2018, before me, the undersigned, a Notary Public in and for said State, personally appeared Timothy Harrington, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is subscribed to the within instrument and acknowledged to me that s/he executed the same in her/his capacity, and that by her/his, signature on the instrument, the individual(s) or the person(s) upon behalf of which the individual acted, executed the instrument.

Notary Public

NICOLE C MINZY
11-14-2024

Attachment 1:

Activities Description

1.0 Activities Description

The Yachtsman Marina is located at 57 Ocean Avenue in Kennebunkport, Maine, with 600 feet of frontage along the Kennebunk River. The Town of Kennebunkport's Assessor's Office identifies the parcel as Map 10, Block 1, Lot 3. The facility is an active marina with 58 boat slips.

Existing Conditions

The Yachtsman Marina is located approximately 0.75-mile from the mouth of the Kennebunk River. The Kennebunk River flows generally southeast, past the towns of Lyman, Arundel, Kennebunk, and Kennebunkport. It enters the Atlantic Ocean in Kennebunkport, approximately 0.5-mile downstream from the town center. The surrounding area, with its high density of marinas and other waterfront uses, has an extensive history of dredging. The Yachtsman Marina dredging activities date back to the 1970s, with the most recent permits issued for maintenance dredging in 2016. Silt, sand, and other natural deposits have impacted the marina of the Yachtsman Marina and have limited boat navigation and berthing depths, especially during periods of low tide.

Proposed Project

The applicant is proposing to mechanically dredge approximately 6,400± cubic yards of sediment from the area in front of the Yachtsman Marina, including in and around the boat slips, to provide adequate depth for navigation and berthing.

The area of the dredge will be approximately 61,000 square feet (1.4-acres). The proposed dredge depth will be to elevation -6.0 feet mean low water, with about one foot of over-dig. It is anticipated that dredging will coincide with neighboring marinas performing dredging at the same approximate time (see "Adjacent Dredging Projects" section below). The material will be transported by barge to the Isle of Shoals North Disposal Site (IOSN). The IOSN is located approximately 15 nautical miles east of Portsmouth, New Hampshire, in the Gulf of Maine.

The proposed dredge area is coincidental with the area that was previously permitted under Maine DEP Permit #L-18612-4E-A-N in 1994. Since that time, the Yachtsman Marina was dredged in 2005 under Permit ##L-18612-4E-B-N, and in Winter 2015-2016 under Maine DEP's Permit by Rule (PBR) process and U.S. Army Corps of Engineers (USACE) Permit #NAE-2004-319.

Given the timing for receiving permit approvals from Maine DEP and USACE, WEA anticipates that the work will occur during the winter 2025-2026 dredge window.

Adjacent Dredging Projects

The dredging of the Yachtsman Marina will coincide with similar dredging work at three adjacent marinas on the Kennebunk River, including the Arundel Yacht Club, the Kennebunkport Marina, and the Kennebunk River Club.

Attachment 2:

Alternatives Analysis

2.0 Alternatives Analysis

Dredging Alternatives Analysis

WEA studied several alternatives for the Yachtsman Marina dredging project, all evaluated against its purpose and need. The project's purpose is to dredge and dispose of dredged material from the site in an efficient, environmentally cautious, and effective manner; the project's need is to provide the Yachtsman Marina with safe navigation and anchoring conditions for watercraft.

The existing conditions and dredging alternatives analysis are described in the following narrative:

Existing Conditions

The Yachtsman Marina (site) encompasses approximately 1.70 acres of land. Ocean Avenue and Silas Perkins Park border the property to the north; Ocean Avenue borders the site to the east; the Kennebunkport Marina is located south of the property; and the Kennebunk River borders the property to the west.

Alternative 1 – No Action

WEA investigated the possibility of not dredging, however, the project's purpose is to provide effective navigation for watercraft and boat slips at the Yachtsman Marina. If Alternative 1 is utilized, the club members and guest mariners will not be able to safely navigate to the boat slips. The area would continue to fill in with sediment and eventually the mooring and docking space would become unusable. Alternative 1 is not practicable as it would eventually force the Yachtsman Marina to close due to unsafe navigation and does not satisfy the project need.

Alternative 2 – Reduced Dredge

WEA investigated the option of dredging 50% less than the proposed amount of 6,400 cubic yards. Though there may be a slight environmental benefit to dredging less (a smaller area would be disturbed and the length of dredging activities would be reduced), the dredged area would quickly fill in again within a few years, requiring the area to be dredged again sooner than if the area was dredged to elevation -6.0 feet. Again, this would not allow the club members and others to navigate or use the docks in a safe manner. Alternative 2 would not advance the project's need.

Alternative 3 – Full Dredge

WEA investigated the option of fully dredging the marina to the proposed elevation of -6.0 feet mean low water, totaling 6,400 cubic yards of dredge material. The dredging will provide adequate sediment removal for boat owners to navigate safely for 6-8 years at the current rate of sedimentation, and therefore has been selected as the most appropriate alternative for this project to meet the project's purpose and need.

Selection

Given the information above, Alternative 3 was selected as the most appropriate alternative for the project. This alternative will provide the maximum efficiency of dredging and will optimize the time between necessary dredging events.

Dredge Material Disposal Alternatives Analysis

The USACE approved a Sampling and Analysis Plan (SAP) for the project on January 21, 2022, which provided proposed sediment sampling locations, methods, and testing criteria to determine disposal suitability. The sampling results were submitted to the USACE for the Yachtsman Marina and the nearby Arundel Yacht Club, Kennebunkport Marina, and Kennebunk River Club. The USACE issued a Suitability Determination for all 4 sites on June 10, 2024, which documents the suitability of the dredged material for disposal at the Isle of Shoals North (IOSN) open water disposal site.

It is WEA's understanding that the USACE requires Individual Standard Permit applicants to conduct an alternatives analysis to evaluate options for disposal of dredged material. In order of disposal method preference, the USACE favors onshore disposal, followed by beneficial use, and then open water placement.

The dredge material disposal alternatives analysis is described in the following narrative:

Alternative A – Onshore Disposal

Onshore Disposal – Storage of Material at the Yachtsman Marina

WEA investigated the option of onshore disposal of the 6,400 cubic yards of dredged materials from the Yachtsman Marina. The Yachtsman Marina encompasses approximately 1.70 acres of land, as shown in the aerial site map attached to this Alternatives Analysis as Figure 1. Due to the layout of the Yachtsman Marina lot, there is minimal space available to conduct onshore disposal operations at the site.

Logistically, to conduct onshore disposal of the dredged material, the following steps would need to be taken:

- Use barge-mounted dredging equipment to dredge sediment.
- Place the dredged material onshore into a stockpile or a large container from the dredge barge.
  - As shown in the attached aerial site map, the largest area available for a stockpile of dredged materials is located within a 26-foot by 26-foot grassed area between the Yachtsman Marina/Hotel buildings. If a 4-foot walkway is kept clear around the stockpile, the allowable diameter of the stockpile would be 18 feet (therefore the allowable radius would be 9 feet). Using the following standard soil stockpile volume equation, the required height of a 6,400 cubic yard (172,800 cubic feet) stockpile would need to be 2,037 feet tall, which is infeasible.
    - $Volume = \frac{1}{3} \times \pi \times Radius^2 \times Height \rightarrow$
    - $Height = Volume \times 3 \times \frac{1}{\pi} \times \frac{1}{Radius^2} \rightarrow$
    - $Height = 172{,}800 ft^3 \times 3 \times \frac{1}{\pi} \times \frac{1}{(9ft)^2} = 2{,}037\ ft$
  - In addition, this step is infeasible due to the layout of the Yachtsman Marina's dock/boat slips; the closest a dredge barge could get to the "open space" located to the between the Yachtsman Marina buildings is at least 70 feet away, requiring the dredging equipment to have a very large reach.

- Give the dredged sediment appropriate time to dewater.
- Load dried dredged sediment into dump trucks or roll-off containers and haul offsite to a final disposal location.
    - Dump trucks have an approximately 20 cubic yard capacity and roll-off containers have a maximum capacity of 40 cubic yards. With these capacities, the hauling and disposal of the dried dredged sediment would require approximately 320 or 160 truckloads, respectively. The hauling of sediment would be infeasible due to major increases in project duration and costs.
    - In addition, because the proposed and allowable dredging window occurs during winter, local roadways will be posted for heavy truck traffic, which would likely require hauling vehicles to reduce the quantity of sediment they can transport at once.

As documented above, onshore disposal of dredged sediment using the Yachtsman Marina site is infeasible due to site constraints and sediment hauling duration/costs. As mentioned, an aerial map of the site is included as Figure 1 in this Alternatives Analysis for reference.

Onshore Disposal – Storage of Material at Alternative Locations on the Kennebunk River

The proposed dredge volume for the Yachtsman Marina is 6,400 cubic yards, or 172,800 cubic feet. Area estimates for storing the dredged material in a stockpile or in roll-off dumpsters for dewatering are described below. Dewatering the dredged sediment could take anywhere from a couple days to a couple weeks.

Storage via Stockpile

It is assumed that acceptable side slopes for a stockpile of wet, silty sediment would be between 4:1 and 5:1 (horizontal to vertical), and an acceptable stockpile height would be between 20 and 25 feet. Using these criteria and the estimated dredge volume of 172,800 cubic feet, the diameter of the stockpile needed to store the dredged material would be approximately 180 feet. It is assumed that around 20 feet of additional space would be required around the perimeter of the stockpile for erosion and sedimentation controls, dewatering materials, and equipment access, increasing the diameter of the storage area to 220 feet. Figure 2, included with this Alternatives Analysis, shows what a 220-foot diameter stockpile would look like on nearby facilities with open space along the Kennebunk River; there are no facilities with adequate space to accommodate the stockpile storage area. In addition, the Yachtsman Marina does not have control or interest in any of the nearby facilities along the Kennebunk River shown in Figure 2, with the exception of the Kennebunkport Marina at 67 Ocean Avenue, which also does not have adequate space to accommodate the stockpile storage area.

Storage via Roll-Off Dumpster

The largest readily available roll-off dumpster size is 40 cubic yards. It is assumed that wet sediment dumped into a roll-off dumpster to dewater would contain about 20-percent water, which would reduce the soil capacity in the dumpster to 32 cubic yards. With this assumption, it would require 200 dumpsters to store 6,400 cubic yards of sediment. Each roll-off dumpster is 22 feet long by 7.5 feet wide; adding a 5-foot walking area around the roll-off would increase the footprint of each roll-off to 27 feet by 12.5 feet, or 337.5 square feet. The total space required for 200 roll-off dumpsters would be approximately 67,500 square feet. Figure 3, included with this Alternatives

Analysis, shows what an 67,500 square foot roll-off dumpster storage area would look like on nearby facilities with open space along the Kennebunk River; there are no facilities with adequate space to accommodate the roll-off storage area. In addition, the Yachtsman Marina does not have control or interest in any of the nearby facilities along the Kennebunk River shown in Figure 3, with the exception of the Kennebunkport Marina at 67 Ocean Avenue, which also does not have adequate space to accommodate the roll-off storage area.

Onshore Disposal – Disposal Location Alternatives

As stated above, it is infeasible to get the dredged material onshore for dewatering and subsequent hauling to a disposal location at the Yachtsman Marina and other nearby facilities along the Kennebunk River. As a result, the following onshore disposal location alternatives are also considered infeasible:

- Landfill
    - This alternative is also infeasible due to the estimated cost to dispose of the material at a landfill. Tipping and hauling fees for material disposal would likely be between $75 and $100 per cubic yard, totaling around $480,000 to $640,000 for disposal of 6,400 cubic yards of material.
    - The Juniper Ridge Landfill in Alton/Old Town, Maine and the Waste Management Crossroads Landfill in Norridgewock, Maine currently do not have sufficient capacity to accommodate the dredge materials and the increase in daily traffic to dispose of the dredge materials. The Waste Management Turnkey Landfill in Rochester, NH could accommodate the materials, however, as documented above, this option is both infeasible due to inability to get the dredge material upland, and cost prohibitive.
- Well injection
    - The Environmental Protection Agency's "General Information About Injection Wells" webpage states that injected fluids may include "water, wastewater, brine (salt water), or water mixed with chemicals." The dredged materials will consist of silty sediment and therefore well injection is not a feasible disposal alternative.
    - In addition, the Maine Department of Environmental Protection's Underground Injection Control (UIC) Program webpage states that Class I, II, III, and IV injections wells are prohibited in Maine.
- Incineration
    - This alternative is also infeasible due to the estimated cost to incinerate soils. Hauling and incineration fees would likely be around $700 per cubic yard, totaling around $4.5M for the incineration of 6,400 cubic yards of material. (Source: Federal Remediation Technologies Roundtable Screening Matrix and Reference Guide, Version 4.0, Section 4.22 Incineration.) In addition, it appears that the closest soil incineration facilities to the Yachtsman Marina are in Illinois or Arkansas.
- Spread of material over open ground
    - This alternative is also infeasible because the Yachtsman Marina does not have access to a land area appropriate for spreading the material over open ground. Spreading 172,800 cubic feet of soil across a land area would consist of: 1 foot of sediment spread across a 172,800 square foot (~4 acre) land area; or 6 inches of sediment spread across a 345,600 square foot (~7.9 acre) land area.

- Additional biological, chemical, or physical treatment of intermediate or final waste streams
    - Additional treatment of the dredged sediment would not increase the feasibility of onshore disposal.

Alternative B – Beneficial Use

WEA used the USACE's New England District Beneficial Use Planning Tool (Tool) to identify potential beneficial use dredge material disposal sites within a 30-mile radius of the project site, which is the distance from the Yachtsman Marina to the IOSN open water disposal site. The Tool identified 17 potential beneficial use sites; an analysis of the suitability of each of these sites is as follows:

- Beach Nourishment (4 sites – Wells Beach, Drakes Island Beach, Camp Ellis, Western Beach)
    - A representative from the USACE confirmed that all beach nourishment projects require sand, whereas the dredged material from the Kennebunk River will be primarily silt. Therefore, beneficial use of dredged material at the beach nourishment sites is infeasible.
- Construction and Industrial or Commercial Uses (2 sites – Cobble Berm in Ogunquit, ME and Dune Erosion/Stormwater Improvements in Wells, ME)
    - The two construction projects require cobble and sand materials, respectively, whereas the material dredged from the Kennebunk River will be primarily silt. Therefore, beneficial use of dredged material at the construction sites is infeasible.
- Nearshore Berm (6 sites – Wallis Sands, Wells, Goochs Beach, Kennebunk River, Saco, and Little River Rock Disposal Sites)
    - A representative from the USACE confirmed that all nearshore berm projects require sand, whereas the dredged material from the Kennebunk River will be primarily silt. Therefore, beneficial use of dredged material at nearshore berm sites is infeasible.
- Salt Marshes (5 sites – Piscataqua, Ogunquit/Rachel Carson National Wildlife Refuge, Webhannet, and Little River Salt Marsh Priority Areas Accepting Sediment; and Goosefare Salt Marsh)
    - Piscataqua Salt Marsh Priority Area: A representative from the New Hampshire Division of Environmental Services (NHDES) stated that the Piscataqua Salt Marsh is not a potential dredge disposal site.
    - Ogunquit/Rachel Carson National Wildlife Refuge, Webhannet, and Little River Salt Marsh Priority Areas Accepting Sediment and Goosefare Salt Marsh: A representative from the U.S. Fish and Wildlife Service (USFWS) stated that the State of Maine's current regulations and permitting processes do not allow the use of dredged materials on salt marshes.
    - Beneficial use of dredged material at salt marsh sites is infeasible.

A summary of the 17 potential beneficial use sites is included as Table 1, attached to this Alternatives Analysis along with a list of references and copies of relevant email communications.

Alternative C – Open Water Placement

Open Water Placement – Saco Bay Open Water Disposal Site

In order to get Maine DEP's approval for disposal at the Saco Bay Open Water Disposal Site, additional benthic environment testing of the river sediment is required. The time it will take to conduct the additional sediment testing and analysis, to receive an updated Suitability Determination for Saco Bay from the USACE, and to receive permit approvals for dredging from the USACE and Maine DEP would push the dredging activities to the Winter 2026-2027 dredge window. The Yachtsman Marina has a critical need to conduct their maintenance dredging in the Winter 2025-2026 dredge window, as boats at their marina are already experiencing navigation challenges due to river sediment accumulation at the marina. As a result, consideration of the Saco Bay Disposal Site is not a feasible alternative for this round of maintenance dredging.

Open Water Placement – Isle of Shoals North Open Water Disposal Site

As stated above, the USACE issued a Suitability Determination for the Yachtsman Marina and the nearby Arundel Yacht Club, Kennebunkport Marina, and Kennebunk River Club on June 10, 2024, which documents the suitability of the dredged material for disposal at the IOSN open water disposal site.

Selection

Due to the infeasibility of disposing of dredged material onshore and there being no beneficial use sites suitable for disposal, Alternative C, open water placement at IOSN, was selected as the most appropriate alternative for the project.

Figures

Yachtsman Marina

57 Ocean Avenue, Kennebunkport, ME

Approximate limits of "open space" for stockpile placement

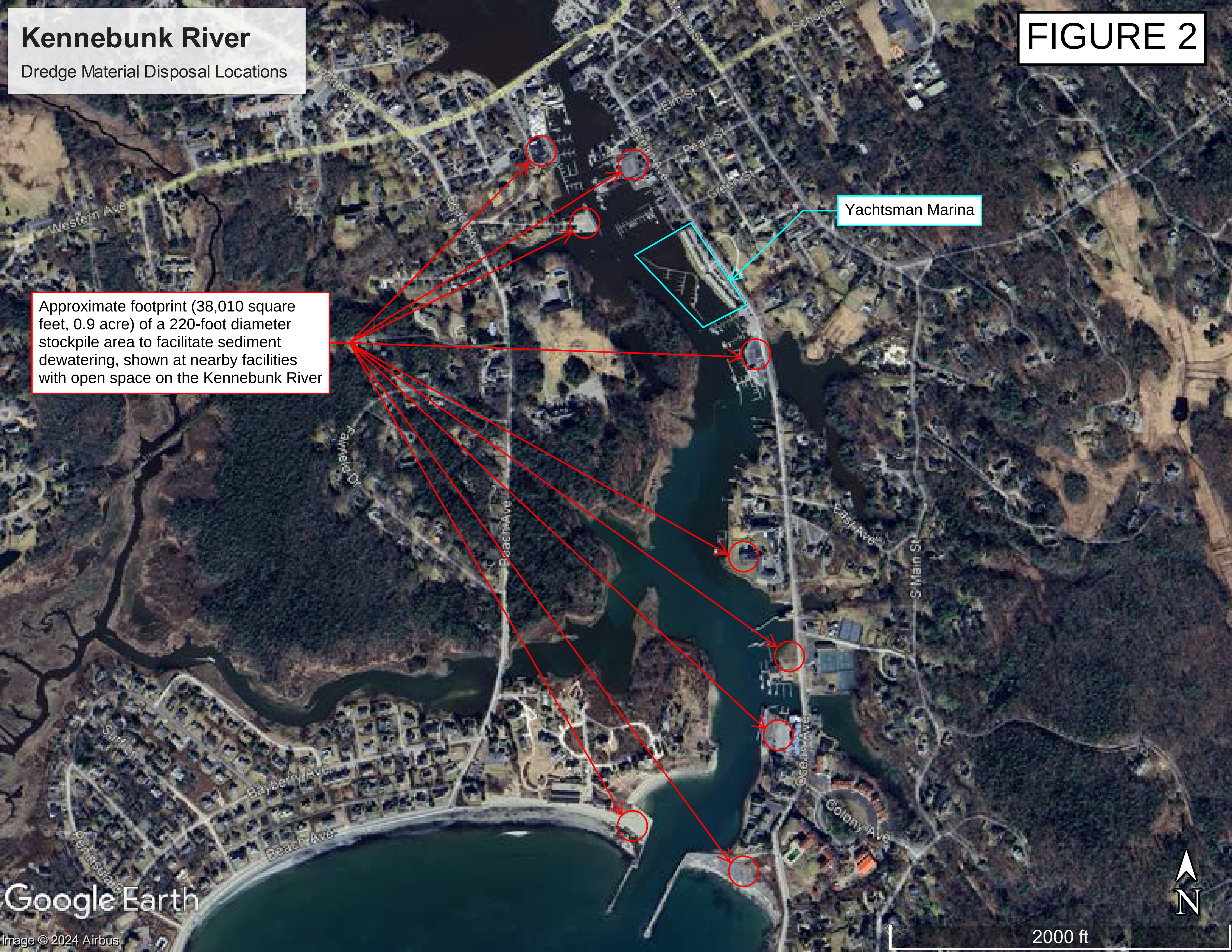
Approximate limits of 9-foot radius stockpile

Approximate location of the closest a dredge barge could get to the site

Kennebunk River

Dredge Material Disposal Locations

FIGURE 2

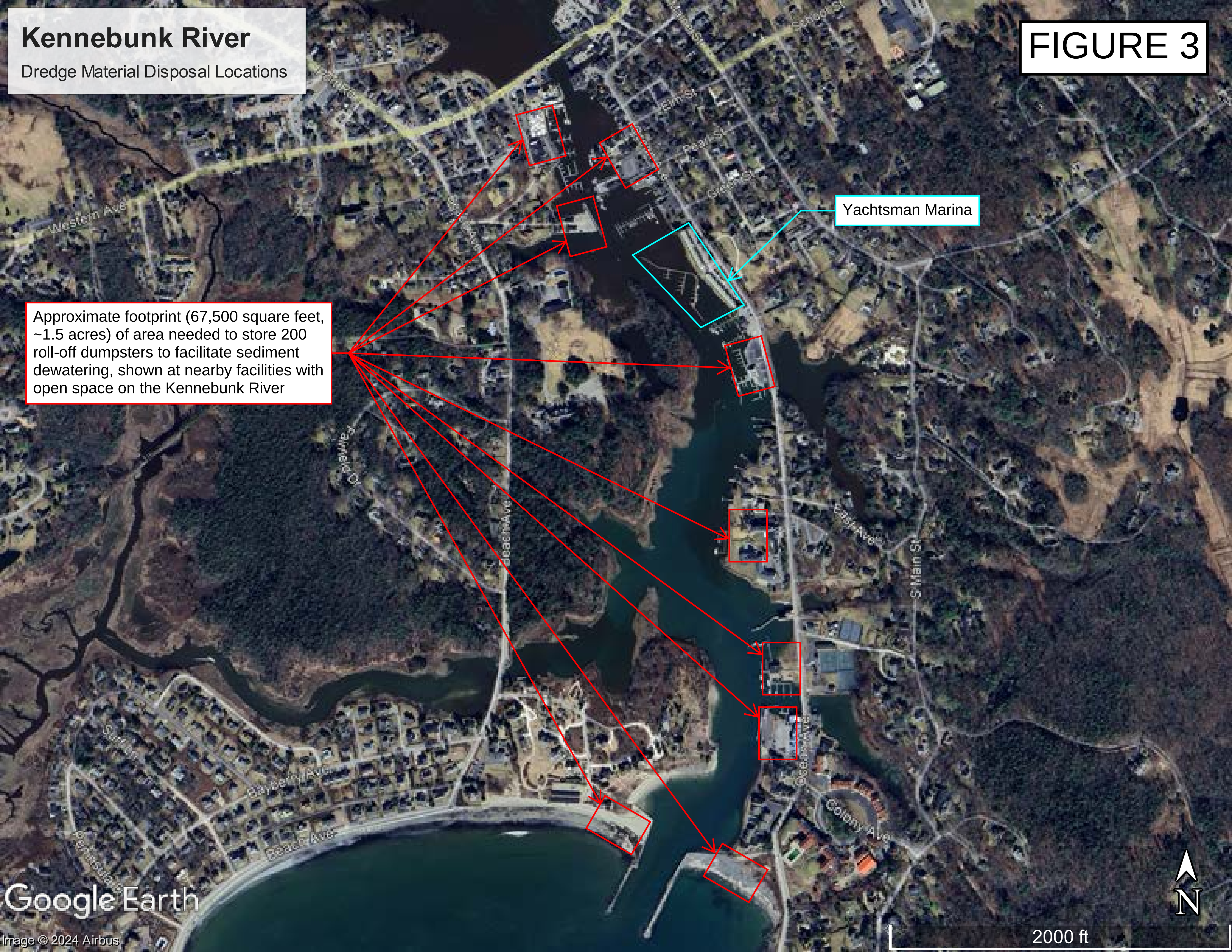


Approximate footprint (38,010 square feet, 0.9 acre) of a 220-foot diameter stockpile area to facilitate sediment dewatering, shown at nearby facilities with open space on the Kennebunk River

FIGURE 3

Kennebunk River

Dredge Material Disposal Locations



Approximate footprint (67,500 square feet, ~1.5 acres) of area needed to store 200 roll-off dumpsters to facilitate sediment dewatering, shown at nearby facilities with open space on the Kennebunk River

Yachtsman Marina

Tables

Table 1: Dredge Material Disposal Beneficial Use Alternatives – Yachtsman Marina

Table 1
Dredge Material Disposal Beneficial Use Alternatives - Yachtsman Marina
Summary Table & References

Project Name[1]	Project Category	Location	Coordinates	Contact	Feasible Disposal Location?	Reasoning
Wells Beach	Beach Nourishment	Wells, ME	43.311208N -70.561063W	USACE	No	Beach nourishment projects require sand; dredged material from the Kennebunk River will be primarily silt.[4,5]
Drakes Island Beach	Beach Nourishment	Wells, ME	43.321900N -70.552082W	USACE	No	Beach nourishment projects require sand; dredged material from the Kennebunk River will be primarily silt.[4,5]
Camp Ellis	Beach Nourishment	Saco, ME	43.466204N -70.381264W	USACE	No	This beach nourishment project requires "sandy shoal material," and dredged material from the Kennebunk River will be primarily silt.[4,5,6]
Western Beach	Beach Nourishment	Scarborough, ME	43.539528N -70.321888W	USACE	No	Beach nourishment projects require sand; dredged material from the Kennebunk River will be primarily silt.[4,5]
Cobble Berm	Construction and Industrial or Commercial Uses	Ogunquit, ME	43.236523N -70.589087W	USACE	No	Project requires cobble, and dredged material from the Kennebunk River will be primarily silt.
Dune Erosion and Stormwater Improvements	Construction and Industrial or Commercial Uses	Wells, ME	43.248998N -70.595158W	USACE	No	Dune requires sand, and dredged material from the Kennebunk River will be primarily silt.
Wallis Sands Disposal Site	Nearshore Berm	Rye, NH	43.020324N -70.726276W	USACE	No	Nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5]
Wells Nearshore Disposal Site	Nearshore Berm	Wells, ME	43.307605N -70.560229W	USACE	No	20,000 CY of dredged "sandy" material from the 2020 Wells Harbor federal navigation project was placed here; however, nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5,6]
Goochs Beach Nearshore Site	Nearshore Berm	Kennebunkport, ME	43.345503N -70.481053W	USACE	No	20,000 CY of dredged material from the 2020 Kennebunk/Kennebunkport federal navigation project was placed here; however, nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5,6]
Kennebunk River Disposal Site	Nearshore Berm	Kennebunkport, ME	43.345134N -70.479100W	USACE	No	Nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5]
Saco Nearshore Disposal Site	Nearshore Berm	Saco, ME	43.467543N -70.366173W	USACE	No	Nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5]
Little River Rock Nearshore	Nearshore Berm	Saco, ME	43.518925N -70.364468W	USACE	No	Nearshore berm projects require sand, and dredged material from the Kennebunk River will be primarily silt.[4,5]
Piscataqua Salt Marsh Priority Area[2]	Salt Marsh Priority Area	Rye, NH	--	USFWS	No	Piscataqua Salt Marsh is not a potential dredge disposal site.[7]
Ogunquit Salt Marsh Priority Area/Rachel Carson National Wildlife Refuge[3]	Salt Marsh Priority Area	Ogunquit/Wells, ME	--	USFWS	No	Maine state permitting does not allow the use of dredged materials on salt marshes.[8]

Table 1
Dredge Material Disposal Beneficial Use Alternatives - Yachtsman Marina
Summary Table & References

Project Name[1]	Project Category	Location	Coordinates	Contact	Feasible Disposal Location?	Reasoning
Webhannet Salt Marsh Priority Area[3]	Salt Marsh Priority Area	Wells, ME	--	USFWS	No	Maine state permitting does not allow the use of dredged materials on salt marshes.[8]
Little River Salt Marsh Priority Area[3]	Salt Marsh Priority Area	Wells, ME	--	USFWS	No	Maine state permitting does not allow the use of dredged materials on salt marshes.[8]
Goosefare Salt Marsh	Wetland Habitats/Salt Marsh	Saco, ME	43.493752N -70.392875W	USFWS	No	Maine state permitting does not allow the use of dredged materials on salt marshes.[8]

References:

1. USACE New England District Beneficial Use Planning Tool: https://www.arcgis.com/apps/dashboards/4f1c828081684605af2972cb6297dacf
2. New Hampshire Saltmarsh Restoration Priorities for the Saltmarsh Sparrow: https://acjv.org/documents/NH_SALS_comp_guidance_doc.pdf
3. Maine Saltmarsh Restoration Priorities for the Saltmarsh Sparrow: https://acjv.org/documents/ME_SALS_comp_guidance_doc.pdf
4. Email Correspondence Between WEA and USACE, dated August 13, 2024 (attached).
5. Email Correspondence Between WEA and USEPA, dated August 14, 2024 (attached).
6. USACE Update Report - Maine, dated January 31, 2024: https://www.nae.usace.army.mil/Portals/74/ME-UpdateReport_31Jan2024.pdf
7. Email Correspondence Between WEA and NHDES, dated August 19, 2024 (attached).
8. Email Correspondence Between WEA and USFWS, dated August 14, 2024 (attached).

References

1. **Email Correspondence Between WEA and USACE, dated August 13, 2024.**
2. **Email Correspondence Between WEA and USEPA, dated August 14, 2024.**
3. **Email Correspondence Between WEA and NHDES, dated August 19, 2024.**
4. **Email Correspondence Between WEA and USFWS, dated August 14, 2024.**

From: Hopkins, Aaron D CIV USARMY CENAE (USA) <Aaron.D.Hopkins@usace.army.mil>
Sent: Tuesday, August 13, 2024 12:44 PM
To: Leyna Tobey; Saloio, Gabriella J CIV USARMY CEHQ (USA)
Subject: RE: Beneficial Use Sites for Dredging

Hi Leyna,

I got your voicemail the other day and I apologize for not returning your call yet.

Great to see that you used the Beneficial Use of Dredged Material Planning Tool as a screening step for your project. You are correct about the beach nourishment sites needing sandy material – and the same can be said for the nearshore berm sites you identified in the Planning Map as those are intended to be feeder berms for the adjacent beaches. The openwater sites in your list are included in the Planning Map to compare openwater disposal alternatives and are not considered beneficial use themselves. That leaves the five salt marsh sites on your list which are all potential restoration sites from the USFWS. I would suggest you reach out to the contacts in the Atlantic Coast Joint Venture reference at USFWS or Maine Dept of Inland Fisheries and Wildlife to see if there are any potential beneficial uses for your project at those sites. We were able to provide some dredged material recently to the Rachel Carson National Wildlife Refuge in Wells, ME for a small beneficial use project.

Aaron

Aaron Hopkins
DAMOS Program Manager
US Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742
978.318.8973

From: Leyna Tobey <leyna@Walsh-eng.com>
Sent: Tuesday, August 13, 2024 10:54 AM
To: Saloio, Gabriella J CIV USARMY CEHQ (USA) <Gabriella.J.Saloio@usace.army.mil>; Hopkins, Aaron D CIV USARMY CENAE (USA) <Aaron.D.Hopkins@usace.army.mil>
Subject: [Non-DoD Source] Beneficial Use Sites for Dredging

Good morning Gabriella and Aaron,

I am working on permitting a dredging project for several marinas on the lower Kennebunk River in Kennebunk, ME, and am currently conducting an alternatives analysis on where to dispose of the 25,000 CY of silty dredge material. I used the Army Corp's Beneficial Use of Dredged Material Planning Tool and found the potential disposal locations in the attached spreadsheet within a 30-mile radius of the project site.

As Gabriella is listed as the ACOE contact for several of the disposal locations and Aaron is listed at the contact for the DAMOS Beneficial Use Planning Map, I was hoping either of you would be able to provide me with some details for the disposal sites listed in the attached spreadsheet (e.g. if they are accepting materials, what types of materials they are accepting, timeline for acceptance, etc.) or could point me in the right direction to another contact to reach out to. (Note that the attached spreadsheet does not include any beach nourishment projects, as those projects are assumed to need sand and the material we will be dredging is primarily silt.)

Please give me a call to discuss if that would be easier. Thanks in advance!

Leyna

Leyna Tobey, PE*
Project Manager | Civil Engineer
**Licensed in MA*

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One Karen Drive, Suite 2A
Westbrook, ME 04092
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From:	Wolf, Steven <Wolf.Steven@epa.gov>
Sent:	Wednesday, August 14, 2024 10:18 AM
To:	Leyna Tobey
Cc:	Sterling, Alexa
Subject:	FW: Dredged Material Disposal Inquiry
Attachments:	2024-08-12 Dredge Disposal Alternatives Analysis_to EPA.xlsx

Hi Leyna, EPA co-manages the ocean dredged material disposal sites with the Army Corps – the goal of the alternatives analysis is to evaluate other uses of the dredged material rather than just straight disposal. The nearshore sites are considered "beneficial" in that material placed at those sites is integrated into coastal sediment transport and can actually nourish beaches with material under the right hydrodynamic conditions. Unfortunately, as I recall, the material from the projects you referenced contains too high a percentage of fine-grained material to be placed at the nearshore sites. For evaluating the feasibility of using the material as part of salt marsh restoration, I'd direct you back to the Corps and to ME and NH state agencies. I'd suggest starting with Todd Randall at the New England District Corps (todd.a.randall@usace.army.mil) who could provide information on any federal marsh restoration projects as well as the contact information for the states folks involved in marsh restoration. Feel free to reach back it you need additional information - Steve

Steven Wolf | US Environmental Protection Agency, Region 1 (New England)
5 Post Office Square, Suite 100, Mail Code OEP06-1 Boston, MA 02109-3912
Office: 617-918-1617 Mobile: 978-201-1928 wolf.steven@epa.gov

---

From: Leyna Tobey <leyna@Walsh-eng.com>
Sent: Tuesday, August 13, 2024 12:12 PM
To: Sterling, Alexa <Sterling.Alexa@epa.gov>; Wolf, Steven <Wolf.Steven@epa.gov>
Subject: Dredged Material Disposal Inquiry

Good afternoon Alexa and Steven,

I am working on permitting a dredging project for several marinas on the lower Kennebunk River in Kennebunk, ME, and am currently conducting an alternatives analysis on where to dispose of the 25,000 CY of silty dredge material. I used the Army Corp's Beneficial Use of Dredged Material Planning Tool and found the potential disposal locations in the attached spreadsheet within a 30-mile radius of the project site.

As you are both listed on the EPA's website for dredged material disposal, I was hoping either of you would be able to provide me with some details for the disposal sites listed in the attached spreadsheet (e.g. if they are accepting materials, what types of materials they are accepting, timeline for acceptance, etc.) or could point me in the right direction to another contact to reach out to. (Note that the attached spreadsheet does not include any beach nourishment projects, as those projects are assumed to need sand and the material we will be dredging is primarily silt.)

Please give me a call to discuss if that would be easier. Thanks in advance!

Leyna

Leyna Tobey, PE*
Project Manager | Civil Engineer
*Licensed in MA

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From:	Lucey, Kevin <kevin.p.lucey@des.nh.gov>
Sent:	Monday, August 19, 2024 11:59 AM
To:	Leyna Tobey; tracy@rockinghamccd.org
Subject:	RE: Piscataqua Saltmarsh Restoration Inquiry
Follow Up Flag:	Follow up
Flag Status:	Flagged

Hi Leyna,
There are only 3 NH sites listed as Beneficial Use Sites (Seabrook Beach, Hampton Beach, and Wallis Sands Offshore Berm). The "Piscataqua Salt Marsh" is not a potential dredge disposal site. Its included on the USACE mapper because it is a USFWS Priority for Salt Marsh. NH has not yet undertaken any sediment placement projects on tidal wetlands.

I don't know much about it, but I understand that there is a dredge sediment reuse project at the Webhannet Salt Marsh in Wells.

Good luck,
Kevin Lucey, Habitat Coordinator
Coastal Program | Watershed Management Bureau | Water Division
New Hampshire Department of Environmental Services
222 International Drive, Suite 175
Portsmouth, NH 03801
603-559-0026
kevin.p.lucey@des.nh.gov

From: Leyna Tobey <leyna@Walsh-eng.com>
Sent: Tuesday, August 13, 2024 1:53 PM
To: Lucey, Kevin <kevin.p.lucey@des.nh.gov>; tracy@rockinghamccd.org
Subject: Piscataqua Saltmarsh Restoration Inquiry

EXTERNAL: Do not open attachments or click on links unless you recognize and trust the sender.

Good afternoon Tracy and Kevin,

I am working on permitting a dredging project for several marinas on the lower Kennebunk River in Kennebunk, ME, and am currently conducting an alternatives analysis on where to dispose of the 25,000 CY of silty dredge material. I used the Army Corp's Beneficial Use of Dredged Material Planning Tool (here) and found that the Piscataqua Saltmarsh is listed as a potential dredge material disposal location.

I saw that you were both listed as contacts for the project on the New Hampshire Saltmarsh Restoration Priorities for the Saltmarsh Sparrow document, and I was hoping either of you would be able to provide me with some details regarding whether you are accepting materials for the Saltmarsh, what types of materials are being accepted, timeline for material acceptance, etc. Or, if you are not the right contacts to be reaching out to, could you please point me in the right direction of who I should be contacting?

Please give me a call to discuss if that would be easier. Thanks in advance!

Leyna

Leyna Tobey, PE*
Project Manager | Civil Engineer
**Licensed in MA*

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Leyna Tobey

From: Sanders, Nicole A <nicole_sanders@fws.gov>
Sent: Wednesday, August 14, 2024 9:50 AM
To: Leyna Tobey; danielle.dauria@maine.gov
Cc: Adamowicz, Susan; Stromayer, Karl
Subject: RE: [EXTERNAL] Webhannet Saltmarsh Restoration Inquiry

Hi Leyna,

Thank you for reaching out! Right now, in Maine, state permitting does now allow the use of dredged materials on salt marshes. We are going to pilot the first thin-layer placement on Refuge land in Maine but the reason we are able to do this is because ours is a true pilot study permitted under an innovate pilot program with the Maine DEP. This permitting pathway operates under a pilot solid waste permit. We initiated conversations with the Army Corps and regulators years prior to getting our small (~1,000 cy) amount of clean, sandy sediment. Though it's certainly not out of the question to apply for another thin-layer placement project, it will not be a fast process, and DEP may not permit it at all based on the current regulatory processes. Usually for a pilot, there is only a small amount of sediment used 1-2,000 cubic yards over a ~2 acre area. Still, they may consider scaling up, which is an important part of learning and attempting new restoration techniques in Maine. And, there are salt marsh areas that we have conceptually considered for future thin-layer projects. All comes down to the permitting process! Once our refuge manager, Karl, has returned from annual leave myself, Sue, and Karl can discuss viable options and get back to you. Thanks again for reaching out and thinking of us.

Best,
Nicole

From: Leyna Tobey <leyna@Walsh-eng.com>
Sent: Tuesday, August 13, 2024 2:00 PM
To: Sanders, Nicole A <nicole_sanders@fws.gov>; danielle.dauria@maine.gov
Subject: [EXTERNAL] Webhannet Saltmarsh Restoration Inquiry

Good afternoon Nicole and Danielle,

I am working on permitting a dredging project for several marinas on the lower Kennebunk River in Kennebunk, ME, and am currently conducting an alternatives analysis on where to dispose of the 25,000 CY of silty dredge material. I used the Army Corp's Beneficial Use of Dredged Material Planning Tool (here) and found that the Webhannet River Complex Saltmarsh is listed as a potential dredge material disposal location.

I saw that you were both listed as contacts for the project on the Maine Saltmarsh Restoration Priorities for the Saltmarsh Sparrow document, and I was hoping either of you would be able to provide me with some details regarding whether you are accepting materials for the project(s), what types of materials are being accepted, timeline for material acceptance, etc. Or, if you are not the right contacts to be reaching out to, could you please point me in the right direction of who I should be contacting?

Please give me a call to discuss if that would be easier. Thanks in advance!

Leyna

Leyna Tobey, PE*
Project Manager | Civil Engineer
*Licensed in MA

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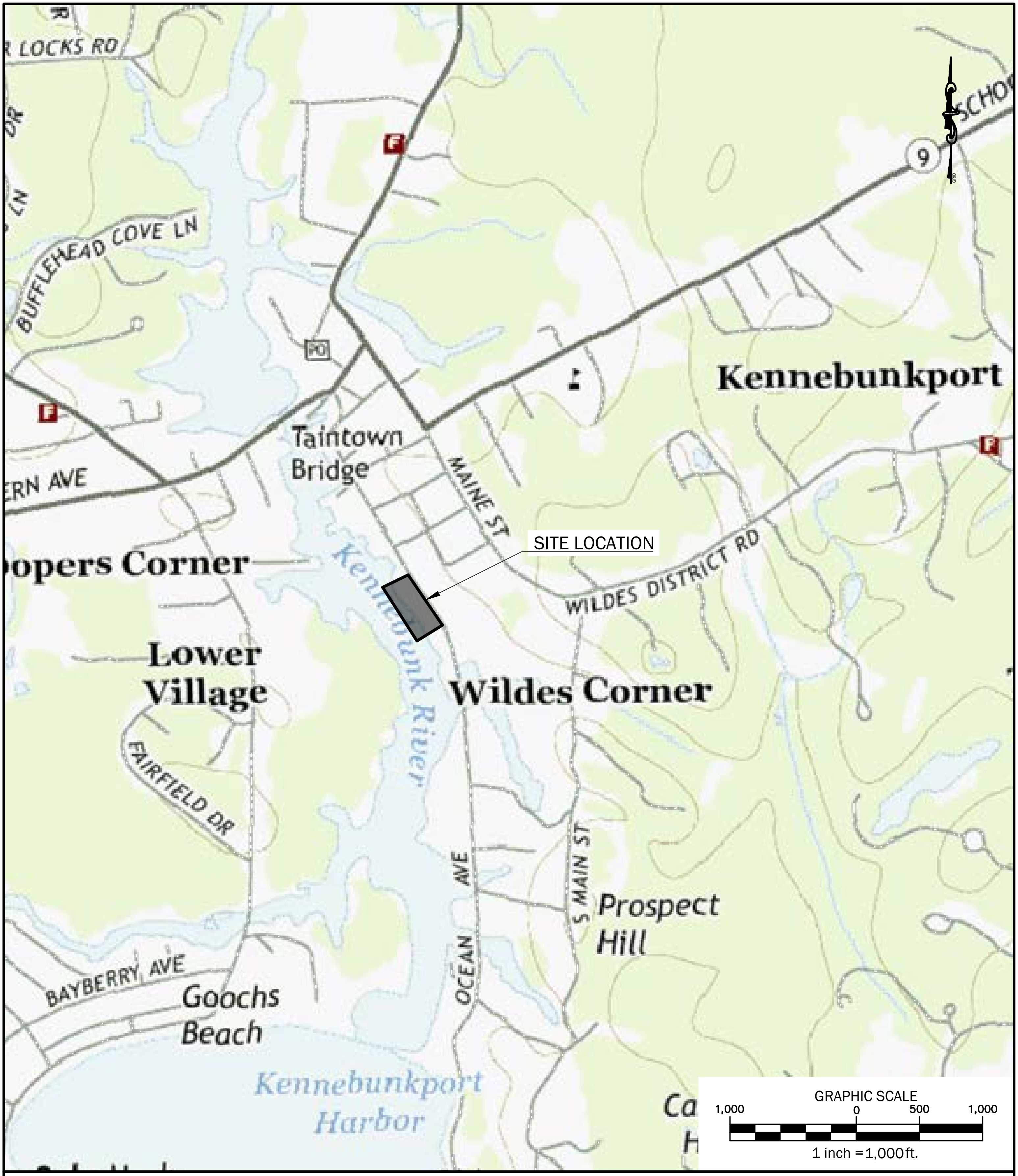
Attachment 3:

Site Location Map



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ph: 207.553.9898 | www.walsh-eng.com

Yachtsman Marina Dredging

Yachtsman Marina
57 Ocean Avenue
Kennebunkport, Maine 04046

Sheet Title:

Site Location

Job No.:	643.5
Date:	OCTOBER 2024
Scale:	1" = 1,000'
Drawn:	LLT
Checked:	WRW

P:\782 - Arundel Yacht Club Dredging\3. CAD\782 - Base.dwg plot date: 10/24/2024 11:02 AM

Attachment 4:

Photo Log

Attachment 4.0
PHOTO LOG

Yachtsman Marina Dredge

Kennebunkport, ME

Photo No. 1

Date: 10/20/2020

Site Location:
Yachtsman Marina

Description:
View from the south-east side of the marina.

Photo No. 2

Date: 10/20/2020

Site Location:
Yachtsman Marina

Description:
View from north-west side of the marina.

Photo No. 3

Date: 10/20/2020

Site Location:
Yachtsman Marina

Description:
Aerial view of marina.

Photo No. 4

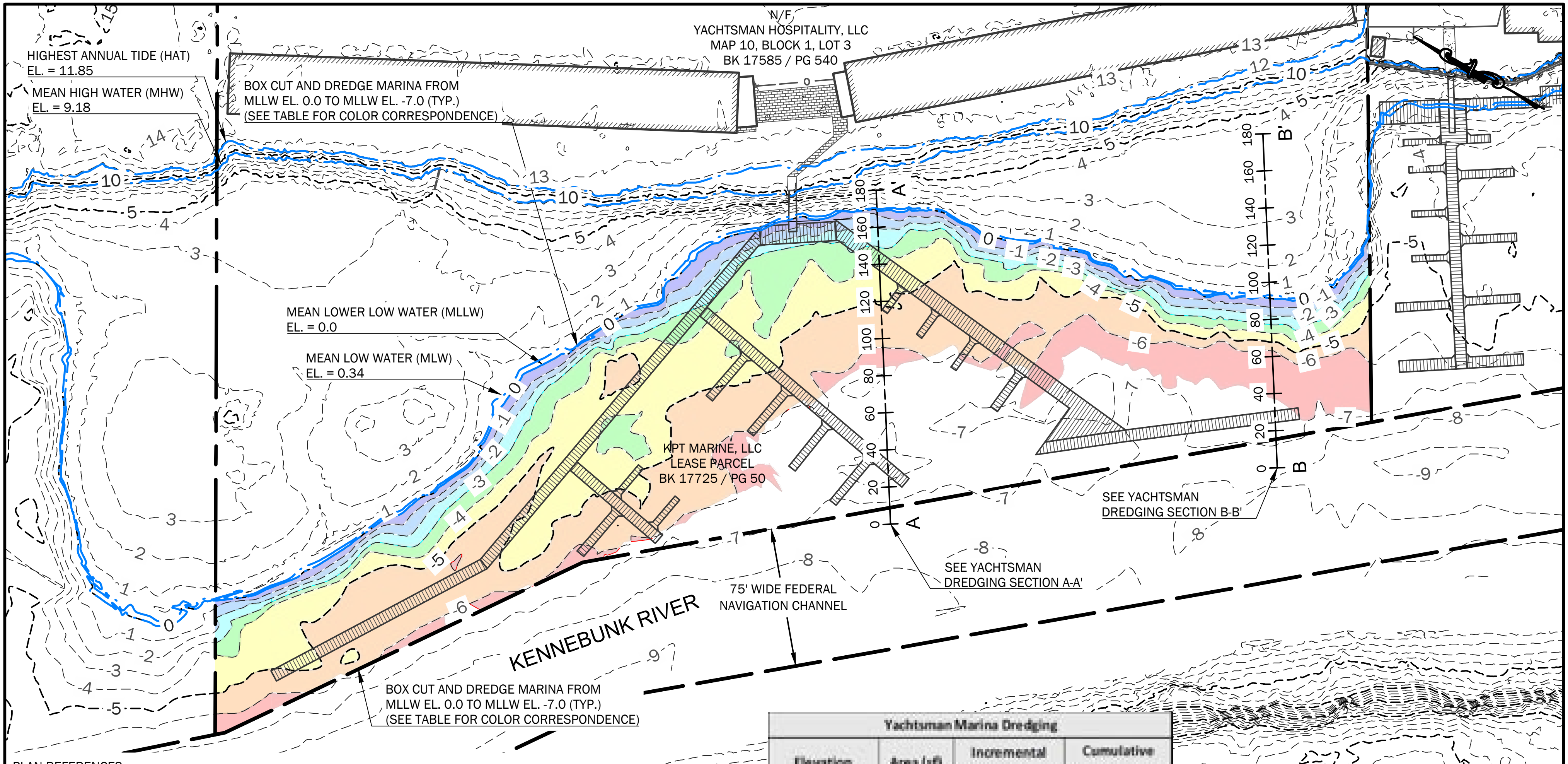
Date:
2021

Site Location:
Yachtsman Marina

Description:
Boat slips in the marina.

Attachment 5:

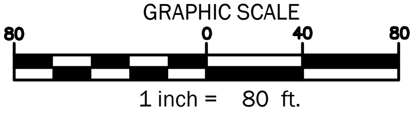
Site Plan



Yachtsman Marina Dredging			
Elevation	Area (sf)	Incremental Volume (cu. yd.)	Cumulative Volume (cu. yd.)
0 to -1	2,610	55	55
-1 to -2	5,415	160	215
-2 to -3	8,635	285	500
-3 to -4	14,310	455	955
-4 to -5	26,850	795	1,750
-5 to -6	43,420	1,350	3,100
-6 to -7	49,740	2,020	5,120
Total Dredge Volume w/ 25% Bulking Factor			6,400 cu. yd.

PLAN REFERENCES:

1. BATHYMETRY CONDUCTED BY WEA ON NOVEMBER 17, 2023 USING A HYDROLITE SONARMITE ECHOSOUNDER AND CARLSON BRx7 GNSS RECEIVER.
2. TOPOGRAPHIC DATA COLLECTED BY WEA VIA A DJI M300 DRONE EQUIPPED WITH A ZENMUSE L1 LIDAR CAMERA ON NOVEMBER 21, 2023.
3. ALL ELEVATIONS ON THIS PLAN ARE BASED ON THE MLLW VERTICAL DATUM. ELEVATIONS IN NAVD88 HAVE BEEN RAISED BY 5.15 FEET TO THE MLLW DATUM.A PLAN TITLED "BOUNDARY SURVEY AT YACHTSMAN LODGE & MARINA" PREPARED BY OWEN HASKELL, INC. OF 390 U.S. ROUTE ONE, UNIT 10, FALMOUTH, MAINE 04105, DATED APRIL 26, 2018.
4. A PLAN TITLED "SITE PLAN SHOWING THE PROPERTY OF THE KENNEBUNKPORT MARINA" PREPARED BY WILLIAM PIERCE OF 6 WATERHOUSE ROAD, DAYTON, MAINE 04005, DATED NOVEMBER 1, 1995
5. A PLAN TITLED " KENNEBUNK RIVER KENNEBUNK AND KENNEBUNKPORT MAINE AFTER DREDGE SURVEY" PREPARED BY U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DISTRICT DATED MARCH 9, 2020.
6. A PLAN TITLED "DOCK PLAN" PREPARED BY REILLY STUDIOS OF 959 ISLINGTON STREET, PORTSMOUTH, NEW HAMPSHIRE 03801, DATED MARCH 4, 2008.



WALSH
ENGINEERING ASSOCIATES, INC.
One Karen Dr., Suite 2A | Westbrook, Maine 04092
ph: 207.553.9898 | www.walsh-eng.com

YACHTSMAN MARINA DREDGING

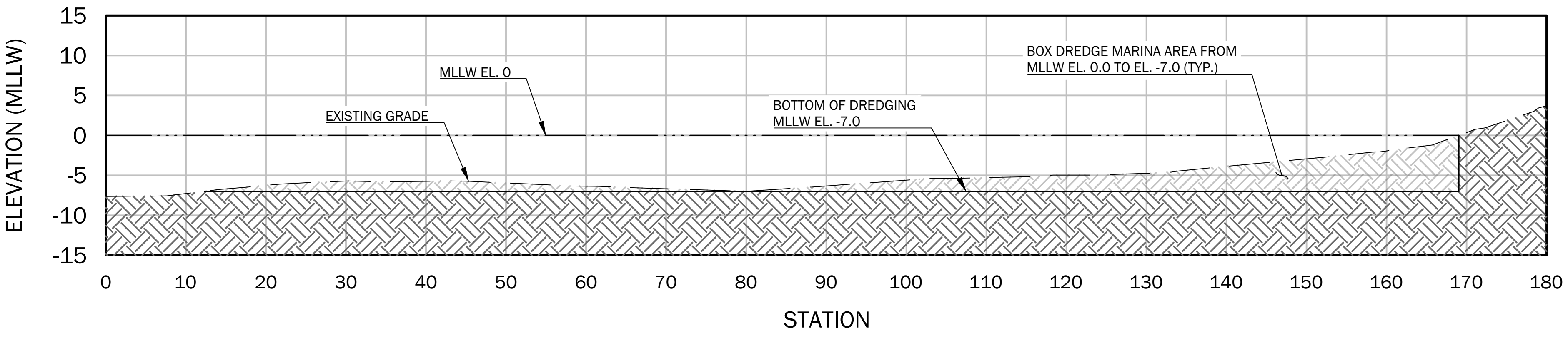
57 OCEAN AVE.
KENNEBUNKPORT, ME 04046

Sheet Title:
**FIG 1:
PLAN VIEW**

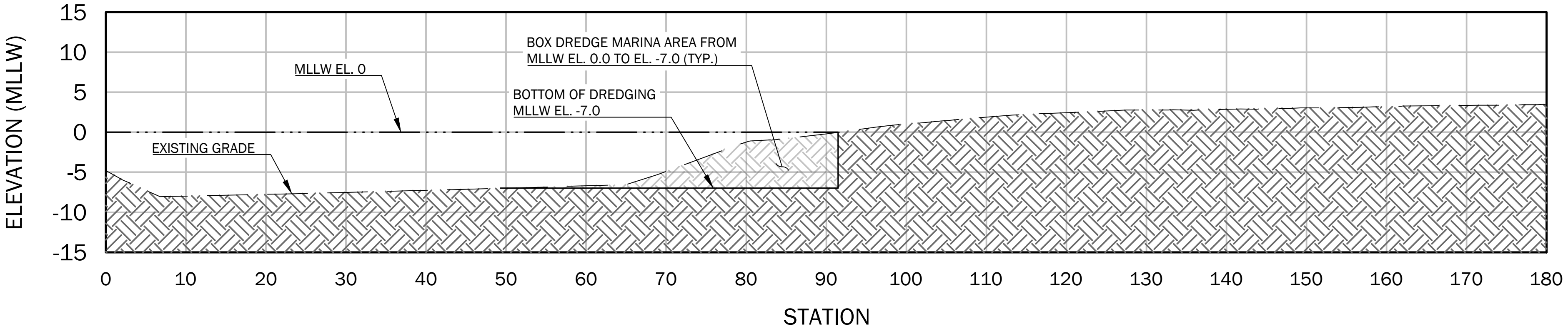
Job No.:	643.1
Date:	OCT. 29, 2024
Scale:	1" = 80'
Drawn:	CAR/MNW
Checked:	WRW

Attachment 6:

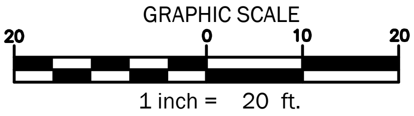
Additional Plan (Section Views)



Yachtsman Dredging Section A-A'



Yachtsman Dredging Section B-B'



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YACHTSMAN MARINA DREDGING

57 OCEAN AVE.
KENNEBUNKPORT, ME 04046

Sheet Title:
FIG 2:
SECTION VIEW

Job No.:	643.1
Date:	OCT. 29, 2024
Scale:	1" = 20'
Drawn:	CAR/MNW
Checked:	WRW

P:\643.1 - Yachtsman Marina Dredge\3. CAD\643.1 - BASE.dwg plot date: 10/29/2024 8:52 AM

Attachment 7:

Construction Plan

7.0 Construction Plan

The dredging will be conducted utilizing a floating barge and dredging crane with a clamshell bucket. The barge will access the project area from traveling upriver from the Kennebunk River Breakwater. The area of the dredge will be approximately 61,000 square feet (1.4 acres). The proposed dredge depth will be to elevation -6.0 feet mean low water, with about one foot of over-dig. It is anticipated that dredging will coincide with neighboring marinas performing dredging at the same approximate time, including the Arundel Yacht Club, the Kennebunkport Marina, and the Kennebunk River Club. The material will be transported by barge to the Isle of Shoals North Disposal Site (IOSN). The IOSN is located approximately 15 nautical miles east of Portsmouth, New Hampshire, in the Gulf of Maine.

Attachment 8:

Erosion and Sedimentation Control Plan

8.0 Erosion and Sedimentation Control Plan

The dredging will be conducted from a floating barge using a dredging crane with a clamshell bucket. The dredged material will be placed on the barge and brought to the Isle of Shoals North (IOSN) open water placement site for disposal. There will be no storage of the dredged material on land which negates the need for erosion and sedimentation control measures in this regard. No formal erosion control measures are proposed for the project. However, turbidity curtains will be implemented, if deemed necessary, around the proposed dredging area to mitigate the travel of sediment during the in-water disturbance.

Attachment 9:

Site Conditions Report

9.0 Site Conditions Report

The dredging activity will occur at the Yachtsman Marina within the Kennebunk River, which is located approximately 0.75 miles from the mouth of the Kennebunk River.

The shoreline area southeast of the Yachtsman Marina consists of medium riprap placed to prevent bank erosion. The sandy area in front of those walls is completely covered at high tide and is partially exposed at low tide. Minimal rockweed was observed in this area, but no other plant or marine species were noted.

According to the Maine Department of Inland Fisheries & Wildlife (IF&W) Beginning with Habitat website (https://www.maine.gov/ifw/fish-wildlife/wildlife/beginning-with-habitat/maps/index.html), the dredging location is bordered to the northwest and southeast by wetlands identified by the National Wetland Inventory (NWI). The area of the dredging is located in a relatively small area of the Kennebunk River's shellfish growing area.

According to the U.S. Department of Fish & Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) website (https://ipac.ecosphere.fws.gov/), the following are listed species that may occur in the area of the property: the Northern Long-eared Bat, Tricolored Bat, and the Monarch Butterfly.

According to the National Oceanic and Atmospheric Administration (NOAA) Fisheries Essential Fish Habitat (EFH) Mapper, the project location is mapped within a New England/Mid-Atlantic EFH for the following species: Acadian redfish (larvae); haddock (juvenile); little skate (adult); monkfish (eggs, larvae, juvenile, adult); silver hake (eggs, larvae, adult); and winter flounder (eggs). The project is likely to have short-term and localized impacts to EFH, with no significant impacts to these habitats anticipated.

According to the NOAA Fisheries Greater Atlantic Region Endangered Species Act (ESA) Section 7 Mapper (Section 7 Mapper), adult and subadult Atlantic sturgeon (threatened/endangered) and adult shortnose sturgeon (endangered) migrate and forage in the Kennebunk River within the limits of the project boundary. The migrating and foraging time of year for the Atlantic sturgeon is identified as all year, however, the Section 7 Mapper notes that the Atlantic sturgeon exhibit seasonal coastal movements in the spring and fall; the migrating and foraging time of year for the shortnose sturgeon is identified as April 1 to November 30.

The Yachtsman Marina dredging work is proposed to take place in winter 2025-2026 and to avoid disturbances to EFH and sturgeon populations to the maximum extent possible.

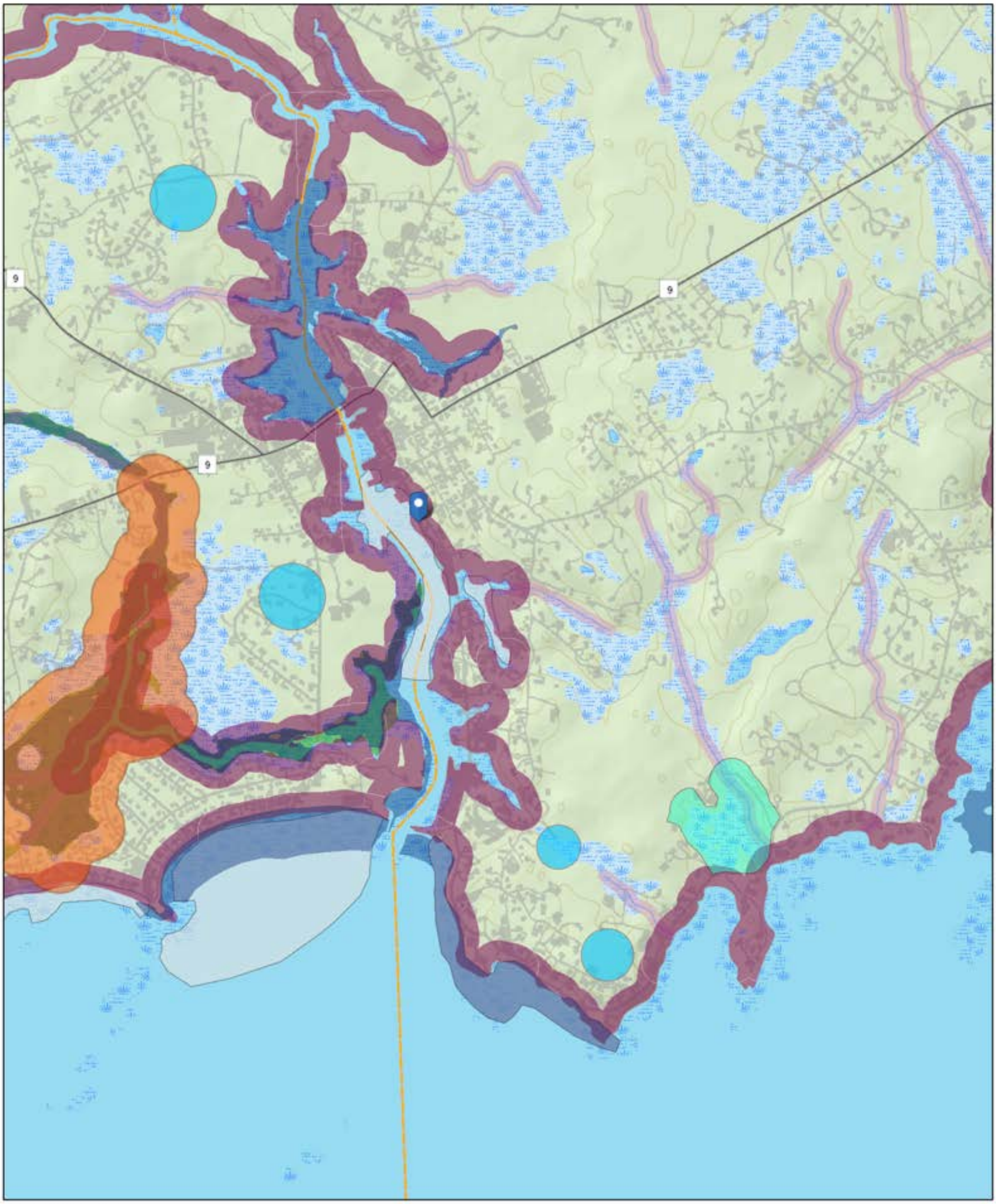
Refer to photos in Section 4.0 and the Maine DEP Coastal Wetland Characterization form provided in Appendix B. Based on the resource mapping shown, the project will have minimal impact on existing natural resources.

The Kennebunk River (Assessment Unit ID ME0106000301_622 R01) is listed on the Maine Department of Environmental Protection's (DEP's) Final 2018/2020/2022 Integrated Water Quality Report as a Delisted Category 5 Waterbody, as a Total Maximum Daily Load (TMDL) for

E. coli was approved for the river in 2009. The proposed dredging activities will not discharge any bacteria into the river.

Maine IF&W Beginning with Habitat Map

Beginning With Habitat



October 25, 2024

- Shellfish Beds
- Stream Buffer (75 feet)
- Great Ponds, Rivers and Coastal Buffer (250 feet)
- Atlantic Salmon Habitat
- Shorebird Habitat
- Seabird Nesting Island
- Tidal Waterfowl / Wading Bird Habitat
- Inland Waterfowl / Wading Bird Habitat
- Significant Vernal Pools
- Deer Wintering Areas
- Essential Wildlife Habitats
- Endangered, Threatened, and Special Concern Species
- Natural Communities
- Rare Plants and Natural Communities

1:18,056

0 0.15 0.3 0.6 mi

0 0.23 0.45 0.9 km

Beginning with Habitat Program for Planning Purposes Only
Map Created With BWH Map Viewer

USFWS IPaC Official Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
Phone: (207) 469-7300 Fax: (207) 902-1588

In Reply Refer To: 10/25/2024 18:30:18 UTC
Project Code: 2025-0011334
Project Name: Yachtsman Marina Dredging

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
(207) 469-7300

PROJECT SUMMARY

Project Code:	2025-0011334
Project Name:	Yachtsman Marina Dredging
Project Type:	Navigation Channel Improvement
Project Description:	Maintenance dredge of Kennebunk River

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.3569549,-70.47482428275957,14z

Counties: York County, Maine

ENDANGERED SPECIES ACT SPECIES

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

[1] The Bald and Golden Eagle Protection Act of 1940.

[2] The Migratory Birds Treaty Act of 1918.

3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to Bald Eagle Nesting and Sensitivity to Human Activity

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (🟩)

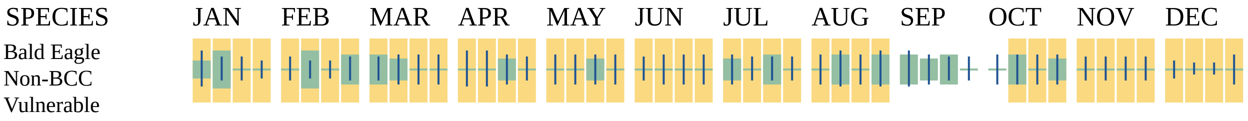
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (🟨)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

🟩 probability of presence 🟨 breeding season | survey effort – no data



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Oystercatcher *Haematopus palliatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8935	Breeds Apr 15 to Aug 31

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Blue-winged Warbler *Vermivora cyanoptera* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9509	Breeds May 1 to Jun 30
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9643	Breeds May 20 to Aug 10
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20
Grasshopper Sparrow *Ammodramus savannarum perpallidus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8329	Breeds Jun 1 to Aug 20
Hudsonian Godwit *Limosa haemastica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9482	Breeds elsewhere
Least Tern *Sternula antillarum antillarum* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/11919	Breeds Apr 25 to Sep 5

NAME	BREEDING SEASON
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Pectoral Sandpiper *Calidris melanotos* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere
Prairie Warbler *Setophaga discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Purple Sandpiper *Calidris maritima* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9574	Breeds elsewhere
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Ruddy Turnstone *Arenaria interpres morinella* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10633	Breeds elsewhere
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Saltmarsh Sparrow *Ammospiza caudacuta* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9719	Breeds May 15 to Sep 5
Scarlet Tanager *Piranga olivacea* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11967	Breeds May 10 to Aug 10

NAME	BREEDING SEASON
Semipalmated Sandpiper *Calidris pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9603	Breeds elsewhere
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Whimbrel *Numenius phaeopus hudsonicus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11991	Breeds elsewhere
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10669	Breeds Apr 20 to Aug 5
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (🟩)

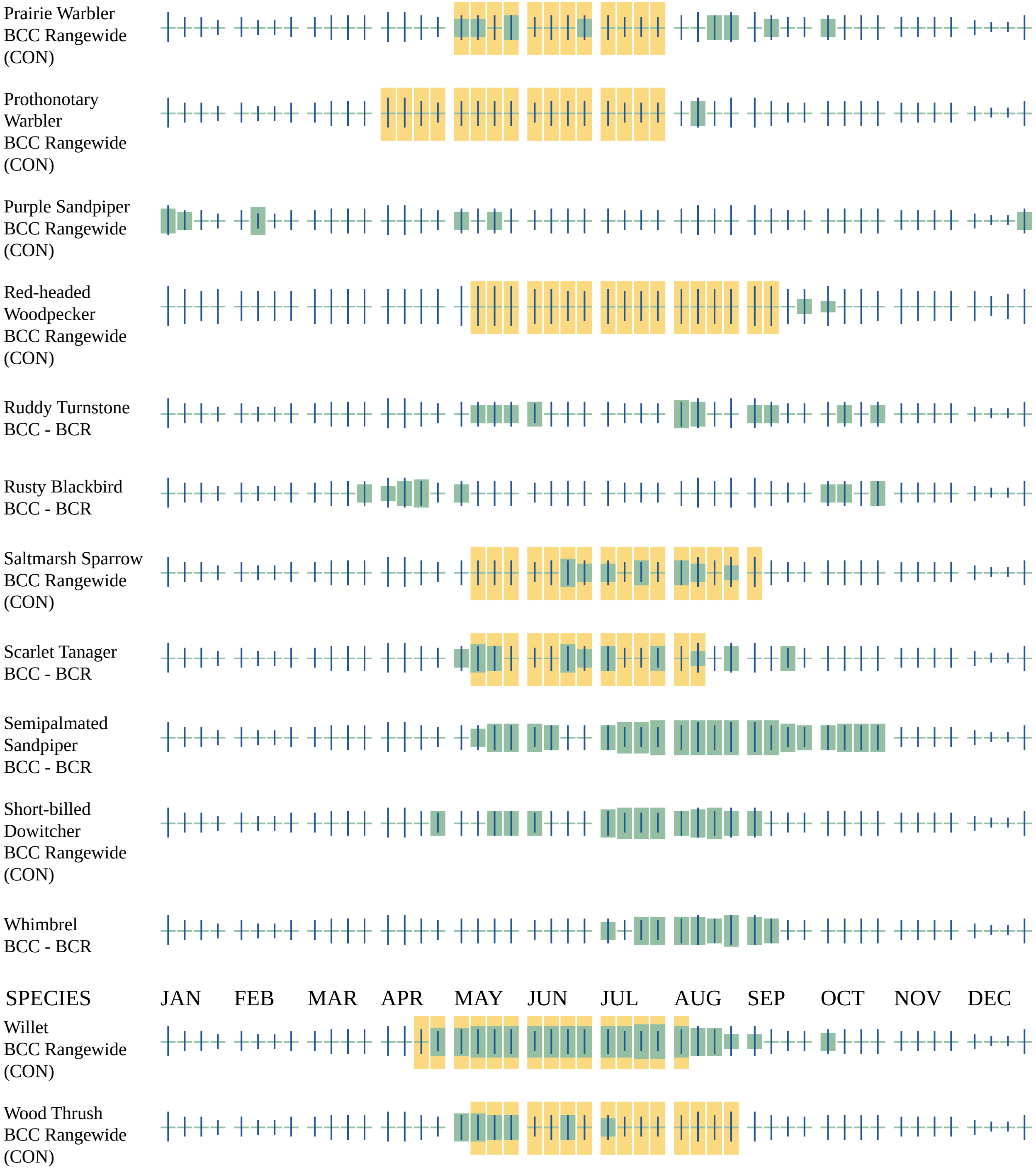
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (🟨)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (−)
A week is marked as having no data if there were no survey events for that week.

🟩 probability of presence 🟨 breeding season | survey effort — no data



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds

- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

ESTUARINE AND MARINE DEEPWATER

- E1UBL

ESTUARINE AND MARINE WETLAND

- E2US3N

IPAC USER CONTACT INFORMATION

Agency:	Private Entity
Name:	Leyna Tobey
Address:	One Karen Drive
Address Line 2:	Suite 2A
City:	Westbrook
State:	ME
Zip:	04092
Email	leyna@walsh-eng.com
Phone:	2075539898

NOAA Fisheries EFH Mapper Report

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

Greater Atlantic Regional Office
Atlantic Highly Migratory Species Management Division

Query Results

Degrees, Minutes, Seconds: Latitude = 43º 21' 26" N, Longitude = 71º 31' 30" W
Decimal Degrees: Latitude = 43.357, Longitude = -70.475

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

*** W A R N I N G ***

Please note under "Life Stage(s) Found at Location" the category "ALL" indicates that all life stages of that species share the same map and are designated at the queried location.

EFH

Link	Data Caveats	Species/ Management Unit	Lifestage(s) Found at Location	Management Council	FMP
📄	?	Acadian Redfish	Larvae	New England	Amendment 14 to the Northeast Multispecies FMP
📄	?	Haddock	Juvenile	New England	Amendment 14 to the Northeast Multispecies FMP
📄	?	Little Skate	Adult	New England	Amendment 2 to the Northeast Skate Complex FMP
📄	?	Monkfish	Adult, Eggs/Larvae, Juvenile	New England	Amendment 4 to the Monkfish FMP
📄	?	Silver Hake	Adult, Eggs/Larvae	New England	Amendment 14 to the Northeast Multispecies FMP
📄	?	Winter Flounder	Eggs	New England	Amendment 14 to the Northeast Multispecies FMP

Pacific Salmon EFH

No Pacific Salmon Essential Fish Habitat (EFH) were identified at the report location.

Atlantic Salmon

No Atlantic Salmon were identified at the report location.

HAPCs

No Habitat Areas of Particular Concern (HAPC) were identified at the report location.

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.
****For links to all EFH text descriptions see the complete data inventory:** **open data inventory -->**

All EFH species have been mapped for the Greater Atlantic region,
Atlantic Highly Migratory Species EFH,
Bigeye Sand Tiger Shark,
Bigeye Sixgill Shark,
Caribbean Sharpnose Shark,
Galapagos Shark,
Narrowtooth Shark,
Sevengill Shark,
Sixgill Shark,
Smooth Hammerhead Shark,
Smalltail Shark

NOAA Fisheries Greater Atlantic Region ESA Section 7 Map

Drawn Action Area & Overlapping S7 Consultation Areas

Area of Interest (AOI) Information

Area : 5.69 acres

Oct 25 2024 10:31:05 Eastern Daylight Time

Summary

Name	Count	Area(acres)	Length(mi)
Atlantic Sturgeon	2	9.37	N/A
Shortnose Sturgeon	1	4.69	N/A
Atlantic Salmon	0	0	N/A
Sea Turtles	0	0	N/A
Atlantic Large Whales	0	0	N/A
In or Near Critical Habitat	0	0	N/A

Atlantic Sturgeon

#	Feature ID	Species	Lifestage	Behavior	Zone	From	Until	From (2)	Until (2)	Area(acres)
1	ANS_C50_ADU_MAF	Atlantic sturgeon	Adult	Migrating & Foraging	N/A	01/01	12/31	N/A	N/A	4.68
2	ANS_C50_SUB_MAF	Atlantic sturgeon	Subadult	Migrating & Foraging	N/A	01/01	12/31	N/A	N/A	4.68

Shortnose Sturgeon

#	Feature ID	Species	Life Stage	Behavior	Zone	From	Until	From (2)	Until (2)	Area(acres)
1	SNS_C50_ADU_MAF	Shortnose sturgeon	Adult	Migrating & Foraging	N/A	04/01	11/30	N/A	N/A	4.69

Attachment 10:

Notice of Intent to File

10.0 Notice of Intent to File

The applicant must provide public notice for all Individual NRPA permit applications.

1. **Newspaper**: The NOI was published in the *Portland Press Herald* on November 21, 2024. Proof of the notification is attached.

2. **Abutting Property Owners**: Abutters were sent the NOI via mail on November 20, 2024. A list of abutters and proof of mailing is attached.

3. **Municipal Office**: A copy of the NOI and a duplicate of the entire application has been sent to the applicable municipal office.

Newspaper Public Notice

PUBLIC NOTICE:
NOTICE OF INTENT TO FILE

Please take notice that KPT Marine, LLC, of 57 Ocean Ave, Kennebunkport, ME 04046, is intending to file a Natural Resources Protection Act (NRPA) Permit application with the Maine Department of Environmental Protection (DEP) pursuant to the provisions of 38 M.R.S. §§ 480-A through 480-BB on or about November 20, 2024. This application is for dredging activities to take place in the Kennebunk River to improve the boating operations (navigation) of the Yachtsman Marina.

A request for a public hearing or a request that the Board of Environmental Protection assume jurisdiction over this application must be received by the Department in writing no later than 20 days after the application is found by the Department to be complete and is accepted for processing. A public hearing may or may not be held at the discretion of the Commissioner or Board of Environmental Protection. Public comment on the application will be accepted throughout the processing of the application. The application will be filed for public inspection at the Maine DEP's office in Portland during normal working hours. A copy of the application may also be seen at the municipal offices in Kennebunkport, Maine. Written public comments may be sent to the regional office in Portland where the application is filed for public inspection: Maine DEP, Southern Maine Regional Offices, 312 Canco Road, Portland, Maine 04103.

Proof of Newspaper Public Notice

Portland Press Herald
EST. 1862
Maine Sunday Telegram
pressherald.com

Classified Advertising Proof

Bill Walsh
Walsh Engineering Associates
1 Karen Dr #2A
Westbrook
ME
04092 -192
+1 (207) 553-9898
jenileigh@Walsh-eng.com

Thank you for placing your advertisement with us.

Your order information and a preview of your advertisement are attached below for your review. If there are changes or questions, please contact the classified department at (207) 791-6100

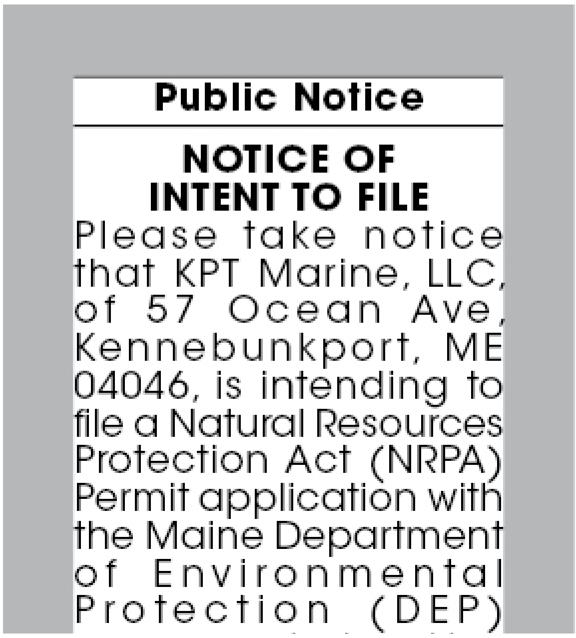
Thank you

(207) 791-6100 jjensen@mainetoday.com Monday – Friday 8:00 am – 5pm

Order Number	**0529918**	Order Price	**$409.95**
Sales Rep.	**Joan Jensen**	PO No.	**Yachtsman Marina Notice of Intent to File / Sherry Pinard**
Account	**10155**	Payment Type	**Invoice**

Publication	**Portland Press Herald**	Number of dates	**1**
First Run Date	**11/21/2024**	Last Run Date	**11/21/2024**

Publication	**Online Upsell PPH**	Number of dates	**1**
First Run Date	**11/21/2024**	Last Run Date	**11/21/2024**



Public Notice

NOTICE OF INTENT TO FILE

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Abutters Letter

WALSH
ENGINEERING ASSOCIATES, INC.

November 19, 2024

Dear Abutter/Neighbor of 57 Ocean Ave:

On behalf of KPT Marine, LLC, at 57 Ocean Avenue in Kennebunkport, ME 04046, I am writing to inform you of their intent to submit a Natural Resources Protection Act (NRPA) permit application to the Maine Department of Environmental Protection (DEP). The NRPA permit will provide for dredging activities in the Kennebunk River to improve the boating operations of the Yachtsman Marina.

You are receiving this letter as the Maine DEP requires that all abutters of the subject property receive notification of the NRPA application. I have attached a copy of the Public Notice that will be published in the *Portland Press Herald* on or around November 21, 2024.

Should you have any questions or concerns, please do not hesitate to contact me at (207) 553-9898 or leyna@walsh-eng.com.

Respectfully,

Leyna L Tobey

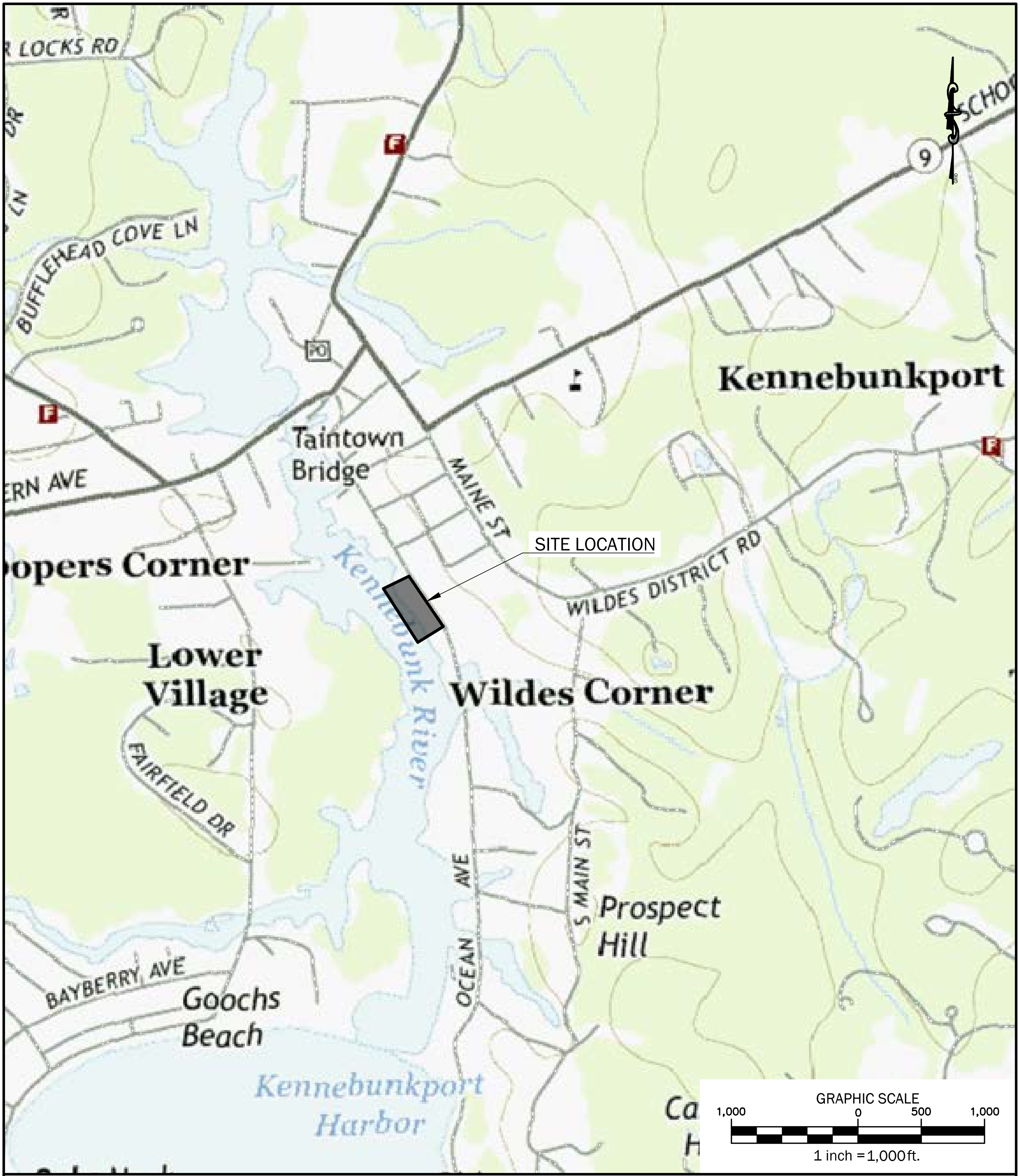
Leyna Tobey, PE – Project Manager
Walsh Engineering Associates, Inc.

Enc. Public Notice
Site Location Plan

PUBLIC NOTICE:
NOTICE OF INTENT TO FILE

Please take notice that KPT Marine, LLC, of 57 Ocean Ave, Kennebunkport, ME 04046, is intending to file a Natural Resources Protection Act (NRPA) Permit application with the Maine Department of Environmental Protection (DEP) pursuant to the provisions of 38 M.R.S. §§ 480-A through 480-BB on or about November 20, 2024. This application is for dredging activities to take place in the Kennebunk River to improve the boating operations (navigation) of the Yachtsman Marina.

A request for a public hearing or a request that the Board of Environmental Protection assume jurisdiction over this application must be received by the Department in writing no later than 20 days after the application is found by the Department to be complete and is accepted for processing. A public hearing may or may not be held at the discretion of the Commissioner or Board of Environmental Protection. Public comment on the application will be accepted throughout the processing of the application. The application will be filed for public inspection at the Maine DEP's office in Portland during normal working hours. A copy of the application may also be seen at the municipal offices in Kennebunkport, Maine. Written public comments may be sent to the regional office in Portland where the application is filed for public inspection: Maine DEP, Southern Maine Regional Offices, 312 Canco Road, Portland, Maine 04103.



WALSH
ENGINEERING ASSOCIATES, INC.

One Karen Dr., Suite 2A | Westbrook, Maine 04092
ph: 207.553.9898 | www.walsh-eng.com

Yachtsman Marina Dredging

Yachtsman Marina
57 Ocean Avenue
Kennebunkport, Maine 04046

Sheet Title:

Site Location

Job No.:	643.5
Date:	OCTOBER 2024
Scale:	1" = 1,000'
Drawn:	LLT
Checked:	WRW

P:\782 - Arundel Yacht Club Dredging\3. CAD\782 - Base.dwg plot date: 10/24/2024 11:02 AM

Abutters List (1,000-foot)

1000 feet Abutters List Report

Kennebunkport, ME
November 08, 2024

Subject Property:

Parcel Number: 10-1-3
CAMA Number: 10-1-3
Vision ID: 3427
Property Address: 57 OCEAN AVENUE
Mailing Address: YACHTSMAN HOSPITALITY, LLC
2 LIVEWELL DRIVE, #203
KENNEBUNK, ME 04043

Abutters:

Parcel Number: 10-1-10
CAMA Number: 10-1-10
Vision ID: 3438
Property Address: 41 OCEAN AVENUE
Mailing Address: ENOCH, MATTHEW S & DONNA C
642 ALLEGIANCE DRIVE
LITITZ, PA 17543

Parcel Number: 10-1-11
CAMA Number: 10-1-11
Vision ID: 539
Property Address: 4 WHARF LANE
Mailing Address: HALL, JONATHAN S
PO BOX 811
WINDHAM, NH 03087

Parcel Number: 10-1-12
CAMA Number: 10-1-12
Vision ID: 3439
Property Address: 7 WHARF LANE
Mailing Address: ROMINE, DONALD J & RHODA M
325 DUNES BLVD., APT 803
NAPLES, FL 34110

Parcel Number: 10-1-13
CAMA Number: 10-1-13
Vision ID: 105940
Property Address: 5 WHARF LANE
Mailing Address: SWEENEY, JOHN & ANN-MARIE
16 MARTIN STREET
ACTON, MA 01720

Parcel Number: 10-1-14
CAMA Number: 10-1-14
Vision ID: 543
Property Address: 3 WHARF LANE
Mailing Address: 2538970 ONTARIO, INC
765 WESTNEY ROAD SOUTH
AJAX, ON L1S 6W1

Parcel Number: 10-1-15
CAMA Number: 10-1-15
Vision ID: 3441
Property Address: 53 OCEAN AVENUE
Mailing Address: KENNEBUNKPORT, TOWN OF
PO BOX 566
KENNEBUNKPORT, ME 04046

Parcel Number: 10-1-2
CAMA Number: 10-1-2
Vision ID: 3426
Property Address: 67 OCEAN AVENUE
Mailing Address: KPT MARINE, LLC
PO BOX 2734
KENNEBUNKPORT, ME 04046

Parcel Number: 10-1-4
CAMA Number: 10-1-4
Vision ID: 525
Property Address: OCEAN AVENUE
Mailing Address: KENNEBUNKPORT, TOWN OF
PO BOX 566
KENNEBUNKPORT, ME 04046

Parcel Number: 10-1-5
CAMA Number: 10-1-5
Vision ID: 3428
Property Address: 51 OCEAN AVENUE
Mailing Address: ARUNDEL YACHT CLUB
PO BOX 328
KENNEBUNKPORT, ME 04046-0328

Parcel Number: 10-1-6
CAMA Number: 10-1-6
Vision ID: 527
Property Address: 49 OCEAN AVENUE
Mailing Address: EDITH HG MCCONNELL REVOCABLE TRUST
PO BOX 1813
KENNEBUNKPORT, ME 04046

Parcel Number: 10-1-7
CAMA Number: 10-1-7
Vision ID: 105722
Property Address: 47 OCEAN AVENUE #5
Mailing Address: BARTLETT, HUGH J & JUDITH
PO BOX 293
KENNEBUNKPORT, ME 04046

Parcel Number: 10-1-7
CAMA Number: 10-1-7A
Vision ID: 105722
Property Address: 47 OCEAN AVENUE #7
Mailing Address: FANTON, ROMA F
39 MEETINGHOUSE LANE
FAIRFIELD, CT 06430

Parcel Number: 10-1-7
CAMA Number: 10-1-7B
Vision ID: 105722
Property Address: 47 OCEAN AVENUE #8
Mailing Address: NOWAK, LORI
4940 N HACIENDA DEL SOL ROAD
TUCSON, AZ 85718

Parcel Number: 10-1-7
CAMA Number: 10-1-7C
Vision ID: 105722
Property Address: 47 OCEAN AVENUE #6
Mailing Address: NOWAK, LORI
4940 N HACIENDA DEL SOL ROAD
TUCSON, AZ 85718

Parcel Number: 10-1-7
CAMA Number: 10-1-7D
Vision ID: 105722
Property Address: 47 OCEAN AVENUE #4
Mailing Address: MCFB, LLC
PO BOX 2675
KENNEBUNKPORT, ME 04046

Parcel Number: 10-1-7
CAMA Number: 10-1-7E
Vision ID: 105722
Property Address: 47 OCEAN AVENUE #2
Mailing Address: MULBERGER, VIRGINIA A
804 HALL PLACE
ALEXANDRIA, VA 22302

Parcel Number: 10-1-7
CAMA Number: 10-1-7F
Vision ID: 105722
Property Address: 47 OCEAN AVENUE #3
Mailing Address: REDDEN, MICHAELA A & OLSHAN, ARTHUR
8 FRAESCO LANE
NORWOOD, NJ 07648

Parcel Number: 10-1-7
CAMA Number: 10-1-7G
Vision ID: 105722
Property Address: 47 OCEAN AVENUE #1
Mailing Address: PELLETIER, THOMAS J & CYNTHIA L
182 LOWELL STREET
PEABODY, MA 01960

Parcel Number: 10-1-7
CAMA Number: 10-1-7Z
Vision ID: 105722
Property Address: 47 OCEAN AVENUE #MAIN
Mailing Address: RIVERBANK CONDO
,

Parcel Number: 10-1-8
CAMA Number: 10-1-8
Vision ID: 3437
Property Address: 45 OCEAN AVENUE
Mailing Address: WOMEN & WINE, LLC
PO BOX 1148
KENNEBUNKPORT, ME 04046

Parcel Number: 10-1-9
CAMA Number: 10-1-9
Vision ID: 537
Property Address: 43 OCEAN AVENUE
Mailing Address: WILLIAMSON, ROBERT S
PO BOX 1950
KENNEBUNKPORT, ME 04046

Parcel Number: 10-2-1
CAMA Number: 10-2-1
Vision ID: 3442
Property Address: 46 OCEAN AVENUE
Mailing Address: BYERLY, WILLIAM F & MARY C
PO BOX 2675
KENNEBUNKPORT, ME 04046

Parcel Number: 10-2-2
CAMA Number: 10-2-2
Vision ID: 546
Property Address: OCEAN AVENUE
Mailing Address: KENNEBUNKPORT CONSERVATION TRUST
PO BOX 7004
CAPE PORPOISE, ME 04014-07004

Parcel Number: 10-2-3
CAMA Number: 10-2-3
Vision ID: 547
Property Address: 5 PEARL STREET
Mailing Address: KENNEBUNKPORT CAPTAINS COLLECTION, LLC
PO BOX 3089
KENNEBUNKPORT, ME 04046

Parcel Number: 10-3-1
CAMA Number: 10-3-1
Vision ID: 548
Property Address: 7 PEARL STREET
Mailing Address: BALCOM, WILLIAM BRIAN
3002 WINDSOR RIDGE DRIVE
WESTBOROUGH, MA 01581

Parcel Number: 10-3-2
CAMA Number: 10-3-2
Vision ID: 549
Property Address: 6 PLEASANT STREET
Mailing Address: KENNEBUNKPORT CAPTAINS COLLECTION, LLC
PO BOX 3089
KENNEBUNKPORT, ME 04046

Parcel Number: 10-3-3
CAMA Number: 10-3-3
Vision ID: 550
Property Address: 35 MAINE STREET
Mailing Address: KCC-CGH HOLDINGS, LLC
PO BOX 3089
KENNEBUNKPORT, ME 04046

Parcel Number: 10-3-4
CAMA Number: 10-3-4
Vision ID: 551
Property Address: 33 MAINE STREET
Mailing Address: MICHELLE L DRAGHETTI REVOCABLE TRUST
PO BOX 2797
KENNEBUNKPORT, ME 04046

Parcel Number:	10-3-5	Mailing Address:	WIDMER, MATTHEW A & AMY M
CAMA Number:	10-3-5		18 LOUDEN HEIGHTS NORTH
Vision ID:	552		ALBANY, NY 12211
Property Address:	31 MAINE STREET		

Parcel Number:	10-4-1	Mailing Address:	KENNEBUNKPORT CAPTAINS
CAMA Number:	10-4-1		COLLECTION, LLC
Vision ID:	3443		PO BOX 3089
Property Address:	8 PLEASANT STREET		KENNEBUNKPORT, ME 04046

Parcel Number:	10-4-2	Mailing Address:	MIDDLETON, MARJORIE D & JOHN L JR
CAMA Number:	10-4-2		PO BOX 1046
Vision ID:	3444		KENNEBUNKPORT, ME 04046
Property Address:	10 PLEASANT STREET		

Parcel Number:	10-4-3	Mailing Address:	DAVID L KELLY FAMILY TRUST
CAMA Number:	10-4-3		25 OAK STREET
Vision ID:	555		CHARLESTOWN, MA 02129
Property Address:	12 PLEASANT STREET		

Parcel Number:	10-4-4	Mailing Address:	MALTE LUKAS REVOCABLE TRUST
CAMA Number:	10-4-4		PO BOX 2798
Vision ID:	556		KENNEBUNKPORT, ME 04046
Property Address:	5 SOUTH STREET		

Parcel Number:	10-4-5	Mailing Address:	MATTUCHIO FAMILY IRREVOCABLE
CAMA Number:	10-4-5		TRUST
Vision ID:	3445		PO BOX 169
Property Address:	3 SOUTH STREET		KENNEBUNKPORT, ME 04046

Parcel Number:	10-4-6	Mailing Address:	MORELLI, MICHAEL J & KERRY H
CAMA Number:	10-4-6A		42 BOULDER TRAIL
Vision ID:	105723		BRONXVILLE, NY 10708
Property Address:	41 MAINE STREET #1		

Parcel Number:	10-4-6	Mailing Address:	LEA RAE LEVINES REVOCABLE TRUST
CAMA Number:	10-4-6B		610 SOUTH ROME AVE, UNIT 303
Vision ID:	105723		TAMPA, FL 33606
Property Address:	41 MAINE STREET #2		

Parcel Number:	10-4-6	Mailing Address:	CAPPS, NOBLE F & NANCY H
CAMA Number:	10-4-6C		PO BOX 1023
Vision ID:	105723		KENNEBUNKPORT, ME 04046
Property Address:	41 MAINE STREET #3		

Parcel Number:	10-4-6	Mailing Address:	PORT COMMONS CONDO
CAMA Number:	10-4-6Z		
Vision ID:	105723		,
Property Address:	41 MAINE STREET #MAIN		

Parcel Number: 10-4-7
CAMA Number: 10-4-7
Vision ID: 561
Property Address: 11 GREENE STREET
Mailing Address: MARINO, ELAINE
PO BOX 1537
KENNEBUNKPORT, ME 04046

Parcel Number: 10-4-8
CAMA Number: 10-4-8
Vision ID: 562
Property Address: CORNER MAINE & GREENE ST
Mailing Address: MARINO, ELAINE
PO BOX 1537
KENNEBUNKPORT, ME 04046

Parcel Number: 10-4-9
CAMA Number: 10-4-9
Vision ID: 563
Property Address: 39 MAINE STREET
Mailing Address: HUNTER, JAMES & JOAN F
39 MAINE STREET
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-1
CAMA Number: 10-5-1
Vision ID: 3449
Property Address: 3 SOUTH MAIN STREET
Mailing Address: RYBCZYK, STEPHEN M & CAROLE A
64 MILLER ROAD
BURLINGTON, CT 06013

Parcel Number: 10-5-10
CAMA Number: 10-5-10
Vision ID: 587
Property Address: 52 OCEAN AVENUE
Mailing Address: MAHONEY FAMILY REVOCABLE TRUST
52 OCEAN AVENUE
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-11
CAMA Number: 10-5-11
Vision ID: 588
Property Address: 5 GREENE STREET
Mailing Address: STOHLMAN, SUZANNE
PO BOX 127
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-12
CAMA Number: 10-5-12
Vision ID: 3465
Property Address: 60 OCEAN AVENUE
Mailing Address: MARQUIS, ALFRED C JR & JULIE A
PO BOX 1835
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-13
CAMA Number: 10-5-13
Vision ID: 590
Property Address: 66 OCEAN AVENUE
Mailing Address: DORAN, WILLIAM M & SUSAN L
4807 MARBLE HILL DRIVE
LAFAYETTE HILL, PA 19444

Parcel Number: 10-5-14
CAMA Number: 10-5-14
Vision ID: 3466
Property Address: 68 OCEAN AVENUE
Mailing Address: WINSTANLEY, ADAM D
150 BAKER AVENUE SUITE 303
CONCORD, MA 01742

Parcel Number: 10-5-17
CAMA Number: 10-5-17
Vision ID: 593
Property Address: 10 SOUTH STREET
Mailing Address: SPENCER, MARY A
PO BOX 1422
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-2
CAMA Number: 10-5-2
Vision ID: 565
Property Address: 59 MAINE STREET
Mailing Address: KASYAN, ANN M & ALPEYRIE, JEAN-LOUIS
59 MAINE STREET
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-3
CAMA Number: 10-5-3
Vision ID: 566
Property Address: 57 MAINE STREET
Mailing Address: JANE E FIRTH TRUST
57 MAINE STREET
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-4
CAMA Number: 10-5-4
Vision ID: 567
Property Address: 55 MAINE STREET
Mailing Address: HWTM INVESTMENTS LIMITED PARTNERSHIP
6125 ROUTE DE L'AEROPORT
SAINT HUBERT, QC J3Y 0V9

Parcel Number: 10-5-4A
CAMA Number: 10-5-4A
Vision ID: 568
Property Address: MAINE STREET
Mailing Address: HWTM INVESTMENTS LIMITED PARTNERSHIP
6125 ROUTE DE L'AEROPORT
SAINT HUBERT, QC J3Y 0V9

Parcel Number: 10-5-5
CAMA Number: 10-5-5
Vision ID: 569
Property Address: 53 MAINE STREET
Mailing Address: ANDONIAN, DAVID & KRIS A
PO BOX 800
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-6
CAMA Number: 10-5-6
Vision ID: 105752
Property Address: 47 MAINE STREET #7
Mailing Address: CROW, KAREN W
PO BOX 342
KENNEBUNK, ME 04043

Parcel Number: 10-5-6
CAMA Number: 10-5-6A
Vision ID: 105752
Property Address: 47 MAINE STREET #8
Mailing Address: DIETZ, KATHLEEN
107 OLD PORT ROAD
KENNEBUNK, ME 04043

Parcel Number: 10-5-6
CAMA Number: 10-5-6B
Vision ID: 105752
Property Address: 47 MAINE STREET #10
Mailing Address: CALDERA, RICHARD & MARGARET
47 MAINE STREET, UNIT 10
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-6
CAMA Number: 10-5-6C
Vision ID: 105752
Property Address: 47 MAINE STREET #14
Mailing Address: GRAHAM, MARY ANN
PO BOX 183
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-6
CAMA Number: 10-5-6D
Vision ID: 105752
Property Address: 47 MAINE STREET #9
Mailing Address: GROMAN, ELIZABETH L
47 MAINE STREET UNIT #9
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-6
CAMA Number: 10-5-6E
Vision ID: 105752
Property Address: 47 MAINE STREET #11

Mailing Address:
RANDALL, KAREN
PO BOX 40
LUDLOW, MA 01056

Parcel Number: 10-5-6
CAMA Number: 10-5-6F
Vision ID: 105752
Property Address: 47 MAINE STREET #6

Mailing Address:
DROMGOOLE, JOHN & CAROL ANN
150 HUBBARD STREET #A
CONCORD, MA 01742

Parcel Number: 10-5-6
CAMA Number: 10-5-6G
Vision ID: 105752
Property Address: 47 MAINE STREET #2

Mailing Address:
DENOIA, MARC
590 TREMONT STREET
BOSTON, MA 02118

Parcel Number: 10-5-6
CAMA Number: 10-5-6H
Vision ID: 105752
Property Address: 47 MAINE STREET #3

Mailing Address:
MARGUERITE J WATERS REVOCABLE TRUST
47 MAINE STREET #3
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-6
CAMA Number: 10-5-6I
Vision ID: 105752
Property Address: 47 MAINE STREET #1

Mailing Address:
KENNEDY, ILONA & LESLIE
47 MAINE STREET, UNIT 1
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-6
CAMA Number: 10-5-6J
Vision ID: 105752
Property Address: 47 MAINE STREET #13

Mailing Address:
HAGER, CHRISTIE L & STARK, ROYAL J
26 BREWER DRIVE
WESTBOROUGH, MA 01581

Parcel Number: 10-5-6
CAMA Number: 10-5-6K
Vision ID: 105752
Property Address: 47 MAINE STREET #12

Mailing Address:
AUSTIN, JACK N & HOYT, KATHERINE L
47 MAINE STREET, UNIT 12
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-6
CAMA Number: 10-5-6L
Vision ID: 105752
Property Address: 47 MAINE STREET #5

Mailing Address:
MARTHA NIKITAS STONE REV TRUST
42 PINE STREET
CONCORD, MA 01742

Parcel Number: 10-5-6
CAMA Number: 10-5-6M
Vision ID: 105752
Property Address: 47 MAINE STREET #4

Mailing Address:
MCGINN, HOWARD D & JAYNE A
9 SHANANDOAH DRIVE
PAXTON, MA 01612

Parcel Number: 10-5-6
CAMA Number: 10-5-6Z
Vision ID: 105752
Property Address: 47 MAINE STREET #MAIN

Mailing Address:
TAMARACKS CONDO

,

Parcel Number: 10-5-7
CAMA Number: 10-5-7
Vision ID: 584
Property Address: 43 MAINE STREET
Mailing Address: KUDAS, JACEK & SHARRY
43 MAINE STREET
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-8
CAMA Number: 10-5-8
Vision ID: 3464
Property Address: 6 SOUTH STREET
Mailing Address: YANKOWSKI, GEORGE E JR & JANICE G
PO BOX 1333
KENNEBUNKPORT, ME 04046

Parcel Number: 10-5-9
CAMA Number: 10-5-9
Vision ID: 586
Property Address: 8 SOUTH STREET
Mailing Address: CARNEY, DONALD A
PO BOX 675
KENNEBUNKPORT, ME 04046

Parcel Number: 10-6-1
CAMA Number: 10-6-1
Vision ID: 3467
Property Address: 34 MAINE STREET
Mailing Address: KENNEBUNKPORT CAPTAINS COLLECTION, LLC
PO BOX 3089
KENNEBUNKPORT, ME 04046

Parcel Number: 10-6-10
CAMA Number: 10-6-10
Vision ID: 603
Property Address: 56 MAINE STREET
Mailing Address: GREEN, FRANK T
56 MAINE STREET
KENNEBUNKPORT, ME 04046

Parcel Number: 10-6-11A
CAMA Number: 10-6-11A
Vision ID: 3472
Property Address: 15 TOWNE STREET
Mailing Address: TYLER, TROY
15 TOWNE STREET
KENNEBUNKPORT, ME 04046

Parcel Number: 10-6-2
CAMA Number: 10-6-2
Vision ID: 595
Property Address: 38 MAINE STREET
Mailing Address: CUP AND SAUCER, LLC
133 SEASPRAY AVENUE
PALM BEACH, FL 33480

Parcel Number: 10-6-3
CAMA Number: 10-6-3
Vision ID: 3468
Property Address: 40 MAINE STREET
Mailing Address: 40 MAINE STREET, LLC
ATTN: KRISTIN BEAN 7019 S 45TH PLACE
PHOENIX, AZ 85042

Parcel Number: 10-6-4
CAMA Number: 10-6-4
Vision ID: 597
Property Address: 42 MAINE STREET
Mailing Address: KIVLEHAN REVOCABLE TRUST
PO BOX 1727
KENNEBUNKPORT, ME 04046

Parcel Number: 10-6-5
CAMA Number: 10-6-5
Vision ID: 598
Property Address: 44 MAINE STREET
Mailing Address: LINDA BROOKS REVOCABLE TRUST
PO BOX 3085
KENNEBUNKPORT, ME 04046

Parcel Number: 10-6-6
CAMA Number: 10-6-6
Vision ID: 3469
Property Address: 48 MAINE STREET
Mailing Address: PAPPAGEORGE, PATRICIA
1267 REALTA DRIVE
CHARLOTTE, NC 28211

Parcel Number: 10-6-7
CAMA Number: 10-6-7
Vision ID: 3470
Property Address: 50 MAINE STREET
Mailing Address: PRICE, EUGENE THOMAS & KRISTEN E
15 FERNWOOD ROAD
WEST HARTFORD, CT 06119

Parcel Number: 10-6-8
CAMA Number: 10-6-8
Vision ID: 601
Property Address: 52 MAINE STREET
Mailing Address: FLYNN, SEAN M & AMY S
123 WASHINGTON STREET #2
WINCHESTER, MA 01890

Parcel Number: 10-6-9
CAMA Number: 10-6-9
Vision ID: 3471
Property Address: 54 MAINE STREET
Mailing Address: MIKLOS MARK A & JENNIFER L
54 MAINE STREET
KENNEBUNKPORT, ME 04046

Parcel Number: 11-1-1
CAMA Number: 11-1-1
Vision ID: 105724
Property Address: 37 OCEAN AVENUE #4
Mailing Address: ADAMS, DAVID R & ELLEN L
PO BOX 1016
KENNEBUNKPORT, ME 04046

Parcel Number: 11-1-1
CAMA Number: 11-1-1A
Vision ID: 105724
Property Address: 37 OCEAN AVENUE #6
Mailing Address: SIMONETTI, ALEXIS A
37 OCEAN AVENUE, #6
KENNEBUNKPORT, ME 04046

Parcel Number: 11-1-1
CAMA Number: 11-1-1B
Vision ID: 105724
Property Address: 37 OCEAN AVENUE #2
Mailing Address: STRAUB, CHARLES W JR & CAROL J
100 STONEHAVEN DRIVE
COLUMBIANA, OH 44408

Parcel Number: 11-1-1
CAMA Number: 11-1-1C
Vision ID: 105724
Property Address: 37 OCEAN AVENUE #5
Mailing Address: DESCOTEAUX, DAVID & JULIA
89 HAIGHT HILL ROAD
STANFORDVILLE, NY 12581

Parcel Number: 11-1-1
CAMA Number: 11-1-1D
Vision ID: 105724
Property Address: 37 OCEAN AVENUE #1
Mailing Address: REVOCABLE TRUST OF ALICE L ROSE
51 PETTEE STREET #34
NEWTON, MA 02464

Parcel Number: 11-1-1
CAMA Number: 11-1-1E
Vision ID: 105724
Property Address: 37 OCEAN AVENUE #3
Mailing Address: DRANOW, STEVEN & JAMIE
5 ROOKERY CIRCLE
NEW CITY, NY 10956

Parcel Number: 11-1-1
CAMA Number: 11-1-1Z
Vision ID: 105724
Property Address: 37 OCEAN AVENUE #MAIN
Mailing Address: LEESIDE CONDO
,

Parcel Number: 11-1-2
CAMA Number: 11-1-2
Vision ID: 614
Property Address: 35 OCEAN AVENUE
Mailing Address: HANDLEN, FRANK W & CUMMINS, SHARON L
PO BOX 210
KENNEBUNKPORT, ME 04046

Parcel Number: 11-1-3
CAMA Number: 11-1-3
Vision ID: 3475
Property Address: 33 OCEAN AVENUE
Mailing Address: THOMPSON, HARRY A III & JILL M
PO BOX 20
KENNEBUNKPORT, ME 04046

Parcel Number: 11-1-4
CAMA Number: 11-1-4
Vision ID: 3476
Property Address: 31 OCEAN AVENUE
Mailing Address: RINALDI, JOHN F & POWELL, BRIAN
PO BOX 1079
KENNEBUNKPORT, ME 04046

Parcel Number: 11-1-5
CAMA Number: 11-1-5
Vision ID: 617
Property Address: 29 OCEAN AVENUE
Mailing Address: SHAHIAN, DOUGLAS & LISA
37 HICKORY LANE
BOXFORD, MA 01921

Parcel Number: 11-1-6
CAMA Number: 11-1-6
Vision ID: 3477
Property Address: 27 OCEAN AVENUE
Mailing Address: DAVID C KRIEG LIVING TRUST
PO BOX 664
KENNEBUNKPORT, ME 04046

Parcel Number: 11-6-1
CAMA Number: 11-6-1
Vision ID: 713
Property Address: 11 TOWNE STREET
Mailing Address: MILES, DANIEL F & ANDREA
11 TOWNE STREET
KENNEBUNKPORT, ME 04046

Parcel Number: 11-6-10
CAMA Number: 11-6-10
Vision ID: 722
Property Address: 28 MAINE STREET
Mailing Address: SPICEWOOD MAINE, LLC
8 SPICEWOOD LANE
WILTON, CT 06897

Parcel Number: 11-6-11
CAMA Number: 11-6-11
Vision ID: 723
Property Address: 30 MAINE STREET
Mailing Address: EISING, PETER A & SUSANNE
PO BOX 2761
KENNEBUNKPORT, ME 04046

Parcel Number: 11-6-2
CAMA Number: 11-6-2
Vision ID: 714
Property Address: 9 TOWNE STREET
Mailing Address: LILLIAN M BARTLETT REVOCABLE TRUST
PO BOX 2549
KENNEBUNKPORT, ME 04046

Parcel Number: 11-7-1
CAMA Number: 11-7-1
Vision ID: 724
Property Address: 29 MAINE STREET
Mailing Address: MAINE PEARL LLC
1370 FAN PALM ROAD
BOCA RATON, FL 33432

Parcel Number: 11-7-10
CAMA Number: 11-7-10
Vision ID: 3505
Property Address: 4 PEARL STREET
Mailing Address: MATTHEW C ALLARD REVOCABLE TRUST
54 WESSCUM WOOD ROAD
RIVERSIDE, CT 06878

Parcel Number: 11-7-11
CAMA Number: 11-7-11
Vision ID: 3506
Property Address: 8 PEARL STREET
Mailing Address: STEPHEN C PAGE REVOCABLE TRUST
6539 SOUTH MARINA WAY
STUART, FL 34996

Parcel Number: 11-7-12
CAMA Number: 11-7-12
Vision ID: 735
Property Address: 10 PEARL STREET
Mailing Address: PAUL L MAHONEY REVOCABLE TRUST
6825 SAN MARINO DRIVE
NAPLES, FL 34108

Parcel Number: 11-7-13
CAMA Number: 11-7-13
Vision ID: 736
Property Address: 12 PEARL STREET
Mailing Address: DOWNS, EVA M
PO BOX 1778
KENNEBUNKPORT, ME 04046

Parcel Number: 11-7-2
CAMA Number: 11-7-2
Vision ID: 3503
Property Address: 27 MAINE STREET
Mailing Address: KARAKHANIAN, ALEXANDER & RENA
661 MELALEUCA LANE
MIAMI, FL 33137

Parcel Number: 11-7-3
CAMA Number: 11-7-3
Vision ID: 726
Property Address: 9 ELM STREET
Mailing Address: DELANCEY-KAY REVOCABLE TRUST
600 MAIN STREET, APT 2303
WORCESTER, MA 01608

Parcel Number: 11-7-4
CAMA Number: 11-7-4
Vision ID: 727
Property Address: 7 ELM STREET
Mailing Address: CONDON, ROBERT & ELLICE
80 S RIVER ROAD
STUART, FL 34996

Parcel Number: 11-7-5
CAMA Number: 11-7-5
Vision ID: 728
Property Address: 5 ELM STREET
Mailing Address: KUBIAK, FAITH & KATHERINE
PO BOX 6
KENNEBUNKPORT, ME 04046

Parcel Number: 11-7-6
CAMA Number: 11-7-6
Vision ID: 729
Property Address: 3 ELM STREET
Mailing Address: M&T BANK
C/O CONCENTRIX PO BOX 2410
OMAHA, NE 68103

Parcel Number: 11-7-7
CAMA Number: 11-7-7
Vision ID: 730
Property Address: 40 OCEAN AVENUE
Mailing Address: 1 ELM STREET, LLC
135 GRAFTON STREET
CHEVY CHASE, MD 20815

Parcel Number: 11-7-8
CAMA Number: 11-7-8
Vision ID: 3504
Property Address: 42 OCEAN AVENUE
Mailing Address: PAINE, W ROBERT & EVELYN
PO BOX 1364
KENNEBUNKPORT, ME 04046

Parcel Number: 11-7-9
CAMA Number: 11-7-9
Vision ID: 732
Property Address: 2 PEARL STREET
Mailing Address: BLACK FAMILY REVOCABLE TRUST
PO BOX 837
KENNEBUNKPORT, ME 04046

Parcel Number: 11-8-1
CAMA Number: 11-8-1
Vision ID: 3507
Property Address: 6 ELM STREET
Mailing Address: KENNEBUNKPORT, TOWN OF
PO BOX 566
KENNEBUNKPORT, ME 04046

Parcel Number: 11-8-2
CAMA Number: 11-8-2
Vision ID: 738
Property Address: 3 CHESTNUT STREET
Mailing Address: DULEY, BRIGITTE I
PO BOX 567
KENNEBUNKPORT, ME 04046

Parcel Number: 11-8-3
CAMA Number: 11-8-3
Vision ID: 3508
Property Address: 32 OCEAN AVENUE
Mailing Address: OCEAN AVENUE REALTY TRUST
PO BOX 949
KENWOOD, CA 95452

Parcel Number: 11-8-4
CAMA Number: 11-8-4
Vision ID: 740
Property Address: 2 ELM STREET
Mailing Address: CABE, MARIO & JOANN
1008 E KENNEDY RD
NORTH WALES, PA 19454

Parcel Number: 11-8-5
CAMA Number: 11-8-5
Vision ID: 741
Property Address: 4 ELM STREET
Mailing Address: WHETSELL, M HEYWARD JR &
SHERRILL A
2820 COUNTRY CLUB RD
WINSTON-SALEM, NC 27104

Parcel Number: 11-9-1
CAMA Number: 11-9-1
Vision ID: 742
Property Address: 14 CHESTNUT STREET
Mailing Address: BELYEA, JOHN A
PO BOX 401
KENNEBUNKPORT, ME 04046

Parcel Number: 11-9-11
CAMA Number: 11-9-11
Vision ID: 3511
Property Address: 30 OCEAN AVENUE
Mailing Address: PERKINS, CARLA L
PO BOX 796
KENNEBUNKPORT, ME 04046-0796

Parcel Number: 11-9-12
CAMA Number: 11-9-12
Vision ID: 753
Property Address: 4 CHESTNUT STREET
Mailing Address: KNOWLES, ROBERT W
PO BOX 130
KENNEBUNKPORT, ME 04046

Parcel Number: 11-9-13
CAMA Number: 11-9-13
Vision ID: 3512
Property Address: 6 CHESTNUT STREET
Mailing Address: KILBURN HOUSE, LLC
1601 EAST BLOUNT ST.
PENSACOLA, FL 32503

Parcel Number: 11-9-14
CAMA Number: 11-9-14
Vision ID: 755
Property Address: 8 CHESTNUT STREET
Mailing Address: GOODWIN, KAREN A
PO BOX 545
KENNEBUNKPORT, ME 04046

Parcel Number: 11-9-16
CAMA Number: 11-9-16
Vision ID: 757
Property Address: 12 CHESTNUT STREET
Mailing Address: VASQUEZ, NICHOLAS & KERCADO, MELISSA
PO BOX 2742
KENNEBUNKPORT, ME 04046

Parcel Number: 11-9-2
CAMA Number: 11-9-2
Vision ID: 743
Property Address: 10 ELM STREET
Mailing Address: MCWILLIAMS FAMILY TRUST
28 COLTON LANE
SHREWSBURY, MA 01545

Parcel Number: 11-9-3
CAMA Number: 11-9-3
Vision ID: 3509
Property Address: 12 ELM STREET
Mailing Address: HECKLER, JOHN H & CAROL A
PO BOX 831
KENNEBUNKPORT, ME 04046

Parcel Number: 11-9-4
CAMA Number: 11-9-4
Vision ID: 745
Property Address: 25 MAINE STREET
Mailing Address: NATOLI, JOAN E & RICHARD
PO BOX 763
KENNEBUNKPORT, ME 04046

Parcel Number: 8-1-15
CAMA Number: 8-1-15
Vision ID: 190
Property Address: 91 OCEAN AVENUE
Mailing Address: 91 OCEAN AVENUE COTTAGE, LLC
C/O MARCIA KELLAMS 2000 S OCEAN BLVD, Y10
DELRAY BEACH, FL 33483

Parcel Number: 8-1-16
CAMA Number: 8-1-16
Vision ID: 191
Property Address: 89 OCEAN AVENUE
Mailing Address: CHESTER E & SHIRLEY B HOMER REVOCABLE TRUSTS
1 HARBOUR PLACE, SUITE 4G
PORTSMOUTH, NH 03801

Parcel Number: 8-1-17
CAMA Number: 8-1-17
Vision ID: 192
Property Address: 87 OCEAN AVENUE
Mailing Address: BARNES, ANNE F
PO BOX 84
KENNEBUNKPORT, ME 04046

Parcel Number: 8-1-18
CAMA Number: 8-1-18
Vision ID: 193
Property Address: 85 OCEAN AVENUE

Mailing Address: WINSTANLEY, MELISSA F
847 LOWELL ROAD
CONCORD, MA 01742

Parcel Number: 8-1-19
CAMA Number: 8-1-19
Vision ID: 194
Property Address: 83 OCEAN AVENUE

Mailing Address: CHESTER E HOMER III REVOCABLE TRUST
1 HARBOUR PLACE, SUITE 4G
PORTSMOUTH, NH 03801

Parcel Number: 8-1-20
CAMA Number: 8-1-20
Vision ID: 195
Property Address: OCEAN AVENUE

Mailing Address: EDMANDS, PETER L & CLARK-EDMANDS, SHEILA
8 IVY COURT
KENNEBUNK, ME 04043

Parcel Number: 8-1-22
CAMA Number: 8-1-22
Vision ID: 197
Property Address: 75 OCEAN AVENUE

Mailing Address: TIDEMARK CORPORATION
273 CORPORATE DRIVE, SUITE 150
PORTSMOUTH, NH 03801

Parcel Number: 8-2-1
CAMA Number: 8-2-1
Vision ID: 3357
Property Address: 82 OCEAN AVENUE

Mailing Address: 82 OCEAN AVENUE, LLC
4461 PRESERVE PARKWAY SOUTH
GREENWOOD VILLAGE, CO 80121

Parcel Number: 8-2-19
CAMA Number: 8-2-19
Vision ID: 217
Property Address: CHICKS CREEK

Mailing Address: TILNEY, PETER VR & KATHERINE R
15 SOUTH MAIN STREET
KENNEBUNKPORT, ME 04046

Parcel Number: 8-2-2
CAMA Number: 8-2-2
Vision ID: 200
Property Address: 84 OCEAN AVENUE

Mailing Address: HAMILTON-VOMBAUR, ZOE
24 CEDARLAWN ROAD
IRVINGTON, NY 10533

Parcel Number: 8-2-20
CAMA Number: 8-2-20
Vision ID: 3364
Property Address: 11 SOUTH MAIN STREET

Mailing Address: WILLIAMS, EMILY B & SILLS, DIANE M
28 CONCORD ST
CARLISLE, MA 01740

Parcel Number: 8-2-21
CAMA Number: 8-2-21
Vision ID: 105846
Property Address: 7 SOUTH MAIN STREET #MAIN

Mailing Address: COTTAGE AT CABOT COVE CONDOS

,

Parcel Number: 8-2-21
CAMA Number: 8-2-21A
Vision ID: 105846
Property Address: 7 SOUTH MAIN STREET #1

Mailing Address: SOUTH MAINE, LLC
C/O COTTAGES AT CABOT COVE 2
LIVEWELL DR, STE 203
KENNEBUNK, ME 04043

Parcel Number:	8-2-21	Mailing Address:	ATLANTIC RESORT HOLDINGS, LLC
CAMA Number:	8-2-21B		2 LIVEWELL DR., SUITE 203
Vision ID:	105846		KENNEBUNK, ME 04043
Property Address:	7 SOUTH MAIN STREET #2		

Parcel Number:	8-2-21	Mailing Address:	ATLANTIC RESORT HOLDINGS, LLC
CAMA Number:	8-2-21C		2 LIVEWELL DR., SUITE 203
Vision ID:	105846		KENNEBUNK, ME 04043
Property Address:	7 SOUTH MAIN STREET #3		

Parcel Number:	8-2-21	Mailing Address:	ATLANTIC RESORT HOLDINGS, LLC
CAMA Number:	8-2-21D		2 LIVEWELL DR., SUITE 203
Vision ID:	105846		KENNEBUNK, ME 04043
Property Address:	7 SOUTH MAIN STREET #4		

Parcel Number:	8-2-21	Mailing Address:	ATLANTIC RESORT HOLDINGS, LLC
CAMA Number:	8-2-21E		2 LIVEWELL DR., SUITE 203
Vision ID:	105846		KENNEBUNK, ME 04043
Property Address:	7 SOUTH MAIN STREET #5		

Parcel Number:	8-2-21	Mailing Address:	KNOX, ELIZABETH H & FRANCIS V JR
CAMA Number:	8-2-21F		9 PARKER RIDGE WAY
Vision ID:	105846		NEWBURYPORT, MA 01950
Property Address:	7 SOUTH MAIN STREET #6		

Parcel Number:	8-2-21	Mailing Address:	KPT COTTAGE 7, LLC
CAMA Number:	8-2-21G		4224 244TH AVE NE
Vision ID:	105846		REDMOND, WA 98053
Property Address:	7 SOUTH MAIN STREET #7		

Parcel Number:	8-2-21	Mailing Address:	CHEESMAN, CLAIRE
CAMA Number:	8-2-21H		403 MONMOUTH AVENUE
Vision ID:	105846		NEW MILFORD, NJ 07646
Property Address:	7 SOUTH MAIN STREET #8		

Parcel Number:	8-2-21	Mailing Address:	KLEINMAN, LINDA T & JEFFREY H
CAMA Number:	8-2-21J		2 LOS ANGELES STREET, #1511
Vision ID:	105846		NEWTON, MA 02458
Property Address:	7 SOUTH MAIN STREET #9		

Parcel Number:	8-2-21	Mailing Address:	KENNETH J GIMBEL REVOCABLE
CAMA Number:	8-2-21K		TRUST
Vision ID:	105846		PO BOX 798
Property Address:	7 SOUTH MAIN STREET #10		KENNEBUNKPORT, ME 04046

Parcel Number:	8-2-21	Mailing Address:	JUDGE, STEPHEN D
CAMA Number:	8-2-21L		127 PERKINS ROW
Vision ID:	105846		TOPSFIELD, MA 01983
Property Address:	7 SOUTH MAIN STREET #11		

Parcel Number: 8-2-21
CAMA Number: 8-2-21M
Vision ID: 105846
Property Address: 7 SOUTH MAIN STREET #12
Mailing Address: ATLANTIC RESORT HOLDINGS, LLC
2 LIVEWELL DR., SUITE 203
KENNEBUNK, ME 04043

Parcel Number: 8-2-21
CAMA Number: 8-2-21N
Vision ID: 105846
Property Address: 7 SOUTH MAIN STREET #13
Mailing Address: ATLANTIC RESORT HOLDINGS, LLC
2 LIVEWELL DR., SUITE 203
KENNEBUNK, ME 04043

Parcel Number: 8-2-21
CAMA Number: 8-2-21O
Vision ID: 105846
Property Address: 7 SOUTH MAIN STREET #14
Mailing Address: KPT COTTAGE 14, LLC
4224 244TH AVENUE NE
REDMOND, CA 98053

Parcel Number: 8-2-21
CAMA Number: 8-2-21P
Vision ID: 105846
Property Address: 7 SOUTH MAIN STREET #15
Mailing Address: ATLANTIC RESORT HOLDINGS, LLC
2 LIVEWELL DR., SUITE 203
KENNEBUNK, ME 04043

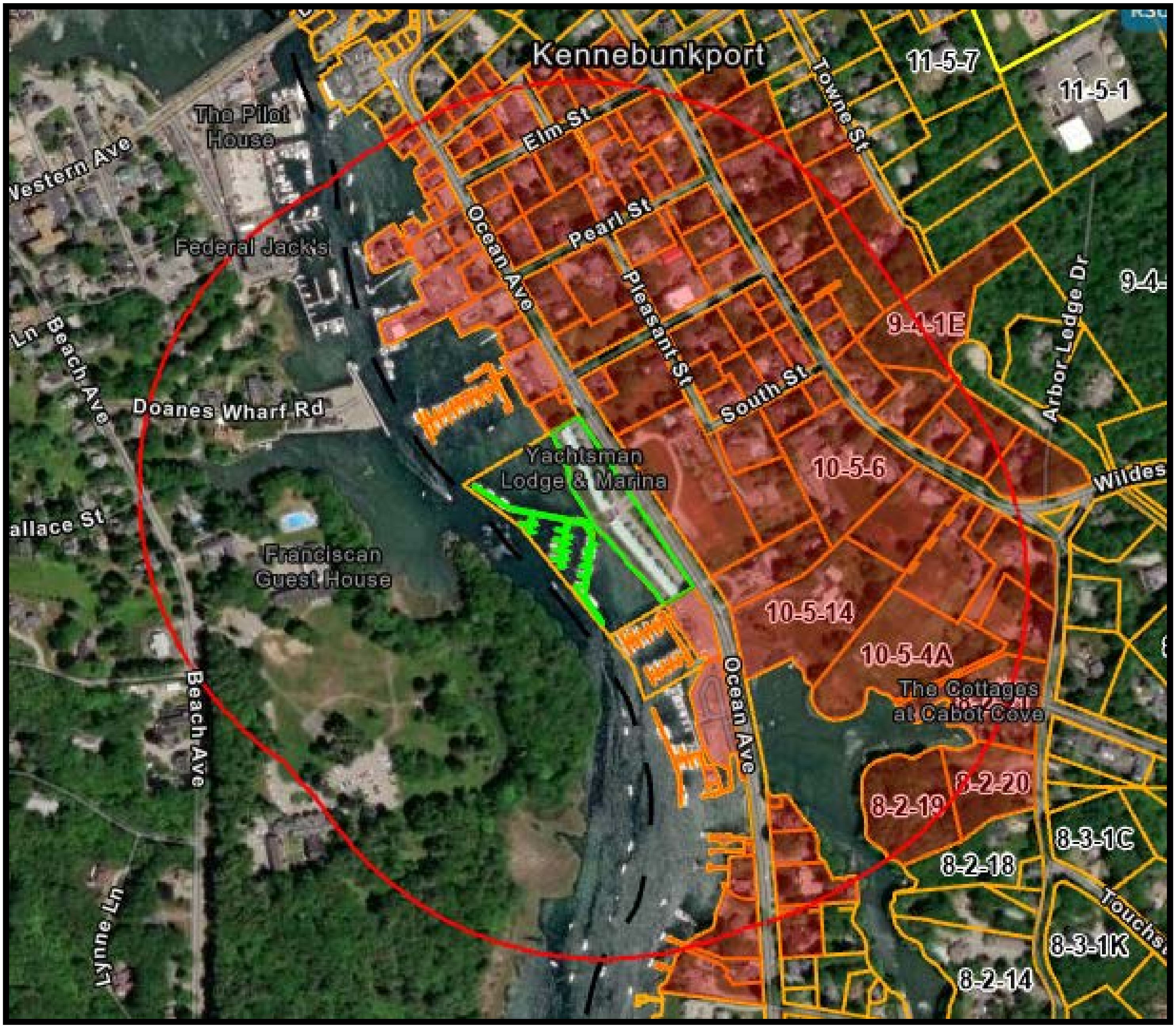
Parcel Number: 8-2-21
CAMA Number: 8-2-21Q
Vision ID: 105846
Property Address: 7 SOUTH MAIN STREET #16
Mailing Address: ATLANTIC RESORT HOLDINGS, LLC
2 LIVEWELL DR., SUITE 203
KENNEBUNK, ME 04043

Parcel Number: 8-2-23
CAMA Number: 8-2-23
Vision ID: 3366
Property Address: 80 OCEAN AVENUE
Mailing Address: KENNEBUNKPORT, TOWN OF
PO BOX 566
KENNEBUNKPORT, ME 04046

Parcel Number: 8-2-3
CAMA Number: 8-2-3
Vision ID: 201
Property Address: 86 OCEAN AVENUE
Mailing Address: MARY BANKS STROHM REVOCABLE TRUST
4211 CASWELL AVE, UNIT A
AUSTIN, TX 78751

Parcel Number: 8-2-4
CAMA Number: 8-2-4
Vision ID: 202
Property Address: 90 OCEAN AVENUE
Mailing Address: OCEAN AVE B&B, LLC
60 SEAGATE DRIVE, APT 1701
NAPLES, FL 34103

Parcel Number: 9-4-1E
CAMA Number: 9-4-1E
Vision ID: 103703
Property Address: 12 ARBOR LEDGE DRIVE
Mailing Address: FAESSLER, WILLY A & JANICE M
12 ARBOR LEDGE DRIVE
KENNEBUNKPORT, ME 04046


Kennebunkport
11-5-7
11-5-1
Towne St
Elm St
The Pilot House
Western Ave
Pearl St
Federal Jack's
Ocean Ave
Pleasant St
9-4-1E
9-4-
Arbor Lodge Dr
Ln
Beach Ave
Doanes Wharf Rd
South St
Yachtsman Lodge & Marina
10-5-6
Wildes
allace St
Franciscan Guest House
10-5-14
10-5-4A
The Cottages at Cabot Cove
Ocean Ave
Beach Ave
8-2-20
8-2-19
8-3-1C
8-2-18
Touchs
Lynne Ln
8-3-1K
8-2-14

Abutting Properties for
11 DOANES WHARF ROAD
088/ / 068/ /
(500 Feet)

Location:
088/ / 014/ 022/
8 WESTERN AVENUE #22
Owner:
D'ITALIA, JEFFREY &
HOWES, MARY
12 COMMODORES WAY
KENNEBUNK, ME 04043

Location:
088/ / 014/ 009/
8 WESTERN AVENUE #9
Owner:
HART, ROBERT &
HART, MARY
42 RIVERSIDE DRIVE
READING, MA 01867

Location:
088/ / 014/ 018/
8 WESTERN AVENUE #18
Owner:
UNCLE GF BABA FAMILY IRREVOC TRST&
CAOUETTE, MICHAEL A TRUSTEE & ET AL
C/O M&JC PROPERTY MNGMNT
480 ROUTE 101
BEDFORD, NH 03110

Location:
088/ / 014/ 012/
8 WESTERN AVENUE #12
Owner:
CAMPBELL, BRIAN J
5706 ROCKMERE DRIVE
BETHESDA, MD 20816

Location:
088/ / 071/ /
8 DOANES WHARF ROAD
Owner:
HARMAN, GERALD K &
HARMAN, ALICE M
P.O. BOX 1554
ARLINGTON, MA 02474

Location:
088/ / 014/ 008/
8 WESTERN AVENUE #8
Owner:
PRM-RGM, LLC
F/K/A PRM-CMM LLC
40 STARK STREET
MANCHESTER, NH 03101

Location:
088/ / 014/ 005/
8 WESTERN AVENUE #5
Owner:
SINCLAIR, THOMAS J REVOC TRUST&
SINCLAIR, THOMAS J & SARA E TRUSTEES
PO BOX 377
KENNEBUNKPORT, ME 04046

Location:
088/ / 014/ 002/
8 WESTERN AVENUE #2
Owner:
ODONNELL, JOHN M &
FERREIRO, ROXANA
368 HIGHLAND STREET
WESTON, MA 02493

Location:
088/ / 014/ 004/
8 WESTERN AVENUE #4
Owner:
UNCLE GF BABA FAMILY IRREVOC TRST&
CAOUETTE, MICHAEL A. TRSTEE & ET AL
C/O M&JC PROPERTY MNGMNT
480 ROUTE 101
BEDFORD, NH 03110

Location:
088/ / 014/ 020/
8 WESTERN AVENUE #20
Owner:
109 PORT ROAD LLC
5 HEARTHSTONE DRIVE
KENNEBUNK, ME 04043

Location:
088/ / 052/ /
21 BEACH AVENUE
Owner:
CHRISTIANSEN, JOHN
144 COMMONWEALTH AVE
BOSTON, MA 02116

Location:
088/ / 014/ 023/
8 WESTERN AVENUE #23
Owner:
TALMAGE SOLAR ENGINEERING, INC
25 ROCKMARSH ROAD
KENNEBUNKPORT, ME 04046

Location:
088/ / 014/ 014/
8 WESTERN AVENUE #14
Owner:
PRM-RGM, LLC
F/K/A PRM-CMM LLC
40 STARK STREET
MANCHESTER, NH 03101

Location:
088/ / 014/ 010/
8 WESTERN AVENUE #10
Owner:
MULLEN, EUGENE M &
MULLEN, LAUREL A
103 LORING ROAD
WESTON, MA 02493

Location:
088/ / 014/ 024/
8 WESTERN AVENUE #24
Owner:
UMANZIO, ROY D &
ZANDER, CHRISTINE
PO BOX 4277
ANDOVER, MA 01810

Location:
088/ / 014/ 015/
8 WESTERN AVENUE #15
Owner:
UNCLE GF BABA FAMILY IRREVOC TRST&
CAOUETTE, MICHAEL A TRSTEE& ET AL
C/O M&JC PROPERTY MNGMNT
480 ROUTE 101
BEDFORD, NH 03110

Location:
088/ / 014/ 017/
8 WESTERN AVENUE #17
Owner:
MURRAY, BENJAMIN &
MURRAY, SARAH D
235 BROWN STREET
KENNEBUNK, ME 04043

Location:
088/ / 014/ 006/
8 WESTERN AVENUE #6
Owner:
MULLEN, EUGENE M
103 LORING ROAD
WESTON, MA 02493

Location:
088/ / 014/ 021/
8 WESTERN AVENUE #21
Owner:
ESIELONIS, STEVEN M
ESIELONIS, SUSAN H
15 CHRISTENSEN LANE
KENNEBUNK, ME 04043

Location:
088/ / 014/ 019/
8 WESTERN AVENUE #19
Owner:
EAST RIDGE REALTY OF SC LLC
1602 BEAUFORD PLACE
VALDOSTA, GA 31602

Location:
088/ / 014/ 011/
8 WESTERN AVENUE #11
Owner:
COSTELLO, MICHAEL &
COSTELLO, DONNA
37 FAIRFIELD DRIVE
KENNEBUNK, ME 04043

Location:
088/ / 014/ 013/
8 WESTERN AVENUE #13
Owner:
NOBLE, RENN E
15 HOLLAND ROAD
KENNEBUNK, ME 04043

Location:
088/ / 075/ /
5 DOANES WHARF ROAD
Owner:
PIMENTEL, ALLYSON B REVOC TRST&
PIMENTEL, ALLYSON B & ARMANDO,JR
TRUSTEE
19730 GRANDVIEW TERRACE
JUPITER, FL 33458

Location:
088/ / 051/ /
19 BEACH AVENUE
Owner:
RODRIGUES, JOSEPH S &
RODRIGUES, NANCY C
19 BEACH AVENUE
KENNEBUNK, ME 04043

Location:
088/ / 069/ /
12 DOANES WHARF ROAD
Owner:
KENNEBUNK SEWER DISTRICT
P.O. BOX 648
KENNEBUNK, ME 04043

Location:
088/ / 014/ 016/
8 WESTERN AVENUE #16
Owner:
MURRAY, JAMES SR, TRUST &
MURRAY, JAMES M SR
PO BOX 1174
KENNEBUNKPORT, ME 04046

Location:
088/ / 035/ /
20 CHASE HILL ROAD
Owner:
BEACH DOGS KPT LLC
5220 CASABLANCA DRIVE
PARADISE VALLEY, AZ 85253

Location:
088/ / 072/ /
6 DOANES WHARF ROAD
Owner:
LAMBERTS, RICHARD J REVOC TRUST&
LAMBERTS, EDITH L REVOC TRUST &
PO BOX 2599
KENNEBUNKPORT, ME 04046

Location:
088/ / 074/ /
7 DOANES WHARF ROAD
Owner:
TCLL LLC
PO BOX 2688
KENNEBUNKPORT, ME 04046

Location:
088/ / 063/ /
25 BEACH AVENUE
Owner:
MERZ, MARTHA A
316 HALSEY ROAD
ANNAPOLIS, MD 21401

Location:
088/ / 017/ /
CHASE HILL ROAD
Owner:
PORT SCAPE CONDOMINIUMS
CHASE HILL ROAD
KENNEBUNK, ME 04043

Location:
088/ / 076/ /
1 DOANES WHARF ROAD
Owner:
TRELINA LLC
62 PORTLAND ROAD
SUITE 25
KENNEBUNK, ME 04043

Location:
088/ / 068/ /
11 DOANES WHARF ROAD
Owner:
HIOS HOSPITALITY LLC
WHITE BARN INN OWNER LLC
11 DOANES WHAR ROAD
KENNEBUNK, ME 04043

Location:
088/ / 028/ /
9 CHASE HILL ROAD
Owner:
FOLEY, PATRICIA A &
DANT, SHANNON HAYES & ET AL
9 CHASE HILL ROAD
KENNEBUNK, ME 04043

Location:
088/ / 022/ /
10 CHASE HILL ROAD
Owner:
GLOBEVEST CAPITAL REAL ESTATE US
LP
1005 RUE LIONEL DAUMAIS BUREAU
BOUCHERVILLE, QC J4B 0B1

Location:
088/ / 037/ /
12 BEACH AVENUE
Owner:
GGPP DEAN LLC
c/o WILK, NINA
1901 OLDE MILL FOREST DRIVE
RALEIGH, NC 27606

Location:
088/ / 067/ /
4 DOANES WHARF ROAD
Owner:
BR2 LLC
86 NEWBURY STREET
PORTLAND, ME 04101

Location:
088/ / 077/ /
22 BEACH AVENUE
Owner:
PERKINS, CARLA L
P.O. BOX 796
KENNEBUNKPORT, ME 04046

Location:
088/ / 014/ 007/
8 WESTERN AVENUE #7
Owner:
HANNON, SHEILA W &
HANNON, THOMAS A, SR
161 BIANCA ROAD
DUXBURY, MA 02332

Location:
088/ / 023/ /
12 CHASE HILL ROAD
Owner:
J&S HOSPITALITY LLC
PO BOX 620C
KENNEBUNKPORT, ME 04046

Location:
088/ / 062/ /
23 BEACH AVENUE
Owner:
23 BEACH AVE LAND TRUST
8502 MARBLEHEAD ROAD
LUTHERVILLE, MD 20193

Location:
088/ / 070/ /
10 DOANES WHARF ROAD
Owner:
MCAVOY, KEITH FRANCIS &
MCAVOY, MARY-ANN
10 DOANES WHARF ROAD
KENNEBUNK, ME 04043

Location:
088/ / 014/ 003/
8 WESTERN AVENUE #3
Owner:
SINCLAIR, THOMAS J REVOC TRUST &
SINCLAIR, SARA E REVOC TRUST&
PO BOX 377
KENNEBUNKPORT, ME 04046

Location:
088/ / 024/ /
16 CHASE HILL ROAD
Owner:
NARVAEZ, DAMIAN M &
NARVAEZ, RACHEL G
2500 REGATTA AVENUE
MIAMI BEACH, FL 33140

Location:
088/ / 066/ /
2 DOANES WHARF ROAD
Owner:
BR2 LLC
86 NEWBURY STREET
PORTLAND, ME 04101

Location:
088/ / 073/ /
9 DOANES WHARF ROAD
Owner:
WEADOCK, FLORENCE T
256 SIMON WILLARD ROAD
CONCORD, MA 01742

Location:
088/ / 079/ /
26 BEACH AVENUE
Owner:
SOCIETY OF FRANCISCAN FATHERS
P.O. BOX 980
KENNEBUNKPORT, ME 04046

Location:
088/ / 014/ /
8 WESTERN AVENUE
Owner:
RIVERVIEW BOATSLIPS
CONDOMINIUMS
CONTROL CARD
KENNEBUNK, ME 04043

Location:
088/ / 080/ /
8 WESTERN AVENUE
Owner:
SHIPYARD, INC
8 WESTERN AVENUE
KENNEBUNK, ME 04043

Location:
088/ / 050/ /
17 BEACH AVENUE
Owner:
MUTINO, PETER A &
MUTINO, SUSAN L
8 APPLE TREE LANE
DARIEN, CT 06820

Location:
088/ / 018/ /
14 CHASE HILL ROAD
Owner:
BULL, STEPHEN B &
TURNER, SHERRY M
12720 HUNTSMAN WAY
POTOMAC, MD 20854-2307

Proof of Mailing to Abutters (Mailing Labels)

Walsh Engineering Associates, Inc.
1 KAREN DR STE 2A
WESTBROOK ME 04092-1917

$5.54 US POSTAGE
FIRST-CLASS IMI
Oct 30 2024
Mailed from ZIP 04092
1 OZ FIRST-CLASS MAIL LETTER
RATE

11923275

endicia

063S0011485632

USPS CERTIFIED MAIL

9407 1118 9876 5486 6944 65

KENNEBUNKPORT, TOWN OF
PO BOX 566
KENNEBUNKPORT ME 04046-0566

Walsh Engineering Associates, Inc.
1 KAREN DR STE 2A
WESTBROOK ME 04092-1917

$5.54 US POSTAGE
FIRST-CLASS IMI
Oct 30 2024
Mailed from ZIP 04092
1 OZ FIRST-CLASS MAIL LETTER
RATE
11923275

endicia
063S0011485640

USPS CERTIFIED MAIL

9407 1118 9876 5486 6944 03

KPT MARINE, LLC
PO BOX 2734
KENNEBUNKPORT ME 04046-2734

Walsh Engineering Associates, Inc.
1 KAREN DR STE 2A
WESTBROOK ME 04092-1917

$5.54 US POSTAGE
FIRST-CLASS IMI
Oct 30 2024
Mailed from ZIP 04092
1 OZ FIRST-CLASS MAIL LETTER RATE
11923275

endicia
063S0010937442

USPS CERTIFIED MAIL

9407 1118 9876 5486 6944 96

KENNEBUNKPORT, TOWN OF
PO BOX 566
KENNEBUNKPORT ME 04046-0566

Walsh Engineering Associates, Inc.
1 KAREN DR STE 2A
WESTBROOK ME 04092-1917

$5.54 US POSTAGE
FIRST-CLASS IMI
Oct 30 2024
Mailed from ZIP 04092
1 OZ FIRST-CLASS MAIL LETTER
RATE
11923275

endicia
063S0010937441

USPS CERTIFIED MAIL

9407 1118 9876 5486 6944 41

ARUNDEL YACHT CLUB
PO BOX 328
KENNEBUNKPORT ME 04046-0328

Walsh Engineering Associates, Inc.
1 KAREN DR STE 2A
WESTBROOK ME 04092-1917

$5.54 US POSTAGE
FIRST-CLASS IMI
Oct 30 2024
Mailed from ZIP 04092
1 OZ FIRST-CLASS MAIL LETTER
RATE
11923276

endicia
063S0010937441

USPS CERTIFIED MAIL

9407 1118 9876 5486 6944 89

MAHONEY FAMILY REVOCABLE TRUST
52 OCEAN AVE
KENNEBUNKPORT ME 04046

Walsh Engineering Associates, Inc.
1 KAREN DR STE 2A
WESTBROOK ME 04092-1917

$5.54 **US POSTAGE**
FIRST-CLASS IMI
Oct 30 2024
Mailed from ZIP 04092
1 OZ FIRST-CLASS MAIL LETTER
RATE

11923275

endicia
063S0011718298

USPS CERTIFIED MAIL

9407 1118 9876 5486 6944 34

STOHLMAN, SUZANNE
PO BOX 127
KENNEBUNKPORT ME 04046-0127

Walsh Engineering Associates, Inc.
1 KAREN DR STE 2A
WESTBROOK ME 04092-1917

$5.54 US POSTAGE
FIRST-CLASS IMI
Oct 30 2024
Mailed from ZIP 04092
1 OZ FIRST-CLASS MAIL LETTER RATE
11923275

endicia
063S0010937440

USPS CERTIFIED MAIL

9407 1118 9876 5486 6945 19

MARQUIS, ALFRED C JR & JULIE A
PO BOX 1835
KENNEBUNKPORT ME 04046-4835

Walsh Engineering Associates, Inc.
1 KAREN DR STE 2A
WESTBROOK ME 04092-1917

$5.54 US POSTAGE
FIRST-CLASS IMI
Oct 30 2024
Mailed from ZIP 04092
1 OZ FIRST-CLASS MAIL LETTER RATE
11923275

endicia

063S0010937441

USPS CERTIFIED MAIL

9407 1118 9876 5486 6945 26

DORAN, WILLIAM M & SUSAN L
4807 MARBLE HL
LAFAYETTE HL PA 19444-1043

1 ELM STREET, LLC
135 GRAFTON STREET
CHEVY CHASE MD 20815

2538970 ONTARIO, INC
765 WESTNEY ROAD SOUTH
AJAX ON L1S 6W1

40 MAINE STREET, LLC
ATTN: KRISTIN BEAN
7019 S 45TH PLACE
PHOENIX AZ 85042

82 OCEAN AVENUE, LLC
4461 PRESERVE PARKWAY SOUTH
GREENWOOD VILLAGE CO 80121

91 OCEAN AVENUE COTTAGE, LLC
C/O MARCIA KELLAMS
2000 S OCEAN BLVD, Y10
DELRAY BEACH FL 33483

ADAMS, DAVID R & ELLEN L
PO BOX 1016
KENNEBUNKPORT ME 04046

ANDONIAN, DAVID & KRIS A
PO BOX 800
KENNEBUNKPORT ME 04046

ARUNDEL YACHT CLUB
PO BOX 328
KENNEBUNKPORT ME 04046-0328

ATLANTIC RESORT HOLDINGS, LLC
2 LIVEWELL DR., SUITE 203
KENNEBUNK ME 04043

AUSTIN, JACK N & HOYT, KATHERINE L
47 MAINE STREET, UNIT 12
KENNEBUNKPORT ME 04046

BALCOM, WILLIAM BRIAN
3002 WINDSOR RIDGE DRIVE
WESTBOROUGH MA 01581

BARNES, ANNE F
PO BOX 84
KENNEBUNKPORT ME 04046

BARTLETT, HUGH J & JUDITH
PO BOX 293
KENNEBUNKPORT ME 04046

BELYEA, JOHN A
PO BOX 401
KENNEBUNKPORT ME 04046

BLACK FAMILY REVOCABLE TRUST
PO BOX 837
KENNEBUNKPORT ME 04046

BYERLY, WILLIAM F & MARY C
PO BOX 2675
KENNEBUNKPORT ME 04046

CABE, MARIO & JOANN
1008 E KENNEDY RD
NORTH WALES PA 19454

CALDERA, RICHARD & MARGARET
47 MAINE STREET, UNIT 10
KENNEBUNKPORT ME 04046

CAPPS, NOBLE F & NANCY H
PO BOX 1023
KENNEBUNKPORT ME 04046

CARNEY, DONALD A
PO BOX 675
KENNEBUNKPORT ME 04046

CHEESMAN, CLAIRE
403 MONMOUTH AVENUE
NEW MILFORD NJ 07646

CHESTER E & SHIRLEY B HOMER
REVOCABLE TRUSTS
1 HARBOUR PLACE, SUITE 4G
PORTSMOUTH NH 03801

CHESTER E HOMER III REVOCABLE TRUST
1 HARBOUR PLACE, SUITE 4G
PORTSMOUTH NH 03801

CONDON, ROBERT & ELLICE
80 S RIVER ROAD
STUART FL 34996

COTTAGE AT CABOT COVE CONDOS

CROW, KAREN W
PO BOX 342
KENNEBUNK ME 04043

CUP AND SAUCER, LLC
133 SEASPRAY AVENUE
PALM BEACH FL 33480

DAVID C KRIEG LIVING TRUST
PO BOX 664
KENNEBUNKPORT ME 04046

DAVID L KELLY FAMILY TRUST
25 OAK STREET
CHARLESTOWN MA 02129

DELANCEY-KAY REVOCABLE TRUST
600 MAIN STREET, APT 2303
WORCESTER MA 01608

DENOIA, MARC
590 TREMONT STREET
BOSTON MA 02118

DESCOTEAUX, DAVID & JULIA
89 HAIGHT HILL ROAD
STANFORDVILLE NY 12581

DIETZ, KATHLEEN
107 OLD PORT ROAD
KENNEBUNK ME 04043

DORAN, WILLIAM M & SUSAN L
4807 MARBLE HILL DRIVE
LAFAYETTE HILL PA 19444

DOWNS, EVA M
PO BOX 1778
KENNEBUNKPORT ME 04046

DRANOW, STEVEN & JAMIE
5 ROOKERY CIRCLE
NEW CITY NY 10956

DROMGOOLE, JOHN & CAROL ANN
150 HUBBARD STREET #A
CONCORD MA 01742

DULEY, BRIGITTE I
PO BOX 567
KENNEBUNKPORT ME 04046

EDITH HG MCCONNELL REVOCABLE TRUST
PO BOX 1813
KENNEBUNKPORT ME 04046

EDMANDS, PETER L & CLARK-EDMANDS,
SHEILA
8 IVY COURT
KENNEBUNK ME 04043

EISING, PETER A & SUSANNE
PO BOX 2761
KENNEBUNKPORT ME 04046

ENOCH, MATTHEW S & DONNA C
642 ALLEGIANCE DRIVE
LITITZ PA 17543

FAESSLER, WILLY A & JANICE M
12 ARBOR LEDGE DRIVE
KENNEBUNKPORT ME 04046

FANTON, ROMA F
39 MEETINGHOUSE LANE
FAIRFIELD CT 06430

FLYNN, SEAN M & AMY S
123 WASHINGTON STREET #2
WINCHESTER MA 01890

GOODWIN, KAREN A
PO BOX 545
KENNEBUNKPORT ME 04046

GRAHAM, MARY ANN
PO BOX 183
KENNEBUNKPORT ME 04046

GREEN, FRANK T
56 MAINE STREET
KENNEBUNKPORT ME 04046

GROMAN, ELIZABETH L
47 MAINE STREET UNIT #9
KENNEBUNKPORT ME 04046

HAGER, CHRISTIE L & STARK, ROYAL J
26 BREWER DRIVE
WESTBOROUGH MA 01581

HALL, JONATHAN S
PO BOX 811
WINDHAM NH 03087

HAMILTON-VOMBAUR, ZOE
24 CEDARLAWN ROAD
IRVINGTON NY 10533

HANDLEN, FRANK W & CUMMINS, SHARON L
PO BOX 210
KENNEBUNKPORT ME 04046

HECKLER, JOHN H & CAROL A
PO BOX 831
KENNEBUNKPORT ME 04046

HUNTER, JAMES & JOAN F
39 MAINE STREET
KENNEBUNKPORT ME 04046

HWTM INVESTMENTS LIMITED PARTNERSHIP
6125 ROUTE DE L'AEROPORT
SAINT HUBERT QC J3Y 0V9

JANE E FIRTH TRUST
57 MAINE STREET
KENNEBUNKPORT ME 04046

JUDGE, STEPHEN D
127 PERKINS ROW
TOPSFIELD MA 01983

KARAKHANIAN, ALEXANDER & RENA
661 MELALEUCA LANE
MIAMI FL 33137

KASYAN, ANN M & ALPEYRIE, JEAN-LOUIS
59 MAINE STREET
KENNEBUNKPORT ME 04046

KCC-CGH HOLDINGS, LLC
PO BOX 3089
KENNEBUNKPORT ME 04046

KENNEBUNKPORT CAPTAINS COLLECTION, LLC
PO BOX 3089
KENNEBUNKPORT ME 04046

KENNEBUNKPORT CONSERVATION TRUST
PO BOX 7004
CAPE PORPOISE ME 04014-07004

KENNEBUNKPORT, TOWN OF
PO BOX 566
KENNEBUNKPORT ME 04046

KENNEDY, ILONA & LESLIE
47 MAINE STREET, UNIT 1
KENNEBUNKPORT ME 04046

KENNETH J GIMBEL REVOCABLE TRUST
PO BOX 798
KENNEBUNKPORT ME 04046

KILBURN HOUSE, LLC
1601 EAST BLOUNT ST.
PENSACOLA FL 32503

KIVLEHAN REVOCABLE TRUST
PO BOX 1727
KENNEBUNKPORT ME 04046

KLEINMAN, LINDA T & JEFFREY H
2 LOS ANGELES STREET, #1511
NEWTON MA 02458

KNOWLES, ROBERT W
PO BOX 130
KENNEBUNKPORT ME 04046

KNOX, ELIZABETH H & FRANCIS V JR
9 PARKER RIDGE WAY
NEWBURYPORT MA 01950

KPT COTTAGE 14, LLC
4224 244TH AVENUE NE
REDMOND CA 98053

KPT COTTAGE 7, LLC
4224 244TH AVE NE
REDMOND WA 98053

KPT MARINE, LLC
PO BOX 2734
KENNEBUNKPORT ME 04046

KUBIAK, FAITH & KATHERINE
PO BOX 6
KENNEBUNKPORT ME 04046

KUDAS, JACEK & SHARRY
43 MAINE STREET
KENNEBUNKPORT ME 04046

LEA RAE LEVINES REVOCABLE TRUST
610 SOUTH ROME AVE, UNIT 303
TAMPA FL 33606

LEESIDE CONDO

LILLIAN M BARTLETT REVOCABLE TRUST
PO BOX 2549
KENNEBUNKPORT ME 04046

LINDA BROOKS REVOCABLE TRUST
PO BOX 3085
KENNEBUNKPORT ME 04046

M&T BANK
C/O CONCENTRIX
PO BOX 2410
OMAHA NE 68103

MAHONEY FAMILY REVOCABLE TRUST
52 OCEAN AVENUE
KENNEBUNKPORT ME 04046

MAINE PEARL LLC
1370 FAN PALM ROAD
BOCA RATON FL 33432

MALTE LUKAS REVOCABLE TRUST
PO BOX 2798
KENNEBUNKPORT ME 04046

MARGUERITE J WATERS REVOCABLE TRUST
47 MAINE STREET #3
KENNEBUNKPORT ME 04046

MARINO, ELAINE
PO BOX 1537
KENNEBUNKPORT ME 04046

MARQUIS, ALFRED C JR & JULIE A
PO BOX 1835
KENNEBUNKPORT ME 04046

MARTHA NIKITAS STONE REV TRUST
42 PINE STREET
CONCORD MA 01742

MARY BANKS STROHM REVOCABLE TRUST
4211 CASWELL AVE, UNIT A
AUSTIN TX 78751

MATTHEW C ALLARD REVOCABLE TRUST
54 WESSCUM WOOD ROAD
RIVERSIDE CT 06878

MATTUCHIO FAMILY IRREVOCABLE TRUST
PO BOX 169
KENNEBUNKPORT ME 04046

MCFB, LLC
PO BOX 2675
KENNEBUNKPORT ME 04046

MCGINN, HOWARD D & JAYNE A
9 SHANANDOAH DRIVE
PAXTON MA 01612

MCWILLIAMS FAMILY TRUST
28 COLTON LANE
SHREWSBURY MA 01545

MICHELLE L DRAGHETTI REVOCABLE TRUST
PO BOX 2797
KENNEBUNKPORT ME 04046

MIDDLETON, MARJORIE D & JOHN L JR
PO BOX 1046
KENNEBUNKPORT ME 04046

MIKLOS MARK A & JENNIFER L
54 MAINE STREET
KENNEBUNKPORT ME 04046

MILES, DANIEL F & ANDREA
11 TOWNE STREET
KENNEBUNKPORT ME 04046

MORELLI, MICHAEL J & KERRY H
42 BOULDER TRAIL
BRONXVILLE NY 10708

MULBERGER, VIRGINIA A
804 HALL PLACE
ALEXANDRIA VA 22302

NATOLI, JOAN E & RICHARD
PO BOX 763
KENNEBUNKPORT ME 04046

NOWAK, LORI
4940 N HACIENDA DEL SOL ROAD
TUCSON AZ 85718

OCEAN AVE B&B, LLC
60 SEAGATE DRIVE, APT 1701
NAPLES FL 34103

OCEAN AVENUE REALTY TRUST
PO BOX 949
KENWOOD CA 95452

PAINE, W ROBERT & EVELYN
PO BOX 1364
KENNEBUNKPORT ME 04046

PAPPAGEORGE, PATRICIA
1267 REALTA DRIVE
CHARLOTTE NC 28211

PAUL L MAHONEY REVOCABLE TRUST
6825 SAN MARINO DRIVE
NAPLES FL 34108

PELLETIER, THOMAS J & CYNTHIA L
182 LOWELL STREET
PEABODY MA 01960

PERKINS, CARLA L
PO BOX 796
KENNEBUNKPORT ME 04046-0796

PORT COMMONS CONDO

PRICE, EUGENE THOMAS & KRISTEN E
15 FERNWOOD ROAD
WEST HARTFORD CT 06119

RANDALL, KAREN
PO BOX 40
LUDLOW MA 01056

REDDEN, MICHAELA A & OLSHAN, ARTHUR
8 FRAESCO LANE
NORWOOD NJ 07648

REVOCABLE TRUST OF ALICE L ROSE
51 PETTEE STREET #34
NEWTON MA 02464

RINALDI, JOHN F & POWELL, BRIAN
PO BOX 1079
KENNEBUNKPORT ME 04046

RIVERBANK CONDO

ROMINE, DONALD J & RHODA M
325 DUNES BLVD., APT 803
NAPLES FL 34110

RYBCZYK, STEPHEN M & CAROLE A
64 MILLER ROAD
BURLINGTON CT 06013

SHAHIAN, DOUGLAS & LISA
37 HICKORY LANE
BOXFORD MA 01921

SIMONETTI, ALEXIS A
37 OCEAN AVENUE, #6
KENNEBUNKPORT ME 04046

SOUTH MAINE, LLC
C/O COTTAGES AT CABOT COVE
2 LIVEWELL DR, STE 203
KENNEBUNK ME 04043

SPENCER, MARY A
PO BOX 1422
KENNEBUNKPORT ME 04046

SPICEWOOD MAINE, LLC
8 SPICEWOOD LANE
WILTON CT 06897

STEPHEN C PAGE REVOCABLE TRUST
6539 SOUTH MARINA WAY
STUART FL 34996

STOHLMAN, SUZANNE
PO BOX 127
KENNEBUNKPORT ME 04046

STRAUB, CHARLES W JR & CAROL J
100 STONEHAVEN DRIVE
COLUMBIANA OH 44408

SWEENEY, JOHN & ANN-MARIE
16 MARTIN STREET
ACTON MA 01720

TAMARACKS CONDO

THOMPSON, HARRY A III & JILL M
PO BOX 20
KENNEBUNKPORT ME 04046

TIDEMARK CORPORATION
273 CORPORATE DRIVE, SUITE 150
PORTSMOUTH NH 03801

TILNEY, PETER VR & KATHERINE R
15 SOUTH MAIN STREET
KENNEBUNKPORT ME 04046

TYLER, TROY
15 TOWNE STREET
KENNEBUNKPORT ME 04046

VASQUEZ, NICHOLAS & KERCADO, MELISSA
PO BOX 2742
KENNEBUNKPORT ME 04046

WHETSELL, M HEYWARD JR & SHERRILL A
2820 COUNTRY CLUB RD
WINSTON-SALEM NC 27104

WIDMER, MATTHEW A & AMY M
18 LOUDEN HEIGHTS NORTH
ALBANY NY 12211

WILLIAMS, EMILY B & SILLS, DIANE M
28 CONCORD ST
CARLISLE MA 01740

WILLIAMSON, ROBERT S
PO BOX 1950
KENNEBUNKPORT ME 04046

WINSTANLEY, ADAM D
150 BAKER AVENUE SUITE 303
CONCORD MA 01742

WINSTANLEY, MELISSA F
847 LOWELL ROAD
CONCORD MA 01742

WOMEN & WINE, LLC
PO BOX 1148
KENNEBUNKPORT ME 04046

YANKOWSKI, GEORGE E JR & JANICE G
PO BOX 1333
KENNEBUNKPORT ME 04046

D'ITALIA, JEFFREY &
12 COMMODORES WAY
KENNEBUNK, ME 04043

ODONNELL, JOHN M &
368 HIGHLAND STREET
WESTON, MA 02493

UMANZIO, ROY D &
PO BOX 4277
ANDOVER, MA 01810

HART, ROBERT &
42 RIVERSIDE DRIVE
READING, MA 01867

UNCLE GF BABA FAMILY IRREVOC TRST&
C/O M&JC PROPERTY MNGMNT
480 ROUTE 101
BEDFORD. NH 03110

UNCLE GF BABA FAMILY IRREVOC TRST&
C/O M&JC PROPERTY MNGMNT
480 ROUTE 101
BEDFORD. NH 03110

UNCLE GF BABA FAMILY IRREVOC TRST&
C/O M&JC PROPERTY MNGMNT
480 ROUTE 101
BEDFORD. NH 03110

109 PORT ROAD LLC
5 HEARTHSTONE DRIVE
KENNEBUNK, ME 04043

MURRAY, BENJAMIN &
235 BROWN STREET
KENNEBUNK, ME 04043

CAMPBELL, BRIAN J
5706 ROCKMERE DRIVE
BETHESDA, MD 20816

CHRISTIANSEN, JOHN
144 COMMONWEALTH AVE
BOSTON, MA 02116

MULLEN, EUGENE M
103 LORING ROAD
WESTON, MA 02493

HARMAN, GERALD K &
P.O. BOX 1554
ARLINGTON, MA 02474

TALMAGE SOLAR ENGINEERING, INC
25 ROCKMARSH ROAD
KENNEBUNKPORT, ME 04046

ESIELONIS, STEVEN M
15 CHRISTENSEN LANE
KENNEBUNK, ME 04043

PRM-RGM, LLC
40 STARK STREET
MANCHESTER, NH 03101

PRM-RGM, LLC
40 STARK STREET
MANCHESTER, NH 03101

EAST RIDGE REALTY OF SC LLC
1602 BEAUFORD PLACE
VALDOSTA, GA 31602

SINCLAIR, THOMAS J REVOC TRUST&
PO BOX 377
KENNEBUNKPORT, ME 04046

MULLEN, EUGENE M &
103 LORING ROAD
WESTON, MA 02493

COSTELLO, MICHAEL &
37 FAIRFIELD DRIVE
KENNEBUNK, ME 04043

NOBLE, RENN E
15 HOLLAND ROAD
KENNEBUNK, ME 04043

PORT SCAPE CONDOMINIUMS
CHASE HILL ROAD
KENNEBUNK, ME 04043

J&S HOSPITALITY LLC
PO BOX 620C
KENNEBUNKPORT, ME 04046

PIMENTEL, ALLYSON B REVOC TRST&
19730 GRANDVIEW TERRACE
JUPITER, FL 33458

TRELINA LLC
62 PORTLAND ROAD
SUITE 25
KENNEBUNK. ME 04043

23 BEACH AVE LAND TRUST
8502 MARBLEHEAD ROAD
LUTHERVILLE, MD 20193

RODRIGUES, JOSEPH S &
19 BEACH AVENUE
KENNEBUNK, ME 04043

HIOS HOSPITALITY LLC
11 DOANES WHAR ROAD
KENNEBUNK, ME 04043

MCAVOY, KEITH FRANCIS &
10 DOANES WHARF ROAD
KENNEBUNK, ME 04043

KENNEBUNK SEWER DISTRICT
P.O. BOX 648
KENNEBUNK, ME 04043

MURRAY, JAMES SR, TRUST &
PO BOX 1174
KENNEBUNKPORT, ME 04046

BEACH DOGS KPT LLC
5220 CASABLANCA DRIVE
PARADISE VALLEY, AZ 85253

LAMBERTS, RICHARD J REVOC TRUST&
PO BOX 2599
KENNEBUNKPORT, ME 04046

TCLL LLC
PO BOX 2688
KENNEBUNKPORT, ME 04046

MERZ, MARTHA A
316 HALSEY ROAD
ANNAPOLIS, MD 21401

SHIPYARD, INC
8 WESTERN AVENUE
KENNEBUNK, ME 04043

FOLEY, PATRICIA A &
9 CHASE HILL ROAD
KENNEBUNK, ME 04043

GLOBEVEST CAPITAL REAL ESTATE US LP
1005 RUE LIONEL DAUMAIS BUREAU
BOUCHERVILLE, QC J4B 0B1

GGPP DEAN LLC
c/o WILK, NINA
1901 OLDE MILL FOREST DRIVE
RALEIGH, NC 27606

BR2 LLC
86 NEWBURY STREET
PORTLAND, ME 04101

PERKINS, CARLA L
P.O. BOX 796
KENNEBUNKPORT, ME 04046

HANNON, SHEILA W &
161 BIANCA ROAD
DUXBURY, MA 02332

MUTINO, PETER A &
8 APPLE TREE LANE
DARIEN, CT 06820

SINCLAIR, THOMAS J REVOC TRUST &
PO BOX 377
KENNEBUNKPORT, ME 04046

NARVAEZ, DAMIAN M &
2500 REGATTA AVENUE
MIAMI BEACH, FL 33140

BR2 LLC
86 NEWBURY STREET
PORTLAND, ME 04101

WEADOCK, FLORENCE T
256 SIMON WILLARD ROAD
CONCORD, MA 01742

SOCIETY OF FRANCISCAN FATHERS
P.O. BOX 980
KENNEBUNKPORT, ME 04046

RIVERVIEW BOATSLIPS CONDOMINIUMS
CONTROL CARD
KENNEBUNK, ME 04043

BULL, STEPHEN B &
12720 HUNTSMAN WAY
POTOMAC, MD 20854-2307

Public Notice Certification

08/08

PUBLIC NOTICE FILING AND CERTIFICATION

Department Rules, Chapter 2, require an applicant to provide public notice for all Tier 2, Tier 3 and individual Natural Resources Protect Act projects. In the notice, the applicant must describe the proposed activity and where it is located. **"Abutter"** for the purposes of the notice provision means any person who owns property that is BOTH (1) adjoining and (2) within one mile of the delineated project boundary, including owners of property directly across a public or private right of way.

1. **Newspaper:** You must publish the Notice of Intent to File in a newspaper circulated in the area where the activity is located. The notice must appear in the newspaper within 30 days prior to the filing of the application with the Department. You may use the attached Notice of Intent to File form, or one containing identical information, for newspaper publication and certified mailing.

2. **Abutting Property Owners:** You must send a copy of the Notice of Intent to File by certified mail to the owners of the property abutting the activity. Their names and addresses can be obtained from the town tax maps or local officials. They must receive notice within 30 days prior to the filing of the application with the Department.

3. **Municipal Office:** You must send a copy of the Notice of Intent to File and a **duplicate of the entire application** to the Municipal Office.

ATTACH a list of the names and addresses of the owners of abutting property.

CERTIFICATION

By signing below, the applicant or authorized agent certifies that:

5. A Notice of Intent to File was published in a newspaper circulated in the area where the project site is located within 30 days prior to filing the application;
6. A certified mailing of the Notice of Intent to File was sent to all abutters within 30 days of the filing of the application;
7. A certified mailing of the Notice of Intent to File, and a duplicate copy of the application was sent to the town office of the municipality in which the project is located; and
8. Provided notice of and held a public informational meeting, if required, in accordance with Chapter 2, Rules Concerning the Processing of Applications, Section 13, prior to filing the application. Notice of the meeting was sent by certified mail to abutters and to the town office of the municipality in which the project is located at least ten days prior to the meeting. Notice of the meeting was also published once in a newspaper circulated in the area where the project site is located at least seven days prior to the meeting.

The Public Informational Meeting was held on N/A.
Date

Approximately N/A members of the public attended the Public Informational Meeting.

Leyna L. Tobey
Signature of Applicant or authorized agent

11/22/2024
Date

Attachment 11:

Historic Sites

11.0 Historic Sites

As required by the U.S. Army Corps of Engineers (USACE), the Maine Historic Preservation Commission (MHPC) and the Tribal Historic Preservation Officers (THPO) of Maine have been notified regarding this project. Copies of these notifications are included with this section. Any responses received from the MHPC and THPO will be forwarded to the project manager assigned to this project.

Maine Historic Preservation Commission Notification

WALSH
ENGINEERING ASSOCIATES, INC.

October 25, 2024

Maine Historic Preservation Commission
Mr. Kirk F. Mohney, Director
65 State House Station
Augusta, Maine 04333-0065
MHPCprojectreview@maine.gov

VIA: Transmitted via email as noted above

RE: Yachtsman Marina Dredging – Project Review Request
57 Ocean Ave, Kennebunkport, ME 04046
Map 10, Block 1, Lot 3

On behalf of the Yachtsman Marina (Applicant), Walsh Engineering Associates, Inc. (WEA) intends to file permit applications with the Maine Department of Environmental Protection (DEP) and the U.S. Army Corps of Engineers (USACE) for maintenance dredging activities in the Kennebunk River at 57 Ocean Avenue in Kennebunkport, Maine. WEA is requesting that the Maine Historic Preservation Commission (MHPC) review the area for any known historic and/or archaeological resources. A site location map is attached for your review.

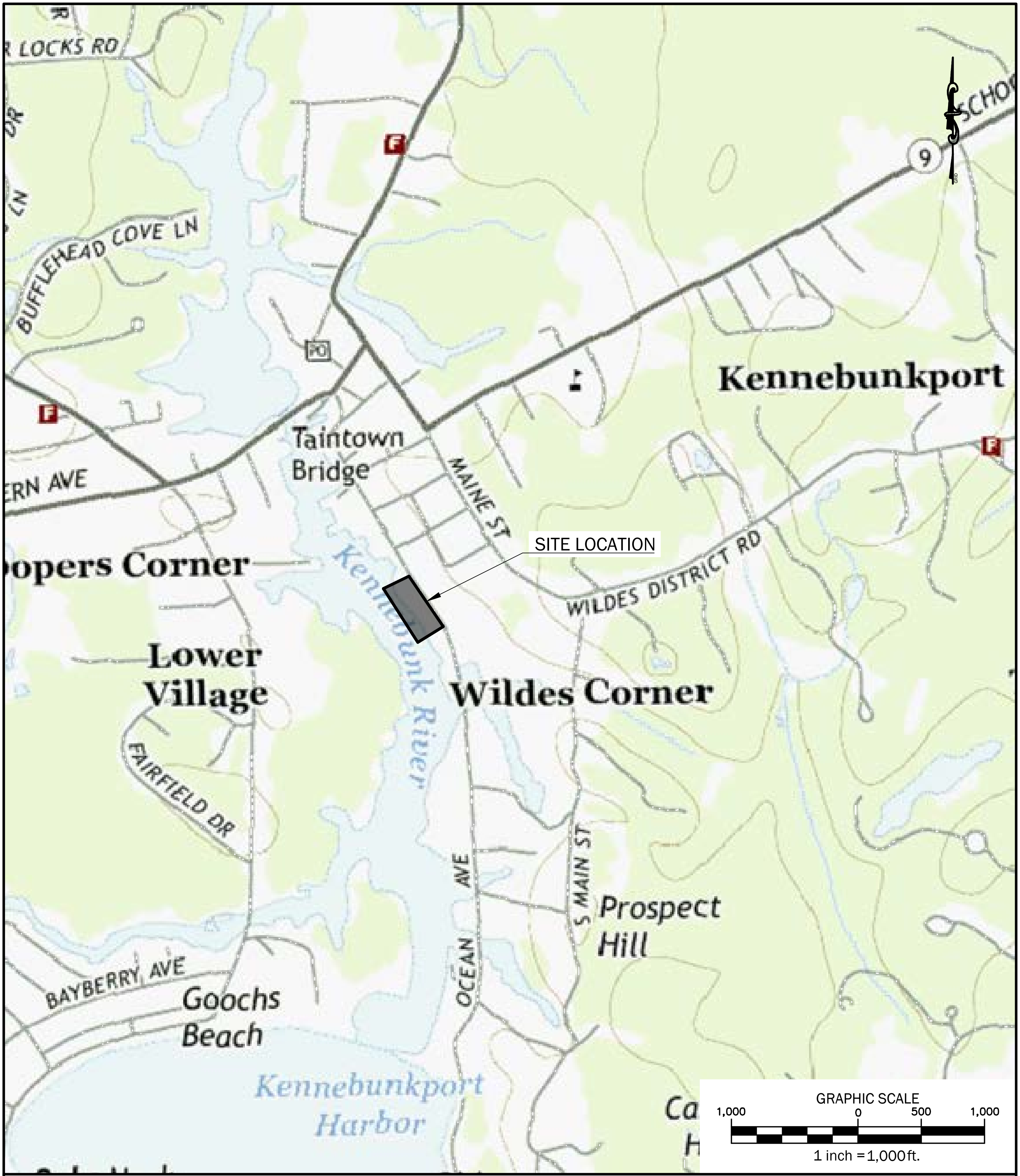
If you have any questions or concerns with this project, please feel free to contact me at (207) 553-9898 or by e-mail at leyna@walsh-eng.com. Thank you in advance for your time.

Respectfully,

Leyna L Tobey

Leyna Tobey, Project Manager
Walsh Engineering Associates, Inc.

Enc: Site Location Map



WALSH
ENGINEERING ASSOCIATES, INC.

One Karen Dr., Suite 2A | Westbrook, Maine 04092
ph: 207.553.9898 | www.walsh-eng.com

Yachtsman Marina Dredging

Yachtsman Marina
57 Ocean Avenue
Kennebunkport, Maine 04046

Sheet Title:
Site Location

Job No.:	643.5
Date:	OCTOBER 2024
Scale:	1" = 1,000'
Drawn:	LLT
Checked:	WRW

P:\782 - Arundel Yacht Club Dredging\3. CAD\782 - Base.dwg plot date: 10/24/2024 11:02 AM

Maine Historic Preservation Commission Response

WALSH
ENGINEERING ASSOCIATES, INC.

October 25, 2024

Maine Historic Preservation Commission
Mr. Kirk F. Mohney, Director
65 State House Station
Augusta, Maine 04333-0065
MHPCprojectreview@maine.gov

RECEIVED
OCT 25 2024
By 1921-24

VIA: Transmitted via email as noted above

RE: Yachtsman Marina Dredging – Project Review Request
57 Ocean Ave, Kennebunkport, ME 04046
Map 10, Block 1, Lot 3

On behalf of the Yachtsman Marina (Applicant), Walsh Engineering Associates, Inc. (WEA) intends to file permit applications with the Maine Department of Environmental Protection (DEP) and the U.S. Army Corps of Engineers (USACE) for maintenance dredging activities in the Kennebunk River at 57 Ocean Avenue in Kennebunkport, Maine. WEA is requesting that the Maine Historic Preservation Commission (MHPC) review the area for any known historic and/or archaeological resources. A site location map is attached for your review.

If you have any questions or concerns with this project, please feel free to contact me at (207) 553-9898 or by e-mail at leyna@walsh-eng.com. Thank you in advance for your time.

Respectfully,

Leyna L. Tobey

Leyna Tobey, Project Manager
Walsh Engineering Associates, Inc.

Enc: Site Location Map

Based on the information submitted, I have concluded that there will be no historic properties affected by the proposed undertaking, as defined by Section 106 of the National Historic Preservation Act. Consequently, pursuant to 36 CFR 800.4(d)(1), no further Section 106 consultation is required unless additional resources are discovered during project implementation pursuant to 36 CFR 800.13.

Kirk F. Mohney
Kirk F. Mohney,
State Historic Preservation Officer
Maine Historic Preservation Commission

11/6/24
Date

Tribal Historic Preservation Officers Notification

WALSH
ENGINEERING ASSOCIATES, INC.

October 25, 2024

Houlton Band of Maliseet Indians
Isaac St. John, THPO
88 Bell Road, Littleton, Maine 04730
istjohn@maliseets.com

Passamaquoddy Tribe of Indians
Donald Soctomah, THPO
Pleasant Point Reservation
P.O. Box 343, Perry, Maine 04667
soctomah@gmail.com

Passamaquoddy Tribe of Indians
Donald Soctomah, THPO
Indian Township Reservation
P.O. Box 301, Princeton, Maine 04668
soctomah@gmail.com

Mi'kmaq Nation
Jenny Gaenzle, THPO
7 Northern Road, Presque Isle, Maine 04769
jgaenzle@micmac-nsn.gov

Penobscot Nation
Chris Sockalexis, THPO
Cultural and Historic Preservation Dept.
12 Wabanaki Way, Indian Island, Maine 04468
chris.sockalexis@penobscotnation.org

VIA: Transmitted via email as noted above

RE: Yachtsman Marina Dredging – Project Review Request
57 Ocean Ave, Kennebunkport, ME 04046
Map 10, Block 1, Lot 3

On behalf of the Yachtsman Marina (Applicant), Walsh Engineering Associates, Inc. (WEA) intends to file permit applications with the Maine Department of Environmental Protection (DEP) and the U.S. Army Corps of Engineers (USACE) for maintenance dredging activities in the Kennebunk River at 57 Ocean Avenue in Kennebunkport, Maine. WEA is requesting that the Maine Tribal Historic Preservation Offices (THPO) review the area for any known historic and/or archaeological resources. A site location map is attached for your review.

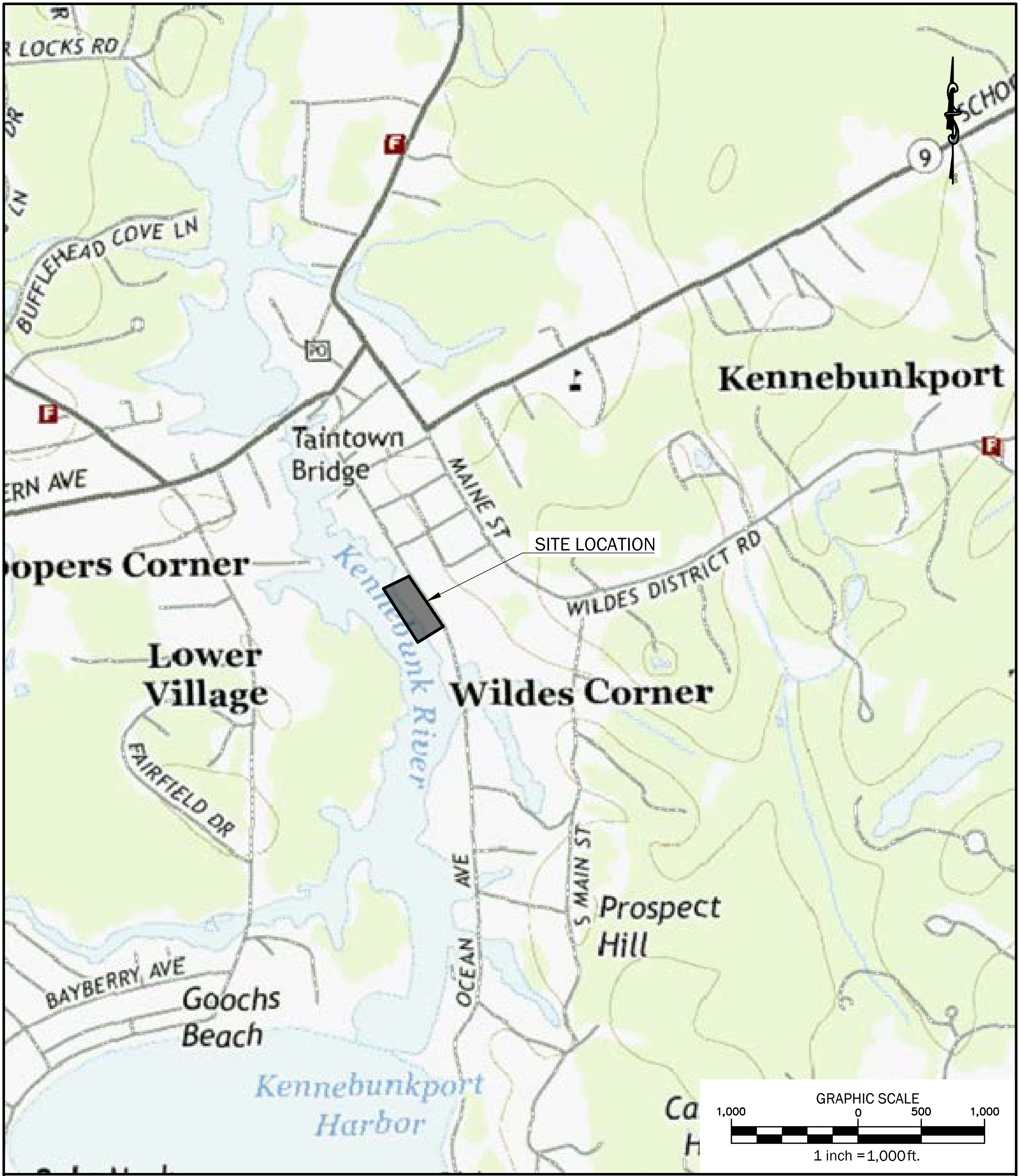
If you have any questions or concerns with this project, please feel free to contact me at (207) 553-9898 or by e-mail at leyna@walsh-eng.com. Thank you in advance for your time.

Respectfully,

Leyna L Tobey

Leyna Tobey, Project Manager
Walsh Engineering Associates, Inc.

Enc: Site Location Map



WALSH

ENGINEERING ASSOCIATES, INC.

One Karen Dr., Suite 2A | Westbrook, Maine 04092
ph: 207.553.9898 | www.walsh-eng.com

Yachtsman Marina Dredging

Yachtsman Marina
57 Ocean Avenue
Kennebunkport, Maine 04046

Sheet Title:

Site Location

Job No.:	643.5
Date:	OCTOBER 2024
Scale:	1" = 1,000'
Drawn:	LLT
Checked:	WRW

Tribal Historic Preservation Officers Responses Received to Date

Tribal Historic Preservation Office
Passamaquoddy Tribe
PO Box 159 Princeton, Me. 04668
207-214-4051

November 5, 2024

Leyna Tobey, PE*

Project Manager | Civil Engineer

Walsh

One Karen Drive, Suite 2A

Westbrook, ME 04092

- Re: Kennebunk River at 57 Ocean Avenue in Kennebunkport

Dear ***Leyna*** ;

The Passamaquoddy THPO has reviewed the following application regarding the historic properties and significant religious and cultural properties in accordance with NHPA, NEPA, AIRFA, NAGPRA, ARPA, Executive Order 13007 Indian Sacred Sites, Executive Order 13175 Consultation and Coordination with Indian Tribal Governments, and Executive Order 12898 Environmental Justice.

The Project listed above will not have an impact on cultural concerns. If any artifacts or human remains are uncovered please stop and notify this office and the State Historic Preservation Office.

Sincerely;

Donald Soctomah THPO
Soctomah@gmail.com

Attachment 12:

Functional Assessment

12.0 Functional Assessment

In accordance with the Wetlands and Waterbodies Protection Rules, Section 5.C(6)(b) Coastal Wetlands: *a coastal wetland alteration that does not cover, remove or destroy marsh vegetation, does not fill more than 500 square feet of intertidal or subtidal are, and has no adverse effect on marine resource or on wildlife habitat as determined by the DMR or IF&W as applicable* requires neither a functional assessment nor compensation.

Because this area has been frequently dredged, the project will have minimal impact on the existing natural resources, and the impact to wetland functions and values from this activity will be insignificant, this project does not require a functional assessment.

Attachment 13:

Wetland Compensation Plan

13.0 Wetland Compensation Plan

In accordance with the Wetlands and Waterbodies Protection Rules, Section 5.C(6)(b) Coastal Wetlands: *a coastal wetland alteration that does not cover, remove or destroy marsh vegetation, does not fill more than 500 square feet of intertidal or subtidal are, and has no adverse effect on marine resource or on wildlife habitat as determined by the DMR or IF&W as applicable* requires neither a functional assessment nor compensation.

The proposed activities result in minimal impact to the coastal wetland. No loss or degradation of wetland function is anticipated because of this activity. No compensation is proposed.

Attachment 14:

Sampling and Analysis Plan

14.0 Sampling and Analysis Plan

The U.S. Army Corps of Engineers (USACE) approved a Sampling and Analysis Plan (SAP) for the project on January 21, 2022, which provided proposed sediment sampling locations, methods, and testing criteria to determine disposal suitability. The sampling results were submitted to the USACE for the Yachtsman Marina and the nearby Arundel Yacht Club, Kennebunkport Marina, and Kennebunk River Club. The USACE issued a Suitability Determination for all 4 sites on June 10, 2024, which documents the suitability of the dredged material for disposal at the Isle of Shoals North (IOSN) open water disposal site.

The SAP and USACE's Suitability Determination are included as an attachment to this permit section for reference.

Sampling and Analysis Plan (SAP)

CENAE–PDE 21 January 2022

FINAL Sampling and Analysis Plan for Yachtsman Marina, Kennebunkport, ME, File Number NAE-2004-00319

1. **Project Description:** The applicant is proposing to mechanically dredge approximately 6,300 cubic yards (CY) of material from shoaled areas totaling 1.4 acres within the property's marina basin located in the town of Kennebunkport, ME (Figures 1 and 2). This area will be dredged to the proposed depth of -6 feet at mean lower low water (MLLW) plus one foot of allowable overdepth. The applicant proposes to dispose of this material at the Isles of Shoals North Disposal Site (IOSN).

This sampling and analysis plan (SAP) has been developed by the New England District (NAE) U.S. Army Corps of Engineers (USACE) to gather information to support a dredged material suitability determination for the open water disposal alternative associated with this project. This sampling and analysis effort will be divided into two phases. The first phase will include sampling and testing of dredge site sediment for grain size and bulk chemistry in order to identify contaminants of concern. The second phase will include sampling of dredge site sediment and water for elutriate and biological testing in order to evaluate the material for placement at IOSN. The results of biological testing will be evaluated against the most recent NAE dataset for the IOSN reference area. All sampling and analysis activities described in this plan shall follow the requirements set forth in the "*Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters*" (RIM) dated May 6, 2004. A copy of the RIM may be downloaded from the NAE website: http://www.nae.usace.army.mil/Missions/Regulatory/DredgedMaterialProgram/RegionalImplementationManual.aspx

2. **Conceptual Site Model:** NAE reviewed historic testing data, water quality data, spill records, and adjacent land use information to develop a conceptual site model (CSM) for the proposed project. The CSM was used to characterize the system and identify potential sources of contamination, site-specific contaminants of concern, exposure pathways, and biological receptors in order to inform this sampling and analysis plan.

Project Setting: The property is associated with the Yachtsman Hotel & Marina Club located on the eastern bank of the Kennebunk River approximately 0.3 miles north of the river's mouth in Kennebunkport, ME (Figure 1). The marina offers boat dockage to the Yachtsman Hotel's guests. The Marina is now leased to and managed by the adjacent Kennebunkport Marina located to the south. The Applicant is proposing to dredge the leased area to connect the two Marinas. Land use in the surrounding area includes a mix of residential properties and marina facilities. The adjacent Kennebunkport Marina offers boat slips and full mechanical services and repairs and has a boat ramp. The Arundel Yacht Club is approximately 500 feet north of the property. Chicks Marina, which has a fuel dock, is adjacent to the southern property boundary of the Kennebunkport Marina, approximately 800 feet south of the Yachtsman property. Downtown Kennebunkport, an area with several restaurants, retail shops, and marine services, is approximately 1,500 feet north of the property. The Kennebunkport River Federal Navigation Project (FNP) -6 foot MLLW channel is located directly adjacent to the western boundary of the project area.

Water Quality: Water Quality in the project area is dictated by tidal exchange with the Gulf of Maine with freshwater input from the Kennebunk River to the north and a series of overboard discharge pipes within the Yachtsman Marina property (Figure 3). The 2014 Environmental Assessment for dredging of the Kennebunk River FNP noted that there have been reported increases of bacterial counts in the water, attributed to faulty septic systems, agriculture, and overboard discharges. Tidal waters of the Kennebunk River are classified as SB by the Maine Department of Environmental Protection (MEDEP). Class SB waters must be of such quality that they are suitable for the designated uses of recreation in and on the water, fishing, aquaculture, propagation and harvesting of shellfish, industrial process and cooling water supply, hydroelectric power generation, navigation and as habitat for fish and other estuarine and marine life (38 M.R.S. § 465(B)(2) https://www.mainelegislature.org/legis/statutes/38/title38sec465-B.html).

Dredge History and Existing Testing Data: The project area was last dredged in 2015 when approximately 3,914 CY of material were removed to a depth of -5 feet Mean Low Water (MLW) and placed at the Cape Arundel Disposal Site (CADS). Sampling and testing of this material in 2014 documented sediments from two samples along the shoreline in the middle of the basin to be predominately fine grained (passing the No. 200 sieve) while the remaining four samples, located away from the shoreline, were predominately sand with some silt. A review of the associated chemistry data found elevated levels of pesticides (total DDX [4,4'-DDD + 4,4'-DDE + 4,4'-DDT]) and total high molecular weight polyaromatic hydrocarbons (HPAHs). A review of the associated biological testing data found sediment from the project area not likely to be acutely toxic to benthic organisms. A suitability determination from 2014 for the project area found sediments suitable for open water disposal at CADS. A residual dredging event of 100 CY was authorized by USACE in 2020 and the material was placed upland.

Spill Data: Based on information provided by the applicant and a review of the Maine Department of Environmental Protection (MEDEP) Oil and Hazardous Waste Spill Database (https://www.maine.gov/dep/spills/index.html), NAE determined that there have been several small diesel, gasoline, and oil spills within the surrounding area of the project site since the area was last dredged.
Risk Ranking: Following the tier one review of the site characteristics, location,

and the available historical data, the proposed project was given a **low-moderate** risk ranking according to the following matrix.

Table 1: Project Risk Ranking

Rank	Guidelines
Low	Few or no sources of contamination. Data available to verify no significant potential for adverse biological effects.
Low-Moderate	Few or no sources of contamination but existing data is insufficient to confirm ranking.
Moderate	Contamination sources exist within the vicinity of the project with the potential to produce chemical concentrations that may cause adverse biological effects.
High	Known sources of contamination within the project area and historical data exists that has previously failed biological testing.

3. **Sample Collection:** In the first phase of testing the applicant shall collect sediment cores from five locations within the proposed dredge areas as specified in Table 2 (also see Figure 3). These locations were selected based on information from the CSM described above, the low to moderate risk ranking for the project, and shoaled areas identified in the project conditions survey submitted by the applicant. All core samples shall be collected to the proposed dredge depth plus overdredge amount using inert core liners. Estimated core lengths based on the bathymetry provided by the applicant are provided in Table 2, but the actual required core lengths shall be determined at the time of the sampling effort using measured water depths at each location corrected to MLLW. In order to ensure that the core samples adequately represent the dredge interval at each location, all cores to be used for this project shall have a recovered length that is within 75% of the core penetration depth. In addition, any cores that display significant disturbance such as compaction or wash out shall be disregarded. If the cores from any location do not meet the acceptability criteria after six attempts, then the applicant should retain the best core from that location and contact NAE for further guidance. The penetration and recovery for the core used for the chemistry and grain size samples should be recorded on the sample log.

Upon collection, all cores shall be measured and maintained in an upright position for a minimum of 15 minutes to allow any fine-grained material to settle. After a core has settled, it shall be re-measured before any overlying water is drained, taking care to not include overlying water with sediment flocculant in the measurement. All cores shall be split lengthwise, photographed with a stadia rod for scale, and described in accordance with ASTM D 2488 (Standard Practice for Description and Identification of Soils). Samples shall be collected from the dredge interval (dredge depth + overdepth) within each core for grain size and bulk chemical analysis as described in the sections below. If the dredge interval within a core is homogenous then the entire length may be composited as a single sample with the chemistry/grain size sample interval noted on the sampling log. If any core shows significant stratification or obvious signs of contamination, then subsamples shall be collected from each layer and noted on the sampling log and the applicant shall consult NAE for guidance prior to the start of analysis. The term "significant stratification" includes any distinct change in sediment composition that could represent a change in depositional history or waterway usage such as a change in color or lithology. Compositing of dissimilar sediment layers without prior approval from NAE will result in the rejection of any resulting data products.

All sediments held for testing shall be stored in accordance with the requirements in Table 3 (from Table 8-9 in *Evaluation of Dredged Material Proposed for Ocean Disposal, Testing Manual, 1991).* Sample chain of custody forms shall be maintained by the applicant and submitted to NAE with the data package described in section 5 of this SAP.

Based on the results of the grain size and bulk chemistry sediment testing, NAE will provide the applicant with a biological testing compositing plan. In the second phase of testing, dredge area sediment shall be collected from the same sample locations described in Table 2 and composited according to NAE's biological testing compositing plan. Sufficient amounts of sediment and water shall be collected for elutriate preparation and analysis, water column toxicity testing, 10-day whole sediment toxicity testing, and 28-day bioaccumulation testing according to the sections below. Sediment cores from each station shall be collected using inert core liners and may be transferred directly into food grade polyethylene pails after core recovery has been measured. In addition, the applicant shall collect dredge site water from a central location within the proposed project area. All water samples shall be collected from the middle of the water column using either a non-contaminating pump or a discrete water sampler.

Please note that the applicant is not required to collect sediment or water samples from the IOSN reference site as the results of the biological testing will be compared to recent reference site data collected by NAE.

Again, all sediment and water samples held for testing shall be stored in accordance with the requirements in Table 3 (from Table 8-2 in Evaluation of Dredged Material Proposed for Ocean Disposal, Testing Manual, 1991). Sample chain of custody forms shall be maintained by the applicant and submitted to NAE with the data package described in section 5 of this SAP.

Vessel positioning shall be achieved using a Global Positioning System (GPS) that has been calibrated on site using a known reference point. The required horizontal accuracy at each sample location shall be 10 feet or less. All coordinate data shall be reported in geographic NAD 83 decimal degree format. All depth data shall be reported in tenths of feet. Water depths at each location are to be determined with an accuracy of ±0.1 feet (relative to MLLW). All depth data shall be reported in tenths of feet.

For phase one sampling, sample data including date, time, latitude, longitude, GPS accuracy at each sample station, measured water depth, tidal correction, core penetration, recovery, and chemistry sample intervals(s) shall be recorded in a sampling log (Figure 4 or equivalent) and provided to NAE with the applicant's core descriptions and photographs.

For phase two sampling, all sample data including date, time, latitude, longitude, GPS accuracy at each sample station, measured water depth, tidal correction, number of cores collected at each station, core lengths, and a general description of the sediment shall be recorded in a sampling log and provided to NAE. Note that if any of the phase two cores are significantly different from the material that was sampled during phase one, a representative core should be photographed and described and NAE should be consulted for guidance.

4. **Sample Analysis:** Sediment and water samples from the dredge area shall undergo physical, chemical, and biological analysis as described in the sections below. All laboratories used for this project shall have an approved Laboratory Quality Assurance Plan (LQAP) on file with NAE. Any data produced by a lab without an approved LQAP will not be accepted. The RIM, a list of laboratories with approved LQAPs, and the reporting format and requirements for electronic submission of data are available for download through the NAE website: http://www.nae.usace.army.mil/Missions/Regulatory/Dredged-Material-Program/.

Grain Size and Bulk Sediment Chemistry: All samples from the proposed dredge footprint shall be individually analyzed for grain size and bulk sediment chemistry. Testing parameters, analytical methods, and reporting limits to be used are outlined in Table 4. The listed analytical methods are recommended but can be replaced by other methods that will provide the required reporting limits. Additional guidance on the physical and chemical analysis of sediments can be found in chapter 5 of the RIM. NAE will provide the applicant with a compositing plan for biological testing based on sample proximity, physical characteristics recorded during the core description process, and the results of grain size and bulk chemistry analysis.

Elutriate Chemistry: Elutriate samples shall be prepared from the dredge area water and sediments according to the project compositing plan. The elutriate samples and clean seawater (provided by the applicant's testing facility) used for dilutions in the suspended phase particulate bioassays shall undergo chemical analysis according to the testing parameters, analytical methods, and reporting limits outlined in Table 5. The listed analytical methods are recommended but can be replaced by other methods that will give the required reporting limits.

Additional guidance can be found in Section 6.1 of the RIM and Section 9.4 of the Green Book.

Water Column Toxicity Testing: Suspended phase particulate bioassays shall be performed on each composite sample in accordance with the requirements specified in Section 6.2 of the RIM, and Section 11.1 of the Green Book. Refer to the RIM for guidance in selecting the test species. Clean seawater provided by the applicant's testing facility shall be used as both control and dilution water.

Please note that excessive ammonia concentrations in the elutriate samples may cause a toxic response that is not of interest to the SPP bioassay, which focuses on persistent contaminants. To account for this scenario, the US Environmental Protection Agency (EPA) and NAE have devised a protocol to determine if ammonia is the driver of toxicity in situations where unionized ammonia is present at concentrations above the applicable water quality criteria (WQC). In order to facilitate this protocol, the applicant may choose to have their laboratory measure total ammonia in the undiluted elutriate samples prior to SPP bioassay initiation and calculate the unionized ammonia concentrations based on measurements of pH, temperature, and salinity. If the calculated unionized ammonia concentrations are greater than the applicable WQC, the testing facility should immediately notify the applicant and seek guidance from NAE on project-specific procedures for preparation of additional elutriate samples requiring treatment for ammonia reduction and the need for additional SPP testing. This protocol is not a requirement, but NAE recommends it to prevent a 'false positive' toxicity result that would limit the applicant's disposal alternatives.

10-Day Whole Sediment Toxicity Testing: 10-day whole sediment toxicity testing shall be performed on each composite sample in accordance with the requirements specified in Chapter 7.1 of the RIM, Section 11.2 of the Green Book, and Methods for Assessing the Toxicity of Sediment-Associated Contaminants with Estuarine and Marine Amphipods, 1994. The bioassay test shall use two species of test animals, the amphipod *Leptocheirus plumulosus* and the mysid shrimp *Americamysis bahia*. If alternate species are selected from the RIM then contact NAE prior to sampling to coordinate necessary reference data collection.

28-Day Bioaccumulation Testing: 28-day bioaccumulation testing shall be performed on each composite sample in accordance with the requirements specified in Chapter 7.2 of the RIM and Section 12.1 of the Green Book. The bioaccumulation test shall use a bivalve, Macoma nasuta, and the polychaete Nereis virens as test animals. If alternate species are selected from the RIM then contact NAE prior to sampling to coordinate necessary reference data collection. At the end of the 28–day test, the tissues of the survivors shall be tested for the project contaminants of concern according to Tables 8 and 9 of the RIM. The contaminants of concern will be determined from the bulk sediment chemistry testing described above.

5. **Reporting requirements:** All sediment testing data is required to be submitted electronically in the electronic data deliverable (EDD) format available on the NAE website (http://www.nae.usace.army.mil/Missions/Disposal-Area-Monitoring-System-DAMOS/Electronic-Data-Deliverables.aspx). Hard copy data submission is also required but may be substituted with a printer friendly, easy-to-read format (e.g., PDF, MS Word). Any analytes not detected shall be reported as half the method detection limit (MDL) and qualified with a "U". RIM quality control summary tables are required to be submitted with each project dataset. These tables are found in Appendix II of the RIM.

6. **Contact Information:** Questions about this plan should be directed to Gabriella Saloio (phone: 978-318-8138 e-mail: Gabriella.J.Saloio@usace.army.mil)

Gabriella Saloio

Gabriella Saloio
Biologist
New England District
U.S. Army Corps of Engineers

Table 2: Yachtsman Marina Sample Locations

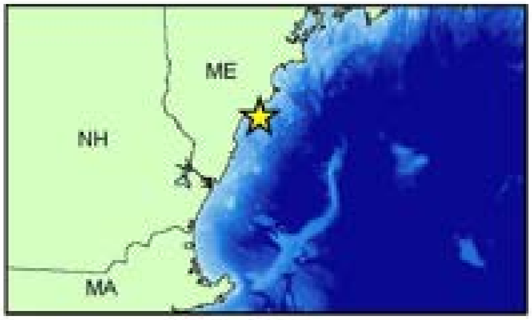
Station	Latitude (NAD 83)	Longitude (NAD 83)	Survey Depth (Feet MLLW)	Project Depth (Feet MLLW)	Overdepth (Feet)	Estimated Core length (Feet)
Y-1	-70.475778	43.357352	-1.2	-6.0	1.0	5.8
Y-2	-70.475316	43.357253	-0.8	-6.0	1.0	6.2
Y-3	-70.474885	43.357021	-4.1	-6.0	1.0	2.9
Y-4	-70.474671	43.356732	-4.3	-6.0	1.0	2.7
Y-5	-70.474369	43.356289	-1.0	-6.0	1.0	6.0

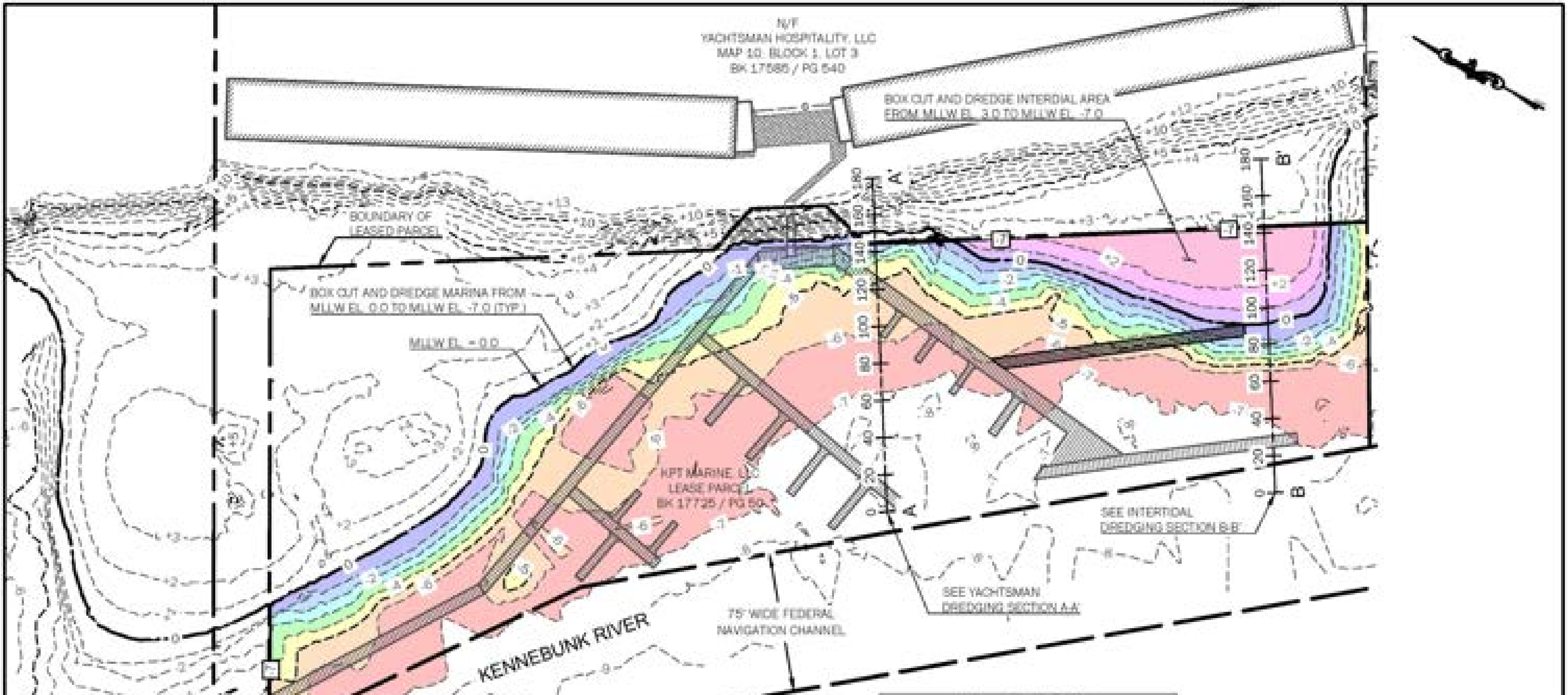
US Army Corps
of Engineers
New England District

FIGURE 1
YACHTSMAN MARINA
KENNEBUNKPORT, ME

2015 NAIP AERIAL IMAGERY

GCS NAD 1983





Yachtsman Marina Dredging			
Elevation	Area (sf)	Incremental Volume (cy)	Cumulative Volume (cy)
3 to 2	3,139	58	58
2 to 1	4,987	150	209
1 to 0	6,383	211	419
0 to -1	11,064	323	742
-1 to -2	13,955	463	1,206
-2 to -3	17,176	577	1,782
-3 to -4	20,926	706	2,488
-4 to -5	25,701	863	3,351
-5 to -6	37,075	1,163	4,514
-6 to -7	59,304	1,783	6,297

**FIGURE 2:
APPLICANT DREDGE
PLAN**

GRAPHIC SCALE
80 0 40 80
1 inch = 80 ft.

PLAN REFERENCES

1. BATHYMETRY CONDUCTED BY WEA ON OCTOBER 27, 2020 USING HYDROLITE SONARMITE ECHOSOUNDER AND CARLSON BRx6 GNSS RECEIVER
2. A PLAN TITLED "BOUNDARY SURVEY AT YACHTSMAN LODGE & MARINA" PREPARED BY OWEN HASKELL, INC. OF 390 U.S. ROUTE ONE, UNIT 10, FALMOUTH, MAINE 04105, DATED APRIL 26, 2018.
3. A PLAN TITLED "SITE PLAN SHOWING THE PROPERTY OF THE KENNEBUNKPORT MARINA" PREPARED BY WILLIAM PIERCE OF 6 WATERHOUSE ROAD, DAYTON, MAINE 04005, DATED NOVEMBER 1, 1996
4. A PLAN TITLED " KENNEBUNK RIVER KENNEBUNK AND KENNEBUNKPORT MAINE AFTER DREDGE SURVEY" PREPARED BY U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DISTRICT DATED MARCH 9, 2020
5. ALL ELEVATIONS ON THIS PLAN ARE BASED ON MLLW. THE MLLW TO NAVD88 CORRECTIONS FOR THIS PROJECT IS 5.09 FEET
6. A PLAN TITLED "DOCK PLAN" PREPARED BY REILLY STUDIOS OF 959 ISLINGTON STREET, PORTSMOUTH, NEW HAMPSHIRE 03801, DATED MARCH 4, 2008

WALSH
ENGINEERING ASSOCIATES, INC.

One Karen Dr., Suite 2A | Westbrook, Maine 04092
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Yachtsman Marina Dredging

Kennebunkport Marina
59 Ocean Ave
Kennebunkport, Maine 04046

Sheet Title:
Plan View

Job No.:	643.1
Date:	May 2021
Scale:	1" = 20'
Drawn:	CAR
Checked:	WRW

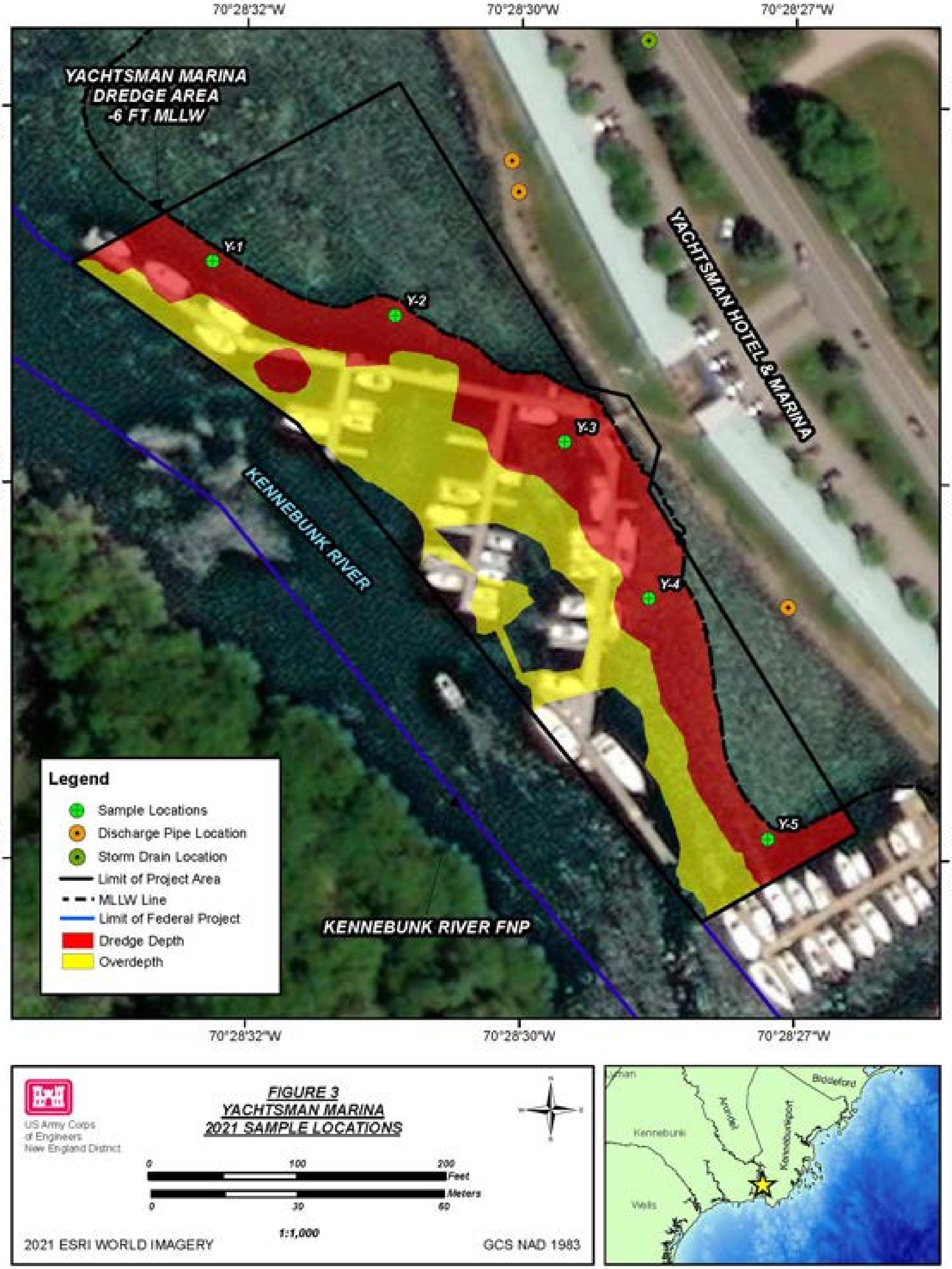


FIGURE 3
YACHTSMAN MARINA
2021 SAMPLE LOCATIONS

TABLE 3: RECOMMENDED PROCEDURES FOR SAMPLE COLLECTION, PRESERVATION, AND STORAGE

Analyses	Collection Method	Sample Volume	Container	Preservation Technique	Storage Conditions	Holding Time[b]
Sediment						
Chemical/Physical Analyses						
Metals	Grab/corer	200 mL	Precleaned polyethylene jar[c]	Refrigerate. Dry ice[b] or freezer storage is recommended for extended holding times.	≤ 4° C[c]	Hg - 28 days Others - 6 Months[d]
Organic Compounds	Grab/corer	475 mL	Solvent-rinsed glass jar with Teflon lid[c]	Refrigerate. Dry ice[b] or freezer storage is recommended for extended holding times.	≤ 4° C/dark[d]	14 days[e]
Particle Size	Grab/corer	75 mL	Whirl-pac bag[b]	Refrigerate	≤ 4° C	Undetermined
Total Organic Carbon	Grab/corer	3 L	Heat treated glass vial with Teflon lined lid[c]	Refrigerate. Dry ice[c] or freezer storage is recommended for extended holding times.	≤ 4° C[c]	14 days
Sediment from Which Elutriate is Prepared	Grab/corer	Dependent on tests performed	Glass with Teflon lined lid	Completely fill and Refrigerate	≤ 4° C/dark/airtight	Undetermined
Biological Tests						
Dredged Material	Grab/corer	12-15 L per sample	Plastic bag or container[e]	Completely fill and Refrigerate; sieve	≤ 4° C/dark/airtight	14 days[i ƒ]
Reference Sediment	Grab/corer	45-50 L per test	Plastic bag or container[e]	Completely fill and Refrigerate; sieve	≤ 4° C/dark/airtight	14 days[i ƒ]
Control Sediment	Grab/corer	21-25 L per test	Plastic bag or container[e]	Completely fill and Refrigerate; sieve	≤ 4° C/dark/airtight	14 days[i ƒ]
Water and Elutriate						
Chemical/Physical Analyses						
Metals		Discrete sampler or pump	1 L	Acid-rinsed polyethylene or glass jar	pH <2 with HNO_3[d]	4° C ± 2° C[d]

TABLE 3: RECOMMENDED PROCEDURES FOR SAMPLE COLLECTION, PRESERVATION, AND STORAGE (CONTINUED)

Organics	Discrete sampler or pump	4 L	Amber glass bottle[d]	Airtight seal; refrigerate	4° C ± 2° C[d]	5 days[d]
Tissue						
Metals	Trawl/ Teflon coated grab	30 g	Double Ziploc[c]	Handle with non-metallic forceps; plastic gloves; dry ice[c]	≤ -20° C[C]	Hg - 14 days Others - 6 months[i]
PCBs and Chlorinated Pesticides	Trawl/ Teflon coated grab	100 g	Hexane-rinsed double aluminum foil and double Ziploc[c]	Handle with hexane-rinsed stainless steel forceps; dry ice[c]	≤ -20° C[C]	10 days[i] [e]
Volatile Organic Compounds	Trawl/ Teflon coated grab	50 g	Heat cleaned aluminum foil and watertight plastic bag[i]	Covered ice chest[d]	≤ -20° C[i]	10 days[i] [e]
PAHs	Trawl/ Teflon coated grab	50 g	Hexane-rinsed double aluminum foil and double Ziploc[c]	Handle with hexane-rinsed stainless steel forceps; dry ice[c]	≤ -20° C[i]	10 days[i] [e]
Lipids	Trawl/ Teflon coated grab	50 g	Hexane-rinsed aluminum foil	Handle with hexane-rinsed stainless steel forceps; quick freeze	20° C	Undetermined

[a] *This table contains only a summary of collection, preservation, and storage procedures for samples. The cited references should be consulted for a more detailed description of these procedures.*

[b] *These holding times are for sediment, water, and tissue based on guidance that is sometimes administrative rather than technical in nature. There are no promulgated, scientifically based holding time criteria for sediments, tissues, or elutriates. References should be consulted if holding times for sample extracts are desired. Holding times are from the time of sample collection.*

[c] *NOAA (1989).*

[d] *Tetra Tech (1986a)*

[e] *Sample may be held for up to one year if maintained ≤ -20° C*

[f] *Two weeks is recommended; sediments must not be held for longer than 8 weeks prior to biological testing.*

[g] *NOAA (1989).*

[h] *Plumb (1981).*

[i] *Tetra Tech (1986b)*

TABLE 4: BULK SEDIMENT TESTING PARAMETERS

Parameter	Analytical Method	Reporting Limit (ppm)
Metals		
Arsenic	6010B, 6020, 7060, 7061	0.4
Cadmium	6010B, 6020, 7130, 7131	0.07
Chromium	6010B, 6020, 7190, 7191	0.5
Copper	6010B, 6020, 7210	0.5
Lead	6010B, 6020, 7420, 7421	0.5
Mercury	7471	0.02
Nickel	6010B, 6020, 7520	0.5
Zinc	6010B, 6020, 7950	1.0
PCBs (total by NOAA summation of congeners)		
See next page	8082A	0.001
Pesticides	NOAA (1993), 8081B	0.001
Aldrin	Heptachlor epoxide	
cis- & trans-Chlordane	Hexachlorobenzene	
4,4'-DDT, DDD, DDE	Lindane	
Dieldrin	Methoxychlor	
α & β Endosulfan	cis- & trans-Nonachlor	
Endrin	Oxychlordane	
Heptachlor	Toxaphene	0.025
Polycyclic Aromatic Hydrocarbons (PAHs)	8270C-SIM	0.01
Acenaphthene	Chrysene	
Acenaphthylene	Dibenzo(a,h)anthracene	
Anthracene	Fluoranthene	
Benzo(a)anthracene	Fluorene	
Benzo(a)pyrene	Indeno(1, 2, 3-cd)pyrene	
Benzo(b)fluoranthene	Naphthalene	
Benzo(k)fluoranthene	Phenanthrene	
Benzo(g, h, i)perylene	Pyrene	
Total Organic Carbon	Plumb (1981), APHA (1995)	0.1%
Percent Moisture	Plumb (1981), EPA (1992), PSEP (1986)	1.0%
Grain Size	Wet Sieve (#4, 10, 40, 200)	

TABLE 4: BULK SEDIMENT TESTING PARAMETERS (CONTINUED)

PCB CONGENERS

Analytical Method: NOAA (1993), 8082A

Reporting Limit: 1 ppb

Congeners:

8*	2,4’ diCB
18*	2,2’,5 triCB
28*	2,4,4’ triCB
44*	2,2’,3,5’ tetraCB
49	2,2’,4’,5 tetraCB
52*	2,2’,5,5’ tetraCB
66*	2,3’,4,4’ tetraCB
87	2,2’,3,4,5’ pentaCB
101*	2,2’,4,5,5’ pentaCB
105*	2,3,3’,4,4’ pentaCB
118*	2,3’,4,4’,5 pentaCB
128*	2,3,3’,4,4’ hexaCB
138*	2,2’,3,4,4’,5’ hexaCB
153*	2,2’,4,4’,5,5’ hexaCB
170*	2,2’,3,3’,4,4’,5 heptaCB
180*	2,2’,3,4,4’,5,5’ heptaCB
183	2,2’,3,4,4’,5’,6 heptaCB
184	2,2’,3,4,4’,6,6’ heptaCB
187*	2,2’,3,4’,5,5’,6 heptaCB
195*	2,2’,3,3’,4,4’,5,6 octaCB
206*	2,2’,3,3’,4,4’,5,5’,6 nonaCB
209*	2,2’,3,3’,4,4’,5,5’,6,6’ decaCB

* denotes a congener to be used in estimating Total PCB. To calculate Total PCB, sum the concentrations of all eighteen congeners marked with a “*” and multiply by 2.

The specified methods are recommendations only. Other acceptable methodologies capable of meeting the Reporting Limits can be used. Sample preparation methodologies (e.g. extraction and cleanup) and sample size may need to be modified to achieve the required Reporting Limits.

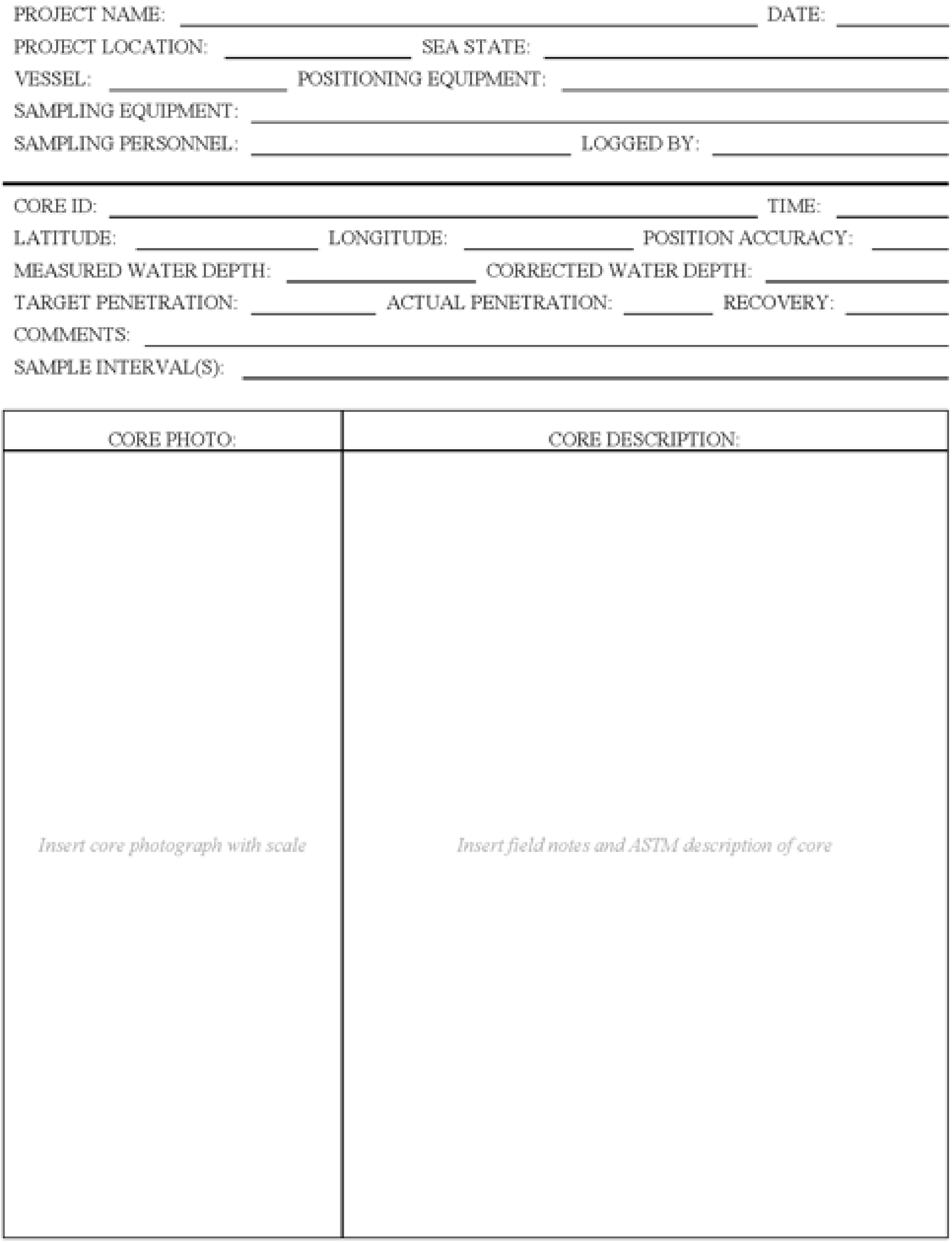
TABLE 5: ELUTRIATE TESTING PARAMETERS

Parameter	Recommended Analytical Method	Reporting Limit (μg/L)
Metals		
Arsenic	200.9, 1632	1.0
Cadmium	200.9, 1637	1.0
Chromium (VI)	218.6, 1636	1.0
Copper	200.9, 1639, 1640	0.6
Lead	200.9, 1639, 1640	1.0
Mercury	245.7, 1631	0.4
Nickel	200.9, 1639, 1640	1.0
Selenium	200.9, 1639	1.0
Silver	200.9	0.5
Zinc	200.9, 1639	1.0
PCBs (total, by either of these methods)		
	3510B, 8080A, NYSDEC	0.006
Pentachlorophenol	3501B, 8270C	2.60
Pesticides	3510B, 8080A	
Aldrin		0.26
Chlordane		0.02
Chloropyrifos		0.002
Dieldrin		0.14
4, 4'-DDT		0.03
α & β Endosulfan		0.007
Endrin		0.007
Heptachlor		0.01
Heptachlor epoxide		0.01
Lindane		0.26
Toxaphene		0.04

Reference:

NYSDEC. 1991. Analytical Method for the Determination of PCB Congeners by Fused Silica Capillary Column Gas Chromatography with Electron Capture Detector. NYSDEC #91-11.

FIGURE 4: EXAMPLE CORE LOG DATA SHEET



PROJECT NAME: ______________________ DATE: __________

PROJECT LOCATION: __________ SEA STATE: __________

VESSEL: __________ POSITIONING EQUIPMENT: __________

SAMPLING EQUIPMENT: ______________________

SAMPLING PERSONNEL: __________ LOGGED BY: __________

CORE ID: ______________________ TIME: __________

LATITUDE: __________ LONGITUDE: __________ POSITION ACCURACY: ______

MEASURED WATER DEPTH: __________ CORRECTED WATER DEPTH: __________

TARGET PENETRATION: ______ ACTUAL PENETRATION: ______ RECOVERY: ______

COMMENTS: ______________________

SAMPLE INTERVAL(S): ______________________

CORE PHOTO:	CORE DESCRIPTION:
Insert core photograph with scale	*Insert field notes and ASTM description of core*

USACE's Suitability Determination for Isle of Shoals North

CENAE-PDE **10 June 2024**

FINAL Suitability Determination for Maintenance Dredging of the Kennebunk River Projects, Kennebunkport, Maine

Summary:

This determination addresses the suitability of shoaled sediments within four project areas along the Kennebunk River, in Kennebunkport, Maine (ME): Arundel Yacht Club (AYC), Yachtsman Marina, Kennebunkport Marina, and Kennebunk River Club (KBRC) for unconfined open water disposal at the Isle of Shoals North Disposal Site (IOSN) (Figure 1). The New England District (NAE) of the US Army Corps of Engineers (USACE) finds that sufficient data have been provided to satisfy the evaluation and testing requirements of Section 103 of the Marine Protection Research and Sanctuaries Act (MPRSA). Based on an evaluation of the project sites and the material proposed to be dredged, NAE finds these sediments suitable for unconfined open water disposal at IOSN as proposed.

1. Project Description:

The applicants are proposing to mechanically dredge shoaled areas from four project areas along the Kennebunk River in Kennebunkport, ME.

- The Arundel Yacht Club is proposing to dredge approximately 8,031 cubic yards (cy) from shoaled areas totaling just over 1 acre within the property's marina basin (Figures 1, 2, and 6).
- The Yachtsman Marina is proposing to dredge approximately 6,400 cy of shoaled material from areas totaling 1.4 acres within the property's marina basin (Figures 1, 3, and 7).
- The Kennebunkport Marina is proposing to dredge approximately 3,675 cy of shoaled material from 0.8 acres within the property's marina basin (Figures 1, 4, and 8).
- The Kennebunk River Club is proposing to dredge a total of approximately 8,935 cy of shoaled material: 3,026 cy of material will be removed from the 0.4 acre north marina basin, and 5,909 cy will be removed from the 0.8 acre south marina basin (Figures 1, 5, and 9).

All areas will be dredged to the authorized project depth of -6 feet at mean lower low water (MLLW) plus 1 foot of allowable overdepth. The applicant requested that disposal of the proposed dredge material be evaluated for IOSN as a potential alternative for this project.

Table 1: Project Area Summary

Project Area	File Number	Project Depth (ft MLLW) plus 1 ft OD	Dredge Volume (cy)	Acreage
Arundel Yacht Club	NAE-2022-00288	-6.0	8,031	1.0
Yachtsman Marina	NAE-2004-00319	-6.0	6,400	1.4
Kennebunkport Marina	NAE-2005-00280	-6.0	3,675	0.8
Kennebunk River Club – North Marina Basin	NAE-2007-2704	-6.0	3,026	0.4
Kennebunk River Club – South Marina Basin		-6.0	5,909	0.8

2. Conceptual Site Model:

USACE reviewed historic testing data, previous environmental assessments, water quality data, and adjacent land use information to develop a conceptual site model (CSM) for the Kennebunk River projects (Figure 10). NAE used this CSM to characterize the system and to identify potential sources of contamination, site-specific contaminants of concern, exposure pathways, and biological receptors to inform this suitability determination.

Project Setting: All four projects are located along the eastern shoreline of the Kennebunk River in Kennebunkport, ME. The Arundel Yacht Club is located farthest upriver (approximately 0.8 miles from the river's mouth), the Yachtsman Marina and Kennebunkport Marina are adjacent to each other just to the south of Arundel Yacht Club, and the Kennebunk River Club is located farther down river, about 0.25 miles from the mouth of the river (Figure 1).

The Arundel Yacht Club building was constructed in 1806 and served as a rope making facility until 1816. Sanborn maps from 1911 show that the property was used as a boat house, carriage house, and wagon shed prior to the establishment of the yacht club in 1957. The yacht club provides dockage for up to fifty recreational boats and has a launch for small sailboats. There are no repair or fuel facilities on the property. The Yachtsman Marina offers boat dockage to the Yachtsman Hotel guests. The Marina is now leased to and managed by the adjacent Kennebunkport Marina, located directly to the south. The applicant is proposing to dredge the leased area to connect the two marinas. The Kennebunkport Marina is a year-round facility offering slips, full mechanical services, a ship store, engine sales, power boat and canoe rentals, as well as a boat ramp. The Kennebunk River Club provides seasonal dockage for recreational vessels, as well as shoreside facilities for social and recreational functions.

Land use in the surrounding area is largely a mix of residential property, many with private docks, and other marina facilities. Chicks Marina, which has a fuel dock, is adjacent to Kennebunkport Marina. Downtown Kennebunkport, which has several restaurants, retail shops, and marine services, is approximately 1,000 feet north of Arundel Yacht Club. The Kennebunkport River Federal Navigation Project (FNP) -6 foot MLLW channel is located directly adjacent to the western boundary of the project areas.

Water Quality: Water Quality in the project area is dictated by tidal exchange with the Gulf of Maine with freshwater input from the Kennebunk River to the north and a series of stormwater discharge pipes within the marina properties along the river (Figures 6-9). Tidal waters of the Kennebunk River are classified as SB by the Maine Department of Environmental Protection (MEDEP). Class SB waters must be of such quality that they are suitable for the designated uses of recreation in and on the water, fishing, aquaculture, propagation and harvesting of shellfish, industrial process and cooling water supply, hydroelectric power generation, navigation and as habitat for fish and other estuarine and marine life (38 M.R.S. § 465(B)(2) https://www.mainelegislature.org/legis/statutes/38/title38sec465-B.html).

Dredge History and Existing Testing Data: The Arundel Yacht Club was last dredged in 2017 when approximately 1,800 cy of material were removed to a depth of -6 feet at Mean Low Water (MLW) and placed at the Cape Arundel Disposal Site (CADS). Sampling and testing of this material in 2003 documented sediments to be predominately fine grained. A review of the associated chemistry data found cadmium, copper, and mercury detected at concentrations with the potential to cause toxicity based on current sediment screening guidelines. Based on the results of elutriate, toxicity, and bioaccumulation studies, NAE found the material from the Arundel Yacht Club suitable for placement at CADS in a 2015 suitability determination.

The Yachtsman Marina was last dredged in 2015 when approximately 3,914 cy of material were removed to a depth of -5 feet MLW and placed at CADS. Sampling and testing of this material in 2014 documented sediments from two samples along the shoreline in the middle of the basin to be predominately fine grained while the remaining four samples, located away from the shoreline, were predominately sand with some silt. A review of the associated chemistry data found levels of total DDX (sum of 4,4'-DDD + 4,4'-DDE +4,4'-DDT) and total high molecular weight polyaromatic hydrocarbons (HPAHs) detected at concentrations with the potential to cause toxicity based on current sediment screening guidelines. Based on the results of elutriate, toxicity, and bioaccumulation studies, NAE found the material from the Yachtsman Marina suitable for placement at CADS in a 2014 suitability determination. In addition, a residual dredging event of 100 cy was authorized by USACE in 2020 and this material was placed upland.

The Kennebunkport Marina was last dredged in 2015 when approximately 1,500 cy of material were removed to a depth of -5 feet MLW and placed at CADS. Sampling and testing of this material in 2014 documented predominately fine grained sediments with little sand. A review of the associated chemistry data found total DDX and total HPAHs detected at concentrations with the potential to cause toxicity based on current sediment screening guidelines. Based on the results of elutriate, toxicity, and bioaccumulation studies, NAE found the material from the Kennebunkport Marina suitable for placement at CADS in a 2014 suitability determination.

The Kennebunk River Club was last dredged in 2009 when 7,609 cy of fine grained material were mechanically removed and placed at CADS. A review of the associated chemistry data found cadmium, total HPAHs, total DDX, and total chlordane detected at concentrations with the potential to cause toxicity based on current sediment screening guidelines. Based on the results of elutriate, toxicity, and bioaccumulation studies, NAE found the material from the Kennebunk River Club suitable for placement at CADS in a 2009 suitability determination.

Spill Data: Based on information provided by the applicant and a review of the MEDEP Oil and Hazardous Waste Spill Database (https://www.maine.gov/dep/spills/index.html) and the U.S. Coast Guard’s National Response Center website, NAE determined that there have been several small sheens, diesel, gasoline, and oil spills within the vicinity of the project sites since 2009.

Disposal Site: IOSN is located approximately 23 miles south of the project locations. IOSN is regularly monitored by the NAE Disposal Area Monitoring System (DAMOS) Program. The most recent DAMOS report on IOSN was based on a 2022 survey of the site (USACE, 2023).

Risk Ranking: Based on the site characteristics and the available testing data outlined above, all four projects were given a **low-moderate** risk ranking according to the following matrix in Table 2.

Table 2: Project Risk Ranking

Rank	Guidelines
Low	Few or no sources of contamination. Data available to verify no significant potential for adverse biological effects.
Low-Moderate	Few or no sources of contamination but existing data is insufficient to confirm ranking.
Moderate	Contamination sources exist within the vicinity of the project with the potential to produce chemical concentrations that may cause adverse biological effects.
High	Known sources of contamination within the project area and historical data exists that has previously failed biological testing.

3. Sampling, Testing, and Analysis:

NAE prepared sampling and analysis plans (SAPs) in January of 2022 for the Kennebunkport (three samples) and Yachtsman Marinas (five samples) and in May 2022 for the Arundel Yacht Club (four samples) that called for the collection of samples for bulk sediment chemistry and grain size, as well as full biological testing, including elutriate preparation and analysis, water column toxicity testing, 10-day whole sediment toxicity testing, and 28-day bioaccumulation testing. The applicants collected sediment cores from these three marina basins in July of 2022 (Table 3, Figures 6 through 8) for chemistry and grain size analysis. In addition, NAE prepared a biological testing SAP in June of 2020 for the Kennebunk River Club using bulk sediment chemistry and grain size data collected in December of 2018 which was also used in this evaluation (Table 3, Figure 9).

Table 3: Core Locations

Sample Location	Latitude	Longitude	Project Depth with Overdepth (ft MLLW)	Water Depth (ft MLLW)	Required Core Length (ft)	Recovery/ Penetration (ft)	Sample Interval (ft)
Arundel Yacht Club							
AYC-1	43.35831	-70.47582	-7.0	-3.9	3.1	3.2/3.2	0-3.2
AYC-2	43.35800	-70.47561	-7.0	-2.1	4.9	2.4/2.4	0-2.4
AYC-3	43.35793	-70.47634	-7.0	-3.2	3.8	0.75/1.0	0-0.75
AYC-4	43.35811	-70.47638	-7.0	-3.0	4.0	4.0/4.1	0-4.0
Yachtsman Marina							
Y-1	43.35735	-70.47578	-7.0	-1.5	5.5	3.5/3.5	0-3.5
Y-2	43.35724	-70.47533	-7.0	-1.2	5.8	2.5/2.5	0-2.5
Y-3	43.35701	-70.47488	-7.0	-4.2	2.8	2.7/2.7	0-2.7
Y-4	43.35673	-70.47467	-7.0	-4.4	2.6	3.4/3.4	0-2.6
Y-5	43.35629	-70.47437	-7.0	-1.0	6.0	6.1/6.1	0-6.0
Kennebunkport Marina							
K-1	43.35587	-70.47367	-7.0	-1.8	5.2	4.2/4.2	0-4.2
K-2	43.35607	-70.47394	-7.0	-4.8	2.2	3.1/3.1	0-2.2
K-3	43.35634	-70.47400	-7.0	-1.7	5.3	4.2/4.3	0-4.2
Kennebunk River Club							
KBRC-A	43.34975	-70.47269	-7.0	-2.5	5.0	4.5/4.5	0-4.5
KBRC-B	43.34982	-70.47327	-7.0	-4.0	3.0	3.0/3.0	0-3.0
KBRC-C	43.35007	-70.47322	-7.0	-2.0	4.0	5.0/5.0	0-5.0
KBRC-D	43.35008	-70.47340	-7.0	-5.0	1.0	2.0/2.0	0-2.0
KBRC-E	43.35046	-70.47323	-7.0	-2.5	6.0	4.5/4.5	0-4.5
KBRC-F	43.35039	-70.47352	-7.0	-2.0	4.0	5.0/5.0	0-5.0
KBRC-G	43.35063	-70.47326	-7.0	-1.0	2.0	6.0/6.0	0-6.0
KBRC-H	43.35055	-70.47354	-7.0	-4.0	3.0	3.0/3.0	0-3.0
KBRC-I	43.35082	-70.47331	-7.0	-1.5	6.0	5.5/5.5	0-5.5

Physical and Chemical Analysis of Sediments

Samples were largely composed of fines with little to some fine sand though several stations from the Yachtsman Marina and Kennebunk River Club were composed of fine sand with little to some fines. Grain size data are presented in Table 4 and core logs are provided in Appendix A.

Table 4: Grain Size Results

Sample ID	%Gravel	%Sand			%Fines
		Coarse	*Medium*	*Fine*	
Arundel Yacht Club					
AYC-1	0.1	1.7	6.4	13.1	78.7
AYC-2	3.1	2.2	12.5	31.4	50.8
AYC-3	0.4	0.9	5.2	14.4	79.1
AYC-4	3.6	0.8	4.5	10.7	80.4
Yachtsman Marina					
Y-1	4.9	0.8	6.0	64.7	23.6
Y-2	0.3	1.5	9.8	60.6	27.8
Y-3	2.3	1.7	5.7	20.6	69.7
Y-4	0.0	0.8	5.4	26.5	67.3
Y-5	1.0	1.2	4.4	80.6	12.8
Kennebunkport Marina					
K-1	0.1	0.6	4.4	43.9	51.0
K-2	0.0	1.2	7.9	28.9	62.0
K-3	2.4	1.5	8.0	19.7	68.4
Kennebunk River Club					
KBRC-A	0.0	1.0	4.0	32.0	62.7
KBRC-B	0.1	1.0	7.0	40.0	51.6
KBRC-C	0.0	1.0	2.0	61.0	35.6
KBRC-D	0.0	1.0	4.0	56.0	38.6
KBRC-E	0.0	0.0	3.0	71.0	25.9
KBRC-F	0.2	1.0	1.0	81.0	16.6
KBRC-G	0.2	1.0	4.0	61.0	33.8
KBRC-H	0.6	2.0	4.0	64.0	29.7
KBRC-I	0.7	2.0	10.0	45.0	43.4

As no project specific contaminants of concern were identified in the CSM, samples were analyzed for the standard suite of contaminants specified in the Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters (RIM) (EPA/USACE, 2004).

To examine the sediment concentrations in an ecologically meaningful context, NAE used Sediment Quality Guidelines (SQGs) to screen the chemical concentrations found in the sediment samples from the Kennebunk River project areas samples. Applicable SQG screening values for marine and estuarine sediments are the National Oceanic and Atmospheric Administration (NOAA) effects-range low (ERL) and effects-range median (ERM). It is important to understand that these values were not derived as toxicity pass-fail thresholds. Rather, ERL and ERM values are empirically derived guidelines based on a large number of studies nationwide that identify contaminant levels that indicate probability of toxic effects to inform decision making (Long et al., 1998). Effects are considered unlikely at concentrations below the ERL with an increased probability of toxic effects as concentrations increase. At concentrations above the ERM toxic effects are considered likely. For samples with sediment concentrations that fall between the ERL and ERM levels, consideration is given to both the number of contaminants that exceed ERL values and where the concentrations fall in the range between ERL and ERM values in assessing the probability of toxic effects and the potential need for additional testing.

Metals concentrations were largely below the ERL with many concentrations also less than the IOSN reference concentrations in all four project areas. Arsenic was detected at concentrations just above the ERL and reference value at stations AYC-1 and AYC-4, though both stations were below the established natural background level, 16 mg/kg, in Maine sediments (MEDEP, 2018). Nickel concentrations at Arundel Yacht Club stations AYC-1 and AYC-4 and Yachtsman Marina station Y-3 were also slightly greater than the ERL and IOSN reference value. The lead concentration in the Kennebunkport Marina station K-1 was greater than both the ERL and reference value. All metal concentrations in the Kennebunk River Club samples were below the ERL.

A few individual low molecular weight polyaromatic hydrocarbons (LPAHs) were found at concentrations above their respective ERLs, including acenaphthene and fluorene at station K-2 in the Kennebunkport Marina, acenaphthene, anthracene, and fluorene at stations KBRC-A and B in the Kennebunk River Club, and all individual LPAHs except for naphthalene at the Arundel Yacht Club station AYC-2. Additionally, the total LPAH concentration at AYC-2 was greater than the ERL and IOSN reference value. Individual HPAHs benzo(a)anthracene and fluoranthene were found at concentrations greater than their respective ERLs at stations AYC-2, KBRC-A, and KBRC-B. Pyrene and chrysene were also found above the ERL at KBRC-B and pyrene was found above the ERL in station KBRC-C. Total HPAH concentrations were found above the ERL at stations AYC-2 at the Arundel Yacht Club and stations KBRC-A, B, and C in the Kennebunk River Club. All PAH concentrations were below ERL values in all samples from the Yachtsman Marina.

The pesticides 4,4’-DDD, 4,4’-DDE, and 4,4’-DDT as well as total DDX concentrations were found at concentrations greater than the ERL at stations K-1 and 2 at the Kennebunkport Marina and stations AYC-1 and 2 at the Arundel Yacht Club, where station AYC-4 also had 4,4’-DDE, 4,4’-DDT, and total DDX at concentrations over the ERL. Stations Y-1 and 2 at the Yachtsman Marina contained concentrations of 4,4’-DDE and total DDX that were greater than the ERL and the concentration of 4,4’-DDD was also above the ERL at station Y-2. Total DDX was found in concentrations above the ERL in all the Kennebunk River Club stations except for KBRC-F. 4,4`-DDT concentrations were also greater than the ERL in stations KBRC-B, KBRC-C, and KBRC-I and 4,4`-DDD exceeded the ERL in station KBRC-C. Dieldrin was found at concentrations greater than the ERL at Kennebunk River Club stations KBRC-A, B, D, E, and I and total chlordane was found at concentrations greater than the ERL at all stations in the Kennebunk River Club project area except for KBRC-E and KBRC-G.

Individual polychlorinated biphenyls (PCBs) were generally not detected. Where detected, total PCBs were found at concentrations well below the ERL at all stations sampled.

A summary of the bulk sediment chemistry data is presented in Table 5 with comparison to the ERL/ERM values and reference concentrations for IOSN. The full bulk chemistry results are presented in Appendix B.

Table 5. Summary of Bulk Sediment Chemistry Results

							Kennebunkport Marina						*Yachtsman Marina*									
					IOSN		K-1		K-2		K-3		Y-1		Y-2		Y-3		Y-4		Y-5	
Parameter	CAS Number	Units	ERL	ERM	Value	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Physical																						
Total organic carbon	14762744	%			1.28		0.37		3.04		2.32		0.93		0.72		1.90		1.19		0.20	
Metals																						
Arsenic	7440382	mg/kg	8.2	70	9.66		2.85		6.68		6.34		6.65		3.20		7.96		4.54		0.984	
Cadmium	7440439	mg/kg	1.2	9.6	0.072		0.295		0.410		0.344		0.225		0.235		0.388		0.430		0.093	
Chromium	7440473	mg/kg	81	370	31.5		21.9		27.1		26.4		17.7		14.7		33.6		23.1		6.71	
Copper	7440508	mg/kg	34	270	10.9		14.2		16.7		15.4		12.5		8.64		18.3		9.82		1.59	
Lead	7439921	mg/kg	46.7	218	18.1		134		21.9		17.1		12.4		12.9		20.2		7.79		1.81	
Mercury	7439976	mg/kg	0.150	0.710	0.032		0.051		0.063		0.047		0.045		0.051		0.052		0.011	J	0.005	J
Nickel	7440020	mg/kg	20.9	51.6	20.8		9.17		15.6		15.4		11.3		8.37		21.4		15.1		3.81	
Zinc	7440666	mg/kg	150	410	60.6		56.6		67.4		57.2		42.2		37.6		71.2		45.2		10.2	
PAHs																						
Total LPAH	*SUMLPAH*	ug/kg	552	3,160	48.2		185		225		225		188		191		118		7.87		8.67	
Total HPAH	*SUMHPAH*	ug/kg	1,700	9,600	260		1238		1697		1664		1336		1338		863		33.3		48.3	
Pesticides																						
4,4`-DDD	72548	ug/kg	2	20	0.020	U	4.98	J	4.66	J	0.112	UJ	1.16	J	2.86	J	0.093	UJ	0.016	UJ	0.013	UJ
4,4`-DDE	72559	ug/kg	2.2	27	0.066		2.23		4.53	J	0.068	U	2.50	J	2.78		0.057	U	0.010	U	0.008	U
4,4`-DDT	50293	ug/kg	1	7	0.026	U	1.44		1.44		0.148	U	0.960		0.808		0.123	U	0.020	U	0.017	U
Total DDX	SUMDDX	ug/kg	1.58	46.1	0.112		8.65		10.6		0.328	U	4.62		6.45		0.272	U	0.045	U	0.038	U
Dieldrin	60571	ug/kg	0.02	8	0.040	U	0.031	U	0.038	U	0.226	U	0.038	U	0.031	U	0.187	U	0.031	U	0.026	U
Total Chlordane	*SUMCHLOR*	ug/kg	0.5	6	0.300	U	0.233	U	0.289	U	1.710	U	0.285	U	0.234	U	1.42	U	0.233	U	0.198	U
PCBs																						
Total PCBs	*SumNOAA18*	ug/kg	22.7	180	4.02	U	8.34		3.98		2.77		1.92		2.33		3.56		1.56	U	1.33	U

Table 5. Summary of Bulk Sediment Chemistry Results, cont.

							Arundel Yacht Club							
					IOSN		AYC-1		AYC-2		AYC-3		AYC-4	
Parameter	CAS Number	Units	ERL	ERM	Value	Q	Result	Q	Result	Q	Result	Q	Result	Q
Physical														
Total organic carbon	14762744	%			1.28		1.14		1.15		8.46		2.64	
Metals														
Arsenic	7440382	mg/kg	8.2	70	9.66		9.75		6.72		7.78		10.3	
Cadmium	7440439	mg/kg	1.2	9.6	0.072		0.335		0.330		0.453		0.613	
Chromium	7440473	mg/kg	81	370	31.5		41.6		26.2		25.6		38.1	
Copper	7440508	mg/kg	34	270	10.9		29.4		15.7		25.6		24.3	
Lead	7439921	mg/kg	46.7	218	18.1		30.9		26.1		21.4		33.7	
Mercury	7439976	mg/kg	0.150	0.710	0.032		0.064		0.086		0.059	J	0.108	
Nickel	7440020	mg/kg	20.9	51.6	20.8		25.4		13.0		15.0		22.7	
Zinc	7440666	mg/kg	150	410	60.6		101		58.1		68.6		98.0	
PAHs														
Total LPAH	*SUMLPAH*	ug/kg	552	3,160	48.2		189		654		90.9		104	
Total HPAH	*SUMHPAH*	ug/kg	1,700	9,600	260		1482		3341		411		986	
Pesticides														
4,4`-DDD	72548	ug/kg	2	20	0.020	U	3.87	J	4.34	J	0.274	UJ	1.99	J
4,4`-DDE	72559	ug/kg	2.2	27	0.066		7.51	J	5.74		0.167	U	4.37	J
4,4`-DDT	50293	ug/kg	1	7	0.026	U	1.62	J	2.60		0.360	U	1.51	J
Total DDX	SUMDDX	ug/kg	1.58	46.1	0.112		13.0		12.7		0.801	U	7.87	
Dieldrin	60571	ug/kg	0.02	8	0.040	U	0.23	U	0.15	U	0.550	U	0.225	U
Total Chlordane	*SUMCHLOR*	ug/kg	0.5	6	0.300	U	1.72	U	1.11	U	4.2	U	1.7	U
PCBs														
Total PCBs	*SumNOAA18*	ug/kg	22.7	180	4.02	U	3.95		8.87		5.59	U	2.29	U

Table 5. Summary of Bulk Sediment Chemistry Results, cont.

							Kennebunk River Club																	
					IOSN		KBRC-A		KBRC-B		KBRC-C		KBRC-D		KBRC-E		KBRC-G		KBRC-H		KBRC-I		KBRC-F	
Parameter	CAS Number	Units	ERL	ERM	Value	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Physical																								
Total organic carbon	14762744	%			1.28		-		-		-		-		-		-		-		-		-	
Metals																								
Arsenic	7440382	mg/kg	8.2	70	9.66		5.34		4.98		3.52		3.30		2.47		3.34		2.82		5.12		1.58	
Cadmium	7440439	mg/kg	1.2	9.6	0.072		0.463		0.433		0.300		0.350		0.229		0.277		0.237		0.451		0.119	
Chromium	7440473	mg/kg	81	370	31.5		27.5		26.0		20.0		20.5		15.6		18.0		16.5		24.8		11.0	
Copper	7440508	mg/kg	34	270	10.9		13.7		13.8		9.34		9.52		18.6		8.28		7.16		13.6		5.32	
Lead	7439921	mg/kg	46.7	218	18.1		18.8		17.8		12.2		13.3		8.67		11.5		9.29		17.7		4.81	
Mercury	7439976	mg/kg	0.150	0.710	0.032		0.062		0.054		0.052		0.053		0.032		0.067		0.046		0.056		0.023	
Nickel	7440020	mg/kg	20.9	51.6	20.8		15.9		14.5		11.4		11.3		8.57		9.92		8.67		13.4		6.12	
Zinc	7440666	mg/kg	150	410	60.6		68.9		67.7		48.3		50.9		37.2		50.5		39.9		78.2		28.9	J
PAHs																								
Total LPAH	*SUMLPAH*	ug/kg	552	3,160	48.2		316		321		208		106		114		101		127		217		104	
Total HPAH	*SUMHPAH*	ug/kg	1,700	9,600	260		2644		4212		2028		866		838		756		653		1301		567	
Pesticides																								
4,4\`-DDD	72548	ug/kg	2	20	0.020	U	1.30		1.90		2.10		1.30		1.00		1.20		0.880		1.70		0.680	
4,4\`-DDE	72559	ug/kg	2.2	27	0.066		1.90		1.30		1.40		1.30		0.790		1.40		1.30		2.00		0.400	
4,4\`-DDT	50293	ug/kg	1	7	0.026	U	0.850		1.50		4.00		0.750		0.620		0.900		0.530		2.20		0.028	U
Total DDX	SUMDDX	ug/kg	1.58	46.1	0.112		4.05		4.70		7.50		3.35		2.41		3.50		2.71		5.90		1.11	
Dieldrin	60571	ug/kg	0.02	8	0.040	U	0.460		0.850		0.026	U	1.00		1.20		0.026	U	0.026	U	0.610		0.026	U
Total Chlordane	*SUMCHLOR*	ug/kg	0.5	6	0.300	U	1.4		0.95		1.8		1.8		0.044	U	0.265		1.54		1.04		1.25	
PCBs																								
Total PCBs	*SumNOAA18*	ug/kg	22.7	180	4.02	U	1.4		2.1		1.2		0.751		0.326	U	0.326	U	0.831		1.3		0.706	

Notes:
Yellow indicates an exceedance of the ERL
Red indicates an exceedance of the ERM
U= Compound was analyzed for but was not detected (non-detect)
J= Indicates an estimated value
Non-detects reported as half the MDL
Reference site data from DAMOS monitoring surveys (2019 IOSN)
Total PCBs were calculated using the NOAA 18 method
Total Chlordane is a sum of alpha and gamma chlordane, cis and trans nonachlor, and oxychlordane; IOSN value is a sum of only alpha and gamma chlordane

Elutriate Chemistry and Biological Analysis of Sediments

Based on the lithology, chemistry results, and location of sample stations, NAE provided the applicant with a compositing plan for biological testing following the tiered testing protocol outlined in the Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual (Green Book, EPA/USACE, 1991). Sediment and water for biological testing were collected by the applicant in February of 2023 to characterize the potential risk associated with open water placement of the dredged material from the four Kennebunk River projects. Sediment was collected from ten representative sample locations across all four project areas to create one composite sample (Table 2 and Figures 6 through 9). The composite sample for biological testing was comprised of sediment from stations AYC-1, 2, and 4 from the Arundel Yacht Club, Y-2 and 3 from the Yachtsman Marina, K-1 and 2 from the Kennebunkport Marina, and KBRC-B, C, and E from the Kennebunk River Club. Site water was also collected from a central location within each proposed project area and composited. The biological testing samples were collected according to the compositing plan to determine the potential for the dredged sediment to cause adverse effects to the biological receptors identified in the CSM. Compliance with water quality criteria was determined through elutriate testing, sediment toxicity was measured through a 10-day whole sediment acute toxicity test, human health risk was determined through a 28-day bioaccumulation test, and water column toxicity was determined through a suspended particulate phase test as described in the Green Book (USEPA/USACE, 1991).

Evaluating Potential Effects to Benthic Organisms

The CSM identified the uptake of contaminants from placed dredged material at IOSN as a primary exposure pathway for project sediments and the potential for acute toxicity was determined through a 10-day whole sediment acute toxicity test as described in the Green Book (EPA/USACE, 1991).

Mean mortality in the control samples of the 10-day whole sediment acute toxicity tests was less than 10% for the amphipod (*Leptocheirus plumulosus*) and the mysid (*Americamysis bahia*); therefore, the tests were valid based on criteria established in the testing protocol.

Mean survivability for *A. bahia* and *L. plumulosus* was 97% and 95%, respectively. Results were not statistically different when compared to survivability in the IOSN reference sediment. The material proposed to be dredged is not considered acutely toxic to the mysids or amphipods used in this assessment.

Results from the 10-day whole sediment toxicity test are summarized in Table 6.

Table 6: Mean Survivability in the 10-day Whole Sediment Toxicity Test

Organism	Lab Control	IOSN Reference	Comp 1
A. bahia	98%	98%	97%
L. plumulosus	98%	93%	95%

Evaluating Potential Effects to Human Health

In order to assess the potential risk to human health through the exposure pathways identified in the CSM, a 28-day bioaccumulation test was performed with the clam, *Macoma nasuta,* and marine polychaete worm, *Nereis virens,* using sediments from the composite sample.

Results showed statistically significant increases of certain contaminants of concern (COCs) in tissue samples from clams exposed to project sediments when compared to tissue samples from clams exposed to reference area sediments including three metals (copper, lead, and nickel), several individual PAHs, three PCB congeners, and two pesticides (4,4'-DDD and 4,4'-DDE). Generally, COC concentrations were only slightly higher in the composite tissue sample than in the pre-test or IOSN reference tissue. Anthracene, benzo(a)anthracene, benzo(b)fluoranthene, and chrysene concentrations were 5 times higher in the composite tissue sample than in the IOSN reference site tissue concentrations. Fluoranthene, pyrene and 4,4'-DDD concentrations were more than 10 times higher in the composite tissue sample than in the IOSN reference site tissue concentrations. Copper, nickel, fluorene, naphthalene, and PCB 52 were detected at concentrations less than were detected in the pre-test tissue, which reflects the initial contaminant load in the wild caught specimens prior to the test initiation, suggesting that these contaminants may not be attributable to site conditions. However, these analytes were conservatively included in subsequent risk modeling.

Significant increases in worm tissue samples as compared to reference area tissue samples included five metals (cadmium, chromium, lead, nickel, and zinc), several individual PAHs, two PCB congeners, and one pesticide (4,4'-DDD). Generally, COC concentrations were only slightly higher in the composite tissue sample than in the pre-test or IOSN reference tissue. Pyrene was 5 times higher in the composite tissue sample than the IOSN reference site tissue concentrations. Benzo(k)fluoranthene, fluoranthene, and PCB 105 were more than 10 times higher in the composite tissue sample than the IOSN reference site tissue concentrations. Chromium, lead, nickel, anthracene, naphthalene, and 4,4'-DDD were detected at concentrations less than were detected in the pre-test tissue, which reflects the initial contaminant load in the wild caught specimens prior to the test initiation, suggesting that these contaminants may not be attributable to site conditions, however these analytes were conservatively included in the subsequent risk modeling.

Based on these results, the tissue burden data were analyzed with the EPA Bioaccumulation Evaluation Screening Tool (BEST) model to determine the toxicological significance of bioaccumulation from exposure to the dredged sediment. The BEST model includes an evaluation of the non-carcinogenic risk, carcinogenic risk, and any observed exceedances of Food and Drug Administration (FDA) thresholds to determine potential adverse impacts to human health from the consumption of lobster, fish, or shellfish exposed to project sediments. Consideration was also given to the number of contaminants that were statistically elevated in comparison to the reference tissue concentrations and to the magnitude of those concentrations in comparison to the reference tissue concentrations and comparable organisms living in the vicinity of the disposal site according to the factors outlined in the Ocean Testing Manual (USEPA/USACE, 1991).

For both *Macoma nasuta* and *Alitta virens*, modeling based on the tissue contaminant loads measured in the composite sample found that all contaminants were below the EPA Hazard Quotient for non-carcinogenic risk of 1.0, below the EPA carcinogenic risk threshold (1×10^{-4}), and were also less than established FDA action levels. Statistically elevated concentrations of contaminants in the tissue samples that could not be evaluated using the BEST model were compared to background invertebrate concentrations in the NOAA Mussel Watch dataset (NCCOS, 2023) and all concentrations were found to be less than the dataset concentrations.

Based on this analysis, there is no unacceptable risk to the receptors identified in the CSM from the bioaccumulation of contaminants through exposure to the dredged material from the projects. BEST model outputs and tissue data are provided in Appendix C.

Evaluating Potential Effects to Fish and Marine Invertebrates

The CSM identified the uptake of contaminants from the water column during the placement of dredged material at IOSN as a primary exposure pathway for project sediments. Elutriate samples were prepared from the site composite sediment sample and site water and the potential for water column toxicity was determined through a suspended particulate phase (SPP) toxicity test as described in the Green Book (USEPA/USACE, 1991).

The results from the SPP toxicity test were used to determine the median lethal concentration (LC_{50}) for the three target species exposed to the sediment elutriates. All three species, the mysid, *A. bahia*, the minnow, *Menidia beryllina*, and the mussel, *Mytilus edulis,* showed no adverse effects on survival after exposure to the elutriate from the composite sample (Table 7).

Table 7: LC_{50} Values in Suspended Phase Toxicity Test

Composite	***A. bahia*** **LC_{50} (%)**	***M. beryllina*** **LC_{50} (%)**	***M. edulis*** **LC_{50} (%)**
Composite 1	>100%	>100%	>100%

To determine if the discharge of dredged material would meet the limiting permissible concentration (LPC), NAE utilized the Short-Term Fate (STFATE) numerical model to analyze the disposal cloud as it descends through the water column after release from a scow. Results of the STFATE evaluation using the lowest LPC (LC_{50} of 100% and an application factor of 0.01) predicted that the water column would attain the LPC within four hours of disposal at IOSN. Additionally, all contaminants of concern in the elutriate samples were below the federal and Maine water quality criteria. Elutriate chemistry concentrations are presented in Appendix D.

4. Suitability Determination:

Based on the weight of evidence, including the CSM, sediment chemistry results, biological testing results, and the subsequent risk modeling, no significant adverse impacts through the exposure pathways identified in the conceptual site model were found for the Arundel Yacht Club, Kennebunkport Marina, Yachtsman Marina, and Kennebunk River Club. Based on the testing and evaluation requirements set forth in Section 103 of the MPRSA, the sediments to be dredged are considered suitable for unconfined open water disposal at IOSN.

This suitability determination was coordinated with EPA Region 1 and MEDEP. MEDEP concurred with the determination and EPA Region 1 conducted an individual evaluation of the project and documented their findings in a separate memo.

Briley K. Barra

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Briley K. Barra
Technical Specialist
Dredged Material Management Team
USACE-New England District

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Date: 2024.06.12
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Richard B. Loyd
Chief
Environmental Resources and
Marine Programs Section
USACE-New England District

5. References:

Long E.R & MacDonald D.D. 1998. Recommended Uses of Empirically Derived, Sediment Quality Guidelines for Marine and Estuarine Ecosystems, Human and Ecological Risk Assessment: An International Journal, 4:5, 1019-1039.

MEDEP 2018. Maine Remedial Action Guidelines (RAGS) for Sites Contaminated with Hazardous Substances. Maine Department of Environmental Protection, Bureau of Remediation and Waste Management. 19 October 2018.

National Centers for Coastal Ocean Science, 2023: National Status and Trends: Mussel Watch Program, https://www.fisheries.noaa.gov/inport/item/39400.

USACE 2022. Monitoring Survey at the Isles of Shoals North Disposal Site, October 2021. DAMOS Contribution No. 214. Prepared by INSPIRE Environmental, Newport, RI for the U.S. Army Corps of Engineers, New England District, Concord, MA. 46 pp plus Figures and Appendices.

USEPA/USACE 2004. Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters. U.S. EPA Region 1, Boston, MA/U.S. Army Corps of Engineers, New England District, Concord, MA.

USEPA/USACE 1991. Evaluation of Dredged Material Proposed for Ocean Disposal Testing Manual. Environmental Protection Agency, Office of Water and Department of the Army, United States Army Corps of Engineers. Washington, D.C.

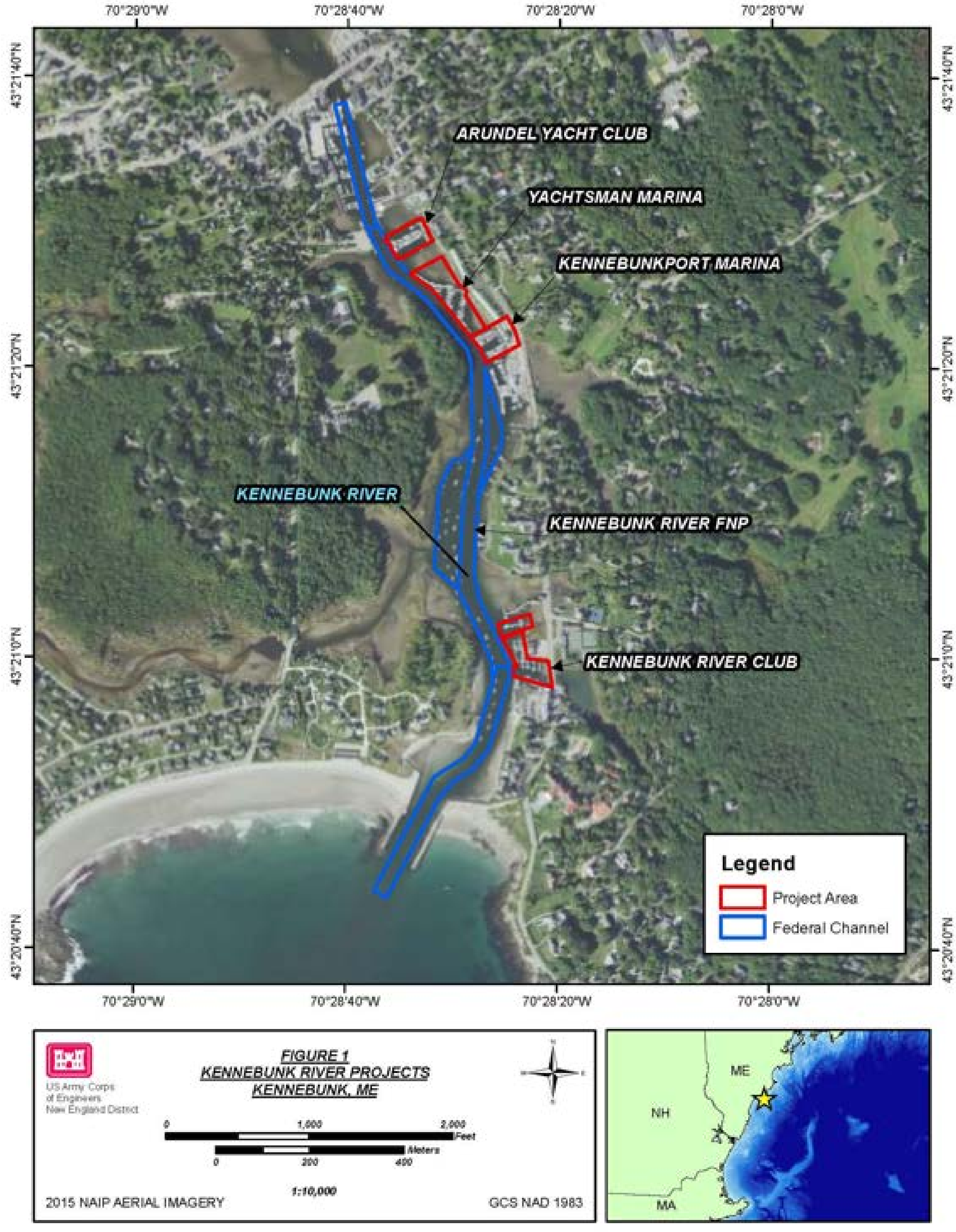
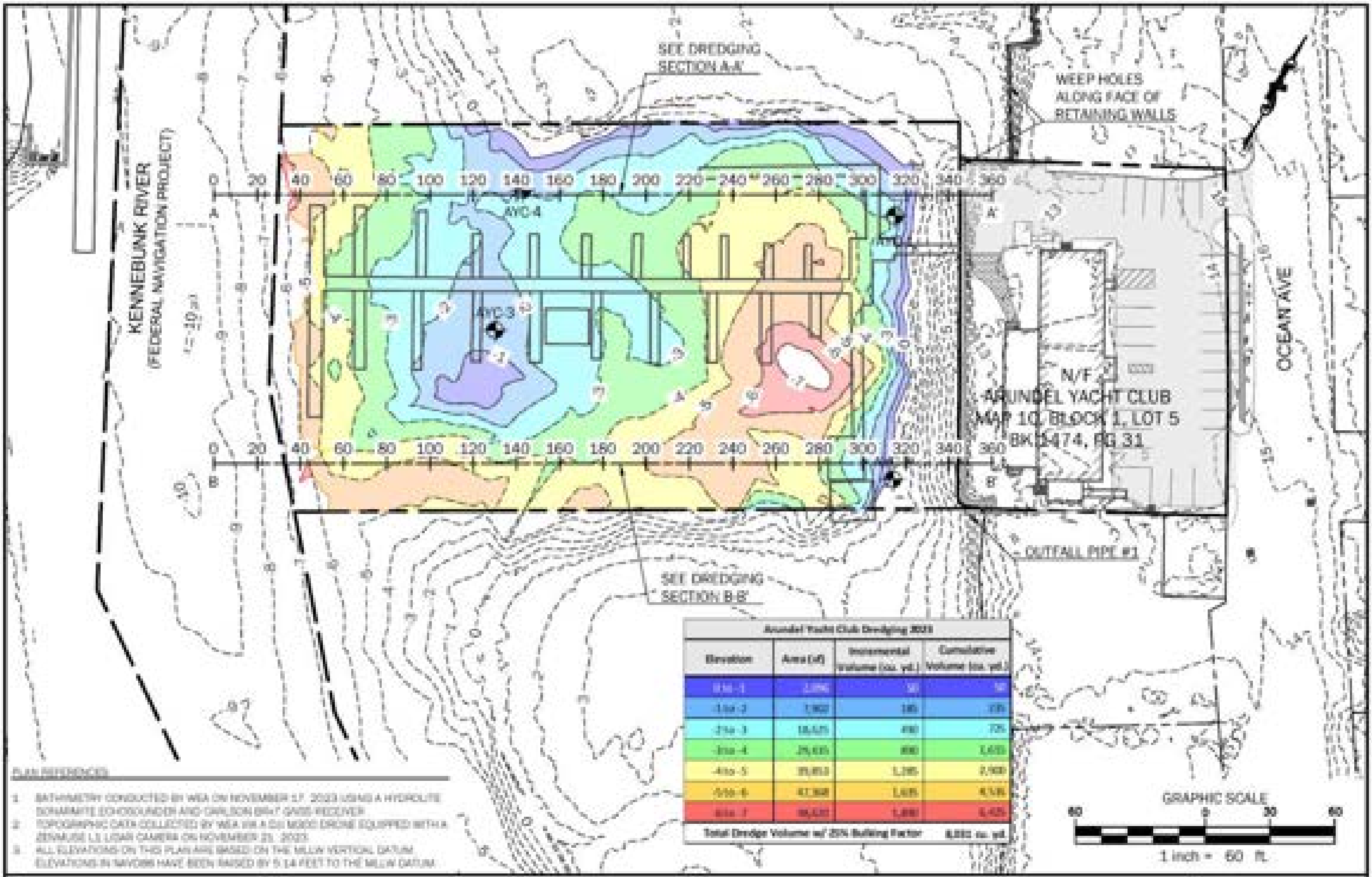


FIGURE 1
KENNEBUNK RIVER PROJECTS
KENNEBUNK, ME



Arundel Yacht Club Dredging 2023

Elevation	Area (sf)	Incremental Volume (cu. yd.)	Cumulative Volume (cu. yd.)
0 to -1	2,090	50	50
-1 to -2	7,902	185	235
-2 to -3	18,635	490	725
-3 to -4	29,635	890	1,615
-4 to -5	39,853	1,285	2,900
-5 to -6	47,368	1,635	4,535
-6 to -7	86,620	1,890	6,425
Total Dredge Volume w/ 25% Bulking Factor			8,031 cu. yd.

PLAN REFERENCES:

1. BATHYMETRY CONDUCTED BY WEA ON NOVEMBER 17, 2023 USING A HYDROLITE SONARMITE ECHOSOUNDER AND CARLSON BRX7 GNSS RECEIVER
2. TOPOGRAPHIC DATA COLLECTED BY WEA VIA A DJI M300 DRONE EQUIPPED WITH A ZENMUSE L1 LIDAR CAMERA ON NOVEMBER 21, 2023.
3. ALL ELEVATIONS ON THIS PLAN ARE BASED ON THE MLLW VERTICAL DATUM. ELEVATIONS IN NAVD88 HAVE BEEN RAISED BY 5.14 FEET TO THE MLLW DATUM.

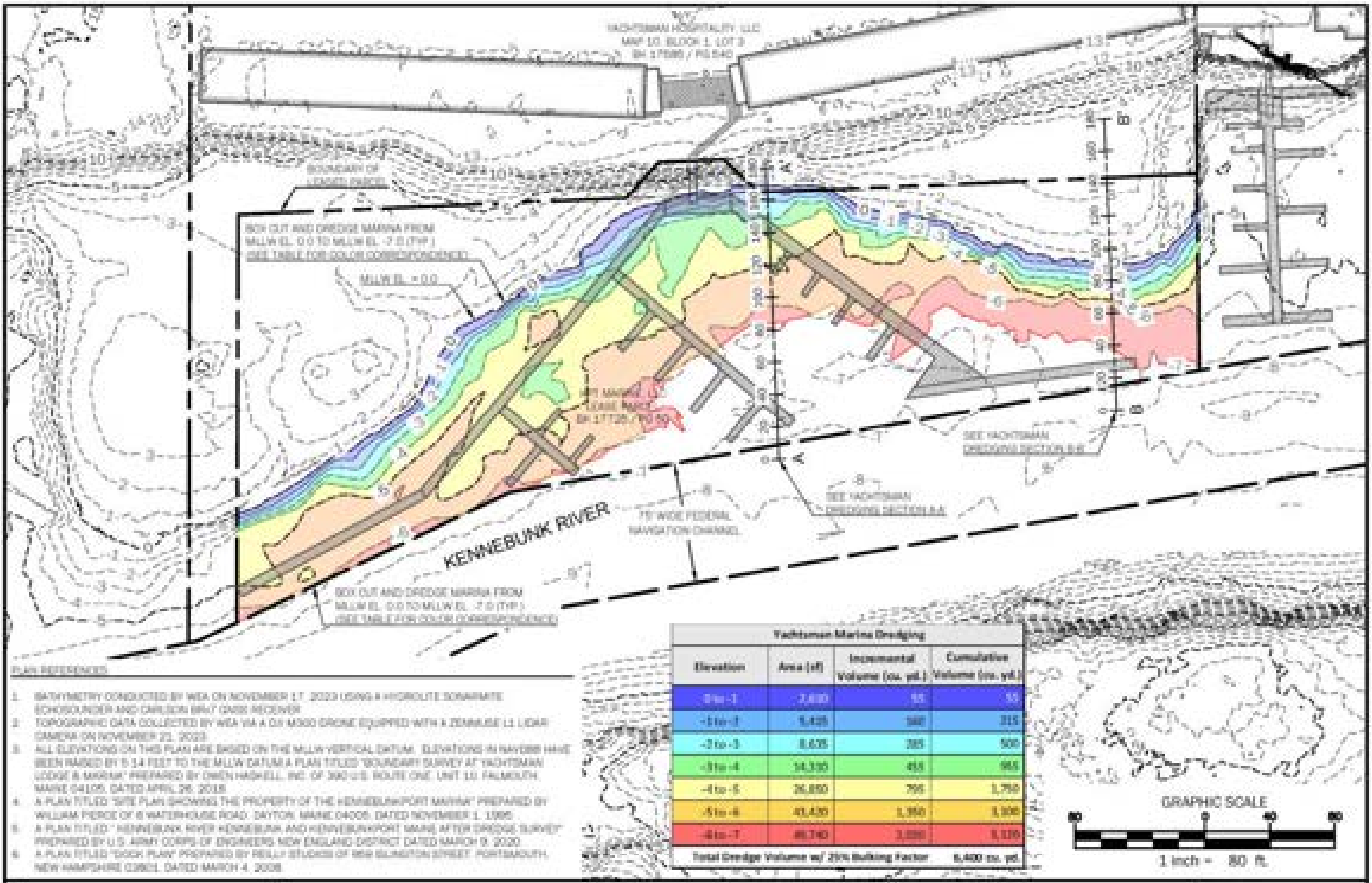
WALSH
ENGINEERING ASSOCIATES, INC.

One Karen Dr., Suite 2A | Westbrook, Maine 04092
ph: 207.553.9898 | www.walsh-eng.com

Arundel Yacht Club Dredging: 2023 Bathymetry

Arundel Yacht Club
51 Ocean Ave
Kennebunkport, Maine 04046

Figure 2:
Arundel Yacht Club
Applicant Dredge Plan



Yachtsman Marina Dredging

Elevation	Area (sf)	Incremental Volume (cu. yd.)	Cumulative Volume (cu. yd.)
0 to -1	2,630	55	55
-1 to -2	5,435	160	215
-2 to -3	8,635	285	500
-3 to -4	14,330	455	955
-4 to -5	26,850	795	1,750
-5 to -6	43,430	1,350	3,100
-6 to -7	49,740	2,020	5,120
Total Dredge Volume w/ 25% Bulking Factor			6,400 cu. yd.

PLAN REFERENCES

1. BATHYMETRY CONDUCTED BY WEA ON NOVEMBER 17, 2023 USING A HYDROLITE SONARMITE ECHOSOUNDER AND CARLSON BRX7 GNSS RECEIVER
2. TOPOGRAPHIC DATA COLLECTED BY WEA VIA A DJI M300 DRONE EQUIPPED WITH A ZENMUSE L1 LIDAR CAMERA ON NOVEMBER 21, 2023.
3. ALL ELEVATIONS ON THIS PLAN ARE BASED ON THE MLLW VERTICAL DATUM. ELEVATIONS IN NAVD88 HAVE BEEN RAISED BY 5.14 FEET TO THE MLLW DATUM A PLAN TITLED "BOUNDARY SURVEY AT YACHTSMAN LODGE & MARINA" PREPARED BY OWEN HASKELL, INC. OF 390 U.S. ROUTE ONE, UNIT 10, FALMOUTH, MAINE 04105, DATED APRIL 26, 2018.
4. A PLAN TITLED "SITE PLAN SHOWING THE PROPERTY OF THE KENNEBUNKPORT MARINA" PREPARED BY WILLIAM PIERCE OF 8 WATERHOUSE ROAD, DAYTON, MAINE 04005, DATED NOVEMBER 1, 1995.
5. A PLAN TITLED " KENNEBUNK RIVER KENNEBUNK AND KENNEBUNKPORT MAINE AFTER DREDGE SURVEY" PREPARED BY U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DISTRICT DATED MARCH 9, 2020.
6. A PLAN TITLED "DOCK PLAN" PREPARED BY REILLY STUDIOS OF 959 ISLINGTON STREET, PORTSMOUTH, NEW HAMPSHIRE 03801, DATED MARCH 4, 2008.

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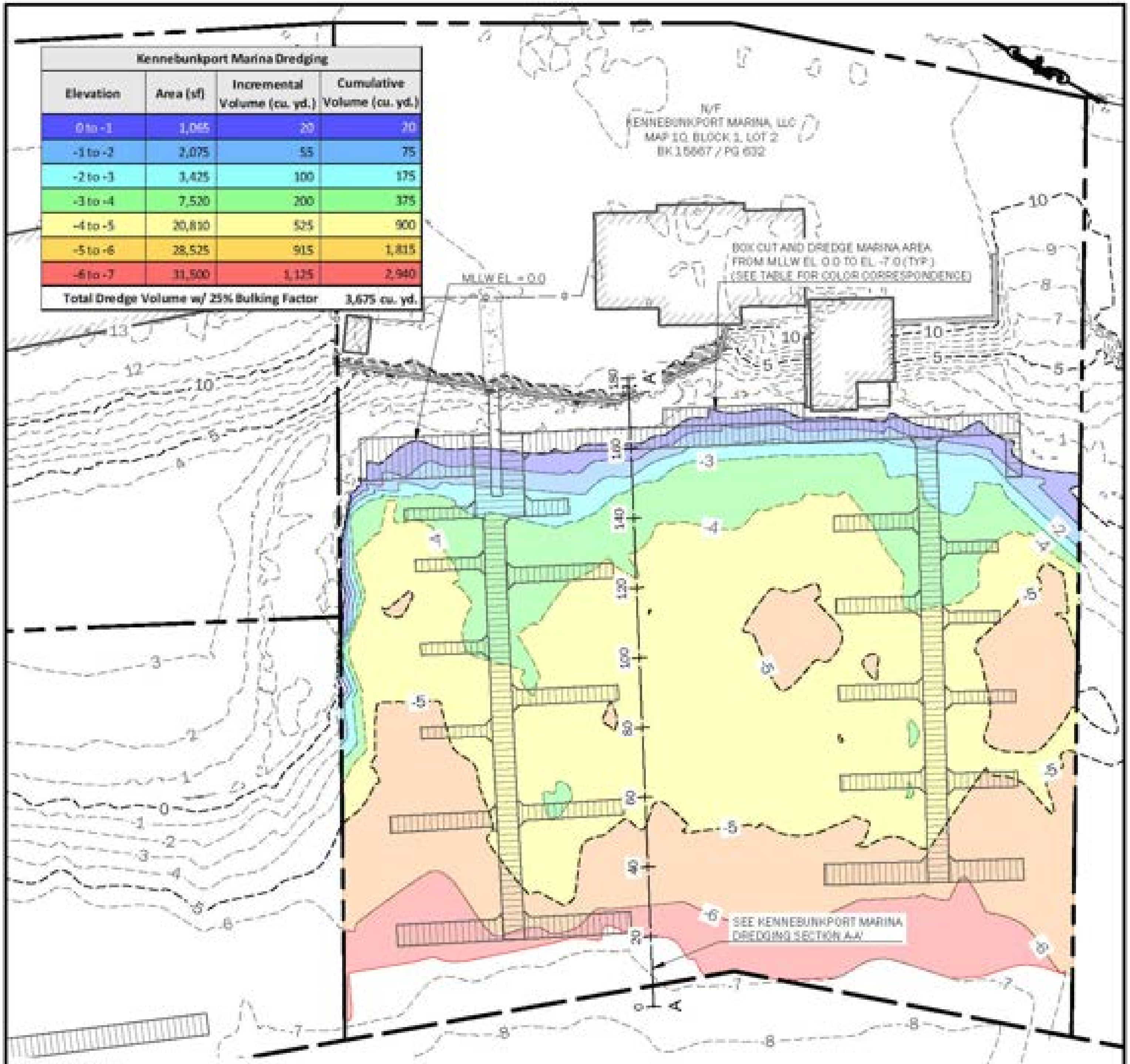
Yachtsman Marina Dredging: 2023 Bathymetry

Kennebunkport Marina
59 Ocean Ave
Kennebunkport, Maine 04046

Figure 3:
Yachtsman Marina
Applicant Dredge Plan



Kennebunkport Marina Dredging			
Elevation	Area (sf)	Incremental Volume (cu. yd.)	Cumulative Volume (cu. yd.)
0 to -1	1,065	20	20
-1 to -2	2,075	55	75
-2 to -3	3,425	100	175
-3 to -4	7,520	200	375
-4 to -5	20,810	525	900
-5 to -6	28,525	915	1,815
-6 to -7	31,500	1,125	2,940
Total Dredge Volume w/ 25% Bulking Factor			3,675 cu. yd.

PLAN REFERENCES

1. BATHYMETRY CONDUCTED BY WEA ON NOVEMBER 17, 2023 USING A HYDROLITE SONARMITE ECHOSOUNDER AND CARLSON BRx7 GNSS RECEIVER.
2. TOPOGRAPHIC DATA COLLECTED BY WEA VIA A DJI M300 DRONE EQUIPPED WITH A ZENMUSE L1 LIDAR CAMERA ON NOVEMBER 21, 2023.
3. ALL ELEVATIONS ON THIS PLAN ARE BASED ON THE MLLW VERTICAL DATUM. ELEVATIONS IN NAVD88 HAVE BEEN RAISED BY 5.14 FEET TO THE MLLW DATUM.
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5. A PLAN TITLED "SITE PLAN SHOWING THE PROPERTY OF THE KENNEBUNKPORT MARINA" PREPARED BY WILLIAM PIERCE OF 6 WATERHOUSE ROAD, DAYTON, MAINE 04005, DATED NOVEMBER 1, 1995.
6. A PLAN TITLED " KENNEBUNK RIVER KENNEBUNK AND KENNEBUNKPORT MAINE AFTER DREDGE SURVEY" PREPARED BY U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DISTRICT DATED MARCH 9, 2020.
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Kennebunkport Marina Dredging: 2023 Bathymetry

Kennebunkport Marina
67 Ocean Ave
Kennebunkport, Maine 04046

Figure 4: Kennebunkport Marina Applicant Dredge Plan

PLAN REFERENCES:
1. KENNEBUNK RIVER FEDERAL CHANNEL INFORMATION TAKEN FROM DIGITAL FILE FROM A.C.O.E. WEBSITE. FILE KNR_CS_2018_006.
2. CONTOURS SET TO M.L.L.W. = 0.00 FEET.
3. AERIAL IMAGE FROM M.E.G.I.S. WEBSITE, 2018

ECO-ANALYSTS, INC.
ENVIRONMENTAL CONSULTANTS
P.O. BOX 224 BATH, MAINE 04530
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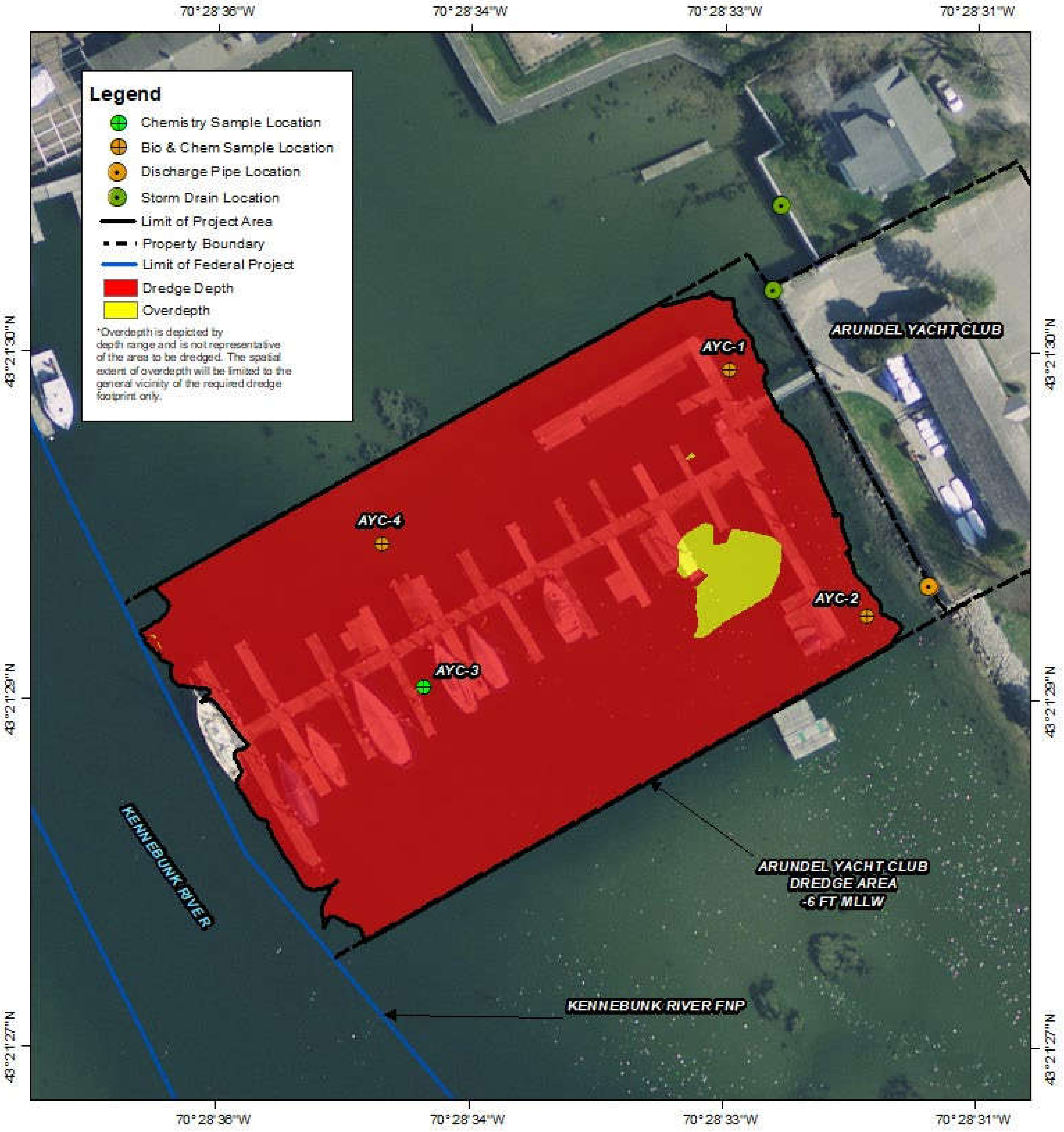
Date: 12/9/2019
Project: KRC
Drafted By: TF/SS

Plan View of the Existing Condition and the proposed dredge window for the Kennebunk River Club, 116 Ocean Ave in Kennebunkport, Maine

Figure 5:
Kennebunk River Club
Applicant Dredge Plan



*Overdepth is depicted by depth range and is not representative of the area to be dredged. The spatial extent of overdepth will be limited to the general vicinity of the required dredge footprint only.

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New England District

FIGURE 6
ARUNDEL YACHT CLUB SAMPLE LOCATIONS

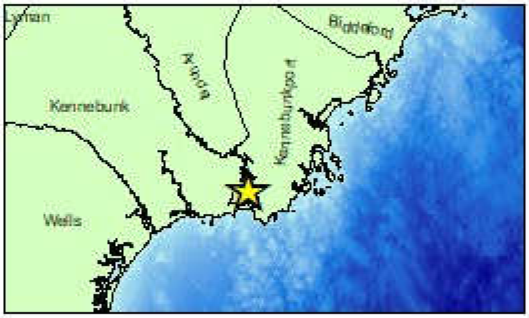
0 70 140 Feet

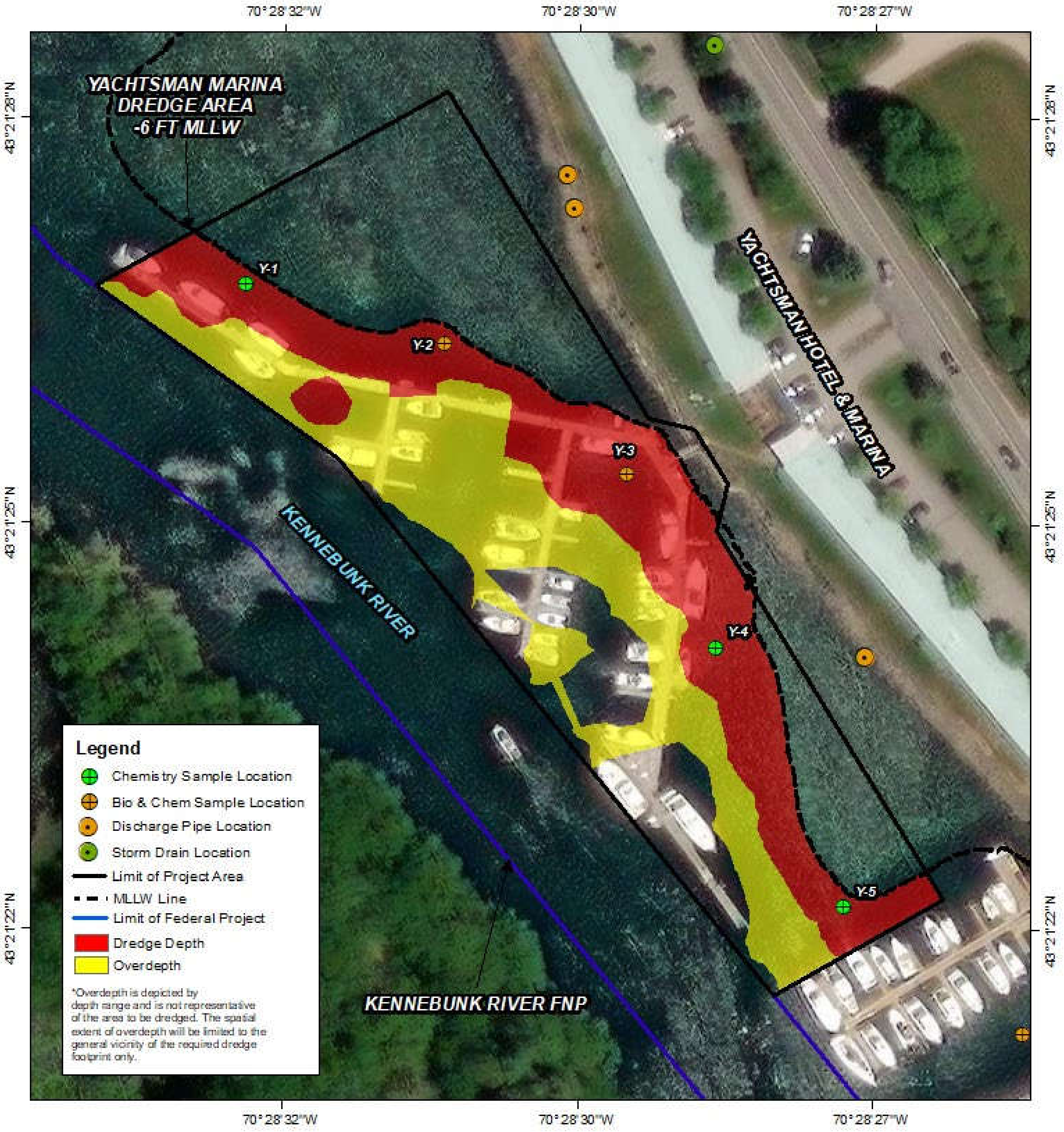
0 20 40 Meters

1:700

2024 ESRI WORLD IMAGERY

GCS NAD 1983





*Overdepth is depicted by depth range and is not representative of the area to be dredged. The spatial extent of overdepth will be limited to the general vicinity of the required dredge footprint only.

US Army Corps
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New England District

FIGURE 7
YACHTSMAN MARINA
SAMPLE LOCATIONS

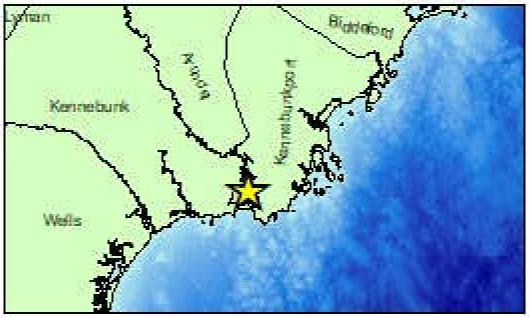
0 100 200 Feet

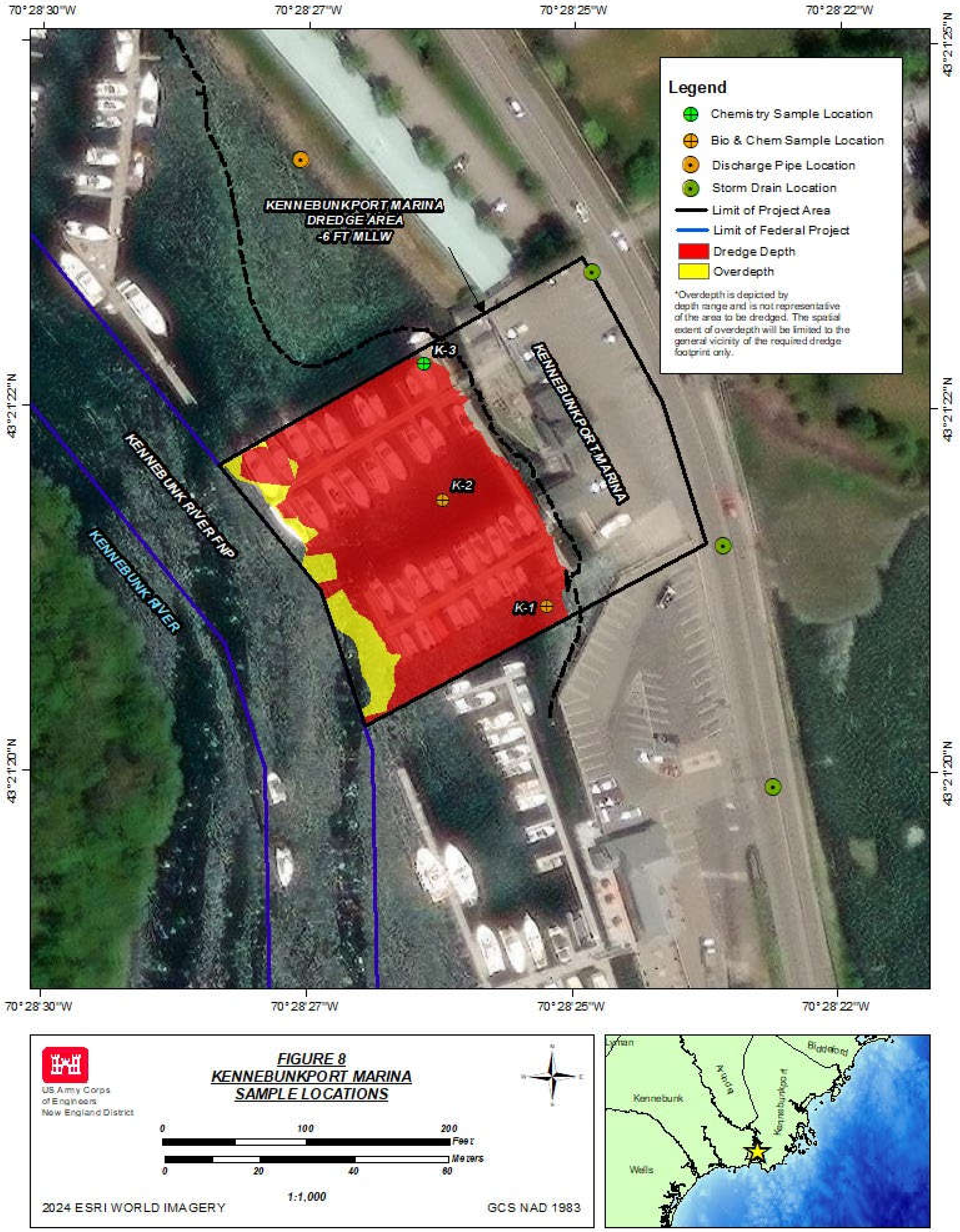
0 30 60 Meters

1:1,000

2024 ESRI WORLD IMAGERY

GCS NAD 1983



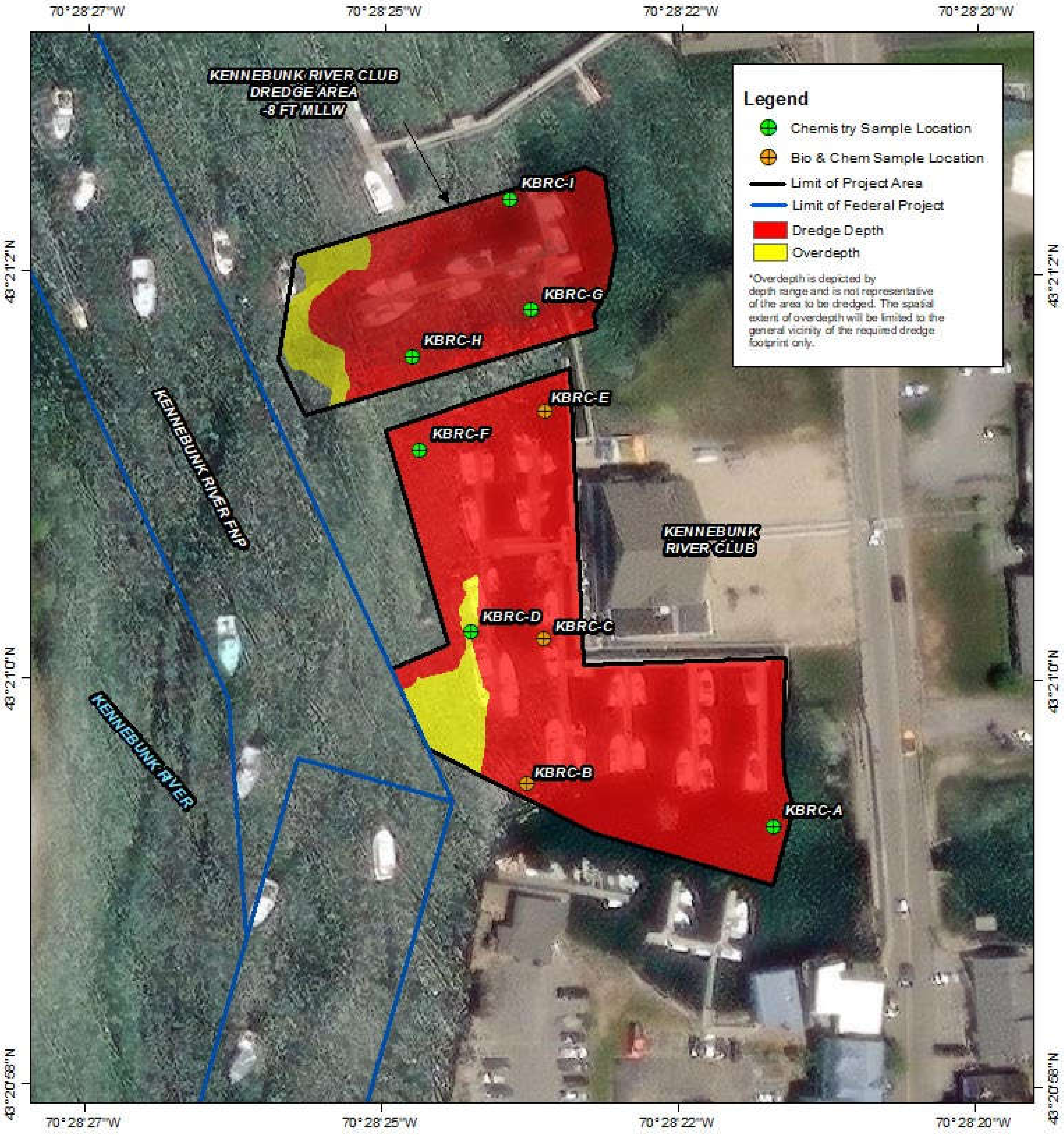


*Overdepth is depicted by depth range and is not representative of the area to be dredged. The spatial extent of overdepth will be limited to the general vicinity of the required dredge footprint only.

FIGURE 8
KENNEBUNKPORT MARINA
SAMPLE LOCATIONS

2024 ESRI WORLD IMAGERY

GCS NAD 1983



US Army Corps
of Engineers
New England District

FIGURE 9
KENNEBUNK RIVER CLUB
SAMPLE LOCATIONS

0 100 200 Feet

0 20 40 60 Meters

1:1,000

2024 ESRI WORLD IMAGERY

GCS NAD 1983

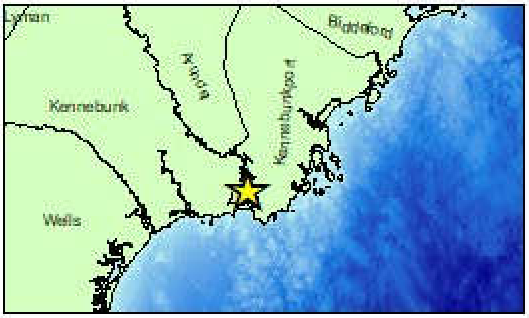
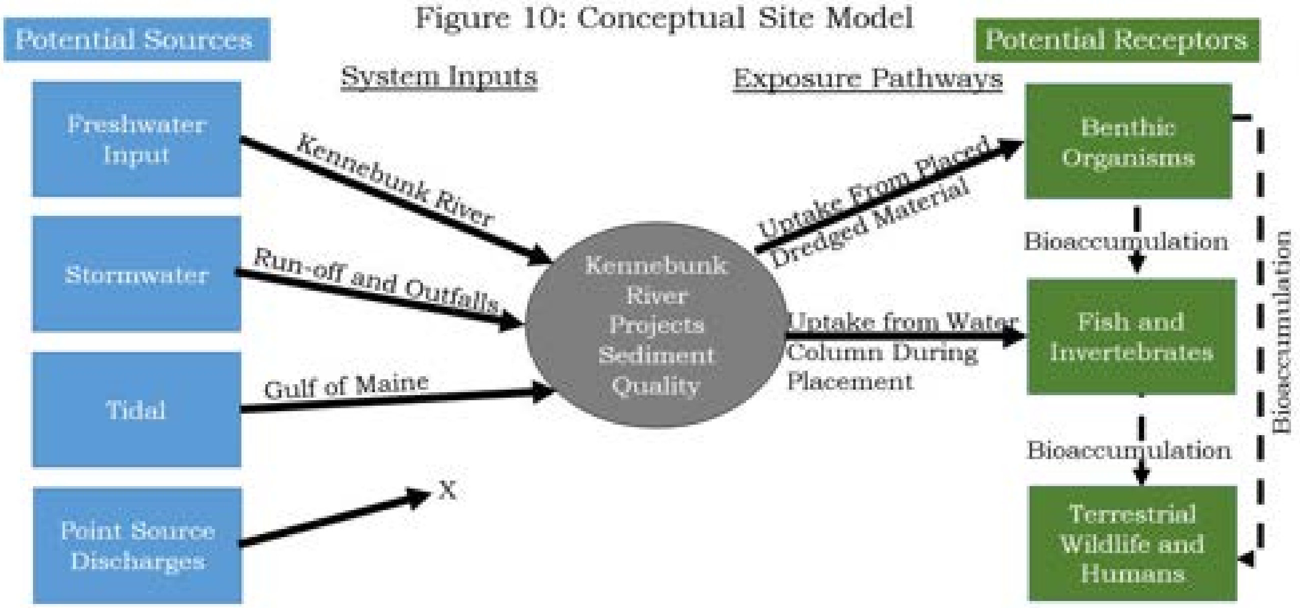


Figure 10: Conceptual Site Model



Appendix A
Core Logs and Photographs

Coastline Consulting & Development Core Log

Project: Arundel Yacht Club

Date: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: AYC-1

Time: 1:06 pm

Sampler Type: VibraCore Sampler

Depth: -3.9’ MLLW

Coordinates: **Latitude:** 43.35831 **Longitude:** -70.47582

Penetration: 3.2’ **Recovery:** 3.2’ **No. Attempts:** 3

Material Description: 0-3.1, composited. Dark silt/mud with shell debris.

Core Photo

Coastline Consulting & Development Core Log

Project: Arundel Yacht Club **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: AYC-2 **Time:** 12:20 pm

Sampler Type: VibraCore Sampler

Depth: -2.1' MLLW

Coordinates: **Latitude:** 43.35800 **Longitude:** -70.47561

Penetration: 2.4' **Recovery:** 2.4' **No. Attempts:** 9

Material Description: 0-2.4' composited. Hard packed sand with shell debris. Multiple attempts were made refusal was reached after 2.4' penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Arundel Yacht Club **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: AYC-3 **Time:** 12:55 pm

Sampler Type: VibraCore Sampler

Depth: -3.2' MLLW

Coordinates: **Latitude:** 43.35793 **Longitude:** -70.47634

Penetration: 1' **Recovery:** 9" **No. Attempts:** 16

Material Description: 0-9" composited. Hard substrate encountered a lot of wood debris and shell material. We attempted to call ACOE contacts during sampling, messages were left but no one returned the calls that day. We kept the largest core and did not cut it because we did not want to lose any material. Sample was extruded directly into bucket for compositing. We attempted multiple cores within a 10' radius of the location and saved the best one. Multiple attempts were made refusal was reached after 1' penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Arundel Yacht Club **Date:** 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: AYC-4 **Time:** 12:35 pm

Sampler Type: VibraCore Sampler

Depth: -3.0' MLLW

Coordinates: **Latitude:** 43.35811 **Longitude:** -70.47638

Penetration: 4.1' **Recovery:** 4.0' **No. Attempts:** 5

Material Description: 0-4.0 composited. Dark silt with hard packed sand at bottom of core.

Core Photo

Coastline Consulting & Development Core Log

Project: Kennebunkport Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: K-1 **Time:** 9:38 am

Sampler Type: VibraCore Sampler

Depth: -1.8' MLLW

Coordinates: **Latitude:** 43.35587 **Longitude:** -70.47367

Penetration: 4.2' **Recovery:** 4.2' **No. Attempts:** 6

Material Description: 0-4.2' composited. Dark silt with hard packed sand at bottom of core. Multiple attempts were made refusal was reached after 4.2' penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Kennebunkport Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: K-2 **Time:** 9:47 am

Sampler Type: VibraCore Sampler

Depth: -4.8’ MLLW

Coordinates: **Latitude:** 43.35607 **Longitude:** -70.47394

Penetration: 3.1’ **Recovery:** 3.1’ **No. Attempts:** 3

Material Description: 0-2.2’ composited. Dark silt with hard packed sand towards bottom of core.

Core Photo

Coastline Consulting & Development Core Log

Project: Kennebunkport Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: K-3 **Time:** 10:05 am

Sampler Type: VibraCore Sampler

Depth: -1.7’ MLLW

Coordinates: **Latitude:** 43.35634 **Longitude:** -70.474

Penetration: 4.3’ **Recovery:** 4.2’ **No. Attempts:** 7

Material Description: 0-4.2’ composited. Dark silt with hard packed sand at bottom of core. Multiple attempts were made refusal was reached after 4.3’ penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Yachtsman Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: Y-1 **Time:** 11:29 am

Sampler Type: VibraCore Sampler

Depth: -1.5' MLLW

Coordinates: **Latitude:** 43.35735 **Longitude:** -70.47578

Penetration: 3.5' **Recovery:** 3.5' **No. Attempts:** 8

Material Description: 0-3.5' composited. Compact sand with shell debris. Multiple attempts were made refusal was reached after 3.5' penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Yachtsman Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: Y-2 **Time:** 11:15 am

Sampler Type: VibraCore Sampler

Depth: -1.2' MLLW

Coordinates: **Latitude:** 43.35724 **Longitude:** -70.47533

Penetration: 2.5' **Recovery:** 2.5' **No. Attempts:** 8

Material Description: 0-2.5' composited. Hard packed sand. Multiple attempts were made refusal was reached after 2.5' penetration.

Core Photo

Coastline Consulting & Development Core Log

Project: Yachtsman Marina

Date: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: Y-3

Time: 11:02 am

Sampler Type: VibraCore Sampler

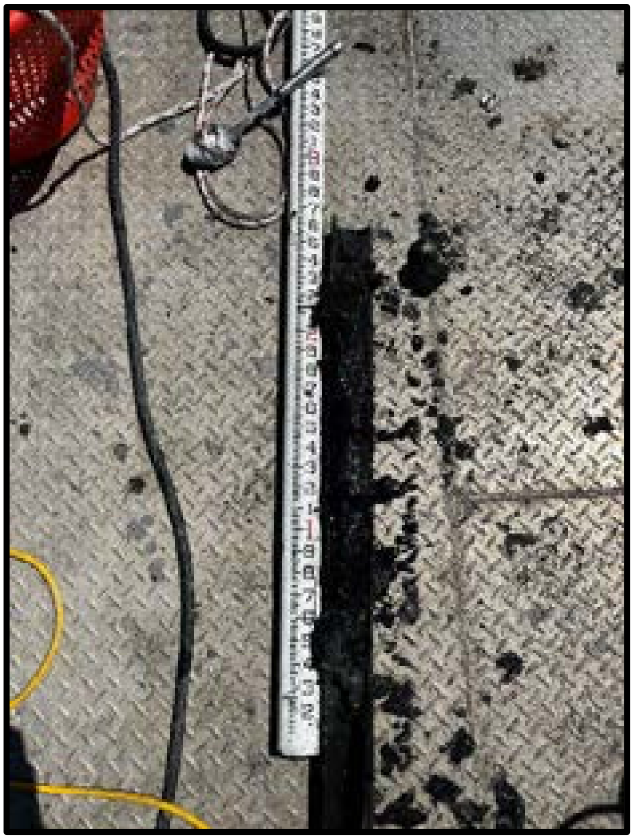
Depth: -4.2' MLLW

Coordinates: **Latitude:** 43.35701 **Longitude:** -70.47488

Penetration: 2.7' **Recovery:** 2.7' **No. Attempts:** 5

Material Description: 0-2.7' composited. Dark silt with hard packed sand at bottom of core.

Core Photo



Coastline Consulting & Development Core Log

Project: Yachtsman Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: Y-4 **Time:** 10:54 am

Sampler Type: VibraCore Sampler

Depth: -4.4' MLLW

Coordinates: **Latitude:** 43.35673 **Longitude:** -70.47467

Penetration: 3.4' **Recovery:** 3.4' **No. Attempts:** 4

Material Description: 0-2.6' composited. Dark silt with hard packed sand at bottom of core.

Core Photo

Coastline Consulting & Development Core Log

Project: Yachtsman Marina **Date**: 7/26/2022

Sampling Personnel: Dustin J Kach

Weather: Light Winds, Clear Skies

Location Method: DGPS: 1 meter accuracy

Sample ID: Y-5 **Time:** 10:40 am

Sampler Type: VibraCore Sampler

Depth: -1.0' MLLW

Coordinates: **Latitude:** 43.35629 **Longitude:** -70.47437

Penetration: 6.1' **Recovery:** 6.1' **No. Attempts:** 3

Material Description: 0-6.0' composited. Dark silt with hard packed sand at bottom of core.

Core Photo

Appendix B
Bulk Sediment Chemistry Results

							Kennebunkport Marina (NAE-2005-00280)						Yachtsman Marina (NAE-2004-00319)										Arundel Yacht Club (NAE-2022-00288)								Kennebunk River Club (NAE-2007-2704)																	
					IOSN		K-1		K-2		K-3		Y-1		Y-2		Y-3		Y-4		Y-5		AYC-1		AYC-2		AYC-3		AYC-4		KBRC-A		KBRC-B		KBRC-C		KBRC-D		KBRC-E		KBRC-G		KBRC-H		KBRC-I		KBRC-F	
Parameter	CAS Number	Units	ERL	ERM	Value	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Physical																																																	
Total organic carbon	14762744	%			1.28		0.37		3.04		2.32		0.93		0.72		1.90		1.19		0.20		1.14		1.15		8.46		2.64		-		-		-		-		-		-		-		-		-	
Metals																																																	
Arsenic	7440382	mg/kg	8.2	70	9.66		2.85		6.68		6.34		6.65		3.20		7.96		4.54		0.984		9.75		6.72		7.78		10.3		5.34		4.98		3.52		3.30		2.47		3.34		2.82		5.12		1.58	
Cadmium	7440439	mg/kg	1.2	9.6	0.072		0.295		0.410		0.344		0.225		0.235		0.388		0.430		0.093		0.335		0.330		0.453		0.613		0.463		0.433		0.300		0.350		0.229		0.277		0.237		0.451		0.119	
Chromium	7440473	mg/kg	81	370	31.5		21.9		27.1		26.4		17.7		14.7		33.6		23.1		6.71		41.6		26.2		25.6		38.1		27.5		26.0		20.0		20.5		15.6		18.0		16.5		24.8		11.0	
Copper	7440508	mg/kg	34	270	10.9		14.2		16.7		15.4		12.5		8.64		18.3		9.82		1.59		29.4		15.7		25.6		24.3		13.7		13.8		9.34		9.52		18.6		8.28		7.16		13.6		5.32	
Lead	7439921	mg/kg	46.7	218	18.1		134		21.9		17.1		12.4		12.9		20.2		7.79		1.81		30.9		26.1		21.4		33.7		18.8		17.8		12.2		13.3		8.67		11.5		9.29		17.7		4.81	
Mercury	7439976	mg/kg	0.150	0.710	0.032		0.051		0.063		0.047		0.045		0.051		0.052		0.011	J	0.005	J	0.064		0.086		0.059	J	0.108		0.062		0.054		0.052		0.053		0.032		0.067		0.046		0.056		0.023	
Nickel	7440020	mg/kg	20.9	51.6	20.8		9.17		15.6		15.4		11.3		8.37		21.4		15.1		3.81		25.4		13.0		15.0		22.7		15.9		14.5		11.4		11.3		8.57		9.92		8.67		13.4		6.12	
Zinc	7440666	mg/kg	150	410	60.6		56.6		67.4		57.2		42.2		37.6		71.2		45.2		10.2		101		58.1		68.6		98.0		68.9		67.7		48.3		50.9		37.2		50.5		39.9		78.2		28.9	J
PAHs																																																	
Acenaphthene	83329	ug/kg	16	500	1.48		3.96	J	20.4		15.1		5.30		3.46	J	2.97	J	1.75	J	1.32	J	11.3		23.4		1.40	U	4.94	J	21.7		18.2		1.35	U	1.35	U	1.35	U	1.35	U	1.35	U	1.35	U	1.35	U
Acenaphthylene	208968	ug/kg	44	640	7.06		30.1		20.6		12.6		9.97		17.0		12.6		0.241	U	0.884	J	23.8		71.1		7.60	J	15.3		10.0		1.25	U	1.25	U	1.25	U	1.25	U	1.25	U	1.25	U	11.9		1.25	
Anthracene	120127	ug/kg	85.3	1,100	4.14		32.5		34.5		40.4		26.3		32.5		18.1		0.692	J	0.640	J	25.0		119		7.96	J	18.6		90.3		143.0		46.3		19.6		26.2		18.9		25.2		29.1		15.4	U
Fluorene	86737	ug/kg	19	540	2.40		8.08		25.5		17.1		6.97		9.01		5.98		0.218	U	0.186	U	12.9		37.4		3.53	J	4.86	J	37.8		30.6		15.9		1.45	U	1.45	U	1.45	U	10.9		14.2		1.45	
Naphthalene	91203	ug/kg	160	2,100	6.25		8.30		10.2		11.6		5.13		8.99		9.39		2.35	UJ	2.26	UJ	14.5		21.8		29.7		7.95		1.15	U	1.15	U	1.15	U	1.15	U	1.15	U	1.15	U	1.15	U	1.15	U	1.15	U
Phenanthrene	85018	ug/kg	240	1500	26.9		102		114		128		134	J	120		69.4		2.62	J	3.38	J	101		381		40.7		52.2		155		127		142		81.5		82.9	J	76.5		87.1		159		82.9	
Total LPAH	*SUMLPAH*	ug/kg	552	3,160	48.2		185		225		225		188		191		118		7.87		8.67		189		654		90.9		104		316		321		208		106		114		101		127		217		104	
Benzo(a)anthracene	56553	ug/kg	261	1,600	21.3		115		157		133		127		128		74.0		2.98	J	3.97		136		326		31.0		77.3		311		522		257		92		97.2		78.7		67.0		136		55.8	
Benzo(a)pyrene	50328	ug/kg	430	1,600	23.4		129		160		130		132	J	130		85.3		3.12	J	4.60		140		328		35.7		90.0		171	J	226	J	146	J	80	J	76.8		71.4	J	58	J	129	J	51.8	J
Benzo(b)fluoranthene	205992	ug/kg			36.4		126		180		137		116	J	141		95.8		3.61	J	5.28		163		320		42.7		93.5		282	J	303	J	210	J	109	J	87.2		86.6	J	86.2	J	201	J	63.6	J
Benzo(g,h,i)perylene	191242	ug/kg			23.1		88.0		112		90.4		87.6	J	83.3		63.9		2.36	J	3.32	J	101		206		28.2		61.9		73.1	J	82.4	J	60.7	J	38.2	J	39.7		31.0	J	23.7	J	50	J	26.8	J
Benzo(k)fluoranthene	207089	ug/kg			18.5		91		131		117		106	J	94.6		61.4		2.23	J	3.38	J	120		231		31.1		75.7		174	J	251	J	139	J	77.7	J	67.3		78.9	J	52.5	J	110	J	40.5	J
Chrysene	218019	ug/kg	384	2,800	21.7		132		164		138		136	J	140		88.9		3.32	J	4.68		148		362		42.9		94.7		321		455		216		102		95.7		86.1		79.0		169		58.6	
Dibenz(a,h)anthracene	53703	ug/kg	63.4	260	4.41		19.6		24.4		20.4		19.6		21.2		15.2		0.253	U	0.723	J	25.3		56.6		8.33	J	14.7		11.6	J	15.5	J	10.0	UJ	9.9	UJ	10.2		10.1	UJ	10.2	UJ	10.1	UJ	9.90	UJ
Fluoranthene	206440	ug/kg	600	5,100	42.1		239		364		474		297	J	269		167		7.05		6.58		291		702		92.7		233		618		1130		264		152		162	J	136		127		209		123	
Indeno(1,2,3-cd)pyrene	193395	ug/kg			23.6		83.5		108		94.6		90.1	J	86.5		67.2		2.39	J	3.20	J	102		215		27.4		64.2		71.2	J	87.5	J	60.5	J	39.5	J	43.8		33.4	J	27.2	J	51.0	J	28.1	J
Pyrene	129000	ug/kg	665	2,600	45.2		215		297		330		225		244		144		5.99		12.6		256		594		71.2		181		611		1140		665		166		158		144		122		236		109	
Total HPAH	*SUMHPAH*	ug/kg	1,700	9,600	260		1238		1697		1664		1336		1338		863		33.3		48.3		1482		3341		411		986		2644		4212		2028		866		838		756		653		1301		567	
Pesticides																																																	
4,4`-DDD	72548	ug/kg	2	20	0.020	U	4.98	J	4.66	J	0.112	UJ	1.16	J	2.86	J	0.093	UJ	0.016	UJ	0.013	UJ	3.87	J	4.34	J	0.274	UJ	1.99	J	1.30		1.90		2.10		1.30		1.00		1.20		0.880		1.70		0.680	
4,4`-DDE	72559	ug/kg	2.2	27	0.066		2.23		4.53	J	0.068	U	2.50	J	2.78		0.057	U	0.010	U	0.008	U	7.51	J	5.74		0.167	U	4.37	J	1.90		1.30		1.40		1.30		0.790		1.40		1.30		2.00		0.400	
4,4`-DDT	50293	ug/kg	1	7	0.026	U	1.44		1.44		0.148	U	0.960		0.808		0.123	U	0.020	U	0.017	U	1.62	J	2.60		0.360	U	1.51	J	0.850		1.50		4.00		0.750		0.620		0.900		0.530		2.20		0.028	U
Total DDX	SUMDDX	ug/kg	1.58	46.1	0.112		8.65		10.6		0.328	U	4.62		6.45		0.272	U	0.045	U	0.038	U	13.0		12.7		0.801	U	7.87		4.05		4.70		7.50		3.35		2.41		3.50		2.71		5.90		1.11	
Aldrin	309002	ug/kg			0.066	U	0.051	U	0.063	U	0.374	U	0.063	U	0.051	U	0.311	U	0.051	U	0.044	U	0.378	U	0.243	U	0.915	U	0.374	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.200	UJ
Alpha-Chlordane (cis)	5103719	ug/kg			0.142	U	0.110	U	0.137	U	0.810	U	0.135	U	0.111	U	0.670	U	0.110	U	0.094	U	0.815	U	0.525	U	1.97	U	0.810	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
cis-Nonachlor	5103731	ug/kg			0.019	U	0.015	U	0.019	U	0.109	U	0.018	U	0.015	U	0.090	U	0.015	U	0.013	U	0.110	U	0.071	U	0.265	U	0.109	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U
Dieldrin	60571	ug/kg	0.02	8	0.040	U	0.031	U	0.038	U	0.226	U	0.038	U	0.031	U	0.187	U	0.031	U	0.026	U	0.23	U	0.15	U	0.550	U	0.225	U	0.460		0.850		0.026	U	1.00		1.20		0.026	U	0.026	U	0.610		0.026	U
Endosulfan I	959988	ug/kg			0.036	U	0.028	U	0.035	U	0.206	U	0.035	U	0.029	U	0.171	U	0.028	U	0.024	U	0.208	U	0.134	U	0.500	U	0.206	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U
Endosulfan II	33213659	ug/kg			0.019	U	0.015	U	0.018	U	0.106	U	0.018	U	0.015	U	0.088	U	0.015	U	0.013	U	0.107	U	0.069	U	0.260	U	0.106	U	0.019	U	0.019	U	0.019	U	1.20		0.019	U	0.019	U	0.019	U	0.740		0.019	U
Endrin	72208	ug/kg			0.022	U	0.017	U	0.021	U	0.123	U	0.021	U	0.017	U	0.102	U	0.017	U	0.014	U	0.124	U	0.080	U	0.300	U	0.123	U	0.027	U	0.027	U	0.430		0.760		0.027	U	0.027	U	0.770		1.90		0.027	U
Gamma-Chlordane (trans)	5103742	ug/kg			0.040	U	0.031	U	0.039	U	0.228	U	0.038	U	0.031	U	0.189	U	0.031	U	0.027	U	0.23	U	0.15	U	0.555	U	0.228	U	0.710		0.910		0.220		1.8		0.009	U	0.009	U	1.50		0.720		0.830	J
Heptachlor	76448	ug/kg			0.041	U	0.032	U	0.040	U	0.235	U	0.039	U	0.032	U	0.195	U	0.032	U	0.027	U	0.237	U	0.152	U	0.570	U	0.234	U	0.470		0.300		0.310		0.230		0.220		0.009	U	0.009	U	0.820		0.009	U
Heptachlor epoxide	1024573	ug/kg			0.085	U	0.066	U	0.082	U	0.482	U	0.081	U	0.066	U	0.400	U	0.066	U	0.056	U	0.487	U	0.312	U	1.18	U	0.482	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.200	UJ
Hexachlorobenzene	118741	ug/kg			0.354	U	0.274	U	0.341	U	2.015	U	0.337	UJ	0.276	U	1.670	U	0.274	U	0.234	U	2.035	U	1.305	U	4.92	U	2.02	U	0.009	U	0.450		0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.009	U
Lindane	58899	ug/kg			0.059	U	0.046	U	0.057	U	0.338	U	0.057	UJ	0.047	U	0.281	U	0.046	U	0.039	U	0.342	U	0.219	U	0.825	U	0.338	U	0.013	U	0.670		0.540		0.013	U	0.013	U	0.013	U	0.013	U	0.013	U	0.400	J
Methoxychlor	72435	ug/kg			0.913	U	0.073	U	0.090	U	0.530	U	0.089	U	0.073	U	0.442	U	0.073	U	0.062	U	0.540	U	0.345	U	1.30	U	0.530	U	0.125	U	0.125	U	0.125	U	0.125	U	0.125	U	0.125	U	0.125	U	0.125	U	0.125	U
Oxychlordane	27304138	ug/kg			0.082	U	0.063	U	0.079	U	0.464	U	0.078	U	0.064	U	0.385	U	0.063	U	0.054	U	0.469	U	0.301	U	1.13	U	0.464	U	0.710		0.010	U	1.60		0.010	U	0.010	U	0.230		0.010	U	0.290		0.200	UJ
Toxaphene	8001352	ug/kg			1.71	U	1.33	U	1.65	U	9.70	U	1.63	U	1.34	U	8.10	U	1.33	U	1.13	U	9.80	U	6.30	U	23.8	U	9.70	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
trans-Nonachlor	39765805	ug/kg			0.018	U	0.014	U	0.017	U	0.100	U	0.017	U	0.014	U	0.083	U	0.014	U	0.012	U	0.101	U	0.065	U	0.244	U	0.100	U	0.009	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.200	UJ
Total Chlordane	*SUMCHLOR*	ug/kg	0.5	6	0.300	U	0.233	U	0.289	U	1.710	U	0.285	U	0.234	U	1.42	U	0.233	U	0.198	U	1.72	U	1.11	U	4.2	U	1.7	U	1.4		0.95		1.8		1.8		0.044	U	0.265		1.54		1.04		1.25	
PCBs																																																	
PCB 008	34883437	ug/kg			0.104	U	0.041	U	0.050	U	0.059	U	0.050	U	0.041	U	0.049	U	0.041	U	0.035	U	0.060	U	0.039	U	0.145	U	0.06	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U
PCB 018	37680652	ug/kg			0.076	U	0.030	U	0.037	U	0.043	U	0.036	U	0.030	U	0.036	U	0.030	U	0.025	U	0.044	U	0.028	U	0.105	U	0.043	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U
PCB 028	7012375	ug/kg			0.129	U	0.050	U	0.062	U	0.074	U	0.062	U	0.050	U	0.061	U	0.050	U	0.043	U	0.074	U	0.048	U	0.179	U	0.073	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U	0.015	U
PCB 044	41464395	ug/kg			0.144	U	0.056	U	0.069	U	0.082	U	0.069	U	0.056	U	0.068	U	0.056	U	0.048	U	0.083	U	0.393		0.200	U	0.082	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
(PCB 049)	41464408	ug/kg			0.140	U	0.055	U	0.068	U	0.080	U	0.067	U	0.055	U	0.067	U	0.055	U	0.047	U	0.081	U	0.052	U	0.195	U	0.080	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U
PCB 052	35693993	ug/kg			0.080	U	0.308	J	0.248	J	0.046	U	0.038	U	0.031	U	0.038	U	0.031	U	0.027	U	0.046	U	0.506		0.111	U	0.046	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U
PCB 066	32598100	ug/kg			0.075	U	0.029	U	0.036	U	0.043	U	0.036	U	0.030	U	0.036	U	0.029	U	0.025	U	0.043	U	0.028	U	0.105	U	0.043	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U
(PCB 087)	38380028	ug/kg			0.061	U	0.302	J	0.030	U	0.035	U	0.029	U	0.024	U	0.029	U	0.024	U	0.020	U	0.035	U	0.023	U	0.085	U	0.035	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U
PCB 101	37680732	ug/kg			0.123	U	0.819		0.059	U	0.070	U	0.059	U	0.048	U	0.270	J	0.048	U	0.041	U	0.357	J	0.747		0.170	U	0.070	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
PCB 105	32598144	ug/kg			0.110	U	0.043	U	0.053	U	0.063	U	0.053	U	0.043	U	0.052	U	0.043	U	0.037	U	0.063	U	0.041	U	0.153	U	0.063	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.010	U	0.200	
PCB 118	31508006	ug/kg			0.116	U	0.571		0.056	U	0.066	U	0.056	U	0.046	U	0.055	U	0.045	U	0.039	U	0.067	U	0.590		0.162	U	0.066	U	0.011	U	0.250		0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U
PCB 128	38380073	ug/kg			0.137	U	0.053	U	0.066	U	0.078	U	0.066	U	0.054	U	0.065	U	0.053	U	0.046	U	0.079	U	0.051	U	0.191	U	0.078	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U
PCB 138	35065282	ug/kg			0.088	U	0.922		0.625		0.290	J	0.042	U	0.278	J	0.453	J	0.034	U	0.029	U	0.389	J	1.07		0.122	U	0.050	U	0.280		0.360		0.230		0.220		0.008	U	0.008	U	0.260		0.290		0.008	U
PCB 153	35065271	ug/kg			0.183	U	0.597		0.316	J	0.104	U	0.087	U	0.206	J	0.292	J	0.071	U	0.061	U	0.300	J	0.657		0.254	U	0.104	U	0.260		0.310		0.220		0.006	U	0.006	U	0.006	U	0.006	U	0.220		0.006	U
PCB 170	35065306	ug/kg			0.067	U	0.026	U	0.033	U	0.039	U	0.032	U	0.027	U	0.032	U	0.026	U	0.022	U	0.039	U	0.025	U	0.094	U	0.039	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U
PCB 180	35065293	ug/kg			0.069	U	0.256	J	0.033	U	0.039	U	0.033	U	0.027	U	0.033	U	0.027	U	0.023	U	0.040	U	0.026	U	0.096	U	0.039	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U	0.007	U
(PCB 183)	52663691	ug/kg			0.037	U	0.015	U	0.018	U	0.021	U	0.018	U	0.015	U	0.018	U	0.015	U	0.012	U	0.022	U	0.014	U	0.052	U	0.021	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
(PCB 184)	74472483	ug/kg			0.076	U	0.030	U	0.037	U	0.043	U	0.036	U	0.030	U	0.036	U	0.030	U	0.025	U	0.044	U	0.028	U	0.105	U	0.043	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U
PCB 187	52663680	ug/kg			0.099	U	0.213	J	0.048	U	0.056	U	0.047	U	0.039	U	0.047	U	0.039	U	0.033	U	0.057	U	0.037	U	0.138	U	0.056	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U	0.008	U
PCB 195	52663782	ug/kg			0.129	U	0.050	U	0.062	U	0.074	U	0.062	U	0.051	U	0.061	U	0.050	U	0.043	U	0.075	U	0.048	U	0.180	U	0.074	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U	0.009	U
PCB 206	40186729	ug/kg			0.132	U	0.051	U	0.064	U	0.075	U	0.063	U	0.052	U	0.063	U	0.051	U	0.044	U	0.076	U	0.049	U	0.184	U	0.075	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U	0.011	U
PCB 209	2051243	ug/kg			0.151	U	0.059	U	0.073	U	0.086	U	0.072	U	0.059	U	0.072	U	0.059	U	0.050	U	0.087	U	0.056	U	0.211	U	0.086	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U
Total PCBs	*SumNOAA18*	ug/kg	22.7	180	4.02	U	8.34		3.98		2.77		1.92		2.33		3.56		1.56	U	1.33	U	3.95		8.87		5.59	U	2.29	U	1.4		2.1		1.2		0.751		0.326	U	0.326	U	0.831		1.3		0.706	

Notes:

Yellow indicates an exceedance of the ERL

Red indicates an exceedance of the ERM

U= Compound was analyzed for but was not detected (non-detect)

J= Indicates an estimated value

J+= Indicates an estimated value biased high

Non-detects reported as half the MDL

Reference site data from DAMOS monitoring surveys (2019 IOSN)

Total PCBs were calculated using the NOAA 18 method

Total Chlordane is a sum of alpha and gamma chlordane, cis and trans nonachlor, and oxychlordane; IOSN value is a sum of only alpha and gamma chlordane

Appendix C
Tissue Concentrations and BEST Model Output

TABLE C-1 STATISTICAL COMPARISONS OF *N. virens* BODY BURDENS VS. IOSN 2019 REFERENCE DATA

Compound	Units	Pre-Test [d]		IOSN 2019		Composite	
		Mean	Qual	Mean	Qual	Mean	Qual
Trace Metals							
Arsenic, total	mg/Kg	2.00		2.25		2.02	NS
Cadmium, total	mg/Kg	0.0300	b	0.0252	b	0.0338	bS
Chromium, total	mg/Kg	0.620	b	0.0686	b	0.551	bS
Copper, total	mg/Kg	1.49		1.20		1.12	NS
Lead, total	mg/Kg	0.195		0.0744		0.191	S
Mercury, total	mg/Kg	0.0110	b	0.0156	b	0.00662	abNS
Nickel, total	mg/Kg	0.476		0.168		0.232	S
Zinc, total	mg/Kg	13.1		18.6		14.1	NS/S e
PAH Compounds							
Acenaphthene	µg/Kg	0.620	a	0.563	ab	0.883	abNS
Acenaphthylene	µg/Kg	0.381	a	0.286	a	4.22	aNS
Anthracene	µg/Kg	0.903	ab	0.310	a	0.610	abS
Benzo(a)anthracene	µg/Kg	0.775	a	0.581	a	0.766	ac
Benzo(a)pyrene	µg/Kg	0.813	a	0.610	a	0.805	ac
Benzo(b)fluoranthene	µg/Kg	1.08	a	0.807	a	2.43	aS
Benzo(k)fluoranthene	µg/Kg	0.493	a	0.371	a	6.45	aS
Benzo(g,h,i)perylene	µg/Kg	0.345	a	0.259	a	0.427	abS
Chrysene	µg/Kg	0.752	a	0.564	a	1.14	abS
Dibenz(a,h)anthracene	µg/Kg	0.400	a	0.300	a	0.396	ac
Fluoranthene	µg/Kg	0.610	a	0.569	ab	6.71	bS
Fluorene	µg/Kg	1.07	b	0.431	ab	2.05	bS
Indeno(1,2,3-cd)pyrene	µg/Kg	0.810	a	0.608	a	0.802	ac
Naphthalene	µg/Kg	1.64	b	0.651	ab	1.60	abS
Phenanthrene	µg/Kg	0.677	a	2.04	b	0.861	abNS
Pyrene	µg/Kg	0.898	a	0.674	a	6.23	bS
Total PAHs	µg/Kg	12.3		9.63		36.4	
PCB Congeners							
PCB 008	µg/Kg	0.0638	a	0.0480	a	0.0632	ac
PCB 018	µg/Kg	0.0465	a	0.0349	a	0.0460	ac
PCB 028	µg/Kg	0.0790	a	0.0593	a	0.0784	ac
PCB 044	µg/Kg	0.0880	a	0.0661	a	0.0873	ac
PCB 052	µg/Kg	0.0491	a	0.0369	a	0.136	abS
PCB 066	µg/Kg	0.0462	a	0.0347	a	0.0457	ac
PCB 101	µg/Kg	0.0752	a	0.0564	a	0.0745	ac
PCB 105	µg/Kg	0.0675	a	0.0506	a	0.810	aS
PCB 118	µg/Kg	0.0713	a	0.0534	a	0.0706	ac
PCB 128	µg/Kg	0.0842	a	0.0632	a	0.0834	ac
PCB 138	µg/Kg	0.305	ab	0.331	ab	0.462	aNS
PCB 153	µg/Kg	0.628	b	0.763		0.857	aNS
PCB 170	µg/Kg	0.0413	a	0.0310	a	0.0409	ac
PCB 180	µg/Kg	0.0423	a	0.0318	a	0.0419	ac
PCB 187	µg/Kg	0.256	a	0.0456	a	0.0601	ac
PCB 195	µg/Kg	0.0795	a	0.0596	a	0.0786	ac
PCB 206	µg/Kg	0.0810	a	0.0608	a	0.0802	ac
PCB 209	µg/Kg	0.0928	a	0.0697	a	0.0920	ac
Total PCBs	µg/Kg	4.39		3.79		6.42	
Pesticides							
Aldrin	µg/Kg	0.0404	a	0.0605	a	0.0400	ac
cis-Chlordane	µg/Kg	0.0870	a	0.131	a	0.0863	ac
trans-Chlordane	µg/Kg	0.0245	a	0.0369	a	0.0243	ac
cis-Nonachlor	µg/Kg	0.0117	a	0.0176	a	0.0116	ac
trans-Nonachlor	µg/Kg	0.0108	a	0.0161	a	0.0106	ac
Oxychlordane	µg/Kg	0.0501	a	0.0752	a	0.0495	ac
Total Chlordanes	µg/Kg	0.184		0.277		0.182	
4,4'-DDT	µg/Kg	0.0159	a	0.0238	a	0.0158	ac
4,4'-DDD	µg/Kg	3.29	ab	0.0182	a	0.665	S
4,4'-DDE	µg/Kg	0.00737	a	0.0111	a	0.00728	ac
Total DDT	µg/Kg	3.32		0.0531		0.688	
Dieldrin	µg/Kg	0.0243	a	0.0365	a	0.0241	ac
alpha-Endosulfan	µg/Kg	0.0222	a	0.0334	a	0.0220	ac
beta-Endosulfan	µg/Kg	0.0115	a	0.0173	a	0.0113	ac
Total Endosulfans	µg/Kg	0.0337		0.0507		0.0333	
Endrin	µg/Kg	0.0132	a	0.0199	a	0.0131	ac
Heptachlor	µg/Kg	0.0253	a	0.0379	a	0.0250	ac
Heptachlor epoxide	µg/Kg	0.0520	a	0.0780	a	0.0515	ac
Hexachlorobenzene	µg/Kg	0.217	a	0.326	a	0.215	ac
Lindane (gamma-BHC)	µg/Kg	0.0365	a	0.0548	a	0.0361	ac
Methoxychlor	µg/Kg	0.0575	a	0.843	a	0.0568	ac
Toxaphene	µg/Kg	1.05	a	1.58	a	1.04	ac

Notes:

Mean concentrations are reported to 3 significant figures.

a = COC not detected (below MDL) in at least one replicate; mean value was calculated using one-half of the project specific MDL for non-detected values.
b = COC concentration estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c = COC was not detected in either the dredge tissue replicates or in the historic reference tissue, therefore was eliminated from further evaluation.

[d] Pre-test tissue represents the mean of three replicates, whereas the reference and site composites represent a mean of 5 replicates.

[e] Analysis conducted after removal of a statistical outlier.

NS = Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.
S = Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05.

TABLE C-2 STATISTICAL COMPARISONS OF *M. nasuta* BODY BURDENS VS. IOSN 2019 REFERENCE DATA

Compound	Units	Pre-Test [d]		IOSN 2019		Composite	
		Mean	Qual	Mean	Qual	Mean	Qual
Trace Metals							
Arsenic, total	mg/Kg	2.59		3.49		2.54	NS
Cadmium, total	mg/Kg	0.0297	b	0.0290	b	0.0266	bNS
Chromium, total	mg/Kg	0.465		0.334	b	0.434	bNS
Copper, total	mg/Kg	3.10		1.77		2.71	S
Lead, total	mg/Kg	0.129		0.349		0.452	S
Mercury, total	mg/Kg	0.00185	a	0.00170	a	0.00208	ac
Nickel, total	mg/Kg	0.713		0.521		0.570	NS/S[e]
Zinc, total	mg/Kg	11.6		11.8		12.8	NS
PAH Compounds							
Acenaphthene	µg/Kg	1.07	ab	0.453	a	1.56	abNS
Acenaphthylene	µg/Kg	0.378	a	0.279	a	0.381	ac
Anthracene	µg/Kg	0.853	ab	0.302	a	2.69	bS
Benzo(a)anthracene	µg/Kg	1.32	ab	0.565	a	5.40	bS
Benzo(a)pyrene	µg/Kg	0.805	a	0.594	a	1.74	abS
Benzo(b)fluoranthene	µg/Kg	1.07	a	0.786	a	4.41	bS
Benzo(k)fluoranthene	µg/Kg	0.490	a	0.455	ab	1.25	abS
Benzo(g,h,i)perylene	µg/Kg	0.342	a	0.518	ab	0.820	abNS
Chrysene	µg/Kg	2.01	b	0.550	a	2.92	bS
Dibenz(a,h)anthracene	µg/Kg	0.559	ab	2.97	b	0.400	aNS
Fluoranthene	µg/Kg	2.57	b	2.12	b	26.6	S
Fluorene	µg/Kg	2.11	b	0.253	a	1.74	bS
Indeno(1,2,3-cd)pyrene	µg/Kg	0.803	a	3.54	b	0.985	abNS
Naphthalene	µg/Kg	3.78	b	0.390	a	1.77	bS
Phenanthrene	µg/Kg	4.09	b	1.97	b	6.92	bS
Pyrene	µg/Kg	2.86	b	1.63	b	20.8	S
Total PAHs	µg/Kg	25.1		17.4		80.4	
PCB Congeners							
PCB 008	µg/Kg	0.0633	a	0.0467	a	0.0639	ac
PCB 018	µg/Kg	0.0461	a	0.0340	a	0.0465	ac
PCB 028	µg/Kg	0.0783	a	0.0578	a	0.0791	ac
PCB 044	µg/Kg	0.0873	a	0.0644	a	0.0883	ac
PCB 052	µg/Kg	2.09		0.0359	a	0.172	aS
PCB 066	µg/Kg	0.0457	a	0.0338	a	0.0462	ac
PCB 101	µg/Kg	0.0745	a	0.0550	a	0.0754	ac
PCB 105	µg/Kg	0.0668	a	0.0493	a	0.0675	ac
PCB 118	µg/Kg	0.0708	a	0.0522	a	0.142	abS
PCB 128	µg/Kg	0.0835	a	0.0616	a	0.0843	ac
PCB 138	µg/Kg	0.392	a	0.0394	a	0.0539	ac
PCB 153	µg/Kg	0.111	a	0.0820	a	0.142	abS
PCB 170	µg/Kg	0.0410	a	0.0303	a	0.0414	ac
PCB 180	µg/Kg	0.0419	a	0.0309	a	0.0423	ac
PCB 187	µg/Kg	0.0603	a	0.0445	a	0.0607	ac
PCB 195	µg/Kg	0.0787	a	0.0580	a	0.0794	ac
PCB 206	µg/Kg	0.0803	a	0.0594	a	0.0810	ac
PCB 209	µg/Kg	0.0920	a	0.0680	a	0.0929	ac
Total PCBs	µg/Kg	7.22		1.81		2.92	
Pesticides							
Aldrin	µg/Kg	0.0200	a	0.0296	a	0.0202	ac
cis-Chlordane	µg/Kg	0.0432	a	0.0638	a	0.0436	ac
trans-Chlordane	µg/Kg	0.0122	a	0.0180	a	0.0123	ac
cis-Nonachlor	µg/Kg	0.00582	a	0.00870	a	0.00587	ac
trans-Nonachlor	µg/Kg	0.00533	a	0.00780	a	0.00538	ac
Oxychlordane	µg/Kg	0.0248	a	0.0366	a	0.0250	ac
Total Chlordanes	µg/Kg	0.0913		0.135		0.0922	
4,4'-DDT	µg/Kg	0.00788	a	0.0117	a	0.00796	ac
4,4'-DDD	µg/Kg	0.00598	a	0.00880	a	0.391	S
4,4'-DDE	µg/Kg	0.00365	a	0.219	b	0.499	S
Total DDT	µg/Kg	0.0175		0.240		0.898	
Dieldrin	µg/Kg	0.0121	a	0.0178	a	0.0122	ac
alpha-Endosulfan	µg/Kg	0.0110	a	0.0163	a	0.0111	ac
beta-Endosulfan	µg/Kg	0.00568	a	0.00840	a	0.00573	ac
Total Endosulfans	µg/Kg	0.0167		0.0247		0.0168	
Endrin	µg/Kg	0.00653	a	0.00970	a	0.00662	ac
Heptachlor	µg/Kg	0.0125	a	0.0186	a	0.0127	ac
Heptachlor epoxide	µg/Kg	0.0257	a	0.0381	a	0.0260	ac
Hexachlorobenzene	µg/Kg	0.108	a	0.159	a	0.109	ac
Lindane (gamma-BHC)	µg/Kg	0.0181	a	0.0267	a	0.0183	ac
Methoxychlor	µg/Kg	0.0285	a	0.411	a	0.0287	ac
Toxaphene	µg/Kg	0.518	a	0.767	a	0.524	ac

Notes:

Mean concentrations are reported to 3 significant figures.

a = COC not detected (below MDL) in at least one replicate; mean value was calculated using one-half of the project specific MDL for non-detected values.

b = COC concentration estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.

c = COC was not detected in either the dredge tissue replicates or in the historic reference tissue, therefore was eliminated from further evaluation.

[d] Pre-test tissue represents the mean of three replicates, whereas the reference and site composites represent a mean of 5 replicates.

[e] Analysis conducted after removal of a statistical outlier.

NS = Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.

S = Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05.

Project name: **Yachtsman Marina, Kennebunkport, ME**

Project number:

Model filename: **EPA Reg 1 Template wChemical List.best**

Chemical filename: **Chemical_List_for_EPA_Reg1_template (in progress).xlsx**

Table Of Contents

Human Subreport

Human: Adult Angler

Total Estimated Risks From Organics(see EPA Table Xa)

Receptor: Adult Angler

Organism: Macoma nasuta

		Cancer Risk	Non-Cancer Risk
Composite (10 Stations at		Fish Fillet	
	Test	6.01E-6	3.72E-2
	Reference	1.66E-6	1.74E-2
		Nereis virens	
	Test	0	0
	Reference	0	0
		Macoma nasuta	
	Test	6.23E-6	3.84E-2
	Reference	1.72E-6	1.8E-2
		Total Lobster	
	Test	3.1E-5	1.92E-1
	Reference	8.57E-6	9E-2

		Cancer Risk	**Non-Cancer Risk**
		Lobster Hepatopancreas	
	Test	2.14E-5	1.33E-1
	Reference	5.91E-6	6.21E-2
		Lobster Muscle	
	Test	9.62E-6	5.96E-2
	Reference	2.66E-6	2.79E-2

Total Estimated Risks From Organics(see EPA Table Xa)

Receptor: Adult Angler

Organism: Nereis virens

		Cancer Risk	Non-Cancer Risk
Composite (10 Stations at		Fish Fillet	
	Test	5.09E-6	8.9E-2
	Reference	1.63E-6	3.72E-2
		Nereis virens	
	Test	6.12E-6	1.08E-1
	Reference	1.97E-6	4.51E-2
		Macoma nasuta	
	Test	0	0
	Reference	0	0
		Total Lobster	
	Test	2.63E-5	4.59E-1
	Reference	8.39E-6	1.92E-1
		Lobster Hepatopancreas	
	Test	1.81E-5	3.17E-1
	Reference	5.79E-6	1.32E-1
		Lobster Muscle	
	Test	8.14E-6	1.42E-1
	Reference	2.6E-6	5.95E-2

Seafood Non-Cancer Risks (see EPA Table 6a, Columns F & G)

Receptor: Adult Angler

Organism: Macoma nasuta

			Non-Cancer Risk
Composite (10 Stations at 4 Marinas Mud)	Copper	**Test**	0
		Reference	0
	Lead	**Test**	0
		Reference	0
	Nickel	**Test**	0
		Reference	0

Seafood Non-Cancer Risks (see EPA Table 6a, Columns F & G)

Receptor: Adult Angler

Organism: Nereis virens

			Non-Cancer Risk
Composite (10 Stations at 4 Marinas Mud)	Cadmium	**Test**	2.9E-3
		Reference	2.16E-3
	Chromium	**Test**	1.57E-2
		Reference	1.96E-3
	Lead	**Test**	0
		Reference	0
	Nickel	**Test**	0
		Reference	0
	Zinc	**Test**	4.02E-3
		Reference	5.31E-3

FDA Action Limit/Tolerance (see EPA Table 3, Columns D & E)

Receptor: Adult Angler

Organism: Macoma nasuta

	Contaminant	FDA Action Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Total PCBs	2E3	6.47E0
Composite (10 Stations	Mercury	1E0	2.08E-3
Composite (10 Stations	Total DDT	5E3	1.56E0
Composite (10 Stations	Total Chlordanes	3E2	1.53E-1

FDA Action Limit/Tolerance (see EPA Table 3, Columns D & E)

Receptor: Adult Angler

Organism: Nereis virens

	Contaminant	FDA Action Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Total PCBs	2E3	1.42E1
Composite (10 Stations	Mercury	1E0	6.62E-3
Composite (10 Stations	Total DDT	5E3	1.36E0
Composite (10 Stations	Total Chlordanes	3E2	3.04E-1

Ecological Effects Level (see EPA Table 8a.1, Columns D & E)

Receptor: Adult Angler

Organism: Macoma nasuta

	Contaminant	Ecological Effect Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Anthracene	3.75E3	2.69E0
Composite (10 Stations	Benzo(a)pyrene	8E3	3.47E0
Composite (10 Stations	PAH Total	1E4	8.04E1
Composite (10 Stations	Total PCBs	4E3	6.47E0
Composite (10 Stations	Aldrin	2.99E2	2.02E-2
Composite (10 Stations	Dieldrin	4.37E0	1.64E-2
Composite (10 Stations	Endosulfans	2.86E0	1.69E-2
Composite (10 Stations	Arsenic	1.26E1	2.54E0
Composite (10 Stations	Cadmium	3.03E0	2.66E-2
Composite (10 Stations	Chromium	1.18E1	4.34E-1
Composite (10 Stations	Copper	9.6E0	2.71E0
Composite (10 Stations	Lead	1.19E1	4.52E-1
Composite (10 Stations	Mercury	2E-1	2.08E-3
Composite (10 Stations	Nickel	3.8E0	5.7E-1
Composite (10 Stations	Zinc	1.52E3	1.28E1
Composite (10 Stations	Total DDT	3E3	1.56E0

Ecological Effects Level (see EPA Table 8a.1, Columns D & E)

Receptor: Adult Angler

Organism: Nereis virens

	Contaminant	Ecological Effect Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Anthracene	3.75E3	6.1E-1
Composite (10 Stations	Benzo(a)pyrene	8E3	1.61E0
Composite (10 Stations	PAH Total	1E4	3.64E1
Composite (10 Stations	Total PCBs	4E3	1.42E1
Composite (10 Stations	Aldrin	2.99E2	4E-2
Composite (10 Stations	Dieldrin	4.37E0	3.25E-2
Composite (10 Stations	Endosulfans	2.86E0	3.33E-2
Composite (10 Stations	Arsenic	1.26E1	2.02E0
Composite (10 Stations	Cadmium	3.03E0	3.38E-2
Composite (10 Stations	Chromium	1.18E1	5.51E-1
Composite (10 Stations	Copper	9.6E0	1.12E0
Composite (10 Stations	Lead	1.19E1	1.91E-1
Composite (10 Stations	Mercury	2E-1	6.62E-3
Composite (10 Stations	Nickel	3.8E0	2.32E-1
Composite (10 Stations	Zinc	1.52E3	1.41E1
Composite (10 Stations	Total DDT	3E3	1.36E0

FDA Level of Concern (see EPA Table 7a, Columns B & D)

Receptor: Adult Angler

Organism: Macoma nasuta

	Contaminant	FDA Level of Concern(mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Arsenic	8.6E1	2.54E0
Composite (10 Stations	Cadmium	3.7E0	2.66E-2
Composite (10 Stations	Chromium	1.3E1	4.34E-1
Composite (10 Stations	Lead	1.7E0	4.52E-1
Composite (10 Stations	Nickel	8E1	5.7E-1

FDA Level of Concern (see EPA Table 7a, Columns B & D)

Receptor: Adult Angler

Organism: Nereis virens

	Contaminant	FDA Level of Concern(mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite (10 Stations	Arsenic	8.6E1	2.02E0
Composite (10 Stations	Cadmium	3.7E0	3.38E-2
Composite (10 Stations	Chromium	1.3E1	5.51E-1
Composite (10 Stations	Lead	1.7E0	1.91E-1
Composite (10 Stations	Nickel	8E1	2.32E-1

Selected Chemicals

Invertebrate Name Macoma nasuta

	Composite (10
118	X
153	X
4,4'-DDD	X
4,4'-DDE	X
Anthracene	X
Benzo(a)anthracene	X
Benzo(a)pyrene	X
Benzo(b)fluoranthene	X
Benzo(k)fluoranthene	X
Chrysene	X
Fluoranthene	X
Fluorene	X
Naphthalene	X
PAH Total	X
Phenanthrene	X
Pyrene	X
Total DDT	X
Total PCBs	X
Copper	X
Lead	X
Nickel	X

Invertebrate Name Nereis virens

	Composite (10
105	X
4,4'-DDD	X
52	X
Anthracene	X
Benzo(b)fluoranthene	X
Benzo(g,h,i)perylene	X
Benzo(k)fluoranthene	X
Chrysene	X
Fluoranthene	X
Fluorene	X
Naphthalene	X
PAH Total	X
Pyrene	X
Total DDT	X
Total PCBs	X
Cadmium	X
Chromium	X
Lead	X
Nickel	X
Zinc	X

Appendix D
Elutriate Chemistry Results

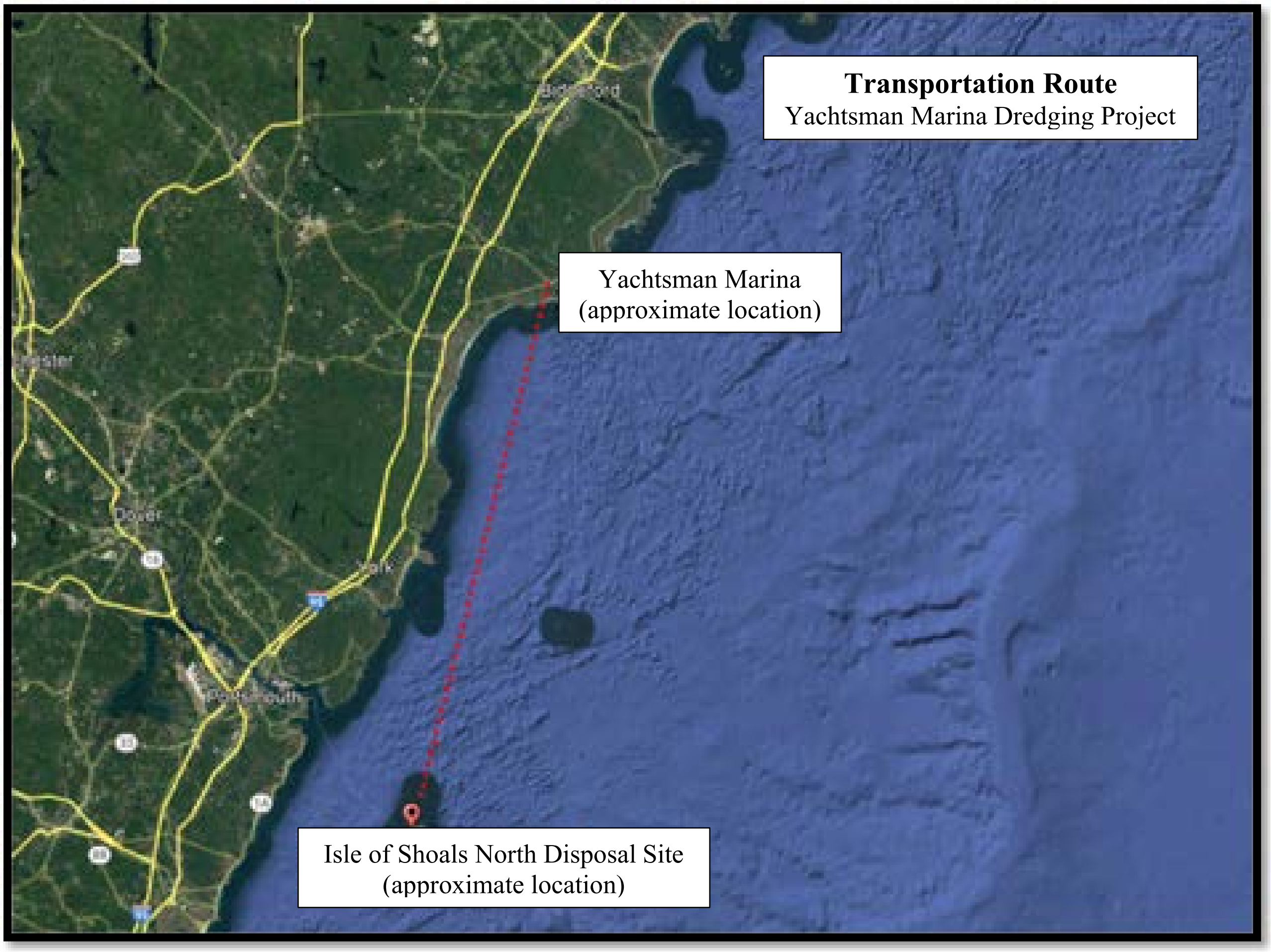
Kennebunkport River Projects			ME WQC	Elutriate Average	Q	Site Water Average	Q	Lab Water Average	Q
Parameter	CAS Number	Units							
Metals									
Arsenic	7440382	ug/L	69	3.67		1.22		0.140	U
Cadmium	7440439	ug/L	33	0.295	U	0.30	U	0.295	U
Hexavalent Chromium	18540299	ug/L	1108	1.50	U	1.50	U	1.50	U
Copper	7440508	ug/L	5.78	1.92	U	1.92	U	1.92	U
Lead	7439921	ug/L	221	1.72	U	1.72	U	1.72	U
Mercury	7439976	ug/L	2.1	0.010	U	0.010	U	0.010	U
Nickel	7440020	ug/L	75	2.78	U	2.78	U	2.78	U
Selenium	7782492	ug/L	291	0.115	*	0.065	U	0.560	U
Silver	7440224	ug/L	2.24	0.815	U	0.82	U	0.815	U
Zinc	7440666	ug/L	95	17.1	U	17.1	U	17.1	U
Industrial Chemicals									
Pentachlorophenol	87865	ug/L	13	0.290	U	0.224	U	0.222	U
Pesticides									
4,4`-DDT	50293	ug/L	0.13	0.00012	U	0.00008	U	0.00008	U
Aldrin	309002	ug/L	1.3	0.00023	U	0.00016	U	0.00016	U
Alpha-Chlordane (cis)	5103719	ug/L		0.00011	U	0.00008	U	0.00008	U
Dieldrin	60571	ug/L	0.71	0.00006	U	0.00004	U	0.00004	U
Chlorpyrifos	2921882	ug/L	0.011*	0.00011	U	0.00008	U	0.00008	U
Endosulfan I	959988	ug/L	0.034	0.00011	U	0.00008	U	0.00008	U
Endosulfan II	33213659	ug/L	0.034	0.00010	U	0.00007	U	0.00007	U
Endrin	72208	ug/L	0.037	0.00012	U	0.00008	U	0.00008	U
Gamma-Chlordane (trans)	5103742	ug/L		0.00005	U	0.00004	U	0.00004	U
Heptachlor	76448	ug/L	0.053	0.00008	U	0.00006	U	0.00006	U
Heptachlor epoxide	1024573	ug/L	0.053	0.00010	U	0.00007	U	0.00007	U
Lindane	58899	ug/L	0.16	0.00007	U	0.00005	U	0.00005	U
Toxaphene	8001352	ug/L	0.21	0.00365	U	0.00257	U	0.00257	U
Chlordane (alpha + gamma)	*SUMCHLOR*	ug/L	0.09	0.00016	U	0.00011	U	0.00011	U
PCBs									
PCB 008	34883437	ug/L		0.00010	U	0.00007	U	0.00007	U
PCB 018	37680652	ug/L		0.00013	U	0.00009	U	0.00009	U
PCB 028	7012375	ug/L		0.00013	U	0.00009	U	0.00009	U
PCB 044	41464395	ug/L		0.00008	U	0.00006	U	0.00006	U
(PCB 049)	41464408	ug/L		0.00028	J	0.00005	U	0.00005	U
PCB 052	35693993	ug/L		0.00037	J	0.00005	U	0.00005	U
PCB 066	32598100	ug/L		0.00010	U	0.00007	U	0.00007	U
(PCB 087)	38380028	ug/L		0.00013	U	0.00009	U	0.00009	U
PCB 101	37680732	ug/L		0.00016	U	0.00011	U	0.00011	U
PCB 105	32598144	ug/L		0.00011	U	0.00008	U	0.00008	U
PCB 118	31508006	ug/L		0.00009	U	0.00006	U	0.00006	U
PCB 128	38380073	ug/L		0.00011	U	0.00008	U	0.00008	U
PCB 138	35065282	ug/L		0.00008	U	0.00005	U	0.00005	U
PCB 153	35065271	ug/L		0.00009	*	0.00004	U	0.00004	U
PCB 170	35065306	ug/L		0.00012	U	0.00008	U	0.00008	U
PCB 180	35065293	ug/L		0.00010	U	0.00007	U	0.00007	U
(PCB 183)	52663691	ug/L		0.00011	U	0.00007	U	0.00007	U
(PCB 184)	74472483	ug/L		0.00010	U	0.00007	U	0.00007	U
PCB 187	52663680	ug/L		0.00007	U	0.00005	U	0.00005	U
PCB 195	52663782	ug/L		0.00006	U	0.00004	U	0.00004	U
PCB 206	40186729	ug/L		0.00013	U	0.00009	U	0.00009	U
PCB 209	2051243	ug/L		0.00006	U	0.00004	U	0.00004	U
Total PCBs	*SumNOAA18*	ug/L	0.03	0.00416		0.00243	U	0.00243	U
Notes									

U: Compound was analyzed for but was not detected (non-detect)
J: Indicates an estimated value
* indicates average includes detects and non-detects
Non-detects are reported as 1/2 the MDL
Half the MDL was used for U-qualified values to calculate summary and average values
Yellow=exceedance of water quality criteria
Total PCBs were calculated using the NOAA 18 method
Total PCB WQC is for chronic exposure as no acute exposure value available

Attachment 15:

Disposal Site Transportation Route

15.0 Isle of Shoals North Disposal Site Transportation Route



Location: The Isle of Shoals North (IOSN) Disposal Site is located in the Gulf of Maine, approximately 20 km (10.8 nmi) east of Portsmouth, New Hampshire, 17.7 km (9.55 nmi) southeast of Kittery, Maine, and 11.2 km (6.04 nmi) north of Eastern Island, the closest within the Isle of Shoals. The site is defined as a 2,600 m (8,530 ft) diameter circle on the seafloor with its center located at 70° 26.995' W and 43° 1.142' N.

Route: From the Yachtsman Marina, navigate in a southerly direction towards the mouth of the Kennebunk River, then in a southwestern direction through the Gulf of Maine to the IOSN Disposal Site. The total transportation route distance from the Kennebunkport Marina to the IOSN Disposal Site is 23 nautical miles.

Estimated Number of Trips to IOSN: The estimated quantity of dredge material expected to be removed from the Yachtsman Marina is 6,400 cubic yards. It is estimated that the dredge scow that will be used to transport sediment to the IOSN Disposal Site will have between 500 and 600 cubic yards of capacity, which would result in 11 to 13 trips to the IOSN Disposal Site.

Attachment 16:

Notice to Fisherman

16.0 Notice to Fisherman

A notice to inform fishermen of the proposed route for transportation the dredged material will be published and appear in a newspaper of general circulation in the area of the route:

NOTICE TO FISHERMAN

The Yachtsman Marina proposes to dredge approximately 61,000 square feet (1.4 acres) of the Kennebunk River located offshore and west of the club. The proposed dredge depth will be -6.0, with about one foot of over-dig, with the total volume of proposed dredging to be 6,400 cubic yards of sediment. The dredge will take place in and around the boat slips and is for maintenance and navigational safety.

Dredging of sediment will be completed by mechanical methods using a barge mounted excavator or crane with a clamshell bucket. Sediment will be loaded onto a scow barge and transported to the Isle of Shoals North Disposal Site (IOSN). The IOSN is located approximately 15 nautical miles east of Portsmouth, New Hampshire, in the Gulf of Maine. The suitability determination of the dredge spoils has been approved by the Army Corp of Engineers for open water disposal to the IOSN.

This operation would coincide with neighboring marinas performing dredging at the same approximate time. Dredging activity will occur between November and April in any given year.

Appendix A:

MDEP Visual Evaluation Field Survey Checklist

APPENDIX A: MDEP VISUAL EVALUATION
FIELD SURVEY CHECKLIST

(Natural Resources Protection Act, 38 M.R.S. §§ 480 A - Z)

Name of applicant: KPT Marine, LLC (c/o Shawn Dumas) Phone: 207-590-1658

Application Type: NRPA Individual Permit

Activity Type: (brief activity description) Dredging approximately 6,400 cy of material

Activity Location: Town: Kennebunkport County: York

GIS Coordinates, if known: UTM: 4801524.69 m N, 19 T 380503.11 m E

Date of Survey: 10/17/2024 Observer: Michael N. Walsh Phone: 207 553-9898

	Distance Between the Proposed Visibility Activity and Resource (in Miles)		
1.Would the activity be visible from:	0-¼	¼-1	1+
A. A National Natural Landmark or other outstanding natural feature?	☐	☐	☒
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge?	☐	☐	☒
C. A state or federal trail?	☐	☐	☒
D. A public site or structure listed on the National Register of Historic Places?	☐	☐	☒
E. A National or State Park?	☐	☐	☒
F. 1) A municipal park or public open space?	☒	☐	☐
2) A publicly owned land visited, in part, for the use, observation, enjoyment and appreciation of natural or man-made visual qualities?	☒	☐	☐
3) A public resource, such as the Atlantic Ocean, a great pond or a navigable river?	☒	☐	☐
2. What is the closest estimated distance to a similar activity?	☒	☐	☐
3. What is the closest distance to a public facility intended for a similar use?	☐	☒	☐

4. Is the visibility of the activity seasonal? (i.e., screened by summer foliage, but visible during other seasons) ☐Yes ☒No

5. Are any of the resources checked in question 1 used by the public during the time of year during which the activity will be visible? ☒Yes ☐No

Appendix B:

MDEP Coastal Wetland Field Survey Checklist

APPENDIX B

MAINE'S COASTAL WETLANDS: COASTAL WETLAND CHARACTERIZATION GUIDELINES

(Partly derived from Maine's Coastal Wetlands: Volume II)

Guidelines for the sampling and assessment of coastal wetlands have been developed by the Department of Environmental Protection to standardize habitat characterizations and functional assessments of coastal wetlands as required by the Natural Resources Protection Act (NRPA). The NRPA requires all applicants to characterize coastal wetland areas occurring in the location or vicinity of a proposed activity. Intertidal and/or subtidal characterizations are required for the following activities: fill, crib-supported or subtidal piers, lobster pounds, shoreline stabilization, or dredging. Activities impacting over 500 square feet of coastal wetland require a functional assessment performed by a professional wetland scientist unless the Department determines that the activity will have minimal adverse impact on the functions and values of the wetland.

This checklist satisfies the requirement for Attachment 12, Wetland Delineation Report, described in Part II of the NRPA application for <u>coastal wetlands located only in intertidal areas and subtidal areas less than one foot in depth</u>. The checklist is required for all activities impacting coastal wetlands to provide information describing coastal habitats and assess their most critical functions and values with the least amount of sampling effort possible, providing DEP licensing staff and biologists with information. The information provided will be used to determine whether the Department will require further sampling and assessment. <u>This checklist does not substitute for any other NRPA application requirements</u>.

SURVEY METHODS:

Following the methods below, survey and photograph the activity area on an ebb tide.

1. Walk throughout the activity area and note the location and measurements of all dominant habitat types. If not part of an application, complete an overhead drawing of the activity area. The overhead drawing should include the location and types of vegetation, boundaries of habitat types, sample locations, the location of spring high tide, mean high water and mean low water, and contours, if possible.

2. Take photographs of activity area and habitat types. (Include date, time, tide cycle and location of each photograph).

3. Search throughout the entire activity site, turning over rocks, wood, and algal mats, and look for any identifiable organisms present on the surface of the habitat, list the organisms found if known, and estimate their relative abundance. Complete the Checklist.

4. Using a clam rake or shovel, turn over sediments at random locations throughout the intertidal zone (at least one per zone, high, mid and low). Look for any identifiable organisms present in the sediments and estimate their relative abundance. Mark location on overhead drawing. Complete the Checklist.

<u>PLEASE NOTE</u>: Some activities may require quantitative benthic analysis of the sediments. Examples of such activities include dredges, lobster pounds, and fill activities consisting of over 500 square feet. Determination of sampling requirements may be made through consultation with DEP licensing staff and biologists. Guidelines for quantitative benthic sampling can be provided on request.

DEFINITIONS:

Area of Impact:

<u>Direct Impact</u>: The footprint of a proposed activity; e.g. area of dredge, area covered by cribs, base of riprap.

<u>Indirect Impact</u>: The area surrounding a proposed activity that will potentially be affected by the activity; e.g. shoreline adjacent to riprap, salt marsh areas, shaded areas. NOTE: The area of indirect impact will vary from site to site and should be determined on a case by case basis by the consultant, the applicant, and DEP staff.

(pink)

Timing of Survey Work: The date, time of day, and tidal height of sampling. Ideally, surveys should be conducted between May 1 and November 30 on an ebb or flood tide. Surveys may be conducted at other times of year, if necessary. Include the timing of low tide on the survey date. If the activity will extend into the low intertidal and/or shallow subtidal, the survey should be conducted on a negative or zero tide.

Energy Levels:

Exposed/High energy: Area exposed to oceanic swell and wind waves. Wind fetch (i.e. direction of origin) unlimited. Water velocity exceeds 2 meters/second.

Partially exposed/Moderate energy: Oceanic swell attenuated by offshore reefs, islands, or headlands, but shoreline is substantially exposed to wind waves. Typical of cobble or gravel fields. Water velocity between 1 and 2 meters/second.

Semi-protected/Low energy: Shoreline protected from sea swell, but it may receive waves generated by moderate fetch. Typical of gravel or unconsolidated muddy sediments. Water velocity less than 1 meter/second.

Protected/Low energy: No sea swell, little or no current, and restricted wind. Typical of unconsolidated muddy sediments. Water velocity less than 1 meter/second.

Drainage on Intertidal Flats: The amount of water left on intertidal area after ebb tide.

Habitats: description of activity site and adjacent areas

Sand Beach: exposed environments containing at least 75% sand.

Boulder/cobble Beach: exposed environments dominated by boulders and/or loose rounded rocks.

Sand Flat: protected and semi-protected environment dominated by sandy sediment.

Mixed Coarse & Fines: semi-protected environment consisting of a mixture of rocks, boulders, gravel, sand, cobbles, and mud.

Rocky Shore: semi-protected to moderate consisting of rocks, boulders, or ledge.

Salt Marsh: persistent near shore emergent grass habitats.

Ledge: stable bedrock

Mud Flat: protected environments containing at least 75% mud

Eelgrass: intertidal and subtidal grass habitat.

Relative Abundance: the frequency of an organism at or adjacent to the activity site

Absent: Organism is physically absent from the specific area.

Scattered or occasional: A limited number of a specific organism found only after a thorough investigation of the habitat *or* organisms occurring in small (<1/2 square foot) patches or small clumps throughout the zone.

Common: Specific organism found readily with little investigation, but not visually obvious; found repeatedly and/or occurring in numerous patches throughout habitat.

Abundant: Specific organism is visually obvious throughout area with limited or no habitat disturbance.

(pink)

APPENDIX B: MDEP COASTAL WETLAND CHARACTERIZATION: INTERTIDAL & SHALLOW SUBTIDAL FIELD SURVEY CHECKLIST

NAME OF APPLICANT: KPT Marine, LLC (c/o Shawn Dumas) PHONE: 207-590-1658
APPLICATION TYPE: NRPA Individual Permit
ACTIVITY LOCATION: TOWN: Kennebunkport COUNTY: York

ACTIVITY DESCRIPTION: ☐ fill ☐ pier ☐ lobster pound ☐ shoreline stabilization
☒ dredge ☐ other: ____

DATE OF SURVEY: 10/17/2024 OBSERVER: Michael N. Walsh

TIME OF SURVEY: 2:30 pm TIDE AT SURVEY: Low

SIZE OF DIRECT IMPACT OR FOOTPRINT (square feet):
Intertidal area: ____ Subtidal area: 61,000 SF (1.4 acres)

SIZE OF INDIRECT IMPACT, if known (square feet): ____
Intertidal area: ____ Subtidal area: ____

HABITAT TYPES PRESENT (check all that apply):
☒ sand beach ☐ boulder/cobble beach ☐ sand flat ☒ mixed coarse & fines ☐ salt marsh
☐ ledge ☐ rocky shore ☒ mudflat (sediment depth, if known: ____)

ENERGY: ☐ protected ☒ semi-protected ☐ partially exposed ☐ exposed

DRAINAGE: ☐ drains completely ☒ standing water ☐ pools ☐ stream or channel

SLOPE: ☐ >20% ☐ 10-20% ☐ 5-10% ☒ 0-5% ☐ variable

SHORELINE CHARACTER:
☐ bluff/bank (height from spring high tide: ____) ☐ beach ☒ rocky ☐ vegetated

FRESHWATER SOURCES: ☐ stream ☒ river ☐ wetland ☐ stormwater

MARINE ORGANISMS PRESENT:

	absent	occasional	common	abundant
mussels	☐	☒	☐	☐
clams	☒	☐	☐	☐
marine worms	☐	☒	☐	☐
rockweed	☒	☐	☐	☐
eelgrass	☒	☐	☐	☐
lobsters	☐	☒	☐	☐
other	☐	☐	☐	☐

SIGNS OF SHORELINE OR INTERTIDAL EROSION? ☐ yes ☒ no

PREVIOUS ALTERATIONS? ☒ yes ☐ no

CURRENT USE OF SITE AND ADJACENT UPLAND:
☐ undeveloped ☒ residential ☐ commercial ☐ degraded ☒ recreational

PLEASE SUBMIT THE FOLLOWING:
☒ Photographs ☒ Overhead drawing (pink)

Appendix C:

Supplemental Information for Dredging Activities

APPENDIX C: APPLICATION FOR A NATURAL RESOURCES PROTECTION ACT PERMIT

SUPPLEMENTAL INFORMATION FOR DREDGING ACTIVITIES IN A COASTAL WETLAND, GREAT POND, RIVER, STREAM OR BROOK

(Discard this part if dredging is not proposed as part of your activity.)

The DEP and the Corps strongly recommend that applicants schedule a pre-application meeting prior to submitting an application for dredging.

Volume to be dredged:	6,400 cu. yds.		
Sq. ft. to be dredged: **i**	61,000 sq. ft.		

Max. depth of dredging below existing grade:	-6.0
Type of material (example: sand, silt, clay, gravel. etc.) to be Dredged:	Silt and sand
Describe what erosion and sediment control measures will be used during the dredging operation. (attach separate sheet if necessary):	Loading the dredge material directly onto the barge (scow) will allow it to be de-watered.
Describe how and where the dredge spoils will be dewatered (attach separate sheet if necessary): **Show dewatering location and erosion control measures on activity drawings.**	Spoils will be loaded directly onto the barge (scow) where it will be de-watered prior to transport.
What equipment will be used for the dredge?	The dredge will be conducted from a floating barge using a crane with a clam shell bucket and/or backhoe.

Disposal Location: (Check one)	**Upland disposal:** ☐ On site ☐ Landfill ☐ Other____________	**Ocean disposal:** Federal Disposal Site ☐ Arundel ☐ Portland ☐ Rockland ☒ Other Isle of Shoals

(pink)

FOR UPLAND DISPOSAL:

Contact the Division of Solid Waste Management at (207) 822-6300:

Contacted: ☐ Yes ☐ No If yes, attach a copy of any correspondence.
Permitted: ☐ Yes ☐ No If yes, provide the permit number______________________.

FOR OCEAN DISPOSAL:

☒ Submit as **Attachment 15,** a copy of the test results performed in accordance with the U.S. Environmental Protection Agency and the Army Corps of Engineers' document entitled "Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters" (May 2002). This is available from the Army Corps of Engineers. (207) 623-8367 **Submitted as Attachment 14*

NOTE: Applicants are STRONGLY recommended to contact the DEP prior to performing any sediment sampling. Improperly sampled or analyzed sediments may have to be retested.

☒ Submit as **Attachment 16,** a copy of a map showing the proposed transportation route to the disposal site.

List all municipalities adjacent to the proposed transportation site: **Submitted as Attachment 15*

New Hampshire: Rye, New Castle

Maine: Kittery, Eliot, York, Ogunquit

A copy of the application must be submitted to all municipalities adjacent to the proposed transportation site.

☒ Submit as **Attachment 17,** a copy of the notice of the proposed transportation route. A copy of the proposed transportation route must be published in a newspaper of general circulation in the area of the proposed route. (The notice of the proposed route must include compass bearings or Loran coordinates). The notice must be published under the heading "NOTICE TO FISHERMEN". **Submitted as Attachment 16*

(pink)

Appendix D:

Sediment Sampling Results

ECOTOXICOLOGICAL TESTING
WHOLE SEDIMENT BIOASSAYS

KENNEBUNKPORT, MAINE

Prepared for:

Eco-Analysts, Inc.
P.O. Box 224
Bath, Maine 04530

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC
231 Schilling Circle
Hunt Valley, Maryland 21031
For questions concerning this report, please contact Michael Chanov
ph: 410-584-7000

Results relate only to the items tested or to the samples as received by the laboratory.

This report shall not be reproduced, except in full, without written approval of
EA Engineering, Science, and Technology, Inc., PBC

This report contains 18 pages plus 6 attachments.

27 April 2023

Michael K. Chanov II — Date
Laboratory Director

EA Project Number 70022.TOX

E87550

EA Report Number 9149

1. INTRODUCTION

In accordance with the US Army Corps of Engineers, New England District (CENAE), EA Engineering, Science, and Technology, Inc., PBC (EA) performed whole sediment toxicity testing on sediment samples collected from the area of dredging proposed for the marinas located on the Kennebunk River in Kennebunkport, Maine. Placement of dredge materials is proposed at the Isles of Shoals North (IOSN) Disposal Site. Samples were provided by Eco-Analysts, Inc., Bath, Maine The purpose of this study was to evaluate the toxicity of the sediment samples to benthic organisms.

The toxicity testing program consisted of 10-day whole sediment toxicity tests with *Americamysis bahia* (opossum shrimp) and *Leptocheirus plumulosus* (estuarine amphipod). The whole sediment toxicity tests evaluated the effects of exposure to the sediment samples on survival of the test organisms compared to a historical reference. All biological testing was completed at EA in Hunt Valley, Maryland.

2. MATERIALS AND METHODS

2.1 SAMPLE RECEIPT AND PREPARATION

Ten sediment samples were collected by Eco-Analysts personnel from locations in the dredge footprint identified in the Sampling and Analysis Plan. One sediment composite was created for the project and placed into five 5-gallon buckets. The samples were held at ≤4°C and were hand delivered by courier to EA's Ecotoxicology Laboratory in Hunt Valley, Maryland. The composited sediment sample was logged in and assigned an EA laboratory accession number and was stored in the dark in a secured walk-in cooler at ≤4°C until used for testing. Table 1 summarizes the sample identification, accession numbers, and collection and receipt information for the sediment sample. Chain-of-custody records are included in Attachment I.

2.2 TOXICITY TEST METHODS

All toxicity testing was conducted following EA's standard operating procedures (EA 2022) which are in accordance with the *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters* (USEPA, CENAE 2004), USEPA/USACE guidance (1991, 1998) and USEPA guidance (2002).

2.2.1 Whole Sediment Toxicity Testing

Whole sediment toxicity testing was conducted with two estuarine species, *Leptocherius plumulosus* (amphipod) and *Americamysis bahia* (opossum shrimp), both acquired from Aquatic Research Organisms (Hampton, New Hampshire) on 9 March 2023. The amphipods in Lot LP-181 were 2-4 mm and the mysids from Lot AB-1232 were 5 days old when used to initiate the toxicity test. Both assays were initiated on 10 March 2023. During the 24-hour holding period, the organisms were gradually acclimated to laboratory water at 20°C and to the appropriate test salinity.

Reference sediment was not collected from the IOSN. Rather, historic survival data from 2019 were provided by the CENAE for comparison purposes.

For solid phase testing, USEPA guidance (Davies, et. al. 1993) specifies the reduction of pore water total ammonia concentrations to ≤20 mg/L NH_3-N prior to testing. Pore water was extracted from each of the sediment samples by centrifugation. Initial interstitial total ammonia concentration in the sediment sample was 63.5 mg/L NH_3-N (Tables 2 and 3). The "thin layer" ammonia reduction procedure described by Ferretti (Ferretti, et.al., 2000) was utilized prior to initiating solid phase testing of the sediment sample. For this procedure, 2 L of sediment was spread evenly over the bottom of a high-density polyethylene tub (88 x 42 x 15 cm) to a depth of approximately 8 mm. A high density polyethylene plastic cover was placed over each sediment, and 12 L of artificial seawater was carefully added to the tub to minimize disturbance of the sediments. The overlying water was replaced twice daily until the pore water ammonia concentration was ≤ 20 mg/L NH_3-N. The interstitial ammonia value for the ammonia purged sediment are presented in Tables 2 and 3.

The whole sediment toxicity tests were conducted as static, non-renewal tests with ten days of exposure to the sediments and overlying water. Artificial seawater (Crystal Sea artificial sea salts) at 20 ppt salinity (*L. plumulosus*) and 30 ppt salinity (*A. bahia*) was used as the overlying water.

The *A. bahia* and *L. plumulosus* tests utilized 1-L beakers as the exposure chambers, with each beaker containing 175 ml of sediment and 800 ml of overlying water. There were five replicate chambers for both the composite sediment sample and laboratory control. Test organisms were randomly assigned to the test chambers, 20 per replicate, for a total of 100 organisms exposed per sample.

The tests were maintained at a target of 20±1°C, with a 16-hour light/8-hour dark (*A. bahia*) or 24-hour light (*L. plumulosus*) photoperiod. The test chambers were visually inspected daily for abnormal organism behavior or lack of burrowing.

The overlying water in each test chamber was gently aerated (100 bubbles per minute) for the duration of the tests. Water quality measurements of temperature, pH, dissolved oxygen, and salinity were recorded daily on one replicate of each sample and control. The water quality parameters measured during the *A. bahia* and *L. plumulosus* toxicity tests are summarized in Tables 4 and 5, respectively.

After ten days of exposure, the test organisms were retrieved from the samples and the number of live organisms per replicate was recorded. Copies of the original data sheets for the *A. bahia* and *L. plumulosus* toxicity testing are included as Attachments II and III, respectively.

2.2.2 Data Analysis

Statistical analyses were performed on the whole sediment test data according to USEPA/USACE (1998) guidance, using the CETIS® statistical software package (Comprehensive Environmental Toxicity Information System, Version 2.1.1.5). If survival in the sediment was greater than the allowable percent difference (20 percent) from the corresponding reference, then a t-test or Wilcoxon's Two-Sample Test (depending on normal or non-normal data distribution) was performed on the sediment sample. The statistical analyses were performed to determine if exposure to the sediment sample resulted in significantly lower survival ($p=0.05$) as compared to the organisms exposed to the corresponding control or historical reference sediment. The results of the *A. bahia* and *L. plumulosus* whole sediment bioassays are summarized in Tables 6 and 7, respectively. The statistical analyses for *A. bahia* and *L. plumulosus* are summarized in Tables 8 and 9, respectively.

2.2.3 Reference Toxicant Testing

In conformance with EA's quality assurance/quality control program requirements, reference toxicant testing was performed by EA on acquired lots of *A. bahia* and *L. plumulosus*. The reference toxicant tests consisted of a graded concentration series of a specific toxicant in water only tests, with no sediment present in the test chambers. The results of the reference toxicant tests were compared to established control chart limits. Table 10 presents the results of the reference toxicant testing.

2.3 ARCHIVES

Original data sheets, records, memoranda, notes, and computer printouts are archived at EA's Office in Hunt Valley, Maryland. These data will be retained for a period of 5 years unless a longer period of time is requested.

3. RESULTS AND DISCUSSION

This bioassay study using sediment collected from the Yachtsman Marina project area was designed and conducted to meet the requirements of the USEPA/USACE dredged material testing program. The results of these toxicity tests met the current NELAC standards, where applicable. Protocol requires 90 percent survival in the laboratory control, indicating that test organisms were healthy and that endpoints met or exceed requirements specified in the current version of the RIM.

3.1 WHOLE SEDIMENT TOXICITY TESTING

Tables 6 and 8 summarize the results and statistical analyses of the 10-day whole sediment toxicity testing with *A. bahia*. Survival in the composite sediment sample was 97 percent, while the laboratory control and historical IOSN reference data both had 98 percent survival. Statistical analyses demonstrated that there were no significant effects on *A. bahia* survival following exposure to the composite sediment sample as compared with the IOSN 2019 reference data, and results for the composite sample were within 20% of the reference data.

Tables 7 and 9 summarize the results and statistical analyses of the 10-day whole sediment toxicity testing with *L. plumulosus*. Survival in the composite sediment sample was 95 percent. The laboratory control had 98 percent survival, while the historical IOSN reference data had 93 percent survival. As such, the statistical analyses demonstrated that there were no significant effects on *L. plumulosus* survival following exposure to the composite sediment sample as compared with the IOSN 2019 reference data, and results for the composite sample were within 20% of the reference data.

3.2 REFERENCE TOXICANT TESTS

The results of the reference toxicant tests are summarized in Table 10. All of the reference toxicant test results fell within the established laboratory control chart limits.

4. REFERENCES CITED

Davies T., D. Davis, J. Elmore. 1993. Technical panel recommendations concerning use of acute amphipod tests in evaluation of dredged material. Technical Report. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

EA. 2022. EA Ecotoxicology Laboratory Quality Assurance and Standard Operating Procedures Manual. EA Manual ATS-102. Internal document prepared by EA's Ecotoxicology Laboratory, EA Engineering, Science, and Technology, Inc., PBC, Hunt Valley, Maryland.

Ferretti, J. A., D. F. Calesso and T. R. Hermon. 2000. Evaluation of Methods to Remove Ammonia Interference in Marine Sediment Toxicity Tests. Environ. Toxicol. Chem. 19:1935-1941.

USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. EPA-821-R-02-012. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

USEPA and USACE. 1991. Evaluation of Dredged Material Proposal for Ocean Disposal, Testing Manual (commonly called "The Green Book").

USEPA and USACE. 1998. Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S.-Inland Testing Manual. EPA/823/B-94/004. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. and Department of the Army, U.S. Army Corps of Engineers, Washington, D.C.

USEPA Region 1, CENAE. 2004. Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters. September 2004.

TABLE 1 SUMMARY OF COLLECTION AND RECEIPT INFORMATION FOR SEDIMENT SAMPLES

Sample Identification	**EA Accession Number**	**Collection**		**Receipt**	
		Time	**Date**	**Time**	**Date**
10 Stations at 4 Marinas Mud	AT3-098	1300	8 February 2023	1630	9 February 2023

TABLE 2 AMMONIA CONCENTRATIONS MEASURED ON SEDIMENT PORE WATER AND OVERLYING WATER DURING SOLID PHASE TOXICITY TESTING WITH *Americamysis bahia*

		Pore Water Ammonia ($mg/L\ NH_3$-N)						
Sediment Identification	**EA Accession Number**	**Initial**	**Day 0**	**Day 2**	**Day 4**	**Day 6**	**Day 8**	**Day 10**
10 Stations at 4 Marinas Mud	AT3-098	63.5	15.9	15.3	15.2	6.6	3.7	7.4
SOLID PHASE CONTROL	AT3-152	N/A	3.8	3.6	1.7	1.0	<0.4	<0.4

		Overlying Water Ammonia ($mg/L\ NH_3$-N)					
Sediment Identification	**EA Accession Number**	**Day 0**	**Day 2**	**Day 4**	**Day 6**	**Day 8**	**Day 10**
10 Stations at 4 Marinas Mud	AT3-098	2.2	2.0	2.1	2.1	2.0	2.3
SOLID PHASE CONTROL	AT3-152	1.2	1.0	0.9	<0.1	<0.1	<0.1

TABLE 3 AMMONIA CONCENTRATIONS MEASURED ON SEDIMENT PORE WATER AND OVERLYING WATER DURING SOLID PHASE TOXICITY TESTING WITH *Leptocherius plumulosus*

		Pore Water Ammonia (mg/L NH_3-N)						
Sediment Identification	**EA Accession Number**	**Initial**	**Day 0**	**Day 2**	**Day 4**	**Day 6**	**Day 8**	**Day 10**
10 Stations at 4 Marinas Mud	AT3-098	63.5	19.0	18.3	19.1	10.6	3.9	---
SOLID PHASE CONTROL	AT3-152	N/A	2.8	2.4	2.8	1.5	1.3	<0.4

		Overlying Water Ammonia (mg/L NH_3-N)					
Sediment Identification	**EA Accession Number**	**Day 0**	**Day 2**	**Day 4**	**Day 6**	**Day 8**	**Day 10**
10 Stations at 4 Marinas Mud	AT3-098	2.6	2.6	2.4	4.0	3.1	3.0
SOLID PHASE CONTROL	AT3-152	0.6	0.9	0.8	<0.1	<0.1	<0.1

TABLE 4 SUMMARY OF WATER QUALITY PARAMETERS MEASURED DURING WHOLE SEDIMENT BIOASSAY TESTING WITH *Americamysis bahia*

Sediment Sample Identification	**EA Accession Number**	**Range**			
		Temperature (°C)	**pH**	**Dissolved Oxygen (mg/L)**	**Salinity (ppt)**
10 Stations at 4 Marinas Mud	AT3-098	19.2 – 21.6 [a]	7.9 – 8.3	6.9 – 7.7	27.0 – 30.1
SOLID PHASE CONTROL	AT3-152	19.0 – 21.9 [a]	8.0 – 8.2	5.4 – 7.6	27.0 – 28.5

[a] Measurement is outside the target range but within limits allowed by the RIM.

TABLE 5 SUMMARY OF WATER QUALITY PARAMETERS MEASURED DURING WHOLE SEDIMENT BIOASSAY TESTING WITH *Leptocheirus plumulosus*

Sediment Sample Identification	**EA Accession Number**	**Range**			
		Temperature (°C)	**pH**	**Dissolved Oxygen (mg/L)**	**Salinity (ppt)**
10 Stations at 4 Marinas Mud	AT3-098	19.0 – 21.7 [a]	7.7 – 8.5	7.4 – 8.1	19.5 – 22.0
SOLID PHASE CONTROL	AT3-152	19.0 – 22.0 [a]	7.7 – 8.4	7.2 – 8.1	19.6 – 22.0

[a] Measurement is outside the target range but within limits allowed by the RIM.

TABLE 6 RESULTS OF 10-DAY WHOLE SEDIMENT TOXICITY TESTING WITH *Americamysis bahia*

Test Number: TN-23-326
Testing Dates: 3/10/23 to 3/20/23

Sample Identification	EA Accession Number	No. Alive/No. Exposed	10-Day Mean Percent Survival
10 Stations at 4 Marinas Mud	AT3-098	97 / 100	97
IOSN REFERENCE	N/A	N/A	98
SOLID PHASE CONTROL	AT3-152	98 / 100	98

TABLE 7 RESULTS OF 10-DAY WHOLE SEDIMENT TOXICITY TESTING WITH *Leptocheirus plumulosus*

Test Number: TN-23-327
Testing Dates: 3/10/23 to 3/20/23

Sample Identification	EA Accession Number	No. Alive/No. Exposed	10-Day Mean Percent Survival
10 Stations at 4 Marinas Mud	AT3-098	95 / 100	95
IOSN REFERENCE	N/A	N/A	93
SOLID PHASE CONTROL	AT3-152	98 / 100	98

TABLE 8 STATISTICAL ANALYSIS OF 10-DAY WHOLE SEDIMENT TOXICITY TESTING WITH *Americamysis bahia*

Test Number: TN-23-326

Testing Dates: 3/10/23 to 3/20/23

Sample Identification	EA Accession Number	Mean Survival	Significantly Different as Compared to: IOSN 2019	Difference in Survival >20% as Compared to: IOSN 2019	
IOSN Reference	IOSN 2019	98%	-	-	-
10 Stations at 4 Marinas Mud	AT3-098	97%	No	No	1%

TABLE 9 STATISTICAL ANALYSIS OF 10-DAY WHOLE SEDIMENT TOXICITY TESTING WITH *Leptocheirus plumulosus*

Test Number: TN-23-327

Testing Dates: 3/10/23 to 3/20/23

Sample Identification	**EA Accession Number**	**Mean Survival**	**Significantly Different as Compared to: IOSN 2019**	**Difference in Survival >20% as Compared to: IOSN 2019**	
IOSN Reference	IOSN 2019	93%	-	-	-
10 Stations at 4 Marinas Mud	AT3-098	95%	No	No	-2%

TABLE 10 RESULTS OF REFERENCE TOXICANT TESTING ON ACQUIRED LOTS OF TEST ORGANISMS

Test Species	**Reference Toxicant**	**Test Endpoint**	**Acceptable Control Chart Limits**
Americamysis bahia	Potassium chloride (KCl)	48-Hour EC50: 493 mg/L KCl	413 – 604 mg/L KCl
Leptocheirus plumulosus	Cadmium chloride ($CdCl_2$)	48-Hour LC50: 9.3 mg/L Cd	2.6 – 25.1 mg/L Cd

ATTACHMENT I

Chain-of-Custody Records
(2 pages)

Chain-of-Custody Record

EA Engineering, Science, and Technology

EA Ecotoxicology Laboratory
231 Schilling Circle
Hunt Valley, Maryland 21031
Telephone: 410-584-7000
Fax: 410-584-1057

Sample Shipped By: (circle)
Fed. Ex. UPS [✓ Other:] courier
Tracking #:

Client: ECO-ANALYSTS, INC. Project No.:
NPDES Number: Client Purchase Order Number:
City/State Collected: KENNEBUNK RIVER, MAINE

PLEASE READ SAMPLING INSTRUCTIONS ON BACK OF FORM

Accession Number (office use only)	Grab	Composite	Collection		Sample Description (including Site, Station Number, and Outfall Number)	Number/Volume of Container
			Start Date/Time	End Date/Time		
AT3-098		x	2/8/23 0900	02/8/23 1300	10 Stations at 4 Marinas Mud	5 Ten Gal Buckets
AT3-099	X		"	"	" Sitewater	"

Sampled By: Dustin Kach & Bud Brown	Date/Time 2/8/23 0900 - 1300	Received By: Dustin Kach	Date/Time 2/8/23 1300
Sampler's Printed Name: Dustin Kach & Bud Brown	Title: President	Relinquished By:	Date/Time 2/9/23 @ 11:37am
Relinquished By:	Date/Time 2/8/23 1132	Received By Laboratory	Date/Time 2/9/23 1630

Was Sample Chilled During Collection? **No**

Comments:

Sample Collection Parameters

Visual Description:
Temperature (°C):
pH:
TRC (mg/L):
Other:

White-Report Production Yellow-Laboratory Pink-Client/Sampler
EA 0534 F&B Rev.9/12

ATTACHMENT II

Americamysis bahia 10-Day Whole Sediment Test Data Sheets and Statistical Analyses

(20 pages)

SEDIMENT TOXICITY TEST SET-UP BENCH SHEET

Project Number: EA.TOX

Client: Eco Analyst

QC Test Number: TN-23-326

TEST ORGANISM INFORMATION

Common Name: Opossum shrimp

Scientific Name: *A. bahia*

Lot Number: AB-1232

Source: ARO

Adults Isolated (Time, Date):

Neonates Pulled (Time, Date):

Acclimation: 24hrs Age: 5days

Culture Water (T/S): 20.1 °C 27.9 ppt

TEST INITIATION

Date	Time	Initials	Activity
3/9/23	1530	SC	Sediment Added to Chambers
↓	↓	↓	Overlying Water Added to Chambers
3/10/23	1530	JD	Organisms Transferred

TEST SET-UP

Sample Number(s): AT3-152(Control), AT3-098

Overlying Water: 30 ppt Crystal Sea (LD3-385)

Treatment	Volume Test Sediment	Volume Overlying Water
AT3-152 (Lab Control)	175 ml	800 ml
↓	↓	↓
AT3-098		

TOXICOLOGY LABORATORY BENCH SHEET - ORGANISM RECOVERY RECORD

Project Number: EA.TOX
Client: Eco Analyst
QC Test Number: TN-23-326
Organisms Recovered (date, time, initials): 3/20/23 1500

TEST ORGANISM
Common Name: Opossum shrimp
Scientific Name: *A. bahia*

Treatment	Replicate	Number of Organisms Loaded	Number of Organisms Recovered
AT3- 152	A	20	20
(Lab Control)	B	20	19
	C	20	19
	D	20	20
	E	20	20
AT3-098	A	20	20
	B	20	20
	C	20	19
	D	20	19
	E	20	19

TOXICITY TEST WATER QUALITY DATA SHEET - NEW SOLUTIONS

Project Number: EA.TOX

Client: Eco Analyst

QC Test Number: TN-23-326

TEST ORGANISM

Common Name: Opossum shrimp

Scientific Name: *A. bahia*

Beginning Date: 3/10/23 Time: 1530

Ending Date: 3/24/23 Time: 1500

TARGET VALUES Temp: 20 °C pH: 6.0 - 9.0 DO: >4.0 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6
AT3-152	Control	19.2							8.0							7.5							27.0						
AT3-098		19.0							8.0							7.4							27.5						
	Meter Number	682							682							682							682						
	Time	1332							1332							1332							1332						
	Initials	UAD							UAD							UAD							UAD						

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX
Client: Eco Analyst
QC Test Number: TN-23-326

TEST ORGANISM
Common Name: Opossum shrimp
Scientific Name: *A. bahia*

Beginning Date: 3/10/23 Time: 1530
Ending Date: 3/20/23 Time: 1500

TARGET VALUES Temp: 20 °C pH: 6.0 - 9.0 DO: >4.0 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
AT3-152	Control	21.0	20.8	21.6	21.0	20.9	20.5	20.4	8.2	8.3	7.9	8.1	8.1	8.1	8.1	7.3	7.5	7.6	7.5	6.9	7.5	7.7	27.0	27.0	27.0	27.8	28.9	28.5	29.9
AT3-098		21.0	21.0	21.9	21.0	21.0	19.9	20.8	8.2	8.2	8.0	8.2	8.1	8.3	8.1	7.3	7.1	7.5	7.2	5.4	7.6	7.4	27.0	27.0	27.0	28.1	27.9	28.0	28.5
	Meter Number	681	652	681	682	682	683	662	681	652	681	682	682	683	662	681	652	681	682	682	683	664	681	652	681	682	682	683	66
	Time	1025	1449	1210	0830	1312	1410	1606	1025	1449	1210	0830	1312	1410	1606	1025	1449	1210	0830	1312	1401	1606	1025	1449	1210	0830	1312	1401	1606
	Initials	GC	JL	TG	Tb	SL	LMO	MB	GC	JL	TG	Tb	SL	LMO	MB	GC	JL	TG	Tb	SL	LMO	MB	GC	JL	TG	Tb	SL	LMO	MB

(6) JL
3/12/23

EA

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX
TEST ORGANISM
Beginning Date: 3/16/23 Time: 1530
Client: Eco Analyst
Common Name: Opossum shrimp
Ending Date: 3/10/23 Time: 1500
QC Test Number: TN-23-326
Scientific Name: *A. bahia*

TARGET VALUES Temp: 20 °C pH: 6.0 - 9.0 DO: >4.0 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14
AT3- 152	Control	19.9	19.9	20.5					8.0	8.1	8.0					7.6	7.5	7.4					28.2	30.1	~~2~~ 27.4				
AT3-098		20.1	20.1	21.0					8.0	8.2	8.0					7.6	7.5	7.4					27.0	28.5	27.6				
	Meter Number	681	682	681					681	682	681					681	682	681					681	682	681				
	Time	0847	~~0~~1310	0901					0847	1310	0901					0847	1310	0901					0847	1310	0901				
	Initials	KY	TG	TG					KY	TG	TG					KY	TG	TG					KY	TG	TG				

ⓑ TG 3/20/23

ⓑ TG 3/19/23

TOXICOLOGY LABORATORY BENCH SHEET - AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-326

EA Sample Number	Day 0 Overlying Water				Day 0 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)
Control	1.22	31.9	7.9	19.2	3.84	31.2	7.6	19.0
AT3-098	2.19	31.2	7.9	19.2	15.85	31.0	7.6	19.0
Meter	VERSASTAR	682	682	682	VERSASTAR	682	682	682
Initials/Date/Time	3/15/23 MKL	3/10/23 1220	3/10/23 1220	3/10/23 1220	3/15/23 MKL	3/10/23 1220	3/10/23 1220	3/10/23 1220

TOXICOLOGY LABORATORY BENCH SHEET - AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-326

EA Sample Number	Day 2 Overlying Water				Day 2 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)
Control	0.96	31.9	7.9	19.1	3.56	30.0	7.5	19.0
AT3-098	2.02	30.6	8.0	19.1	15.30	29.4	7.3	19.0
Meter	VERSASTAR	602	602	602	VERSASTAR	602	602	602
Initials/Date/Time	3/15/23 MKC	3/14/23 1100	3/14/23 1100	3/14/23 1100	3/15/23 MKC	3/14/23 1100	3/14/23 1100	3/14/23 1100

TOXICOLOGY LABORATORY BENCH SHEET - AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-326

EA Sample Number	Day 4 Overlying Water				Day 4 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)
Control	0.89	33.0	7.8	18.7	1.68	33.0	7.9	18.9
AT3-098	2.09	33.0	7.9	18.9	15.20	33.0	7.6	18.9
Meter	VERSASTAR	682	682	682	VERSASTAR	682	682	682
Initials/Date/ Time	3/15/23 MKL	3/14/23 1130 TP	3/14/23 1130 TP	3/14/23 1130 TP	3/15/23 MKL	3/14/23 1130 TP	3/14/23 1130 TP	3/14/23 1130 TP

TOXICOLOGY LABORATORY BENCH SHEET - AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-326

EA Sample Number	Day 6 Overlying Water				Day 6 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (ºC)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (ºC)
Control	<0.1	35.5	8.1	19.1	1.01	26.4	7.3	17.6
AT3-098	2.11	30.6	8.3	19.0	6.64	31.2	7.5	20.7
Meter	VERSASTAR	683	683	683	VERSASTAR	683	683	683
Initials/Date/ Time	3/28/23 MKL	UAO 3-16-23 1459	UAO 3-16-23 1459	UAO 3-16-23 1459	3/28/23 MKL	UAO 3-16-23 1601	UAO 3-16-23 1601	UAO 3-16-23 1601

TOXICOLOGY LABORATORY BENCH SHEET - AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-326

(a) TP 3/18/23

EA Sample Number	Day 8 Overlying Water				Day 8 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C) (a)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)
Control	<0.1	~~27.9~~ 28.1	8.0 ~~7.9~~	21.8 ~~21.7~~	<0.4	28.0	7.9	21.5
AT3-098	2.0	27.4	7.9	21.7	3.70	27.3	7.7	21.8
Meter	VERSASTAR	681	681	681	VERSASTAR	681	681	681
Initials/Date/ Time	3/26/23 LAO	3/18/23 1100 TP	3/18/23 1100 TP	3/18/23 1100 TP	4/1/23 TP	3/18/23 1100 TP	3/18/23 1100 TP	3/18/23 1100 TP

TOXICOLOGY LABORATORY BENCH SHEET - AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-326

EA Sample Number	Day 10 Overlying Water				Day 10 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (ºC)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (ºC)
Control	<0.1	33.5	7.8	20.4	<0.4	42.1	7.6	22.3
AT3-098	2.31	33.7	7.5	20.5	7.35	36.3	6.9	23.1
Meter	VERSASTAR	682	682	682	VERSASTAR	682	682	682
Initials/Date/ Time	3/28/23 MLC	UAO 1644 3-20-23	UAO 3-20-23	UAO 1644 3-20-23	3/28/23 MLC	UAO 3-20-23 1650	UAO 3-20-23 1650	UAO 3-20-23 1650

TOXICOLOGY LABORATORY BENCH SHEET - FEEDING RECORD

Project Number: EA.TOX

Client: Eco Analyst

QC Test Number: TN-23-326

Food: (Day 0-10): 5 drops of *Artemia* 1x/day.

Day	Date	Time	Initials
0	3/10/23	1545	TD
1	3/11/23	0830	KY
2	3/12/23	0830	JL
3	3/13/23	0815	TB
4	3/14/23	0830	KY
5	3/15/23	0848	GL
6	3/16/23	0810	TD
7	3/17/23	0755	TD
8	3/18/23	0825	KY
9	3/19/23	0815	TB
10	3/20/23	0830	TB

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: EA.TOX

Client: Eco Analyst

QC Test Number: TN-23-326

Day	Testing Location	Date	Time	Initials
0	29	3/10/23	1530	TO
1	29	3/11/23	0820	KY
2	29	3/12/23	1450	JL
3	29	3/13/23	1210	TB
4	29	3/14/23	0830	Tb
5	29	3/15/23	1308	SC
6	29	3/16/23	1400	UA
7	29	3/17/23	1607	RJS
8	29	3/18/23	1105	TP
9	29	3/19/23	0815	TB
10	29	3/20/23	0830	TB
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: EA.TOX

Client: Eco Analyst

QC Test Number: TN-23-326

Date/Time/Initials	Comments/Activity

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: EA.TOX

Client: Eco Analyst

QC Test Number: TN-23-326

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

CETIS Test Data Worksheet

Report Date: 07 Apr-23 16:32 (p 1 of 1)
Test Code/ID: TN-23-326Ab / 13-1892-8740

Americamysis bahia 10-Day Survival Sediment Test

EA-EST, Inc. PBC

Start Date: 10 Mar-23 15:30
End Date: 20 Mar-23 15:00
Sample Date: 09 Mar-23

Species: Americamysis bahia
Protocol: US ACE NED RIM (2004)
Material: Laboratory Control Sediment

Sample Code: AT3-152
Sample Source: Yachtsman Marina NAE-2004-00319
Sample Station: Laboratory Control

Sample	Rep	Pos	# Exposed	# Survived	Notes
AT3-152	1	1	20	20	
AT3-152	2	4	20	19	
AT3-152	3	8	20	19	
AT3-152	4	11	20	20	
AT3-152	5	15	20	20	
IOSN 2019	1	3	20	19	
IOSN 2019	2	5	20	20	
IOSN 2019	3	9	20	20	
IOSN 2019	4	12	20	19	
IOSN 2019	5	13	20	20	
AT3-098	1	2	20	20	
AT3-098	2	6	20	20	
AT3-098	3	7	20	19	
AT3-098	4	10	20	19	
AT3-098	5	14	20	19	

Analyst: NM

QA:

CETIS Summary Report

Report Date: 07 Apr-23 16:37 (p 1 of 1)
Test Code/ID: TN-23-326Ab / 13-1892-8740

Americamysis bahia 10-Day Survival Sediment Test

EA-EST, Inc. PBC

Batch ID:	12-9216-3705	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	10 Mar-23 15:30	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	20 Mar-23 15:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Test Length:	9d 23h	**Taxon:**		**Source:**	ARO - Aquatic Research Or **Age:** 5 d

Sample ID:	14-3904-1293	**Code:**	AT3-152	**Project:**	Dredged Sediment Evaluation
Sample Date:	09 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	09 Mar-23 15:30	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	40h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
AT3-152	14-3904-1293	09 Mar-23	09 Mar-23 15:30	40h	Eco-Analysts, Inc.	Dredged Sediment Evalu
IOSN 2019	00-2071-8579	10 Mar-23	10 Mar-23	16h		
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	30d 3h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
AT3-152	Laboratory Control Sediment	Yachtsman Marina NAE-2004-00	Laboratory Control	
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-1122-5059	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.7381	IOSN 2019 passed survival rate	1
18-2338-9679	Survival Rate	Equal Variance t Two-Sample Test	0.2898	AT3-098 passed survival rate	1

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
AT3-152	LC	5	0.980	0.946	1.010	0.950	1.000	0.012	0.027	2.79%	0.00%
IOSN 2019	RS	5	0.980	0.946	1.010	0.950	1.000	0.012	0.027	2.79%	0.00%
AT3-098		5	0.970	0.936	1.000	0.950	1.000	0.012	0.027	2.82%	1.02%

Survival Rate Detail

MD5: 6DB39A6AF9FD0DD6C333D75C16513A7C

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-152	LC	1.000	0.950	0.950	1.000	1.000
IOSN 2019	RS	0.950	1.000	1.000	0.950	1.000
AT3-098		1.000	1.000	0.950	0.950	0.950

Analyst: NR QA: OR

CETIS Analytical Report

Report Date: 07 Apr-23 16:32 (p 1 of 2)
Test Code/ID: TN-23-326Ab / 13-1892-8740

Americamysis bahia 10-Day Survival Sediment Test

EA-EST, Inc. PBC

Analysis ID:	18-1122-5059	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.1
Analyzed:	07 Apr-23 16:32	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	07 Apr-23 16:30	**MD5 Hash:**	CF0DC2D65B921694E75EDF509D2DB236	**Editor ID:**	005-341-210-5

Batch ID:	12-9216-3705	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	10 Mar-23 15:30	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	20 Mar-23 15:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Test Length:	9d 23h	**Taxon:**		**Source:**	ARO - Aquatic Research Or **Age:** 5 d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
AT3-152	14-3904-1293	09 Mar-23	09 Mar-23 15:30	40h	Eco-Analysts, Inc.	Dredged Sediment Evalu
IOSN 2019	00-2071-8579	10 Mar-23	10 Mar-23	16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
AT3-152	Laboratory Control Sediment	Yachtsman Marina NAE-2004-00	Laboratory Control	
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	IOSN 2019 passed survival rate endpoint	3.29%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control Sedim	Reference Sed	8	27.5	---	2	Exact	0.7381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0309042	0.0038630	8			
Total	0.0309042		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.64	0.741	0.0002	Non-Normal Distribution

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
AT3-152	LC	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	0.00%
IOSN 2019	RS	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	0.00%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
AT3-152	LC	5	1.410	1.340	1.490	1.460	1.350	1.460	0.028	4.40%	0.00%
IOSN 2019	RS	5	1.410	1.340	1.490	1.460	1.350	1.460	0.028	4.40%	0.00%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-152	LC	1.000	0.950	0.950	1.000	1.000
IOSN 2019	RS	0.950	1.000	1.000	0.950	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-152	LC	1.460	1.350	1.350	1.460	1.460
IOSN 2019	RS	1.350	1.460	1.460	1.350	1.460

Analyst: NR QA: SR

CETIS Analytical Report

Report Date: 07 Apr-23 16:32 (p 2 of 2)
Test Code/ID: TN-23-326Ab / 13-1892-8740

Americamysis bahia 10-Day Survival Sediment Test

EA-EST, Inc. PBC

Analysis ID:	18-2338-9679	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.1
Analyzed:	07 Apr-23 16:32	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	07 Apr-23 16:30	**MD5 Hash:**	1E540BB82786F57113DA54C30799A1EC	**Editor ID:**	005-341-210-5

Batch ID:	12-9216-3705	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	10 Mar-23 15:30	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	20 Mar-23 15:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Test Length:	9d 23h	**Taxon:**		**Source:**	ARO - Aquatic Research Or **Age:** 5 d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	00-2071-8579	10 Mar-23	10 Mar-23	16h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	30d 3h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	AT3-098 passed survival rate endpoint	3.29%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	0.577	1.86	0.0731	CDF	0.2898	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012877	0.0012877	1	0.333	0.5796	Non-Significant Effect
Error	0.0309042	0.0038630	8			
Total	0.0321919		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.799	0.741	0.0142	Normal Distribution

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	0.00%
AT3-098		5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	1.02%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	1.410	1.340	1.490	1.460	1.350	1.460	0.028	4.40%	0.00%
AT3-098		5	1.390	1.310	1.470	1.350	1.350	1.460	0.028	4.47%	1.61%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.950	1.000	1.000	0.950	1.000
AT3-098		1.000	1.000	0.950	0.950	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.350	1.460	1.460	1.350	1.460
AT3-098		1.460	1.460	1.350	1.350	1.350

Analyst: NR QA:

ATTACHMENT III

Leptocheirus plumulosus 10-Day Whole Sediment Test Data Sheets and Statistical Analyses

(20 pages)

SEDIMENT TOXICITY TEST SET-UP BENCH SHEET

Project Number: EA.TOX

Client: Eco Analyst

QC Test Number: TN-23-327

TEST ORGANISM INFORMATION

Common Name: Amphipod

Scientific Name: *Leptocheirus plumulosus*

Lot Number: LP-181

Source: ARO

Adults Isolated (Time, Date):

Neonates Pulled (Time, Date):

Acclimation: 24hrs Age: 2-4 mm

Culture Water (T/S): 20.0 °C 19.6 ppt

TEST INITIATION

Date	Time	Initials	Activity
3/9/23	1530	SC	Sediment Added to Chambers
↓	↓	↓	Overlying Water Added to Chambers
3/10/23	1430	Zb	Organisms Transferred

TEST SET-UP

Sample Number(s): AT3-152(Control), AT3-098

Overlying Water: 20 ppt Crystal Sea (LD3-259)

Treatment	Volume Test Sediment	Volume Overlying Water
AT3-152 (Lab Control)	175 ml	800 ml
↓	↓	↓
AT3-098		

TOXICOLOGY LABORATORY BENCH SHEET - ORGANISM RECOVERY RECORD

Project Number: EA.TOX

Client: Eco Analyst

QC Test Number: TN-23-327

Organisms Recovered (date, time, initials): 3/20/23 1330

TEST ORGANISM

Common Name: Amphipod

Scientific Name: *Leptocheirus plumulosus*

Treatment	Replicate	Number of Organisms Loaded	Number of Organisms Recovered
AT3-157	A	20	19
(Lab Control)	B	20	20
	C	20	20
	D	20	20
	E	20	19
AT3-098	A	20	19
	B	20	19
	C	20	19
	D	20	18
	E	20	19

TOXICITY TEST WATER QUALITY DATA SHEET - NEW SOLUTIONS

Project Number: EA.TOX
Client: Eco Analyst
QC Test Number: TN-23-327

TEST ORGANISM
Common Name: Amphipod
Scientific Name: *Leptocheirus plumulosus*

Beginning Date: 3/10/23 Time: 1430
Ending Date: 3/6/23 Time: 1330

TARGET VALUES: Temp: 20 °C pH: 6.0 - 9.0 DO: ≥4.0 mg/L Salinity: 20 ppt Photoperiod: 24 hr light Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6
AT3-153	Control	19.0							8.1							7.7							21.1						
AT3-098		19.0							8.1							7.7							21.3						
	Meter Number	[illegible]							[illegible]							[illegible]							[illegible]						
	Time	1133							1133							1133							1133						
	Initials	[illegible]							[illegible]							[illegible]							[illegible]						

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX
TEST ORGANISM
Beginning Date: 3/10/23 Time: 1430

Client: Eco Analyst
Common Name: Amphipod
Ending Date: 3/20/23 Time: 1330

QC Test Number: TN-23-327
Scientific Name: *Leptocheirus plumulosus*

TARGET VALUES: Temp: 20 °C pH: 6.0 - 9.0 DO: ≥4.0 mg/L Salinity: 20 ppt Photoperiod: 24 hr light Light Intensity: 50 - 100 fc

		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
Sample #		1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
AT3-152	Control	19.9	21.0	21.7	21.0	20.6	19.9	21.0	8.3	8.4	8.2	82	85	8.1	8.4	79	7.4	7.7	76	8.0	8.1	7.5	20.0	20.5	20.1	21.9	21.3	19.5	22.0
AT3-098		21.0	21.0	22.0	21.0	21.0	21.0	21.0	8.2	8.3	8.2	82	84	8.3	8.3	7.9	7.2	7.5	76	7.9	7.9	7.3	21.1	22.0	20.6	22.0	22.0	19.6	22.0
	Meter Number	681	682	681	682	682	683	662	681	682	681	682	682	683	662	681	682	681	682	682	683	662	681	682	681	682	682	683	662
	Time	1014	1455	1219	0841	1310	1342	1615	1014	1455	1219	0841	1310	1342	1615	1014	1455	1219	0841	1310	1342	1615	1014	1453	1219	0841	1310	1342	1615
	Initials	GL	JL	TB	TP	SL	WD	MB	GL	JL	TB	TP	SL	WD	MB	GL	JL	TB	TP	SL	WD	AH	GL	JL	TB	TP	SL	WD	AH

ATS-T14
06/21/06

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX
TEST ORGANISM
Beginning Date: 3/10/23 Time: 1430
Client: Eco Analyst
Common Name: Amphipod
Ending Date: 3/20/23 Time: 1330
QC Test Number: TN-23-327
Scientific Name: *Leptocheirus plumulosus*
TARGET VALUES: Temp: 20 °C pH: 6.0 - 9.0 DO: ≥4.0 mg/L Salinity: 20 ppt Photoperiod: 24 hr light Light Intensity: 50 - 100 fc

		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
Sample #		8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14
AT3-152	Control	20.1	20.9	21.0					7.9	8.2	7.7					8.1	7.4	7.9					21.0	22.0	21.7				
AT3-098		20.9	21.0	21.0					7.9	8.2	7.7					8.1	7.3	8.0					21.4	22.0	22.0				
Meter Number		681	682	681					681	682	681					681	682	681					681	682	681				
Time		0834	1318	0850					0839	1318	0850					0839	1318	0850					0839	1318	0850				
Initials		KY	[illegible]	[illegible]					KY	[illegible]	[illegible]					KY	[illegible]	[illegible]					KY	[illegible]	[illegible]				

TOXICOLOGY LABORATORY BENCH SHEET - AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-327

EA Sample Number	Day 0 Overlying Water				Day 0 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)
Control	0.59	21.3	8.0	19.1	2.76	20.2	8.0	19.1
AT3-098	2.86	21.6	8.0	19.0	18.95	20.9	7.9	19.3
Meter	VERSASTAR	682	682	682	VERSASTAR	682	682	682
Initials/Date/Time	3/15/23 MKL	3/10/23 1226	3/10/23 1226	3/10/23 1226	3/15/23 MKL	3/10/23 1226	3/10/23 1226	3/10/23 1226

TOXICOLOGY LABORATORY BENCH SHEET -
AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-327

EA Sample Number	Day 2 Overlying Water				Day 2 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)
Control	0.91	20.9	8.0	19.0	2.36	23.1	7.6	19.3
AT3-098	2.60	20.7	8.1	19.0	18.30	22.2	7.7	19.2
Meter	VERSASTAR	682	682	682	VERSASTAR	682	682	682
Initials/Date/ Time	3/15/23 MKL	3/12/23 1112	3/12/23 1112	3/12/23 1112	3/15/23 # MKL	3/12/23 1112	3/12/23 1112	3/12/23 1112

TOXICOLOGY LABORATORY BENCH SHEET - AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-327

EA Sample Number	Day 4 Overlying Water				Day 4 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)
Control	0.82	23.0	8.0	18.2	2.84	23.0	8.0	19.7
AT3-098	2.43	21.5	8.2	19.0	19.05	24.2	7.8	203
Meter	VERSASTAR	682	682	682	VERSASTAR	682	682	682
Initials/Date/ Time	3/15/23 MKL	3/14/23 1140 TP	3/14/23 1140 TP	3/14/23 1140 TP	3/15/23 MKL	3/14/23 1140 TP	3/14/23 1140 TP	3/14/23 1140 TP

TOXICOLOGY LABORATORY BENCH SHEET - AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-327

EA Sample Number	Day 6 Overlying Water				Day 6 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)
Control	<0.1	19.5	8.0	21.0	1.5	17.6	7.5	19.0
AT3-098	4.0	20.0	8.2	21.0	10.6	19.2	7.8	17.9
Meter	VERSASTAR	683	683	683	VERSASTAR	687	683	683
Initials/Date/ Time	3/20/23	3/16/23 1600	3/16/23 1606	3/16/23 1606	3/20/23	3/16/23 1606	3/16/23 1600	3/16/23 1600

TOXICOLOGY LABORATORY BENCH SHEET - AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-327

EA Sample Number	Day 8 Overlying Water				Day 8 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (ºC)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (ºC)
Control	3.10	20.4	7.8	21.0	1.30	20.6	7.8	22.0
AT3-098	~~3.11~~ <0.1	21.2	7.9	21.5	5.85	21.5	7.8	21.9
Meter	VERSASTAR	681	681	681	VERSASTAR	681	681	681
Initials/Date/ Time	3/28/23 MKC	3/18/23 1100 TP	3/18/23 1100 TP	3/18/23 1100 TP	~~3/18/23~~ ~~Ucc~~ 3/28/23 MKC	3/18/23 1100 TP	3/18/23 1100 TP	3/18/23 1100 TP

(a) 3/29/23 JR

(b) TP 3/18/23

TOXICOLOGY LABORATORY BENCH SHEET - AMMONIA RECORD - SEDIMENT

Client: Eco Analyst

QC Test Number: TN-23-327

EA Sample Number	Day 10 Overlying Water				Day 10 Pore Water			
	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)	Ammonia (mg/L)	Salinity (ppt)	pH (su)	Temperature (°C)
Control	<0.1	22.5	7.6	22.5	<0.4	22.7	7.4	23.2
AT3-098	2.96	23.1	8.0	21.8				
Meter	VERSASTAR	682	682	682	VERSASTAR	682	682	682
Initials/Date/ Time	3/28/23 MKL	LAO 1715 3-20-23	1715 LAO 3-20-23	LAO 1715 3-20-23	3/28/23 MKL ~~LAO 3-20~~	LAO 3-20-23 1729	LAO 3-20-23 1729	LAO 3-20-23 1729

(S) 3/20/23
JR for LAO

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: EA.TOX

Client: Eco Analyst

QC Test Number: TN-23-327

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: EA.TOX

Client: Eco Analyst

QC Test Number: TN-23-327

Date/Time/Initials	Comments/Activity

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: EA.TOX

Client: Eco Analyst

QC Test Number: TN-23-327

Day	Testing Location	Date	Time	Initials
0	25	3/10/23	1500	TF
1	25	3/11/23	1022	GC
2	25	3/12/23	1456	JL
3	25	3/13/23	1219	TB
4	25	3/14/23	0841	AP
5	25	3/15/23	1315	SC
6	25	3/16/23	1600	WO
7	25	3/17/23	0755	Tb
8	25	3/18/23	1105	Tb
9	25	3/19/23	1315	TB
10	25	3/20/23	0850	TB
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

CETIS Test Data Worksheet

Report Date: 07 Apr-23 16:34 (p 1 of 1)
Test Code/ID: TN-23-327Lp / 08-3039-3260

Leptocheirus 10-d Survival and Reburial Sediment Test **EA-EST, Inc. PBC**

Start Date: 10 Mar-23 14:30 **Species:** Leptocheirus plumulosus **Sample Code:** AT3-152
End Date: 20 Mar-23 13:30 **Protocol:** EPA/600/R-94/025 (1994) **Sample Source:** Yachtsman Marina NAE-2004-00319
Sample Date: 09 Mar-23 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control

Sample	Rep	Pos	# Exposed	# Survived	# Reburied	Notes
AT3-152	1	1	20	19		
AT3-152	2	4	20	20		
AT3-152	3	8	20	20		
AT3-152	4	12	20	20		
AT3-152	5	13	20	19		
IOSN 2019	1	3	20	18		
IOSN 2019	2	6	20	18		
IOSN 2019	3	9	20	19		
IOSN 2019	4	11	20	19		
IOSN 2019	5	15	20	19		
AT3-098	1	2	20	19		
AT3-098	2	5	20	19		
AT3-098	3	7	20	19		
AT3-098	4	10	20	19		
AT3-098	5	14	20	19		

Analyst: NR QA: SL

CETIS Summary Report

Report Date: 07 Apr-23 16:35 (p 1 of 1)
Test Code/ID: TN-23-327Lp / 08-3039-3260

Leptocheirus 10-d Survival and Reburial Sediment Test

EA-EST, Inc. PBC

Batch ID:	18-4074-9173	**Test Type:**	Survival-Reburial	**Analyst:**	Nancy Roka
Start Date:	10 Mar-23 14:30	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Not Applicable
Ending Date:	20 Mar-23 13:30	**Species:**	Leptocheirus plumulosus	**Brine:**	Crystal Sea
Test Length:	9d 23h	**Taxon:**	Malacostraca	**Source:**	ARO - Aquatic Research Or **Age:**

Sample ID:	14-3904-1293	**Code:**	AT3-152	**Project:**	Dredged Sediment Evaluation
Sample Date:	09 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	09 Mar-23 15:30	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	38h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
AT3-152	14-3904-1293	09 Mar-23	09 Mar-23 15:30	38h	Eco-Analysts, Inc.	Dredged Sediment Evalu
IOSN 2019	00-2071-8579	10 Mar-23	10 Mar-23	14h		
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	30d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
AT3-152	Laboratory Control Sediment	Yachtsman Marina NAE-2004-00	Laboratory Control	
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
09-6242-9666	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0397	IOSN 2019 failed survival rate	1
07-0341-4086	Survival Rate	Unequal Variance t Two-Sample Test	0.9111	AT3-098 passed survival rate	1

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
09-6242-9666	Survival Rate	Control Resp	0.98	0.9	<<	Yes	Passes Criteria

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
AT3-152	LC	5	0.980	0.946	1.010	0.950	1.000	0.012	0.027	2.79%	0.00%
IOSN 2019	RS	5	0.930	0.896	0.964	0.900	0.950	0.012	0.027	2.94%	5.10%
AT3-098		5	0.950	0.950	0.950	0.950	0.950	0.000	0.000	0.00%	3.06%

Survival Rate Detail

MD5: A9FBF58A28141E827CEAD3E25AD5132A

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-152	LC	0.950	1.000	1.000	1.000	0.950
IOSN 2019	RS	0.900	0.900	0.950	0.950	0.950
AT3-098		0.950	0.950	0.950	0.950	0.950

Analyst: NR QA: OL

CETIS Analytical Report

Report Date: 07 Apr-23 16:35 (p 1 of 3)
Test Code/ID: TN-23-327Lp / 08-3039-3260

Leptocheirus 10-d Survival and Reburial Sediment Test

EA-EST, Inc. PBC

Analysis ID:	09-6242-9666	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.1
Analyzed:	07 Apr-23 16:34	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	07 Apr-23 16:33	**MD5 Hash:**	BEE15B2ADFC4B9839C1A71D8F53EC313	**Editor ID:**	005-341-210-5

Batch ID:	18-4074-9173	**Test Type:**	Survival-Reburial	**Analyst:**	Nancy Roka
Start Date:	10 Mar-23 14:30	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Not Applicable
Ending Date:	20 Mar-23 13:30	**Species:**	Leptocheirus plumulosus	**Brine:**	Crystal Sea
Test Length:	9d 23h	**Taxon:**	Malacostraca	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
AT3-152	14-3904-1293	09 Mar-23	09 Mar-23 15:30	38h	Eco-Analysts, Inc.	Dredged Sediment Evalu
IOSN 2019	00-2071-8579	10 Mar-23	10 Mar-23	14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
AT3-152	Laboratory Control Sediment	Yachtsman Marina NAE-2004-00	Laboratory Control	
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	IOSN 2019 failed survival rate endpoint	3.05%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control Sedim		Reference Sed*	8	18	—	1	Exact	0.0397	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	Upper	Overlap	Decision
Control Resp	0.98	0.9	<<	Yes	Passes Criteria

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.25	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0283984	0.0283984	1	8.55	0.0192	Significant Effect
Error	0.026566	0.0033208	8			
Total	0.0549644		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.39	23.2	0.7572	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7	0.741	0.0009	Non-Normal Distribution

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
AT3-152	LC	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	0.00%
IOSN 2019	RS	5	0.930	0.896	0.964	0.950	0.900	0.950	0.012	2.94%	5.10%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
AT3-152	LC	5	1.410	1.340	1.490	1.460	1.350	1.460	0.028	4.40%	0.00%
IOSN 2019	RS	5	1.310	1.240	1.370	1.350	1.250	1.350	0.024	4.03%	7.54%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-152	LC	0.950	1.000	1.000	1.000	0.950
IOSN 2019	RS	0.900	0.900	0.950	0.950	0.950

Analyst: NR QA:

Leptocheirus 10-d Survival and Reburial Sediment Test **EA-EST, Inc. PBC**

Analysis ID:	09-6242-9666	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.1
Analyzed:	07 Apr-23 16:34	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	07 Apr-23 16:33	**MD5 Hash:**	BEE15B2ADFC4B9839C1A71D8F53EC313	**Editor ID:**	005-341-210-5

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-152	LC	1.350	1.460	1.460	1.460	1.350
IOSN 2019	RS	1.250	1.250	1.350	1.350	1.350

Analyst: NR QA: JR

CETIS Analytical Report

Report Date: 07 Apr-23 16:35 (p 3 of 3)
Test Code/ID: TN-23-327Lp / 08-3039-3260

Leptocheirus 10-d Survival and Reburial Sediment Test — **EA-EST, Inc. PBC**

Analysis ID: 07-0341-4086
Analyzed: 07 Apr-23 16:34
Edit Date: 07 Apr-23 16:33

Endpoint: Survival Rate
Analysis: Parametric-Two Sample
MD5 Hash: 2A42733776C7572A47EA36E264C4412B

CETIS Version: CETISv2.1.1
Status Level: 1
Editor ID: 005-341-210-5

Batch ID: 18-4074-9173
Start Date: 10 Mar-23 14:30
Ending Date: 20 Mar-23 13:30
Test Length: 9d 23h

Test Type: Survival-Reburial
Protocol: EPA/600/R-94/025 (1994)
Species: Leptocheirus plumulosus
Taxon: Malacostraca

Analyst: Nancy Roka
Diluent: Not Applicable
Brine: Crystal Sea
Source: ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	00-2071-8579	10 Mar-23	10 Mar-23	14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	30d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	AT3-098 passed survival rate endpoint	2.75%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	4	-1.63	2.13	0.0503	CDF	0.9111	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.64	2.29	0.8052	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0037046	0.0037046	1	2.67	0.1411	Non-Significant Effect
Error	0.0111139	0.0013892	8			
Total	0.0148185		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.814	0.741	0.0215	Normal Distribution

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.930	0.896	0.964	0.950	0.900	0.950	0.012	2.94%	0.00%
AT3-098		5	0.950	0.950	0.950	0.950	0.950	0.950	0.000	0.00%	-2.15%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	1.310	1.240	1.370	1.350	1.250	1.350	0.024	4.03%	0.00%
AT3-098		5	1.350	1.350	1.350	1.350	1.350	1.350	0.000	0.00%	-2.95%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.900	0.900	0.950	0.950	0.950
AT3-098		0.950	0.950	0.950	0.950	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.250	1.250	1.350	1.350	1.350
AT3-098		1.350	1.350	1.350	1.350	1.350

Analyst: NR QA: DR

ATTACHMENT IV

Report Quality Assurance Record
(2 pages)

REPORT QUALITY ASSURANCE RECORD

Client: Eco-Analysts

Author: M. Chanov

Project Number: 70022-TOX

EA Report Number: 9179

REPORT CHECKLIST

QA/QC ITEM	REVIEWER	DATE
1. Samples collected, transported, and received according to study plan requirements.		4/25/23
2. Samples prepared and processed according to study plan requirements.		4/25/23
3. Data collected using calibrated instruments and equipment.		4/25/23
4. Calculations checked:		
- Hand calculations checked		4/25/23
- Documented and verified statistical procedure used.		4/25/23
5. Data input/statistical analyses complete and correct.		4/27/2023
6. Reported results and facts checked against original sources.		4/27/2023
7. Data presented in figures and tables correct and in agreement with text.		4/27/2023
8. Results reviewed for compliance with study plan requirements.		4/25/23

	AUTHOR	DATE
9. Commentary reviewed and resolved.		4/27/23

10. All study plan and quality assurance/control requirements have been met and the report is approved:

PROJECT MANAGER — DATE 4/27/23

QUALITY CONTROL OFFICER — DATE 4/27/2023

SENIOR TECHNICAL REVIEWER — DATE 4/27/23

ATTACHMENT V

US Army Corps of Engineers Quality Assurance Checklist
(3 pages)

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	NA
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	NA
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA
20. Were corrective action forms provided for all non-conforming data?	NA
21. Were all the species-specific test conditions in Appendix V met?	Yes, except as noted for temperature
22. Were the test-specific age requirements met for each test species?	Yes
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	No, bulk physical/chemical testing completed prior to biological testing
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	Yes
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	Yes

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species	Yes	Temperature in both assays higher than target range, but within RIM limits (Tables 4 and 5)	Data Package
Test species age	Age/health within guidelines for each species (Appendix V)	Yes		Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No	Yes		Data Package (separate cover)
Water column toxicity test: Control mortality Control abnormality	 ≤ 10% mean ≤ 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae	NA		
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 ≤ 10% mean (no chamber > 20%) See EPA (1994a) Section 9; Table 11.3	Yes		Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

ATTACHMENT VI

Email Communications
(2 pages)

-----Original Message-----
From: Hopkins, Aaron D CIV USARMY CENAE (US) <Aaron.D.Hopkins@usace.army.mil>
Sent: Wednesday, March 11, 2020 16:41

Cc: Wolf, Steven H CIV USARMY CENAE (USA) <Steven.Wolf@usace.army.mil>
Subject: RE: 10-Day Solid Phase Assay (UNCLASSIFIED)

We are sticking with the 20% threshold for the 10 day toxicity tests. This is something we are reviewing though and may revise as part of the RIM update.

Thanks,
Aaron

Aaron Hopkins
US Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742
978.318.8973

-----Original Message-----
From: Wolf, Steven H CIV USARMY CENAE (USA)
Sent: Wednesday, March 11, 2020 1:45 PM
To: Hopkins, Aaron D CIV USARMY CENAE (US) <Aaron.D.Hopkins@usace.army.mil>
Subject: FW: 10-Day Solid Phase Assay (UNCLASSIFIED)

Sent: Wednesday, March 11, 2020 12:23 PM
To: Wolf, Steven H CIV USARMY CENAE (USA) <Steven.Wolf@usace.army.mil>
Cc: [redacted]
Subject: [Non-DoD Source] 10-Day Solid Phase Assay

Hi Steve,

The lab is working through the bioassays for the [redacted] project, and is beginning to draft the interim reports and provide data. In the reporting process a question regarding the comparson of the dredge site data to the reference site has come up. Historically including as recently as the last spring, all 10-day survival numbers were compared to the reference site to determine if they were significantly different and if so was the difference >20%, the lab has asked if they should continue to use 20% or should they use 10% as is stated in the ITM.

ECOTOXICOLOGICAL TESTING
BIOACCUMULATION ASSAYS

KENNEBUNKPORT, MAINE

Prepared for:

Eco-Analysts, Inc.
P.O. Box 224
Bath, Maine 04530

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC
231 Schilling Circle
Hunt Valley, Maryland 21031
For questions concerning this report, please contact Michael Chanov
ph: 410-584-7000

Results relate only to the items tested or to the samples as received by the laboratory.

This report shall not be reproduced, except in full, without written approval of
EA Engineering, Science, and Technology, Inc., PBC

This report contains 23 pages plus 14 attachments.

6 September 2023

Michael K. Chanov II
Laboratory Director

Date

EA Project Number 70022.TOX

ACCREDITED IN ACCORDANCE WITH nelac
E87550

EA Report Number 9180

1. INTRODUCTION

In accordance with the US Army Corps of Engineers, New England District (CENAE), EA Engineering, Science, and Technology, Inc., PBC (EA) performed solid phase bioaccumulation testing on sediment samples collected from the area of dredging proposed the marinas located on the Kennebunk River in Kennebunkport, Maine. Placement of dredge materials is proposed at the Isles of Shoals North (IOSN) Disposal Site. Samples were provided by Eco-Analysts, Inc., Bath, Maine. The purpose of this study was to evaluate the toxicity and bioaccumulation potential of the sediment samples to benthic organisms.

The toxicity testing program consisted of 28-day bioaccumulation tests with *Nereis virens* (sand worm) and *Macoma nasuta* (blunt-nose clam). The bioaccumulation tests evaluated survival of the test organisms and bioaccumulative effects following exposure to the sediment samples. All biological testing was completed at EA, Hunt Valley, Maryland. At the completion of the 28-day exposure period, tissues from surviving organisms were couriered to Alpha Analytical, Mansfield, Massachusetts for chemical analysis.

2. MATERIALS AND METHODS

2.1 SAMPLE RECEIPT AND PREPARATION

Ten sediment cores were collected by Eco-Analysts personnel and/or their representatives from locations in the dredge footprint and composited in accordance with the Sampling and Analysis Plan. One sediment composite was created for the project and placed into five 5-gallon buckets. The samples were held at ≤4°C and were hand delivered to EA's Ecotoxicology Laboratory in Hunt Valley, Maryland. The composited sediment sample was logged in and assigned an EA laboratory accession number and was stored in the dark in a secured walk-in cooler at ≤4°C until used for testing. Table 1 summarizes the sample identification, accession number, and collection and receipt information for the sediment samples. A summary of the pore water ammonia measurements is included in Table 2. Chain-of-custody records are included in Attachment I.

Reference sediment was not collected from the IOSN. Rather, historic survival and body burden data from 2019 were provided by the CENAE for statistical comparison purposes.

2.2 TOXICITY TEST METHODS

All toxicity testing was conducted following EA's standard operating procedures (EA 2022) which are in accordance with the *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters* (USEPA, CENAE 2004), and USEPA/USACE guidance (1991, 1998).

2.2.1 Bioaccumulation Testing and Tissue Chemistry

Bioaccumulation testing was conducted using the sand worm (*Nereis virens*) and the blunt-nose clam (*Macoma nasuta*). The adult clams (lot number MA-080) and the adult worms (NV-088) were received from Aquatic Research Organisms (Hampton, New Hampshire) on 29 March 2023 and 7 March 2023, respectively. The organisms were placed in clean seawater and allowed to depurate accumulated waste products, prior to use in testing.

The sediment samples and overlying water were added to the test chambers a minimum of one day prior to test initiation to allow time for the suspended sediments to settle. The overlying water was 30 ppt artificial seawater (Crystal Sea artificial sea salts). Natural sediments from the organism collection sites were used as laboratory controls in the bioaccumulation testing. Control sediment used in the *N. virens* test was collected from the Damariscotta River, Booth Bay Harbor, Maine. Control sediment used in the clam bioaccumulation test was collected from Tomales Bay, California. The bioaccumulation tests were 28 days in duration and were conducted as static renewal assays. The overlying water was replaced three times a week by siphoning approximately 80 percent of the overlying water from the aquaria and replacing with new overlying water taking care not to disturb the sediment surface.

The bioaccumulation tests were conducted in 10-gallon aquaria with 5 L of sediment and 22 L of overlying water per aquarium. There were five replicates per test sediment, and three replicates per control sediment. Based on the analytical tissue biomass requirements, 30 organisms were randomly introduced into each replicate chamber for both species.

The bioaccumulation test for the sandworm was initiated on 8 March 2023 and completed on 5 April 2023. The clam assay was initiated on 29 March 2023 and completed on 26 April 2023. During the 28-day exposure periods, the test chambers were maintained at a target temperature of 20±1°C for *N. virens* and 12±1°C for *M. nasuta* with a 16-hour light/8-hour dark photoperiod. Gentle aeration was provided to each aquarium throughout the test period. Observations of mortality and abnormal organism behavior were recorded daily, and dead organisms were removed, as observed, from the test chambers. Measurements of temperature, pH, dissolved oxygen, and salinity of the overlying water were recorded on one replicate of each sample and control at test initiation, termination, and three times a week prior to replacement of the overlying water. The water quality measurements are summarized in Table 3 *(N. virens*) and Table 4 (*M. nasuta*). The organisms were not fed during the exposure period.

After 28 days of exposure, the organisms were recovered from the samples and placed into clean artificial sea water for 24 hours to purge their digestive tracts. After the depuration period, the organism tissues were collected and submitted to Alpha Analytical for chemical analyses. Copies of the original data sheets and tissue chains-of-custody from the *N. virens* and *M. nasuta* testing are included in Attachments II and III, respectively. Copies of tissue chemistry results used for the statistical analysis of body burden data for *N. virens* and *M. nasuta* are provided in Attachments IV through XI. The complete tissue chemistry and quality assurance analytical report is provided under separate cover by Alpha Analytical.

All tissue data qualified as "JB" or "P" were treated as J-qualified for purposes of assigning footnotes for the CENAE EDD.

The RLs for zinc and PCBs were higher than their respective RIM RLs, however all MDLs met RIM criteria.

2.2.2 Data Analysis

The statistical analyses of survival and body burden data were completed using CETIS® ver. 2.1.1.5 (Comprehensive Environmental Toxicity Information System) software to determine significant differences between the IOSN 2019 reference data and the site composite tissues. Data were evaluated to determine homogeneity of sample variances and normality of distribution using appropriate statistical analyses. Data sets were subsequently evaluated using the appropriate parametric or non-parametric Analysis of Variance (ANOVA) statistical tests. Statistical difference was evaluated at $\alpha = 0.05$. Per RIM guidelines and direction provided by the CENAE in an email dated March 30, 2018, one-half the MDL is used in instances when a compound of concern (COC) is not detected for purposes of calculating a mean tissue concentration and total concentrations for PAHs, PCBs, and pesticides. MDLs used in statistical computations may differ due to differences in tissue mass and final extract volumes used in the analysis for each sample. Statistical analyses of survival data are included in Attachments II and III for *N. virens* and *M. nasuta*, respectively. Statistical analyses of body burden data are included in Attachments IV through XI.

All mean body burden concentrations presented in the narrative report tables, CETIS® reports and the CENAE EDD spreadsheet are calculated from the same source of tissue chemistry data generated by Alpha. Concentrations are presented to a precision of 3 significant figures for all COCs. Slight differences in the concentrations may be attributable to the ability and limitations of each software package to capture and report significant figures. The values agree within reason by rounding and represent the magnitude of the average concentration of the COC detected in tissue.

The statistical analyses were completed for all COCs identified in the SAP, however following guidance from the CENAE in emails dated July 28, 2020 and October 9, 2020, COCs were excluded from the evaluation if they were not detected in both the reference site and composite tissue replicates. These COCs are "c" qualified accordingly. All email communications are included in Attachment XIV.

As mentioned in Section 2.1, IOSN reference data from 2019 were used for statistical comparisons against data generated from this study. The IOSN 2019 data were generated using a different lot of test organisms than the assays completed for this study. As such, a comparison between the pre-test tissue and site composite results provides added insight to the levels of COCs observed in site tissue samples because the test organisms are from the same lot. In addition, there may be slight differences in the MDLs between the IOSN 2019 reference data and the samples analyzed as part of this study.

2.2.3 Reference Toxicant Testing

In conformance with EA's quality assurance/quality control program requirements, reference toxicant testing was performed by EA on the acquired lots of *N. virens* and *M. nasuta* utilized in the testing program. The reference toxicant tests consisted of a graded concentration series of a specific toxicant in water only tests, with no sediment present in the test chambers. Table 5 presents the results of the reference toxicant testing.

2.3 ARCHIVES

Original data sheets, records, memoranda, notes, and computer printouts are archived at EA's Office in Hunt Valley, Maryland. These data will be retained for a period of 5 years unless a longer period of time is requested.

3. RESULTS AND DISCUSSION

This bioassay study using a sediment composite sample collected from the Yachtsman Marina project area was designed and conducted to meet the requirements of the USEPA/USACE dredged material testing program. The results of these toxicity tests met the current NELAC standards, where applicable. Protocol requires 90 percent survival in the laboratory control, indicating that test organisms were healthy and that endpoints met or exceed requirements specified in the current version of the RIM.

Tables 6 through 9 provide results of *N. virens* and *M. nasuta* survival summaries and statistical analyses. Tables 10 and 11 provide summaries of body burden data with findings of significance for *N. virens* and *M. nasuta*, respectively. Table 12 summarizes significant uptake and the magnitude of COC concentrations in worm and clam tissue versus IOSN 2019 and pre-test tissue. Table 13 summarizes project specific Reporting Limits (RLs) and Method Detection Limits (MDLs) used in this study. Summaries of the tissue chemistry results and the statistical analysis of body burden data for *N. virens* and *M. nasuta* are provided in Attachments IV through XI.

3.1 *Nereis virens* BIOACCUMULATION EVALUATION RESULTS

3.1.1 Survival

Mean *N. virens* survival in the laboratory control sediment was 93 percent. Surviving organisms from the site composite sample provided sufficient tissue for preparation and analysis of body burdens. Mean survival of worms was 93 percent in the composite sample, and 90 percent in the IOSN 2019 reference data. Statistical analyses demonstrated that there were no significant effects on *N. virens* survival following exposure to the composite sediment sample as compared with the IOSN 2019 reference data, and results were within 10 percent of the reference data.

3.1.2 Body Burden Analysis

There were significant increases in body burdens for worms maintained in site composite sediments for 5 metals, 9 PAHs, 2 PCB congeners and 4,4’-DDD as compared to IOSN 2019 reference data. Of these COCs, lead, nickel, anthracene, and naphthalene were detected in composite tissue at concentrations less than in pre-test tissue, suggesting that the presence of these COCs may not be attributable to site conditions or factor heavily in the suitability determination for sediment disposal. Likewise, although concentrations of chromium and 4,4'-DDD were 8 to 37 times higher in composite tissue than in IOSN 2019 reference tissue, they were detected at concentrations below pre-test tissue levels. Of the remaining COCs, concentrations of pyrene were more than 5 times higher and concentrations of 2 PAHs and PCB 105 were more than 1 order of magnitude higher in composite tissue than in IOSN 2019 tissue. The remaining COCs were only slightly higher in composite tissue than in pre-test or IOSN 2019 tissue.

3.2 *Macoma nasuta* BIOACCUMULATION EVALUATION RESULTS

3.2.1 Survival

Mean *M. nasuta* survival in the laboratory control sediment was 90 percent. Surviving organisms from the site composite sample provided sufficient tissue for preparation and analysis of body burdens. Mean survival of clams was 96 percent in the site composite sample and 94 percent in the IOSN 2019 reference data. Statistical analyses demonstrated that there were no significant effects on *M. nasuta* survival following exposure to the composite sediment sample as compared with the IOSN 2019 reference data, and results were within 10 percent of the reference data.

3.2.2 Body Burden Analysis

There were significant increases in body burdens for clams maintained in site composite sediments for 3 metals, 11 PAHs, 3 PCB congeners and 2 pesticides as compared to IOSN 2019 reference data. Of these COCs, copper, nickel, PCB 52 and naphthalene were detected in composite tissue at concentrations less than in pre-test tissue, suggesting that the presence of these COCs may not be attributable to site conditions or factor heavily in the suitability determination for sediment disposal. Likewise, fluorene was over 6 times higher in composite tissue than in IOSN 2019 reference tissue, they were detected at concentrations below pre-test tissue levels. Of the remaining COCs, concentrations of 4 PAHs were more than 5 times higher and concentrations of 2 PAHs and 4,4'-DDD were more than 1 order of magnitude higher in composite tissue than in IOSN 2019 tissue. The remaining COCs were only slightly higher in composite tissue than in pre-test or IOSN 2019 tissue.

3.3 REFERENCE TOXICANT TESTS

The results of the reference toxicant tests are summarized in Table 5. All of the reference toxicant test results fell within the established laboratory control chart limits.

4. REFERENCES CITED

EA. 2022. EA Ecotoxicology Laboratory Quality Assurance and Standard Operating Procedures Manual. EA Manual ATS-102. Internal document prepared by EA's Ecotoxicology Laboratory, EA Engineering, Science, and Technology, Inc., PBC, Hunt Valley, Maryland.

USEPA and USACE. 1991. Evaluation of Dredged Material Proposal for Ocean Disposal, Testing Manual (commonly called "The Green Book").

USEPA and USACE. 1998. Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S.-Inland Testing Manual. EPA/823/B-94/004. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. and Department of the Army, U.S. Army Corps of Engineers, Washington, D.C.

USEPA Region 1, CENAE. 2004. Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters. September 2004

TABLE 1 SUMMARY OF COLLECTION AND RECEIPT INFORMATION FOR SEDIMENT SAMPLES

Sample Identification	EA Accession Number	Collection		Receipt	
		Time	Date	Time	Date
10 Stations at 4 Marinas Mud	AT3-098	0900-1300	8 February 2023	1630	9 February 2023

TABLE 2 AMMONIA CONCENTRATIONS MEASURED ON SEDIMENT PORE WATER PRIOR TO BIOACCUMULATION TOXICITY TESTING

Sediment Identification	**EA Accession Number**	**Initial Ammonia (mg/L NH_3-N)**	**Purged Ammonia (mg/L NH_3-N)**
10 Stations at 4 Marinas Mud	AT3-098	63.5	49.6

TABLE 3 SUMMARY OF WATER QUALITY PARAMETERS MEASURED DURING BIOACCUMULATION TESTING WITH *Nereis virens*

***Test Number:* TN-23-302**
***Testing Dates:* 3/8/23 – 4/5/23**

Sediment Sample Identification	**EA Accession Number**	**Range**			
		Temperature (°C)	**pH (SU)**	**Dissolved Oxygen (mg/L)**	**Salinity (ppt)**
10 Stations at 4 Marinas Mud	AT3-098	19.3 – 20.3	7.8 – 8.2	6.8 – 8.4	27.0 – 31.4
LABORATORY CONTROL	AT3-152	19.0 – 20.2	7.8 – 8.1	7.0 – 8.7	27.0 – 31.7

TABLE 4 SUMMARY OF WATER QUALITY PARAMETERS MEASURED DURING BIOACCUMULATION TESTING WITH *Macoma nasuta*

***Test Number:* TN-23-303**
***Testing Dates:* 3/29/23 – 4/26/23**

Sediment Sample Identification	**EA Accession Number**	**Range**			
		Temperature (°C)	**pH**	**Dissolved Oxygen (mg/L)**	**Salinity (ppt)**
10 Stations at 4 Marinas Mud	AT3-098	11.5 – 13.0	7.6 – 8.2	7.9 – 8.8	27.0 – 32.2
LABORATORY CONTROL	AT3-191	11.6 – 13.0	7.7 – 8.2	7.7 – 8.7	27.0 – 32.0

TABLE 5 RESULTS OF REFERENCE TOXICANT TESTING ON ACQUIRED LOTS OF TEST ORGANISMS

Test Species	**Organism Lot Number**	**Reference Toxicant**	**Test Endpoint**	**Acceptable Control Chart Limits**
Nereis virens	NV-088	Potassium chloride (KCl)	48-Hour LC50: 1,208 mg/L KCl	587-1,973 mg/L KCl
Macoma nasuta	MA-080	Potassium chloride (KCl)	48-Hour LC50: 1,439 mg/L KCl	929-1,762 mg/L KCl

TABLE 6 RESULTS OF 28-DAY BIOACCUMULATION TESTING WITH *Nereis virens*

Test Number: **TN-23-302**

Testing Dates: **3/8/23 - 4/5/23**

Sample Identification	**EA Accession Number**	**No. Alive/No. Exposed**[(a)]	**28-Day Mean Percent Survival**
LABORATORY CONTROL	AT3-152	72 / 75 [b]	93
IOSN REFERENCE	N/A	N/A	90
10 Stations at 4 Marinas Mud	AT3-098	140 / 150	93

(a) Total for five replicates of thirty organisms for all test sediments except for control, which had three replicates.
(b) Only 15 organisms were added to replicate B of the laboratory control due to technician error.

TABLE 7 STATISTICAL ANALYSIS OF 28-DAY BIOACCUMULATION TESTING WITH *Nereis virens*

Test Number: **TN-23-302**

Testing Dates: **3/8/23 - 4/5/23**

Sample Identification	**EA Accession Number**	**Mean Survival**	**Significantly Different as Compared to: IOSN 2019**	**Difference in Survival >10% as Compared to: IOSN 2019**	
IOSN REFERENCE	N/A	90%	-	-	-
10 Stations at 4 Marinas Mud	AT3-098	93%	No	No	-3%

TABLE 8   RESULTS OF 28-DAY BIOACCUMULATION TESTING WITH *Macoma nasuta*

Test Number: **TN-23-303**

Testing Dates: **3/29/23 - 4/26/23**

Sample Identification	EA Accession Number	No. Alive/No. Exposed[(a)]	28-Day Mean Percent Survival
LABORATORY CONTROL	AT3-191	81 / 90	90
IOSN REFERENCE	N/A	N/A	94
10 Stations at 4 Marinas Mud	AT3-098	144 / 150	96

(a) Total for five replicates of thirty organisms for all test sediments except for control, which had three replicates.

TABLE 9 STATISTICAL ANALYSIS OF 28-DAY BIOACCUMULATION TESTING WITH *Macoma nasuta*

Test Number: **TN-23-303**

Testing Dates: **3/29/23 - 4/26/23**

Sample Identification	**EA Accession Number**	**Mean Survival**	**Significantly Different as Compared to: IOSN 2019**	**Difference in Survival >10% as Compared to: IOSN 2019**	
IOSN REFERENCE	N/A	94%	-	-	-
10 Stations at 4 Marinas Mud	AT3-098	96%	No	No	-2%

TABLE 10 STATISTICAL COMPARISONS OF *N. virens* BODY BURDENS VS. IOSN 2019 REFERENCE DATA

Compound	Units	Pre-Test [d]		IOSN 2019		Composite	
		Mean	Qual	Mean	Qual	Mean	Qual
Trace Metals							
Arsenic, total	mg/Kg	2.00		2.25		2.02	NS
Cadmium, total	mg/Kg	0.0300	b	0.0252	b	0.0338	bS
Chromium, total	mg/Kg	0.620	b	0.0686	b	0.551	bS
Copper, total	mg/Kg	1.49		1.20		1.12	NS
Lead, total	mg/Kg	0.195		0.0744		0.191	S
Mercury, total	mg/Kg	0.0110	b	0.0156	b	0.00662	abNS
Nickel, total	mg/Kg	0.476		0.168		0.232	S
Zinc, total	mg/Kg	13.1		18.6		14.1	NS/S e
PAH Compounds							
Acenaphthene	µg/Kg	0.620	a	0.563	ab	0.883	abNS
Acenaphthylene	µg/Kg	0.381	a	0.286	a	4.22	aNS
Anthracene	µg/Kg	0.903	ab	0.310	a	0.610	abS
Benzo(a)anthracene	µg/Kg	0.775	a	0.581	a	0.766	ac
Benzo(a)pyrene	µg/Kg	0.813	a	0.610	a	0.805	ac
Benzo(b)fluoranthene	µg/Kg	1.08	a	0.807	a	2.43	aS
Benzo(k)fluoranthene	µg/Kg	0.493	a	0.371	a	6.45	aS
Benzo(g,h,i)perylene	µg/Kg	0.345	a	0.259	a	0.427	abS
Chrysene	µg/Kg	0.752	a	0.564	a	1.14	abS
Dibenz(a,h)anthracene	µg/Kg	0.400	a	0.300	a	0.396	ac
Fluoranthene	µg/Kg	0.610	a	0.569	ab	6.71	bS
Fluorene	µg/Kg	1.07	b	0.431	ab	2.05	bS
Indeno(1,2,3-cd)pyrene	µg/Kg	0.810	a	0.608	a	0.802	ac
Naphthalene	µg/Kg	1.64	b	0.651	ab	1.60	abS
Phenanthrene	µg/Kg	0.677	a	2.04	b	0.861	abNS
Pyrene	µg/Kg	0.898	a	0.674	a	6.23	bS
Total PAHs	µg/Kg	12.3		9.63		36.4	
PCB Congeners							
PCB 008	µg/Kg	0.0638	a	0.0480	a	0.0632	ac
PCB 018	µg/Kg	0.0465	a	0.0349	a	0.0460	ac
PCB 028	µg/Kg	0.0790	a	0.0593	a	0.0784	ac
PCB 044	µg/Kg	0.0880	a	0.0661	a	0.0873	ac
PCB 052	µg/Kg	0.0491	a	0.0369	a	0.136	abS
PCB 066	µg/Kg	0.0462	a	0.0347	a	0.0457	ac
PCB 101	µg/Kg	0.0752	a	0.0564	a	0.0745	ac
PCB 105	µg/Kg	0.0675	a	0.0506	a	0.810	aS
PCB 118	µg/Kg	0.0713	a	0.0534	a	0.0706	ac
PCB 128	µg/Kg	0.0842	a	0.0632	a	0.0834	ac
PCB 138	µg/Kg	0.305	ab	0.331	ab	0.462	aNS
PCB 153	µg/Kg	0.628	b	0.763		0.857	aNS
PCB 170	µg/Kg	0.0413	a	0.0310	a	0.0409	ac
PCB 180	µg/Kg	0.0423	a	0.0318	a	0.0419	ac
PCB 187	µg/Kg	0.256	a	0.0456	a	0.0601	ac
PCB 195	µg/Kg	0.0795	a	0.0596	a	0.0786	ac
PCB 206	µg/Kg	0.0810	a	0.0608	a	0.0802	ac
PCB 209	µg/Kg	0.0928	a	0.0697	a	0.0920	ac
Total PCBs	µg/Kg	4.39		3.79		6.42	
Pesticides							
Aldrin	µg/Kg	0.0404	a	0.0605	a	0.0400	ac
cis-Chlordane	µg/Kg	0.0870	a	0.131	a	0.0863	ac
trans-Chlordane	µg/Kg	0.0245	a	0.0369	a	0.0243	ac
cis-Nonachlor	µg/Kg	0.0117	a	0.0176	a	0.0116	ac
trans-Nonachlor	µg/Kg	0.0108	a	0.0161	a	0.0106	ac
Oxychlordane	µg/Kg	0.0501	a	0.0752	a	0.0495	ac
Total Chlordanes	µg/Kg	0.184		0.277		0.182	
4,4'-DDT	µg/Kg	0.0159	a	0.0238	a	0.0158	ac
4,4'-DDD	µg/Kg	3.29	ab	0.0182	a	0.665	S
4,4'-DDE	µg/Kg	0.00737	a	0.0111	a	0.00728	ac
Total DDT	µg/Kg	3.32		0.0531		0.688	
Dieldrin	µg/Kg	0.0243	a	0.0365	a	0.0241	ac
alpha-Endosulfan	µg/Kg	0.0222	a	0.0334	a	0.0220	ac
beta-Endosulfan	µg/Kg	0.0115	a	0.0173	a	0.0113	ac
Total Endosulfans	µg/Kg	0.0337		0.0507		0.0333	
Endrin	µg/Kg	0.0132	a	0.0199	a	0.0131	ac
Heptachlor	µg/Kg	0.0253	a	0.0379	a	0.0250	ac
Heptachlor epoxide	µg/Kg	0.0520	a	0.0780	a	0.0515	ac
Hexachlorobenzene	µg/Kg	0.217	a	0.326	a	0.215	ac
Lindane (gamma-BHC)	µg/Kg	0.0365	a	0.0548	a	0.0361	ac
Methoxychlor	µg/Kg	0.0575	a	0.843	a	0.0568	ac
Toxaphene	µg/Kg	1.05	a	1.58	a	1.04	ac

Notes:

Mean concentrations are reported to 3 significant figures.

a = COC not detected (below MDL) in at least one replicate; mean value was calculated using one-half of the project specific MDL for non-detected values.
b = COC concentration estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c = COC was not detected in either the dredge tissue replicates or in the historic reference tissue, therefore was eliminated from further evaluation.

[d] Pre-test tissue represents the mean of three replicates, whereas the reference and site composites represent a mean of 5 replicates.

[e] Analysis conducted after removal of a statistical outlier.

NS = Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.
S = Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05.

TABLE 11 STATISTICAL COMPARISONS OF *M. nasuta* BODY BURDENS VS. IOSN 2019 REFERENCE DATA

Compound	Units	Pre-Test [d]		IOSN 2019		Composite	
		Mean	Qual	Mean	Qual	Mean	Qual
Trace Metals							
Arsenic, total	mg/Kg	2.59		3.49		2.54	NS
Cadmium, total	mg/Kg	0.0297	b	0.0290	b	0.0266	bNS
Chromium, total	mg/Kg	0.465		0.334	b	0.434	bNS
Copper, total	mg/Kg	3.10		1.77		2.71	S
Lead, total	mg/Kg	0.129		0.349		0.452	S
Mercury, total	mg/Kg	0.00185	a	0.00170	a	0.00208	ac
Nickel, total	mg/Kg	0.713		0.521		0.570	NS/S [e]
Zinc, total	mg/Kg	11.6		11.8		12.8	NS
PAH Compounds							
Acenaphthene	µg/Kg	1.07	ab	0.453	a	1.56	abNS
Acenaphthylene	µg/Kg	0.378	a	0.279	a	0.381	ac
Anthracene	µg/Kg	0.853	ab	0.302	a	2.69	bS
Benzo(a)anthracene	µg/Kg	1.32	ab	0.565	a	5.40	bS
Benzo(a)pyrene	µg/Kg	0.805	a	0.594	a	1.74	abS
Benzo(b)fluoranthene	µg/Kg	1.07	a	0.786	a	4.41	bS
Benzo(k)fluoranthene	µg/Kg	0.490	a	0.455	ab	1.25	abS
Benzo(g,h,i)perylene	µg/Kg	0.342	a	0.518	ab	0.820	abNS
Chrysene	µg/Kg	2.01	b	0.550	a	2.92	bS
Dibenz(a,h)anthracene	µg/Kg	0.559	ab	2.97	b	0.400	aNS
Fluoranthene	µg/Kg	2.57	b	2.12	b	26.6	S
Fluorene	µg/Kg	2.11	b	0.253	a	1.74	bS
Indeno(1,2,3-cd)pyrene	µg/Kg	0.803	a	3.54	b	0.985	abNS
Naphthalene	µg/Kg	3.78	b	0.390	a	1.77	bS
Phenanthrene	µg/Kg	4.09	b	1.97	b	6.92	bS
Pyrene	µg/Kg	2.86	b	1.63	b	20.8	S
Total PAHs	µg/Kg	25.1		17.4		80.4	
PCB Congeners							
PCB 008	µg/Kg	0.0633	a	0.0467	a	0.0639	ac
PCB 018	µg/Kg	0.0461	a	0.0340	a	0.0465	ac
PCB 028	µg/Kg	0.0783	a	0.0578	a	0.0791	ac
PCB 044	µg/Kg	0.0873	a	0.0644	a	0.0883	ac
PCB 052	µg/Kg	2.09		0.0359	a	0.172	aS
PCB 066	µg/Kg	0.0457	a	0.0338	a	0.0462	ac
PCB 101	µg/Kg	0.0745	a	0.0550	a	0.0754	ac
PCB 105	µg/Kg	0.0668	a	0.0493	a	0.0675	ac
PCB 118	µg/Kg	0.0708	a	0.0522	a	0.142	abS
PCB 128	µg/Kg	0.0835	a	0.0616	a	0.0843	ac
PCB 138	µg/Kg	0.392	a	0.0394	a	0.0539	ac
PCB 153	µg/Kg	0.111	a	0.0820	a	0.142	abS
PCB 170	µg/Kg	0.0410	a	0.0303	a	0.0414	ac
PCB 180	µg/Kg	0.0419	a	0.0309	a	0.0423	ac
PCB 187	µg/Kg	0.0603	a	0.0445	a	0.0607	ac
PCB 195	µg/Kg	0.0787	a	0.0580	a	0.0794	ac
PCB 206	µg/Kg	0.0803	a	0.0594	a	0.0810	ac
PCB 209	µg/Kg	0.0920	a	0.0680	a	0.0929	ac
Total PCBs	µg/Kg	7.22		1.81		2.92	
Pesticides							
Aldrin	µg/Kg	0.0200	a	0.0296	a	0.0202	ac
cis-Chlordane	µg/Kg	0.0432	a	0.0638	a	0.0436	ac
trans-Chlordane	µg/Kg	0.0122	a	0.0180	a	0.0123	ac
cis-Nonachlor	µg/Kg	0.00582	a	0.00870	a	0.00587	ac
trans-Nonachlor	µg/Kg	0.00533	a	0.00780	a	0.00538	ac
Oxychlordane	µg/Kg	0.0248	a	0.0366	a	0.0250	ac
Total Chlordanes	µg/Kg	0.0913		0.135		0.0922	
4,4'-DDT	µg/Kg	0.00788	a	0.0117	a	0.00796	ac
4,4'-DDD	µg/Kg	0.00598	a	0.00880	a	0.391	S
4,4'-DDE	µg/Kg	0.00365	a	0.219	b	0.499	S
Total DDT	µg/Kg	0.0175		0.240		0.898	
Dieldrin	µg/Kg	0.0121	a	0.0178	a	0.0122	ac
alpha-Endosulfan	µg/Kg	0.0110	a	0.0163	a	0.0111	ac
beta-Endosulfan	µg/Kg	0.00568	a	0.00840	a	0.00573	ac
Total Endosulfans	µg/Kg	0.0167		0.0247		0.0168	
Endrin	µg/Kg	0.00653	a	0.00970	a	0.00662	ac
Heptachlor	µg/Kg	0.0125	a	0.0186	a	0.0127	ac
Heptachlor epoxide	µg/Kg	0.0257	a	0.0381	a	0.0260	ac
Hexachlorobenzene	µg/Kg	0.108	a	0.159	a	0.109	ac
Lindane (gamma-BHC)	µg/Kg	0.0181	a	0.0267	a	0.0183	ac
Methoxychlor	µg/Kg	0.0285	a	0.411	a	0.0287	ac
Toxaphene	µg/Kg	0.518	a	0.767	a	0.524	ac

Notes:

Mean concentrations are reported to 3 significant figures.

a = COC not detected (below MDL) in at least one replicate; mean value was calculated using one-half of the project specific MDL for non-detected values.
b = COC concentration estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c = COC was not detected in either the dredge tissue replicates or in the historic reference tissue, therefore was eliminated from further evaluation.

[d] Pre-test tissue represents the mean of three replicates, whereas the reference and site composites represent a mean of 5 replicates.

[e] Analysis conducted after removal of a statistical outlier.

NS = Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.
S = Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05.

TABLE 12 SUMMARY OF SIGNIFICANT UPTAKE AND MAGNITUDE OF CONCENTRATION IN TISSUE

	Nereis virens Composite	*Macoma nasuta* Composite
Metals (ug/g wet weight)		
Cadmium	S	
Chromium	🟩 S	
Copper		🟩 S
Lead	🟩 S	S
Nickel	🟩 S	🟩 S a
Zinc	S a	
PAHs (ng/g wet weight)		
Anthracene	🟩 S	🟧 S
Benzo(a)anthracene		🟧 S
Benzo(a)pyrene		S
Benzo(b)fluoranthene	S	🟧 S
Benzo(k)fluoranthene	🟥 S	S
Benzo(g,h,i)perylene	S	
Chrysene	S	🟧 S
Fluoranthene	🟥 S	🟥 S
Fluorene	S	🟩 S
Naphthalene	🟩 S	🟩 S
Phenanthrene		S
Pyrene	🟧 S	🟥 S
PCB Congeners (ng/g wet wt.)		
PCB 52	S	🟩 S
PCB 105	🟥 S	
PCB 118		S
PCB 153		S
Pesticides (ng/g wet weight)		
4,4'-DDD	🟩 S	🟥 S
4,4'-DDE		S

Summary of Significant Uptake:

"S" = Finding of significance.
" " = Finding of no significance.

Summary of Magnitude of Concentration:

🟩 Green shading = concentration in site tissue is equal to or lower than in pre-test tissue.
No shading = concentration in site tissue is <5 times higher than in historic reference tissue.
🟧 Orange shading/"S" = concentration in composite tissue is 5-10 times higher than in historic reference tissue.
🟥 Red shading/"S" = concentration in composite tissue is ≥10 times higher than in historic reference tissue.

Notes:

[a] Analysis conducted both with and without a statistical outlier, and the findings of significance were split.

TABLE 13 PROJECT SPECIFIC ANALYTICAL RLs AND MDLs

COC	Units	RLs		MDLs
		RIM	Alpha	
Trace Metals (6020B and 7474)				
Arsenic	mg/Kg	0.5	0.123	0.0423
Cadmium	mg/Kg	0.1	0.0490	0.0129
Chromium	mg/Kg	1	0.491	0.0442
Copper	mg/Kg	1	0.123	0.041
Lead	mg/Kg	1	0.0490	0.0072
Mercury	mg/Kg	0.02	0.0150	0.00444
Nickel	mg/Kg	1	0.123	0.0459
Zinc	mg/Kg	1	1.23 [a]	0.184
PCB Congeners (8270D-SIM/680(M))				
PCB 008	µg/Kg	0.5	0.66 [a]	0.13
PCB 018	µg/Kg	0.5	0.66 [a]	0.095
PCB 028	µg/Kg	0.5	0.66 [a]	0.162
PCB 044	µg/Kg	0.5	0.66 [a]	0.18
PCB 049	µg/Kg	-	0.66 [a]	0.176
PCB 052	µg/Kg	0.5	0.66 [a]	0.1
PCB 066	µg/Kg	0.5	0.66 [a]	0.0943
PCB 077	µg/Kg	-	-	-
PCB 087	µg/Kg	-	0.66 [a]	0.0765
PCB 101	µg/Kg	0.5	0.66 [a]	0.154
PCB 105	µg/Kg	0.5	0.66 [a]	0.138
PCB 118	µg/Kg	0.5	0.66 [a]	0.146
PCB 126	µg/Kg	0.5	-	-
PCB 128	µg/Kg	-	0.66 [a]	0.172
PCB 138	µg/Kg	0.5	0.66 [a]	0.11
PCB 153	µg/Kg	0.5	0.66 [a]	0.23
PCB 170	µg/Kg	0.5	0.66 [a]	0.0844
PCB 180	µg/Kg	0.5	0.66 [a]	0.086
PCB 183	µg/Kg	-	0.66 [a]	0.0465
PCB 184	µg/Kg	-	0.66 [a]	0.095
PCB 187	µg/Kg	0.5	0.66 [a]	0.124
PCB 195	µg/Kg	0.5	0.66 [a]	0.162
PCB 206	µg/Kg	0.5	0.66 [a]	0.166
PCB 209	µg/Kg	0.5	0.66 [a]	0.19

COC	Units	RLs		MDLs
		RIM	Alpha	
PAH Compounds (8270D-SIM/680(M))				
Acenaphthene	µg/Kg	20	6.6	1.27
Acenaphthylene	µg/Kg	20	6.6	0.778
Anthracene	µg/Kg	20	6.6	0.844
Benzo(a)anthracene	µg/Kg	20	6.6	1.6
Benzo(a)pyrene	µg/Kg	20	6.6	1.7
Benzo(b)fluoranthene	µg/Kg	20	6.6	2.2
Benzo(k)fluoranthene	µg/Kg	20	6.6	1.01
Benzo(g,h,i)perylene	µg/Kg	20	6.6	0.706
Chrysene	µg/Kg	20	6.6	1.54
Dibenz(a,h)anthracene	µg/Kg	20	6.6	0.818
Fluoranthene	µg/Kg	20	6.6	1.25
Fluorene	µg/Kg	20	6.6	0.706
Indeno(1,2,3-c,d)pyrene	µg/Kg	20	6.6	1.66
Naphthalene	µg/Kg	20	6.6	1.09
Phenanthrene	µg/Kg	20	6.6	1.38
Pyrene	µg/Kg	20	6.6	1.83
Pesticides (8081B)				
4,4'-DDD	µg/Kg	1	0.33	0.0247
4,4'-DDE	µg/Kg	1	0.33	0.015
4,4'-DDT	µg/Kg	1	0.33	0.0325
Aldrin	µg/Kg	1	0.33	0.0824
Alpha-BHC	µg/Kg	-	0.33	0.0501
Alpha-Chlordane	µg/Kg	1	0.33	0.178
Beta-BHC	µg/Kg	-	0.33	0.0343
Chlorpyrifos	µg/Kg	-	-	-
cis-Nonachlor	µg/Kg	1	0.33	0.0239
Delta-BHC	µg/Kg	-	0.33	0.0392
Dieldrin	µg/Kg	1	0.33	0.0497
Endosulfan I	µg/Kg	1	0.33	0.0454
Endosulfan II	µg/Kg	1	0.33	0.0234
Endosulfan sulfate	µg/Kg	-	0.33	0.0135
Endrin	µg/Kg	1	0.33	0.027
Endrin Aldehyde	µg/Kg	-	-	-
Endrin ketone	µg/Kg	-	-	-
Gamma-BHC (Lindane)	µg/Kg	1	0.33	0.0745
Gamma-Chlordane	µg/Kg	1	0.33	0.0501
Heptachlor	µg/Kg	1	0.33	0.0516
Heptachlor epoxide	µg/Kg	1	0.66	0.106
Hexachlorobenzene	µg/Kg	1	0.66	0.444
Methoxychlor	µg/Kg	1	0.33	0.117
Oxychlordane	µg/Kg	-	0.66	0.102
Toxaphene	µg/Kg	50	16.6	2.14
Trans-Nonachlor	µg/Kg	1	0.33	0.022

Notes: Reporting and Method Detection limits in this table are representative for this specific project. Individual reporting/Method Detection Limits used in statistical computations may be slightly different from these values as they are based on actual tissue mass, and final extract volumes for a specific analysis. The number of significant figures for values presented in tables and those used in the statistical analysis may also vary.

[a] RL is high but MDL meets RIM requirement.

ATTACHMENT I

Chain-of-Custody Records
(2 pages)

Chain-of-Custody Record

EA Engineering, Science, and Technology

EA Ecotoxicology Laboratory
231 Schilling Circle
Hunt Valley, Maryland 21031
Telephone: 410-584-7000
Fax: 410-584-1057

Sample Shipped By: (circle)
Fed. Ex. UPS [✓ Other:] Courier
Tracking #:

Client: ECO-ANALYSTS, INC. Project No.:
NPDES Number: Client Purchase Order Number:
City/State Collected: KENNEBUNK RIVER, MAINE

PLEASE READ SAMPLING INSTRUCTIONS ON BACK OF FORM

Accession Number (office use only)	Grab	Composite	Collection		Sample Description (including Site, Station Number, and Outfall Number)	Number/Volume of Container
			Start Date/Time	End Date/Time		
AT3-098		x	2/8/23 0900	02/8/23 1300	10 Stations at 4 Marinas Mud	5 Ten Gal Buckets
AT3-099	x		"	"	" Sitewater	"

Sampled By: Dustin Kach & Bud Brown	Date/Time 2/8/23 0900 - 1300	Received By: Dustin Kach	Date/Time 2/8/23 1300
Sampler's Printed Name: Dustin Kach & Bud Brown	Title: President	Relinquished By:	Date/Time 2/9/23 @ 11:37am
Relinquished By:	Date/Time 2/8/23 1137	Received By Laboratory	Date/Time 2/9/23 1630

Was Sample Chilled During Collection? No

Comments:

Sample Collection Parameters
Visual Description:
Temperature (°C):
pH:
TRC (mg/L):
Other:

White-Report Production Yellow-Laboratory Pink-Client/Sampler

ATTACHMENT II

Nereis virens 28-Day Solid Phase Bioaccumulation Testing Data Sheets and Survival Statistical Analyses

(19 pages)

SEDIMENT TOXICITY TEST SET-UP BENCH SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-302

TEST ORGANISM INFORMATION

Common Name: Sand worm
Scientific Name: *Nereis virens*
Lot Number: NV- 088
Source: ARO
Adults Isolated (Time, Date): ______
Neonates Pulled (Time, Date): ______
Acclimation: 1 day
Age: Adult
Culture Water (T/S): — °C — ppt

TEST INITIATION

Date	Time	Initials	Activity
3/3/23	1230	CR	Sediment Added to Chambers
↓	↓	↓	Overlying Water Added to Chambers
3/8/23	1130	LAD/JG	Organisms Transferred

TEST SET-UP

Sample Number(s): AT3-152(Lab Control), AT3-098
Overlying Water: 30 ppt Crystal Sea (LD3-266)

Treatment	Volume Test Sediment	Volume Overlying Water
AT3- 152 (Lab Control)	5L	22L
AT3-098	↓	↓

TOXICOLOGY LABORATORY BENCH SHEET -
ORGANISM LOADING RECORD

Project Number: EA.TOX

Client: EcoAnalysts

QC Test Number: TN-23-302

TEST ORGANISM

Common Name: Sand worm

Scientific Name: *Nereis virens*

Lot Number: NV- 080

Source: ARO

Acclimation: ~24 hour

Age: Adult

Organisms Transferred (date, time, initials): 3-8-23 1130 UAO/MG

Treatment	Replicate	Number of Organisms Loaded
AT3-152	A	30
(Control)	B	15*
	C	30
AT3-098	A	30
	B	↓
	C	↓
	D	↓
	E	↓

* 15 organisms loaded due to technician error.
Ⓢ 3/8/2023 JR

TOXICOLOGY LABORATORY BENCH SHEET -
ORGANISM RECOVERY RECORD

roject Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-302
Organisms Recovered (date, time, initials): 4/5/23 1030 TD

TEST ORGANISM
Common Name: Sand worm
Scientific Name: *Nereis virens*

Treatment	Replicate	Number of Organisms Loaded	Number of Organisms Recovered
AT3-152	A	30	30
(Lab Control)	B	~~30~~ 15*	12
	C	30	30
AT3-098	A	30	28
	B	30	28
	C	30	29
	D	30	29
	E	30	26

* 15 organisms loaded due to technician error.
Ⓢ 3/8/2023 dR

TOXICITY TEST WATER QUALITY DATA SHEET - NEW SOLUTIONS

Project Number: EA.TOX
Client: EcoAnalysts
QC Test Number: TN-23-302

TEST ORGANISM
Common Name: Sand worm
Scientific Name: *Nereis virens*

Beginning Date: 3/8/23 Time: 1130
Ending Date: 4/5/23 Time: 1030

TARGET VALUES: Temp: 20 °C pH: 6.0 - 9.0 DO: ≥2.5 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6
AT3-152	Lab Control	20.0							8.0							7.5							30.0						
AT3-098		19.5							8.2							7.4							30.6						
Meter Number		1087							1082							1082							1082						
Time		0924							0924							0924							0924						
Initials		UAD							UAD							UAD							UAD						

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-302

TEST ORGANISM

Common Name: Sand worm

Scientific Name: *Nereis virens*

Beginning Date: 3/8/23. Time: 1130

Ending Date: 4/5/23 Time: 1030

TARGET VALUES Temp: 20 °C pH: 6.0 - 9.0 DO: >2.5 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
Sample #		1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
AT3-157	Lab Control		19.8			19.0		12.6		7.9			8.0		8.1		7.4			7.0		7.3		28.7			27.9		30.6
AT3-098			19.8			20.1		19.7		7.8			7.9		8.1		7.2			6.8		7.3		30.4			27.7		30.6
	Meter Number		682			683		682		682			683		682		682			683		682		682			683		682
	Time		0846			0833		0840		0846			0833		0840		0846			0833		0840		0846			0833		0840
	Initials		UAD			UAD		JL		UAD			UAD		JL		UAD			UAD		JL		UAD			UAD		JL

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-302

TEST ORGANISM
Common Name: Sand worm
Scientific Name: *Nereis virens*

Beginning Date: 3/8/23 Time: 1130
Ending Date: 4/5/23 Time: 1030

TARGET VALUES Temp: 20 °C pH: 6.0 - 9.0 DO: >2.5 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14
AT3-152	Lab Control		19.4			19.8		19.7		7.9			7.8		7.8		8.7			7.6		7.3		31.7			29.5		29.7
AT3-098			20.1			20.2		19.7		7.9			8.0		7.8		8.4			7.1		7.2		31.4			29.1		29.6
Meter Number			682			682		681		682			682		681		682			682		681		682			682		681
Time			1154			0845		1302		1154			0845		1302		1154			0845		1302		1154			0845		1302
Initials			UAD			UAD		UAD		UAD			UAD		UAD		UAD			UAD		UAD		UAD			UAD		UAD

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-302

TEST ORGANISM
Common Name: Sand worm
Scientific Name: *Nereis virens*

Beginning Date: 3/8/23 Time: 1130
Ending Date: 4/5/23 Time: 1030

TARGET VALUES Temp: 20 °C pH: 6.0 - 9.0 DO: >2.5 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21
AT3-152	Lab Control		20.2	18.0		19.0		19.4		8.1	8.0		6.0		8.1		7.3	7.7		7.7		7.3		28.8	28.9		29.4		29.6
AT3-098			20.2	17.3		19.3		19.5		8.1	7.7		7.9		8.1		7.1	7.7		7.1		7.3		29.6	29.2		29.2		29.6
Meter Number			682	~~683~~		683		682		682	~~683~~		683		682		682	~~683~~		683		682		682	~~683~~		683		682
Time			0851	~~0844~~		0844		1421		0851	~~0844~~		0844		1421		0851	~~0844~~		0844		1421		0851	~~0844~~		0844		1421
Initials			GL	~~JL~~		JL		GL		GL	~~JL~~		JL		GL		GL	~~JL~~		JL		GL		GL	~~JL~~		JL		GL

(b)JL 3/29/23

ATS-T14
06/21/06

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-302

TEST ORGANISM

Common Name: Sand worm

Scientific Name: *Nereis virens*

Beginning Date: 3/8/23 Time: 1130

Ending Date: 4/5/23 Time: 1030

TARGET VALUES Temp: 20 °C pH: 6.0 - 9.0 DO: >2.5 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28
AT3-152	Lab Control		19.8			20.1		20.2		7.9			8.1		8.0		7.5			7.2		7.4		28.4			27.0		30.9
AT3-098			19.7			20.0		20.3		7.9			8.2		8.0		7.4			7.4		7.3		28.5			27.0		30.8
	Meter Number		681			683		682		681			683		682		681			683		682		681			683		682
	Time		0919			0851		0808		0919			0851		0808		0919			0851		0808		0919			0851		0808
	Initials		CL			WO		TB		CL			WO		TB		CL			WO		TB		CL			WO		TB

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-302

Test Material(s): SEDIMENT

Accession Number(s): See set up

Overlying Water: 30 PPT Crystal Sea

Accession Number: LD3-266

TEST ORGANISM

Common Name: Sand Worm

Scientific Name: *Nereis virens*

TEST TYPE: **Static** / Flowthrough

Renewal / Non-renewal

Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Beginning Date: 3/8/23 Time: 1130

Ending Date: 4/5/23 Time: 1030

Test Container: 10 gal aquarium

Test Volume: 5 L sed / 22 L water

Test Duration: 28 days

Treatment	Rep	Number Loaded	Number Removed												Total Removed	Total Recovered
		Day 0 Date 3/8	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
CONTROL	A	30														
AT3-152	B	30														
	C	30														
AT3-098	A	30														
	B	30														
	C	30														
	D	30														
	E	30														
Time / Initials		1130/JG AO														

TOXICOLOGY LABORATORY BENCH SHEET - OVERLYING WATER PREPARATION / USAGE LOG

roject Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-302

Overlying Water: 30 ppt Crystal Sea Artificial Seawater

TEST ORGANISM

Common Name: Sand worm

Scientific Name: *Nereis virens*

Sample Number	Preparation Time, Date	Initials	Date of First Use	Date of Final Use
LD3-266	1600 3/4/23	TP	3/8/23	3/8/23
LD3 384	1300 3/8/23	JL	3/10/23	3/10/23
LD3-407	1154 3/11/23	JL	3/13/23	3/13/23
LD3-408	1100 3/14/23	TP	3/15/23	3/15/23
LD3-423	1235 3/15/23	GL	3/17/23	3/20/23
LD3-438	1700 3/17/23	LAO	3/~~23~~22/23	3/22/23
LD3-453	1430 3/22/23	JL	3/24/23	3/24/23
LD3-454	1430 3/22/23	JL	3/27/23	3/27/23
LD3-470	1340 3/26/23	GL	3/29/23	3/29/23
LD3-476	1630 3/28/23	GL	3/31/23	4/3/23

ⓑ TG 3/22/23

TOXICOLOGY LABORATORY BENCH SHEET - RENEWAL RECORD

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-302

Day	Overlying Water	Date	Time	Initials
0				
1				
2	AT3-384	3/10/23	1100	CK
3				
4				
5	LD3-402	3/13/23	0915	CAD
6				
7	LD3-404	3/15/23	0928	JL
8				
9	LD3-423	3/17/23	1630	CAD
10				
11				
12	LD3-423	3/20/23	1402	JL
13				
14	LD3-438	3/22/23	1400	TG
15				
16	LD3-453	3/24/23	1115	JL
17				
18				
19	LD3-454	3/27/23	1129	JL
20				
21	LD3-470	3/29/23	1430	CL
22				
23	LD3-476	3/31/23	1500	CK
24				
25				
26	LD3-476	4/3/23	0930	CAD
27				
28				

③ 3/10/23

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: EA.TOX

Client: EcoAnalysts

QC Test Number: TN-23-302

Day	Testing Location	Date	Time	Initials
0	7A, 13B	3/8/23	1245	LAD
1				
2	7A, 13B	3/10/23	0950	GR
3				
4				
5	7A, 13B	3/13/23	0915	LAD
6				
7	7A, 13B	3/15/23	0841	JL
8				
9	7A, 13B	3/17/23	1620	LAD
10				
11				
12	7A, 13B	3/20/23	0845	LAD
13				
14	7A, 13B	3/22/23	1400	KG
15				
16	7A, 13B	3/24/23	0851	GL
17				
18				
19	7A, 13B	3/27/23	0845	JL
20				
21	7A, 13B	3/29/23	1429	GL
22				
23	7A, 13B	3/31/23	0919	GL
24				
25				
26	7A, 13B	4/3/23	0852	LAD
27				
28	7A, 13B	4/5/23	0808	Th
29				
30				

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-302

Date/Time/Initials	Comments/Activity

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-302

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

CETIS Test Data Worksheet

Report Date: 05 Sep-23 14:08 (p 1 of 1)
Test Code/ID: TN-23-302NvSurv / 08-9048-9728

Bioaccumulation Evaluation - Survival Endpoint

EA-EST, Inc. PBC

Start Date: 08 Mar-23 11:30
End Date: 05 Apr-23 10:30
Sample Date: 03 Mar-23

Species: Nereis virens
Protocol: US ACE NED RIM (2004)
Material: Laboratory Control Sediment

Sample Code: AT3-152
Sample Source: Yachtsman Marina NAE-2004-00319
Sample Station: Laboratory Control

Sample	Rep	Pos	# Exposed	# Survived	Notes
AT3-152	1	3	30	30	
AT3-152	2	4	15	12	
AT3-152	3	7	30	30	
IOSN 2019	1	2	20	18	
IOSN 2019	2	5	20	16	
IOSN 2019	3	9	20	20	
IOSN 2019	4	11	20	19	
IOSN 2019	5	13	20	17	
AT3-098	1	1	30	28	
AT3-098	2	6	30	28	
AT3-098	3	8	30	29	
AT3-098	4	10	30	29	
AT3-098	5	12	30	26	

Analyst: NR QA:

CETIS Summary Report

Report Date: 05 Sep-23 14:09 (p 1 of 1)
Test Code/ID: TN-23-302NvSurv / 08-9048-9728

Bioaccumulation Evaluation - Survival Endpoint

EA-EST, Inc. PBC

Batch ID:	06-1174-0758	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:30	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:30	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample ID:	11-9755-1044	**Code:**	AT3-152	**Project:**	Dredged Sediment Evaluation
Sample Date:	03 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	03 Mar-23 12:30	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	5d 11h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
AT3-152	11-9755-1044	03 Mar-23	03 Mar-23 12:30	5d 11h	Eco-Analysts, Inc.	Dredged Sediment Evalu
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	11h		
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 22h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
AT3-152	Laboratory Control Sediment	Yachtsman Marina NAE-2004-00	Laboratory Control	
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-5654-4767	Survival Rate	Equal Variance t Two-Sample Test	0.2490	IOSN 2019 passed survival rate	1
12-2728-1176	Survival Rate	Equal Variance t Two-Sample Test	0.7542	AT3-098 passed survival rate	1

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
AT3-152	LC	3	0.933	0.646	1.220	0.800	1.000	0.067	0.115	12.37%	0.00%
IOSN 2019	RS	5	0.900	0.802	0.998	0.800	1.000	0.035	0.079	8.78%	3.57%
AT3-098		5	0.933	0.883	0.984	0.867	0.967	0.018	0.041	4.37%	0.00%

Survival Rate Detail

MD5: 52371F4AC9B6ED2EB280407C07EF73DD

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-152	LC	1.000	0.800	1.000		
IOSN 2019	RS	0.900	0.800	1.000	0.950	0.850
AT3-098		0.933	0.933	0.967	0.967	0.867

Analyst: NR QA:

CETIS Analytical Report

Report Date: 05 Sep-23 14:09 (p 1 of 2)
Test Code/ID: TN-23-302NvSurv / 08-9048-9728

Bioaccumulation Evaluation - Survival Endpoint

EA-EST, Inc. PBC

Analysis ID:	02-5654-4767	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.1
Analyzed:	05 Sep-23 14:09	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	05 Sep-23 13:37	**MD5 Hash:**	2BE9266D39B4D289B00177DB674BBC8F	**Editor ID:**	005-341-210-5

Batch ID:	06-1174-0758	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:30	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:30	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
AT3-152	11-9755-1044	03 Mar-23	03 Mar-23 12:30	5d 11h	Eco-Analysts, Inc.	Dredged Sediment Evalu
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	11h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
AT3-152	Laboratory Control Sediment	Yachtsman Marina NAE-2004-00	Laboratory Control	
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	IOSN 2019 passed survival rate endpoint	13.49%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control Sedim	Reference Sed	6	0.721	1.94	0.239	CDF	0.2490	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.59	2.13	0.6812	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0147312	0.0147312	1	0.52	0.4980	Non-Significant Effect
Error	0.169963	0.0283272	6			
Total	0.184695		7			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.38	26.3	0.4168	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.645	0.6074	Normal Distribution

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
AT3-152	LC	3	0.933	0.646	1.000	1.000	0.800	1.000	0.067	12.37%	0.00%
IOSN 2019	RS	5	0.900	0.802	0.998	0.900	0.800	1.000	0.035	8.78%	3.57%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
AT3-152	LC	3	1.360	0.821	1.890	1.480	1.110	1.480	0.124	15.86%	0.00%
IOSN 2019	RS	5	1.270	1.090	1.440	1.250	1.110	1.460	0.062	11.00%	6.54%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-152	LC	1.000	0.800	1.000		
IOSN 2019	RS	0.900	0.800	1.000	0.950	0.850

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-152	LC	1.480	1.110	1.480		
IOSN 2019	RS	1.250	1.110	1.460	1.350	1.170

Analyst: NR QA:

CETIS Analytical Report

Report Date: 05 Sep-23 14:09 (p 2 of 2)
Test Code/ID: TN-23-302NvSurv / 08-9048-9728

Bioaccumulation Evaluation - Survival Endpoint

EA-EST, Inc. PBC

Analysis ID:	12-2728-1176	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.1
Analyzed:	05 Sep-23 14:09	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	05 Sep-23 13:37	**MD5 Hash:**	97E2AE4963EA6A03812B029A11B133ED	**Editor ID:**	005-341-210-5

Batch ID:	06-1174-0758	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:30	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:30	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	11h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 22h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	AT3-098 passed survival rate endpoint	8.78%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-0.721	1.86	0.133	CDF	0.7542	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.8	2.29	0.4893	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0066221	0.0066221	1	0.52	0.4915	Non-Significant Effect
Error	0.101947	0.0127433	8			
Total	0.108569		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	3.19	23.2	0.2879	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.961	0.741	0.7927	Normal Distribution

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.900	0.802	0.998	0.900	0.800	1.000	0.035	8.78%	0.00%
AT3-098		5	0.933	0.883	0.984	0.933	0.867	0.967	0.018	4.37%	-3.70%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	1.270	1.090	1.440	1.250	1.110	1.460	0.062	11.00%	0.00%
AT3-098		5	1.320	1.220	1.420	1.310	1.200	1.390	0.035	5.92%	-4.06%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.900	0.800	1.000	0.950	0.850
AT3-098		0.933	0.933	0.967	0.967	0.867

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.250	1.110	1.460	1.350	1.170
AT3-098		1.310	1.310	1.390	1.390	1.200

Analyst: NR QA:

ATTACHMENT III

Macoma nasuta 28-Day Solid Phase Bioaccumulation Testing Data Sheets and Survival Statistical Analyses

(18 pages)

SEDIMENT TOXICITY TEST SET-UP BENCH SHEET

ject Number: EA.TOX
Client: EcoAnalysts
QC Test Number: TN-23-303

TEST ORGANISM INFORMATION

Common Name: Blunt nose clam
Scientific Name: *Macoma nasuta*
Lot Number: MA- 080
Source: ARO
Adults Isolated (Time, Date):
Neonates Pulled (Time, Date):
Acclimation: <24hrs
Age: Adult
Culture Water (T/S): — °C — ppt

TEST INITIATION

Date	Time	Initials	Activity
3/20/23	1600	TB	Sediment Added to Chambers
↓	↓	↓	Overlying Water Added to Chambers
3/29/23	1345	UTO	Organisms Transferred

TEST SET-UP

Sample Number(s): AT3-191 (Lab Control), AT3-098
Overlying Water: 30 ppt Crystal Sea (LD3-466)

Treatment	Volume Test Sediment	Volume Overlying Water
AT3- 191 (Lab Control)	5L	22L
↓	↓	↓
AT3-098		

TOXICOLOGY LABORATORY BENCH SHEET - ORGANISM LOADING RECORD

roject Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-303

TEST ORGANISM

Common Name: Blunt nose Clam

Scientific Name: *Macoma nasuta*

Lot Number: MA- 080

Source: ARO

Acclimation: <24-hour

Age: Adult

Organisms Transferred (date, time, initials): 3-29-23 1345 UD

Treatment	Replicate	Number of Organisms Loaded
AT3-191	A	30
(Control)	B	↓
	C	↓
AT3-098	A	30
	B	↓
	C	↓
	D	↓
	E	↓

TOXICOLOGY LABORATORY BENCH SHEET - ORGANISM RECOVERY RECORD

roject Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-303

TEST ORGANISM

Common Name: Blunt nose clam

Scientific Name: *Macoma nasuta*

Organisms Recovered (date, time, initials): 4/26/23 1245 Tb

Treatment	Replicate	Number of Organisms Loaded	Number of Organisms Recovered
AT3- 191	A	30	28
(Lab Control)	B	30	26
	C	30	27
AT3-098	A	30	30
	B	30	30
	C	30	26
	D	30	29
	E	30	29

TOXICITY TEST WATER QUALITY DATA SHEET - NEW SOLUTIONS

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-303

TEST ORGANISM
Common Name: Blunt nose clam
Scientific Name: *Macoma nasuta*

Beginning Date: 3/29/23 Time: 1345
Ending Date: 4/26/23 Time: 1245

TARGET VALUES: Temp: 12 °C pH: 6.0 - 9.0 DO: ≥2.5 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6
AT3-191	Lab Control	12.8							8.2							8.6							29.1						
AT3-098		12.9							8.2							8.6							29.3						
Meter Number		682							682							682							682						
Time		1400							1400							1400							1400						
Initials		GL							GL							GL							GL						

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-303

TEST ORGANISM

Common Name: Blunt nose clam

Scientific Name: *Macoma nasuta*

Beginning Date: 3/29/23 Time: 1345

Ending Date: 4/26/23 Time: 1245

TARGET VALUES: Temp: 12 °C pH: 6.0 - 9.0 DO: ≥2.5 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
AT3-191	Lab Control		13.0			13.0 ~~13.5~~		13.0		8.0			8.1		8.0		8.3			8.0		8.2		27.5			27.0		32.0
AT3-098			13.0			13.0		13.0		8.1			8.2		8.1		8.3			8.5		8.4		27.9			27.0		32.2
Meter Number			681			683		682		681			683		682		681			683		682		681			683		682
Time			0934			0934		0911		0934			0934		0911		0934			0934		0911		0934			0934		0911
Initials			GL			UAO		GL		GL			UAO		GL		GL			UAO		GL		GL			UAO		GL

⑥ UAO 4/3/23

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-303

TEST ORGANISM
Common Name: Blunt nose clam
Scientific Name: *Macoma nasuta*

Beginning Date: 3/29/23 Time: 1345
Ending Date: 4/26/23 Time: 1245

TARGET VALUES: Temp: 12 °C pH: 6.0 - 9.0 DO: ≥2.5 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14
AT3-191	Lab Control		13.0		13.0	~~13.0~~		13.0		8.0			8.2		7.7		7.7			8.7		8.5		31.4			27.8		30.5
AT3-098			13.0			13.0		13.0		8.1			8.2		7.6		7.9			8.7		8.5		32.2			30.0		31.6
	Meter Number		680			680		680		680			680		680		680			680		680		680		689	~~1008~~		680
	Time		0941			1008		1020		0941			1008		1020		0941			1008		1020		0941			1008		1020
	Initials		WD			JL		KY		WD			JL		KY		WD			JL		KY		WD			JL		KY

⑥ JL 4/10/23

ATS-T14
06/21/06

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-303

TEST ORGANISM
Common Name: Blunt nose clam
Scientific Name: *Macoma nasuta*

Beginning Date: 3/29/23 Time: 1345
Ending Date: 4/26/23 Time: 1245

TARGET VALUES: Temp: 12 °C pH: 6.0 - 9.0 DO: ≥2.5 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21
AT3-191	Lab Control		13.0			13.0		13.0		8.0			8.0		8.0		8.1			8.1		8.0		29.5			29.3		30.7
AT3-098			13.0			13.0		13.0		8.1			8.0		8.1		8.2			8.1		8.1		29.6			29.6		31.0
Meter Number			683			683		683		683			683		683		683			683		683		683			683		683
Time			0901			0947		0842		0901			0947		0842		0901			0947		0842		0901			0947		0842
Initials			GL			WO		GL		GL			WO		GL		GL			WO		GL		GL			WO		GL

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-303

TEST ORGANISM
Common Name: Blunt nose clam
Scientific Name: *Macoma nasuta*

Beginning Date: 3/29/23 Time: 1345
Ending Date: 4/26/23 Time: 1245

TARGET VALUES: Temp: 12 °C pH: 6.0 - 9.0 DO: ≥2.5 mg/L Salinity: 30 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Salinity (ppt)						
		22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28
AT3-191	Lab Control		13.0			11.6		11.9		8.0			7.9		7.9		8.4			8.7		8.7		27.0			27.4		30.0
AT3-098			13.0			11.5		11.7		8.0			8.0		7.8		8.3			8.8		8.6		27.0			27.7		30.1
	Meter Number		682			682		681		682			682		681		682			682		681		682			682		681
	Time		0907			0932		0819		0907			0932		0814		0907			0932		0814		0907			0932		0814
	Initials		KY			CAO		TB		KY			CAO		TB		KY			CAO		TB		KY			CAO		TB

TOXICOLOGY LABORATORY BENCH SHEET - RENEWAL RECORD

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-303

Day	Overlying Water	Date	Time	Initials
0				
1				
2	LD3-471	3/31/23	1600	CK
3				
4				
5	LD3-471	4/3/23	1020	LAD
6				
7	LD3-485	4/5/23	1001	GL
8				
9	LD3-508	4/7/23	1300	CK
10				
11				
12	LD3-501	4/10/23	1011	JL
13				
14	LD3-501	4/12/23	1100	KY
15				
16	LD3-502	4/14/23	1024	GL
17				
18				
19	LD3-513	4/17/23	1415	LAD
20				
21	LD3-532/LD3-539	4/19/23	1105	KY
22				
23	LD3-540	4/21/23	0910	KY
24				
25				
26	LD3-548	4/24/23	1035	LAD
27				
28				

TOXICOLOGY LABORATORY BENCH SHEET - OVERLYING WATER PREPARATION / USAGE LOG

ject Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-303

Overlying Water: 30 ppt Crystal Sea Artificial Seawater

TEST ORGANISM

Common Name: Blunt nose clam

Scientific Name: *Macoma nasuta*

Sample Number	Preparation Time, Date	Initials	Date of First Use	Date of Final Use
LD3-466	1620, 3/26/23	JA	3/28/23	3/28/23
LD3-471	1530, 3/28/23	DT	3/31/23	4/3/23
LD3-485	1520, 3/28/23	JG	4/5/23	4/5/23
LD3-508	1630 4/5/23	SL	4/7/23	4/10/23
LD3-501	1630 4/5/23	~~JL~~ SL|KY	4/10/23	~~4/10/23~~ ~~4/12/23~~ 4/12/23 ⑥ JL 4/14/23
~~LD3-501~~	~~1100 1630 4/5/23~~	~~SL|KY~~	~~4/~~	
LD3-502	1635 3/29/23	GL	4/14/23	4/14/23
LD3-513	1615 4/6/23	GL	4/17/23	4/17/23
LD3-532	~~1037~~ 1000 4/17/23	KY|JG	4/19/23	4/19/23
LD3-539	1430 4/18/23	KY	4/19/23	4/19/23
LD3-540	1000 4/19/23	KY	4/21/23	4/21/23
LD3-548	1331 4/20/23	GL	4/24/23	4/24/23

⑨ 4/12/23 KY

ATS-T30
03/01/00

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-303

Day	Testing Location	Date	Time	Initials
0	19B, 20B	3/29/23	1600	JR
1				
2	19B, 20B	3/31/23	0936	GL
3				
4				
5	19B, 20B	4/3/23	0937	LAD
6				
7	19B, 20B	4/5/23	0911	GL
8				
9	19B, 20B	4/7/23	0940	LAD
10				
11				
12	19B, 20B	4/10/23	1540	JR
13				
14	19B, 20B	4/12/23	1020	KY
15				
16	19B, 20B	4/14/23	1001	GL
17				
18				
19	19B, 20B	4/17/23	1430	LAD
20				
21	19B, 20B	4/19/23	0846	GL
22				
23	19B, 20B	4/21/23	0908	KY
24				
25				
26	19B, 20B	4/24/23	0933	LAD
27				
28	19B, 20B	4/26/23	1245	[illegible]
29				
30				

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-303

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-303

Date/Time/Initials	Comments/Activity

CETIS Test Data Worksheet

Report Date: 08 May-23 23:11 (p 1 of 1)
Test Code/ID: TN-23-303MnSurv / 05-1648-0077

Bioaccumulation Evaluation - Survival Endpoint

EA-EST, Inc. PBC

Start Date: 29 Mar-23 13:45
End Date: 26 Apr-23 12:45
Sample Date: 20 Mar-23

Species: Macoma nasuta
Protocol: US ACE NED RIM (2004)
Material: Laboratory Control Sediment

Sample Code: AT3-191
Sample Source: Yachtsman Marina NAE-2004-00319
Sample Station: Laboratory Control

Sample	Rep	Pos	# Exposed	# Survived	Notes
AT3-191	1	1	30	28	
AT3-191	2	6	30	26	
AT3-191	3	8	30	27	
IOSN 2019	1	2	20	19	
IOSN 2019	2	5	20	18	
IOSN 2019	3	7	20	20	
IOSN 2019	4	10	20	18	
IOSN 2019	5	12	20	19	
AT3-098	1	3	30	30	
AT3-098	2	4	30	30	
AT3-098	3	9	30	26	
AT3-098	4	11	30	29	
AT3-098	5	13	30	29	

Analyst: NL QA:

CETIS Summary Report

Report Date: 08 May-23 23:13 (p 1 of 1)
Test Code/ID: TN-23-303MnSurv / 05-1648-0077

Bioaccumulation Evaluation - Survival Endpoint

EA-EST, Inc. PBC

Batch ID:	03-8883-4534	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:45	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:45	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample ID:	10-1907-8970	**Code:**	AT3-191	**Project:**	Dredged Sediment Evaluation
Sample Date:	20 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	20 Mar-23 16:00	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	9d 14h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
AT3-191	10-1907-8970	20 Mar-23	20 Mar-23 16:00	9d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h		
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
AT3-191	Laboratory Control Sediment	Yachtsman Marina NAE-2004-00	Laboratory Control	
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
06-3628-8518	Survival Rate	Equal Variance t Two-Sample Test	0.8889	IOSN 2019 passed survival rate	1
15-9977-3478	Survival Rate	Equal Variance t Two-Sample Test	0.7968	AT3-098 passed survival rate	1

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
AT3-191	LC	3	0.900	0.817	0.983	0.867	0.933	0.019	0.033	3.70%	0.00%
IOSN 2019	RS	5	0.940	0.888	0.992	0.900	1.000	0.019	0.042	4.45%	-4.44%
AT3-098		5	0.960	0.892	1.030	0.867	1.000	0.025	0.055	5.71%	-6.67%

Survival Rate Detail

MD5: 9962839BD8282B8BBFF87A881CBEBCC1

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-191	LC	0.933	0.867	0.900		
IOSN 2019	RS	0.950	0.900	1.000	0.900	0.950
AT3-098		1.000	1.000	0.867	0.967	0.967

Analyst: NR QA:

CETIS Analytical Report

Report Date: 08 May-23 23:12 (p 1 of 2)
Test Code/ID: TN-23-303MnSurv / 05-1648-0077

Bioaccumulation Evaluation - Survival Endpoint

EA-EST, Inc. PBC

Analysis ID:	06-3628-8518	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.1
Analyzed:	08 May-23 23:12	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 23:09	**MD5 Hash:**	3AB31F1E28D613C7BA7B01DCD2B4A574	**Editor ID:**	005-341-210-5

Batch ID:	03-8883-4534	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:45	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:45	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
AT3-191	10-1907-8970	20 Mar-23	20 Mar-23 16:00	9d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
AT3-191	Laboratory Control Sediment	Yachtsman Marina NAE-2004-00	Laboratory Control	
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	IOSN 2019 passed survival rate endpoint	8.16%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control Sedim		Reference Sed	6	-1.36	1.94	0.111	CDF	0.8889	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.79	2.13	0.3406	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.011287	0.011287	1	1.86	0.2221	Non-Significant Effect
Error	0.0365073	0.0060845	6			
Total	0.0477943		7			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.37	199	0.6357	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.645	0.4950	Normal Distribution

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
AT3-191	LC	3	0.900	0.817	0.983	0.900	0.867	0.933	0.019	3.70%	0.00%
IOSN 2019	RS	5	0.940	0.888	0.992	0.950	0.900	1.000	0.019	4.45%	-4.44%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
AT3-191	LC	3	1.250	1.110	1.390	1.250	1.200	1.310	0.033	4.50%	0.00%
IOSN 2019	RS	5	1.330	1.220	1.440	1.350	1.250	1.460	0.039	6.53%	-6.20%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-191	LC	0.933	0.867	0.900		
IOSN 2019	RS	0.950	0.900	1.000	0.900	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
AT3-191	LC	1.310	1.200	1.250		
IOSN 2019	RS	1.350	1.250	1.460	1.250	1.350

Analyst:______ QA:______

Bioaccumulation Evaluation - Survival Endpoint

EA-EST, Inc. PBC

Analysis ID:	15-9977-3478	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv2.1.1
Analyzed:	08 May-23 23:12	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 23:09	**MD5 Hash:**	ED41FF2F03C95AC3423E56D60D13F732	**Editor ID:**	005-341-210-5

Batch ID:	03-8883-4534	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:45	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:45	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	AT3-098 passed survival rate endpoint	6.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-0.876	1.86	0.12	CDF	0.7968	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.96	2.29	0.2713	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.007994	0.007994	1	0.768	0.4065	Non-Significant Effect
Error	0.0833144	0.0104143	8			
Total	0.0913084		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.76	23.2	0.5962	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5215	Normal Distribution

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.940	0.888	0.992	0.950	0.900	1.000	0.019	4.45%	0.00%
AT3-098		5	0.960	0.892	1.000	0.967	0.867	1.000	0.025	5.71%	-2.13%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	1.330	1.220	1.440	1.350	1.250	1.460	0.039	6.53%	0.00%
AT3-098		5	1.390	1.240	1.530	1.390	1.200	1.480	0.052	8.32%	-4.25%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.950	0.900	1.000	0.900	0.950
AT3-098		1.000	1.000	0.867	0.967	0.967

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.350	1.250	1.460	1.250	1.350
AT3-098		1.480	1.480	1.200	1.390	1.390

ATTACHMENT IV

Nereis virens 28-Day Solid Phase Bioaccumulation Testing Tissue Chemistry and Body Burden Statistical Analyses

Metals

(17 pages)

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

			Pre-Assay		
CONTAMINANT	REP1	REP2	REP3	REP4 *	REP5 *
Metals (ug/g wet weight)					
Arsenic	1.94	2.40	1.66		
Cadmium	0.0270 J	0.0420 J	0.0210 J		
Chromium	0.389 J	1.10	0.372 J		
Copper	1.13	2.28	1.05		
Lead	0.171	0.247	0.167		
Mercury	0.0100 J	0.0180	0.00500 J		
Nickel	0.344	0.784	0.299		
Zinc	14.9	16.6	7.73		

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

	IOSN Reference				
CONTAMINANT	REP1	REP2	REP3	REP4	REP5
Metals (ug/g wet weight)					
Arsenic	2.26	1.92	1.93	2.63	2.51
Cadmium	0.0250 J	0.0220 J	0.0180 J	0.0320 J	0.0290 J
Chromium	0.0730 J	0.0630 J	0.0550 J	0.0880 J	0.0640 J
Copper	1.16	1.12	0.996	1.40	1.31
Lead	0.0700	0.0740	0.0580	0.0710	0.0990
Mercury	0.0180	0.0160	0.0120	0.0180	0.0140 J
Nickel	0.154	0.130	0.118	0.191	0.246
Zinc	7.15	11.8	6.63	8.38	58.9

* = Qualifiers

U Analyte not detected; belo

J Analyte estimated; detectio

NA Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

10 Stations at 4 Marinas Mud

CONTAMINANT	REP1	REP2	REP3	REP4	REP5
Metals (ug/g wet weight)					
Arsenic	1.65	1.96	2.21	2.16	2.12
Cadmium	0.0300 J	0.0370 J	0.0330 J	0.0340 J	0.0350 J
Chromium	0.232 J	0.507	0.459 J	0.997	0.561
Copper	0.901	1.08	1.04	1.41	1.19
Lead	0.196	0.225	0.180	0.179	0.173
Mercury	0.00195 U	0.00400 J	0.00213 U	0.0160	0.00900 J
Nickel	0.203	0.239	0.278	0.262	0.179
Zinc	18.6	12.0	16.7	14.5	8.61

* = Qualifiers
U Analyte not detected; belo
J Analyte estimated; detectio
NA Not Analyzed

CETIS Test Data Worksheet

Report Date: 19 Aug-23 06:54 (p 1 of 1)
Test Code/ID: TN-23-302NvMet / 07-8839-3412

Bioaccumulation Evaluation - Metals - Nereis virens **EA-EST, Inc. PBC**

Start Date: 08 Mar-23 11:31 **Species:** Nereis virens **Sample Code:** AT3-152
End Date: 05 Apr-23 10:31 **Protocol:** US ACE NED RIM (2004) **Sample Source:** Yachtsman Marina NAE-2004-00319
Sample Date: 03 Mar-23 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control

Sample	Rep	Pos	Body Burden	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Silver
IOSN 2019	1	2		2.26	0.025	0.073	1.16	0.07	0.018	0.154	7.15	
IOSN 2019	2	3		1.92	0.022	0.063	1.12	0.074	0.016	0.13	11.8	
IOSN 2019	3	6		1.93	0.018	0.055	0.996	0.058	0.012	0.118	6.63	
IOSN 2019	4	8		2.63	0.032	0.088	1.4	0.071	0.018	0.191	8.38	
IOSN 2019	5	10		2.51	0.029	0.064	1.31	0.099	0.014	0.246	58.9	
AT3-098	1	1		1.65	0.03	0.232	0.901	0.196	0.001945	0.203	18.6	
AT3-098	2	4		1.96	0.037	0.507	1.08	0.225	0.004	0.239	12	
AT3-098	3	5		2.21	0.033	0.459	1.04	0.18	0.00213	0.278	16.7	
AT3-098	4	7		2.16	0.034	0.997	1.41	0.179	0.016	0.262	14.5	
AT3-098	5	9		2.12	0.035	0.561	1.19	0.173	0.009	0.179	8.61	

Analyst: NR QA: JR

Bioaccumulation Evaluation - Metals - Nereis virens **EA-EST, Inc. PBC**

Batch ID:	13-8417-6872	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:31	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:31	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample ID:	11-9755-1044	**Code:**	AT3-152	**Project:**	Dredged Sediment Evaluation
Sample Date:	03 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	03 Mar-23 12:30	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	5d 12h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-3802-6235	Arsenic	Equal Variance t Two-Sample Test	0.8845	AT3-098 passed arsenic	1
14-9372-2871	Cadmium	Equal Variance t Two-Sample Test	0.0069	AT3-098 failed cadmium	1
16-2542-8047	Chromium	Unequal Variance t Two-Sample Test	0.0072	AT3-098 failed chromium	1
02-4210-0599	Chromium	Wilcoxon Rank Sum Two-Sample Test	0.0040	AT3-098 failed chromium	1
13-8883-2132	Copper	Equal Variance t Two-Sample Test	0.7353	AT3-098 passed copper	1
06-0350-2940	Lead	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed lead	1
12-6341-4781	Mercury	Equal Variance t Two-Sample Test	0.9925	AT3-098 passed mercury	1
20-0017-5455	Nickel	Equal Variance t Two-Sample Test	0.0305	AT3-098 failed nickel	1
13-3955-6427	Zinc	Equal Variance t Two-Sample Test	0.0206	AT3-098 failed zinc	1
04-4295-9523	Zinc	Wilcoxon Rank Sum Two-Sample Test	0.1111	AT3-098 passed zinc	1

Analyst: NR QA: JR

Bioaccumulation Evaluation - Metals - Nereis virens **EA-EST, Inc. PBC**

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	2.25	1.85	2.65	1.92	2.63	0.145	0.325	14.46%	0.00%
AT3-098		5	2.02	1.74	2.3	1.65	2.21	0.102	0.227	11.24%	10.22%

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0252	0.0183	0.0321	0.018	0.032	0.00248	0.00554	21.99%	0.00%
AT3-098		5	0.0338	0.0306	0.037	0.03	0.037	0.00116	0.00259	7.66%	-34.13%

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0686	0.053	0.0842	0.055	0.088	0.00563	0.0126	18.34%	0.00%
AT3-098		5	0.551	0.205	0.898	0.232	0.997	0.125	0.279	50.60%	-703.50%

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	1.2	0.999	1.4	0.996	1.4	0.0713	0.159	13.32%	0.00%
AT3-098		5	1.12	0.888	1.36	0.901	1.41	0.0851	0.19	16.93%	6.10%

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0744	0.0557	0.0931	0.058	0.099	0.00673	0.015	20.22%	0.00%
AT3-098		5	0.191	0.164	0.217	0.173	0.225	0.00941	0.021	11.03%	-156.18%

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0156	0.0124	0.0188	0.012	0.018	0.00117	0.00261	16.72%	0.00%
AT3-098		5	0.00662	-0.000797	0.014	0.00195	0.016	0.00267	0.00597	90.24%	57.60%

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.168	0.103	0.232	0.118	0.246	0.0232	0.0518	30.90%	0.00%
AT3-098		5	0.232	0.181	0.283	0.179	0.278	0.0183	0.041	17.65%	-38.38%

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	18.6	-9.53	46.7	6.63	58.9	10.1	22.6	121.87%	0.00%
AT3-098		5	14.1	9.2	19	8.61	18.6	1.76	3.93	27.89%	24.18%

Arsenic Detail MD5: 48E122A42250FF85911F835BB2714057

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	2.26	1.92	1.93	2.63	2.51
AT3-098		1.65	1.96	2.21	2.16	2.12

Cadmium Detail MD5: 49D3145D3123EE99E93E8679CCD08CA8

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.025	0.022	0.018	0.032	0.029
AT3-098		0.03	0.037	0.033	0.034	0.035

Chromium Detail MD5: 33A4BA1F273B8C646B085A0939A25926

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.073	0.063	0.055	0.088	0.064
AT3-098		0.232	0.507	0.459	0.997	0.561

Copper Detail MD5: 53E4A07891BFC6AE9553271C0EAE2C41

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.16	1.12	0.996	1.4	1.31
AT3-098		0.901	1.08	1.04	1.41	1.19

Lead Detail MD5: 08B1B33DD308F1D4D30CFFD0662A5930

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.07	0.074	0.058	0.071	0.099
AT3-098		0.196	0.225	0.18	0.179	0.173

Mercury Detail MD5: C833F844DB2CF941F2FCB24EBADA1402

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.018	0.016	0.012	0.018	0.014
AT3-098		0.00195	0.004	0.00213	0.016	0.009

Nickel Detail MD5: BAF4DBD486C3A66235EB865EB550BEBC

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.154	0.13	0.118	0.191	0.246
AT3-098		0.203	0.239	0.278	0.262	0.179

Zinc Detail MD5: 7821CD915E3E53C736EE0C85DE1DE09D

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	7.15	11.8	6.63	8.38	58.9
AT3-098		18.6	12	16.7	14.5	8.61

Analyst: NR QA: JR

STUDY: **TN-23-302**
CLIENT: **Eco-Analysts, Inc.**
PROJECT: **Yachtsman Marina, Kennebunkport, ME NAE-2004-00319**
ASSAY: ***N. virens*** **28-day Bioaccumulation Evaluation**
TASK: **Statistical Analysis of Body Burden Metals**

Endpoint	Method	C	<	T	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Arsenic	Equal Variance t Two-Sample Test	IOSN	<	Comp	-1.296315	1.859548	0.8844953	0.05	FALSE	0.3299323	8		C
Cadmium	Equal Variance t Two-Sample Test	IOSN	<	Comp	3.144471	1.859548	0.006856192	0.05	TRUE	0.005085788	8		C
Chromium	Unequal Variance t Two-Sample Test	IOSN	<	Comp	5.11689	2.353364	0.00722293	0.05	TRUE	0.1706995	3		C
Chromium	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	15		0.003968254	0.05	TRUE		8	0	E
Copper	Equal Variance t Two-Sample Test	IOSN	<	Comp	-0.6574845	1.859548	0.7353358	0.05	FALSE	0.2064641	8		C
Lead	Equal Variance t Two-Sample Test	IOSN	<	Comp	10.04866	1.859548	4.093E-06	0.05	TRUE	0.02150332	8		C
Mercury	Equal Variance t Two-Sample Test	IOSN	<	Comp	-3.084291	1.859548	0.9924905	0.05	FALSE	0.005417142	8		C
Nickel	Equal Variance t Two-Sample Test	IOSN	<	Comp	2.179135	1.859548	0.03047227	0.05	TRUE	0.05495523	8		C
Zinc	Equal Variance t Two-Sample Test	IOSN	<	Comp	2.498184	1.894579	0.02055064	0.05	TRUE	4.240874	7		C
Zinc	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	21		0.1111111	0.05	FALSE		8	0	E

CETIS Analytical Report

Report Date: 19 Aug-23 06:54 (p 1 of 8)
Test Code/ID: TN-23-302NvMet / 07-8839-3412

Bioaccumulation Evaluation - Metals - Nereis virens **EA-EST, Inc. PBC**

Analysis ID:	14-3802-6235	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:49	**MD5 Hash:**	DF2BDA9EB0E0632414FC98407CF1225E	**Editor ID:**	

Batch ID:	13-8417-6872	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:31	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:31	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed arsenic endpoint	14.66%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-1.3	1.86	0.33	CDF	0.8845	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.44	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.13225	0.13225	1	1.68	0.2310	Non-Significant Effect
Error	0.6296	0.0787	8			
Total	0.76185		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.05	23.2	0.5031	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.922	0.741	0.3732	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	2.25	1.85	2.65	2.26	1.92	2.63	0.145	14.46%	0.00%
AT3-098		5	2.02	1.74	2.3	2.12	1.65	2.21	0.102	11.24%	10.22%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	2.26	1.92	1.93	2.63	2.51
AT3-098		1.65	1.96	2.21	2.16	2.12

Analyst: NR QA: JR

Bioaccumulation Evaluation - Metals - Nereis virens **EA-EST, Inc. PBC**

Analysis ID:	14-9372-2871	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:49	**MD5 Hash:**	B96EBCBC73516D3013B78FD7B5D1F854	**Editor ID:**	

Batch ID:	13-8417-6872	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:31	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:31	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed cadmium endpoint	20.18%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	3.14	1.86	0.00509	CDF	0.0069	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.77	2.29	0.5560	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001849	0.0001849	1	9.89	0.0137	Significant Effect
Error	0.0001496	0.0000187	8			
Total	0.0003345		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	4.58	23.2	0.1696	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.989	0.741	0.9959	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0252	0.0183	0.0321	0.025	0.018	0.032	0.00248	21.99%	0.00%
AT3-098		5	0.0338	0.0306	0.037	0.034	0.03	0.037	0.00116	7.66%	-34.13%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.025	0.022	0.018	0.032	0.029
AT3-098		0.03	0.037	0.033	0.034	0.035

Analyst: NR QA: JR

Bioaccumulation Evaluation - Metals - Nereis virens **EA-EST, Inc. PBC**

Analysis ID:	16-2542-8047	**Endpoint:**	Chromium	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:49	**MD5 Hash:**	53A2BA2A09713E0DC71DD20E75BCA127	**Editor ID:**	

Batch ID:	13-8417-6872	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:31	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:31	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed chromium endpoint	248.83%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	3	5.12	2.35	0.171	CDF	0.0072	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.306116	0.306116	1	33.8	0.0007	Significant Effect
Error	0.063388	0.0090554	7			
Total	0.369504		8			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	132	24.3	0.0004	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.814	0.701	0.0293	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0686	0.053	0.0842	0.064	0.055	0.088	0.00563	18.34%	0.00%
AT3-098		4	0.44	0.21	0.67	0.459	0.232	0.561	0.0723	32.89%	-541.03%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.073	0.063	0.055	0.088	0.064
AT3-098		0.232	0.507	0.459	---	0.561

Analyst: NR QA: JR

Bioaccumulation Evaluation - Metals - Nereis virens **EA-EST, Inc. PBC**

Analysis ID:	13-8883-2132	**Endpoint:**	Copper	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:49	**MD5 Hash:**	F85C5A6258CB4ED4B31ACE29920B57DF	**Editor ID:**	

Batch ID:	13-8417-6872	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:31	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:31	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed copper endpoint	17.25%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-0.657	1.86	0.206	CDF	0.7353	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.73	2.29	0.6291	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0133225	0.0133225	1	0.432	0.5293	Non-Significant Effect
Error	0.24655	0.0308187	8			
Total	0.259872		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.42	23.2	0.7399	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7163	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	1.2	0.999	1.4	1.16	0.996	1.4	0.0713	13.32%	0.00%
AT3-098		5	1.12	0.888	1.36	1.08	0.901	1.41	0.0851	16.93%	6.10%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.16	1.12	0.996	1.4	1.31
AT3-098		0.901	1.08	1.04	1.41	1.19

Analyst: NR QA: JR

Bioaccumulation Evaluation - Metals - Nereis virens **EA-EST, Inc. PBC**

Analysis ID:	06-0350-2940	**Endpoint:**	Lead	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:49	**MD5 Hash:**	486E86376DD112B2B637D9FCC3831C6A	**Editor ID:**	

Batch ID:	13-8417-6872	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:31	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:31	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed lead endpoint	28.90%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	10	1.86	0.0215	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2	2.29	0.2387	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0337561	0.0337561	1	101	<1.0E-05	Significant Effect
Error	0.0026744	0.0003343	8			
Total	0.0364305		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.95	23.2	0.5323	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.871	0.741	0.1020	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0744	0.0557	0.0931	0.071	0.058	0.099	0.00673	20.22%	0.00%
AT3-098		5	0.191	0.164	0.217	0.18	0.173	0.225	0.00941	11.03%	-156.18%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.07	0.074	0.058	0.071	0.099
AT3-098		0.196	0.225	0.18	0.179	0.173

Analyst: NR QA: JR

Bioaccumulation Evaluation - Metals - Nereis virens **EA-EST, Inc. PBC**

Analysis ID:	12-6341-4781	**Endpoint:**	Mercury	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:49	**MD5 Hash:**	B14DF90D09FFB249BD776DE339A125CE	**Editor ID:**	

Batch ID:	13-8417-6872	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:31	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:31	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed mercury endpoint	34.73%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-3.08	1.86	0.00542	CDF	0.9925	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.16	2.29	0.1085	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002018	0.0002018	1	9.51	0.0150	Significant Effect
Error	0.0001697	2.122E-05	8			
Total	0.0003716		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	5.24	23.2	0.1376	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.893	0.741	0.1815	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0156	0.0124	0.0188	0.016	0.012	0.018	0.00117	16.72%	0.00%
AT3-098		5	0.00662	-0.000797	0.014	0.004	0.00195	0.016	0.00267	90.24%	57.60%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.018	0.016	0.012	0.018	0.014
AT3-098		0.00195	0.004	0.00213	0.016	0.009

CETIS Analytical Report

Report Date: 19 Aug-23 06:54 (p 7 of 8)
Test Code/ID: TN-23-302NvMet / 07-8839-3412

Bioaccumulation Evaluation - Metals - Nereis virens — **EA-EST, Inc. PBC**

Analysis ID:	20-0017-5455	**Endpoint:**	Nickel	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:49	**MD5 Hash:**	D31D6166FB89BC529979C5AC2D07EA33	**Editor ID:**	

Batch ID:	13-8417-6872	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:31	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:31	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed nickel endpoint	32.75%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	2.18	1.86	0.055	CDF	0.0305	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.78	2.29	0.5399	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0103684	0.0103684	1	4.75	0.0609	Non-Significant Effect
Error	0.0174676	0.0021835	8			
Total	0.027836		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.6	23.2	0.6594	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6281	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.168	0.103	0.232	0.154	0.118	0.246	0.0232	30.90%	0.00%
AT3-098		5	0.232	0.181	0.283	0.239	0.179	0.278	0.0183	17.65%	-38.38%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.154	0.13	0.118	0.191	0.246
AT3-098		0.203	0.239	0.278	0.262	0.179

Analyst: NR QA: JR

Bioaccumulation Evaluation - Metals - Nereis virens **EA-EST, Inc. PBC**

Analysis ID:	13-3955-6427	**Endpoint:**	Zinc	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:49	**MD5 Hash:**	0273BB7FF8A9CB03C86DC48774CE1DE	**Editor ID:**	

Batch ID:	13-8417-6872	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:31	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:31	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed zinc endpoint	49.95%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	7	2.5	1.89	4.24	CDF	0.0206	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	69.4899	69.4899	1	6.24	0.0411	Significant Effect
Error	77.9419	11.1346	7			
Total	147.432		8			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.85	46.2	0.4155	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.968	0.701	0.8726	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	4	8.49	4.79	12.2	7.15	6.63	11.8	1.16	27.39%	0.00%
AT3-098		5	14.1	9.2	19	14.5	8.61	18.6	1.76	27.89%	-65.87%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	7.15	11.8	6.63	8.38	---
AT3-098		18.6	12	16.7	14.5	8.61

Analyst: NR QA: JR

ATTACHMENT V

Nereis virens 28-Day Solid Phase Bioaccumulation Testing Tissue Chemistry and Body Burden Statistical Analyses

PAHs

(27 pages)

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

			Pre-Assay		
CONTAMINANT	REP1	REP2	REP3	REP4 *	REP5 *
PAHs (ng/g wet weight)					
Acenaphthene	0.615 U	0.630 U	0.615 U		
Acenaphthylene	0.377 U	0.388 U	0.378 U		
Anthracene	0.409 U	0.421 U	1.88 J		
Benzo(a)anthracene	0.765 U	0.790 U	0.770 U		
Benzo(a)pyrene	0.805 U	0.830 U	0.805 U		
Benzo(b)fluoranthene	1.07 U	1.10 U	1.07 U		
Benzo(k)fluoranthene	0.489 U	0.500 U	0.490 U		
Benzo(g,h,i)perylene	0.342 U	0.352 U	0.343 U		
Chrysene	0.745 U	0.765 U	0.745 U		
Dibenzo(a,h)anthracene	0.396 U	0.408 U	0.397 U		
Fluoranthene	0.605 U	0.620 U	0.605 U		
Fluorene	1.34 J	1.18 J	0.693 J		
Indeno(1,2,3-c,d)pyrene	0.800 U	0.825 U	0.805 U		
Naphthalene	1.54 JB	2.19 JB	1.20 JB		
Phenanthrene	0.670 U	0.690 U	0.670 U		
Pyrene	0.890 U	0.915 U	0.890 U		
PAH Total	11.9	12.6	12.4		

* = Qualifiers

U	Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J	Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA	Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

IOSN Reference

CONTAMINANT	REP1	REP2	REP3	REP4	REP5
PAHs (ng/g wet weight)					
Acenaphthene	0.462 U	0.458 U	0.460 U	0.954 J	0.480 U
Acenaphthylene	0.284 U	0.282 U	0.283 U	0.287 U	0.295 U
Anthracene	0.308 U	0.306 U	0.307 U	0.311 U	0.320 U
Benzo(a)anthracene	0.575 U	0.570 U	0.575 U	0.585 U	0.600 U
Benzo(a)pyrene	0.605 U	0.600 U	0.605 U	0.610 U	0.630 U
Benzo(b)fluoranthene	0.800 U	0.795 U	0.800 U	0.810 U	0.830 U
Benzo(k)fluoranthene	0.368 U	0.365 U	0.367 U	0.372 U	0.382 U
Benzo(g,h,i)perylene	0.258 U	0.255 U	0.257 U	0.260 U	0.267 U
Chrysene	0.560 U	0.555 U	0.560 U	0.565 U	0.580 U
Dibenzo(a,h)anthracene	0.299 U	0.296 U	0.297 U	0.301 U	0.310 U
Fluoranthene	1.01 J	0.451 U	0.453 U	0.459 U	0.472 U
Fluorene	0.258 U	0.255 U	0.543 J	0.832 J	0.267 U
Indeno(1,2,3-c,d)pyrene	0.605 U	0.600 U	0.600 U	0.610 U	0.625 U
Naphthalene	0.812 J	0.394 U	0.396 U	1.24 J	0.412 U
Phenanthrene	2.12 J	1.76 J	2.01 J	3.10 J	1.23 J
Pyrene	0.670 U	0.665 U	0.665 U	0.675 U	0.695 U
PAH Total	9.99	8.61	9.18	12.0	8.39

* = Qualifiers
U Analyte not detected; belo
J Analyte estimated; detectio
NA Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

10 Stations at 4 Marinas Mud

CONTAMINANT	REP1	REP2	REP3	REP4	REP5
PAHs (ng/g wet weight)					
Acenaphthene	0.620 U	1.31 J	0.610 U	1.24 J	0.635 U
Acenaphthylene	0.380 U	0.371 U	0.374 U	12.2	7.79
Anthracene	0.412 U	0.845 J	0.965 J	0.404 U	0.422 U
Benzo(a)anthracene	0.770 U	0.755 U	0.760 U	0.755 U	0.790 U
Benzo(a)pyrene	0.810 U	0.790 U	0.800 U	0.795 U	0.830 U
Benzo(b)fluoranthene	1.07 U	1.05 U	7.90	1.05 U	1.10 U
Benzo(k)fluoranthene	0.492 U	0.481 U	30.3	0.483 U	0.505 U
Benzo(g,h,i)perylene	0.344 U	0.337 U	0.339 U	0.338 U	0.776 J
Chrysene	1.82 J	1.63 J	0.740 U	0.735 U	0.770 U
Dibenzo(a,h)anthracene	0.399 U	0.390 U	0.393 U	0.391 U	0.409 U
Fluoranthene	7.81	8.46	10.7	2.77 J	3.83 J
Fluorene	1.73 J	1.31 J	1.13 J	3.78 J	2.30 J
Indeno(1,2,3-c,d)pyrene	0.805 U	0.790 U	0.795 U	0.790 U	0.830 U
Naphthalene	1.65 JB	2.32 JB	2.29 JB	0.520 U	1.20 JB
Phenanthrene	0.675 U	0.660 U	1.62 J	0.660 U	0.690 U
Pyrene	8.04	6.62	7.73	4.83 J	3.92 J
PAH Total	27.8	28.1	67.4	31.7	26.8

* = Qualifiers
U Analyte not detected; belo
J Analyte estimated; detectio
NA Not Analyzed

CETIS Test Data Worksheet

Report Date: 19 Aug-23 06:55 (p 1 of 1)
Test Code/ID: TN-23-302NvPAH / 17-1765-7444

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Start Date: 08 Mar-23 11:32
End Date: 05 Apr-23 10:32
Sample Date: 03 Mar-23

Species: Nereis virens
Protocol: US ACE NED RIM (2004)
Material: Laboratory Control Sediment

Sample Code: AT3-152
Sample Source: Yachtsman Marina NAE-2004-00319
Sample Station: Laboratory Control

Sample	Rep	Pos	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	1,4-Dichlorobenze	Total PAHs
IOSN 2019	1	2	0.462	0.284	0.308	0.575	0.605	0.8	0.2575	0.368	0.56	0.2985	1.01	0.2575	0.605	0.812	2.12	0.67		
IOSN 2019	2	4	0.458	0.2815	0.3055	0.57	0.6	0.795	0.255	0.365	0.555	0.296	0.451	0.255	0.6	0.3935	1.76	0.665		
IOSN 2019	3	5	0.46	0.283	0.307	0.575	0.605	0.8	0.2565	0.3665	0.56	0.297	0.453	0.543	0.6	0.3955	2.01	0.665		
IOSN 2019	4	8	0.954	0.2865	0.311	0.585	0.61	0.81	0.26	0.3715	0.565	0.301	0.459	0.832	0.61	1.24	3.1	0.675		
IOSN 2019	5	9	0.4795	0.2945	0.3195	0.6	0.63	0.83	0.267	0.382	0.58	0.3095	0.472	0.267	0.625	0.412	1.23	0.695		
AT3-098	1	1	0.62	0.3795	0.4115	0.77	0.81	1.07	0.344	0.492	1.82	0.399	7.81	1.73	0.805	1.65	0.675	8.04		
AT3-098	2	3	1.31	0.371	0.845	0.755	0.79	1.045	0.3365	0.481	1.63	0.39	8.46	1.31	0.79	2.32	0.66	6.62		
AT3-098	3	6	0.61	0.374	0.965	0.76	0.8	7.9	0.339	30.3	0.74	0.393	10.7	1.13	0.795	2.29	1.62	7.73		
AT3-098	4	7	1.24	12.2	0.404	0.755	0.795	1.05	0.3375	0.483	0.735	0.391	2.77	3.78	0.79	0.52	0.66	4.83		
AT3-098	5	10	0.635	7.79	0.422	0.79	0.83	1.1	0.776	0.505	0.77	0.409	3.83	2.3	0.83	1.2	0.69	3.92		

Analyst: NR QA: JR

CETIS Summary Report

Report Date: 19 Aug-23 06:56 (p 1 of 5)
Test Code/ID: TN-23-302NvPAH / 17-1765-7444

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample ID:	11-9755-1044	**Code:**	AT3-152	**Project:**	Dredged Sediment Evaluation
Sample Date:	03 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	03 Mar-23 12:30	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	5d 12h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
09-6281-0431	Acenaphthene	Equal Variance t Two-Sample Test	0.0634	AT3-098 passed acenaphthene	1
10-1846-2388	Acenaphthylene	Unequal Variance t Two-Sample Test	0.0922	AT3-098 passed acenaphthylene	1
14-8405-4060	Anthracene	Unequal Variance t Two-Sample Test	0.0352	AT3-098 failed anthracene	1
02-1204-0422	Benzo(a)anthracene	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed benzo(a)anthracene	1
10-8756-9954	Benzo(a)pyrene	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed benzo(a)pyrene	1
09-2700-3438	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed benzo(b)fluoranthene	1
18-4472-6594	Benzo(b)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.0040	AT3-098 failed benzo(b)fluoranthene	1
13-4397-7733	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed benzo(g,h,i)perylene	1
15-5949-4399	Benzo(g,h,i)perylene	Wilcoxon Rank Sum Two-Sample Test	0.0040	AT3-098 failed benzo(g,h,i)perylene	1
11-9752-3554	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed benzo(k)fluoranthene	1
21-1524-6710	Benzo(k)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.0040	AT3-098 failed benzo(k)fluoranthene	1
14-6869-2556	Chrysene	Unequal Variance t Two-Sample Test	0.0378	AT3-098 failed chrysene	1
19-8988-8883	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed dibenz(a,h)anthracene	1
16-7604-1580	Fluoranthene	Unequal Variance t Two-Sample Test	0.0072	AT3-098 failed fluoranthene	1
02-3007-9915	Fluorene	Equal Variance t Two-Sample Test	0.0014	AT3-098 failed fluorene	1
14-8100-8905	Fluorene	Equal Variance t Two-Sample Test	0.0054	AT3-098 failed fluorene	1
08-3442-7926	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed indeno(1,2,3-cd)pyrene	1
12-1685-5860	Naphthalene	Equal Variance t Two-Sample Test	0.0188	AT3-098 failed naphthalene	1
01-9493-0851	Phenanthrene	Equal Variance t Two-Sample Test	0.9945	AT3-098 passed phenanthrene	1
13-2043-1908	Pyrene	Unequal Variance t Two-Sample Test	0.0012	AT3-098 failed pyrene	1

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.563	0.291	0.835	0.458	0.954	0.0979	0.219	38.90%	0.00%
AT3-098		5	0.883	0.437	1.33	0.61	1.31	0.16	0.359	40.64%	-56.92%

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.286	0.28	0.292	0.282	0.294	0.0023	0.00514	1.80%	0.00%
AT3-098		5	4.22	-2.6	11	0.371	12.2	2.46	5.5	130.12%	-1377.05

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.31	0.303	0.317	0.306	0.319	0.00249	0.00557	1.80%	0.00%
AT3-098		5	0.61	0.27	0.949	0.404	0.965	0.122	0.273	44.81%	-96.49%

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.581	0.566	0.596	0.57	0.6	0.00534	0.0119	2.05%	0.00%
AT3-098		5	0.766	0.748	0.784	0.755	0.79	0.0066	0.0147	1.93%	-31.84%

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.61	0.595	0.625	0.6	0.63	0.00524	0.0117	1.92%	0.00%
AT3-098		5	0.805	0.785	0.825	0.79	0.83	0.00707	0.0158	1.96%	-31.97%

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.807	0.79	0.824	0.795	0.83	0.00624	0.014	1.73%	0.00%
AT3-098		5	2.43	-1.36	6.23	1.04	7.9	1.37	3.06	125.62%	-201.49%

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.259	0.253	0.265	0.255	0.267	0.00211	0.00472	1.82%	0.00%
AT3-098		5	0.427	0.184	0.669	0.336	0.776	0.0874	0.195	45.79%	-64.58%

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.371	0.362	0.379	0.365	0.382	0.00305	0.00681	1.84%	0.00%
AT3-098		5	6.45	-10.1	23	0.481	30.3	5.96	13.3	206.62%	-1641.01

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.564	0.552	0.576	0.555	0.58	0.0043	0.00962	1.71%	0.00%
AT3-098		5	1.14	0.469	1.81	0.735	1.82	0.241	0.539	47.35%	-101.95%

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.3	0.294	0.307	0.296	0.31	0.00243	0.00542	1.81%	0.00%
AT3-098		5	0.396	0.387	0.406	0.39	0.409	0.00352	0.00786	1.98%	-31.96%

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.569	0.263	0.875	0.451	1.01	0.11	0.247	43.35%	0.00%
AT3-098		5	6.71	2.6	10.8	2.77	10.7	1.48	3.32	49.40%	-1079.96

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.431	0.114	0.748	0.255	0.832	0.114	0.256	59.32%	0.00%
AT3-098		5	2.05	0.725	3.37	1.13	3.78	0.477	1.07	52.04%	-375.75%

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.608	0.595	0.621	0.6	0.625	0.00464	0.0104	1.71%	0.00%
AT3-098		5	0.802	0.781	0.823	0.79	0.83	0.00752	0.0168	2.10%	-31.91%

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.651	0.185	1.12	0.394	1.24	0.168	0.375	57.59%	0.00%
AT3-098		5	1.6	0.65	2.54	0.52	2.32	0.341	0.762	47.75%	-145.31%

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	2.04	1.2	2.89	1.23	3.1	0.305	0.683	33.41%	0.00%
AT3-098		5	0.861	0.334	1.39	0.66	1.62	0.19	0.424	49.30%	57.88%

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.674	0.659	0.689	0.665	0.695	0.00557	0.0124	1.85%	0.00%
AT3-098		5	6.23	3.99	8.46	3.92	8.04	0.805	1.8	28.92%	-824.04%

Analyst: NR QA: JR

Acenaphthene Detail MD5: 28B59F3CDBB3583514093D0F338B80B5

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.462	0.458	0.46	0.954	0.479
AT3-098		0.62	1.31	0.61	1.24	0.635

Acenaphthylene Detail MD5: 299524FB48C3129698F11873019E882B

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.284	0.282	0.283	0.287	0.294
AT3-098		0.38	0.371	0.374	12.2	7.79

Anthracene Detail MD5: A34DB90A0D84147410AFDC111A084513

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.308	0.306	0.307	0.311	0.319
AT3-098		0.412	0.845	0.965	0.404	0.422

Benzo(a)anthracene Detail MD5: F21062880BC25FB0106842311D450EF9

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.575	0.57	0.575	0.585	0.6
AT3-098		0.77	0.755	0.76	0.755	0.79

Benzo(a)pyrene Detail MD5: 3E33BFA4FFA8A2EA09CE125D593F1F9E

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.605	0.6	0.605	0.61	0.63
AT3-098		0.81	0.79	0.8	0.795	0.83

Benzo(b)fluoranthene Detail MD5: B9DBFEDE27A858016CB5293AEE0B8C7B

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.8	0.795	0.8	0.81	0.83
AT3-098		1.07	1.04	7.9	1.05	1.1

Benzo(g,h,i)perylene Detail MD5: 97E05B58C7062EF6512E109593DA9630

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.257	0.255	0.257	0.26	0.267
AT3-098		0.344	0.336	0.339	0.338	0.776

Benzo(k)fluoranthene Detail MD5: 5AC16B10241B3E60E75B2811EC01D1A9

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.368	0.365	0.366	0.371	0.382
AT3-098		0.492	0.481	30.3	0.483	0.505

Chrysene Detail MD5: 1E6F3DE2491E3F1E8BB58E2E184DE3BB

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.56	0.555	0.56	0.565	0.58
AT3-098		1.82	1.63	0.74	0.735	0.77

Dibenz(a,h)anthracene Detail MD5: 98BDEA55C64E5C7EF57253E78848B905

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.299	0.296	0.297	0.301	0.31
AT3-098		0.399	0.39	0.393	0.391	0.409

Fluoranthene Detail MD5: B46293A567C77CBA338763CB86CD1614

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.01	0.451	0.453	0.459	0.472
AT3-098		7.81	8.46	10.7	2.77	3.83

Analyst: NR QA: JR

Fluorene Detail MD5: 3FA5D56A13943E3E44387FC58EED93C8

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.257	0.255	0.543	0.832	0.267
AT3-098		1.73	1.31	1.13	3.78	2.3

Indeno(1,2,3-cd)pyrene Detail MD5: 4B1EBBEADD85F99B8C5A7EE9812EE167

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.605	0.6	0.6	0.61	0.625
AT3-098		0.805	0.79	0.795	0.79	0.83

Naphthalene Detail MD5: CD3D20716F571D79A1152AFA9AD5B270

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.812	0.394	0.396	1.24	0.412
AT3-098		1.65	2.32	2.29	0.52	1.2

Phenanthrene Detail MD5: C87FB68D06FB6E8BD23935F2E5F05A70

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	2.12	1.76	2.01	3.1	1.23
AT3-098		0.675	0.66	1.62	0.66	0.69

Pyrene Detail MD5: 1B7ED20057A7949857964C82BD3C8A93

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.67	0.665	0.665	0.675	0.695
AT3-098		8.04	6.62	7.73	4.83	3.92

STUDY: TN-23-302
CLIENT: Eco-Analysts, Inc.
PROJECT: Yachtsman Marina, Kennebunkport, ME NAE-2004-00319
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PAHs

Endpoint	Method	C	<	T	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Acenaphthene	Equal Variance t Two-Sample Test	IOSN	<	Comp	1.703979	1.859548	0.06339341	0.05	FALSE	0.3495425	8		C
Acenaphthylene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	1.602066	2.131847	0.09219988	0.05	FALSE	5.238909	4		C
Anthracene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	2.44968	2.131847	0.03523478	0.05	TRUE	0.2604674	4		C
Benzo(a)anthracene	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.80244	1.859548	0	0.05	TRUE	0.0157788	8		C
Benzo(a)pyrene	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.15053	1.859548	0	0.05	TRUE	0.01637034	8		C
Benzo(b)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	15		0.003968254	0.05	TRUE		8	0	E
Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	IOSN	<	Comp	19.86739	1.894579	0	0.05	TRUE	0.0247224	7		C
Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	IOSN	<	Comp	28.51986	1.894579	0	0.05	TRUE	0.005317733	7		C
Benzo(g,h,i)perylene	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	15		0.003968254	0.05	TRUE		8	0	E
Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	IOSN	<	Comp	20.22445	1.894579	0	0.05	TRUE	0.01120853	7		C
Benzo(k)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	15		0.003968254	0.05	TRUE		8	0	E
Chrysene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	2.383667	2.131847	0.03784344	0.05	TRUE	0.5142547	4		C
Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.47496	1.859548	0	0.05	TRUE	0.007942909	8		C
Fluoranthene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	4.131057	2.131847	0.007240722	0.05	TRUE	3.171149	4		C
Fluorene	Equal Variance t Two-Sample Test	IOSN	<	Comp	3.300467	1.859548	0.005425649	0.05	TRUE	0.9122329	8		C
Fluorene	Equal Variance t Two-Sample Test	IOSN	<	Comp	4.52013	1.894579	0.001365866	0.05	TRUE	0.4973545	7		C
Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.96619	1.859548	0	0.05	TRUE	0.01642307	8		C
Naphthalene	Equal Variance t Two-Sample Test	IOSN	<	Comp	2.489245	1.859548	0.01878322	0.05	TRUE	0.7062451	8		C
Phenanthrene	Equal Variance t Two-Sample Test	IOSN	<	Comp	-3.289896	1.859548	0.9944881	0.05	FALSE	0.6686671	8		C
Pyrene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	6.895549	2.131847	0.00115953	0.05	TRUE	1.71709	4		C

CETIS Analytical Report

Report Date: 19 Aug-23 06:56 (p 1 of 16)
Test Code/ID: TN-23-302NvPAH / 17-1765-7444

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	09-6281-0431	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:55	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	4E533CF8084BFBF14A4043A9C963E506	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed acenaphthene endpoint	62.12%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	1.7	1.86	0.35	CDF	0.0634	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.25648	0.25648	1	2.9	0.1268	Non-Significant Effect
Error	0.706668	0.0883335	8			
Total	0.963148		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.69	23.2	0.3616	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.794	0.741	0.0124	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.563	0.291	0.835	0.462	0.458	0.954	0.0979	38.90%	0.00%
AT3-098		5	0.883	0.437	1.33	0.635	0.61	1.31	0.16	40.64%	-56.92%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.462	0.458	0.46	0.954	0.48
AT3-098		0.62	1.31	0.61	1.24	0.635

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	10-1846-2388	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:55	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	9C40152BD86A2B90D4C2F1257F4FC61E	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed acenaphthylene endpoint	1832.43%

Unequal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	4	1.6	2.13	5.24	CDF	0.0922	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.18	2.29	0.0992	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	38.7499	38.7499	1	2.57	0.1478	Non-Significant Effect
Error	120.781	15.0977	8			
Total	159.531		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1140000	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0402	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.286	0.28	0.292	0.284	0.282	0.295	0.0023	1.80%	0.00%
AT3-098		5	4.22	-2.6	11	0.38	0.371	12.2	2.46	130.12%	-1377.05%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.284	0.282	0.283	0.287	0.295
AT3-098		0.38	0.371	0.374	12.2	7.79

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	14-8405-4060	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:55	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	0EE18B9183090C120935F3897FAFFD1A	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed anthracene endpoint	83.97%

Unequal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	4	2.45	2.13	0.26	CDF	0.0352	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.95	2.29	0.2857	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.223951	0.223951	1	6	0.0400	Significant Effect
Error	0.298555	0.0373194	8			
Total	0.522507		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2400	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.862	0.741	0.0810	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.31	0.303	0.317	0.308	0.306	0.32	0.00249	1.80%	0.00%
AT3-098		5	0.61	0.27	0.949	0.422	0.404	0.965	0.122	44.81%	-96.49%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.308	0.306	0.307	0.311	0.32
AT3-098		0.412	0.845	0.965	0.404	0.422

Bioaccumulation Evaluation - PAHs - Nereis

EA-EST, Inc. PBC

Analysis ID:	02-1204-0422	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:55	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	BFC429358BDF8F36ED709B3AD11983F1	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed benzo(a)anthracene endpoint	2.72%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	21.8	1.86	0.0158	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.9	2.29	0.3527	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0855625	0.0855625	1	475	<1.0E-05	Significant Effect
Error	0.00144	0.00018	8			
Total	0.0870025		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.53	23.2	0.6920	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.821	0.741	0.0264	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.581	0.566	0.596	0.575	0.57	0.6	0.00534	2.05%	0.00%
AT3-098		5	0.766	0.748	0.784	0.76	0.755	0.79	0.0066	1.93%	-31.84%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.575	0.57	0.575	0.585	0.6
AT3-098		0.77	0.755	0.76	0.755	0.79

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	10-8756-9954	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:55	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	5106A0BC1B1562C92F3CA08067BE0DDC	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed benzo(a)pyrene endpoint	2.68%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	22.2	1.86	0.0164	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.91	2.29	0.3427	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0950625	0.0950625	1	491	<1.0E-05	Significant Effect
Error	0.00155	0.0001938	8			
Total	0.0966125		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.82	23.2	0.5768	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.866	0.741	0.0909	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.61	0.595	0.625	0.605	0.6	0.63	0.00524	1.92%	0.00%
AT3-098		5	0.805	0.785	0.825	0.8	0.79	0.83	0.00707	1.96%	-31.97%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.605	0.6	0.605	0.61	0.63
AT3-098		0.81	0.79	0.8	0.795	0.83

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	18-4472-6594	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:55	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	6B7B6407C4040E1F952714F1179164B5	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed benzo(b)fluoranthene endpoint	314.95%

Wilcoxon Rank Sum Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	15	---	0	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.68	2.29	0.0004	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.60969	6.60969	1	1.42	0.2683	Non-Significant Effect
Error	37.3628	4.67035	8			
Total	43.9725		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	47900	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.63	0.741	0.0001	Non-Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.807	0.79	0.824	0.8	0.795	0.83	0.00625	1.73%	0.00%
AT3-098		5	2.43	-1.36	6.23	1.07	1.05	7.9	1.37	125.62%	-201.49%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.8	0.795	0.8	0.81	0.83
AT3-098		1.07	1.05	7.9	1.05	1.1

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	13-4397-7733	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:55	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	5FE12096E6564B4DA61A02296512A837	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed benzo(g,h,i)perylene endpoint	2.05%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	7	28.5	1.89	0.00532	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01424	0.01424	1	813	<1.0E-05	Significant Effect
Error	0.0001226	1.751E-05	7			
Total	0.0143626		8			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.01	46.2	0.5916	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.871	0.701	0.1264	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.259	0.253	0.265	0.258	0.255	0.267	0.00211	1.82%	0.00%
AT3-098		4	0.339	0.334	0.345	0.338	0.337	0.344	0.00166	0.98%	-30.88%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.258	0.255	0.257	0.26	0.267
AT3-098		0.344	0.337	0.339	0.338	---

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	11-9752-3554	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:55	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	6855E33D32DC66D489FF8ABC8834DAED	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed benzo(k)fluoranthene endpoint	3.02%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	7	20.2	1.89	0.0112	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0318136	0.0318136	1	409	<1.0E-05	Significant Effect
Error	0.0005445	7.778E-05	7			
Total	0.0323581		8			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.58	24.3	0.3830	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.898	0.701	0.2390	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.371	0.362	0.379	0.368	0.365	0.382	0.00305	1.84%	0.00%
AT3-098		4	0.49	0.473	0.508	0.483	0.481	0.505	0.00547	2.23%	-32.29%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.368	0.365	0.367	0.372	0.382
AT3-098		0.492	0.481	---	0.483	0.505

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	14-6869-2556	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:55	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	F213485DA4637EE3A64C893711A0B1BC	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed chrysene endpoint	91.18%

Unequal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	4	2.38	2.13	0.514	CDF	0.0378	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.89	2.29	0.3574	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.826563	0.826563	1	5.68	0.0443	Significant Effect
Error	1.16379	0.145474	8			
Total	1.99035		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	3140	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.858	0.741	0.0714	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.564	0.552	0.576	0.56	0.555	0.58	0.0043	1.71%	0.00%
AT3-098		5	1.14	0.469	1.81	0.77	0.735	1.82	0.241	47.35%	-101.95%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.56	0.555	0.56	0.565	0.58
AT3-098		1.82	1.63	0.74	0.735	0.77

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	19-8988-8883	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:55	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	E03DE0113FD71AD272230D47ABC1E90C	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed dibenz(a,h)anthracene endpoint	2.64%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	22.5	1.86	0.00794	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.98	2.29	0.2560	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02304	0.02304	1	505	<1.0E-05	Significant Effect
Error	0.0003649	4.561E-05	8			
Total	0.0234049		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.1	23.2	0.4900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.861	0.741	0.0779	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.3	0.294	0.307	0.299	0.296	0.31	0.00243	1.81%	0.00%
AT3-098		5	0.396	0.387	0.406	0.393	0.39	0.409	0.00352	1.98%	-31.96%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.299	0.296	0.297	0.301	0.31
AT3-098		0.399	0.39	0.393	0.391	0.409

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	16-7604-1580	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:55	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	58EFA4925F3AA65DCE08F4A9811ED2F7	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed fluoranthene endpoint	557.32%

Unequal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	4	4.13	2.13	3.17	CDF	0.0072	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.8	2.29	0.5014	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	94.4026	94.4026	1	17.1	0.0033	Significant Effect
Error	44.2539	5.53174	8			
Total	138.656		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	181	23.2	0.0002	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.926	0.741	0.4106	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.569	0.263	0.875	0.459	0.451	1.01	0.11	43.35%	0.00%
AT3-098		5	6.71	2.6	10.8	7.81	2.77	10.7	1.48	49.40%	-1079.96%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.01	0.451	0.453	0.459	0.472
AT3-098		7.81	8.46	10.7	2.77	3.83

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	14-8100-8905	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:56	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	9AEDD73F70540F039F24B66E57CB36BD	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed fluorene endpoint	211.70%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	3.3	1.86	0.912	CDF	0.0054	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.37	2.29	0.0288	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.55371	6.55371	1	10.9	0.0109	Significant Effect
Error	4.81312	0.60164	8			
Total	11.3668		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	17.4	23.2	0.0170	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.876	0.741	0.1181	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.431	0.114	0.748	0.267	0.255	0.832	0.114	59.32%	0.00%
AT3-098		5	2.05	0.725	3.37	1.73	1.13	3.78	0.477	52.04%	-375.75%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.258	0.255	0.543	0.832	0.267
AT3-098		1.73	1.31	1.13	3.78	2.3

Analyst: NR QA: JR

CETIS Analytical Report

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	08-3442-7926	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:56	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	E499F098C84D34DED30A0B8134DDA060	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed indeno(1,2,3-cd)pyrene endpoint	2.70%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	22	1.86	0.0164	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.13	2.29	0.1299	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09409	0.09409	1	483	<1.0E-05	Significant Effect
Error	0.00156	0.000195	8			
Total	0.09565		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.63	23.2	0.3721	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.842	0.741	0.0462	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.608	0.595	0.621	0.605	0.6	0.625	0.00464	1.71%	0.00%
AT3-098		5	0.802	0.781	0.823	0.795	0.79	0.83	0.00752	2.10%	-31.91%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.605	0.6	0.6	0.61	0.625
AT3-098		0.805	0.79	0.795	0.79	0.83

CETIS Analytical Report

Report Date: 19 Aug-23 06:56 (p 14 of 16)
Test Code/ID: TN-23-302NvPAH / 17-1765-7444

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	12-1685-5860	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:56	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	0AA9FD9E0C176677B37305CC020F17AD	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed naphthalene endpoint	108.55%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	2.49	1.86	0.706	CDF	0.0188	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.9	2.29	0.3485	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.23445	2.23445	1	6.2	0.0376	Significant Effect
Error	2.88487	0.360609	8			
Total	5.11932		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	4.14	23.2	0.1978	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.927	0.741	0.4218	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.651	0.185	1.12	0.412	0.394	1.24	0.168	57.59%	0.00%
AT3-098		5	1.6	0.65	2.54	1.65	0.52	2.32	0.341	47.75%	-145.31%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.812	0.394	0.396	1.24	0.412
AT3-098		1.65	2.32	2.29	0.52	1.2

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	01-9493-0851	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:56	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	7AB24DD7125ABEB7E2AB615F6438C2A1	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed phenanthrene endpoint	32.71%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-3.29	1.86	0.669	CDF	0.9945	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.97	2.29	0.2655	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.49872	3.49872	1	10.8	0.0110	Significant Effect
Error	2.58604	0.323255	8			
Total	6.08476		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.59	23.2	0.3794	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.866	0.741	0.0896	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	2.04	1.2	2.89	2.01	1.23	3.1	0.305	33.41%	0.00%
AT3-098		5	0.861	0.334	1.39	0.675	0.66	1.62	0.19	49.30%	57.88%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	2.12	1.76	2.01	3.1	1.23
AT3-098		0.675	0.66	1.62	0.66	0.69

Bioaccumulation Evaluation - PAHs - Nereis **EA-EST, Inc. PBC**

Analysis ID:	13-2043-1908	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:56	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:50	**MD5 Hash:**	05FB8E6A71FC61834386F3A2DF12E9E0	**Editor ID:**	

Batch ID:	16-7806-7369	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:32	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:32	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pyrene endpoint	254.76%

Unequal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	4	6.9	2.13	1.72	CDF	0.0012	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.92	2.29	0.3209	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	77.1173	77.1173	1	47.5	0.0001	Significant Effect
Error	12.9749	1.62186	8			
Total	90.0922		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	20900	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.895	0.741	0.1925	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.674	0.659	0.689	0.67	0.665	0.695	0.00557	1.85%	0.00%
AT3-098		5	6.23	3.99	8.46	6.62	3.92	8.04	0.805	28.92%	-824.04%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.67	0.665	0.665	0.675	0.695
AT3-098		8.04	6.62	7.73	4.83	3.92

ATTACHMENT VI

Nereis virens 28-Day Solid Phase Bioaccumulation Testing Tissue Chemistry and Body Burden Statistical Analyses

PCBs

(29 pages)

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

			Pre-Assay		
CONTAMINANT	REP1	REP2	REP3	REP4 *	REP5 *
PCB Congeners (ng/g wet wt.)					
PCB 8	0.0630 U	0.0650 U	0.0635 U		
PCB 18	0.0460 U	0.0473 U	0.0461 U		
PCB 28	0.0780 U	0.0805 U	0.0785 U		
PCB 44	0.0870 U	0.0895 U	0.0875 U		
PCB 52	0.0486 U	0.0500 U	0.0487 U		
PCB 66	0.0457 U	0.0470 U	0.0458 U		
PCB 101	0.0745 U	0.0765 U	0.0745 U		
PCB 105	0.0670 U	0.0685 U	0.0670 U		
PCB 118	0.0705 U	0.0725 U	0.0710 U		
PCB 128	0.0835 U	0.0855 U	0.0835 U		
PCB 138	0.267 J	0.594 J	0.0535 U		
PCB 153	0.454 J	0.651 J	0.780		
PCB 170	0.0409 U	0.0421 U	0.0410 U		
PCB 180	0.0419 U	0.0431 U	0.0420 U		
PCB 187	0.646	0.0620 U	0.0600 U		
PCB 195	0.0785 U	0.0810 U	0.0790 U		
PCB 206	0.0800 U	0.0825 U	0.0805 U		
PCB 209	0.0920 U	0.0945 U	0.0920 U		
Total PCBs	4.73	4.66	3.79		

* = Qualifiers

U	Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J	Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA	Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

IOSN Reference

CONTAMINANT	REP1		REP2		REP3		REP4		REP5	
PCB Congeners (ng/g wet wt										
PCB 8	0.0475	U	0.0475	U	0.0475	U	0.0480	U	0.0495	U
PCB 18	0.0345	U	0.0345	U	0.0345	U	0.0350	U	0.0360	U
PCB 28	0.0590	U	0.0585	U	0.0585	U	0.0595	U	0.0610	U
PCB 44	0.0655	U	0.0650	U	0.0655	U	0.0665	U	0.0680	U
PCB 52	0.0365	U	0.0365	U	0.0365	U	0.0370	U	0.0380	U
PCB 66	0.0345	U	0.0340	U	0.0345	U	0.0350	U	0.0355	U
PCB 101	0.0560	U	0.0555	U	0.0560	U	0.0565	U	0.0580	U
PCB 105	0.0500	U	0.0500	U	0.0500	U	0.0510	U	0.0520	U
PCB 118	0.0530	U	0.0525	U	0.0530	U	0.0535	U	0.0550	U
PCB 128	0.0630	U	0.0620	U	0.0625	U	0.0635	U	0.0650	U
PCB 138	0.714		0.498		0.0400	U	0.0405	U	0.361	J
PCB 153	0.862		0.621		0.687		1.01		0.636	
PCB 170	0.0310	U	0.0305	U	0.0305	U	0.0310	U	0.0320	U
PCB 180	0.0315	U	0.0315	U	0.0315	U	0.0320	U	0.0325	U
PCB 187	0.0455	U	0.0450	U	0.0450	U	0.0455	U	0.0470	U
PCB 195	0.0590	U	0.0585	U	0.0590	U	0.0600	U	0.0615	U
PCB 206	0.0605	U	0.0600	U	0.0600	U	0.0610	U	0.0625	U
PCB 209	0.0690	U	0.0685	U	0.0690	U	0.0700	U	0.0720	U
Total PCBs	4.74		3.82		3.04		3.71		3.65	

* = Qualifiers
U Analyte not detected; belo
J Analyte estimated; detectio
NA Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

10 Stations at 4 Marinas Mud

CONTAMINANT	REP1	REP2	REP3	REP4	REP5
PCB Congeners (ng/g wet wt					
PCB 8	0.0635 U	0.0620 U	0.0630 U	0.0625 U	0.0650 U
PCB 18	0.0463 U	0.0453 U	0.0457 U	0.0455 U	0.0475 U
PCB 28	0.0790 U	0.0770 U	0.0775 U	0.0775 U	0.0810 U
PCB 44	0.0880 U	0.0860 U	0.0865 U	0.0860 U	0.0900 U
PCB 52	0.0489 U	0.0478 U	0.0482 U	0.485 J	0.0500 U
PCB 66	0.0460 U	0.0450 U	0.0453 U	0.0451 U	0.0472 U
PCB 101	0.0750 U	0.0730 U	0.0740 U	0.0735 U	0.0770 U
PCB 105	0.0670 U	0.0655 U	3.78	0.0660 U	0.0690 U
PCB 118	0.0710 U	0.0695 U	0.0700 U	0.0695 U	0.0730 U
PCB 128	0.0840 U	0.0820 U	0.0825 U	0.0825 U	0.0860 U
PCB 138	1.00	1.15	0.0530 U	0.0525 U	0.0550 U
PCB 153	1.04	1.48	0.843	0.110 U	0.814
PCB 170	0.0412 U	0.0403 U	0.0406 U	0.0404 U	0.0422 U
PCB 180	0.0422 U	0.0412 U	0.0415 U	0.0414 U	0.0432 U
PCB 187	0.0605 U	0.0590 U	0.0595 U	0.0595 U	0.0620 U
PCB 195	0.0790 U	0.0775 U	0.0780 U	0.0775 U	0.0810 U
PCB 206	0.0805 U	0.0790 U	0.0795 U	0.0790 U	0.0830 U
PCB 209	0.0925 U	0.0905 U	0.0910 U	0.0910 U	0.0950 U
Total PCBs	6.21	7.34	11.3	3.29	3.92

* = Qualifiers

U	Analyte not detected; belo
J	Analyte estimated; detectio
NA	Not Analyzed

CETIS Test Data Worksheet

Report Date: 19 Aug-23 06:57 (p 1 of 1)
Test Code/ID: TN-23-302NvPCB / 04-0924-3837

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Start Date: 08 Mar-23 11:33 **Species:** Nereis virens **Sample Code:** AT3-152
End Date: 05 Apr-23 10:33 **Protocol:** US ACE NED RIM (2004) **Sample Source:** Yachtsman Marina NAE-2004-00319
Sample Date: 03 Mar-23 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control

Sample	Rep	Pos	PCB 008	PCB 018	PCB 028	PCB 044	PCB 052	PCB 066	PCB 101	PCB 105	PCB 118	PCB 128	PCB 138	PCB 153	PCB 170	PCB 180	PCB 187	PCB 195	PCB 206	PCB 209	PCB 087	PCB 049	PCB 183	PCB 184	Total PCBs
IOSN 2019	1	2	0.048	0.035	0.059	0.066	0.037	0.035	0.056	0.05	0.053	0.063	0.714	0.862	0.031	0.032	0.046	0.059	0.061	0.069	0.028	0.064	0.017	0.035	
IOSN 2019	2	3	0.048	0.035	0.059	0.065	0.037	0.034	0.056	0.05	0.053	0.062	0.498	0.621	0.031	0.032	0.045	0.059	0.06	0.069	0.028	0.064	0.017	0.035	
IOSN 2019	3	5	0.048	0.035	0.059	0.066	0.037	0.035	0.056	0.05	0.053	0.063	0.04	0.687	0.031	0.032	0.045	0.059	0.06	0.069	0.028	0.064	0.017	0.035	
IOSN 2019	4	8	0.048	0.035	0.06	0.067	0.037	0.035	0.057	0.051	0.054	0.064	0.041	1.01	0.031	0.032	0.046	0.06	0.061	0.07	0.028	0.065	0.017	0.035	
IOSN 2019	5	10	0.05	0.036	0.061	0.068	0.038	0.036	0.058	0.052	0.055	0.065	0.361	0.636	0.032	0.033	0.047	0.062	0.063	0.072	0.029	0.067	0.018	0.036	
AT3-098	1	1	0.064	0.046	0.079	0.088	0.049	0.046	0.075	0.067	0.071	0.084	1	1.04	0.041	0.042	0.061	0.079	0.081	0.093	0.037	0.086	0.023	0.046	
AT3-098	2	4	0.062	0.045	0.077	0.086	0.048	0.045	0.073	0.066	0.07	0.082	1.15	1.48	0.040	0.041	0.059	0.078	0.079	0.091	0.037	0.084	0.022	0.045	
AT3-098	3	6	0.063	0.046	0.078	0.087	0.048	0.045	0.074	3.78	0.07	0.083	0.053	0.843	0.041	0.042	0.06	0.078	0.08	0.091	0.037	0.085	0.022	0.046	
AT3-098	4	7	0.063	0.045	0.078	0.086	0.485	0.045	0.074	0.066	0.07	0.083	0.053	0.11	0.040	0.041	0.06	0.078	0.079	0.091	0.037	0.084	0.022	0.045	
AT3-098	5	9	0.065	0.048	0.081	0.09	0.05	0.047	0.077	0.069	0.073	0.086	0.055	0.814	0.042	0.043	0.062	0.081	0.083	0.095	0.038	0.088	0.023	0.048	

Analyst: NR QA: JR

CETIS Summary Report

Report Date:	19 Aug-23 06:58 (p 1 of 5)
Test Code/ID:	TN-23-302NvPCB / 04-0924-3837

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample ID:	11-9755-1044	**Code:**	AT3-152	**Project:**	Dredged Sediment Evaluation
Sample Date:	03 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	03 Mar-23 12:30	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	5d 12h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-9121-2104	PCB 008	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 008	1
13-8217-6257	PCB 018	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 018	1
11-4561-0244	PCB 028	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 028	1
16-1112-5112	PCB 044	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 044	1
09-0192-7086	PCB 052	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 052	1
13-3296-8099	PCB 052	Wilcoxon Rank Sum Two-Sample Test	0.0040	AT3-098 failed pcb 052	1
11-5197-6838	PCB 066	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 066	1
18-8869-0510	PCB 101	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 101	1
16-3802-4478	PCB 105	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 105	1
07-4136-0669	PCB 105	Wilcoxon Rank Sum Two-Sample Test	0.0040	AT3-098 failed pcb 105	1
00-9484-6417	PCB 118	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 118	1
13-1827-6879	PCB 128	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 128	1
11-3728-5619	PCB 138	Equal Variance t Two-Sample Test	0.3277	AT3-098 passed pcb 138	1
20-6837-7661	PCB 153	Equal Variance t Two-Sample Test	0.3489	AT3-098 passed pcb 153	1
12-6194-5314	PCB 170	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 170	1
05-3230-0024	PCB 180	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 180	1
05-4569-7612	PCB 187	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 187	1
02-2598-3391	PCB 195	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 195	1
03-1612-5429	PCB 206	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 206	1
15-1840-5518	PCB 209	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 209	1

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.048	0.0469	0.0491	0.0475	0.0495	0.000387	0.000866	1.80%	0.00%
AT3-098		5	0.0632	0.0618	0.0646	0.062	0.065	0.000515	0.00115	1.82%	-31.67%

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0349	0.0341	0.0357	0.0345	0.036	0.000292	0.000652	1.87%	0.00%
AT3-098		5	0.046	0.0449	0.0472	0.0453	0.0475	0.000403	0.000901	1.96%	-31.92%

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0593	0.058	0.0606	0.0585	0.061	0.000464	0.00104	1.75%	0.00%
AT3-098		5	0.0784	0.0764	0.0804	0.077	0.081	0.000731	0.00164	2.09%	-32.21%

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0661	0.0646	0.0676	0.065	0.068	0.000534	0.00119	1.81%	0.00%
AT3-098		5	0.0873	0.0852	0.0894	0.086	0.09	0.000768	0.00172	1.97%	-32.07%

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0369	0.0361	0.0377	0.0365	0.038	0.000292	0.000652	1.77%	0.00%
AT3-098		5	0.136	-0.106	0.378	0.0478	0.485	0.0873	0.195	143.48%	-268.51%

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0347	0.034	0.0354	0.034	0.0355	0.000255	0.00057	1.64%	0.00%
AT3-098		5	0.0457	0.0446	0.0468	0.045	0.0472	0.000405	0.000905	1.98%	-31.70%

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0564	0.0552	0.0576	0.0555	0.058	0.00043	0.000962	1.71%	0.00%
AT3-098		5	0.0745	0.0725	0.0765	0.073	0.077	0.000707	0.00158	2.12%	-32.09%

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0506	0.0495	0.0517	0.05	0.052	0.0004	0.000894	1.77%	0.00%
AT3-098		5	0.809	-1.25	2.87	0.0655	3.78	0.743	1.66	205.13%	-1499.80

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0534	0.0522	0.0546	0.0525	0.055	0.00043	0.000962	1.80%	0.00%
AT3-098		5	0.0706	0.0688	0.0724	0.0695	0.073	0.00066	0.00147	2.09%	-32.21%

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0632	0.0618	0.0646	0.062	0.065	0.000515	0.00115	1.82%	0.00%
AT3-098		5	0.0834	0.0814	0.0854	0.082	0.086	0.000731	0.00164	1.96%	-31.96%

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.331	-0.0337	0.695	0.04	0.714	0.131	0.293	88.75%	0.00%
AT3-098		5	0.462	-0.236	1.16	0.0525	1.15	0.251	0.562	121.62%	-39.73%

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.763	0.555	0.972	0.621	1.01	0.0751	0.168	22.01%	0.00%
AT3-098		5	0.857	0.242	1.47	0.11	1.48	0.222	0.495	57.78%	-12.34%

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.031	0.0302	0.0318	0.0305	0.032	0.000274	0.000612	1.98%	0.00%
AT3-098		5	0.0409	0.0399	0.0419	0.0402	0.0422	0.000357	0.000798	1.95%	-31.97%

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0318	0.0312	0.0324	0.0315	0.0325	0.0002	0.000447	1.41%	0.00%
AT3-098		5	0.0419	0.0409	0.0429	0.0412	0.0432	0.000368	0.000822	1.96%	-31.70%

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0456	0.0446	0.0466	0.045	0.047	0.000367	0.000822	1.80%	0.00%
AT3-098		5	0.0601	0.0586	0.0616	0.059	0.062	0.000534	0.00119	1.99%	-31.80%

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0596	0.0581	0.0611	0.0585	0.0615	0.000534	0.00119	2.00%	0.00%
AT3-098		5	0.0786	0.0768	0.0804	0.0775	0.081	0.00066	0.00147	1.88%	-31.88%

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0608	0.0595	0.0621	0.06	0.0625	0.000464	0.00104	1.71%	0.00%
AT3-098		5	0.0802	0.0781	0.0823	0.079	0.083	0.000752	0.00168	2.10%	-31.91%

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0697	0.068	0.0714	0.0685	0.072	0.000624	0.0014	2.00%	0.00%
AT3-098		5	0.092	0.0897	0.0943	0.0905	0.095	0.000822	0.00184	2.00%	-31.99%

Analyst: NR QA: JR

PCB 008 Detail MD5: B6CD15DC1443B921495F7DFEACB92387

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0475	0.0475	0.0475	0.048	0.0495
AT3-098		0.0635	0.062	0.063	0.0625	0.065

PCB 018 Detail MD5: 0A8FA30BC4B1B12BC4E49675F270B3A8

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0345	0.0345	0.0345	0.035	0.036
AT3-098		0.0463	0.0453	0.0457	0.0454	0.0475

PCB 028 Detail MD5: 6FBFC0FADFAA4B848CA74B7F828197E2

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.059	0.0585	0.0585	0.0595	0.061
AT3-098		0.079	0.077	0.0775	0.0775	0.081

PCB 044 Detail MD5: 1C1D1CB6B4C2ADEFF1E79CE2C642DB23

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0655	0.065	0.0655	0.0665	0.068
AT3-098		0.088	0.086	0.0865	0.086	0.09

PCB 052 Detail MD5: 3920C127A4BDA389DA0F319C5F8AFCEB

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0365	0.0365	0.0365	0.037	0.038
AT3-098		0.0489	0.0478	0.0482	0.485	0.05

PCB 066 Detail MD5: 4EE269D0EA41A6E9E9823C291BDE5535

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0345	0.034	0.0345	0.035	0.0355
AT3-098		0.046	0.045	0.0453	0.0451	0.0472

PCB 101 Detail MD5: B20C9DAA8B6E4F50398B841B80DA6C21

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.056	0.0555	0.056	0.0565	0.058
AT3-098		0.075	0.073	0.074	0.0735	0.077

PCB 105 Detail MD5: 4E29C9426F5B6AA09DB8A3D99E3FD1F6

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.05	0.05	0.05	0.051	0.052
AT3-098		0.067	0.0655	3.78	0.066	0.069

PCB 118 Detail MD5: 1B5869B575FE2659921098AB6726212A

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.053	0.0525	0.053	0.0535	0.055
AT3-098		0.071	0.0695	0.07	0.0695	0.073

PCB 128 Detail MD5: 0803864E2A529E2E5537574498EE36A7

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.063	0.062	0.0625	0.0635	0.065
AT3-098		0.084	0.082	0.0825	0.0825	0.086

PCB 138 Detail MD5: F6533DA9A7F279C17F5EED8E45DF3AB9

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.714	0.498	0.04	0.0405	0.361
AT3-098		1	1.15	0.053	0.0525	0.055

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

PCB 153 Detail MD5: F3D0988551B15E211EEF7D3467C18071

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.862	0.621	0.687	1.01	0.636
AT3-098		1.04	1.48	0.843	0.11	0.814

PCB 170 Detail MD5: 23C6B5B239CEFCFA428787F92E620FE3

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.031	0.0305	0.0305	0.031	0.032
AT3-098		0.0411	0.0402	0.0406	0.0404	0.0422

PCB 180 Detail MD5: 470506518B2F2F8E005B0E35E4536EB0

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0315	0.0315	0.0315	0.032	0.0325
AT3-098		0.0421	0.0412	0.0415	0.0413	0.0432

PCB 187 Detail MD5: 4EBDDEB24063208E6681206C01A3F2F5

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0455	0.045	0.045	0.0455	0.047
AT3-098		0.0605	0.059	0.0595	0.0595	0.062

PCB 195 Detail MD5: CA8DC931CC03C1416788B6DD2F3BD47E

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.059	0.0585	0.059	0.06	0.0615
AT3-098		0.079	0.0775	0.078	0.0775	0.081

PCB 206 Detail MD5: 1F069A22AD4D1FA756C1F37E04C63A59

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0605	0.06	0.06	0.061	0.0625
AT3-098		0.0805	0.079	0.0795	0.079	0.083

PCB 209 Detail MD5: FAAA6B62B98D4AE5FBE056DA1E916DAC

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.069	0.0685	0.069	0.07	0.072
AT3-098		0.0925	0.0905	0.091	0.091	0.095

STUDY: **TN-23-302**
CLIENT: **Eco-Analysts, Inc.**
PROJECT: **Yachtsman Marina, Kennebunkport, ME NAE-2004-00319**
ASSAY: ***N. virens*** **28-day Bioaccumulation Evaluation**
TASK: **Statistical Analysis of Body Burden PCBs**

Endpoint	Method	C	<	T	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 008	Equal Variance t Two-Sample Test	IOSN	<	Comp	23.59498	1.859548	0	0.05	TRUE	0.00119793	8		C
PCB 018	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.39903	1.859548	0	0.05	TRUE	0.000924833	8		C
PCB 028	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.05477	1.859548	0	0.05	TRUE	0.001610416	8		C
PCB 044	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.66373	1.859548	0	0.05	TRUE	0.001739449	8		C
PCB 052	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	15		0.003968254	0.05	TRUE		8	0	E
PCB 052	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.01617	1.894579	0	0.05	TRUE	0.001017588	7		C
PCB 066	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.99916	1.859548	0	0.05	TRUE	0.000889381	8		C
PCB 101	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.86922	1.859548	0	0.05	TRUE	0.001539049	8		C
PCB 105	Equal Variance t Two-Sample Test	IOSN	<	Comp	19.91628	1.894579	0	0.05	TRUE	0.001548194	7		C
PCB 105	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	15		0.003968254	0.05	TRUE		8	0	E
PCB 118	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.84402	1.859548	0	0.05	TRUE	0.00146421	8		C
PCB 128	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.5843	1.859548	0	0.05	TRUE	0.00166323	8		C
PCB 138	Equal Variance t Two-Sample Test	IOSN	<	Comp	0.4634183	1.859548	0.3277057	0.05	FALSE	0.5272658	8		C
PCB 153	Equal Variance t Two-Sample Test	IOSN	<	Comp	0.402669	1.859548	0.3488687	0.05	FALSE	0.435021	8		C
PCB 170	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.03038	1.859548	0	0.05	TRUE	0.000836487	8		C
PCB 180	Equal Variance t Two-Sample Test	IOSN	<	Comp	24.08549	1.859548	0	0.05	TRUE	0.000778238	8		C
PCB 187	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.37401	1.859548	0	0.05	TRUE	0.001205124	8		C
PCB 195	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.39171	1.859548	0	0.05	TRUE	0.001577879	8		C
PCB 206	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.96619	1.859548	0	0.05	TRUE	0.001642307	8		C
PCB 209	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.60877	1.859548	0	0.05	TRUE	0.001919032	8		C

CETIS Analytical Report

Report Date: 19 Aug-23 06:58 (p 1 of 18)
Test Code/ID: TN-23-302NvPCB / 04-0924-3837

Bioaccumulation Evaluation - PCB Congeners - Nereis

EA-EST, Inc. PBC

Analysis ID:	02-9121-2104	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	61B6A6446B6F829C5A69B721843C7316	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 008 endpoint	2.50%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	23.6	1.86	0.0012	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.87	2.29	0.3839	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005776	0.0005776	1	557	<1.0E-05	Significant Effect
Error	0.0000083	1.038E-06	8			
Total	0.0005859		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.77	23.2	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.872	0.741	0.1046	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.048	0.0469	0.0491	0.0475	0.0475	0.0495	0.000387	1.80%	0.00%
AT3-098		5	0.0632	0.0618	0.0646	0.063	0.062	0.065	0.000515	1.82%	-31.67%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0475	0.0475	0.0475	0.048	0.0495
AT3-098		0.0635	0.062	0.063	0.0625	0.065

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Analysis ID:	13-8217-6257	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	B6DA257F039B072D56B781E2EB20402F	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 018 endpoint	2.65%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	22.4	1.86	0.000925	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.97	2.29	0.2663	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003102	0.0003102	1	502	<1.0E-05	Significant Effect
Error	4.947E-06	6.184E-07	8			
Total	0.0003152		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.91	23.2	0.5462	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0299	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0349	0.0341	0.0357	0.0345	0.0345	0.036	0.000292	1.87%	0.00%
AT3-098		5	0.046	0.0449	0.0472	0.0457	0.0453	0.0475	0.000403	1.96%	-31.92%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0345	0.0345	0.0345	0.035	0.036
AT3-098		0.0463	0.0453	0.0457	0.0455	0.0475

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Nereis

EA-EST, Inc. PBC

Analysis ID:	11-4561-0244	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	13664154466A20434E89A621986E9962	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 028 endpoint	2.72%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	22.1	1.86	0.00161	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.01	2.29	0.2206	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0009120	0.0009120	1	486	<1.0E-05	Significant Effect
Error	0.000015	1.875E-06	8			
Total	0.0009270		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.49	23.2	0.3988	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.871	0.741	0.1027	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0593	0.058	0.0606	0.059	0.0585	0.061	0.000464	1.75%	0.00%
AT3-098		5	0.0784	0.0764	0.0804	0.0775	0.077	0.081	0.000731	2.09%	-32.21%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.059	0.0585	0.0585	0.0595	0.061
AT3-098		0.079	0.077	0.0775	0.0775	0.081

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Analysis ID:	16-1112-5112	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	DAC288685AFDD8669A3AD481C61CFF0A	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 044 endpoint	2.63%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	22.7	1.86	0.00174	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0011236	0.0011236	1	514	<1.0E-05	Significant Effect
Error	0.0000175	2.188E-06	8			
Total	0.0011411		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.07	23.2	0.4983	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.861	0.741	0.0775	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0661	0.0646	0.0676	0.0655	0.065	0.068	0.000534	1.81%	0.00%
AT3-098		5	0.0873	0.0852	0.0894	0.0865	0.086	0.09	0.000768	1.97%	-32.07%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0655	0.065	0.0655	0.0665	0.068
AT3-098		0.088	0.086	0.0865	0.086	0.09

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Analysis ID:	13-3296-8099	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	4F06858ACDBF3FEBC8FB08A155CDB556	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 052 endpoint	439.72%

Wilcoxon Rank Sum Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	15	---	0	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.68	2.29	0.0004	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0245421	0.0245421	1	1.29	0.2890	Non-Significant Effect
Error	0.152273	0.0190342	8			
Total	0.176815		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	89600	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.628	0.741	0.0001	Non-Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0369	0.0361	0.0377	0.0365	0.0365	0.038	0.000292	1.77%	0.00%
AT3-098		5	0.136	-0.106	0.378	0.0489	0.0478	0.485	0.0873	143.48%	-268.51%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0365	0.0365	0.0365	0.037	0.038
AT3-098		0.0489	0.0478	0.0482	0.485	0.05

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Analysis ID:	11-5197-6838	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	2771CE0EBE3C5FC800050268051CE78A	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 066 endpoint	2.56%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	23	1.86	0.000889	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.03	2.29	0.2022	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003025	0.0003025	1	529	<1.0E-05	Significant Effect
Error	4.575E-06	5.719E-07	8			
Total	0.0003071		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.52	23.2	0.3927	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.905	0.741	0.2468	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0347	0.034	0.0354	0.0345	0.034	0.0355	0.000255	1.64%	0.00%
AT3-098		5	0.0457	0.0446	0.0468	0.0453	0.045	0.0472	0.000405	1.98%	-31.70%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0345	0.034	0.0345	0.035	0.0355
AT3-098		0.046	0.045	0.0453	0.0451	0.0472

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Analysis ID:	18-8869-0510	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	C0B3241FC036EA10A26D5C76708DBA23	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 101 endpoint	2.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	21.9	1.86	0.00154	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.03	2.29	0.2090	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008190	0.0008190	1	478	<1.0E-05	Significant Effect
Error	0.0000137	1.713E-06	8			
Total	0.0008327		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.7	23.2	0.3588	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.741	0.2574	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0564	0.0552	0.0576	0.056	0.0555	0.058	0.00043	1.71%	0.00%
AT3-098		5	0.0745	0.0725	0.0765	0.074	0.073	0.077	0.000707	2.12%	-32.09%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.056	0.0555	0.056	0.0565	0.058
AT3-098		0.075	0.073	0.074	0.0735	0.077

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Analysis ID:	16-3802-4478	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	1C1EFD20B2ADE9BFADCF7730003EED4	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 105 endpoint	3.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	7	19.9	1.89	0.00155	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005886	0.0005886	1	397	<1.0E-05	Significant Effect
Error	1.039E-05	1.484E-06	7			
Total	0.000599		8			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.99	24.3	0.3169	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.701	0.2792	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0506	0.0495	0.0517	0.05	0.05	0.052	0.0004	1.77%	0.00%
AT3-098		4	0.0669	0.0644	0.0693	0.066	0.0655	0.069	0.000774	2.31%	-32.16%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.05	0.05	0.05	0.051	0.052
AT3-098		0.067	0.0655	---	0.066	0.069

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Nereis	**EA-EST, Inc. PBC**

Analysis ID:	00-9484-6417	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	67AB8F66D4D401A34EA90AE797230695	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 118 endpoint	2.74%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	21.8	1.86	0.00146	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.04	2.29	0.1926	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0007396	0.0007396	1	477	<1.0E-05	Significant Effect
Error	0.0000124	1.55E-06	8			
Total	0.000752		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.35	23.2	0.4279	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.858	0.741	0.0713	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0534	0.0522	0.0546	0.053	0.0525	0.055	0.00043	1.80%	0.00%
AT3-098		5	0.0706	0.0688	0.0724	0.07	0.0695	0.073	0.00066	2.09%	-32.21%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.053	0.0525	0.053	0.0535	0.055
AT3-098		0.071	0.0695	0.07	0.0695	0.073

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Analysis ID:	13-1827-6879	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	C3C4DC1056F0EFDEE07C5586D6C8947A	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 128 endpoint	2.63%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	22.6	1.86	0.00166	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.95	2.29	0.2878	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0010201	0.0010201	1	510	<1.0E-05	Significant Effect
Error	0.000016	0.000002	8			
Total	0.0010361		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.02	23.2	0.5130	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.741	0.1636	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0632	0.0618	0.0646	0.063	0.062	0.065	0.000515	1.82%	0.00%
AT3-098		5	0.0834	0.0814	0.0854	0.0825	0.082	0.086	0.000731	1.96%	-31.96%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.063	0.062	0.0625	0.0635	0.065
AT3-098		0.084	0.082	0.0825	0.0825	0.086

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Analysis ID:	11-3728-5619	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	399A7E177AF191AB1A826ABF483B5A30	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed pcb 138 endpoint	159.44%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	0.463	1.86	0.527	CDF	0.3277	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.63	2.29	0.8415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0431649	0.0431649	1	0.215	0.6554	Non-Significant Effect
Error	1.60796	0.200995	8			
Total	1.65112		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	3.67	23.2	0.2361	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.741	0.0886	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.331	-0.0337	0.695	0.361	0.04	0.714	0.131	88.75%	0.00%
AT3-098		5	0.462	-0.236	1.16	0.055	0.0525	1.15	0.251	121.62%	-39.73%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.714	0.498	0.04	0.0405	0.361
AT3-098		1	1.15	0.053	0.0525	0.055

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Analysis ID:	20-6837-7661	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	3A012973E699D509F4E0717A8201D7EA	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed pcb 153 endpoint	57.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	0.403	1.86	0.435	CDF	0.3489	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.14	2.29	0.1193	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0221841	0.0221841	1	0.162	0.6977	Non-Significant Effect
Error	1.09455	0.136819	8			
Total	1.11673		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	8.7	23.2	0.0594	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.919	0.741	0.3498	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.763	0.555	0.972	0.687	0.621	1.01	0.0751	22.01%	0.00%
AT3-098		5	0.857	0.242	1.47	0.843	0.11	1.48	0.222	57.78%	-12.34%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.862	0.621	0.687	1.01	0.636
AT3-098		1.04	1.48	0.843	0.11	0.814

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Nereis

EA-EST, Inc. PBC

Analysis ID:	12-6194-5314	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	593B2980E4B846DF34D8D0F06EC55ED6	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 170 endpoint	2.70%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	22	1.86	0.000836	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.92	2.29	0.3191	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002455	0.0002455	1	485	<1.0E-05	Significant Effect
Error	4.047E-06	5.059E-07	8			
Total	0.0002496		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.7	23.2	0.6206	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.846	0.741	0.0515	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.031	0.0302	0.0318	0.031	0.0305	0.032	0.000274	1.98%	0.00%
AT3-098		5	0.0409	0.0399	0.0419	0.0406	0.0403	0.0422	0.000357	1.95%	-31.97%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.031	0.0305	0.0305	0.031	0.032
AT3-098		0.0412	0.0403	0.0406	0.0404	0.0422

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Analysis ID:	05-3230-0024	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	A9C9E9D4AAD109F4274B61083402572B	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 180 endpoint	2.45%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	24.1	1.86	0.000778	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.12	2.29	0.1372	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002540	0.0002540	1	580	<1.0E-05	Significant Effect
Error	3.503E-06	4.379E-07	8			
Total	0.0002575		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	3.38	23.2	0.2653	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.877	0.741	0.1206	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0318	0.0312	0.0324	0.0315	0.0315	0.0325	0.0002	1.41%	0.00%
AT3-098		5	0.0419	0.0409	0.0429	0.0415	0.0412	0.0432	0.000368	1.96%	-31.70%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0315	0.0315	0.0315	0.032	0.0325
AT3-098		0.0422	0.0412	0.0415	0.0414	0.0432

Bioaccumulation Evaluation - PCB Congeners - Nereis					**EA-EST, Inc. PBC**
Analysis ID:	05-4569-7612	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	6C8EB23E4DC7562EB7EC3DE2C74B3B7	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 187 endpoint	2.64%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	22.4	1.86	0.00121	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.97	2.29	0.2691	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005256	0.0005256	1	501	<1.0E-05	Significant Effect
Error	8.4E-06	1.05E-06	8			
Total	0.0005340		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.11	23.2	0.4871	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.852	0.741	0.0610	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0456	0.0446	0.0466	0.0455	0.045	0.047	0.000367	1.80%	0.00%
AT3-098		5	0.0601	0.0586	0.0616	0.0595	0.059	0.062	0.000534	1.99%	-31.80%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0455	0.045	0.045	0.0455	0.047
AT3-098		0.0605	0.059	0.0595	0.0595	0.062

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Nereis

EA-EST, Inc. PBC

Analysis ID:	02-2598-3391	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	98A1F3574672923967E356CB32D52988	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 195 endpoint	2.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	22.4	1.86	0.00158	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.9	2.29	0.3527	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0009025	0.0009025	1	501	<1.0E-05	Significant Effect
Error	0.0000144	0.0000018	8			
Total	0.0009169		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.53	23.2	0.6920	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.821	0.741	0.0264	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0596	0.0581	0.0611	0.059	0.0585	0.0615	0.000534	2.00%	0.00%
AT3-098		5	0.0786	0.0768	0.0804	0.078	0.0775	0.081	0.00066	1.88%	-31.88%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.059	0.0585	0.059	0.06	0.0615
AT3-098		0.079	0.0775	0.078	0.0775	0.081

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Nereis

EA-EST, Inc. PBC

Analysis ID:	03-1612-5429	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	03526FED9E2B52E4C0A46B32B1EECFC	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 206 endpoint	2.70%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	22	1.86	0.00164	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.13	2.29	0.1299	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0009409	0.0009409	1	483	<1.0E-05	Significant Effect
Error	0.0000156	1.95E-06	8			
Total	0.0009565		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.63	23.2	0.3721	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.842	0.741	0.0462	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0608	0.0595	0.0621	0.0605	0.06	0.0625	0.000464	1.71%	0.00%
AT3-098		5	0.0802	0.0781	0.0823	0.0795	0.079	0.083	0.000752	2.10%	-31.91%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0605	0.06	0.06	0.061	0.0625
AT3-098		0.0805	0.079	0.0795	0.079	0.083

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Nereis **EA-EST, Inc. PBC**

Analysis ID:	15-1840-5518	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:52	**MD5 Hash:**	B776423FBBBE4078D8289235BEA0F104	**Editor ID:**	

Batch ID:	16-3825-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:33	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:33	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 209 endpoint	2.75%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	21.6	1.86	0.00192	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.95	2.29	0.2877	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012432	0.0012432	1	467	<1.0E-05	Significant Effect
Error	0.0000213	2.663E-06	8			
Total	0.0012645		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.73	23.2	0.6082	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.834	0.741	0.0372	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0697	0.068	0.0714	0.069	0.0685	0.072	0.000624	2.00%	0.00%
AT3-098		5	0.092	0.0897	0.0943	0.091	0.0905	0.095	0.000822	2.00%	-31.99%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.069	0.0685	0.069	0.07	0.072
AT3-098		0.0925	0.0905	0.091	0.091	0.095

Analyst: NR QA: JR

ATTACHMENT VII

Nereis virens 28-Day Solid Phase Bioaccumulation Testing Tissue Chemistry and Body Burden Statistical Analyses

Pesticides

(30 pages)

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

			Pre-Assay		
CONTAMINANT	REP1	REP2	REP3	REP4 *	REP5 *
Pesticides (ng/g wet weight)					
Aldrin	0.0400 U	0.0411 U	0.0401 U		
cis-Chlordane	0.0860 U	0.0885 U	0.0865 U		
trans-Chlordane	0.0243 U	0.0250 U	0.0244 U		
cis-Nonachlor	0.0116 U	0.0119 U	0.0116 U		
trans-Nonachlor	0.0107 U	0.0110 U	0.0107 U		
Oxychlordane	0.0495 U	0.0510 U	0.0497 U		
Total Chlordanes	0.182	0.187	0.183		
4,4'-DDT	0.0158 U	0.0162 U	0.0158 U		
4,4'-DDD	6.38 P	3.49 P	0.0120 U		
4,4'-DDE	0.00730 U	0.00750 U	0.00730 U		
Total DDT	6.40	3.51	0.0351		
Dieldrin	0.0241 U	0.0248 U	0.0241 U		
alpha-Endosulfan	0.0220 U	0.0226 U	0.0221 U		
beta-Endosulfan	0.0114 U	0.0117 U	0.0114 U		
Endosulfans	0.0334	0.0343	0.0334		
Endrin	0.0131 U	0.0135 U	0.0132 U		
Heptachlor	0.0250 U	0.0257 U	0.0251 U		
Heptachlor epoxide	0.0515 U	0.0530 U	0.0515 U		
Hexachlorobenzene	0.215 U	0.221 U	0.216 U		
Lindane	0.0361 U	0.0371 U	0.0362 U		
Methoxychlor	0.0570 U	0.0585 U	0.0570 U		
Toxaphene	1.04 U	1.07 U	1.04 U		

* = Qualifiers

U	Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J	Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA	Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

	IOSN Reference									
CONTAMINANT	REP1		REP2		REP3		REP4		REP5	
Pesticides (ng/g wet weight)										
Aldrin	0.0600	U	0.0595	U	0.0600	U	0.0605	U	0.0625	U
cis-Chlordane	0.130	U	0.129	U	0.130	U	0.131	U	0.135	U
trans-Chlordane	0.0365	U	0.0365	U	0.0365	U	0.0370	U	0.0380	U
cis-Nonachlor	0.0175	U	0.0175	U	0.0175	U	0.0175	U	0.0180	U
trans-Nonachlor	0.0160	U	0.0160	U	0.0160	U	0.0160	U	0.0165	U
Oxychlordane	0.0745	U	0.0740	U	0.0745	U	0.0755	U	0.0775	U
Total Chlordanes	0.275		0.273		0.274		0.277		0.285	
4,4'-DDT	0.0235	U	0.0235	U	0.0235	U	0.0240	U	0.0245	U
4,4'-DDD	0.0180	U	0.0180	U	0.0180	U	0.0180	U	0.0190	U
4,4'-DDE	0.0110	U	0.0110	U	0.0110	U	0.0110	U	0.0115	U
Total DDT	0.0525		0.0525		0.0525		0.0530		0.0550	
Dieldrin	0.0365	U	0.0360	U	0.0360	U	0.0365	U	0.0375	U
alpha-Endosulfan	0.0330	U	0.0330	U	0.0330	U	0.0335	U	0.0345	U
beta-Endosulfan	0.0170	U	0.0170	U	0.0170	U	0.0175	U	0.0180	U
Endosulfans	0.0500		0.0500		0.0500		0.0510		0.0525	
Endrin	0.0200	U	0.0195	U	0.0195	U	0.0200	U	0.0205	U
Heptachlor	0.0375	U	0.0375	U	0.0375	U	0.0380	U	0.0390	U
Heptachlor epoxide	0.0775	U	0.0770	U	0.0770	U	0.0780	U	0.0805	U
Hexachlorobenzene	0.324	U	0.321	U	0.323	U	0.327	U	0.336	U
Lindane	0.0545	U	0.0540	U	0.0540	U	0.0550	U	0.0565	U
Methoxychlor	0.835	U	0.830	U	0.835	U	0.845	U	0.870	U
Toxaphene	1.57	U	1.55	U	1.56	U	1.58	U	1.63	U

* = Qualifiers
U Analyte not detected; belo
J Analyte estimated; detectio
NA Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)

10 Stations at 4 Marinas Mud

CONTAMINANT	REP1	REP2	REP3	REP4	REP5
Pesticides (ng/g wet weight)					
Aldrin	0.0402 U	0.0393 U	0.0396 U	0.0395 U	0.0412 U
cis-Chlordane	0.0870 U	0.0850 U	0.0855 U	0.0850 U	0.0890 U
trans-Chlordane	0.0245 U	0.0239 U	0.0241 U	0.0240 U	0.0251 U
cis-Nonachlor	0.0117 U	0.0114 U	0.0115 U	0.0115 U	0.0120 U
trans-Nonachlor	0.0107 U	0.0105 U	0.0106 U	0.0105 U	0.0110 U
Oxychlordane	0.0499 U	0.0488 U	0.0491 U	0.0489 U	0.0510 U
Total Chlordanes	0.184	0.180	0.181	0.180	0.188
4,4'-DDT	0.0159 U	0.0155 U	0.0156 U	0.0156 U	0.0163 U
4,4'-DDD	0.545	1.02	0.934	0.488	0.336
4,4'-DDE	0.00735 U	0.00715 U	0.00720 U	0.00720 U	0.00750 U
Total DDT	0.568	1.04	0.957	0.511	0.360
Dieldrin	0.0242 U	0.0237 U	0.0239 U	0.0238 U	0.0249 U
alpha-Endosulfan	0.0221 U	0.0217 U	0.0218 U	0.0217 U	0.0227 U
beta-Endosulfan	0.0114 U	0.0112 U	0.0113 U	0.0112 U	0.0117 U
Endosulfans	0.0335	0.0328	0.0331	0.0329	0.0344
Endrin	0.0132 U	0.0129 U	0.0130 U	0.0130 U	0.0135 U
Heptachlor	0.0252 U	0.0246 U	0.0248 U	0.0247 U	0.0258 U
Heptachlor epoxide	0.0520 U	0.0505 U	0.0510 U	0.0510 U	0.0530 U
Hexachlorobenzene	0.217 U	0.212 U	0.214 U	0.213 U	0.222 U
Lindane	0.0364 U	0.0356 U	0.0358 U	0.0357 U	0.0373 U
Methoxychlor	0.0570 U	0.0560 U	0.0565 U	0.0560 U	0.0585 U
Toxaphene	1.05 U	1.02 U	1.03 U	1.03 U	1.07 U

* = Qualifiers
U Analyte not detected; belo
J Analyte estimated; detectio
NA Not Analyzed

CETIS Test Data Worksheet

Report Date: 19 Aug-23 07:00 (p 1 of 1)
Test Code/ID: TN-23-302NvPest / 04-3042-6729

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Start Date: 08 Mar-23 11:34 **Species:** Nereis virens **Sample Code:** AT3-152
End Date: 05 Apr-23 10:34 **Protocol:** US ACE NED RIM (2004) **Sample Source:** Yachtsman Marina NAE-2004-00319
Sample Date: 03 Mar-23 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control

Sample	Rep	Pos	4-4'-DDD	4-4'-DDE	4-4'-DDT	aldrin	alpha chlordane	alpha-BHC	beta-BHC	cis-Nonachlor	delta-BHC	Dieldrin	endosulfan I	endosulfan II	endrin	gamma-BHC (Lindane)	gamma-chlordane	heptachlor	heptachlor epoxide	hexachlorobenzene	Methoxychlor	oxychlordane	toxaphene	trans-nonachlor	2-4'-DDD	2-4'-DDE	2-4'-DDT	endosulfan sulfate	Total DDTs
IOSN 2019	1	1	0.02	0.01	0.02	0.06	0.13			0.02		0.04	0.03	0.02	0.02	0.05	0.04	0.04	0.08	0.32	0.84	0.07	1.57	0.02					
IOSN 2019	2	3	0.02	0.01	0.02	0.06	0.13			0.02		0.04	0.03	0.02	0.02	0.05	0.04	0.04	0.08	0.32	0.83	0.07	1.55	0.02					
IOSN 2019	3	6	0.02	0.01	0.02	0.06	0.13			0.02		0.04	0.03	0.02	0.02	0.05	0.04	0.04	0.08	0.32	0.84	0.07	1.56	0.02					
IOSN 2019	4	8	0.02	0.01	0.02	0.06	0.13			0.02		0.04	0.03	0.02	0.02	0.06	0.04	0.04	0.08	0.33	0.85	0.08	1.58	0.02					
IOSN 2019	5	10	0.02	0.01	0.02	0.06	0.14			0.02		0.04	0.03	0.02	0.02	0.06	0.04	0.04	0.08	0.34	0.87	0.08	1.63	0.02					
AT3-098	1	2	0.55	0.007	0.02	0.04	0.09	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.04	0.02	0.03	0.05	0.22	0.06	0.05	1.05	0.01					
AT3-098	2	4	1.02	0.007	0.02	0.04	0.09	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.04	0.02	0.02	0.05	0.21	0.06	0.05	1.02	0.01					
AT3-098	3	5	0.93	0.007	0.02	0.04	0.09	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.04	0.02	0.02	0.05	0.21	0.06	0.05	1.03	0.01					
AT3-098	4	7	0.49	0.007	0.02	0.04	0.09	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.04	0.02	0.02	0.05	0.21	0.06	0.05	1.03	0.01					
AT3-098	5	9	0.34	0.008	0.02	0.04	0.09	0.03	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.04	0.03	0.03	0.05	0.22	0.06	0.05	1.07	0.01					

Analyst: NR QA: JR

CETIS Summary Report

Report Date: 19 Aug-23 07:00 (p 1 of 5)
Test Code/ID: TN-23-302NvPest / 04-3042-6729

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample ID:	11-9755-1044	**Code:**	AT3-152	**Project:**	Dredged Sediment Evaluation
Sample Date:	03 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	03 Mar-23 12:30	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	5d 12h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-0552-7923	4-4'-DDD	Unequal Variance t Two-Sample Test	0.0041	AT3-098 failed 4-4'-ddd	1
14-6121-4079	4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	1.0000	AT3-098 passed 4-4'-dde	1
19-2680-5750	4-4'-DDT	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed 4-4'-ddt	1
13-5698-3625	aldrin	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed aldrin	1
11-2031-6586	alpha chlordane	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed alpha chlordane	1
13-9152-9887	cis-Nonachlor	Wilcoxon Rank Sum Two-Sample Test	1.0000	AT3-098 passed cis-nonachlor	1
06-0623-3039	Dieldrin	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed dieldrin	1
02-3083-2662	endosulfan I	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed endosulfan i	1
02-6532-5065	endosulfan II	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed endosulfan ii	1
07-0975-2842	endrin	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed endrin	1
19-3319-1425	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed gamma-bhc (lindane)	1
06-4006-7514	gamma-chlordane	Wilcoxon Rank Sum Two-Sample Test	1.0000	AT3-098 passed gamma-chlordane	1
11-6127-2344	heptachlor	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed heptachlor	1
03-5485-6177	heptachlor epoxide	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed heptachlor epoxide	1
02-5060-6268	hexachlorobenzene	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed hexachlorobenzene	1
19-5233-4682	Methoxychlor	Unequal Variance t Two-Sample Test	1.0000	AT3-098 passed methoxychlor	1
17-5795-8568	Methoxychlor	Wilcoxon Rank Sum Two-Sample Test	1.0000	AT3-098 passed methoxychlor	1
05-2281-2806	oxychlordane	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed oxychlordane	1
01-2624-1676	toxaphene	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed toxaphene	1
02-9910-1821	trans-nonachlor	Wilcoxon Rank Sum Two-Sample Test	1.0000	AT3-098 passed trans-nonachlor	1

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0182	0.0176	0.0188	0.018	0.019	0.0002	0.000447	2.46%	0.00%
AT3-098		5	0.665	0.296	1.03	0.336	1.02	0.133	0.297	44.66%	-3551.65

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0111	0.0108	0.0114	0.011	0.0115	0.0001	0.000224	2.01%	0.00%
AT3-098		5	0.00728	0.0071	0.00746	0.00715	0.0075	0.0000644	0.000144	1.98%	34.41%

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0238	0.0232	0.0244	0.0235	0.0245	0.0002	0.000447	1.88%	0.00%
AT3-098		5	0.0157	0.0154	0.0161	0.0155	0.0162	0.000139	0.00031	1.97%	33.82%

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0605	0.059	0.062	0.0595	0.0625	0.000524	0.00117	1.94%	0.00%
AT3-098		5	0.0399	0.039	0.0409	0.0393	0.0412	0.000348	0.000778	1.95%	33.97%

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.131	0.128	0.134	0.129	0.135	0.00108	0.00241	1.84%	0.00%
AT3-098		5	0.0863	0.0842	0.0884	0.085	0.089	0.000768	0.00172	1.99%	34.07%

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0176	0.0173	0.0179	0.0175	0.018	0.0001	0.000224	1.27%	0.00%
AT3-098		5	0.0116	0.0113	0.0119	0.0114	0.012	0.000101	0.000226	1.95%	34.09%

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0365	0.0357	0.0373	0.036	0.0375	0.000274	0.000612	1.68%	0.00%
AT3-098		5	0.0241	0.0235	0.0247	0.0237	0.0248	0.000214	0.000478	1.98%	34.05%

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0334	0.0326	0.0342	0.033	0.0345	0.000292	0.000652	1.95%	0.00%
AT3-098		5	0.022	0.0215	0.0225	0.0216	0.0227	0.000194	0.000434	1.97%	34.16%

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0173	0.0167	0.0179	0.017	0.018	0.0002	0.000447	2.59%	0.00%
AT3-098		5	0.0113	0.0111	0.0116	0.0111	0.0117	0.0000992	0.000222	1.96%	34.45%

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0199	0.0194	0.0204	0.0195	0.0205	0.000187	0.000418	2.10%	0.00%
AT3-098		5	0.0131	0.0128	0.0134	0.0129	0.0135	0.00011	0.000246	1.88%	34.12%

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0548	0.0535	0.0561	0.054	0.0565	0.000464	0.00104	1.89%	5.20%
AT3-098		5	0.0361	0.0352	0.037	0.0355	0.0373	0.000314	0.000703	1.95%	3.49%

Analyst: NR QA: JR

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0369	0.0361	0.0377	0.0365	0.038	0.000292	0.000652	1.77%	3.56%
AT3-098		5	0.0243	0.0237	0.0249	0.0239	0.025	0.000209	0.000468	1.92%	2.37%

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0379	0.0371	0.0387	0.0375	0.039	0.000292	0.000652	1.72%	0.00%
AT3-098		5	0.025	0.0244	0.0256	0.0246	0.0258	0.00022	0.000492	1.97%	33.98%

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.078	0.0762	0.0798	0.077	0.0805	0.000652	0.00146	1.87%	0.00%
AT3-098		5	0.0515	0.0503	0.0527	0.0505	0.053	0.000447	0.001	1.94%	33.97%

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.326	0.319	0.334	0.321	0.336	0.00267	0.00596	1.83%	0.00%
AT3-098		5	0.215	0.21	0.22	0.212	0.222	0.00189	0.00424	1.97%	34.01%

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.843	0.823	0.863	0.83	0.87	0.00718	0.016	1.90%	0.00%
AT3-098		5	0.0568	0.0555	0.0581	0.056	0.0585	0.000464	0.00104	1.83%	93.26%

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0752	0.0735	0.0769	0.074	0.0775	0.000624	0.0014	1.86%	0.00%
AT3-098		5	0.0495	0.0484	0.0507	0.0487	0.051	0.000416	0.000929	1.88%	34.15%

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	1.58	1.54	1.61	1.55	1.63	0.0132	0.0295	1.87%	0.00%
AT3-098		5	1.04	1.01	1.06	1.02	1.07	0.00903	0.0202	1.94%	34.14%

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0161	0.0158	0.0164	0.016	0.0165	0.0001	0.000224	1.39%	0.00%
AT3-098		5	0.0106	0.0104	0.0109	0.0104	0.011	0.0000992	0.000222	2.09%	33.91%

4-4'-DDD Detail MD5: 3AC2F24637BB4B91C14DF8039C1C2CD6

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.018	0.018	0.018	0.018	0.019
AT3-098		0.545	1.02	0.934	0.488	0.336

4-4'-DDE Detail MD5: 84E3C18EA1D182D890C2937CB78D64AB

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.011	0.011	0.011	0.011	0.0115
AT3-098		0.00735	0.00715	0.0072	0.0072	0.0075

4-4'-DDT Detail MD5: B6AB72835EA8F5FD1C1DB81ACC073EDB

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0235	0.0235	0.0235	0.024	0.0245
AT3-098		0.0159	0.0155	0.0156	0.0155	0.0162

aldrin Detail MD5: 4679F2E9C684641004BB74E92D0F039E

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.06	0.0595	0.06	0.0605	0.0625
AT3-098		0.0402	0.0393	0.0396	0.0395	0.0412

alpha chlordane Detail MD5: CC2ADF7117E500C15BD9DA5DD158D663

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.13	0.129	0.13	0.131	0.135
AT3-098		0.087	0.085	0.0855	0.085	0.089

cis-Nonachlor Detail MD5: F48BAD9D55CDAFA5A98435658706EC3E

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0175	0.0175	0.0175	0.0175	0.018
AT3-098		0.0117	0.0114	0.0115	0.0115	0.012

Dieldrin Detail MD5: 100664800AE1E04003B6578BDFD32221

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0365	0.036	0.036	0.0365	0.0375
AT3-098		0.0242	0.0237	0.0238	0.0237	0.0248

endosulfan I Detail MD5: 6F87B91E6641DEEFABEB5CD93E1AC3A4

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.033	0.033	0.033	0.0335	0.0345
AT3-098		0.0221	0.0216	0.0218	0.0217	0.0227

endosulfan II Detail MD5: 3239C6E4B7D89C5811C9339447AF03BD

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.017	0.017	0.017	0.0175	0.018
AT3-098		0.0114	0.0111	0.0113	0.0112	0.0117

endrin Detail MD5: A0D2C6B4F9ECDCA13F956098900D5B9E

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.02	0.0195	0.0195	0.02	0.0205
AT3-098		0.0132	0.0129	0.013	0.013	0.0135

gamma-BHC (Lindane) Detail MD5: 614F84BF6F415E980BF132BF85F8F69F

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0545	0.054	0.054	0.055	0.0565
AT3-098		0.0364	0.0355	0.0358	0.0356	0.0373

gamma-chlordane Detail MD5: 3034683ECBB3B1BCF6404B54278E622E

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0365	0.0365	0.0365	0.037	0.038
AT3-098		0.0245	0.0239	0.0241	0.024	0.025

heptachlor Detail MD5: 3B9E0CBD8C081E007766E0A2EC3C44A5

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0375	0.0375	0.0375	0.038	0.039
AT3-098		0.0252	0.0246	0.0248	0.0247	0.0258

heptachlor epoxide Detail MD5: 13E302DC0DDE68B162D75B92B20650EF

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0775	0.077	0.077	0.078	0.0805
AT3-098		0.052	0.0505	0.051	0.051	0.053

hexachlorobenzene Detail MD5: E1BBBA742E57DE5AD07AD219A57FDBF8

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.324	0.321	0.322	0.327	0.336
AT3-098		0.216	0.212	0.213	0.213	0.222

Methoxychlor Detail MD5: 955BF3943188CA3B8CA50ED459DEDBD1

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.835	0.83	0.835	0.845	0.87
AT3-098		0.057	0.056	0.0565	0.056	0.0585

oxychlordane Detail MD5: E6FB14D92CF4B671D06426A3C27C4B4E

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0745	0.074	0.0745	0.0755	0.0775
AT3-098		0.0498	0.0487	0.0491	0.0489	0.051

toxaphene Detail MD5: C865FEEA96D68486D2D8D5F0A836A757

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.57	1.55	1.56	1.58	1.63
AT3-098		1.04	1.02	1.03	1.02	1.07

trans-nonachlor Detail MD5: 794A571E5B6F9708107F5CDABCC8729A

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.016	0.016	0.016	0.016	0.0165
AT3-098		0.0107	0.0104	0.0105	0.0105	0.011

Analyst: NR QA: JR

STUDY: **TN-23-302**
CLIENT: **Eco-Analysts, Inc.**
PROJECT: **Yachtsman Marina, Kennebunkport, ME NAE-2004-00319**
ASSAY: ***N. virens*** **28-day Bioaccumulation Evaluation**
TASK: **Statistical Analysis of Body Burden Pesticides**

Endpoint	Method	C	<	T	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
4-4'-DDD	Unequal Variance t Two-Sample Test	IOSN	<	Comp	4.869961	2.131847	0.00410996	0.05	TRUE	0.2829644	4		C
4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	40		1	0.05	FALSE		8	0	E
4-4'-DDT	Equal Variance t Two-Sample Test	IOSN	<	Comp	-33.07133	1.859548	1	0.05	FALSE	0.000452639	8		C
aldrin	Equal Variance t Two-Sample Test	IOSN	<	Comp	-32.65609	1.859548	1	0.05	FALSE	0.001170186	8		C
alpha chlordane	Equal Variance t Two-Sample Test	IOSN	<	Comp	-33.7144	1.859548	1	0.05	FALSE	0.002459953	8		C
cis-Nonachlor	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	40		1	0.05	FALSE		8	0	E
Dieldrin	Equal Variance t Two-Sample Test	IOSN	<	Comp	-35.78549	1.859548	1	0.05	FALSE	0.000645909	8		C
endosulfan I	Equal Variance t Two-Sample Test	IOSN	<	Comp	-32.5867	1.859548	1	0.05	FALSE	0.000651107	8		C
endosulfan II	Equal Variance t Two-Sample Test	IOSN	<	Comp	-26.69404	1.859548	1	0.05	FALSE	0.000415183	8		C
endrin	Equal Variance t Two-Sample Test	IOSN	<	Comp	-31.28667	1.859548	1	0.05	FALSE	0.000403569	8		C
gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	IOSN	<	Comp	-33.34121	1.859548	1	0.05	FALSE	0.001041845	8		C
gamma-chlordane	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	40		1	0.05	FALSE		8	0	E
heptachlor	Equal Variance t Two-Sample Test	IOSN	<	Comp	-35.26453	1.859548	1	0.05	FALSE	0.000679181	8		C
heptachlor epoxide	Equal Variance t Two-Sample Test	IOSN	<	Comp	-33.52015	1.859548	1	0.05	FALSE	0.001470102	8		C
hexachlorobenzene	Equal Variance t Two-Sample Test	IOSN	<	Comp	-33.90313	1.859548	1	0.05	FALSE	0.006082738	8		C
Methoxychlor	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	40		1	0.05	FALSE		8	0	E
Methoxychlor	Unequal Variance t Two-Sample Test	IOSN	<	Comp	-245.1282	2.353364	1	0.05	FALSE	0.007483141	3		C
oxychlordane	Equal Variance t Two-Sample Test	IOSN	<	Comp	-34.23545	1.859548	1	0.05	FALSE	0.001394846	8		C
toxaphene	Equal Variance t Two-Sample Test	IOSN	<	Comp	-33.69084	1.859548	1	0.05	FALSE	0.02969462	8		C
trans-nonachlor	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	40		1	0.05	FALSE		8	0	E

CETIS Analytical Report

Report Date: 19 Aug-23 07:00 (p 1 of 19)
Test Code/ID: TN-23-302NvPest / 04-3042-6729

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	14-0552-7923	**Endpoint:**	4-4'-DDD	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	8C3CE0F0C4CCA1BDD1003605E13CEE5	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed 4-4'-ddd endpoint	1554.75%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	4	4.87	2.13	0.283	CDF	0.0041	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.8	2.29	0.5037	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.04458	1.04458	1	23.7	0.0012	Significant Effect
Error	0.352356	0.0440445	8			
Total	1.39694		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	440000	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.741	0.2534	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0182	0.0176	0.0188	0.018	0.018	0.019	0.0002	2.46%	0.00%
AT3-098		5	0.665	0.296	1.03	0.545	0.336	1.02	0.133	44.66%	-3551.65%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.018	0.018	0.018	0.018	0.019
AT3-098		0.545	1.02	0.934	0.488	0.336

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Nereis	**EA-EST, Inc. PBC**

Analysis ID:	14-6121-4079	**Endpoint:**	4-4'-DDE	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	23EEA41834C09139D6F093DA3ED4CFA2	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed 4-4'-dde endpoint	1.99%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	40	---	0	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.26	2.29	0.0625	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.648E-05	3.648E-05	1	1030	<1.0E-05	Significant Effect
Error	2.83E-07	3.538E-08	8			
Total	3.676E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.41	23.2	0.4152	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.712	0.741	0.0012	Non-Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0111	0.0108	0.0114	0.011	0.011	0.0115	0.0001	2.01%	0.00%
AT3-098		5	0.00728	0.0071	0.00746	0.0072	0.00715	0.0075	0.0000644	1.98%	34.41%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.011	0.011	0.011	0.011	0.0115
AT3-098		0.00735	0.00715	0.0072	0.0072	0.0075

CETIS Analytical Report

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	19-2680-5750	**Endpoint:**	4-4'-DDT	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	9D8A85229143661C7BED30254A154562	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed 4-4'-ddt endpoint	1.90%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-33.1	1.86	0.000453	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.93	2.29	0.3125	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001620	0.0001620	1	1090	<1.0E-05	Significant Effect
Error	1.185E-06	1.481E-07	8			
Total	0.0001632		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.08	23.2	0.4962	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.741	0.0295	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0238	0.0232	0.0244	0.0235	0.0235	0.0245	0.0002	1.88%	0.00%
AT3-098		5	0.0157	0.0154	0.0161	0.0156	0.0155	0.0163	0.000139	1.97%	33.82%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0235	0.0235	0.0235	0.024	0.0245
AT3-098		0.0159	0.0155	0.0156	0.0156	0.0163

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	13-5698-3625	**Endpoint:**	aldrin	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	6ED9C12523B01552897D499768FD1B54	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed aldrin endpoint	1.93%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-32.7	1.86	0.00117	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.13	2.29	0.1264	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0010558	0.0010558	1	1070	<1.0E-05	Significant Effect
Error	7.92E-06	9.9E-07	8			
Total	0.0010637		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.27	23.2	0.4461	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0404	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0605	0.059	0.062	0.06	0.0595	0.0625	0.000524	1.94%	0.00%
AT3-098		5	0.0399	0.039	0.0409	0.0396	0.0393	0.0412	0.000348	1.95%	33.97%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.06	0.0595	0.06	0.0605	0.0625
AT3-098		0.0402	0.0393	0.0396	0.0395	0.0412

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	11-2031-6586	**Endpoint:**	alpha chlordane	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	6CF43D826CA35FAC795C430CBAF6E77B	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed alpha chlordane endpoint	1.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-33.7	1.86	0.00246	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.08	2.29	0.1642	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0049729	0.0049729	1	1140	<1.0E-05	Significant Effect
Error	3.500E-05	4.375E-06	8			
Total	0.0050079		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.97	23.2	0.5287	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.832	0.741	0.0352	Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.131	0.128	0.134	0.13	0.129	0.135	0.00108	1.84%	0.00%
AT3-098		5	0.0863	0.0842	0.0884	0.0855	0.085	0.089	0.000768	1.99%	34.07%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.13	0.129	0.13	0.131	0.135
AT3-098		0.087	0.085	0.0855	0.085	0.089

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	13-9152-9887	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	9365490B4EADE5D4DD63B353AD2D36FC	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed cis-nonachlor endpoint	1.50%

Wilcoxon Rank Sum Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	40	---	0	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.89	2.29	0.3684	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00009	0.00009	1	1780	<1.0E-05	Significant Effect
Error	4.05E-07	5.062E-08	8			
Total	9.041E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.03	23.2	0.9815	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.751	0.741	0.0037	Non-Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0176	0.0173	0.0179	0.0175	0.0175	0.018	0.0001	1.27%	0.00%
AT3-098		5	0.0116	0.0113	0.0119	0.0115	0.0114	0.012	0.000101	1.95%	34.09%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0175	0.0175	0.0175	0.0175	0.018
AT3-098		0.0117	0.0114	0.0115	0.0115	0.012

Bioaccumulation Evaluation - Pesticides - Nereis

EA-EST, Inc. PBC

Analysis ID:	06-0623-3039	**Endpoint:**	Dieldrin	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	EFDBEC3403EDF502938D0D611892227E	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed dieldrin endpoint	1.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-35.8	1.86	0.000646	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.93	2.29	0.3099	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003863	0.0003863	1	1280	<1.0E-05	Significant Effect
Error	2.413E-06	3.016E-07	8			
Total	0.0003887		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.64	23.2	0.6423	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.856	0.741	0.0679	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0365	0.0357	0.0373	0.0365	0.036	0.0375	0.000274	1.68%	0.00%
AT3-098		5	0.0241	0.0235	0.0247	0.0239	0.0237	0.0249	0.000214	1.98%	34.05%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0365	0.036	0.036	0.0365	0.0375
AT3-098		0.0242	0.0237	0.0239	0.0238	0.0249

CETIS Analytical Report

Report Date: 19 Aug-23 07:00 (p 8 of 19)
Test Code/ID: TN-23-302NvPest / 04-3042-6729

Bioaccumulation Evaluation - Pesticides - Nereis

EA-EST, Inc. PBC

Analysis ID:	02-3083-2662	**Endpoint:**	endosulfan I	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	3C4B97B68CF3AFAB4CC93CC593BED15	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed endosulfan i endpoint	1.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-32.6	1.86	0.000651	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.11	2.29	0.1431	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003255	0.0003255	1	1060	<1.0E-05	Significant Effect
Error	2.452E-06	3.065E-07	8			
Total	0.0003279		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.26	23.2	0.4490	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.791	0.741	0.0114	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0334	0.0326	0.0342	0.033	0.033	0.0345	0.000292	1.95%	0.00%
AT3-098		5	0.022	0.0215	0.0225	0.0218	0.0217	0.0227	0.000194	1.97%	34.16%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.033	0.033	0.033	0.0335	0.0345
AT3-098		0.0221	0.0217	0.0218	0.0217	0.0227

Bioaccumulation Evaluation - Pesticides - Nereis

EA-EST, Inc. PBC

Analysis ID:	02-6532-5065	**Endpoint:**	endosulfan II	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	6B36FC0525BD64452BBAF680016AD88A	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed endosulfan ii endpoint	2.40%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-26.7	1.86	0.000415	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.1	2.29	0.1461	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.880E-05	8.880E-05	1	713	<1.0E-05	Significant Effect
Error	9.97E-07	1.246E-07	8			
Total	8.980E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	4.06	23.2	0.2034	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.869	0.741	0.0969	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0173	0.0167	0.0179	0.017	0.017	0.018	0.0002	2.58%	0.00%
AT3-098		5	0.0113	0.0111	0.0116	0.0113	0.0112	0.0117	0.0000992	1.96%	34.45%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.017	0.017	0.017	0.0175	0.018
AT3-098		0.0114	0.0112	0.0113	0.0112	0.0117

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	07-0975-2842	**Endpoint:**	endrin	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	DD2B453810318B599B9112113D055D16	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed endrin endpoint	2.03%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-31.3	1.86	0.000404	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.85	2.29	0.4121	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001153	0.0001153	1	979	<1.0E-05	Significant Effect
Error	9.42E-07	1.178E-07	8			
Total	0.0001162		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.89	23.2	0.3282	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.938	0.741	0.5309	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0199	0.0194	0.0204	0.02	0.0195	0.0205	0.000187	2.10%	0.00%
AT3-098		5	0.0131	0.0128	0.0134	0.013	0.0129	0.0135	0.00011	1.88%	34.12%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.02	0.0195	0.0195	0.02	0.0205
AT3-098		0.0132	0.0129	0.013	0.013	0.0135

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	19-3319-1425	**Endpoint:**	gamma-BHC (Lindane)	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	83FF9521D24657BBB17A2BEF9E2053FA	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed gamma-bhc (lindane) endpoint	1.90%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-33.3	1.86	0.00104	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.04	2.29	0.2007	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008724	0.0008724	1	1110	<1.0E-05	Significant Effect
Error	6.278E-06	7.848E-07	8			
Total	0.0008786		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.17	23.2	0.4705	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.86	0.741	0.0765	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0548	0.0535	0.0561	0.0545	0.054	0.0565	0.000464	1.89%	5.20%
AT3-098		5	0.0361	0.0352	0.037	0.0358	0.0356	0.0373	0.000314	1.95%	3.49%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0545	0.054	0.054	0.055	0.0565
AT3-098		0.0364	0.0356	0.0358	0.0357	0.0373

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	06-4006-7514	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	594FFD0E40779F1FE9A9ECD526C8E2AF	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed gamma-chlordane endpoint	1.81%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	40	---	0	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.06	2.29	0.1825	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003969	0.0003969	1	1230	<1.0E-05	Significant Effect
Error	2.575E-06	3.219E-07	8			
Total	0.0003995		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.94	23.2	0.5359	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.785	0.741	0.0097	Non-Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0369	0.0361	0.0377	0.0365	0.0365	0.038	0.000292	1.77%	3.56%
AT3-098		5	0.0243	0.0237	0.0249	0.0241	0.0239	0.0251	0.000209	1.92%	2.37%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0365	0.0365	0.0365	0.037	0.038
AT3-098		0.0245	0.0239	0.0241	0.024	0.0251

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	03-5485-6177	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	C7680CECAFD5671B3F20DD3C7F796E20	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed heptachlor epoxide endpoint	1.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-33.5	1.86	0.00147	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.12	2.29	0.1335	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0017556	0.0017556	1	1120	<1.0E-05	Significant Effect
Error	0.0000125	1.563E-06	8			
Total	0.0017681		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.13	23.2	0.4833	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0300	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.078	0.0762	0.0798	0.0775	0.077	0.0805	0.000652	1.87%	0.00%
AT3-098		5	0.0515	0.0503	0.0527	0.051	0.0505	0.053	0.000447	1.94%	33.97%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0775	0.077	0.077	0.078	0.0805
AT3-098		0.052	0.0505	0.051	0.051	0.053

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	11-6127-2344	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	B23F09EECF1AE81697FD4B63712DD573	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed heptachlor endpoint	1.79%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-35.3	1.86	0.000679	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.02	2.29	0.2146	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0004147	0.0004147	1	1240	<1.0E-05	Significant Effect
Error	2.668E-06	3.335E-07	8			
Total	0.0004174		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.76	23.2	0.5988	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.788	0.741	0.0104	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0379	0.0371	0.0387	0.0375	0.0375	0.039	0.000292	1.72%	0.00%
AT3-098		5	0.025	0.0244	0.0256	0.0248	0.0246	0.0258	0.00022	1.97%	33.98%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0375	0.0375	0.0375	0.038	0.039
AT3-098		0.0252	0.0246	0.0248	0.0247	0.0258

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	02-5060-6268	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	1ED096EED56D66A99022756438884E2A	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed hexachlorobenzene endpoint	1.87%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-33.9	1.86	0.00608	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.03	2.29	0.2054	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.030747	0.030747	1	1150	<1.0E-05	Significant Effect
Error	0.000214	2.675E-05	8			
Total	0.030961		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.98	23.2	0.5243	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.86	0.741	0.0769	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.326	0.319	0.334	0.324	0.321	0.336	0.00267	1.83%	0.00%
AT3-098		5	0.215	0.21	0.22	0.214	0.212	0.222	0.00189	1.97%	34.01%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.324	0.321	0.323	0.327	0.336
AT3-098		0.217	0.212	0.214	0.213	0.222

Analyst: NR QA: JR

CETIS Analytical Report

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	17-5795-8568	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	1BF0DC5558AB8A5E68602667CBF3ADAE	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed methoxychlor endpoint	1.59%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	40	---	0	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.52	2.29	0.0067	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.54528	1.54528	1	12000	<1.0E-05	Significant Effect
Error	0.0010343	0.0001293	8			
Total	1.54631		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	240	23.2	0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.783	0.741	0.0090	Non-Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.843	0.823	0.863	0.835	0.83	0.87	0.00718	1.90%	0.00%
AT3-098		5	0.0568	0.0555	0.0581	0.0565	0.056	0.0585	0.000464	1.83%	93.26%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.835	0.83	0.835	0.845	0.87
AT3-098		0.057	0.056	0.0565	0.056	0.0585

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	05-2281-2806	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	865DF939E6D4B28903EE27C11A10CEE1	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed oxychlordane endpoint	1.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-34.2	1.86	0.00139	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.06	2.29	0.1821	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0016487	0.0016487	1	1170	<1.0E-05	Significant Effect
Error	1.125E-05	1.407E-06	8			
Total	0.0016599		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.26	23.2	0.4494	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.854	0.741	0.0646	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0752	0.0735	0.0769	0.0745	0.074	0.0775	0.000625	1.86%	0.00%
AT3-098		5	0.0495	0.0484	0.0507	0.0491	0.0488	0.051	0.000416	1.88%	34.15%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0745	0.074	0.0745	0.0755	0.0775
AT3-098		0.0499	0.0488	0.0491	0.0489	0.051

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	01-2624-1676	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	04A9935CB031727A1521931703F25D5D	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed toxaphene endpoint	1.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-33.7	1.86	0.0297	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.06	2.29	0.1808	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.72361	0.72361	1	1140	<1.0E-05	Significant Effect
Error	0.0051000	0.0006375	8			
Total	0.72871		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.13	23.2	0.4823	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.87	0.741	0.1002	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	1.58	1.54	1.61	1.57	1.55	1.63	0.0132	1.87%	0.00%
AT3-098		5	1.04	1.01	1.06	1.03	1.02	1.07	0.00903	1.94%	34.14%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.57	1.55	1.56	1.58	1.63
AT3-098		1.05	1.02	1.03	1.03	1.07

CETIS Analytical Report

Bioaccumulation Evaluation - Pesticides - Nereis **EA-EST, Inc. PBC**

Analysis ID:	02-9910-1821	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:59	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:53	**MD5 Hash:**	41665718E1BF27DB31610050171D2A19	**Editor ID:**	

Batch ID:	08-2970-4074	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	08 Mar-23 11:34	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	05 Apr-23 10:34	**Species:**	Nereis virens	**Brine:**	Crystal Sea
Test Length:	27d 23h	**Taxon:**	Polychaeta	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	12h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	27d 23h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed trans-nonachlor endpoint	1.63%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	40	---	0	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.9	2.29	0.3433	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.453E-05	7.453E-05	1	1500	<1.0E-05	Significant Effect
Error	3.97E-07	4.962E-08	8			
Total	7.493E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.02	23.2	0.9887	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.73	0.741	0.0021	Non-Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0161	0.0158	0.0164	0.016	0.016	0.0165	0.0001	1.39%	0.00%
AT3-098		5	0.0106	0.0104	0.0109	0.0106	0.0105	0.011	0.0000992	2.09%	33.91%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.016	0.016	0.016	0.016	0.0165
AT3-098		0.0107	0.0105	0.0106	0.0105	0.011

ATTACHMENT VIII

Macoma nasuta 28-Day Solid Phase Bioaccumulation Testing Tissue Chemistry and Body Burden Statistical Analyses

Metals

(17 pages)

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

			Pre-Assay						
CONTAMINANT	REP1		REP2		REP3		REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.57		2.47		2.72					
Cadmium	0.0290	J	0.0260	J	0.0340	J				
Chromium	0.387		0.552		0.455					
Copper	3.72		2.98		2.60					
Lead	0.121		0.121		0.144					
Mercury	0.00173	U	0.00208	U	0.00175	U				
Nickel	0.636		0.769		0.733					
Zinc	11.5		11.1		12.3					

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

			IOSN Reference		
CONTAMINANT	REP1	REP2	REP3	REP4	REP5
Metals (ug/g wet weight)					
Arsenic	2.70	3.55	3.52	4.39	3.28
Cadmium	0.0220 J	0.0300 J	0.0210 J	0.0350 J	0.0370
Chromium	0.305 J	0.381 J	0.252 J	0.497	0.234 J
Copper	1.48	1.72	1.52	2.49	1.65
Lead	0.319	0.347	0.327	0.420	0.332
Mercury	0.00200 U	0.00150 U	0.00150 U	0.00200 U	0.00150 U
Nickel	0.394	0.499	0.450	0.844	0.416
Zinc	9.76	12.2	10.9	15.9	10.0

* = Qualifiers

U	Analyte not detected; belo
J	Analyte estimated; detectio
NA	Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

10 Stations at 4 Marinas Mud

CONTAMINANT	REP1	REP2	REP3	REP4	REP5
Metals (ug/g wet weight)					
Arsenic	2.59	2.83	2.49	2.50	2.31
Cadmium	0.0250 J	0.0300 J	0.0250 J	0.0250 J	0.0280 J
Chromium	0.501	0.393 J	0.510	0.395 J	0.371 J
Copper	2.33	2.78	3.23	2.65	2.54
Lead	0.506	0.446	0.489	0.361	0.456
Mercury	0.00201 U	0.00213 U	0.00210 U	0.00215 U	0.00201 U
Nickel	0.608	0.563	0.610	0.519	0.549
Zinc	12.0	14.3	12.4	13.5	11.7

* = Qualifiers
U   Analyte not detected; belo
J   Analyte estimated; detectio
NA   Not Analyzed

CETIS Test Data Worksheet

Report Date: 19 Aug-23 06:44 (p 1 of 1)
Test Code/ID: TN-23-303MnMet / 11-3134-1920

Bioaccumulation Evaluation - Metals - Macoma **EA-EST, Inc. PBC**

Start Date: 29 Mar-23 13:46 **Species:** Macoma nasuta **Sample Code:** AT3-191
End Date: 26 Apr-23 12:46 **Protocol:** US ACE NED RIM (2004) **Sample Source:** Yachtsman Marina NAE-2004-00319
Sample Date: 20 Mar-23 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control

Sample	Rep	Pos	Body Burden	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Silver
IOSN 2019	1	2		2.7	0.022	0.305	1.48	0.319	0.002	0.394	9.76	
IOSN 2019	2	3		3.55	0.03	0.381	1.72	0.347	0.0015	0.499	12.2	
IOSN 2019	3	6		3.52	0.021	0.252	1.52	0.327	0.0015	0.45	10.9	
IOSN 2019	4	7		4.39	0.035	0.497	2.49	0.42	0.002	0.844	15.9	
IOSN 2019	5	10		3.28	0.037	0.234	1.65	0.332	0.0015	0.416	10	
AT3-098	1	1		2.59	0.025	0.501	2.33	0.506	0.00201	0.608	12	
AT3-098	2	4		2.83	0.03	0.393	2.78	0.446	0.002125	0.563	14.3	
AT3-098	3	5		2.49	0.025	0.51	3.23	0.489	0.002095	0.61	12.4	
AT3-098	4	8		2.5	0.025	0.395	2.65	0.361	0.002145	0.519	13.5	
AT3-098	5	9		2.31	0.028	0.371	2.54	0.456	0.002005	0.549	11.7	

Analyst: NR QA: JR

CETIS Summary Report

Report Date: 19 Aug-23 06:43 (p 1 of 3)
Test Code/ID: TN-23-303MnMet / 11-3134-1920

Bioaccumulation Evaluation - Metals - Macoma **EA-EST, Inc. PBC**

Batch ID:	09-1240-8281	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:46	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:46	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample ID:	10-1907-8970	**Code:**	AT3-191	**Project:**	Dredged Sediment Evaluation
Sample Date:	20 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	20 Mar-23 16:00	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	9d 14h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-4962-0856	Arsenic	Equal Variance t Two-Sample Test	0.9947	AT3-098 passed arsenic	1
18-5050-5224	Cadmium	Equal Variance t Two-Sample Test	0.7481	AT3-098 passed cadmium	1
08-7081-7384	Chromium	Equal Variance t Two-Sample Test	0.0570	AT3-098 passed chromium	1
13-3639-8676	Copper	Equal Variance t Two-Sample Test	0.0022	AT3-098 failed copper	1
00-6439-9040	Lead	Equal Variance t Two-Sample Test	0.0054	AT3-098 failed lead	1
03-3555-2818	Mercury	Equal Variance t Two-Sample Test	0.0087	AT3-098 failed mercury	1
11-4066-2552	Nickel	Equal Variance t Two-Sample Test	0.0012	AT3-098 failed nickel	1
02-4404-1166	Nickel	Wilcoxon Rank Sum Two-Sample Test	0.0754	AT3-098 passed nickel	1
02-9970-4423	Zinc	Equal Variance t Two-Sample Test	0.2125	AT3-098 passed zinc	1

Analyst: NR QA: JR

Bioaccumulation Evaluation - Metals - Macoma **EA-EST, Inc. PBC**

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	3.49	2.73	4.24	2.7	4.39	0.272	0.609	17.45%	0.00%
AT3-098		5	2.54	2.31	2.78	2.31	2.83	0.0847	0.189	7.45%	27.06%

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.029	0.0199	0.0381	0.021	0.037	0.00327	0.00731	25.22%	0.00%
AT3-098		5	0.0266	0.0237	0.0295	0.025	0.03	0.00103	0.0023	8.65%	8.28%

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.334	0.2	0.467	0.234	0.497	0.0481	0.108	32.25%	0.00%
AT3-098		5	0.434	0.352	0.516	0.371	0.51	0.0295	0.066	15.21%	-30.02%

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	1.77	1.26	2.28	1.48	2.49	0.185	0.413	23.30%	0.00%
AT3-098		5	2.71	2.29	3.12	2.33	3.23	0.15	0.336	12.42%	-52.71%

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.349	0.298	0.4	0.319	0.42	0.0183	0.041	11.74%	0.00%
AT3-098		5	0.452	0.382	0.521	0.361	0.506	0.0251	0.0562	12.44%	-29.40%

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0017	0.00136	0.00204	0.0015	0.002	0.000122	0.000274	16.11%	0.00%
AT3-098		5	0.00208	0.002	0.00216	0.002	0.00215	0.0000291	0.000065	3.13%	-22.12%

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.521	0.291	0.75	0.394	0.844	0.0828	0.185	35.55%	0.00%
AT3-098		5	0.57	0.521	0.618	0.519	0.61	0.0175	0.0392	6.87%	-9.45%

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	11.8	8.64	14.9	9.76	15.9	1.12	2.51	21.35%	0.00%
AT3-098		5	12.8	11.4	14.1	11.7	14.3	0.487	1.09	8.53%	-8.75%

Analyst: NR QA: JR

Arsenic Detail MD5: 7EE39F07D07100E28C7AE8E2EAAEFA0E

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	2.7	3.55	3.52	4.39	3.28
AT3-098		2.59	2.83	2.49	2.5	2.31

Cadmium Detail MD5: 2151DA575B01797147656629E9B604EA

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.022	0.03	0.021	0.035	0.037
AT3-098		0.025	0.03	0.025	0.025	0.028

Chromium Detail MD5: 6C665E15D73B8FEF4A2BC28E229F0580

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.305	0.381	0.252	0.497	0.234
AT3-098		0.501	0.393	0.51	0.395	0.371

Copper Detail MD5: C4B152C21884FD0CC6558BA2092E22D3

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.48	1.72	1.52	2.49	1.65
AT3-098		2.33	2.78	3.23	2.65	2.54

Lead Detail MD5: 68ED2BA3FF8B3966BB42B7A580898625

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.319	0.347	0.327	0.42	0.332
AT3-098		0.506	0.446	0.489	0.361	0.456

Mercury Detail MD5: E1F90783EFA78EC21865622AA6184D54

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.002	0.0015	0.0015	0.002	0.0015
AT3-098		0.00201	0.00213	0.00209	0.00215	0.002

Nickel Detail MD5: FBFBFF68498CBDC1593DDF95B8A7AA56

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.394	0.499	0.45	0.844	0.416
AT3-098		0.608	0.563	0.61	0.519	0.549

Zinc Detail MD5: 5294BF2F64ACAF262C1DD0EFF03D3C5D

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	9.76	12.2	10.9	15.9	10
AT3-098		12	14.3	12.4	13.5	11.7

Analyst: NR QA: JR

STUDY: **TN-23-303**
CLIENT: **Eco-Analysts, Inc.**
PROJECT: **Yachtsman Marina, Kennebunkport, ME NAE-2004-00319**
ASSAY: ***M. nasuta*** **28-day Bioaccumulation Evaluation**
TASK: **Statistical Analysis of Body Burden Metals**

Endpoint	Method	C	<	T	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Arsenic	Equal Variance t Two-Sample Test	IOSN	<	Comp	-3.310549	1.859548	0.9946553	0.05	FALSE	0.5302483	8		C
Cadmium	Equal Variance t Two-Sample Test	IOSN	<	Comp	-0.6998541	1.859548	0.7480713	0.05	FALSE	0.006376922	8		C
Chromium	Equal Variance t Two-Sample Test	IOSN	<	Comp	1.774371	1.859548	0.05696218	0.05	FALSE	0.10501	8		C
Copper	Equal Variance t Two-Sample Test	IOSN	<	Comp	3.922431	1.859548	0.002201654	0.05	TRUE	0.4427912	8		C
Lead	Equal Variance t Two-Sample Test	IOSN	<	Comp	3.299803	1.859548	0.005431016	0.05	TRUE	0.05781848	8		C
Mercury	Equal Variance t Two-Sample Test	IOSN	<	Comp	2.986949	1.859548	0.008707395	0.05	TRUE	0.000234082	8		C
Nickel	Equal Variance t Two-Sample Test	IOSN	<	Comp	4.604793	1.894579	0.001235069	0.05	TRUE	0.05350728	7		C
Nickel	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	20		0.07539683	0.05	FALSE		8	0	E
Zinc	Equal Variance t Two-Sample Test	IOSN	<	Comp	0.8405069	1.859548	0.2125153	0.05	FALSE	2.27436	8		C

CETIS Analytical Report

Report Date: 19 Aug-23 06:43 (p 1 of 8)
Test Code/ID: TN-23-303MnMet / 11-3134-1920

Bioaccumulation Evaluation - Metals - Macoma **EA-EST, Inc. PBC**

Analysis ID:	03-4962-0856	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:42	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:42	**MD5 Hash:**	FA1CA36C1E9D61BEE8C73B2C1B8A79B	**Editor ID:**	

Batch ID:	09-1240-8281	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:46	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:46	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed arsenic endpoint	15.20%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-3.31	1.86	0.53	CDF	0.9947	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.12	2.29	0.1330	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.22784	2.22784	1	11	0.0107	Significant Effect
Error	1.6262	0.203275	8			
Total	3.85404		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	10.3	23.2	0.0440	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.741	0.2549	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	3.49	2.73	4.24	3.52	2.7	4.39	0.272	17.45%	0.00%
AT3-098		5	2.54	2.31	2.78	2.5	2.31	2.83	0.0847	7.45%	27.06%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	2.7	3.55	3.52	4.39	3.28
AT3-098		2.59	2.83	2.49	2.5	2.31

Analyst: NR QA: JR

Bioaccumulation Evaluation - Metals - Macoma **EA-EST, Inc. PBC**

Analysis ID:	18-5050-5224	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:42	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:42	**MD5 Hash:**	2864B7DF258976A1EE19C7F4BEDDBE20	**Editor ID:**	

Batch ID:	09-1240-8281	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:46	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:46	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed cadmium endpoint	21.99%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-0.7	1.86	0.00638	CDF	0.7481	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.56	2.29	0.9963	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000144	0.0000144	1	0.49	0.5039	Non-Significant Effect
Error	0.0002352	0.0000294	8			
Total	0.0002496		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	10.1	23.2	0.0458	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7475	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.029	0.0199	0.0381	0.03	0.021	0.037	0.00327	25.22%	0.00%
AT3-098		5	0.0266	0.0237	0.0295	0.025	0.025	0.03	0.00103	8.65%	8.28%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.022	0.03	0.021	0.035	0.037
AT3-098		0.025	0.03	0.025	0.025	0.028

Analyst: NR QA: JR

CETIS Analytical Report

Report Date: 19 Aug-23 06:43 (p 3 of 8)
Test Code/ID: TN-23-303MnMet / 11-3134-1920

Bioaccumulation Evaluation - Metals - Macoma — **EA-EST, Inc. PBC**

Analysis ID:	08-7081-7384	**Endpoint:**	Chromium	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:42	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:42	**MD5 Hash:**	953EFD18FFDD369122AE9FE41C4211C0	**Editor ID:**	

Batch ID:	09-1240-8281	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:46	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:46	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed chromium endpoint	31.46%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	1.77	1.86	0.105	CDF	0.0570	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.94	2.29	0.3010	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0251001	0.0251001	1	3.15	0.1139	Non-Significant Effect
Error	0.0637788	0.0079724	8			
Total	0.0888789		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.66	23.2	0.3667	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.917	0.741	0.3366	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.334	0.2	0.467	0.305	0.234	0.497	0.0481	32.25%	0.00%
AT3-098		5	0.434	0.352	0.516	0.395	0.371	0.51	0.0295	15.21%	-30.02%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.305	0.381	0.252	0.497	0.234
AT3-098		0.501	0.393	0.51	0.395	0.371

Bioaccumulation Evaluation - Metals - Macoma **EA-EST, Inc. PBC**

Analysis ID:	13-3639-8676	**Endpoint:**	Copper	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:42	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:42	**MD5 Hash:**	C5F9F1B65D65EF9A525FA03996B28F54	**Editor ID:**	

Batch ID:	09-1240-8281	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:46	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:46	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed copper endpoint	24.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	3.92	1.86	0.443	CDF	0.0022	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.02	2.29	0.2123	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.18089	2.18089	1	15.4	0.0044	Significant Effect
Error	1.134	0.14175	8			
Total	3.31489		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.51	23.2	0.7002	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.851	0.741	0.0604	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	1.77	1.26	2.28	1.65	1.48	2.49	0.185	23.30%	0.00%
AT3-098		5	2.71	2.29	3.12	2.65	2.33	3.23	0.15	12.42%	-52.71%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.48	1.72	1.52	2.49	1.65
AT3-098		2.33	2.78	3.23	2.65	2.54

CETIS Analytical Report

Report Date: 19 Aug-23 06:43 (p 5 of 8)
Test Code/ID: TN-23-303MnMet / 11-3134-1920

Bioaccumulation Evaluation - Metals - Macoma **EA-EST, Inc. PBC**

Analysis ID:	00-6439-9040	**Endpoint:**	Lead	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:42	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:42	**MD5 Hash:**	1FAB2E86236F30570FE1342E97FBBD67	**Editor ID:**	

Batch ID:	09-1240-8281	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:46	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:46	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed lead endpoint	16.57%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	3.3	1.86	0.0578	CDF	0.0054	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.95	2.29	0.2825	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0263169	0.0263169	1	10.9	0.0109	Significant Effect
Error	0.0193352	0.0024169	8			
Total	0.0456521		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.88	23.2	0.5565	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.956	0.741	0.7435	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.349	0.298	0.4	0.332	0.319	0.42	0.0183	11.74%	0.00%
AT3-098		5	0.452	0.382	0.521	0.456	0.361	0.506	0.0251	12.44%	-29.40%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.319	0.347	0.327	0.42	0.332
AT3-098		0.506	0.446	0.489	0.361	0.456

Bioaccumulation Evaluation - Metals - Macoma **EA-EST, Inc. PBC**

Analysis ID:	03-3555-2818	**Endpoint:**	Mercury	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:42	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:42	**MD5 Hash:**	8041063A2B35188FB8639C0502C3F00B	**Editor ID:**	

Batch ID:	09-1240-8281	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:46	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:46	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed mercury endpoint	13.77%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	2.99	1.86	0.000234	CDF	0.0087	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.6	2.29	0.9106	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.534E-07	3.534E-07	1	8.92	0.0174	Significant Effect
Error	3.169E-07	3.962E-08	8			
Total	6.704E-07		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	17.7	23.2	0.0165	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.877	0.741	0.1199	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0017	0.00136	0.00204	0.0015	0.0015	0.002	0.000122	16.11%	0.00%
AT3-098		5	0.00208	0.002	0.00216	0.0021	0.00201	0.00215	0.0000291	3.13%	-22.12%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.002	0.0015	0.0015	0.002	0.0015
AT3-098		0.00201	0.00213	0.0021	0.00215	0.00201

Bioaccumulation Evaluation - Metals - Macoma

EA-EST, Inc. PBC

Analysis ID:	11-4066-2552	**Endpoint:**	Nickel	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:42	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:42	**MD5 Hash:**	DD1542AADFC689A7E4B54A4604AC8D91	**Editor ID:**	

Batch ID:	09-1240-8281	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:46	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:46	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed nickel endpoint	12.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	7	4.6	1.89	0.0535	CDF	0.0012	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0375845	0.0375845	1	21.2	0.0025	Significant Effect
Error	0.0124076	0.0017725	7			
Total	0.049992		8			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.36	24.3	0.7479	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.938	0.701	0.5616	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	4	0.44	0.367	0.513	0.416	0.394	0.499	0.0229	10.40%	0.00%
AT3-098		5	0.57	0.521	0.618	0.563	0.519	0.61	0.0175	6.87%	-29.57%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.394	0.499	0.45	---	0.416
AT3-098		0.608	0.563	0.61	0.519	0.549

Bioaccumulation Evaluation - Metals - Macoma **EA-EST, Inc. PBC**

Analysis ID:	02-9970-4423	**Endpoint:**	Zinc	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:42	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:42	**MD5 Hash:**	DAE55172D5F58B259B6FDFE024ABC7D	**Editor ID:**	

Batch ID:	09-1240-8281	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:46	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:46	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed zinc endpoint	19.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	0.841	1.86	2.27	CDF	0.2125	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.28	2.29	0.0552	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.64196	2.64196	1	0.706	0.4250	Non-Significant Effect
Error	29.9181	3.73976	8			
Total	32.56		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	5.3	23.2	0.1351	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.89	0.741	0.1701	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	11.8	8.64	14.9	10.9	9.76	15.9	1.12	21.35%	0.00%
AT3-098		5	12.8	11.4	14.1	12.4	11.7	14.3	0.487	8.53%	-8.75%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	9.76	12.2	10.9	15.9	10
AT3-098		12	14.3	12.4	13.5	11.7

Analyst: NR QA: JR

ATTACHMENT IX

Macoma nasuta 28-Day Solid Phase Bioaccumulation Testing
Tissue Chemistry and Body Burden Statistical Analyses

PAHs

(27 pages)

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

			Pre-Assay		
CONTAMINANT	REP1	REP2	REP3	REP4 *	REP5 *
PAHs (ng/g wet weight)					
Acenaphthene	0.610 U	0.620 U	1.98 J		
Acenaphthylene	0.376 U	0.382 U	0.376 U		
Anthracene	0.408 U	0.922 J	1.23 J		
Benzo(a)anthracene	0.765 U	1.57 J	1.61 J		
Benzo(a)pyrene	0.800 U	0.815 U	0.800 U		
Benzo(b)fluoranthene	1.06 U	1.08 U	1.06 U		
Benzo(k)fluoranthene	0.487 U	0.495 U	0.487 U		
Benzo(g,h,i)perylene	0.341 U	0.346 U	0.341 U		
Chrysene	2.25 J	1.82 J	1.96 J		
Dibenzo(a,h)anthracene	0.395 U	0.401 U	0.883 J		
Fluoranthene	2.40 J	2.50 J	2.81 J		
Fluorene	1.82 J	2.38 J	2.14 J		
Indeno(1,2,3-c,d)pyrene	0.800 U	0.810 U	0.800 U		
Naphthalene	4.11 J	3.64 J	3.59 J		
Phenanthrene	3.64 J	4.23 J	4.40 J		
Pyrene	2.82 J	2.99 J	2.77 J		
PAH Total	23.1	25.0	27.2		

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

IOSN Reference

CONTAMINANT	REP1	REP2	REP3	REP4	REP5
PAHs (ng/g wet weight)					
Acenaphthene	0.450 U	0.462 U	0.443 U	0.473 U	0.440 U
Acenaphthylene	0.277 U	0.284 U	0.272 U	0.291 U	0.271 U
Anthracene	0.300 U	0.308 U	0.295 U	0.315 U	0.294 U
Benzo(a)anthracene	0.560 U	0.575 U	0.550 U	0.590 U	0.550 U
Benzo(a)pyrene	0.590 U	0.605 U	0.580 U	0.620 U	0.575 U
Benzo(b)fluoranthene	0.780 U	0.800 U	0.765 U	0.820 U	0.765 U
Benzo(k)fluoranthene	0.359 U	0.368 U	0.353 U	0.844 J	0.351 U
Benzo(g,h,i)perylene	0.527 J	0.536 J	0.614 J	0.670 J	0.245 U
Chrysene	0.545 U	0.560 U	0.535 U	0.575 U	0.535 U
Dibenzo(a,h)anthracene	2.95 J	3.00 J	2.91 J	3.11 J	2.86 J
Fluoranthene	2.09 J	2.23 J	2.41 J	2.48 J	1.38 J
Fluorene	0.251 U	0.258 U	0.247 U	0.263 U	0.245 U
Indeno(1,2,3-c,d)pyrene	3.35 J	3.57 J	3.46 J	3.93 J	3.40 J
Naphthalene	0.387 U	0.397 U	0.380 U	0.406 U	0.378 U
Phenanthrene	1.73 J	2.30 J	2.31 J	2.23 J	1.30 J
Pyrene	1.50 J	1.62 J	1.69 J	1.90 J	1.45 J
PAH Total	16.6	17.9	17.8	19.5	15.0

* = Qualifiers

U	Analyte not detected; belo
J	Analyte estimated; detectio
NA	Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

10 Stations at 4 Marinas Mud

CONTAMINANT	REP1	REP2	REP3	REP4	REP5
PAHs (ng/g wet weight)					
Acenaphthene	0.605 U	0.620 U	2.99 J	2.93 J	0.630 U
Acenaphthylene	0.372 U	0.382 U	0.384 U	0.380 U	0.389 U
Anthracene	2.36 J	2.61 J	3.40 J	3.39 J	1.69 J
Benzo(a)anthracene	6.45	4.37 J	5.43 J	5.14 J	5.60 J
Benzo(a)pyrene	2.42 J	0.815 U	1.64 J	1.71 J	2.10 J
Benzo(b)fluoranthene	5.53 J	3.32 J	4.04 J	3.64 J	5.52 J
Benzo(k)fluoranthene	2.14 J	0.496 U	1.08 J	1.04 J	1.48 J
Benzo(g,h,i)perylene	1.66 J	0.347 U	0.348 U	0.345 U	1.40 J
Chrysene	4.22 J	2.49 J	2.36 J	3.09 J	2.42 J
Dibenzo(a,h)anthracene	0.390 U	0.402 U	0.403 U	0.399 U	0.409 U
Fluoranthene	26.1	19.6	35.9	36.8	14.8
Fluorene	0.935 J	1.27 J	2.60 J	3.00 J	0.882 J
Indeno(1,2,3-c,d)pyrene	0.790 U	0.810 U	0.815 U	0.810 U	1.70 J
Naphthalene	2.00 J	1.66 J	1.91 J	1.81 J	1.45 J
Phenanthrene	4.86 J	4.73 J	10.7	10.1	4.23 J
Pyrene	23.4	13.0	23.0	22.5	22.0
PAH Total	84.2	56.9	97.0	97.1	66.7

* = Qualifiers

U	Analyte not detected; belo
J	Analyte estimated; detectio
NA	Not Analyzed

CETIS Test Data Worksheet

Report Date: 19 Aug-23 06:44 (p 1 of 1)
Test Code/ID: TN-23-303MnPAH / 13-3685-4237

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Start Date: 29 Mar-23 13:47 **Species:** Macoma nasuta **Sample Code:** AT3-191
End Date: 26 Apr-23 12:47 **Protocol:** US ACE NED RIM (2004) **Sample Source:** Yachtsman Marina NAE-2004-00319
Sample Date: 20 Mar-23 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control

Sample	Rep	Pos	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	1,4-Dichlorobenze	Total PAHs
IOSN 2019	1	2	0.45	0.2765	0.3	0.56	0.59	0.78	0.527	0.359	0.545	2.95	2.09	0.251	3.35	0.387	1.73	1.5		
IOSN 2019	2	3	0.462	0.284	0.308	0.575	0.605	0.8	0.536	0.368	0.56	3	2.23	0.2575	3.57	0.397	2.3	1.62		
IOSN 2019	3	5	0.4425	0.272	0.295	0.55	0.58	0.765	0.614	0.3525	0.535	2.91	2.41	0.2465	3.46	0.38	2.31	1.69		
IOSN 2019	4	7	0.4725	0.2905	0.315	0.59	0.62	0.82	0.67	0.844	0.575	3.11	2.48	0.263	3.93	0.406	2.23	1.9		
IOSN 2019	5	9	0.44	0.2705	0.2935	0.55	0.575	0.765	0.245	0.3505	0.535	2.86	1.38	0.245	3.4	0.378	1.3	1.45		
AT3-098	1	1	0.605	0.3715	2.36	6.45	2.42	5.53	1.66	2.14	4.22	0.39	26.1	0.935	0.79	2	4.86	23.4		
AT3-098	2	4	0.62	0.382	2.61	4.37	0.815	3.32	0.3465	0.4955	2.49	0.4015	19.6	1.27	0.81	1.66	4.73	13		
AT3-098	3	6	2.99	0.384	3.4	5.43	1.64	4.04	0.348	1.08	2.36	0.403	35.9	2.6	0.815	1.91	10.7	23		
AT3-098	4	8	2.93	0.3795	3.39	5.14	1.71	3.64	0.3445	1.04	3.09	0.399	36.8	3	0.81	1.81	10.1	22.5		
AT3-098	5	10	0.63	0.389	1.69	5.6	2.1	5.52	1.4	1.48	2.42	0.4085	14.8	0.882	1.7	1.45	4.23	22		

Analyst: NR QA: JR

CETIS Summary Report

Report Date: 19 Aug-23 06:45 (p 1 of 5)
Test Code/ID: TN-23-303MnPAH / 13-3685-4237

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample ID:	10-1907-8970	**Code:**	AT3-191	**Project:**	Dredged Sediment Evaluation
Sample Date:	20 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	20 Mar-23 16:00	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	9d 14h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-7538-5618	Acenaphthene	Unequal Variance t Two-Sample Test	0.0636	AT3-098 passed acenaphthene	1
11-6416-3760	Acenaphthylene	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed acenaphthylene	1
05-9439-4057	Anthracene	Unequal Variance t Two-Sample Test	0.0009	AT3-098 failed anthracene	1
14-6989-9668	Benzo(a)anthracene	Unequal Variance t Two-Sample Test	6.9E-05	AT3-098 failed benzo(a)anthracene	1
01-9784-4906	Benzo(a)pyrene	Unequal Variance t Two-Sample Test	0.0067	AT3-098 failed benzo(a)pyrene	1
15-8115-7379	Benzo(b)fluoranthene	Unequal Variance t Two-Sample Test	0.0008	AT3-098 failed benzo(b)fluoranthene	1
11-2901-4695	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.1736	AT3-098 passed benzo(g,h,i)perylene	1
18-6572-8367	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	0.0128	AT3-098 failed benzo(k)fluoranthene	1
19-9439-8456	Chrysene	Unequal Variance t Two-Sample Test	0.0006	AT3-098 failed chrysene	1
10-9778-7549	Chrysene	Wilcoxon Rank Sum Two-Sample Test	0.0040	AT3-098 failed chrysene	1
04-5124-3396	Dibenz(a,h)anthracene	Unequal Variance t Two-Sample Test	1.0000	AT3-098 passed dibenz(a,h)anthracene	1
05-6250-1207	Fluoranthene	Unequal Variance t Two-Sample Test	0.0025	AT3-098 failed fluoranthene	1
14-9364-0252	Fluorene	Unequal Variance t Two-Sample Test	0.0143	AT3-098 failed fluorene	1
09-5016-7764	Indeno(1,2,3-cd)pyrene	Unequal Variance t Two-Sample Test	1.0000	AT3-098 passed indeno(1,2,3-cd)pyrene	1
07-5576-6393	Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	1.0000	AT3-098 passed indeno(1,2,3-cd)pyrene	1
12-2133-3190	Naphthalene	Unequal Variance t Two-Sample Test	7.2E-05	AT3-098 failed naphthalene	1
04-1490-0844	Phenanthrene	Unequal Variance t Two-Sample Test	0.0132	AT3-098 failed phenanthrene	1
04-1423-2436	Pyrene	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pyrene	1
02-1982-1065	Pyrene	Wilcoxon Rank Sum Two-Sample Test	0.0040	AT3-098 failed pyrene	1

Analyst: NR QA: JR

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.453	0.436	0.47	0.44	0.472	0.00612	0.0137	3.02%	0.00%
AT3-098		5	1.56	-0.0378	3.15	0.605	2.99	0.574	1.28	82.49%	-242.96%

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.279	0.268	0.289	0.271	0.29	0.00377	0.00843	3.02%	0.00%
AT3-098		5	0.381	0.373	0.389	0.371	0.389	0.00288	0.00645	1.69%	-36.78%

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.302	0.291	0.314	0.294	0.315	0.00406	0.00908	3.00%	0.00%
AT3-098		5	2.69	1.79	3.59	1.69	3.4	0.325	0.726	27.00%	-789.84%

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.565	0.543	0.587	0.55	0.59	0.00775	0.0173	3.07%	0.00%
AT3-098		5	5.4	4.46	6.33	4.37	6.45	0.337	0.754	13.96%	-855.40%

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.594	0.571	0.617	0.575	0.62	0.00828	0.0185	3.12%	0.00%
AT3-098		5	1.74	0.987	2.49	0.815	2.42	0.27	0.604	34.76%	-192.42%

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.786	0.756	0.816	0.765	0.82	0.0107	0.0238	3.03%	0.00%
AT3-098		5	4.41	3.11	5.71	3.32	5.53	0.469	1.05	23.79%	-461.07%

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.518	0.315	0.722	0.245	0.67	0.0732	0.164	31.59%	0.00%
AT3-098		5	0.82	0.00675	1.63	0.345	1.66	0.293	0.655	79.87%	-58.14%

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.455	0.185	0.725	0.35	0.844	0.0973	0.218	47.86%	0.00%
AT3-098		5	1.25	0.49	2	0.495	2.14	0.273	0.61	48.89%	-174.21%

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.55	0.528	0.572	0.535	0.575	0.00775	0.0173	3.15%	0.00%
AT3-098		5	2.92	1.94	3.89	2.36	4.22	0.351	0.785	26.93%	-430.18%

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	2.97	2.85	3.08	2.86	3.11	0.0427	0.0956	3.22%	0.00%
AT3-098		5	0.4	0.392	0.409	0.39	0.408	0.00303	0.00678	1.69%	86.50%

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	2.12	1.57	2.66	1.38	2.48	0.197	0.44	20.77%	0.00%
AT3-098		5	26.6	14.6	38.7	14.8	36.8	4.35	9.73	36.54%	-1157.79

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.253	0.243	0.262	0.245	0.263	0.00339	0.00758	3.00%	0.00%
AT3-098		5	1.74	0.506	2.97	0.882	3	0.443	0.991	57.07%	-587.81%

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	3.54	3.25	3.83	3.35	3.93	0.104	0.232	6.55%	0.00%
AT3-098		5	0.985	0.489	1.48	0.79	1.7	0.179	0.4	40.59%	72.19%

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.39	0.375	0.404	0.378	0.406	0.00528	0.0118	3.03%	0.00%
AT3-098		5	1.77	1.5	2.04	1.45	2	0.0971	0.217	12.29%	-353.29%

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	1.97	1.42	2.53	1.3	2.31	0.2	0.447	22.63%	0.00%
AT3-098		5	6.92	2.96	10.9	4.23	10.7	1.43	3.19	46.06%	-250.76%

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	1.63	1.41	1.85	1.45	1.9	0.0793	0.177	10.87%	0.00%
AT3-098		5	20.8	15.3	26.2	13	23.4	1.96	4.38	21.08%	-1173.28

Acenaphthene Detail MD5: E5B5D58470B8911B03E3A444CD72A835

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.45	0.462	0.442	0.472	0.44
AT3-098		0.605	0.62	2.99	2.93	0.63

Acenaphthylene Detail MD5: B126413E64AFB02AA98C384725F0DFA2

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.276	0.284	0.272	0.29	0.271
AT3-098		0.371	0.382	0.384	0.38	0.389

Anthracene Detail MD5: 60426D23768D2C28728EDBAC9882B215

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.3	0.308	0.295	0.315	0.294
AT3-098		2.36	2.61	3.4	3.39	1.69

Benzo(a)anthracene Detail MD5: 1951C02D07B040E6EE2D0CF93503F4CB

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.56	0.575	0.55	0.59	0.55
AT3-098		6.45	4.37	5.43	5.14	5.6

Benzo(a)pyrene Detail MD5: 2581DF2E71E7F8C3E6B9B596CC98B34D

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.59	0.605	0.58	0.62	0.575
AT3-098		2.42	0.815	1.64	1.71	2.1

Benzo(b)fluoranthene Detail MD5: 184AC37F45B688263B5D502E21B35F91

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.78	0.8	0.765	0.82	0.765
AT3-098		5.53	3.32	4.04	3.64	5.52

Benzo(g,h,i)perylene Detail MD5: C795931A73D2727BC941E8445CFD11FB

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.527	0.536	0.614	0.67	0.245
AT3-098		1.66	0.347	0.348	0.345	1.4

Benzo(k)fluoranthene Detail MD5: EA1BCC3872760ADB5077234B1A27DAD9

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.359	0.368	0.352	0.844	0.35
AT3-098		2.14	0.495	1.08	1.04	1.48

Chrysene Detail MD5: 51ACA5FD98A49CB3999C452E5009FD95

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.545	0.56	0.535	0.575	0.535
AT3-098		4.22	2.49	2.36	3.09	2.42

Dibenz(a,h)anthracene Detail MD5: FD1BF8DB86033846450D484A5E121790

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	2.95	3	2.91	3.11	2.86
AT3-098		0.39	0.401	0.403	0.399	0.408

Fluoranthene Detail MD5: 02FE249E2ED2D91DEAEAA82D9706D753

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	2.09	2.23	2.41	2.48	1.38
AT3-098		26.1	19.6	35.9	36.8	14.8

Fluorene Detail

MD5: ADB7E3D32CDAFFED1BF3E0C1F4B318D

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.251	0.257	0.247	0.263	0.245
AT3-098		0.935	1.27	2.6	3	0.882

Indeno(1,2,3-cd)pyrene Detail

MD5: 04EF0FDA4072F35B041FA8C366C6C059

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	3.35	3.57	3.46	3.93	3.4
AT3-098		0.79	0.81	0.815	0.81	1.7

Naphthalene Detail

MD5: A25DF7EFF98F86EA33A59A892C25ED5E

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.387	0.397	0.38	0.406	0.378
AT3-098		2	1.66	1.91	1.81	1.45

Phenanthrene Detail

MD5: C9F4DC5579DCB046DD6F1DF1A33B7C36

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.73	2.3	2.31	2.23	1.3
AT3-098		4.86	4.73	10.7	10.1	4.23

Pyrene Detail

MD5: E41EFCCD8E706B9E9AABDEC3CCEBC5A

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.5	1.62	1.69	1.9	1.45
AT3-098		23.4	13	23	22.5	22

STUDY: **TN-23-303**
CLIENT: **Eco-Analysts, Inc.**
PROJECT: **Yachtsman Marina, Kennebunkport, ME NAE-2004-00319**
ASSAY: ***M. nasuta*** **28-day Bioaccumulation Evaluation**
TASK: **Statistical Analysis of Body Burden PAHs**

Endpoint	Method	C	<	T	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Acenaphthene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	1.920121	2.131847	0.06362686	0.05	FALSE	1.22307	4		C
Acenaphthylene	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.59451	1.859548	0	0.05	TRUE	0.008826488	8		C
Anthracene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	7.351591	2.131847	0.00091167	0.05	TRUE	0.6923958	4		C
Benzo(a)anthracene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	14.33588	2.131847	6.87805E-05	0.05	TRUE	0.7187011	4		C
Benzo(a)pyrene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	4.23065	2.131847	0.00668155	0.05	TRUE	0.5759637	4		C
Benzo(b)fluoranthene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	7.720544	2.131847	0.000757623	0.05	TRUE	1.000682	4		C
Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	IOSN	<	Comp	0.9984897	1.859548	0.1736408	0.05	FALSE	0.5613155	8		C
Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	IOSN	<	Comp	2.736334	1.859548	0.01279694	0.05	TRUE	0.5384284	8		C
Chrysene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	12.07474	2.353364	0.000611206	0.05	TRUE	0.3975953	3		C
Chrysene	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	15		0.003968254	0.05	TRUE		8	0	E
Dibenz(a,h)anthracene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	-59.88929	2.131847	0.9999998	0.05	FALSE	0.09132629	4		C
Fluoranthene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	5.627316	2.131847	0.002452458	0.05	TRUE	9.289891	4		C
Fluorene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	3.348493	2.131847	0.01430444	0.05	TRUE	0.9453106	4		C
Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	40		1	0.05	FALSE		8	0	E
Indeno(1,2,3-cd)pyrene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	-26.3434	2.131847	0.9999938	0.05	FALSE	0.2213914	4		C
Naphthalene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	14.15599	2.131847	7.22851E-05	0.05	TRUE	0.2072815	4		C
Phenanthrene	Unequal Variance t Two-Sample Test	IOSN	<	Comp	3.437374	2.131847	0.01317851	0.05	TRUE	3.069972	4		C
Pyrene	Equal Variance t Two-Sample Test	IOSN	<	Comp	74.90878	1.894579	0	0.05	TRUE	0.5334801	7		C
Pyrene	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	15		0.003968254	0.05	TRUE		8	0	E

CETIS Analytical Report

Report Date: 19 Aug-23 06:45 (p 1 of 16)
Test Code/ID: TN-23-303MnPAH / 13-3685-4237

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	07-7538-5618	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	D2ED3F048BC1A568A37D9F572F6C7946	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed acenaphthene endpoint	269.76%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	4	1.92	2.13	1.22	CDF	0.0636	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.68	2.29	0.7286	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.03381	3.03381	1	3.69	0.0911	Non-Significant Effect
Error	6.58295	0.822869	8			
Total	9.61676		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	8790	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.827	0.741	0.0310	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.453	0.436	0.47	0.45	0.44	0.473	0.00612	3.02%	0.00%
AT3-098		5	1.56	-0.0378	3.15	0.63	0.605	2.99	0.574	82.49%	-242.96%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.45	0.462	0.443	0.473	0.44
AT3-098		0.605	0.62	2.99	2.93	0.63

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	11-6416-3760	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	5C3DB5F62B559D82EAE0FE53CB0C21E2	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed acenaphthylene endpoint	3.17%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	21.6	1.86	0.00883	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.67	2.29	0.7506	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0262656	0.0262656	1	466	<1.0E-05	Significant Effect
Error	0.0004506	5.633E-05	8			
Total	0.0267162		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.71	23.2	0.6162	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.968	0.741	0.8715	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.279	0.268	0.289	0.277	0.271	0.291	0.00377	3.02%	0.00%
AT3-098		5	0.381	0.373	0.389	0.382	0.372	0.389	0.00288	1.69%	-36.78%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.277	0.284	0.272	0.291	0.271
AT3-098		0.372	0.382	0.384	0.38	0.389

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	05-9439-4057	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	042322FA3115DECF606B32A76349129B	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed anthracene endpoint	229.04%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	4	7.35	2.13	0.692	CDF	0.0009	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.07	2.29	0.1751	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	14.2528	14.2528	1	54	8.0E-05	Significant Effect
Error	2.10973	0.263716	8			
Total	16.3625		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	6400	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.853	0.741	0.0636	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.302	0.291	0.314	0.3	0.294	0.315	0.00406	3.00%	0.00%
AT3-098		5	2.69	1.79	3.59	2.61	1.69	3.4	0.325	27.00%	-789.84%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.3	0.308	0.295	0.315	0.294
AT3-098		2.36	2.61	3.4	3.39	1.69

CETIS Analytical Report

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	14-6989-9668	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	1CD720C83E6122B474A72A1DF292B2EF	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed benzo(a)anthracene endpoint	127.20%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	4	14.3	2.13	0.719	CDF	6.9E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.09	2.29	0.1534	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	58.3947	58.3947	1	206	<1.0E-05	Significant Effect
Error	2.27308	0.284135	8			
Total	60.6678		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1890	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.814	0.741	0.0214	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.565	0.543	0.587	0.56	0.55	0.59	0.00775	3.07%	0.00%
AT3-098		5	5.4	4.46	6.33	5.43	4.37	6.45	0.337	13.96%	-855.40%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.56	0.575	0.55	0.59	0.55
AT3-098		6.45	4.37	5.43	5.14	5.6

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	01-9784-4906	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	07D0CC872CB4E0C372BEC64FFC492DF	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed benzo(a)pyrene endpoint	96.96%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	4	4.23	2.13	0.576	CDF	0.0067	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.29	2.29	0.0502	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.26612	3.26612	1	17.9	0.0029	Significant Effect
Error	1.45985	0.182481	8			
Total	4.72597		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1060	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.81	0.741	0.0193	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.594	0.571	0.617	0.59	0.575	0.62	0.00828	3.12%	0.00%
AT3-098		5	1.74	0.987	2.49	1.71	0.815	2.42	0.27	34.76%	-192.42%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.59	0.605	0.58	0.62	0.575
AT3-098		2.42	0.815	1.64	1.71	2.1

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	15-8115-7379	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	12547D065D7BFDF89C5D32437B23B6B5	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed benzo(b)fluoranthene endpoint	127.31%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	4	7.72	2.13	1	CDF	0.0008	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.6	2.29	0.9059	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	32.8334	32.8334	1	59.6	5.6E-05	Significant Effect
Error	4.40667	0.550834	8			
Total	37.2401		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1940	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.888	0.741	0.1599	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.786	0.756	0.816	0.78	0.765	0.82	0.0107	3.03%	0.00%
AT3-098		5	4.41	3.11	5.71	4.04	3.32	5.53	0.469	23.79%	-461.07%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.78	0.8	0.765	0.82	0.765
AT3-098		5.53	3.32	4.04	3.64	5.52

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Macoma | **EA-EST, Inc. PBC**

Analysis ID:	11-2901-4695	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	523DFF6E6369E963329CFCD3E8F54598	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed benzo(g,h,i)perylene endpoint	108.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	0.998	1.86	0.561	CDF	0.1736	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.87	2.29	0.3940	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.227105	0.227105	1	0.997	0.3473	Non-Significant Effect
Error	1.82234	0.227792	8			
Total	2.04944		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	16	23.2	0.0200	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9	0.741	0.2185	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.518	0.315	0.722	0.536	0.245	0.67	0.0732	31.59%	0.00%
AT3-098		5	0.82	0.00675	1.63	0.348	0.345	1.66	0.293	79.87%	-58.14%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.527	0.536	0.614	0.67	0.245
AT3-098		1.66	0.347	0.348	0.345	1.4

Bioaccumulation Evaluation - PAHs - Macoma

EA-EST, Inc. PBC

Analysis ID:	18-6572-8367	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	5C2EE81F8C8B0F2DD96F2421269DB368	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed benzo(k)fluoranthene endpoint	118.39%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	2.74	1.86	0.538	CDF	0.0128	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.07	2.29	0.1724	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.56935	1.56935	1	7.49	0.0256	Significant Effect
Error	1.67676	0.209595	8			
Total	3.24611		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	7.85	23.2	0.0709	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.899	0.741	0.2138	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.455	0.185	0.725	0.359	0.351	0.844	0.0973	47.86%	0.00%
AT3-098		5	1.25	0.49	2	1.08	0.496	2.14	0.273	48.89%	-174.21%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.359	0.368	0.353	0.844	0.351
AT3-098		2.14	0.496	1.08	1.04	1.48

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	19-9439-8456	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	B1108F814D754F82887339DD0B743FF4	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed chrysene endpoint	72.29%

Unequal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	3	12.1	2.35	0.398	CDF	0.0006	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.248	9.248	1	189	<1.0E-05	Significant Effect
Error	0.343	0.049	7			
Total	9.591		8			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	380	24.3	4.6E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.775	0.701	0.0107	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.55	0.528	0.572	0.545	0.535	0.575	0.00775	3.15%	0.00%
AT3-098		4	2.59	2.05	3.13	2.42	2.36	3.09	0.169	13.03%	-370.91%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.545	0.56	0.535	0.575	0.535
AT3-098		---	2.49	2.36	3.09	2.42

CETIS Analytical Report

Report Date: 19 Aug-23 06:45 (p 10 of 16)
Test Code/ID: TN-23-303MnPAH / 13-3685-4237

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	04-5124-3396	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	2095720A7786D968BC7EBB4D69170523	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed dibenz(a,h)anthracene endpoint	3.08%

Unequal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	4	-59.9	2.13	0.0913	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.25	2.29	0.0628	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	16.4558	16.4558	1	3590	<1.0E-05	Significant Effect
Error	0.0367037	0.004588	8			
Total	16.4925		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	199	23.2	0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.882	0.741	0.1367	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	2.97	2.85	3.08	2.95	2.86	3.11	0.0427	3.22%	0.00%
AT3-098		5	0.4	0.392	0.409	0.402	0.39	0.409	0.00303	1.69%	86.50%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	2.95	3	2.91	3.11	2.86
AT3-098		0.39	0.402	0.403	0.399	0.409

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Macoma	**EA-EST, Inc. PBC**

Analysis ID:	05-6250-1207	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	C656B55B4D6FA492965B4472C7B4590E	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed fluoranthene endpoint	438.62%

Unequal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	4	5.63	2.13	9.29	CDF	0.0025	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.82	2.29	0.4607	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1503.32	1503.32	1	31.7	0.0005	Significant Effect
Error	379.786	47.4733	8			
Total	1883.11		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	490	23.2	2.5E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.884	0.741	0.1467	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	2.12	1.57	2.66	2.23	1.38	2.48	0.197	20.77%	0.00%
AT3-098		5	26.6	14.6	38.7	26.1	14.8	36.8	4.35	36.54%	-1157.79%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	2.09	2.23	2.41	2.48	1.38
AT3-098		26.1	19.6	35.9	36.8	14.8

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	14-9364-0252	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	50355D2D13938BB1E1552D52468F309A	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed fluorene endpoint	374.23%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	4	3.35	2.13	0.945	CDF	0.0143	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.91	2.29	0.3362	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.51158	5.51158	1	11.2	0.0101	Significant Effect
Error	3.93249	0.491561	8			
Total	9.44406		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	17100	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.886	0.741	0.1543	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.253	0.243	0.262	0.251	0.245	0.263	0.00339	3.00%	0.00%
AT3-098		5	1.74	0.506	2.97	1.27	0.882	3	0.443	57.07%	-587.81%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.251	0.258	0.247	0.263	0.245
AT3-098		0.935	1.27	2.6	3	0.882

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	07-5576-6393	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	6E4371FDEEA6BDEEBBFD7C28EF82A93	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed indeno(1,2,3-cd)pyrene endpoint	10.85%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	40	---	0	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.32	2.29	0.0405	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	16.3456	16.3456	1	153	<1.0E-05	Significant Effect
Error	0.85448	0.10681	8			
Total	17.2001		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.97	23.2	0.3164	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.692	0.741	0.0007	Non-Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	3.54	3.25	3.83	3.46	3.35	3.93	0.104	6.55%	0.00%
AT3-098		5	0.985	0.489	1.48	0.81	0.79	1.7	0.179	40.59%	72.19%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	3.35	3.57	3.46	3.93	3.4
AT3-098		0.79	0.81	0.815	0.81	1.7

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	12-2133-3190	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	18048F756F904A0CF0BB10D204271968	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed naphthalene endpoint	53.20%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	4	14.2	2.13	0.207	CDF	7.2E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.18	2.29	0.0978	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.73619	4.73619	1	200	<1.0E-05	Significant Effect
Error	0.189077	0.0236347	8			
Total	4.92527		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	338	23.2	5.2E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2387	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.39	0.375	0.404	0.387	0.378	0.406	0.00528	3.03%	0.00%
AT3-098		5	1.77	1.5	2.04	1.81	1.45	2	0.0971	12.29%	-353.29%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.387	0.397	0.38	0.406	0.378
AT3-098		2	1.66	1.91	1.81	1.45

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	04-1490-0844	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	5AB9E6A0C2E5AB41C2FAA05D78AA4D2	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed phenanthrene endpoint	155.52%

Unequal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	4	3.44	2.13	3.07	CDF	0.0132	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.76	2.29	0.5686	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	61.2563	61.2563	1	11.8	0.0089	Significant Effect
Error	41.475	5.18438	8			
Total	102.731		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	50.9	23.2	0.0022	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.908	0.741	0.2657	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	1.97	1.42	2.53	2.23	1.3	2.31	0.2	22.63%	0.00%
AT3-098		5	6.92	2.96	10.9	4.86	4.23	10.7	1.43	46.06%	-250.76%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.73	2.3	2.31	2.23	1.3
AT3-098		4.86	4.73	10.7	10.1	4.23

Analyst: NR QA: JR

Bioaccumulation Evaluation - PAHs - Macoma **EA-EST, Inc. PBC**

Analysis ID:	04-1423-2436	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:45	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:44	**MD5 Hash:**	08C81C009542A76C78DFD918D23F22FA	**Editor ID:**	

Batch ID:	07-2064-6975	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:47	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:47	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pyrene endpoint	32.69%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	7	74.9	1.89	0.533	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	988.699	988.699	1	5610	<1.0E-05	Significant Effect
Error	1.23338	0.176197	7			
Total	989.933		8			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	11.7	24.3	0.0377	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.97	0.701	0.8905	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	1.63	1.41	1.85	1.62	1.45	1.9	0.0793	10.87%	0.00%
AT3-098		4	22.7	21.8	23.7	22.5	22	23.4	0.304	2.67%	-1292.46%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	1.5	1.62	1.69	1.9	1.45
AT3-098		23.4	---	23	22.5	22

Analyst: NR QA: JR

ATTACHMENT X

Macoma nasuta 28-Day Solid Phase Bioaccumulation Testing Tissue Chemistry and Body Burden Statistical Analyses

PCBs

(29 pages)

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

			Pre-Assay		
CONTAMINANT	REP1	REP2	REP3	REP4 *	REP5 *
PCB Congeners (ng/g wet wt.)					
PCB 8	0.0630 U	0.0640 U	0.0630 U		
PCB 18	0.0459 U	0.0466 U	0.0458 U		
PCB 28	0.0780 U	0.0790 U	0.0780 U		
PCB 44	0.0870 U	0.0880 U	0.0870 U		
PCB 52	1.83	2.74	1.71		
PCB 66	0.0455 U	0.0462 U	0.0455 U		
PCB 101	0.0740 U	0.0755 U	0.0740 U		
PCB 105	0.0665 U	0.0675 U	0.0665 U		
PCB 118	0.0705 U	0.0715 U	0.0705 U		
PCB 128	0.0830 U	0.0845 U	0.0830 U		
PCB 138	1.07	0.0540 U	0.0530 U		
PCB 153	0.111 U	0.113 U	0.111 U		
PCB 170	0.0408 U	0.0414 U	0.0408 U		
PCB 180	0.0417 U	0.0424 U	0.0417 U		
PCB 187	0.0600 U	0.0610 U	0.0600 U		
PCB 195	0.0785 U	0.0795 U	0.0780 U		
PCB 206	0.0800 U	0.0810 U	0.0800 U		
PCB 209	0.0915 U	0.0930 U	0.0915 U		
Total PCBs	8.03	7.85	5.76		

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

	IOSN Reference				
CONTAMINANT	REP1	REP2	REP3	REP4	REP5
PCB Congeners (ng/g wet wt					
PCB 8	0.0465 U	0.0475 U	0.0455 U	0.0485 U	0.0455 U
PCB 18	0.0340 U	0.0345 U	0.0330 U	0.0355 U	0.0330 U
PCB 28	0.0575 U	0.0590 U	0.0565 U	0.0600 U	0.0560 U
PCB 44	0.0640 U	0.0655 U	0.0630 U	0.0670 U	0.0625 U
PCB 52	0.0355 U	0.0365 U	0.0350 U	0.0375 U	0.0350 U
PCB 66	0.0335 U	0.0345 U	0.0330 U	0.0350 U	0.0330 U
PCB 101	0.0545 U	0.0560 U	0.0535 U	0.0575 U	0.0535 U
PCB 105	0.0490 U	0.0500 U	0.0480 U	0.0515 U	0.0480 U
PCB 118	0.0520 U	0.0530 U	0.0510 U	0.0545 U	0.0505 U
PCB 128	0.0610 U	0.0630 U	0.0600 U	0.0640 U	0.0600 U
PCB 138	0.0390 U	0.0400 U	0.0385 U	0.0410 U	0.0385 U
PCB 153	0.0815 U	0.0835 U	0.0800 U	0.0855 U	0.0795 U
PCB 170	0.0300 U	0.0310 U	0.0295 U	0.0315 U	0.0295 U
PCB 180	0.0305 U	0.0315 U	0.0300 U	0.0325 U	0.0300 U
PCB 187	0.0440 U	0.0455 U	0.0435 U	0.0465 U	0.0430 U
PCB 195	0.0575 U	0.0590 U	0.0565 U	0.0605 U	0.0565 U
PCB 206	0.0590 U	0.0605 U	0.0580 U	0.0620 U	0.0575 U
PCB 209	0.0675 U	0.0690 U	0.0665 U	0.0710 U	0.0660 U
Total PCBs	1.79	1.84	1.76	1.88	1.76

* = Qualifiers
U   Analyte not detected; belo
J   Analyte estimated; detectio
NA   Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

					10 Stations at 4 Marinas Mud					
CONTAMINANT	REP1		REP2		REP3		REP4		REP5	
PCB Congeners (ng/g wet wt										
PCB 8	0.0625	U	0.0640	U	0.0645	U	0.0635	U	0.0650	U
PCB 18	0.0453	U	0.0467	U	0.0469	U	0.0464	U	0.0475	U
PCB 28	0.0770	U	0.0795	U	0.0795	U	0.0790	U	0.0805	U
PCB 44	0.0860	U	0.0885	U	0.0890	U	0.0880	U	0.0900	U
PCB 52	0.0479	U	0.0492	U	0.0495	U	0.662		0.0500	U
PCB 66	0.0450	U	0.0463	U	0.0465	U	0.0460	U	0.0471	U
PCB 101	0.0735	U	0.0755	U	0.0760	U	0.0750	U	0.0770	U
PCB 105	0.0660	U	0.0675	U	0.0680	U	0.0670	U	0.0690	U
PCB 118	0.0695	U	0.423	J	0.0720	U	0.0710	U	0.0730	U
PCB 128	0.0820	U	0.0845	U	0.0850	U	0.0840	U	0.0860	U
PCB 138	0.0525	U	0.0540	U	0.0545	U	0.0535	U	0.0550	U
PCB 153	0.110	U	0.113	U	0.113	U	0.260	J	0.115	U
PCB 170	0.0403	U	0.0415	U	0.0416	U	0.0412	U	0.0422	U
PCB 180	0.0412	U	0.0424	U	0.0426	U	0.0422	U	0.0432	U
PCB 187	0.0590	U	0.0610	U	0.0610	U	0.0605	U	0.0620	U
PCB 195	0.0775	U	0.0795	U	0.0800	U	0.0790	U	0.0810	U
PCB 206	0.0790	U	0.0810	U	0.0815	U	0.0810	U	0.0825	U
PCB 209	0.0905	U	0.0930	U	0.0935	U	0.0925	U	0.0950	U
Total PCBs	2.41		3.18		2.49		3.98		2.52	

* = Qualifiers

U	Analyte not detected; belo
J	Analyte estimated; detectio
NA	Not Analyzed

CETIS Test Data Worksheet

Report Date: 19 Aug-23 06:47 (p 1 of 1)
Test Code/ID: TN-23-303MnPCB / 17-0778-2871

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Start Date: 29 Mar-23 13:48 **Species:** Macoma nasuta **Sample Code:** AT3-191
End Date: 26 Apr-23 12:48 **Protocol:** US ACE NED RIM (2004) **Sample Source:** Yachtsman Marina NAE-2004-00319
Sample Date: 20 Mar-23 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control

Sample	Rep	Pos	PBC 008	PCB 018	PCB 028	PCB 044	PCB 052	PCB 066	PCB 101	PCB 105	PCB 118	PCB 128	PCB 138	PCB 153	PCB 170	PCB 180	PCB 187	PCB 195	PCB 206	PCB 209	PCB 087	PCB 049	PCB 183	PCB 184	Total PCBs
IOSN 2019	1	2	0.047	0.034	0.058	0.064	0.036	0.034	0.055	0.049	0.052	0.061	0.039	0.082	0.03	0.031	0.044	0.058	0.059	0.068	0.027	0.063	0.017	0.034	
IOSN 2019	2	3	0.048	0.035	0.059	0.066	0.037	0.035	0.056	0.05	0.053	0.063	0.04	0.084	0.031	0.032	0.046	0.059	0.061	0.069	0.028	0.064	0.017	0.035	
IOSN 2019	3	6	0.046	0.033	0.057	0.063	0.035	0.033	0.054	0.048	0.051	0.06	0.039	0.08	0.03	0.03	0.044	0.057	0.058	0.067	0.027	0.062	0.017	0.033	
IOSN 2019	4	7	0.049	0.036	0.06	0.067	0.038	0.035	0.058	0.052	0.055	0.064	0.041	0.086	0.032	0.033	0.047	0.061	0.062	0.071	0.029	0.066	0.018	0.036	
IOSN 2019	5	10	0.046	0.033	0.056	0.063	0.035	0.033	0.054	0.048	0.051	0.06	0.039	0.08	0.03	0.03	0.043	0.057	0.058	0.066	0.027	0.061	0.016	0.033	
AT3-098	1	1	0.063	0.045	0.077	0.086	0.048	0.045	0.074	0.066	0.07	0.082	0.053	0.11	0.040	0.041	0.059	0.078	0.079	0.091	0.037	0.084	0.022	0.045	
AT3-098	2	4	0.064	0.047	0.08	0.089	0.049	0.046	0.076	0.068	0.423	0.085	0.054	0.113	0.041	0.042	0.061	0.08	0.081	0.093	0.038	0.087	0.023	0.047	
AT3-098	3	5	0.065	0.047	0.08	0.089	0.049	0.047	0.076	0.068	0.072	0.085	0.055	0.113	0.042	0.043	0.061	0.08	0.082	0.094	0.038	0.087	0.023	0.047	
AT3-098	4	8	0.064	0.046	0.079	0.088	0.662	0.046	0.075	0.067	0.071	0.084	0.054	0.26	0.041	0.042	0.061	0.079	0.081	0.093	0.037	0.551	0.023	0.046	
AT3-098	5	9	0.065	0.047	0.081	0.09	0.05	0.047	0.077	0.069	0.073	0.086	0.055	0.115	0.042	0.043	0.062	0.081	0.083	0.095	0.038	0.088	0.023	0.047	

Analyst: NR QA: JR

CETIS Summary Report

Report Date: 19 Aug-23 06:48 (p 1 of 5)
Test Code/ID: TN-23-303MnPCB / 17-0778-2871

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample ID:	10-1907-8970	**Code:**	AT3-191	**Project:**	Dredged Sediment Evaluation
Sample Date:	20 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	20 Mar-23 16:00	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	9d 14h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
11-6719-3611	PCB 008	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 008	1
16-3276-0407	PCB 018	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 018	1
13-9608-7387	PCB 028	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 028	1
19-3839-9687	PCB 044	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 044	1
05-0591-9058	PCB 052	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 052	1
09-3696-3646	PCB 052	Wilcoxon Rank Sum Two-Sample Test	0.0040	AT3-098 failed pcb 052	1
14-5817-1474	PCB 066	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 066	1
14-9269-7357	PCB 101	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 101	1
04-1507-5714	PCB 105	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 105	1
20-1325-5525	PCB 118	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 118	1
11-1662-6316	PCB 118	Wilcoxon Rank Sum Two-Sample Test	0.0040	AT3-098 failed pcb 118	1
11-7225-5352	PCB 128	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 128	1
09-9129-8390	PCB 138	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 138	1
10-1176-5480	PCB 153	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 153	1
08-1735-4110	PCB 153	Wilcoxon Rank Sum Two-Sample Test	0.0040	AT3-098 failed pcb 153	1
12-8292-6359	PCB 170	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 170	1
15-8865-0666	PCB 180	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 180	1
01-5676-1440	PCB 187	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 187	1
02-4694-1435	PCB 195	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 195	1
03-3708-3472	PCB 206	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 206	1
08-3719-0550	PCB 209	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed pcb 209	1

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0467	0.0451	0.0483	0.0455	0.0485	0.000583	0.0013	2.79%	0.00%
AT3-098		5	0.0639	0.0627	0.0651	0.0625	0.065	0.00043	0.000962	1.51%	-36.83%

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.034	0.0327	0.0353	0.033	0.0355	0.000474	0.00106	3.12%	0.00%
AT3-098		5	0.0465	0.0455	0.0475	0.0453	0.0474	0.000354	0.000792	1.70%	-36.82%

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0578	0.0557	0.0599	0.056	0.06	0.000752	0.00168	2.91%	0.00%
AT3-098		5	0.0791	0.0775	0.0807	0.077	0.0805	0.000579	0.00129	1.64%	-36.85%

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0644	0.0621	0.0667	0.0625	0.067	0.000828	0.00185	2.87%	0.00%
AT3-098		5	0.0883	0.0865	0.0901	0.086	0.09	0.000663	0.00148	1.68%	-37.11%

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0359	0.0346	0.0372	0.035	0.0375	0.000485	0.00108	3.02%	0.00%
AT3-098		5	0.172	-0.169	0.512	0.0479	0.662	0.123	0.274	159.63%	-378.27%

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0338	0.0327	0.0349	0.033	0.035	0.000406	0.000908	2.69%	0.00%
AT3-098		5	0.0462	0.0452	0.0471	0.045	0.0471	0.000346	0.000773	1.67%	-36.63%

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.055	0.0528	0.0572	0.0535	0.0575	0.000775	0.00173	3.15%	0.00%
AT3-098		5	0.0754	0.0738	0.077	0.0735	0.077	0.000579	0.00129	1.72%	-37.09%

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0493	0.0475	0.0511	0.048	0.0515	0.000663	0.00148	3.01%	0.00%
AT3-098		5	0.0675	0.0661	0.0689	0.066	0.069	0.0005	0.00112	1.66%	-36.92%

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0522	0.0502	0.0542	0.0505	0.0545	0.000718	0.0016	3.07%	0.00%
AT3-098		5	0.142	-0.0536	0.337	0.0695	0.423	0.0703	0.157	110.98%	-171.46%

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0616	0.0593	0.0639	0.06	0.064	0.000812	0.00182	2.95%	0.00%
AT3-098		5	0.0843	0.0825	0.0861	0.082	0.086	0.000663	0.00148	1.76%	-36.85%

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0394	0.0381	0.0407	0.0385	0.041	0.000485	0.00108	2.75%	0.00%
AT3-098		5	0.0539	0.0527	0.0551	0.0525	0.055	0.00043	0.000962	1.78%	-36.80%

Analyst: NR QA: JR

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.082	0.0789	0.0851	0.0795	0.0855	0.00112	0.0025	3.05%	0.00%
AT3-098		5	0.142	0.0599	0.224	0.109	0.26	0.0295	0.066	46.54%	-73.05%

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0303	0.0292	0.0314	0.0295	0.0315	0.000406	0.000908	3.00%	0.00%
AT3-098		5	0.0414	0.0405	0.0422	0.0403	0.0422	0.00031	0.000693	1.68%	-36.47%

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0309	0.0296	0.0322	0.03	0.0325	0.000485	0.00108	3.51%	0.00%
AT3-098		5	0.0423	0.0414	0.0432	0.0412	0.0432	0.000321	0.000717	1.69%	-36.89%

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0445	0.0427	0.0463	0.043	0.0465	0.000652	0.00146	3.28%	0.00%
AT3-098		5	0.0607	0.0593	0.0621	0.059	0.062	0.00049	0.0011	1.80%	-36.40%

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.058	0.0558	0.0602	0.0565	0.0605	0.000775	0.00173	2.99%	0.00%
AT3-098		5	0.0794	0.0778	0.081	0.0775	0.081	0.000579	0.00129	1.63%	-36.90%

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0594	0.0571	0.0617	0.0575	0.062	0.000828	0.00185	3.12%	0.00%
AT3-098		5	0.081	0.0794	0.0826	0.079	0.0825	0.00057	0.00127	1.57%	-36.36%

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.068	0.0655	0.0705	0.066	0.071	0.000908	0.00203	2.99%	0.00%
AT3-098		5	0.0929	0.0909	0.0949	0.0905	0.095	0.000731	0.00164	1.76%	-36.62%

PCB 008 Detail

MD5: 9C603D30B16A57D426E738700F73B519

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0465	0.0475	0.0455	0.0485	0.0455
AT3-098		0.0625	0.064	0.0645	0.0635	0.065

PCB 018 Detail

MD5: DD9BEDC40F682A4349BA0136904F97C7

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.034	0.0345	0.033	0.0355	0.033
AT3-098		0.0453	0.0466	0.0468	0.0463	0.0474

PCB 028 Detail

MD5: 786773990FB8BBB1B08C3594EEA9CE4D

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0575	0.059	0.0565	0.06	0.056
AT3-098		0.077	0.0795	0.0795	0.079	0.0805

PCB 044 Detail

MD5: D2EFAD9773BDE40510B0CEAEF31B9A2D

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.064	0.0655	0.063	0.067	0.0625
AT3-098		0.086	0.0885	0.089	0.088	0.09

PCB 052 Detail

MD5: 936FDE147307595B0DD61AD9E6253183

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0355	0.0365	0.035	0.0375	0.035
AT3-098		0.0479	0.0492	0.0494	0.662	0.05

PCB 066 Detail

MD5: 7A24F9E788E803B4DB65AED846AE44FA

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0335	0.0345	0.033	0.035	0.033
AT3-098		0.045	0.0463	0.0465	0.046	0.0471

PCB 101 Detail

MD5: 030FC5C2EC3878D6CB1097D3BD05BD5C

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0545	0.056	0.0535	0.0575	0.0535
AT3-098		0.0735	0.0755	0.076	0.075	0.077

PCB 105 Detail

MD5: D02B9D3F2A01B1B333F2F0D7963B1648

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.049	0.05	0.048	0.0515	0.048
AT3-098		0.066	0.0675	0.068	0.067	0.069

PCB 118 Detail

MD5: F4A31E554A76400BC4D54496C71B1A3E

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.052	0.053	0.051	0.0545	0.0505
AT3-098		0.0695	0.423	0.072	0.071	0.073

PCB 128 Detail

MD5: F7C2E9EACAC0BEBB404EE5A1AC418C2

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.061	0.063	0.06	0.064	0.06
AT3-098		0.082	0.0845	0.085	0.084	0.086

PCB 138 Detail

MD5: EB396B64B9D31D9A53B859815C4B1256

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.039	0.04	0.0385	0.041	0.0385
AT3-098		0.0525	0.054	0.0545	0.0535	0.055

PCB 153 Detail MD5: BFDB7A2262DFC5BD213F5DAA527DC792

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0815	0.0835	0.08	0.0855	0.0795
AT3-098		0.109	0.112	0.113	0.26	0.115

PCB 170 Detail MD5: 5B285380C382208B75EA8F6FD2806A3E

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.03	0.031	0.0295	0.0315	0.0295
AT3-098		0.0403	0.0415	0.0416	0.0412	0.0422

PCB 180 Detail MD5: E7A91940C4BA30C77459FE5B9AFB47F1

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0305	0.0315	0.03	0.0325	0.03
AT3-098		0.0412	0.0424	0.0426	0.0421	0.0432

PCB 187 Detail MD5: 2CB198593AF1373895ED983CC6673022

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.044	0.0455	0.0435	0.0465	0.043
AT3-098		0.059	0.061	0.061	0.0605	0.062

PCB 195 Detail MD5: 4BD0DE09D74BAE601C1618D06FEEEE3D

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0575	0.059	0.0565	0.0605	0.0565
AT3-098		0.0775	0.0795	0.08	0.079	0.081

PCB 206 Detail MD5: 3D17519E07607620A736093499E06742

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.059	0.0605	0.058	0.062	0.0575
AT3-098		0.079	0.081	0.0815	0.081	0.0825

PCB 209 Detail MD5: 927A5DA40F4466C5BFC0586882D4BFFD

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0675	0.069	0.0665	0.071	0.066
AT3-098		0.0905	0.093	0.0935	0.0925	0.095

STUDY: **TN-23-303**
CLIENT: **Eco-Analysts, Inc.**
PROJECT: **Yachtsman Marina, Kennebunkport, ME NAE-2004-00319**
ASSAY: ***M. nasuta*** **28-day Bioaccumulation Evaluation**
TASK: **Statistical Analysis of Body Burden PCBs**

Endpoint	Method	C	<	T	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 008	Equal Variance t Two-Sample Test	IOSN	<	Comp	23.73826	1.859548	0	0.05	TRUE	0.00134737	8		C
PCB 018	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.15057	1.859548	0	0.05	TRUE	0.001100752	8		C
PCB 028	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.45218	1.859548	0	0.05	TRUE	0.001764121	8		C
PCB 044	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.53314	1.859548	0	0.05	TRUE	0.001972349	8		C
PCB 052	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	15		0.003968254	0.05	TRUE		8	0	E
PCB 052	Equal Variance t Two-Sample Test	IOSN	<	Comp	19.43555	1.894579	1.20916E-07	0.05	TRUE	0.001289174	7		C
PCB 066	Equal Variance t Two-Sample Test	IOSN	<	Comp	23.21432	1.859548	0	0.05	TRUE	0.000991681	8		C
PCB 101	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.09718	1.859548	0	0.05	TRUE	0.001798097	8		C
PCB 105	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.91023	1.859548	0	0.05	TRUE	0.001544656	8		C
PCB 118	Equal Variance t Two-Sample Test	IOSN	<	Comp	18.34905	1.894579	1.78724E-07	0.05	TRUE	0.00197986	7		C
PCB 118	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	15		0.003968254	0.05	TRUE		8	0	E
PCB 128	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.64359	1.859548	0	0.05	TRUE	0.001950312	8		C
PCB 138	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.37398	1.859548	0	0.05	TRUE	0.001205125	8		C
PCB 153	Wilcoxon Rank Sum Two-Sample Test	IOSN	<	Comp	15		0.003968254	0.05	TRUE		8	0	E
PCB 153	Equal Variance t Two-Sample Test	IOSN	<	Comp	19.38645	1.894579	1.23008E-07	0.05	TRUE	0.002968457	7		C
PCB 170	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.62928	1.859548	0	0.05	TRUE	0.000950009	8		C
PCB 180	Equal Variance t Two-Sample Test	IOSN	<	Comp	19.61586	1.859548	0	0.05	TRUE	0.0010807	8		C
PCB 187	Equal Variance t Two-Sample Test	IOSN	<	Comp	19.86572	1.859548	0	0.05	TRUE	0.001516415	8		C
PCB 195	Equal Variance t Two-Sample Test	IOSN	<	Comp	22.13136	1.859548	0	0.05	TRUE	0.001798097	8		C
PCB 206	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.49281	1.859548	0	0.05	TRUE	0.001868822	8		C
PCB 209	Equal Variance t Two-Sample Test	IOSN	<	Comp	21.35157	1.859548	0	0.05	TRUE	0.002168588	8		C

CETIS Analytical Report

Report Date: 19 Aug-23 06:48 (p 1 of 18)
Test Code/ID: TN-23-303MnPCB / 17-0778-2871

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	11-6719-3611	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:47	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	FECC1FE80AF281307E4EC8BA3C0DF58	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 008 endpoint	2.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	23.7	1.86	0.00135	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.67	2.29	0.7532	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0007396	0.0007396	1	564	<1.0E-05	Significant Effect
Error	0.0000105	1.313E-06	8			
Total	0.0007501		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.84	23.2	0.5700	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.949	0.741	0.6522	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0467	0.0451	0.0483	0.0465	0.0455	0.0485	0.000583	2.79%	0.00%
AT3-098		5	0.0639	0.0627	0.0651	0.064	0.0625	0.065	0.00043	1.51%	-36.83%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0465	0.0475	0.0455	0.0485	0.0455
AT3-098		0.0625	0.064	0.0645	0.0635	0.065

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Macoma | **EA-EST, Inc. PBC**

Analysis ID:	16-3276-0407	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:47	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	D3EC8A4E7F778C71526F3FF6A664DC74	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 018 endpoint	3.24%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	21.2	1.86	0.0011	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.7	2.29	0.6826	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003919	0.0003919	1	447	<1.0E-05	Significant Effect
Error	7.008E-06	8.76E-07	8			
Total	0.0003989		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.79	23.2	0.5851	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6974	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.034	0.0327	0.0353	0.034	0.033	0.0355	0.000474	3.12%	0.00%
AT3-098		5	0.0465	0.0455	0.0475	0.0467	0.0453	0.0475	0.000354	1.70%	-36.82%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.034	0.0345	0.033	0.0355	0.033
AT3-098		0.0453	0.0467	0.0469	0.0464	0.0475

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	13-9608-7387	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:47	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	0377D7B29B5F9732FE5E94EDBB423E9A	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 028 endpoint	3.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	22.5	1.86	0.00176	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0011342	0.0011342	1	504	<1.0E-05	Significant Effect
Error	0.000018	2.25E-06	8			
Total	0.0011522		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.69	23.2	0.6250	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.962	0.741	0.8099	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0578	0.0557	0.0599	0.0575	0.056	0.06	0.000752	2.91%	0.00%
AT3-098		5	0.0791	0.0775	0.0807	0.0795	0.077	0.0805	0.000579	1.64%	-36.85%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0575	0.059	0.0565	0.06	0.056
AT3-098		0.077	0.0795	0.0795	0.079	0.0805

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	19-3839-9687	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	3EAC3D0D7916F43F6F89F408981BBB9F	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 044 endpoint	3.06%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	22.5	1.86	0.00197	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.64	2.29	0.8024	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0014280	0.0014280	1	508	<1.0E-05	Significant Effect
Error	0.0000225	2.813E-06	8			
Total	0.0014505		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.56	23.2	0.6785	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.976	0.741	0.9412	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0644	0.0621	0.0667	0.064	0.0625	0.067	0.000828	2.87%	0.00%
AT3-098		5	0.0883	0.0865	0.0901	0.0885	0.086	0.09	0.000663	1.68%	-37.11%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.064	0.0655	0.063	0.067	0.0625
AT3-098		0.086	0.0885	0.089	0.088	0.09

Analyst: NR QA: JR

CETIS Analytical Report

Report Date: 19 Aug-23 06:48 (p 5 of 18)
Test Code/ID: TN-23-303MnPCB / 17-0778-2871

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EA-EST, Inc. PBC**

Analysis ID:	09-3696-3646	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	1BE4B4C3D6E2B223EE9F421AA372C32C	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 052 endpoint	634.92%

Wilcoxon Rank Sum Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	15	---	0	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.68	2.29	0.0004	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0461041	0.0461041	1	1.23	0.3001	Non-Significant Effect
Error	0.3005	0.0375625	8			
Total	0.346604		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	63900	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.628	0.741	0.0001	Non-Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0359	0.0346	0.0372	0.0355	0.035	0.0375	0.000485	3.02%	0.00%
AT3-098		5	0.172	-0.169	0.512	0.0495	0.0479	0.662	0.123	159.63%	-378.27%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0355	0.0365	0.035	0.0375	0.035
AT3-098		0.0479	0.0492	0.0495	0.662	0.05

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Macoma

EA-EST, Inc. PBC

Analysis ID:	14-5817-1474	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	4D9D160EF348E0EFD14D69E0CFCD9004	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 066 endpoint	2.93%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	23.2	1.86	0.000992	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.51	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003832	0.0003832	1	539	<1.0E-05	Significant Effect
Error	5.688E-06	7.11E-07	8			
Total	0.0003888		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.38	23.2	0.7616	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.963	0.741	0.8243	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0338	0.0327	0.0349	0.0335	0.033	0.035	0.000406	2.69%	0.00%
AT3-098		5	0.0462	0.0452	0.0471	0.0463	0.045	0.0471	0.000346	1.67%	-36.63%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0335	0.0345	0.033	0.035	0.033
AT3-098		0.045	0.0463	0.0465	0.046	0.0471

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	14-9269-7357	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	3353EB38044B278D7CACC4E48E04E727	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 101 endpoint	3.27%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	21.1	1.86	0.0018	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.73	2.29	0.6144	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0010404	0.0010404	1	445	<1.0E-05	Significant Effect
Error	0.0000187	2.338E-06	8			
Total	0.0010591		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.79	23.2	0.5862	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.959	0.741	0.7763	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.055	0.0528	0.0572	0.0545	0.0535	0.0575	0.000775	3.15%	0.00%
AT3-098		5	0.0754	0.0738	0.077	0.0755	0.0735	0.077	0.000579	1.72%	-37.09%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0545	0.056	0.0535	0.0575	0.0535
AT3-098		0.0735	0.0755	0.076	0.075	0.077

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	04-1507-5714	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	99C7BBF4546172ABF116BDFFE560FFE6	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 105 endpoint	3.13%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	21.9	1.86	0.00154	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.78	2.29	0.5371	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008281	0.0008281	1	480	<1.0E-05	Significant Effect
Error	0.0000138	1.725E-06	8			
Total	0.0008419		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.76	23.2	0.5974	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5867	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0493	0.0475	0.0511	0.049	0.048	0.0515	0.000663	3.01%	0.00%
AT3-098		5	0.0675	0.0661	0.0689	0.0675	0.066	0.069	0.0005	1.66%	-36.92%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.049	0.05	0.048	0.0515	0.048
AT3-098		0.066	0.0675	0.068	0.067	0.069

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	20-1325-5525	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	0597AABE8A5C5DFE63E5199110DC7087	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 118 endpoint	3.79%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	7	18.3	1.89	0.00198	CDF	<1.0E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008171	0.0008171	1	337	<1.0E-05	Significant Effect
Error	1.699E-05	2.427E-06	7			
Total	0.0008341		8			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.16	46.2	0.9433	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.955	0.701	0.7426	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0522	0.0502	0.0542	0.052	0.0505	0.0545	0.000718	3.07%	0.00%
AT3-098		4	0.0714	0.069	0.0738	0.071	0.0695	0.073	0.000747	2.09%	-36.73%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.052	0.053	0.051	0.0545	0.0505
AT3-098		0.0695	---	0.072	0.071	0.073

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	11-7225-5352	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	85B5447611C018A32DDC654868069831	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 128 endpoint	3.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	21.6	1.86	0.00195	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012882	0.0012882	1	468	<1.0E-05	Significant Effect
Error	0.000022	2.75E-06	8			
Total	0.0013102		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.964	0.741	0.8284	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0616	0.0593	0.0639	0.061	0.06	0.064	0.000812	2.95%	0.00%
AT3-098		5	0.0843	0.0825	0.0861	0.0845	0.082	0.086	0.000663	1.76%	-36.85%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.061	0.063	0.06	0.064	0.06
AT3-098		0.082	0.0845	0.085	0.084	0.086

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	09-9129-8390	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	9769FBC2DCBFB15B6C7D55433F7C843E	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 138 endpoint	3.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	22.4	1.86	0.00121	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.66	2.29	0.7759	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005256	0.0005256	1	501	<1.0E-05	Significant Effect
Error	8.400E-06	1.05E-06	8			
Total	0.0005340		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.27	23.2	0.8223	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.963	0.741	0.8142	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0394	0.0381	0.0407	0.039	0.0385	0.041	0.000485	2.75%	0.00%
AT3-098		5	0.0539	0.0527	0.0551	0.054	0.0525	0.055	0.00043	1.78%	-36.80%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.039	0.04	0.0385	0.041	0.0385
AT3-098		0.0525	0.054	0.0545	0.0535	0.055

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	08-1735-4110	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	00ECE76B49D2C091BA135A7A3DE94EC	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 153 endpoint	67.03%

Wilcoxon Rank Sum Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	15	---	0	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.68	2.29	0.0005	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0089700	0.0089700	1	4.11	0.0773	Non-Significant Effect
Error	0.0174727	0.0021841	8			
Total	0.0264427		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	698	23.2	1.2E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.655	0.741	0.0003	Non-Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.082	0.0789	0.0851	0.0815	0.0795	0.0855	0.00112	3.05%	0.00%
AT3-098		5	0.142	0.0599	0.224	0.113	0.11	0.26	0.0295	46.54%	-73.05%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0815	0.0835	0.08	0.0855	0.0795
AT3-098		0.11	0.113	0.113	0.26	0.115

CETIS Analytical Report

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	12-8292-6359	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	67E462D9ADC4D30E150C55A068B00550	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 170 endpoint	3.14%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	21.6	1.86	0.00095	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.58	2.29	0.9685	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003053	0.0003053	1	468	<1.0E-05	Significant Effect
Error	5.22E-06	6.525E-07	8			
Total	0.0003105		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.72	23.2	0.6127	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.955	0.741	0.7278	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0303	0.0292	0.0314	0.03	0.0295	0.0315	0.000406	3.00%	0.00%
AT3-098		5	0.0414	0.0405	0.0422	0.0415	0.0403	0.0422	0.00031	1.68%	-36.47%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.03	0.031	0.0295	0.0315	0.0295
AT3-098		0.0403	0.0415	0.0416	0.0412	0.0422

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Macoma

EA-EST, Inc. PBC

Analysis ID:	15-8865-0666	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	03DC1AB4E1FD1E4DFD5ACE341B1943A	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 180 endpoint	3.50%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	19.6	1.86	0.00108	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.85	2.29	0.4236	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003249	0.0003249	1	385	<1.0E-05	Significant Effect
Error	6.755E-06	8.444E-07	8			
Total	0.0003317		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.29	23.2	0.4427	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7484	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0309	0.0296	0.0322	0.0305	0.03	0.0325	0.000485	3.51%	0.00%
AT3-098		5	0.0423	0.0414	0.0432	0.0424	0.0412	0.0432	0.000321	1.69%	-36.89%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0305	0.0315	0.03	0.0325	0.03
AT3-098		0.0412	0.0424	0.0426	0.0422	0.0432

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	01-5676-1440	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	86402B7DEFC80573430F72405948C151	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 187 endpoint	3.41%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	19.9	1.86	0.00152	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.65	2.29	0.8005	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006561	0.0006561	1	395	<1.0E-05	Significant Effect
Error	0.0000133	1.663E-06	8			
Total	0.0006694		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.77	23.2	0.5935	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.969	0.741	0.8860	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0445	0.0427	0.0463	0.044	0.043	0.0465	0.000652	3.28%	0.00%
AT3-098		5	0.0607	0.0593	0.0621	0.061	0.059	0.062	0.00049	1.80%	-36.40%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.044	0.0455	0.0435	0.0465	0.043
AT3-098		0.059	0.061	0.061	0.0605	0.062

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Macoma	**EA-EST, Inc. PBC**

Analysis ID:	02-4694-1435	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	52480CC6C967322F8696B7D2B1073D17	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 195 endpoint	3.10%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	22.1	1.86	0.0018	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.73	2.29	0.6144	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0011449	0.0011449	1	490	<1.0E-05	Significant Effect
Error	0.0000187	2.338E-06	8			
Total	0.0011636		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.79	23.2	0.5862	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.959	0.741	0.7763	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.058	0.0558	0.0602	0.0575	0.0565	0.0605	0.000775	2.99%	0.00%
AT3-098		5	0.0794	0.0778	0.081	0.0795	0.0775	0.081	0.000579	1.63%	-36.90%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0575	0.059	0.0565	0.0605	0.0565
AT3-098		0.0775	0.0795	0.08	0.079	0.081

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	03-3708-3472	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	0052B1A254D0C6A3EC0F1C651396EBD1	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 206 endpoint	3.15%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	21.5	1.86	0.00187	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.74	2.29	0.6123	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0011664	0.0011664	1	462	<1.0E-05	Significant Effect
Error	0.0000202	2.525E-06	8			
Total	0.0011866		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	2.11	23.2	0.4880	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.96	0.741	0.7875	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0594	0.0571	0.0617	0.059	0.0575	0.062	0.000828	3.12%	0.00%
AT3-098		5	0.081	0.0794	0.0826	0.081	0.079	0.0825	0.00057	1.57%	-36.36%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.059	0.0605	0.058	0.062	0.0575
AT3-098		0.079	0.081	0.0815	0.081	0.0825

Analyst: NR QA: JR

Bioaccumulation Evaluation - PCB Congeners - Macoma **EA-EST, Inc. PBC**

Analysis ID:	08-3719-0550	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	A94FA3F1BA86D1A63C7A3EFA1334CCE	**Editor ID:**	

Batch ID:	14-7703-1847	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:48	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:48	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed pcb 209 endpoint	3.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	8	21.4	1.86	0.00217	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.73	2.29	0.6312	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0015500	0.0015500	1	456	<1.0E-05	Significant Effect
Error	0.0000272	0.0000034	8			
Total	0.0015772		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	1.54	23.2	0.6850	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.97	0.741	0.8953	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.068	0.0655	0.0705	0.0675	0.066	0.071	0.000908	2.99%	0.00%
AT3-098		5	0.0929	0.0909	0.0949	0.093	0.0905	0.095	0.000731	1.76%	-36.62%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0675	0.069	0.0665	0.071	0.066
AT3-098		0.0905	0.093	0.0935	0.0925	0.095

ATTACHMENT XI

Macoma nasuta 28-Day Solid Phase Bioaccumulation Testing Tissue Chemistry and Body Burden Statistical Analyses

Pesticides

(30 pages)

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

CONTAMINANT	REP1		REP2		Pre-Assay REP3		REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.0199	U	0.0202	U	0.0199	U				
cis-Chlordane	0.0430	U	0.0437	U	0.0430	U				
trans-Chlordane	0.0121	U	0.0123	U	0.0121	U				
cis-Nonachlor	0.00580	U	0.00585	U	0.00580	U				
trans-Nonachlor	0.00530	U	0.00540	U	0.00530	U				
Oxychlordane	0.0247	U	0.0251	U	0.0247	U				
Total Chlordanes	0.0908		0.0923		0.0908					
4,4'-DDT	0.00785	U	0.00795	U	0.00785	U				
4,4'-DDD	0.00595	U	0.00605	U	0.00595	U				
4,4'-DDE	0.00363	U	0.00369	U	0.00363	U				
Total DDT	0.0174		0.0177		0.0174					
Dieldrin	0.0120	U	0.0122	U	0.0120	U				
alpha-Endosulfan	0.0110	U	0.0111	U	0.0110	U				
beta-Endosulfan	0.00565	U	0.00575	U	0.00565	U				
Endosulfans	0.0166		0.0169		0.0166					
Endrin	0.00650	U	0.00660	U	0.00650	U				
Heptachlor	0.0125	U	0.0127	U	0.0125	U				
Heptachlor epoxide	0.0256	U	0.0260	U	0.0256	U				
Hexachlorobenzene	0.107	U	0.109	U	0.107	U				
Lindane	0.0180	U	0.0183	U	0.0180	U				
Methoxychlor	0.0284	U	0.0288	U	0.0283	U				
Toxaphene	0.515	U	0.525	U	0.515	U				

* = Qualifiers

U	Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J	Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA	Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

IOSN Reference

CONTAMINANT	REP1	REP2	REP3	REP4	REP5
Pesticides (ng/g wet weight)					
Aldrin	0.0295 U	0.0300 U	0.0290 U	0.0310 U	0.0285 U
cis-Chlordane	0.0635 U	0.0650 U	0.0620 U	0.0665 U	0.0620 U
trans-Chlordane	0.0180 U	0.0185 U	0.0175 U	0.0185 U	0.0175 U
cis-Nonachlor	0.00850 U	0.00900 U	0.00850 U	0.00900 U	0.00850 U
trans-Nonachlor	0.00800 U	0.00800 U	0.00750 U	0.00800 U	0.00750 U
Oxychlordane	0.0365 U	0.0375 U	0.0355 U	0.0380 U	0.0355 U
Total Chlordanes	0.135	0.138	0.131	0.140	0.131
4,4'-DDT	0.0115 U	0.0120 U	0.0115 U	0.0120 U	0.0115 U
4,4'-DDD	0.00900 U	0.00900 U	0.00850 U	0.00900 U	0.00850 U
4,4'-DDE	0.191 J	0.224 J	0.228 J	0.213 J	0.239
Total DDT	0.212	0.245	0.248	0.234	0.259
Dieldrin	0.0175 U	0.0180 U	0.0175 U	0.0185 U	0.0175 U
alpha-Endosulfan	0.0160 U	0.0165 U	0.0160 U	0.0170 U	0.0160 U
beta-Endosulfan	0.00850 U	0.00850 U	0.00800 U	0.00900 U	0.00800 U
Endosulfans	0.0245	0.0250	0.0240	0.0260	0.0240
Endrin	0.00950 U	0.0100 U	0.00950 U	0.0100 U	0.00950 U
Heptachlor	0.0185 U	0.0190 U	0.0180 U	0.0195 U	0.0180 U
Heptachlor epoxide	0.0380 U	0.0390 U	0.0370 U	0.0395 U	0.0370 U
Hexachlorobenzene	0.158 U	0.162 U	0.155 U	0.166 U	0.154 U
Lindane	0.0265 U	0.0270 U	0.0260 U	0.0280 U	0.0260 U
Methoxychlor	0.408 U	0.419 U	0.401 U	0.428 U	0.399 U
Toxaphene	0.760 U	0.780 U	0.750 U	0.800 U	0.745 U

* = Qualifiers
U Analyte not detected; belo
J Analyte estimated; detectio
NA Not Analyzed

Yachtsman Marina
NAE-2004-00319

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)

10 Stations at 4 Marinas Mud

CONTAMINANT	REP1	REP2	REP3	REP4	REP5
Pesticides (ng/g wet weight)					
Aldrin	0.0197 U	0.0203 U	0.0203 U	0.0201 U	0.0206 U
cis-Chlordane	0.0425 U	0.0437 U	0.0439 U	0.0435 U	0.0445 U
trans-Chlordane	0.0120 U	0.0123 U	0.0124 U	0.0122 U	0.0125 U
cis-Nonachlor	0.00570 U	0.00590 U	0.00590 U	0.00585 U	0.00600 U
trans-Nonachlor	0.00525 U	0.00540 U	0.00540 U	0.00535 U	0.00550 U
Oxychlordane	0.0244 U	0.0251 U	0.0252 U	0.0250 U	0.0256 U
Total Chlordanes	0.0898	0.0924	0.0928	0.0918	0.0941
4,4'-DDT	0.00775 U	0.00800 U	0.00800 U	0.00795 U	0.00810 U
4,4'-DDD	0.485	0.299	0.381	0.414	0.374
4,4'-DDE	0.546	0.434	0.456	0.532	0.528
Total DDT	1.04	0.741	0.845	0.954	0.910
Dieldrin	0.0119 U	0.0122 U	0.0123 U	0.0121 U	0.0124 U
alpha-Endosulfan	0.0108 U	0.0112 U	0.0112 U	0.0111 U	0.0114 U
beta-Endosulfan	0.00560 U	0.00575 U	0.00575 U	0.00570 U	0.00585 U
Endosulfans	0.0164	0.0169	0.0170	0.0168	0.0172
Endrin	0.00645 U	0.00665 U	0.00665 U	0.00660 U	0.00675 U
Heptachlor	0.0123 U	0.0127 U	0.0128 U	0.0126 U	0.0129 U
Heptachlor epoxide	0.0254 U	0.0261 U	0.0262 U	0.0259 U	0.0265 U
Hexachlorobenzene	0.106 U	0.109 U	0.110 U	0.108 U	0.111 U
Lindane	0.0178 U	0.0183 U	0.0184 U	0.0182 U	0.0186 U
Methoxychlor	0.0280 U	0.0288 U	0.0290 U	0.0287 U	0.0293 U
Toxaphene	0.510 U	0.525 U	0.530 U	0.520 U	0.535 U

* = Qualifiers
U Analyte not detected; belo
J Analyte estimated; detectio
NA Not Analyzed

CETIS Test Data Worksheet

Report Date: 19 Aug-23 06:50 (p 1 of 1)
Test Code/ID: TN-23-303MnPest / 17-4167-8246

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Start Date: 29 Mar-23 13:49 **Species:** Macoma nasuta **Sample Code:** AT3-191
End Date: 26 Apr-23 12:49 **Protocol:** US ACE NED RIM (2004) **Sample Source:** Yachtsman Marina NAE-2004-00319
Sample Date: 20 Mar-23 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control

Sample	Rep	Pos	4-4'-DDD	4-4'-DDE	4-4'-DDT	aldrin	alpha chlordane	alpha-BHC	beta-BHC	cis-Nonachlor	delta-BHC	Dieldrin	endosulfan I	endosulfan II	endrin	gamma-BHC (Lindane)	gamma-chlordane	heptachlor	heptachlor epoxide	hexachlorobenzene	Methoxychlor	oxychlordane	toxaphene	trans-nonachlor	2-4'-DDD	2-4'-DDE	2-4'-DDT	endosulfan sulfate	Total DDTs
IOSN 2019	1	1	0.009	0.19	0.01	0.03	0.06			0.009		0.02	0.02	0.009	0.01	0.03	0.02	0.02	0.04	0.16	0.41	0.04	0.76	0.008					
IOSN 2019	2	4	0.009	0.22	0.01	0.03	0.07			0.009		0.02	0.02	0.009	0.01	0.03	0.02	0.02	0.04	0.16	0.42	0.04	0.78	0.008					
IOSN 2019	3	6	0.009	0.23	0.01	0.03	0.06			0.009		0.02	0.02	0.008	0.01	0.03	0.02	0.02	0.04	0.16	0.40	0.04	0.75	0.008					
IOSN 2019	4	7	0.009	0.21	0.01	0.03	0.07			0.009		0.02	0.02	0.009	0.01	0.03	0.02	0.02	0.04	0.17	0.43	0.04	0.8	0.008					
IOSN 2019	5	10	0.009	0.24	0.01	0.03	0.06			0.009		0.02	0.02	0.008	0.01	0.03	0.02	0.02	0.04	0.15	0.4	0.04	0.75	0.008					
AT3-098	1	2	0.49	0.55	0.008	0.02	0.04	0.01	0.008	0.006	0.009	0.01	0.01	0.006	0.006	0.02	0.01	0.01	0.03	0.11	0.03	0.02	0.51	0.005					
AT3-098	2	3	0.3	0.43	0.008	0.02	0.04	0.01	0.008	0.006	0.01	0.01	0.01	0.006	0.007	0.02	0.01	0.01	0.03	0.11	0.03	0.03	0.53	0.005					
AT3-098	3	5	0.38	0.46	0.008	0.02	0.04	0.01	0.008	0.006	0.01	0.01	0.01	0.006	0.007	0.02	0.01	0.01	0.03	0.11	0.03	0.03	0.53	0.005					
AT3-098	4	8	0.41	0.53	0.008	0.02	0.04	0.01	0.008	0.006	0.01	0.01	0.01	0.006	0.007	0.02	0.01	0.01	0.03	0.11	0.03	0.02	0.52	0.005					
AT3-098	5	9	0.37	0.53	0.008	0.02	0.04	0.01	0.009	0.006	0.01	0.01	0.01	0.006	0.007	0.02	0.01	0.01	0.03	0.11	0.03	0.03	0.54	0.006					

Analyst: NR QA: JR

CETIS Summary Report

Report Date: 19 Aug-23 06:51 (p 1 of 5)
Test Code/ID: TN-23-303MnPest / 17-4167-8246

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample ID:	10-1907-8970	**Code:**	AT3-191	**Project:**	Dredged Sediment Evaluation
Sample Date:	20 Mar-23	**Material:**	Laboratory Control Sediment	**Source:**	Yachtsman Marina NAE-2004-00319 (
Receipt Date:	20 Mar-23 16:00	**CAS (PC):**		**Station:**	Laboratory Control
Sample Age:	9d 14h	**Client:**	Eco-Analysts, Inc.		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-1300-9223	4-4'-DDD	Unequal Variance t Two-Sample Test	0.0001	AT3-098 failed 4-4'-ddd	1
19-1389-8615	4-4'-DDE	Equal Variance t Two-Sample Test	<1.0E-05	AT3-098 failed 4-4'-dde	1
13-4412-8912	4-4'-DDT	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed 4-4'-ddt	1
11-0747-7870	aldrin	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed aldrin	1
09-4761-2761	alpha chlordane	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed alpha chlordane	1
12-1877-4562	cis-Nonachlor	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed cis-nonachlor	1
07-6660-5254	Dieldrin	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed dieldrin	1
03-9121-3921	endosulfan I	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed endosulfan i	1
00-9261-3119	endosulfan II	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed endosulfan ii	1
12-3923-0051	endrin	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed endrin	1
06-4834-6007	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed gamma-bhc (lindane)	1
00-5738-4808	gamma-chlordane	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed gamma-chlordane	1
16-1399-3357	heptachlor	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed heptachlor	1
15-0976-0545	heptachlor epoxide	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed heptachlor epoxide	1
17-3869-7799	hexachlorobenzene	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed hexachlorobenzene	1
20-4435-9159	Methoxychlor	Unequal Variance t Two-Sample Test	1.0000	AT3-098 passed methoxychlor	1
06-1250-5714	oxychlordane	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed oxychlordane	1
20-3031-3246	toxaphene	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed toxaphene	1
21-2045-5284	trans-nonachlor	Equal Variance t Two-Sample Test	1.0000	AT3-098 passed trans-nonachlor	1

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0088	0.00846	0.00914	0.0085	0.009	0.000122	0.000274	3.11%	0.00%
AT3-098		5	0.391	0.307	0.474	0.299	0.485	0.0302	0.0675	17.28%	-4338.64

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.219	0.196	0.242	0.191	0.239	0.00814	0.0182	8.31%	0.00%
AT3-098		5	0.499	0.436	0.562	0.434	0.546	0.0226	0.0505	10.12%	-127.95%

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0117	0.0114	0.012	0.0115	0.012	0.000122	0.000274	2.34%	0.00%
AT3-098		5	0.00796	0.0078	0.00812	0.00775	0.0081	0.0000579	0.000129	1.63%	31.97%

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0296	0.0284	0.0308	0.0285	0.031	0.00043	0.000962	3.25%	0.00%
AT3-098		5	0.0202	0.0197	0.0206	0.0196	0.0206	0.000155	0.000347	1.72%	31.82%

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0638	0.0614	0.0662	0.062	0.0665	0.000875	0.00196	3.07%	0.00%
AT3-098		5	0.0436	0.0427	0.0445	0.0425	0.0445	0.000327	0.000732	1.68%	31.65%

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0087	0.00836	0.00904	0.0085	0.009	0.000122	0.000274	3.15%	0.00%
AT3-098		5	0.00587	0.00573	0.00601	0.0057	0.006	0.000049	0.00011	1.87%	32.53%

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0178	0.0172	0.0184	0.0175	0.0185	0.0002	0.000447	2.51%	0.00%
AT3-098		5	0.0122	0.0119	0.0124	0.0119	0.0124	0.0000914	0.000204	1.68%	31.69%

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0163	0.0157	0.0169	0.016	0.017	0.0002	0.000447	2.74%	0.00%
AT3-098		5	0.0111	0.0109	0.0114	0.0108	0.0114	0.0000914	0.000204	1.84%	31.84%

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0084	0.00788	0.00892	0.008	0.009	0.000187	0.000418	4.98%	0.00%
AT3-098		5	0.00573	0.00562	0.00584	0.0056	0.00585	0.0000406	0.0000908	1.59%	31.79%

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0097	0.00936	0.01	0.0095	0.01	0.000122	0.000274	2.82%	0.00%
AT3-098		5	0.00662	0.00648	0.00676	0.00645	0.00675	0.000049	0.00011	1.65%	31.75%

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0267	0.0257	0.0277	0.026	0.028	0.000374	0.000837	3.13%	2.60%
AT3-098		5	0.0183	0.0179	0.0186	0.0178	0.0186	0.000133	0.000297	1.62%	1.79%

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.018	0.0174	0.0186	0.0175	0.0185	0.000224	0.0005	2.78%	1.77%
AT3-098		5	0.0123	0.012	0.0125	0.012	0.0125	0.0000914	0.000204	1.67%	1.21%

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0186	0.0178	0.0194	0.018	0.0195	0.000292	0.000652	3.50%	0.00%
AT3-098		5	0.0126	0.0124	0.0129	0.0123	0.0129	0.0001	0.000224	1.77%	31.99%

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0381	0.0367	0.0395	0.037	0.0395	0.00051	0.00114	2.99%	0.00%
AT3-098		5	0.026	0.0255	0.0265	0.0254	0.0265	0.00019	0.000426	1.64%	31.76%

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.159	0.153	0.165	0.154	0.166	0.00216	0.00483	3.04%	0.00%
AT3-098		5	0.109	0.106	0.111	0.106	0.111	0.000831	0.00186	1.71%	31.59%

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.411	0.395	0.426	0.398	0.428	0.00552	0.0124	3.01%	0.00%
AT3-098		5	0.0287	0.0281	0.0293	0.028	0.0293	0.000214	0.000479	1.67%	93.00%

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0366	0.0352	0.038	0.0355	0.038	0.00051	0.00114	3.12%	0.00%
AT3-098		5	0.025	0.0245	0.0256	0.0244	0.0256	0.000188	0.00042	1.68%	31.58%

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.767	0.739	0.795	0.745	0.8	0.0102	0.0228	2.97%	0.00%
AT3-098		5	0.524	0.512	0.536	0.51	0.535	0.0043	0.00962	1.84%	31.68%

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
IOSN 2019	RS	5	0.0078	0.00746	0.00814	0.0075	0.008	0.000122	0.000274	3.51%	0.00%
AT3-098		5	0.00538	0.00527	0.00549	0.00525	0.0055	0.0000406	0.0000908	1.69%	31.03%

4-4'-DDD Detail

MD5: 6E6988FA5B03C7BC3EB6353D464682D1

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.009	0.009	0.0085	0.009	0.0085
AT3-098		0.485	0.299	0.381	0.414	0.374

4-4'-DDE Detail

MD5: F4D550F088660B59635932B36EB9DF79

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.191	0.224	0.228	0.213	0.239
AT3-098		0.546	0.434	0.456	0.532	0.528

4-4'-DDT Detail

MD5: AF75DA90CA351C43F7C196271A7F16D6

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0115	0.012	0.0115	0.012	0.0115
AT3-098		0.00775	0.008	0.008	0.00795	0.0081

aldrin Detail

MD5: 301E73616502E2670F5FC3318FEE7A12

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0295	0.03	0.029	0.031	0.0285
AT3-098		0.0196	0.0203	0.0203	0.0201	0.0206

alpha chlordane Detail

MD5: 703F861370B0A94C257C3A8C12D3CC37

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0635	0.065	0.062	0.0665	0.062
AT3-098		0.0425	0.0437	0.0439	0.0435	0.0445

cis-Nonachlor Detail

MD5: D2850062905152A4167463F1E3886452

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0085	0.009	0.0085	0.009	0.0085
AT3-098		0.0057	0.0059	0.0059	0.00585	0.006

Dieldrin Detail

MD5: 02D3602EC2A5FCEFFEAC483B9BD8EEF8

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0175	0.018	0.0175	0.0185	0.0175
AT3-098		0.0119	0.0122	0.0122	0.0121	0.0124

endosulfan I Detail

MD5: 2179FD1F268BFEB969D482E0762F6824

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.016	0.0165	0.016	0.017	0.016
AT3-098		0.0108	0.0111	0.0112	0.011	0.0114

endosulfan II Detail

MD5: DD9592CFE4FFDEFA1D01AFBD9A3C3E38

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0085	0.0085	0.008	0.009	0.008
AT3-098		0.0056	0.00575	0.00575	0.0057	0.00585

endrin Detail

MD5: 0B41949737A6651ACC510A71D8D476CA

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0095	0.01	0.0095	0.01	0.0095
AT3-098		0.00645	0.00665	0.00665	0.0066	0.00675

gamma-BHC (Lindane) Detail

MD5: 60251AA948AC95E51588C67755903211

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0265	0.027	0.026	0.028	0.026
AT3-098		0.0178	0.0183	0.0184	0.0182	0.0186

gamma-chlordane Detail MD5: 49923285CFE98A4BA040D71D755F8CAA

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.018	0.0185	0.0175	0.0185	0.0175
AT3-098		0.012	0.0123	0.0124	0.0122	0.0125

heptachlor Detail MD5: 53B685F92CDB3914E9196B3D340E172D

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0185	0.019	0.018	0.0195	0.018
AT3-098		0.0123	0.0127	0.0127	0.0126	0.0129

heptachlor epoxide Detail MD5: E354D5595899229516607BE234C05DC9

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.038	0.039	0.037	0.0395	0.037
AT3-098		0.0254	0.026	0.0262	0.0259	0.0265

hexachlorobenzene Detail MD5: DCABBBE8D68BA42551D06690801EE595

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.158	0.162	0.155	0.166	0.154
AT3-098		0.106	0.109	0.109	0.108	0.111

Methoxychlor Detail MD5: A2FD57269A20FEF0C987EC0129C39497

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.408	0.419	0.401	0.428	0.398
AT3-098		0.028	0.0288	0.029	0.0287	0.0293

oxychlordane Detail MD5: 67211C76559A024E63B0B7BF0F707FB0

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0365	0.0375	0.0355	0.038	0.0355
AT3-098		0.0244	0.0251	0.0252	0.0249	0.0256

toxaphene Detail MD5: DBF200E2A25282F09214EF29AE0B7FB9

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.76	0.78	0.75	0.8	0.745
AT3-098		0.51	0.525	0.53	0.52	0.535

trans-nonachlor Detail MD5: F12EA705331241F011416BDAB4D4E33C

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.008	0.008	0.0075	0.008	0.0075
AT3-098		0.00525	0.0054	0.0054	0.00535	0.0055

STUDY: TN-23-303
CLIENT: Eco-Analysts, Inc.
PROJECT: Yachtsman Marina, Kennebunkport, ME NAE-2004-00319
ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden Pesticides

Endpoint	Method	C	<	T	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
4-4'-DDD	Unequal Variance t Two-Sample Test	IOSN	<	Comp	12.65047	2.131847	0.000112413	0.05	TRUE	0.06434064	4		C
4-4'-DDE	Equal Variance t Two-Sample Test	IOSN	<	Comp	11.66548	1.859548	1.32927E-06	0.05	TRUE	0.04466556	8		C
4-4'-DDT	Equal Variance t Two-Sample Test	IOSN	<	Comp	-27.60917	1.859548	1	0.05	FALSE	0.000251899	8		C
aldrin	Equal Variance t Two-Sample Test	IOSN	<	Comp	-20.59785	1.859548	1	0.05	FALSE	0.000850426	8		C
alpha chlordane	Equal Variance t Two-Sample Test	IOSN	<	Comp	-21.61987	1.859548	1	0.05	FALSE	0.001736563	8		C
cis-Nonachlor	Equal Variance t Two-Sample Test	IOSN	<	Comp	-21.45421	1.859548	1	0.05	FALSE	0.000245291	8		C
Dieldrin	Equal Variance t Two-Sample Test	IOSN	<	Comp	-25.64962	1.859548	1	0.05	FALSE	0.000408889	8		C
endosulfan I	Equal Variance t Two-Sample Test	IOSN	<	Comp	-23.60311	1.859548	1	0.05	FALSE	0.000408889	8		C
endosulfan II	Equal Variance t Two-Sample Test	IOSN	<	Comp	-13.9468	1.859548	0.9999996	0.05	FALSE	0.000355995	8		C
endrin	Equal Variance t Two-Sample Test	IOSN	<	Comp	-23.34941	1.859548	1	0.05	FALSE	0.000245291	8		C
gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	IOSN	<	Comp	-21.26005	1.859548	1	0.05	FALSE	0.00073822	8		C
gamma-chlordane	Equal Variance t Two-Sample Test	IOSN	<	Comp	-23.76246	1.859548	1	0.05	FALSE	0.000449188	8		C
heptachlor	Equal Variance t Two-Sample Test	IOSN	<	Comp	-19.30434	1.859548	1	0.05	FALSE	0.000573152	8		C
heptachlor epoxide	Equal Variance t Two-Sample Test	IOSN	<	Comp	-22.23085	1.859548	1	0.05	FALSE	0.001012131	8		C
hexachlorobenzene	Equal Variance t Two-Sample Test	IOSN	<	Comp	-21.70335	1.859548	1	0.05	FALSE	0.004301147	8		C
Methoxychlor	Unequal Variance t Two-Sample Test	IOSN	<	Comp	-69.11124	2.131847	0.9999999	0.05	FALSE	0.01178525	4		C
oxychlordane	Equal Variance t Two-Sample Test	IOSN	<	Comp	-21.27108	1.859548	1	0.05	FALSE	0.001010592	8		C
toxaphene	Equal Variance t Two-Sample Test	IOSN	<	Comp	-21.95524	1.859548	1	0.05	FALSE	0.02058143	8		C
trans-nonachlor	Equal Variance t Two-Sample Test	IOSN	<	Comp	-18.7546	1.859548	1	0.05	FALSE	0.000239947	8		C

CETIS Analytical Report

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	04-1300-9223	**Endpoint:**	4-4'-DDD	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	365E136C7ABE425E3505FB05BD0FEC9A	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed 4-4'-ddd endpoint	731.14%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098*	4	12.7	2.13	0.0643	CDF	0.0001	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.1	2.29	0.1497	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.364428	0.364428	1	160	<1.0E-05	Significant Effect
Error	0.0182175	0.0022772	8			
Total	0.382646		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	60700	23.2	<1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.818	0.741	0.0238	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0088	0.00846	0.00914	0.009	0.0085	0.009	0.000122	3.11%	0.00%
AT3-098		5	0.391	0.307	0.474	0.381	0.299	0.485	0.0302	17.28%	-4338.64%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.009	0.009	0.0085	0.009	0.0085
AT3-098		0.485	0.299	0.381	0.414	0.374

CETIS Analytical Report

Report Date: 19 Aug-23 06:51 (p 2 of 19)
Test Code/ID: TN-23-303MnPest / 17-4167-8246

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	19-1389-8615	**Endpoint:**	4-4'-DDE	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	0449532986689BF4D27ED639AF32C67A	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 failed 4-4'-dde endpoint	20.40%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098*	8	11.7	1.86	0.0447	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.82	2.29	0.4634	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.19628	0.19628	1	136	<1.0E-05	Significant Effect
Error	0.0115388	0.0014424	8			
Total	0.207819		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	7.7	23.2	0.0732	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6872	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.219	0.196	0.242	0.224	0.191	0.239	0.00814	8.31%	0.00%
AT3-098		5	0.499	0.436	0.562	0.528	0.434	0.546	0.0226	10.12%	-127.95%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.191	0.224	0.228	0.213	0.239
AT3-098		0.546	0.434	0.456	0.532	0.528

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Macoma	**EA-EST, Inc. PBC**

Analysis ID:	13-4412-8912	**Endpoint:**	4-4'-DDT	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	A51056C72B17F409154A14A5FFBA4206	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed 4-4'-ddt endpoint	2.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-27.6	1.86	0.000252	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.497E-05	3.497E-05	1	762	<1.0E-05	Significant Effect
Error	3.67E-07	4.588E-08	8			
Total	3.534E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	4.48	23.2	0.1756	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0740	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0117	0.0114	0.012	0.0115	0.0115	0.012	0.000122	2.34%	0.00%
AT3-098		5	0.00796	0.0078	0.00812	0.008	0.00775	0.0081	0.0000579	1.63%	31.97%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0115	0.012	0.0115	0.012	0.0115
AT3-098		0.00775	0.008	0.008	0.00795	0.0081

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	11-0747-7870	**Endpoint:**	aldrin	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	4F40C84C6B9CA709AB35EFFDDB21BEE	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed aldrin endpoint	2.87%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-20.6	1.86	0.00085	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.05	2.29	0.1849	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002218	0.0002218	1	424	<1.0E-05	Significant Effect
Error	4.183E-06	5.229E-07	8			
Total	0.0002260		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	7.66	23.2	0.0738	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.958	0.741	0.7671	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0296	0.0284	0.0308	0.0295	0.0285	0.031	0.00043	3.25%	0.00%
AT3-098		5	0.0202	0.0197	0.0206	0.0203	0.0197	0.0206	0.000155	1.72%	31.82%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0295	0.03	0.029	0.031	0.0285
AT3-098		0.0197	0.0203	0.0203	0.0201	0.0206

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	09-4761-2761	**Endpoint:**	alpha chlordane	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	448C3EA7D282402304013A540199B9B4	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed alpha chlordane endpoint	2.72%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	8	-21.6	1.86	0.00174	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.94	2.29	0.3000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0010191	0.0010191	1	467	<1.0E-05	Significant Effect
Error	1.744E-05	2.180E-06	8			
Total	0.0010365		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	7.14	23.2	0.0831	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7193	Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0638	0.0614	0.0662	0.0635	0.062	0.0665	0.000875	3.07%	0.00%
AT3-098		5	0.0436	0.0427	0.0445	0.0437	0.0425	0.0445	0.000327	1.68%	31.65%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0635	0.065	0.062	0.0665	0.062
AT3-098		0.0425	0.0437	0.0439	0.0435	0.0445

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	12-1877-4562	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	D00F2F890F999B426D2D24A5205E0A8E	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed cis-nonachlor endpoint	2.82%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-21.5	1.86	0.000245	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.53	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.002E-05	2.002E-05	1	460	<1.0E-05	Significant Effect
Error	3.48E-07	4.35E-08	8			
Total	2.037E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	6.25	23.2	0.1037	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.741	0.0873	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0087	0.00836	0.00904	0.0085	0.0085	0.009	0.000122	3.15%	0.00%
AT3-098		5	0.00587	0.00573	0.00601	0.0059	0.0057	0.006	0.000049	1.87%	32.53%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0085	0.009	0.0085	0.009	0.0085
AT3-098		0.0057	0.0059	0.0059	0.00585	0.006

CETIS Analytical Report

Bioaccumulation Evaluation - Pesticides - Macoma

EA-EST, Inc. PBC

Analysis ID:	07-6660-5254	**Endpoint:**	Dieldrin	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	B1F5A087058062B2C2CD2637621354E4	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed dieldrin endpoint	2.30%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-25.6	1.86	0.000409	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.14	2.29	0.1241	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.952E-05	7.952E-05	1	658	<1.0E-05	Significant Effect
Error	9.67E-07	1.209E-07	8			
Total	8.049E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	4.79	23.2	0.1583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.868	0.741	0.0948	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0178	0.0172	0.0184	0.0175	0.0175	0.0185	0.0002	2.51%	0.00%
AT3-098		5	0.0122	0.0119	0.0124	0.0122	0.0119	0.0124	0.0000914	1.68%	31.69%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0175	0.018	0.0175	0.0185	0.0175
AT3-098		0.0119	0.0122	0.0123	0.0121	0.0124

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	03-9121-3921	**Endpoint:**	endosulfan I	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	FF47CC503AB8E950BFB23279C7F3F277	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed endosulfan i endpoint	2.51%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-23.6	1.86	0.000409	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.14	2.29	0.1241	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.734E-05	6.734E-05	1	557	<1.0E-05	Significant Effect
Error	9.67E-07	1.209E-07	8			
Total	6.831E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	4.79	23.2	0.1583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.868	0.741	0.0948	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0163	0.0157	0.0169	0.016	0.016	0.017	0.0002	2.74%	0.00%
AT3-098		5	0.0111	0.0109	0.0114	0.0112	0.0108	0.0114	0.0000914	1.84%	31.84%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.016	0.0165	0.016	0.017	0.016
AT3-098		0.0108	0.0112	0.0112	0.0111	0.0114

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	00-9261-3119	**Endpoint:**	endosulfan II	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	37132A5DA7BEE80601694F5308195EDA	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed endosulfan ii endpoint	4.24%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-13.9	1.86	0.000356	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.1	2.29	0.1467	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.782E-05	1.782E-05	1	195	<1.0E-05	Significant Effect
Error	7.33E-07	9.162E-08	8			
Total	1.856E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	21.2	23.2	0.0118	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.895	0.741	0.1938	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0084	0.00788	0.00892	0.0085	0.008	0.009	0.000187	4.98%	0.00%
AT3-098		5	0.00573	0.00562	0.00584	0.00575	0.0056	0.00585	0.0000406	1.59%	31.79%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0085	0.0085	0.008	0.009	0.008
AT3-098		0.0056	0.00575	0.00575	0.0057	0.00585

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Macoma					**EA-EST, Inc. PBC**

Analysis ID:	12-3923-0051	**Endpoint:**	endrin	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	4B88CC605516CF4BE2798D8338BEB52A	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed endrin endpoint	2.53%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-23.3	1.86	0.000245	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.53	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.372E-05	2.372E-05	1	545	<1.0E-05	Significant Effect
Error	3.48E-07	4.35E-08	8			
Total	2.406E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	6.25	23.2	0.1037	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.741	0.0873	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0097	0.00936	0.01	0.0095	0.0095	0.01	0.000122	2.82%	0.00%
AT3-098		5	0.00662	0.00648	0.00676	0.00665	0.00645	0.00675	0.000049	1.65%	31.75%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0095	0.01	0.0095	0.01	0.0095
AT3-098		0.00645	0.00665	0.00665	0.0066	0.00675

CETIS Analytical Report

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	06-4834-6007	**Endpoint:**	gamma-BHC (Lindane)	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	952F1413F8BBDA7AF2A0951D723E0DDE	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed gamma-bhc (lindane) endpoint	2.76%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-21.3	1.86	0.000738	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.2	2.29	0.0891	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001781	0.0001781	1	452	<1.0E-05	Significant Effect
Error	3.152E-06	3.94E-07	8			
Total	0.0001812		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	7.95	23.2	0.0693	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.741	0.3168	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0267	0.0257	0.0277	0.0265	0.026	0.028	0.000374	3.13%	2.60%
AT3-098		5	0.0183	0.0179	0.0186	0.0183	0.0178	0.0186	0.000133	1.62%	1.79%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0265	0.027	0.026	0.028	0.026
AT3-098		0.0178	0.0183	0.0184	0.0182	0.0186

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Macoma					**EA-EST, Inc. PBC**
Analysis ID:	00-5738-4808	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	EB91F29CD133C53DA8BED1666723A7AE	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed gamma-chlordane endpoint	2.50%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-23.8	1.86	0.000449	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.39	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.237E-05	8.237E-05	1	565	<1.0E-05	Significant Effect
Error	1.167E-06	1.459E-07	8			
Total	8.354E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	5.99	23.2	0.1111	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4274	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.018	0.0174	0.0186	0.018	0.0175	0.0185	0.000224	2.78%	1.77%
AT3-098		5	0.0123	0.012	0.0125	0.0123	0.012	0.0125	0.0000914	1.67%	1.21%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.018	0.0185	0.0175	0.0185	0.0175
AT3-098		0.012	0.0123	0.0124	0.0122	0.0125

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	15-0976-0545	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	43A5EA41BA8B2FE6A9EB5F2F725DCAE1	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed heptachlor epoxide endpoint	2.66%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-22.2	1.86	0.00101	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.73	2.29	0.6316	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003660	0.0003660	1	494	<1.0E-05	Significant Effect
Error	5.925E-06	7.406E-07	8			
Total	0.000372		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	7.17	23.2	0.0825	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7545	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0381	0.0367	0.0395	0.038	0.037	0.0395	0.00051	2.99%	0.00%
AT3-098		5	0.026	0.0255	0.0265	0.0261	0.0254	0.0265	0.00019	1.64%	31.76%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.038	0.039	0.037	0.0395	0.037
AT3-098		0.0254	0.0261	0.0262	0.0259	0.0265

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	16-1399-3357	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	11143760E14E109A61EEF9D035EBD914	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed heptachlor endpoint	3.08%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-19.3	1.86	0.000573	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.96	2.29	0.2778	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.851E-05	8.851E-05	1	373	<1.0E-05	Significant Effect
Error	0.0000019	2.375E-07	8			
Total	9.041E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	8.5	23.2	0.0618	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.955	0.741	0.7224	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0186	0.0178	0.0194	0.0185	0.018	0.0195	0.000292	3.50%	0.00%
AT3-098		5	0.0126	0.0124	0.0129	0.0127	0.0123	0.0129	0.0001	1.77%	31.99%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0185	0.019	0.018	0.0195	0.018
AT3-098		0.0123	0.0127	0.0128	0.0126	0.0129

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Macoma					**EA-EST, Inc. PBC**

Analysis ID:	17-3869-7799	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	F0E4A641FACB3A5649CF9480030475F0	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed hexachlorobenzene endpoint	2.71%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-21.7	1.86	0.0043	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.91	2.29	0.3310	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0063001	0.0063001	1	471	<1.0E-05	Significant Effect
Error	0.000107	1.338E-05	8			
Total	0.0064071		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	6.75	23.2	0.0912	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.976	0.741	0.9428	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.159	0.153	0.165	0.158	0.154	0.166	0.00216	3.04%	0.00%
AT3-098		5	0.109	0.106	0.111	0.109	0.106	0.111	0.000831	1.71%	31.59%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.158	0.162	0.155	0.166	0.154
AT3-098		0.106	0.109	0.11	0.108	0.111

Analyst: NR QA: JR

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	20-4435-9159	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	181BFD1EECC5567DCF971DEE81281D0	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed methoxychlor endpoint	2.87%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed		AT3-098	4	-69.1	2.13	0.0118	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.09	2.29	0.1580	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.364925	0.364925	1	4780	<1.0E-05	Significant Effect
Error	0.0006112	7.640E-05	8			
Total	0.365536		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	666	23.2	1.3E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.905	0.741	0.2509	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.411	0.395	0.426	0.408	0.399	0.428	0.00552	3.01%	0.00%
AT3-098		5	0.0287	0.0281	0.0293	0.0288	0.028	0.0293	0.000214	1.67%	93.00%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.408	0.419	0.401	0.428	0.399
AT3-098		0.028	0.0288	0.029	0.0287	0.0293

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	06-1250-5714	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	2CEAE8CE035F223B0DAD46500D2D3437	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed oxychlordane endpoint	2.76%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-21.3	1.86	0.00101	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.73	2.29	0.6265	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003341	0.0003341	1	452	<1.0E-05	Significant Effect
Error	5.907E-06	7.384E-07	8			
Total	0.00034		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	7.36	23.2	0.0791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.956	0.741	0.7424	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0366	0.0352	0.038	0.0365	0.0355	0.038	0.00051	3.12%	0.00%
AT3-098		5	0.025	0.0245	0.0256	0.0251	0.0244	0.0256	0.000188	1.68%	31.58%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.0365	0.0375	0.0355	0.038	0.0355
AT3-098		0.0244	0.0251	0.0252	0.025	0.0256

Bioaccumulation Evaluation - Pesticides - Macoma **EA-EST, Inc. PBC**

Analysis ID:	20-3031-3246	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	64BBF430881C98257BBB693837667970	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed toxaphene endpoint	2.68%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-22	1.86	0.0206	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2	2.29	0.2341	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.147623	0.147623	1	482	<1.0E-05	Significant Effect
Error	0.00245	0.0003063	8			
Total	0.150073		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	5.62	23.2	0.1231	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.963	0.741	0.8219	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.767	0.739	0.795	0.76	0.745	0.8	0.0102	2.97%	0.00%
AT3-098		5	0.524	0.512	0.536	0.525	0.51	0.535	0.0043	1.84%	31.68%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.76	0.78	0.75	0.8	0.745
AT3-098		0.51	0.525	0.53	0.52	0.535

CETIS Analytical Report

Report Date: 19 Aug-23 06:51 (p 19 of 19)
Test Code/ID: TN-23-303MnPest / 17-4167-8246

Bioaccumulation Evaluation - Pesticides - Macoma — **EA-EST, Inc. PBC**

Analysis ID:	21-2045-5284	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv2.1.1
Analyzed:	19 Aug-23 6:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	08 May-23 22:45	**MD5 Hash:**	E900AD219B0D2BF45F2DDF2B2F538B16	**Editor ID:**	

Batch ID:	16-7638-7277	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Mar-23 13:49	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Apr-23 12:49	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Test Length:	27d 23h	**Taxon:**	Bivalvia	**Source:**	ARO - Aquatic Research Or **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
IOSN 2019	13-4648-8170	08 Mar-23	08 Mar-23	21d 14h	Eco-Analysts, Inc.	Dredged Sediment Evalu
AT3-098	07-1559-4974	08 Feb-23 13:00	09 Feb-23 16:30	49d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
IOSN 2019	Reference sediment	Yachtsman Marina NAE-2004-00	IOSN Reference	
AT3-098	Marine Sediment	Yachtsman Marina NAE-2004-00	10 Stations at 4 Marinas Mu	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	AT3-098 passed trans-nonachlor endpoint	3.08%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Reference Sed	AT3-098	8	-18.8	1.86	0.00024	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.464E-05	1.464E-05	1	352	<1.0E-05	Significant Effect
Error	3.330E-07	4.163E-08	8			
Total	1.497E-05		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Variance Ratio F Test	9.09	23.2	0.0550	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.877	0.741	0.1214	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
IOSN 2019	RS	5	0.0078	0.00746	0.00814	0.008	0.0075	0.008	0.000122	3.51%	0.00%
AT3-098		5	0.00538	0.00527	0.00549	0.0054	0.00525	0.0055	0.0000406	1.69%	31.03%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
IOSN 2019	RS	0.008	0.008	0.0075	0.008	0.0075
AT3-098		0.00525	0.0054	0.0054	0.00535	0.0055

ATTACHMENT XII

Report Quality Assurance Record
(2 pages)

REPORT QUALITY ASSURANCE RECORD

Client: EcoAnalysts

Project Number: EA.TOX

Author: M. Chanov

EA Report Number: 9180

REPORT CHECKLIST

QA/QC ITEM	REVIEWER	DATE
1. Samples collected, transported, and received according to study plan requirements.		9/5/23
2. Samples prepared and processed according to study plan requirements.		9/5/23
3. Data collected using calibrated instruments and equipment.		9/5/23
4. Calculations checked:		
- Hand calculations checked		9/5/23
- Documented and verified statistical procedure used.		9/5/23
5. Data input/statistical analyses complete and correct.		9/6/2023
6. Reported results and facts checked against original sources.		9/6/2023
7. Data presented in figures and tables correct and in agreement with text.		9/6/2023
8. Results reviewed for compliance with study plan requirements.		9/5/23

	AUTHOR	DATE
9. Commentary reviewed and resolved.		9/6/23
10. All study plan and quality assurance/control requirements have been met and the report is approved:		9/6/23
	PROJECT MANAGER	DATE
		9/6/2023
	QUALITY CONTROL OFFICER	DATE
		9/6/23
	SENIOR TECHNICAL OFFICER	DATE

ATTACHMENT XIII

Army Corps of Engineers Quality Assurance Records
(3 pages)

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	NA
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	See Tissue Chemistry report under separate cover
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	See Tissue Chemistry report under separate cover
15. Were the SRM/CRM analyses within acceptance criteria?	See Tissue Chemistry report under separate cover
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	See Tissue Chemistry report under separate cover
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	See Tissue Chemistry report under separate cover
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	See Tissue Chemistry report under separate cover
19. Were surrogate recoveries within the required acceptance criteria?	See Tissue Chemistry report under separate cover
20. Were corrective action forms provided for all non-conforming data?	NA
21. Were all the species-specific test conditions in Appendix V met?	Yes
22. Were the test-specific age requirements met for each test species?	Yes
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	See data package from first phase of testing
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	Yes
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	Yes

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	**Acceptance Criteria***	**Criteria Met? Yes/No**	**List results outside criteria (Cross-reference results table in data report)**	**Location of Results (Retained at Lab or in Data Package)**
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species	Yes		Data Package
Test species age	Age/health within guidelines for each species (Appendix V)	Yes		Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No	Yes		Data Package (separate cover)
Water column toxicity test: Control mortality Control abnormality	 ≤ 10% mean ≤ 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae	NA		
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 ≤ 10% mean (no chamber > 20%) See EPA (1994a) Section 9; Table 11.3	Yes		Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

ATTACHMENT XIV

Email Communications
(7 pages)

Tissue Reporting

Fri, Mar 30, 2018 at 10:17 AM

To:
Cc:

Good morning -

Please see the below confirmation just received from NAE regarding the handling of statistics under their recently requested "totals" calculation protocol. Please proceed using the below guidance and let us know if any questions etc

Best

-----Original Message-----
From: Loyd, Richard B CIV USARMY CENAE (US) [mailto:Richard.B.Loyd@usace.army.mil]
Sent: Friday, March 30, 2018 10:12 AM
To:
Cc:
Su[redacted]

Hey there [redacted],
I agree with ESI's recommendation to use 1/2 MDL for non-detects for both the computation of totals and for statistical analysis. It took a little while to get you an answer because I was waiting on a call back from our regulatory office to make sure they were ok with that methodology as well. In future ESI should follow the proposed protocol for both federal and private projects.

Thanks,
Ben

Richard B. Loyd
US Army Corps of Engineers
696 Virginia Road
Concord, MA 01742
Office: (978) 318-8048
Cell: (978) 763-5438
Richard.B.Loyd@usace.army.mil

-----Original Message-----
From:
Sent: Wednesday, March 28, 2018 4:56 PM
To: Lo[redacted]usace.army.mil>
Cc:
Subject: [Non-DoD Source] Tissue Reporting

Based on the recent directive regarding reporting on non-detects and summation of totals, we have some further questions regarding statistical evaluation. The issue, paraphrased from ESI is as follows:

“Historically the Bioaccumulation EDD, where totals for PCBs etc are provided, uses the MDL when a value is a non-detect "ND" and the statistical analysis on the individual compounds are run using the MDL in place of the ND. Going forward, as per direction from USACE, we will use 1/2 of the MDL to compute the "Total" concentration for specified compounds. Under this scenario what number should be incorporated into the statistical analysis program, the 1/2 MDL or the MDL? As indicated, the "Total" numbers have not been included in the statistical analysis historically. However, a potential issue arises if the stats were run using the MDL then a review of the full data package differs shows different numbers which could potentially lead to some level of confusion. ESI’s suggestion would be to use the 1/2 MDL for the computation of totals and for the statistical analysis, for those groups where total are generated, PCBs, Pesticides and PAHs.

Do you concur with ESI’s recommendation?

Thanks Ben,

-----Original Message-----
From: Loyd, Richard B CIV USARMY CENAE (US) [mailto:Richard.B.Loyd@usace.army.mil <mailto:Richard.B.Loyd@usace.army.mil>]
Sent: Monday, March 26, 2018 2:28 PM
To:
Cc:
Subject: RE: Draft Report

Hello,
I realize that the reporting methods we requested are in conflict with the guidance of the RIM and the 2009 errata. The 2009 errata is the most recent RIM update. Please stick to the guidance we gave you in our last conference call, which is summarized below:

- Please continue to report NDs as the full RL. We are in the process of changing our methods to report NDs as the full MDL, but this change might not take place in the near future.

- For totals calculations (PCBs, DDT, PAHs) please use 1/2 the MDL for NDs. Please remember that PCB totals are calculated using only the NOAA 18 congeners. Also, despite what the errata guidance, please continue to calculate PCB totals for sediment chemistry.

Thanks,
Ben

Richard B. Loyd
US Army Corps of Engineers
696 Virginia Road
Concord, MA 01742
Office: (978) 318-8048
Cell: (978) 763-5438
Richard.B.Loyd@usace.army.mil <mailto:Richard.B.Loyd@usace.army.mil>

From: Loyd, Richard B CIV USARMY CENAE (USA) <Richard.B.Loyd@usace.army.mil> on behalf of Loyd, Richard B CIV USARMY CENAE (USA)
Sent: Tuesday, July 28, 2020 1:08 PM
To:
Cc:
Subject: RE: [Non-DoD Source] Re: CLDS and CCBDS reference area data

Hello,

Please continue to use 1/2 the MDL for non-detects and add appropriate qualifiers as you have done in the past.

The only thing that is changing is the removal of the 'c' qualifier and the requirement to run statistics in a scenario where you have measurable analyte concentrations in your dredge area samples but non-detects in the reference area sample.

Thanks,
Ben

Richard B. Loyd
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Concord, MA 01742
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Cell: (978) 763-5438
Richard.B.Loyd@usace.army.mil

-----Original Message-----
From:
Sent: Tuesday, July 28, 2020 12:53 PM
To: Loyd, Richard B CIV USARMY CENAE (USA) <Richard.B.Loyd@usace.army.mil>
Cc:
Subject: [Non-DoD Source] Re: CLDS and CCBDS reference area data

Greetings,

For the statistical analysis of the bioaccumulation data we have been using half the MDL when a replicate is reported as a non-detect.
Moving forward, what value are we using for instances where the replicate is reported as a non-detect?

Regards,

<Blockedhttps://mail.google.com/mail/u/0/?ui=2&ik=5daaac60f2&attid=0.1&permmsgid=msg-f%3A1626109999743927214&th=16911a6de47283ae&view=fimg&sz=s0-l75-ft&attbid=ANGjdJ-0i0-ICKOCTnsL25z4zFmO422I3FDAfvBsfnV4B17PjvXhvUWXWaVHz6HM-0GQEVw3iHhW3FcmarSRaMZ0MW0gEjSr655W30Proa_AXugmmSR-DiYCxX_-qEQ&disp=emb&realattid=677ce2b6e9998d9d_0.1>

Please take a moment to provide Customer Feedback <Blockedhttps://www.surveymonkey.com/r/T2SSR8W>

Please consider the environment before printing this email

On Tue, Jul 28, 2020 at 11:49 AM Loyd, Richard B CIV USARMY CENAE (USA) <Richard.B.Loyd@usace.army.mil <mailto:Richard.B.Loyd@usace.army.mil> > wrote:

Hello,

The 10-day / 28-day survival and the tissue chemistry results for the standard CLDS and CCBDS reference area data sets are attached. I believe these are the only two sites you are working with at the moment. Please reach out to me for data for other reference areas as needed. Please note that we plan to update these data sets every few years.

When you run bioaccumulation stats we want you to treat the reference site values as a detectable concentrations even if there are 'u'/'a' qualifiers in the data. This will eliminate the use of the 'c' qualifier for the dredge area samples. This is being done to simplify the data input process for the EPA risk assessment model. In the past we have seen elevated dredge area tissue concentrations that are flagged with a 'c' because the analyte was not detected in the reference area sample. This means we have to go through the EDD manually to determine if any of the analytes with a 'C' qualifier need to be included in the model run.

Please let me know if you have any questions.

Thanks,
Ben

Richard B. Loyd

From: Loyd, Richard B CIV USARMY CENAE (USA) <Richard.B.Loyd@usace.army.mil> on behalf of Loyd, Richard B CIV USARMY CENAE (USA)
Sent: Friday, October 09, 2020 3:58 PM
To:
Cc:
Subject: RE: [Non-DoD Source] Re: CLDS and CCBDS reference area data

I think it would be fine to use the 'c' qualifier, but please be sure to update the footnote descriptions accordingly so that no one gets confused.

best,
Ben

Richard B. Loyd
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696 Virginia Road
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Office: (978) 318-8048
Cell: (978) 763-5438
Richard.B.Loyd@usace.army.mil

-----Original Message-----
From:
Sent: Friday, October 9, 2020 3:53 PM
To: Loyd, Richard B CIV USARMY CENAE (USA) <Richard.B.Loyd@usace.army.mil>;
Cc:
Subject: RE: [Non-DoD Source] Re: CLDS and CCBDS reference area data

Hello Ben, I do have a follow up question.

The COCs that will be eliminated from further evaluation because they are not detected in any of the reference and dredge area replicates would be footnoted as such. Should we use the "c" footnote in that instance? Or will that get confused with the prior definition of "c" in the Corps' EDD?

Thanks again-

-----Original Message-----
From: Loyd, Richard B CIV USARMY CENAE (USA) <Richard.B.Loyd@usace.army.mil>
Sent: Friday, October 09, 2020 3:34 PM
To:
Cc:
Subject: RE: [Non-DoD Source] Re: CLDS and CCBDS reference area data

Hello ,
If both the reference and dredge area samples are 'a' qualified with non-detects for all replicates then you can eliminate them from further evaluation. If one or more of the dredge area replicates came back with a detectable concentration then you should proceed with further evaluation.

Let me know if you have any other questions.

Thanks,
Ben

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Cell: (978) 763-5438
Richard.B.Loyd@usace.army.mil

-----Original Message-----
From:
Sent: Thursday, October 8, 2020 1:41 PM
To: Loyd, Richard B CIV USARMY CENAE (USA) <Richard.B.Loyd@usace.army.mil>;
Cc:
Subject: RE: [Non-DoD Source] Re: CLDS and CCBDS reference area data

Good afternoon Ben-

I am in the beginning stages of reporting two 28-day bioaccumulation evaluations (private and IDIQ projects), and am seeking clarification on the new approach for treating "c" qualified data as outlined in your email below. My understanding from your email is that "c" qualifiers should be eliminated, and those COCs that had been removed from further consideration because they were "c" qualified will now be retained for further evaluation.

My question is this: How should we treat COCs that are not detected in either the historic reference tissue or in any current (i.e.,
project-specific) site composite tissues? Should those COCs be retained for further evaluation or should they be eliminated?

Much appreciated-

ECOTOXICOLOGICAL TESTING
WATER COLUMN BIOASSAYS

KENNEBUNKPORT, MAINE

Prepared for:

Eco-Analysts, Inc.
P.O. Box 224
Bath, Maine 04530

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC
231 Schilling Circle
Hunt Valley, Maryland 21031
For questions concerning this report, please contact Michael Chanov
ph: 410-584-7000

Results relate only to the items tested or to the samples as received by the laboratory.

This report shall not be reproduced, except in full, without written approval of EA Engineering, Science, and Technology, Inc., PBC

This report contains 21 pages plus 6 attachments.

8 August 2023

Michael K. Chanov II
Laboratory Director

Date

EA Project Number 70022.TOX

ACCREDITED IN ACCORDANCE WITH
nelac
E87550

EA Report Number 9259

1. INTRODUCTION

In accordance with the US Army Corps of Engineers, New England District (CENAE), EA Engineering, Science, and Technology, Inc., PBC performed water column toxicity testing on sediment samples collected from the area of dredging proposed for the marinas located on the Kennebunk River in Kennebunkport, Maine. Placement of dredge materials is proposed at the Isles of Shoals North (IOSN) Disposal Site. Samples were provided by Eco-Analysts, Inc., Bath, Maine. The purpose of this study was to evaluate the toxicity of standard elutriates prepared from the sediment samples on water column organisms.

The toxicity testing program consisted of acute water column bioassays with *Mytilus* sp. (blue mussel), *Americamysis bahia* (opossum shrimp), and *Menidia beryllina* (inland silverside). The acute water column bioassays evaluated the effects of exposure to the sediment elutriates on survival of the test organisms, and on the development of embryonic *Mytilus* sp. All biological testing was completed at EA Engineering, Science and Technology, Inc. PBC (EA), Hunt Valley, Maryland. All chemical analyses of elutriate solutions were completed by Alpha Analytical, Westborough, Massachusetts.

2. MATERIALS AND METHODS

2.1 SAMPLE RECEIPT AND PREPARATION

Ten sediment samples were collected by Eco-Analysts personnel from locations in the dredge footprint identified in the Sampling and Analysis Plan. One sediment composite was created for the project and placed into five 5-gallon buckets. Water collected from the dredge footprint was collected in 5-gallon pails. The samples were held at ≤4°C and were hand delivered to EA's Ecotoxicology Laboratory in Hunt Valley, Maryland. The samples were logged in and assigned an EA laboratory accession number and stored in the dark in a secured walk-in cooler at ≤4°C until used for testing. Table 1 summarizes the sample identification, accession numbers, and collection and receipt information for the sediment and site water samples. Chain-of-custody records are included in Attachment I.

2.2 TOXICITY TEST METHODS

All toxicity testing was conducted following EA's standard operating procedures (EA 2022) which are in accordance with the *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters* (US EPA, CENAE 2004), USEPA/USACE guidance (1991, 1998) and USEPA guidance (2002).

2.2.1 Water Column Toxicity Testing

Elutriates were prepared using the sediment composite samples and the site water. A subsample of homogenized sediment was combined with site water in a 1:4 sediment to water ratio, on a volume/volume basis. The sediment/water combination was vigorously mixed by aeration and manual stirring for 30 minutes and was then allowed to settle for a minimum of one hour. After settling, the supernatant was siphoned off and adjusted, if necessary, to 30 ppt salinity using Crystal Sea Bioassay Grade synthetic sea salts. The elutriate was used for the water column acute toxicity testing within 24 hours of preparation. Aliquots of the prepared elutriate were couriered overnight and on ice to Alpha Analytical for chemical analysis.

Static, non-renewal bioassays were conducted on the prepared elutriates using *Americamysis bahia* (opossum shrimp) and *Menidia beryllina* (inland silverside). The blue mussel (*Mytilus* sp.*)* was used as the test species for embryo development tests. The test organisms were acquired from outside vendors. Acquired lots of organisms were gradually acclimated to test temperature and salinity prior to use in testing.

Test concentrations of 100, 50, and 10 percent elutriate were prepared by measuring aliquots of elutriate in a graduated cylinder and bringing to final volume with 30 ppt artificial sea water. A test was also prepared for an undiluted site water sample. The artificial seawater was prepared by mixing Crystal Sea synthetic sea salts with laboratory water to a final salinity of 30 ppt. The source of the laboratory water was the City of Baltimore municipal tap water that was passed through a high-capacity, activated carbon filtration system. This synthetic seawater formulation has proven acceptable for aquatic toxicological studies, and has been used successfully at EA for maintaining multigeneration cultures, and for holding healthy populations of estuarine and marine species. Batches of artificial seawater were aerated and aged at least 24 hours prior to use in testing.

In order to evaluate the toxicity of ammonia to the test species, separate toxicity tests were conducted in which the test organisms were exposed to a graded concentration of ammonia, administered as ammonium chloride (NH_4Cl).

2.2.1.1 *Mytilus* sp. Water Column Toxicity Testing

Larval development tests were conducted with the blue mussel (*Mytilus* sp.) on the prepared elutriate. Adult mussels were acquired from Aquatic Research Organisms (Hampton, New Hampshire). Upon receipt at EA, the adult mussels were visually inspected, were scrubbed clean (e.g., barnacles removed) and were placed in 30 ppt artificial seawater at 4ºC. The collection of mussel eggs and sperm, and preparation of gamete dilution were performed according to EA's standard operating procedures (EA 2022) which follow guidelines in USEPA/USACE (1998), USEPA (1995) and ASTM (2012). Spawning was temperature induced by placing the mussels individually into 125 ml cups containing 30 ppt artificial seawater and raising the temperature of the water from 12ºC and 20ºC. Gametes were microscopically inspected to determine normality of eggs and motility of sperm. Gametes that were determined to be acceptable for testing were pooled and were used to prepare the sperm and egg suspensions for the fertilization procedures. Care was taken to keep male and female gametes completely separate to avoid accidental fertilization during gamete preparation. Only combined gamete preparations that had achieved a minimum of 90 percent fertilization were used in testing. Toxicity tests were initiated within 4 hours of egg fertilization.

Test chambers were 30-ml scintillation vials with screw caps. Each test concentration and control had five replicate test chambers containing 10 ml of test solution. At test initiation, 100 µl of fertilized gamete preparation was delivered into each test chamber containing test dilution. Extra replicates of controls were prepared to monitor embryo counts at test initiation and termination. The tests were maintained at a target temperature of 16±1°C with a 16-hour light/8-hour dark photoperiod. Water quality parameters (temperature, pH, dissolved oxygen, and salinity) were measured in separate water quality cups at test initiation and daily during the 48-hour exposure period. Summaries of water quality parameters can be found in Table 4.

The toxicity tests were terminated by adding 250 µl of 37 percent buffered formalin to each test chamber. The preserved samples were then observed microscopically to determine the percent survival of control organisms, and the percentage of embryos in each test treatment and control that had normally developed (C-shaped, hinged, prodissoconch larvae) shells.

In order to evaluate the toxicity of ammonia to *Mytilus* sp., a separate toxicity test was conducted in which the *Mytilus* sp. embryos were exposed to a graded concentration of ammonia, administered as ammonium chloride (NH_4Cl). Copies of all data sheets from the mussel toxicity tests are included in Attachment II.

2.2.1.2 ***Americamysis bahia*** **and** ***Menidia beryllina*** **Water Column Toxicity Testing**

The 96-hour toxicity tests with *A. bahia* and *M. beryllina* were initiated using test organisms received from Aquatic BioSystems (Fort Collins, Colorado). At test initiation, the *A. bahia* were

5 days old. The *M. beryllina* were 12 days old at test initiation. The opossum shrimp and inland silversides were fed *Artemia* sp. nauplii (<24 hours old) during holding, prior to use in testing.

The *A. bahia* and *M. beryllina* testing was conducted in 1-L beakers. Each beaker contained 200 ml of test solution, with five replicate beakers per test concentration. Ten organisms were randomly introduced into each replicate for a total of 50 organisms per concentration. The test chambers were maintained at 20±1°C and 30 ppt ±10%. Dissolved oxygen was maintained at ≥40% saturation using aeration as needed. Illumination was kept at 16-hour light/8-hour dark photoperiod. The *A. bahia* and *M. beryllina* were fed a small ration of brine shrimp nauplii (*Artemia* sp.) daily to avoid starvation and cannibalism (*A. bahia*). Temperature, pH, dissolved oxygen, and salinity were measured daily in one replicate of each concentration of the *A. bahia* and *M. beryllina* toxicity tests during the 96-hour exposure period. Summaries of water quality parameters measured during the toxicity tests are presented in Tables 4 (*A. bahia*) and 5 (*M. beryllina*). The number of live organisms in each test chamber were counted daily and recorded on the test data sheets. Copies of the *A. bahia* and *M. beryllina* acute toxicity test data sheets are included in Attachments III and IV, respectively.

2.2.2 Data Analysis

Statistical analyses were performed on the water column test data according to USEPA/USACE (1998) guidance and using the ToxCalc statistical software package (Version 5.0, Tidepool Scientific Software). For the elutriate testing, an EC50 (median effective concentration) or LC50 (median lethal concentration) was calculated for each test species using the linear interpolation, Spearman-Karber, Trimmed Spearman-Karber, or probit method. Additionally, if normal development or survival in the 100 percent elutriate concentration was at least 10 percent lower than the dilution water control, then a statistical comparison (t-Test) was performed between the 100 percent elutriate concentration and the control. The t-test was based on the assumptions that the observations were independent and normally distributed as determined by the Shapiro-Wilk's test. The F-Test was used to test for homogeneity of variance. When the data did not meet the normality assumption, the nonparametric test, Wilcoxon's Two-Sample Test, was used to analyze the data. An arc sine (square root [Y]) transformation was performed on the survival percentages.

The results of the ammonia testing are summarized in Table 6. The results of the water column testing on the elutriate samples are presented in Tables 7 through 9, and summarized in Table 10.

2.2.3 Reference Toxicant Testing

In conformance with EA's quality assurance/quality control program requirements, reference toxicant testing was performed by EA on *Mytilus* sp., *A. bahia* and *M. beryllina*. The reference toxicant tests consisted of a graded concentration series of a specific toxicant in water only tests. The results of the reference toxicant tests were compared to established control chart limits. Table 11 presents the results of the reference toxicant testing.

2.3 ARCHIVES

Original data sheets, records, memoranda, notes, and computer printouts are archived at EA's Office in Hunt Valley, Maryland. These data will be retained for a period of 5 years unless a longer period of time is requested.

3. RESULTS AND DISCUSSION

This bioassay study using elutriates prepared from the composited sediments collected the marinas located on the Kennebunk River in Kennebunkport, Maine, was designed and conducted to meet the requirements of the USEPA/USACE dredged material testing program and the CENAE protocol requirements. The results of these toxicity tests met the current NELAC standards, where applicable. A summary of the toxicity testing results can be found in Table 10.

3.1 WATER COLUMN TOXICITY TESTING

In order to evaluate the toxicity of ammonia to the test species, separate toxicity tests were conducted in which the test organisms were exposed to a graded concentration of ammonia, administered as ammonium chloride (NH_4Cl). The results of this ammonia study are summarized in Table 6. The 48-hour LC50 value for *Mytilus* sp. was 7.6 mg/L NH_3-N, while the corresponding EC50 was 5.6 mg/L NH_3-N. The ammonia 96-hour LC50 value for *Americamysis bahia* was 31.2 mg/L NH_3-N, while the 96-hour LC50 value for *Menidia beryllina* was 19.7 mg/L NH_3-N.

3.1.1 *Mytilus* sp. Water Column Testing

The results of the *Mytilus* sp. toxicity tests conducted on the elutriate sample are presented in Table 7. Exposure to the sample indicated that the 48-hour LC50 value was >100 percent elutriate. Exposure to the sample did not produce an adverse effect on embryo development, with 48-hour EC50 value of >100 percent elutriate. Percent survival and normal development in 100 percent concentration of the elutriate was 90 and 86 percent, respectively, and was not significantly less (p=0.05) than the laboratory control. The percent survival and normal embryo development in the site water used to prepare the elutriate were 94 and 90 percent, respectively.

3.1.2 *Americamysis bahia* Water Column Testing

Table 8 summarizes the results of the elutriate testing with *A. bahia*. The elutriate sample was not acutely toxic to *A. bahia*. The elutriate had a 96-hour LC50 value of >100 percent elutriate, and survival in the 100 percent test concentration was 90 percent. There was a minimum of 94 percent survival in the laboratory controls, and the site water had 96 percent survival at test termination.

3.1.3 *Menidia beryllina* Water Column Testing

The *M. beryllina* water column test results are presented in Table 9. The elutriate sample was not acutely toxic to *M. beryllina*. The elutriate had a 96-hour LC50 value of >100 percent elutriate, and survival in the 100 percent test concentration was 88 percent. There was a minimum of 94 percent survival in the laboratory controls, and the site water had 82 percent survival at test termination.

3.2 REFERENCE TOXICANT TESTS

The results of the reference toxicant tests are summarized in Table 11. All of the reference toxicant test results fell within the established laboratory control chart limits.

4. REFERENCES CITED

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USEPA/USACE. 1998. Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S.-Inland Testing Manual. EPA/823/B-94/004. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. and Department of the Army, U.S. Army Corps of Engineers, Washington, D.C.

US EPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. EPA-821-R-02-012. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

U.S. Army Corps of Engineers (USACE) New York District/U.S. Environmental Protection Agency (USEPA) Region 2. 2016. Guidance for Performing Tests on Dredged Material Proposed for Ocean Disposal. Regional Testing Manual. April.

US EPA Region 1, CENAE. 2004. Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters. September 2004.

TABLE 1 SUMMARY OF COLLECTION AND RECEIPT INFORMATION FOR SEDIMENT AND SITEWATER SAMPLES

Sample Identification	**EA Accession Number**	**Collection**		**Receipt**	
		Time	**Date**	**Time**	**Date**
10 Stations at 4 Marinas Mud	AT3-098	0900-1300	8 February 2023	1630	9 February 2023
10 Stations at 4 Marinas Site Water	AT3-099	0900-1300	8 February 2023	1630	9 February 2023

TABLE 2 AMMONIA CONCENTRATIONS MEASURED ON ELUTRIATES PRIOR TO WATER COLUMN TOXICITY TESTING

		Ammonia (mg/L NH_3-N)
Sediment Identification	**EA Accession Number**	**(Total/Unionized) Elutriate**
10 Stations at 4 Marinas Mud	AT3-098	2.2/0.05
10 Stations at 4 Marinas Site Water	AT3-099	<0.1/<0.1

TABLE 3 SUMMARY OF WATER QUALITY PARAMETERS MEASURED DURING ELUTRIATE BIOASSAY TESTING WITH *Mytilus* sp.

Sediment Sample Identification	**EA Accession Number**	**Test Number**	**Range**			
			Temperature (°C)	**pH**	**Dissolved Oxygen (mg/L)**	**Salinity (ppt)**
10 Stations at 4 Marinas Mud	AT3-098	TN-23-209	15.6 – 16.9	7.7 – 8.2	7.9 – 8.5	28.6 – 32.9
10 Stations at 4 Marinas Site Water	AT3-099	TN-23-210	15.6 – 16.7	7.8 – 8.2	8.0 – 8.6	28.8 – 33.0

TABLE 4 SUMMARY OF WATER QUALITY PARAMETERS MEASURED DURING ELUTRIATE BIOASSAY TESTING WITH *Americamysis bahia*

Sediment Sample Identification	**EA Accession Number**	**Test Number**	**Range**			
			Temperature (°C)	**pH**	**Dissolved Oxygen (mg/L)**	**Salinity (ppt)**
10 Stations at 4 Marinas Mud	AT3-098	TN-23-212	19.0 – 20.4	7.2 – 8.0	5.8 – 7.7	28.3 – 33.0
10 Stations at 4 Marinas Site Water	AT3-099	TN-23-213	19.0 – 20.0	7.4 – 8.0	5.9 – 7.7	28.4 – 33.0

TABLE 5 SUMMARY OF WATER QUALITY PARAMETERS MEASURED DURING ELUTRIATE BIOASSAY TESTING WITH *Menidia beryllina*

Sediment Sample Identification	**EA Accession Number**	**Test Number**	**Range**			
			Temperature (°C)	**pH**	**Dissolved Oxygen (mg/L)**	**Salinity (ppt)**
10 Stations at 4 Marinas Mud	AT3-098	TN-23-214	19.0 – 20.4	7.7 – 8.1	6.7 – 7.7	28.6 – 33.0
10 Stations at 4 Marinas Site Water	AT3-099	TN-23-215	19.0 – 20.3	7.8 – 8.0	6.7 – 7.9	28.7 – 33.0

TABLE 6 RESULTS OF AMMONIA (NH_4Cl) TOXICITY TESTING

		48-Hour Survival (%)						
			mg/L NH_3-N					
Test Organism	**Test Number**	**Lab Control**	**50 mg/L**	**10 mg/L**	**3.7 mg/L**	**1.5 mg/L**	**0.65 mg/L**	**48-hour LC50 (mg/L NH_3-N)**
Mytilus sp.	TN-23-211	99	4	24	90	94	90	7.6

		48-Hour Normal Development (%)						
			mg/L NH_3-N					
Test Organism	**Test Number**	**Lab Control**	**50 mg/L**	**10 mg/L**	**3.7 mg/L**	**1.5 mg/L**	**0.65 mg/L**	**48-hour EC50 (mg/L NH_3-N)**
Mytilus sp.	TN-23-211	97	0	1	85	89	86	5.6

		96-Hour Survival (%)						
			mg/L NH_3-N					
Test Organism	**Test Number**	**Lab Control**	**150 mg/L**	**87 mg/L**	**42 mg/L**	**21 mg/L**	**7.5 mg/L**	**96-hour LC50 (mg/L NH_3-N)**
A. bahia	TN-23-202	90	0	0	10	80	80	31.2
M. beryllina	TN-23-205	90	0	0	0	50	80	19.7

TABLE 7 RESULTS OF TOXICITY TESTING WITH *Mytilus* sp. ON ELUTRIATES

Sediment Sample Identification	EA Accession Number	Test Number	48-Hour Survival (%)				
			Lab Control	Percent Elutriate			48-hour LC50 (% elutriate)
				100%	50%	10%	
10 Stations at 4 Marinas Mud	AT3-098	TN-23-209	94	90	100	98	>100
10 Stations at 4 Marinas Site Water	AT3-099	TN-23-210	93	94	---	---	>100

Sediment Sample Identification	EA Accession Number	Test Number	48-Hour Normal Embryo Development (%)				
			Lab Control	Percent Elutriate			48-hour EC50 (% elutriate)
				100%	50%	10%	
10 Stations at 4 Marinas Mud	AT3-098	TN-23-209	91	86	99	94	>100
10 Stations at 4 Marinas Site Water	AT3-099	TN-23-210	90	90	---	---	>100

TABLE 8 RESULTS OF TOXICITY TESTING WITH *Americamysis bahia* ON ELUTRIATES

Sample Identification	**EA Accession Number**	**Test Number**	**96-Hour Survival (%)**				
				Percent Elutriate			**96-hour LC50 (% elutriate)**
			Lab Control	**100%**	**50%**	**10%**	
10 Stations at 4 Marinas Mud	AT3-098	TN-23-212	94	90	92	98	>100
10 Stations at 4 Marinas Site Water	AT3-099	TN-23-213	94	96	---	---	>100

TABLE 9 RESULTS OF TOXICITY TESTING WITH *Menidia beryllina* ON ELUTRIATES

Sample Identification	EA Accession Number	Test Number	96-Hour Survival (%)				
			Lab Control	Percent Elutriate			96-hour LC50 (% elutriate)
				100%	50%	10%	
10 Stations at 4 Marinas Mud	AT3-098	TN-23-214	94	88	92	90	>100
10 Stations at 4 Marinas Site Water	AT3-099	TN-23-215	100	82(a)	---	---	>100

(a) 100 percent elutriate treatment is significantly different ($p=0.05$) from the laboratory control

TABLE 10 SUMMARY OF RESULTS OF TOXICITY TESTING ON ELUTRIATES

Sample Identification	***Mytilus* sp.**		***Mytilus* sp.**		***Americamysis bahia***		***Menidia beryllina***	
	48-hour LC_{50} (% elutriate)	Statistical Difference 100% vs. Control	48-hour EC_{50} (% elutriate)	Statistical Difference 100% vs. Control	96-hour LC_{50} (% elutriate)	Statistical Difference 100% vs. Control	96-hour LC_{50} (% elutriate)	Statistical Difference 100% vs. Control
Standard Elutriates								
10 Stations at 4 Marinas Mud	>100	No	>100	No	>100	No	>100	No
10 Stations at 4 Marinas Site Water	>100	No	>100	No	>100	No	>100	Yes

TABLE 11 RESULTS OF REFERENCE TOXICANT TESTING ON ACQUIRED TEST ORGANISMS

Test Species	**Reference Toxicant**	**Test Endpoint**	**Acceptable Control Chart Limits**
Mytilus sp.	Copper chloride ($CuCl_2$)	48-Hour EC50: 5.1 µg/L Cu	2.2– 10.0 µg/L Cu
Americamysis bahia	Potassium chloride (KCl)	48-Hour LC50: 485 mg/L KCl	412 – 604 mg/L KCl
Menidia beryllina	Potassium chloride (KCl)	48-Hour LC50: 1,105 mg/L KCl	817 – 1,325 mg/L KCl

ATTACHMENT I

Chain-of-Custody Records
(2 pages)

Chain-of-Custody Record

EA Engineering, Science, and Technology

EA Ecotoxicology Laboratory
231 Schilling Circle
Hunt Valley, Maryland 21031
Telephone: 410-584-7000
Fax: 410-584-1057

Sample Shipped By: (circle)
Fed. Ex. UPS [✓ Other: courier]
Tracking #:

Client: ECO-ANALYSTS, INC.
Project No.:
NPDES Number:
Client Purchase Order Number:
City/State Collected: KENNEBUNK RIVER, MAINE

PLEASE READ SAMPLING INSTRUCTIONS ON BACK OF FORM

Accession Number (office use only)	Grab	Composite	Collection		Sample Description (including Site, Station Number, and Outfall Number)	Number/Volume of Container
			Start Date/Time	End Date/Time		
At3-098		x	2/8/23 0900	02/8/23 1300	10 Stations at 4 Marinas Mud	5 Ten Gal Buckets
At3-099	X		"	"	" Sitewater	"

Sampled By: Dustin Kach & Bud Brown	Date/Time 2/8/23 0900 - 1300	Received By: Dustin Kach	Date/Time 2/8/23 1300
Sampler's Printed Name: Dustin Kach & Bud Brown	Title: President	Relinquished By:	Date/Time 2/9/23 @ 11:37am
Relinquished By:	Date/Time 2/8/23 1132	Received By Laboratory	Date/Time 2/9/23 1630

Was Sample Chilled During Collection? No

Comments:

Sample Collection Parameters
Visual Description:
Temperature (°C):
pH:
TRC (mg/L):
Other:

ATTACHMENT II

Mytilus sp. 48-Hour Elutriate Toxicity Tests
Data Sheets and Statistical Analyses

(26 pages)

TOXICITY TEST SET-UP BENCH SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-209

TEST ORGANISM INFORMATION

Common Name: BLUE MUSSEL
Scientific Name: *Mytilus sp.*
Lot Number: ME-097
Source: ARO
Adults Isolated (Time, Date):
Neonates Pulled & Fed (Time, Date):
Acclimation: <4 hrs
Age: 24 hours
Culture Water (T/S): 16.0 °C 29.0 ppt

TEST INITIATION

Date	Time	Initials	Activity
2/15/23	0905	TO	Dilutions Made
↓	↓	↓	Test Vessels Filled
	1620		Organisms Transferred
	1700	m	Head Counts

TEST SET-UP

Sample Number: AT3-098
Dilution Number: 30 ppt C.S. (LD3-180)

Test Concentration	Volume Test Material	Final Volume
Control	0 ml	100 ml
10 %	10 ml	↓
50 %	50 ml	↓
100 %	100 ml	↓

TOXICITY TEST DATA SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-209
Test Material: ELUTRIATE
Accession Number: AT3-098
Dilution Water: 30 PPT C.S.
Accession Number: LD3- 180

TEST ORGANISM
Common Name: BLUE MUSSEL
Scientific Name: *Mytilus sp.*
TARGET VALUES
Temp: 16 °C
pH: 6.0 - 9.0
Photoperiod: 16 *l*, 8 *d*
DO: ≥4.0 mg/L
Salinity: 30±3 ppt
Light Intensity: 50 - 100 fc

Beginning Date: 2/15/23 Time: 1620
Ending Date: 2/17/23 Time: 1630
TEST TYPE: **Static** / Flowthrough
Renewal / **Non-renewal**
Test Container: 30 ml vial
Test Volume: 10 ml
Test Duration: 48 hours

Concentration	Rep	Number of Live Organisms					Temperature (°C)					pH					Dissolved Oxygen (mg/L)					Salinity (ppt)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Control							15.6	16.4	16.5			81	8.2	7.7			8.5	80	81			28.8	29.7	29.7		
10%							15.6	16.5	16.6			81	82	7.7			8.5	8.1	80			29.2	29.3	28.6		
50%							15.9	16.7	16.8			81	82	7.7			84	82	7.9			30.7	30.9	29.9		
100%							16.5	16.9	16.8			8.0	82	7.7			84	8.1	7.9			32.6	32.9	31.8		
Meter Number							682	682	681			682	682	681			682	682	681			682	682	681		
Time							1027	1237				1027	1237	1453			1027	1237	1453			1027	1237	1453		
Initials							TP	TP	TP			TP	TP	TP			TP	TP	TP			TP	TP	TP		

EPA Test Method: EPA 821-R-02-012 (CHECK ONE)

Ceriodaphnia: 2002.0_____
Magna/pulex: 2021.0_____
Fathead: 2000.0_____
Trout: 2019.0_____
Americamysis: 2007._____
Cyprinodon: 2004.0_____
Menidia:2006.0_____
OTHER: X

ATS-T01
12/02/08

BIVALVE DEVELOPMENT TEST
EMBRYO OBSERVATION DATA SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-209

Initial number of embryos: 224

Embryos counted (date, initials): 4/6/23 MN

Test Species

Scientific Name: *Mytilus sp.*

Elutriate: --

Accession Number: AT3-098

Lot#: ME- 097

Test Concentration	Replicate	Total # Surviving/ Counted	# Normal	# Abnormal
Control	A	218	212	6
	B	207	203	4
	C	207	200	7
	D	201	195	6
	E	223	214	9
10%	A	216	204	12
	B	224	210	14
	C	218	209	9
	D	219	212	7
	E	227	217	10
50%	A	241	236	5
	B	226	216	10
	C	231	225	6
	D	~~252~~ 251	243	8
	E	232	223	9
100%	A	227	213	14
	B	184	177	7
	C	199	188	11
	D	187	181	6
	E	211	200	11

ⓐ 8/7/2023 JR

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-209

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-209

Date/Time/Initials	Comments/Activity

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-209

Day	Testing Location	Date	Time	Initials
0	51	2/15/23	1620	TP
1	51	2/16/23	1605	TP
2	51	2/17/23	1454	TP
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Bivalve Larval Survival and Development Test-Proportion Alive

Start Date: 2/15/2023
End Date: 2/17/2023
Sample Date:
Comments:
Test ID: TN-23-209
Lab ID:
Protocol:
Sample ID: Eco Analysts
Sample Type: Elutriate
Test Species: MS-Mytilis species

Conc-%	1	2	3	4	5
Control	0.9732	0.9241	0.9241	0.8973	0.9955
10	0.9643	1.0000	0.9732	0.9777	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	0.8214	0.8884	0.8348	0.9420

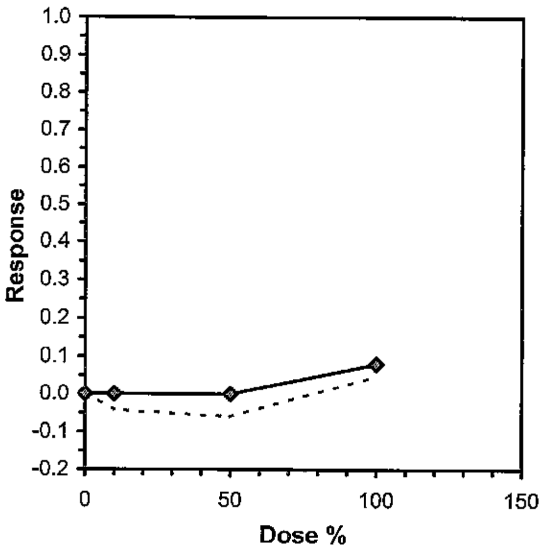
			Transform: Arcsin Square Root					Rank	1-Tailed	Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
Control	0.9429	1.0000	1.3477	1.2446	1.5039	7.849	5			0.9753	1.0000
10	0.9830	1.0426	1.4565	1.3807	1.5374	5.163	5	35.50	17.00	0.9753	1.0000
50	1.0000	1.0606	1.5374	1.5374	1.5374	0.000	5	40.00	17.00	0.9753	1.0000
100	0.8973	0.9517	1.2764	1.1345	1.5374	12.898	5	23.00	17.00	0.8973	0.9200

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92896	0.868	1.05644	1.66226
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	81.269			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Reviewed by:

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date: 2/15/2023
End Date: 2/17/2023
Sample Date:
Comments:
Test ID: TN-23-209
Lab ID:
Protocol:
Sample ID: Eco Analysts
Sample Type: Elutriate
Test Species: MS-Mytilis species

Conc-%	1	2	3	4	5
Control	0.9464	0.9063	0.8929	0.8705	0.9554
10	0.9107	0.9375	0.9330	0.9464	0.9688
50	1.0000	0.9643	1.0000	1.0000	0.9955
100	0.9509	0.7902	0.8393	0.8080	0.8929

			Transform: Arcsin Square Root						1-Tailed			
Conc-%	**Mean**	**N-Mean**	**Mean**	**Min**	**Max**	**CV%**	**N**	**t-Stat**	**Critical**	**MSD**		
Control	0.9143	1.0000	1.2790	1.2027	1.3579	5.178	5				96	1120
10	0.9393	1.0273	1.3250	1.2674	1.3931	3.461	5	-0.988	2.230	0.1038	68	1120
50	0.9920	1.0850	1.4993	1.3807	1.5374	4.529	5	-4.733	2.230	0.1038	9	1120
100	0.8563	0.9365	1.1910	1.0950	1.3473	8.635	5	1.888	2.230	0.1038	161	1120

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.98103	0.868	0.26127	0.0741
Bartlett's Test indicates equal variances (p = 0.50)	2.3588	11.3449		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.06577	0.07171	0.08409	0.00542	5.4E-05	3, 16

Reviewed by:

TOXICITY TEST SET-UP BENCH SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-210

TEST ORGANISM INFORMATION

Common Name: BLUE MUSSEL
Scientific Name: *Mytilus sp.*
Lot Number: ME- 097
Source: ARO
Adults Isolated (Time, Date):
Neonates Pulled & Fed (Time, Date):
Acclimation: <4hr
Age: <4hr
Culture Water (T/S): 16.0 °C 29.0 ppt

TEST INITIATION

Date	Time	Initials	Activity
2/15/23	0907	TF	Dilutions Made
↓	↓	↓	Test Vessels Filled
	1620		Organisms Transferred
	1700		Head Counts

TEST SET-UP

Sample Number: AT3-099
Dilution Number: 30 ppt C.S. (LD3-180)

Test Concentration	Volume Test Material	Final Volume
Control	0 ml	100 ml
Site Water (AT3-099)	100 ml	↓

TOXICITY TEST DATA SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-210
Test Material: SITE WATER
Accession Number: SEE BENCH SHEET
Dilution Water: 30 PPT C.S.
Accession Number: LD3- 180

TEST ORGANISM
Common Name: BLUE MUSSEL
Scientific Name: *Mytilus sp.*
TARGET VALUES
Temp: 16 °C
pH: 6.0 - 9.0
Photoperiod: 16 *l*, 8 *d*
DO: ≥4.0 mg/L
Salinity: 30±3 ppt
Light Intensity: 50 - 100 fc

Beginning Date: 2/15/23 Time: 1620
Ending Date: 2/17/23 Time: 1630
TEST TYPE: **Static** / Flowthrough
Renewal / **Non-renewal**
Test Container: 30 ml vial
Test Volume: 10 ml
Test Duration: 48 hours

Concentration	Rep	Number of Live Organisms					Temperature (°C)					pH					Dissolved Oxygen (mg/L)					Salinity (ppt)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Control							15.6	16.5	16.5			8.0	8.2	7.8			80	81	80			28.8	29.5	29.4		
Site Water							16.1	16.7	16.7			81	82	7.8			86	81	80			33.0	33.0	32.3		
(AT3-099)																										
Meter Number							682	682	681			682	682	681			682	682	681			682	682	681		
Time							1028	1241	1455			1028	1241	1455			1028	1241	1455			1028	1241	1455		
Initials							Tp	Tp	Tp			Tp	Tp	Tp			Tp	Tp	Tp			Tp	Tp	Tp		

EPA Test Method: EPA 821-R-02-012 (CHECK ONE)

Ceriodaphnia: 2002.0_____ Fathead: 2000.0_____ Americamysis: 2007._____ Menidia:2006.0_____
Magna/pulex: 2021.0_____ Trout: 2019.0_____ Cyprinodon: 2004.0_____ OTHER: X

BIVALVE DEVELOPMENT TEST
EMBRYO OBSERVATION DATA SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-210
Initial number of embryos: 224
Embryos counted (date, initials): 4/6/23 MD

Test Species
Scientific Name: *Mytilus sp.*
Elutriate: SITE WATER
Accession Number: AT3-099
Lot#: ME-097

Test Concentration	Replicate	Total # Surviving/ Counted	# Normal	# Abnormal
Control	A	208	200	8
	B	212	201	11
	C	214	205	9
	D	220	213	7
	E	193	187	6
Site Water	A	198	188	10
AT3-099	B	206	190	16
	C	215	211	4
	D	230	214	13
	E	209	199	10

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-210

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-210

Date/Time/Initials	Comments/Activity

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-210

Day	Testing Location	Date	Time	Initials
0	51	2/15/23	1620	TP
1	51	2/16/23	1241	TP
2	51	2/17/23	1455	TP
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
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14				
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22				
23				
24				
25				
26				
27				
28				
29				
30				

Bivalve Larval Survival and Development Test-Proportion Alive

Start Date:	2/15/2023	Test ID:	TN-23-210	Sample ID:	Eco Analysts
End Date:	2/17/2023	Lab ID:		Sample Type:	Site Water
Sample Date:		Protocol:		Test Species:	MS-Mytilis species
Comments:					

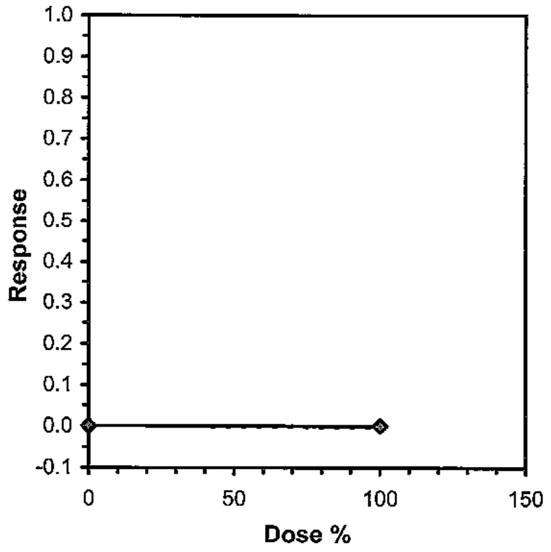
Conc-%	1	2	3	4	5
Control	0.9286	0.9464	0.9554	0.9821	0.8616
100	0.8839	0.9196	0.9598	1.0000	0.9330

			Transform: Arcsin Square Root						1-Tailed		Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
Control	0.9348	1.0000	1.3244	1.1896	1.4368	6.823	5				0.9371	1.0000
100	0.9393	1.0048	1.3444	1.2231	1.5374	8.920	5	-0.298	1.860	0.1249	0.9371	1.0000

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95866		0.781		0.57472	0.24716
F-Test indicates equal variances (p = 0.60)	1.76119		23.1545			
Hypothesis Test (1-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Homoscedastic t Test indicates no significant differences	0.07214	0.0767	0.001	0.01127	0.77303	1, 8

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Reviewed by:

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date: 2/15/2023
End Date: 2/17/2023
Sample Date:
Comments:
Test ID: TN-23-210
Lab ID:
Protocol:
Sample ID: Eco Analysts
Sample Type: Site Water
Test Species: MS-Mytilis species

Conc-%	1	2	3	4	5
Control	0.8929	0.8973	0.9152	0.9509	0.8348
100	0.8393	0.8482	0.9420	0.9688	0.8884

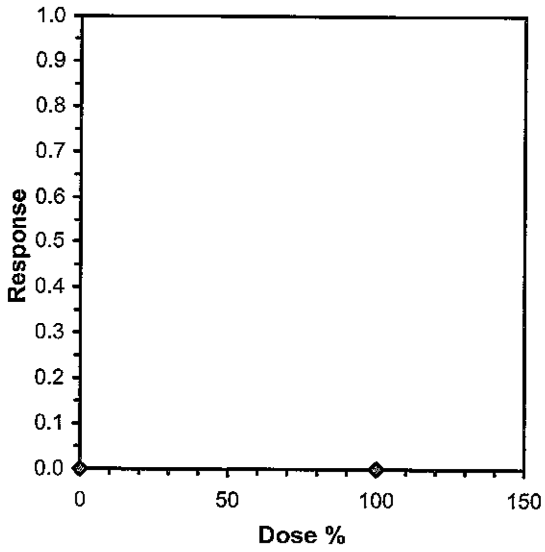
			Transform: Arcsin Square Root						1-Tailed		Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
Control	0.8982	1.0000	1.2514	1.1523	1.3473	5.629	5				0.8982	1.0000
100	0.8973	0.9990	1.2559	1.1583	1.3931	8.101	5	-0.083	1.860	0.1029	0.8973	0.9990

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93456	0.781	0.32136	-1.0127
F-Test indicates equal variances (p = 0.49)	2.08637	23.1545		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.0694	0.077	5.2E-05	0.00766	0.9362	1, 8

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Reviewed by:

TOXICITY TEST SET-UP BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-211

TEST ORGANISM INFORMATION

Common Name: BLUE MUSSEL

Scientific Name: *Mytilus sp.*

Lot Number: ME-097

Source: ARO

Adults Isolated (Time, Date):

Neonates Pulled & Fed (Time, Date):

Acclimation: 24hrs Age: 24hrs

Culture Water (T/S): 16.0 °C 29.0 ppt

TEST INITIATION

Date	Time	Initials	Activity
2/15/23	0910	TB	Dilutions Made
↓	↓	↓	Test Vessels Filled
	1620		Organisms Transferred
	1700	[illegible]	Head Counts

TEST SET-UP

Sample Number: SP3-010 1 g/L NH_3-N (0.383 g NH_4Cl / 100 mg DI)

Dilution Number: 30 ppt C.S. (LD3-180)

Test Concentration	Volume Test Material	Final Volume
CONTROL	0 ml	200 ml
0.65 mg/L	0.13 ml	↓
1.5 mg/L	0.30 ml	
3.7 mg/L	0.74 ml	
10.0 mg/L	2.0 ml	
50.0 mg/L	10.0 ml	

ACUTE TOXICITY TEST DATA SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-211
Test Material: 1 g/L NH_3-N
Accession Number: SP3-010
Dilution Water: 30 PPT C.S.
Accession Number: LD3- 180

TEST ORGANISM
Common Name: BLUE MUSSEL
Scientific Name: *Mytilus sp.*

TARGET VALUES
Temp: 16±1 °C
pH: 6.0 - 9.0
Photoperiod: 16 *l*, 8 *d*
DO: ≥4.0 mg/L
Salinity: 30±3 ppt
Light Intensity: 50 - 100 fc

Beginning Date: 2/15/23 Time: 1620
Ending Date: 2/17/23 Time: 1630
TEST TYPE: **Static** / Flowthrough
Renewal / **Non-renewal**
Test Container: 30 ml Vial
Test Volume: 10 ml
Test Duration: 48 hours

Concentration	Rep	Number of Live Organisms					Temperature (°C)					pH					Dissolved Oxygen (mg/L)					Salinity (ppt)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Control							16.3	16.6	16.5			8.0	8.2	7.8			8.3	8.2	8.1			28.2	29.5	29.6		
0.65 mg/L							16.1	16.6	16.4			8.1	8.2	7.8			8.3	8.2	8.1			28.5	29.1	28.7		
1.5 mg/L							16.0	16.9	16.6			8.1	8.2	7.9			8.3	8.7	9.0			28.6	29.1	28.6		
3.7 mg/L							16.0	17.0	16.6			8.2	8.2	7.9			8.2	8.2	8.0			28.6	29.1	28.4		
10 mg/L							15.9	17.0	16.6			8.2	8.2	7.9			8.2	8.2	7.9			28.5	29.0	28.4		
50 mg/L							16.0	16.9	16.5			8.2	8.2	7.9			8.3	8.1	7.9			27.7	28.3	28.0		
Meter Number							682	682	681			682	682	681			682	682	681			682	682	681		
Time							1025	1244	1457			1025	1244	1457			1025	1244	1457			1025	1244	1457		
Initials							TP	TP	TP			TP	TP	TP			TP	TP	TP			TP	TP	TP		

EPA Test Method: EPA 821-R-02-012 (CHECK ONE)

Ceriodaphnia: 2002.0_____
Magna/pulex: 2021.0_____
Fathead: 2000.0_____
Trout: 2019.0_____
Americamysis: 2007._____
Cyprinodon: 2004.0_____
Menidia:2006.0
OTHER: X

BIVALVE DEVELOPMENT TEST
EMBRYO OBSERVATION DATA SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-211

Initial number of embryos: 224

Embryos counted (date, initials): 4/7/23 MD

Test Species

Scientific Name: *Mytilus sp.*

Test Material: 1 g/L NH_3-N

Accession Number: SP3-010

Test Concentration	Replicate	Total # Surviving/ Counted	# Normal	# Abnormal
CONTROL	A	~~231~~ 233	226	7
	B	238	231	7
	C	226	214	12
	D	209	201	8
	E	225	220	5
0.65 mg/L	A	216	210	6
	B	196	186	10
	C	203	199	4
	D	199	191	8
	E	189	182	7
1.5 mg/L	A	207	199	8
	B	204	196	8
	C	216	206	10
	D	204	195	9
	E	219	206	13
3.7 mg/L	A	202	188	14
	B	204	196	8
	C	201	187	14
	D	204	193	11
	E	198	185	13

ⓐ 8/7/2023
JR

BIVALVE DEVELOPMENT TEST
EMBRYO OBSERVATION DATA SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-211

Initial number of embryos: 121

Embryos counted (date, initials): 4/7/23 MD

Test Species

Scientific Name: *Mytilus sp.*

Test Material: 1 g/L NH_3-N

Accession Number: SP3- 010

Test Concentration	Replicate	Total # Surviving/ Counted	# Normal	# Abnormal
10 mg/L	A	59	1	58
	B	64	1	63
	C	62	0	62
	D	39	1	38
	E	49	3	46
50.0 mg/L	A	12	1	11
	B	15	0	15
	C	8	0	8
	D	9	0	9
	E	2	0	2

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-211

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-211

Date/Time/Initials	Comments/Activity

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-211

Day	Testing Location	Date	Time	Initials
0	51	2/15/23	1620	To
1	51	2/16/23	1244	To
2	51	2/17/23	1457	To
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
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25				
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27				
28				
29				
30				

Bivalve Larval Survival and Development Test-Proportion Alive

Start Date:	2/15/2023	Test ID:	TN-23-211	Sample ID:	Eco Analysts
End Date:	2/17/2023	Lab ID:		Sample Type:	Ammonia
Sample Date:		Protocol:		Test Species:	MS-Mytilis species
Comments:					

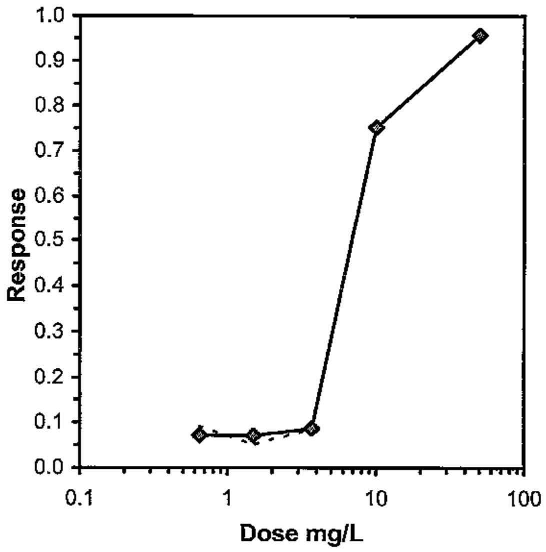
Conc-mg/L	1	2	3	4	5
Control	1.0000	1.0000	1.0000	0.9330	1.0000
0.65	0.9643	0.8750	0.9063	0.8884	0.8438
1.5	0.9241	0.9107	0.9643	0.9107	0.9777
3.7	0.9018	0.9107	0.8973	0.9107	0.8839
10	0.2634	0.2857	0.2768	0.1741	0.2188
50	0.0536	0.0670	0.0357	0.0402	0.0089

			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
Control	0.9866	1.0000	1.4917	1.3090	1.5374	6.846	5				15	1120
*0.65	0.8955	0.9077	1.2489	1.1644	1.3807	6.520	5	5.473	2.360	0.1047	117	1120
*1.5	0.9375	0.9502	1.3256	1.2674	1.4208	5.339	5	3.744	2.360	0.1047	70	1120
*3.7	0.9009	0.9131	1.2509	1.2231	1.2674	1.470	5	5.427	2.360	0.1047	111	1120
*10	0.2438	0.2471	0.5148	0.4304	0.5639	10.834	5	22.015	2.360	0.1047	847	1120
*50	0.0411	0.0416	0.1964	0.0946	0.2618	32.284	5	29.191	2.360	0.1047	1074	1120

Auxiliary Tests					Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)					0.96664		0.9		-0.6622	1.23727
Bartlett's Test indicates equal variances (p = 0.14)					8.28922		15.0863			
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test	<0.65	0.65			0.02716	0.02734	1.35376	0.00492	2.3E-20	5, 24

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%			
5.0%			
10.0%	7.4688	7.1647	7.7857
20.0%	6.9359	6.6822	7.1993
Auto-7.1%	7.6248	7.2938	7.9709



Reviewed by:

Bivalve Larval Survival and Development Test-Proportion Normal

Start Date: 2/15/2023
End Date: 2/17/2023
Sample Date:
Comments:

Test ID: TN-23-211
Lab ID:
Protocol:

Sample ID: Eco Analysts
Sample Type: Ammonia
Test Species: MS-Mytilis species

Conc-mg/L	1	2	3	4	5
Control	1.0000	1.0000	0.9554	0.8973	0.9821
0.65	0.9375	0.8304	0.8884	0.8527	0.8125
1.5	0.8884	0.8750	0.9196	0.8705	0.9196
3.7	0.8393	0.8750	0.8348	0.8616	0.8259
10	0.0045	0.0045	0.0000	0.0045	0.0134
50	0.0045	0.0000	0.0000	0.0000	0.0000

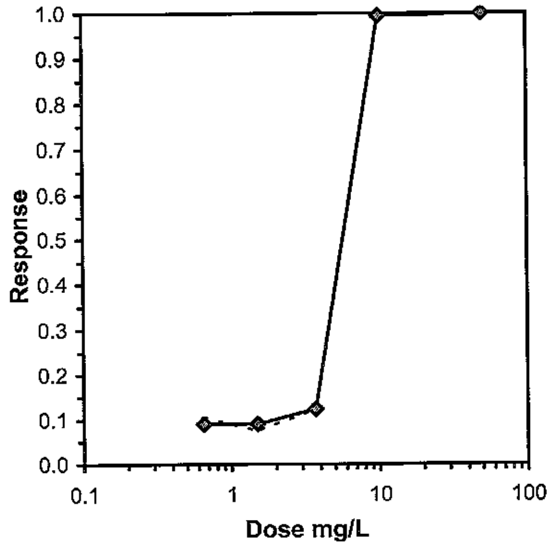
			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-mg/L	**Mean**	**N-Mean**	**Mean**	**Min**	**Max**	**CV%**	**N**	**Sum**	**Critical**	**Resp**	**Number**
Control	0.9670	1.0000	1.4228	1.2446	1.5374	8.780	5			37	1120
*0.65	0.8643	0.8938	1.1989	1.1230	1.3181	6.489	5	16.00	16.00	152	1120
1.5	0.8946	0.9252	1.2418	1.2027	1.2834	3.162	5	17.00	16.00	118	1120
*3.7	0.8473	0.8763	1.1700	1.1404	1.2094	2.443	5	15.00	16.00	171	1120
*10	0.0054	0.0055	0.0700	0.0334	0.1160	42.155	5	15.00	16.00	1114	1120
*50	0.0009	0.0009	0.0401	0.0334	0.0669	37.303	5	15.00	16.00	1119	1120

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92351	0.9	-0.2971	2.44307
Bartlett's Test indicates unequal variances (p = 1.33E-03)	19.8514	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	<0.65	0.65		

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%			
5.0%			
10.0%	5.6340	5.4966	5.7749
20.0%	5.6858	5.6127	5.7599
Auto-9.0%	5.5869	5.4508	5.7264



Reviewed by:

ATTACHMENT III

Americamysis bahia 96-Hour Elutriate Toxicity Tests
Data Sheets and Statistical Analyses
(14 pages)

TOXICITY TEST SET-UP BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-212

TEST ORGANISM INFORMATION

Common Name: OPOSSOM SHRIMP

Scientific Name: *Americamysis bahia*

Lot Number: AB- 1218

Source: ABS

Adults Isolated (Time, Date):

Neonates Pulled & Fed (Time, Date):

Acclimation: 24h Age: 5days

Culture Water (T/S): 18.9 °C 27.0 ppt

TEST INITIATION

Date	Time	Initials	Activity
2/15/23	0840	SC	Dilutions Made
↓	↓	↓	Test Vessels Filled
	0951	SC	Organisms Transferred
↓	1049	Tp	Head Counts

TEST SET-UP

Sample Number: AT3-098

Dilution Number: LD3-181 (30 ppt C.S.)

Test Concentration	Volume Test Material	Final Volume
Control	0 ml	1,000 ml
10 %	100 ml	↓
50 %	500 ml	↓
100 %	1,000 ml	↓

ACUTE TOXICITY TEST DATA SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-212
Test Material: ELUTRIATE
Accession Number: AT3-098
Dilution Water: 30 PPT C.S.
Accession Number: LD3-181

TEST ORGANISM
Common Name: OPOSSUM SHRIMP
Scientific Name: *Americamysis bahia*
TARGET VALUES
Temp: 20±1 °C
pH: 6.0 - 9.0
Photoperiod: 16 *l*, 8 *d*
DO: ≥4.0 mg/L
Salinity: 30±3 ppt
Light Intensity: 50 - 100 fc

Beginning Date: 2/15/23 Time: 0951
Ending Date: 2/19/23 Time: 0926
TEST TYPE: [✓ **Static**] / Flowthrough
Renewal / [✓ **Non-renewal**]
Test Container: 1-L BEAKER
Test Volume: 200 ml
Test Duration: 96 hours

Concentration	Rep	Number of Live Organisms					Temperature (°C)					pH					Dissolved Oxygen (mg/L)					Salinity (ppt)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
CONTROL	A	10	10	10	10	10	19.0	19.2	20.1	19.6	19.3	7.7	8.0	7.9	8.6	7.2	7.7	7.2	6.4	7.3	7.4	29.5	29.9	28.3	29.9	30.1
	B	10	10	10	10	10																				
	C	10	9	10	9	9																				
	D	10	9	9	9	9																				
	E	10	10	10	10	9																				
10%	A	10	10	10	10	10	19.0	19.4	20.0	19.7	19.4	7.8	8.0	7.9	8.1	7.2	7.7	6.5	6.1	6.9	7.1	29.6	29.8	28.5	30.1	30.1
	B	10	10	10	10	10																				
	C	10	10	10	10	9																				
	D	10	10	10	10	10																				
	E	10	10	10	10	10																				
Meter Number							682	682	683	682	681	682	682	683	682	681	682	682	683	682	681	682	682	683	682	682 681
Time		1049	0956	1004	0944	0926	0903	0954	0956	0937	0920	0903	0954	0956	0937	0920	0903	0954	0956	0937	0920	0903	0954	0956	0937	0920
Initials				GL	JZ	JZ	SL		GL	JZ	JZ	SL		GL	JZ	JZ	SL		GL	JZ	JZ	SL		GL	JZ	JZ

JZ 2/19/23

ATS-T01
12/02/08

EPA Test Method: EPA 821-R-02-012 (CHECK ONE)

Ceriodaphnia: 2002.0
Magna/pulex: 2021.0
Fathead: 2000.0
Trout: 2019.0
Americamysis: 2007. X
Cyprinodon: 2004.0
Menidia:2006.0
OTHER:

ACUTE TOXICITY TEST DATA SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-212

Test Material: ELUTRIATE

Accession Number: AT3-098

Dilution Water: 30 PPT C.S.

Accession Number: LD3- 181

TEST ORGANISM

Common Name: OPOSSUM SHRIMP

Scientific Name: *Americamysis bahia*

TARGET VALUES

Temp: 20±1 °C

pH: 6.0 - 9.0

Photoperiod: 16 *l*, 8 *d*

DO: ≥4.0 mg/L

Salinity: 30±3 ppt

Light Intensity: 50 - 100 fc

Beginning Date: 2/15/23 Time: 0951

Ending Date: 2/19/23 Time: 0926

TEST TYPE: [✓ **Static**] / Flowthrough

Renewal / [✓ **Non-renewal**]

Test Container: 1-L BEAKER

Test Volume: 200 ml

Test Duration: 96 hours

Concentration	Rep	Number of Live Organisms					Temperature (°C)					pH					Dissolved Oxygen (mg/L)					Salinity (ppt)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
50%	A	10	10	10	10	10	19.8	19.3	19.8	19.7	19.3	7.8	8.0	7.8	8.0	7.3	7.6	6.3	5.8	6.7	7.0	31.1	31.2	29.8	31.5	31.3
	B	10	10	10	10	9																				
	C	10	10	10	10	8																				
	D	10	10	10	10	10																				
	E	10	10	10	10	9																				
100%	A	10	10	10	9	9	20.4	19.2	19.8	19.7	19.5	7.8	7.9	7.8	8.0	7.3	7.6	6.4	6.2	6.7	7.3	32.9	32.9	31.6	33.0	33.0
	B	10	10	10	9	8																				
	C	10	10	10	10	9																				
	D	10	10	10	10	10																				
	E	10	10	10	9	9																				

EPA Test Method: EPA 821-R-02-012 (CHECK ONE)

Ceriodaphnia: 2002.0 ____
Magna/pulex: 2021.0 ____
Fathead: 2000.0 ____
Trout: 2019.0 ____
Americamysis: 2007. X
Cyprinodon: 2004.0 ____
Menidia: 2006.0 ____
OTHER: ____

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-212

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

TOXICOLOGY LABOATORY BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-212

Date/Time/Initials	Comments/Activity
2/15/23 1127 SC	No dead observed

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-212

Day	Testing Location	Date	Time	Initials
0	5B	2/15/23	0905	SC
1	5B	2/16/23	0957	TO
2	5B	2/17/23	0959	GC
3	5B	2/18/23	0957	JZ
4	5B	2/19/23	0737	JL
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Acute Test-96 Hr Survival

Start Date: 2/15/2023
End Date: 2/19/2023
Sample Date:
Comments:

Test ID: TN-23-212
Lab ID:
Protocol:

Sample ID: Eco Analysts
Sample Type: Elutriate
Test Species: MY-Mysidopsis bahia

Conc-%	1	2	3	4	5
Control	1.0000	1.0000	0.9000	0.9000	0.9000
10	1.0000	1.0000	0.9000	1.0000	1.0000
50	1.0000	0.9000	0.8000	1.0000	0.9000
100	0.9000	0.8000	0.9000	1.0000	0.9000

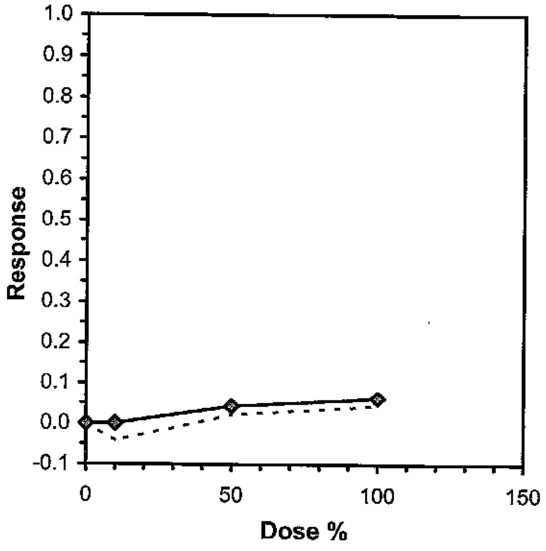
			Transform: Arcsin Square Root						1-Tailed		Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
Control	0.9400	1.0000	1.3142	1.2490	1.4120	6.792	5				0.9600	1.0000
10	0.9800	1.0426	1.3794	1.2490	1.4120	5.284	5	-1.011	2.230	0.1437	0.9600	1.0000
50	0.9200	0.9787	1.2859	1.1071	1.4120	10.026	5	0.440	2.230	0.1437	0.9200	0.9583
100	0.9000	0.9574	1.2533	1.1071	1.4120	8.613	5	0.946	2.230	0.1437	0.9000	0.9375

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96751	0.868	-0.1392	-0.5638
Bartlett's Test indicates equal variances (p = 0.74)	1.27199	11.3449		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.08747	0.0935	0.01438	0.01039	0.28366	3, 16

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	70.000			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Reviewed by:

TOXICITY TEST SET-UP BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-213

TEST ORGANISM INFORMATION

Common Name: OPOSSOM SHRIMP

Scientific Name: *Americamysis bahia*

Lot Number: AB-1218

Source: ABS

Adults Isolated (Time, Date):

Neonates Pulled & Fed (Time, Date):

Acclimation: 24h Age: 5 days

Culture Water (T/S): 18.9 °C 27.0 ppt

TEST INITIATION

Date	Time	Initials	Activity
2/15/23	0928	SC	Dilutions Made
	↓	↓	Test Vessels Filled
↓	0958	SC	Organisms Transferred
	1037	TP	Head Counts

TEST SET-UP

Sample Number: AT3-099

Dilution Number: LD3-181

Test Concentration	Volume Test Material	Final Volume
Control	0 ml	1,000 ml
AT3-099	1,000 ml	↓

ACUTE TOXICITY TEST DATA SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-213
Test Material: ELUTRIATE
Accession Number: AT3-099
Dilution Water: 30 PPT C.S.
Accession Number: LD3481

TEST ORGANISM
Common Name: OPOSSUM SHRIMP
Scientific Name: *Americamysis bahia*

TARGET VALUES
Temp: 20±1 °C
pH: 6.0 - 9.0
Photoperiod: 16 *l*, 8 *d*
DO: ≥4.0 mg/L
Salinity: 30±3 ppt
Light Intensity: 50 - 100 fc

Beginning Date: 2/15/23 Time: 0958
Ending Date: 2/19/23 Time: 0937
TEST TYPE: **Static** / Flowthrough
Renewal / **Non-renewal**
Test Container: 1-L BEAKER
Test Volume: 200 ml
Test Duration: 96 hours

Concentration	Rep	Number of Live Organisms					Temperature (°C)					pH					Dissolved Oxygen (mg/L)					Salinity (ppt)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
CONTROL	A	10	10	10	10	10	19.0	19.4	19.9	19.8	19.9	8.0	7.9	7.9	8.0	7.4	7.7	7.3	6.9	7.1	7.0	29.6	29.8	28.4	27.8	27.4
	B	10	10	10	10	9																				
	C	10	10	10	10	9																				
	D	10	10	10	~~10~~ 9	9																				
	E	10	10	10	10	10																				
AT3-099	A	10	10	9	9	9	19.0	19.4	19.9	19.8	20.0	8.0	7.9	7.9	8.0	7.4	7.7	6.9	5.9	6.8	6.7	33.0	33.0	31.7	32.0	32.9
	B	10	10	10	10	10																				
	C	10	10	10	9	9																				
	D	10	10	10	10	10																				
	E	10	10	10	10	10																				
Meter Number							682	682	683	682	681	682	682	683	662	681	682	682	683	662	681	682	682	683	682	681
Time		1037	1002	1044	0934	0937	0940	1000	1026	0936	0933	0940	1000	1026	0930	0933	0940	1000	1026	0930	0933	0940	1000	1026	0930	0933
Initials		TP	TP	GL	CR	JL	SL	TP	GL	JL	JL	SL	TP	GL	JL	JL	SL	TP	GL	JL	JL	SL	TP	GL	JL	JL

JL 2/18/23

EPA Test Method: EPA 821-R-02-012 (CHECK ONE)
Ceriodaphnia: 2002.0____
Magna/pulex: 2021.0____
Fathead: 2000.0____
Trout: 2019.0____
Americamysis: 2007. X
Cyprinodon: 2004.0____
Menidia:2006.0 ____
OTHER:____

ATS-T01
12/02/08

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-213

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

TOXICOLOGY LABOATORY BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-213

Date/Time/Initials	Comments/Activity
2/15/23 1130 SC	no dead observed

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-213

Day	Testing Location	Date	Time	Initials
0	6A	2/15/23	0940	SC
1	6A	2/16/23	1200	[illegible]
2	6A	2/17/23	1048	GL
3	6A	2/18/23	0935	JL
4	6A	2/19/23	0938	JL
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
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20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Acute Test-96 Hr Survival

Start Date: 2/15/2023
End Date: 2/19/2023
Sample Date:
Comments:

Test ID: TN-23-213
Lab ID:
Protocol:

Sample ID: Eco Analysts
Sample Type: Sitewater
Test Species: MY-Mysidopsis bahia

Conc-%	1	2	3	4	5
Control	1.0000	0.9000	0.9000	0.9000	1.0000
100	0.9000	1.0000	0.9000	1.0000	1.0000

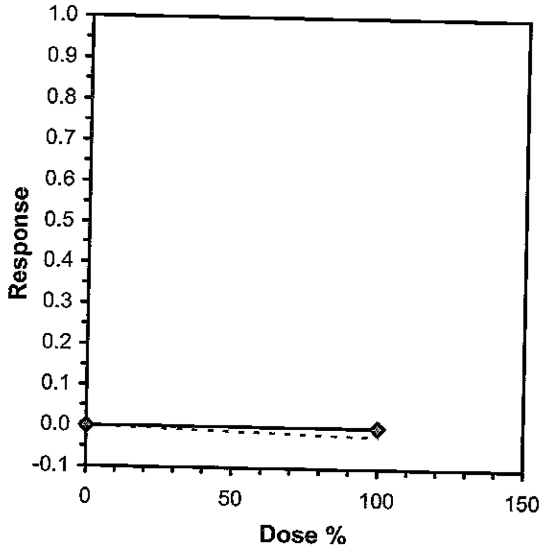
			Transform: Arcsin Square Root						1-Tailed		Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
Control	0.9400	1.0000	1.3142	1.2490	1.4120	6.792	5				0.9500	1.0000
100	0.9600	1.0213	1.3468	1.2490	1.4120	6.628	5	-0.577	1.860	0.1050	0.9500	1.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.79894	0.781	0	-2.2768
F-Test indicates equal variances (p = 1.00)	1	23.1545		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.06072	0.0649	0.00266	0.00797	0.57958	1, 8

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Reviewed by:

ATTACHMENT IV

Menidia beryllina 96-Hour Elutriate Toxicity Tests Data Sheets and Statistical Analyses

(15 pages)

TOXICITY TEST SET-UP BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-214

TEST ORGANISM INFORMATION

Common Name: INLAND SILVERSIDE

Scientific Name: *Menidia beryllina*

Lot Number: MS- 330

Source: ABS

Adults Isolated (Time, Date): ____

Neonates Pulled & Fed (Time, Date): ____

Acclimation: 24h

Age: 11 days

Culture Water (T/S): 200 °C 27.4 ppt

TEST INITIATION

Date	Time	Initials	Activity
2/15/23	0840	SC	Dilutions Made
↓	↓	↓	Test Vessels Filled
	1122	SC	Organisms Transferred
	1155	GL	Head Counts

TEST SET-UP

Sample Number: AT3-098

Dilution Number: LD3-181 (30 ppt C.S.)

Test Concentration	Volume Test Material	Final Volume
Control	0 ml	1,000 ml
10 %	100 ml	↓
50 %	500 ml	
100 %	1,000 ml	

ACUTE TOXICITY TEST DATA SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-214
Test Material: ELUTRIATE
Accession Number: AT3-098
Dilution Water: 30 PPT C.S.
Accession Number: LD3-181

TEST ORGANISM
Common Name: INLAND SILVERSIDE
Scientific Name: *Menidia beryllina*

TARGET VALUES
Temp: 20±1 °C
pH: 6.0 - 9.0
Photoperiod: 16 *l*, 8 *d*
DO: ≥4.0 mg/L
Salinity: 30±3 ppt
Light Intensity: 50 - 100 fc

Beginning Date: 2/15/23 Time: 1122
Ending Date: 2/19/23 Time: 1044
TEST TYPE: **Static** / Flowthrough
Renewal / **Non-renewal**
Test Container: 1-L BEAKER
Test Volume: 200 ml
Test Duration: 96 hours

Concentration	Rep	Number of Live Organisms					Temperature (°C)					pH					Dissolved Oxygen (mg/L)					Salinity (ppt)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
CONTROL	A	10	10	10	10	9	19.0	19.0	20.0	19.6	19.4	7.7	7.9	7.7	8.1	7.8	7.7	7.7	7.1	7.8	7.5	29.5	29.8	28.6	30.0	29.8
	B	10	10	10	9	9																				
	C	10	10	10	10	10																				
	D	10	10	10	10	10																				
	E	10	9	9	9	9																				
10%	A	10	9	8	8	8	19.0	19.1	19.4	19.6	19.5	7.8	7.9	7.9	8.1	7.8	7.7	7.3	6.8	7.7	7.4	29.6	30.0	28.8	30.1	30.0
	B	10	9	8	8	8																				
	C	10	10	10	10	9																				
	D	10	10	10	10	10																				
	E	10	10	10	10	10																				
													682													
Meter Number							682	682	683	682	681	682	~~682~~	683	682	681	682	682	683	682	681	682	682	683	682	681
Time		1155	1055	~~1014~~ 1146	1058	1044	0903	1006	1019	1010	1040	0903	1006	1019	1010	1040	0903	1006	1019	1010	1040	0903	1006	1019	1010	1040
Initials		GL	Tp	GL	JL	JL	SL	Tp	GL	JL	JL	SL	Tp	GL	JL	JL	SL	Tp	GL	JL	JL	SL	Tp	GL	JL	JL

ⓑGL 2/17/23

ⓑGL 2/15/23

EPA Test Method: EPA 821-R-02-012 (CHECK ONE)

Ceriodaphnia: 2002.0____
Magna/pulex: 2021.0____
Fathead: 2000.0____
Trout: 2019.0____
Americamysis: 2007.____
Cyprinodon: 2004.0____
Menidia:2006.0 X
OTHER:____

ATS-T01
12/02/08

ACUTE TOXICITY TEST DATA SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-214
Test Material: ELUTRIATE
Accession Number: AT3-098
Dilution Water: 30 PPT C.S.
Accession Number: LD3- 181

TEST ORGANISM
Common Name: INLAND SILVERSIDE
Scientific Name: *Menidia beryllina*

TARGET VALUES
Temp: 20±1 °C
pH: 6.0 - 9.0
Photoperiod: 16 *l*, 8 *d*
DO: ≥4.0 mg/L
Salinity: 30±3 ppt
Light Intensity: 50 - 100 fc

Beginning Date: 2/5/23 Time: 1122
Ending Date: 2/9/23 Time: 1044
TEST TYPE: **Static** / Flowthrough
Renewal / **Non-renewal**
Test Container: 1-L BEAKER
Test Volume: 200 ml
Test Duration: 96 hours

Concentration	Rep	Number of Live Organisms					Temperature (°C)					pH					Dissolved Oxygen (mg/L)					Salinity (ppt)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
50%	A	10	9	9	9	9	19.8	19.1	19.4	19.7	19.6	7.8	80	7.9	8.1	7.9	7.6	73	6.7	7.1	7.3	31.1	31.0	29.9	31.2	31.2
	B	10	10	10	10	10																				
	C	10	9	8	8	8																				
	D	10	10	10	10	10																				
	E	10	9	9	9	9																				
100%	A	10	9	9	8	8	20.4	19.1	19.4	19.6	19.6	7.8	80	7.9	8.1	7.8	7.6	7.2	6.7	7.2	7.3	32.9	32.6	31.2	33.0	32.8
	B	10	10	10	10	10																				
	C	10	10	10	10	10																				
	D	10	9	9	9	9																				
	E	10	8	7	7	7																				

EPA Test Method: EPA 821-R-02-012 (CHECK ONE)

Ceriodaphnia: 2002.0_____
Magna/pulex: 2021.0_____
Fathead: 2000.0_____
Trout: 2019.0_____
Americamysis: 2007._____
Cyprinodon: 2004.0_____
Menidia:2006.0 X
OTHER:_____

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-214

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-214

Date/Time/Initials	Comments/Activity
2/15/23 1310 SC	no obsered dead

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-214

Day	Testing Location	Date	Time	Initials
0	SA	2/15/23	0905	SL
1	SA	2/16/23	1055	Z
2	SA	2/17/23	1152	GL
3	SA	2/18/23	1013	JL
4	SA	2/19/23	1048	JL
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
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18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Acute Test-96 Hr Survival

Start Date: 2/15/2023
End Date: 2/19/2023
Sample Date:
Comments:

Test ID: TN-23-214
Lab ID:
Protocol:

Sample ID: Eco Analysts
Sample Type: Elutriate
Test Species: MB-Menidia beryllina

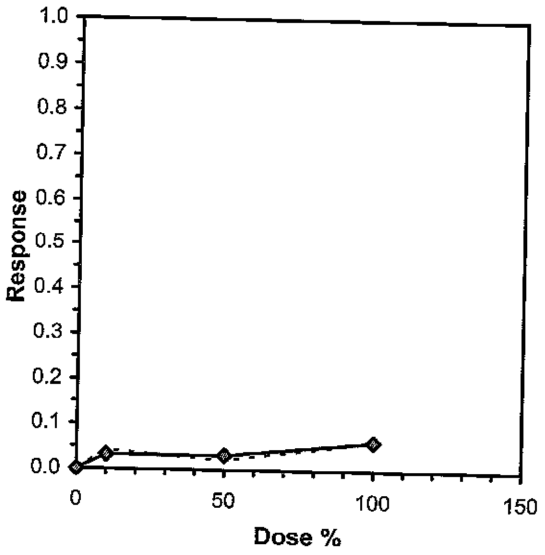
Conc-%	1	2	3	4	5
Control	0.9000	0.9000	1.0000	1.0000	0.9000
10	0.8000	0.8000	0.9000	1.0000	1.0000
50	0.9000	1.0000	0.8000	1.0000	0.9000
100	0.8000	1.0000	1.0000	0.9000	0.7000

			Transform: Arcsin Square Root						1-Tailed		Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
Control	0.9400	1.0000	1.3142	1.2490	1.4120	6.792	5				0.9400	1.0000
10	0.9000	0.9574	1.2575	1.1071	1.4120	12.128	5	0.625	2.230	0.2026	0.9100	0.9681
50	0.9200	0.9787	1.2859	1.1071	1.4120	10.026	5	0.312	2.230	0.2026	0.9100	0.9681
100	0.8800	0.9362	1.2343	0.9912	1.4120	15.085	5	0.880	2.230	0.2026	0.8800	0.9362

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93109	0.868	-0.1368	-1.2218
Bartlett's Test indicates equal variances (p = 0.59)	1.91346	11.3449		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.132	0.14109	0.00601	0.02063	0.83102	3, 16

			Linear Interpolation (200 Resamples)	
Point	%	SD	95% CL(Exp)	Skew
IC05	78.333			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Reviewed by:

TOXICITY TEST SET-UP BENCH SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-215

TEST ORGANISM INFORMATION

Common Name: INLAND SILVERSIDE
Scientific Name: *Menidia beryllina*
Lot Number: MS- 330
Source: ABS
Adults Isolated (Time, Date):
Neonates Pulled & Fed (Time, Date): 11
Acclimation: 24h
Age: 12days
Culture Water (T/S): 19.0 °C 27.4 ppt

(b)
76
2/15/23

TEST INITIATION

Date	Time	Initials	Activity
2/15/23	0928	SC	Dilutions Made
↓	↓	↓	Test Vessels Filled
	1103	SC	Organisms Transferred
↓	1151	GL	Head Counts

TEST SET-UP

Sample Number: AT3-099
Dilution Number: LD3- 187

Test Concentration	Volume Test Material	Final Volume
Control	0 ml	1,000 ml
AT3-099	1,000 ml	↓

ACUTE TOXICITY TEST DATA SHEET

Project Number: EA.TOX
Client: Eco Analysts
QC Test Number: TN-23-215
Test Material: SITE WATER
Accession Number: AT3-099
Dilution Water: 30 PPT C.S.
Accession Number: LD3-181

TEST ORGANISM
Common Name: INLAND SILVERSIDE
Scientific Name: *Menidia beryllina*

TARGET VALUES
Temp: 20±1 °C
pH: 6.0 - 9.0
Photoperiod: 16 *l*, 8 *d*
DO: ≥4.0 mg/L
Salinity: 30±3 ppt
Light Intensity: 50 - 100 fc

Beginning Date: 2/15/23 Time: 1103
Ending Date: 2/19/23 Time: 1027
TEST TYPE: **Static** / Flowthrough
Renewal / **Non-renewal**
Test Container: 1-L BEAKER
Test Volume: 200 ml
Test Duration: 96 hours

Concentration	Rep	Number of Live Organisms					Temperature (°C)					pH					Dissolved Oxygen (mg/L)					Salinity (ppt)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Control	A	10	10	10	10	10	19.0	19.3	19.4	18.5	20.3	8.0	8.0	7.9	7.9	7.8	7.7	7.4	6.8	7.9	7.3	29.6	29.8	28.7	30.2	29.1
	B	10	10	10	10	10																				
	C	10	10	10	10	10																				
	D	10	10	10	10	10																				
	E	10	10	10	10	10																				
AT3-099	A	10	9	8	8	8	19.0	19.5	19.8	19.7	20.2	8.0	8.0	7.9	7.9	7.8	7.7	7.2	6.7	7.5	7.1	33.0	32.5	31.3	32.7	32.5
	B	10	9	10	8	8																				
	C	10	10	8	8	8																				
	D	10	9	9	9	9																				
	E	10	8	8	8	8																				
Meter Number							682	682	683	682	681	682	682	683	682	681	682	682	683	682	681	682	682	683	682	681
Time		~~GL~~ 1151	1024	1049	1048	1027	0940	0951	1024	0925	1024	0940	0951	1024	0925	1024	0940	0951	1024	0925	1024	0940	0951	1024	0925	1024
Initials		~~HSt~~	TP	GL	JL	JL	SL	TP	GL	JL	JL	SL	TP	GL	JL	JL	SL	TP	GL	JL	JL	SL	TP	GL	JL	JL

GL (b) GL 2/15/23
(b) JL 2/19/23

EPA Test Method: EPA 821-R-02-012 (CHECK ONE)

Ceriodaphnia: 2002.0
Magna/pulex: 2021.0
Fathead: 2000.0
Trout: 2019.0
Americamysis: 2007.
Cyprinodon: 2004.0
Menidia:2006.0 X
OTHER:

ATS-T01
12/02/08

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-215

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-215

Date/Time/Initials	Comments/Activity
2/15/23 1300 SL	no dead observed

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: EA.TOX

Client: Eco Analysts

QC Test Number: TN-23-215

Day	Testing Location	Date	Time	Initials
0	6A	2/15/23	0930	SC
1	6A	2/16/23	1026	TP
2	6A	2/17/23	1017	GC
3	6A	2/18/23	0927	JL
4	6A	2/19/23	1027	JL
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
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16				
17				
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19				
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22				
23				
24				
25				
26				
27				
28				
29				
30				

Acute Test-96 Hr Survival

Start Date: 2/15/2023
End Date: 2/19/2023
Sample Date:
Comments:
Test ID: TN-23-215
Lab ID:
Protocol:
Sample ID: Eco Analysts
Sample Type: Sitewater
Test Species: MB-Menidia beryllina

Conc-%	1	2	3	4	5
Control	1.0000	1.0000	1.0000	1.0000	1.0000
100	0.8000	0.8000	0.8000	0.9000	0.8000

			Transform: Arcsin Square Root					Rank	1-Tailed	Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	5			1.0000	1.0000
*100	0.8200	0.8200	1.1355	1.1071	1.2490	5.588	5	15.00	19.00	0.8200	0.8200

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.62485	0.781	2.51558	7.15179
Equality of variance cannot be confirmed				

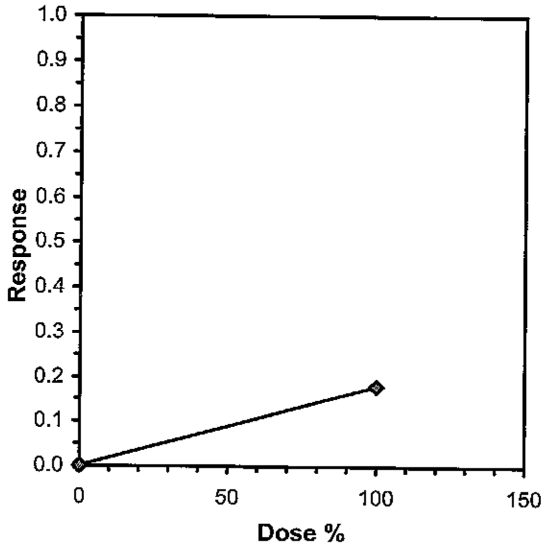
Hypothesis Test (1-tail, 0.05)

Wilcoxon Two-Sample Test indicates significant differences

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05*	27.778	3.324	23.333	40.476	1.3377
IC10*	55.556	6.648	46.667	80.952	1.3377
IC15*	83.333				
IC20	>100				
IC25	>100				
IC40	>100				
IC50	>100				

* indicates IC estimate less than the lowest concentration



Reviewed by:

ATTACHMENT V

Report Quality Assurance Records
(2 pages)

REPORT QUALITY ASSURANCE RECORD

Client: Eco Analysts

Author: Michael Chanev

Project Number: EA.TOX

EA Report Number: 9759

REPORT CHECKLIST

QA/QC ITEM	REVIEWER	DATE
1. Samples collected, transported, and received according to study plan requirements.		8/1/23
2. Samples prepared and processed according to study plan requirements.		8/1/23
3. Data collected using calibrated instruments and equipment.		8/1/23
4. Calculations checked:		
- Hand calculations checked		8/1/23
- Documented and verified statistical procedure used.		8/1/23
5. Data input/statistical analyses complete and correct.	M Redelfs	8/7/2023
6. Reported results and facts checked against original sources.	M Redelfs	8/7/2023
7. Data presented in figures and tables correct and in agreement with text.	M Redelfs	8/7/2023
8. Results reviewed for compliance with study plan requirements.		8/1/23

	AUTHOR	DATE
9. Commentary reviewed and resolved.		8/9/23
10. All study plan and quality assurance/control requirements have been met and the report is approved:		8/9/23
	PROJECT MANAGER	DATE
	M Redelfs	8/7/2023
	QUALITY CONTROL OFFICER	DATE
		8/8/23
	SENIOR TECHNICAL OFFICER	DATE

ATTACHMENT VI

US Army Corps of Engineers Quality Assurance Checklist
(2 pages)

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species	Yes	N/A	In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)	Yes	N/A	In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No	N/A	N/A	In Data Package
Water column toxicity test: Control mortality Control abnormality	$\leq$ 10% mean $\leq$ 30% mussel/oyster; $\leq$ 40% clam larvae, $\leq$ 30% sea urchin larvae	Yes	N/A	In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	$\leq$ 10% mean (no chamber > 20%) See EPA (1994a) Section 9; Table 11.3	N/A	N/A	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.