Department of Marine Resources
Site Review

Maine Island Aquaculture, LLC
P.O. Box 346
North Haven, ME
04853

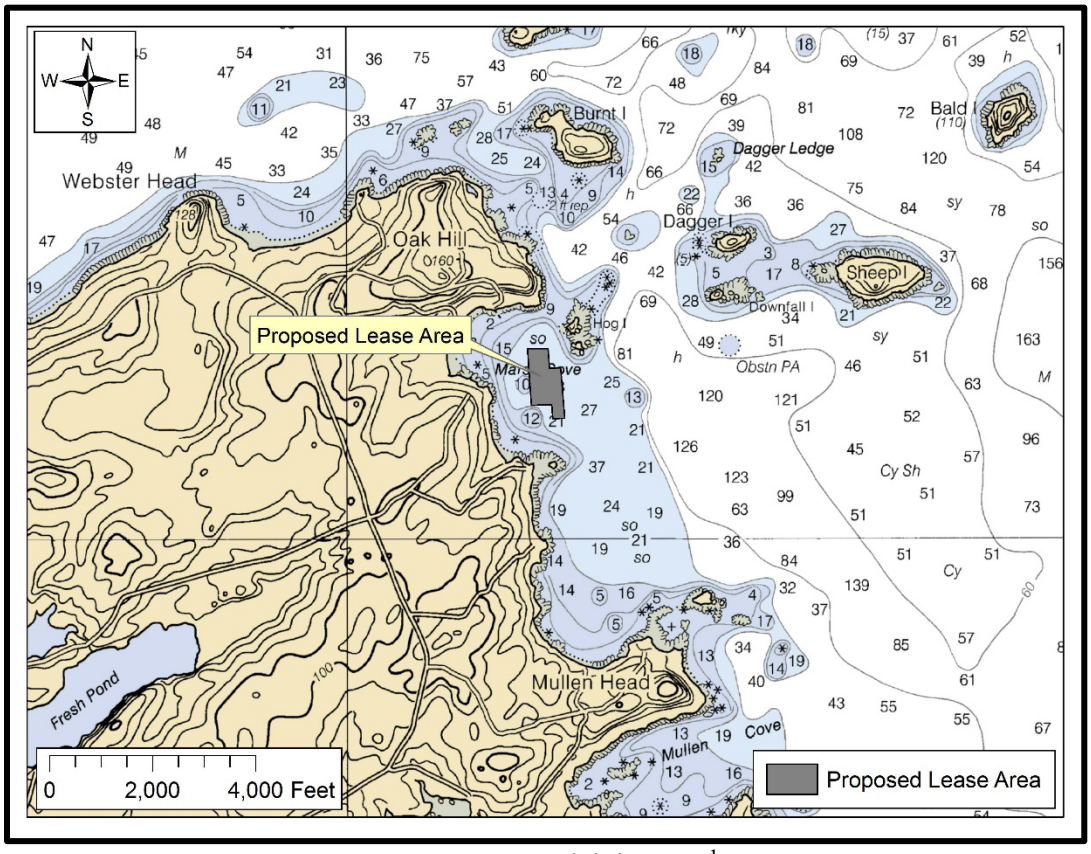

Figure 1: Vicinity map[1]

Location: Southwest of Hog Island, Marsh Cove, North Haven, Knox County, Maine

Purpose: Standard lease for the suspended culture of sea scallops (*Placopecten magellanicus*), sugar kelp (*Saccharina latissima*), dulse (*Palmaria palmata*) winged kelp (*Alaria esculenta*), and skinny kelp (*Saccharina angustissima*)

Site Review by: Marcy Nelson, Flora Drury and Cheyenne Adams
Report Preparation by: Cheyenne Adams, Flora Drury, and Marcy Nelson

Report Completed: March 4, 2022

[1]All figures in this report were created in either ArcMap version 10.6 or ArcGIS Pro version 2.9 using digitized NOAA Nautical Charts or geo-referenced aerial photographs provided by The Maine Office of GIS (orthoCoastalCentralCoast2003and2005).

Application Overview

The applicant, Maine Island Aquaculture, LLC, is requesting 15.07[2] acres southwest of Hog Island in Marsh Cove, North Haven.[3] The application requests to culture sea scallops on the northwestern section of the site using up to 800 hard mesh oyster bags (17.25" x 36.5" x 4") inside up to 100 Oyster Condos (45" x 40.5" x 22.5"), 1,000 lantern nets (6' x 18"), and 200 spat bags (32" x 15"). All scallop gear would be 20 feet below the surface of the water and deployed year-round, except for spat bags which would be deployed December to June. Marine algae would be cultured on the southeastern section of the site with up to 20 longlines measuring 800' in length that would be deployed 7 feet below the surface of the water from November to June.[4] Up to 28 depth-control buoys and 8 mooring buoys would be associated with scallop gear, while buoys associated with marine algae cultivation would include 180 depth-control buoys and 40 mooring buoys.[5] A 30' x 14' work barge would be moored in Marsh Cove, outside of the lease site, and transported to the site as needed.[6]

General Characteristics

Maine Department of Marine Resources (MDMR) Scientists Marcy Nelson, Flora Drury and Cheyenne Adams visited the proposed lease site on June 17, 2021. MDMR staff arrived onsite at approximately 10 am; the tide was ebbing. The proposed lease area is located in subtidal waters in Marsh Cove, off the eastern shore of North Haven. Ledge and sandy beaches compose the surrounding shoreline. The North Haven uplands hosts a mixed forest and residential properties (Images 1-6). Docks and moorings are located within Marsh Cove, with the highest density of these structures located north of the proposed lease. Hog Island is located to the northeast of the proposal and hosts no development (Image 7).

[2] The application requests 15 acres. MDMR calculations, based on the coordinates provided in the application, indicate the area is 15.07 acres.
[3] Application, page 1 (all page numbering in this report references the actual page number in the application, not how page numbers are labelled in the application).
[4] Application, page 13
[5] Application, page 14 and 17
[6] Application, page 19

Image 1. Looking south toward Mullen Head from near the proposed Corner 1 (June 17, 2021).

Image 2. Looking southwest toward the North Haven shoreline from near the proposed Corner 1 (June 17, 2021).

Image 3. Looking west toward the North Haven shoreline from near the proposed Corner 1 (June 17, 2021).

Image 4. Looking northwest toward the North Haven shoreline from near the proposed Corner 1 (June 17, 2021).

Image 5. Looking north toward the North Haven shoreline from near the proposed Corner 1 (June 17, 2021).

Image 6. Looking northeast from near the proposed Corner 1 (June 17, 2021).

Image 7. Looking east toward Hog Island from near the proposed Corner 1 (June 17, 2021).

Image 8. Looking southeast from near the proposed Corner 1 (June 17, 2021).

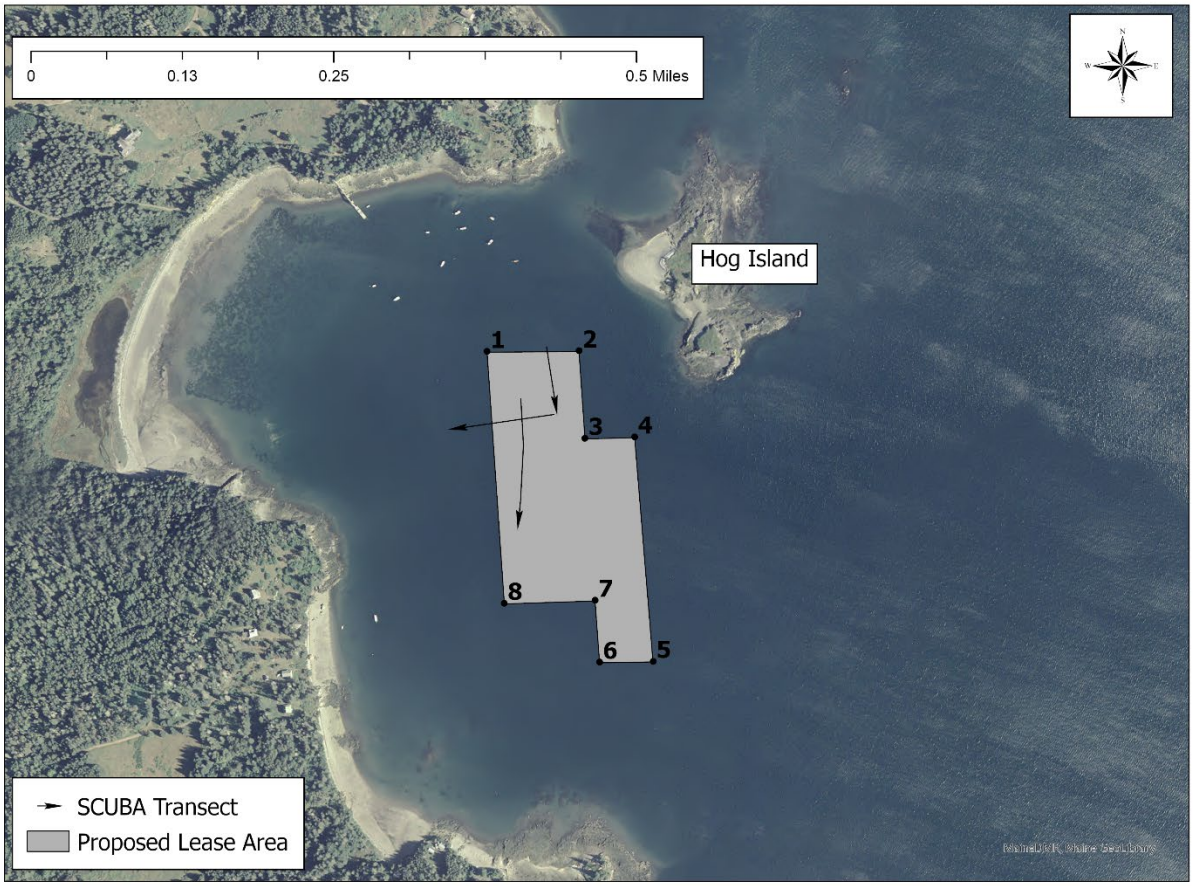

Figure 2: SCUBA transect through the proposed lease area (June 17, 2021).

Depth

MDMR staff collected depths at approximately 10:30 am on June 17, 2021, using a transom mounted depth sounder. Water depths at the corners of the proposed lease ranged from 26.2 to 34.7 to feet. Divers also noticed a deeper section in the middle of the proposed lease, which was approximately 50 feet deep. Correcting for tidal range would derive water depths approximately 0.31 feet lower at mean low water (MLW, 0.0'). Although some areas near the proposed lease boundaries would be less than or just over 26 feet at mean low water, and the applicant is planning to hang 6-foot-long lantern nets from longlines suspended 20 below the surface of the water, the shallowest corners are 4, 5, and 6, which encompass the section proposed for marine algae culture only (Figure 2 & 3). Therefore, the depths at the site appear to be appropriate for the gear layout proposed.

Table 1: Tide predictions at North Haven, Penobscot Bay, ME (44.1267° N, 68.8733° W)[7]

Date	Time	Height (ft)
6/17/2021	4:20 AM	9.79 H
6/17/2021	10:40 AM	0.31 L
6/17/2021	4:58 PM	9.45 H

Bottom Characteristics

The bottom of the proposed lease site has a range of sediment types, including cobble and soft mud (Images 9 and 10). Bottom characteristics were categorized using the Coastal and Marine Ecological Classification Standard (CMECS), a national standard for describing features of the marine environment. Sediment information was determined based on visual analysis of the video; no sediment samples were taken or grain size analysis performed. The substrate types observed during the SCUBA transect are included in Table 2.

Table 2: Bottom characteristics of proposed site.

Substrate Origin	Substrate Class	Substrate Subclass	Substrate Group : Subgroup
Geologic Substrate	Unconsolidated Mineral Substrate	Fine Unconsolidated Substrate	Mud
Geologic Substrate	Unconsolidated Mineral Substrate	Course Unconsolidated Substrate	Gravel : Cobble
Biogenic Substrate	Shell Substrate	Shell Rubble	-

[7] http://tbone.biol.sc.edu/tide/tideshow.cgi

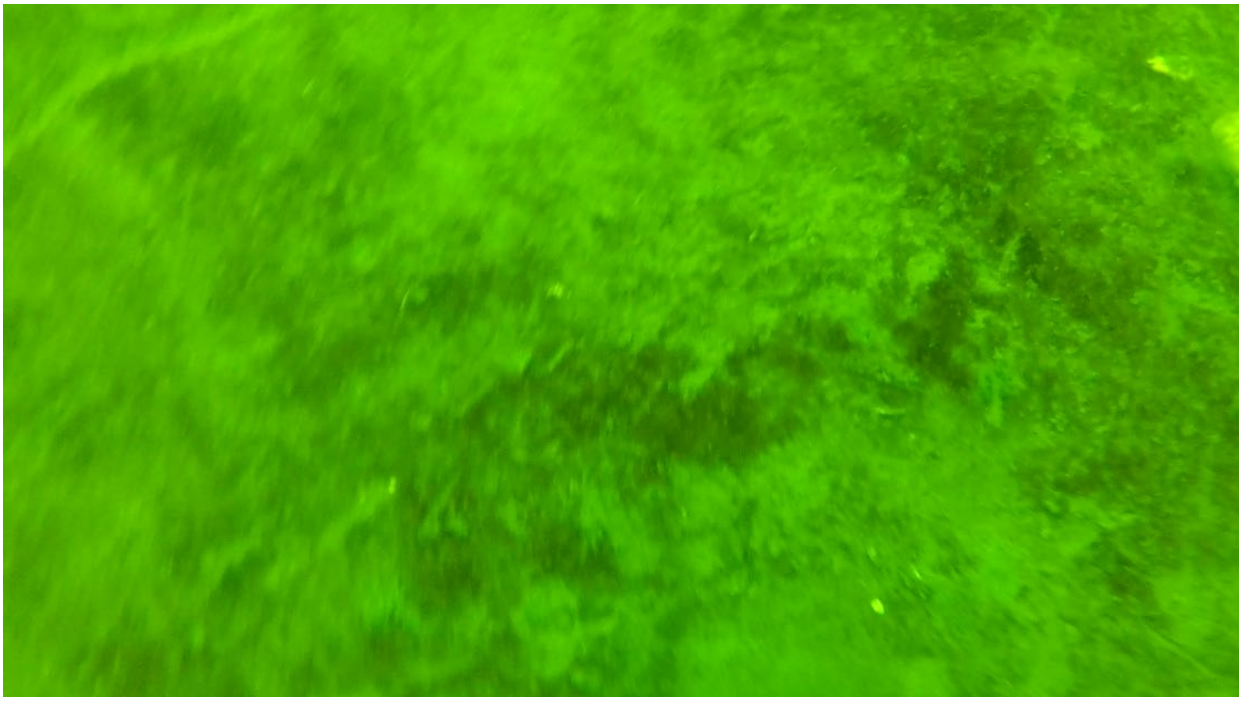

Image 10. Mud sediment on the bottom of the proposed lease site (June 17, 2021).

Position and Distances to Shore

The measuring tool in ArcGIS Pro version 2.9 were used to verify the distances and bearings between proposed lease corners. Distances to shore were determined using the measuring tool in ArcGIS Pro 2.9, digital orthophotography provided by the Maine Office of GIS, and the application coordinates.

Application Coordinates (WGS84)– 15.07 Acres (Figure 2)

Corner	Latitude	Longitude
1	44° 10’ 36.47” N	68° 49’ 11.75” W then 400.68 feet at 86° True to
2	44° 10’ 36.49” N	68° 49’ 6.25” W then 381.46 feet at 175° True to
3	44° 10’ 32.73” N	68° 49’ 5.90” W then 216.42 feet at 89° True to
4	44° 10’ 32.78” N	68° 49’ 2.93” W then 979.92 feet at 175° True to
5	44° 10’ 23.13” N	68° 49’ 1.86” W then 233.15 feet at 267° True to
6	44° 10’ 23.10” N	68° 49’ 5.06” W then 269.92 at 356° True to
7	44° 10’ 25.76” N	68° 49’ 5.32” W then 395.78 feet at 269° True to
8	44° 10’ 25.64” N	68° 49’ 10.75” W then 1,098.68 feet at 357° True to 1.

Table 3: Approximate distances from proposed lease to surrounding features (Figures 1 & 2).[8]

Feature	Distance
Corner 1 to nearest mooring in mooring field to the northwest	~290 feet to the northwest
1-2 Boundary to North Haven shoreline, nearest point (~MLW)	~730 feet to the north
Corner 2 to Hog Island shoreline, nearest point (~MLW)	~390 feet to the northeast
Corner 2 to 9-foot depth contour line (NOAA Charts)	~350 feet to the east
Corner 4 to Hog Island shoreline, nearest point (~MLW)	~350 feet to the northeast
Corner 4 to 9-foot depth contour line (NOAA Charts)	~300 feet to the east
Corner 6 to North Haven shoreline, nearest point (~MLW)	~675 feet to the south
Corner 6 to 9-foot depth contour line (NOAA Charts)	~365 feet to the southwest
8-1 Boundary to North Haven shoreline, nearest point (~MLW)	~700 feet to the west

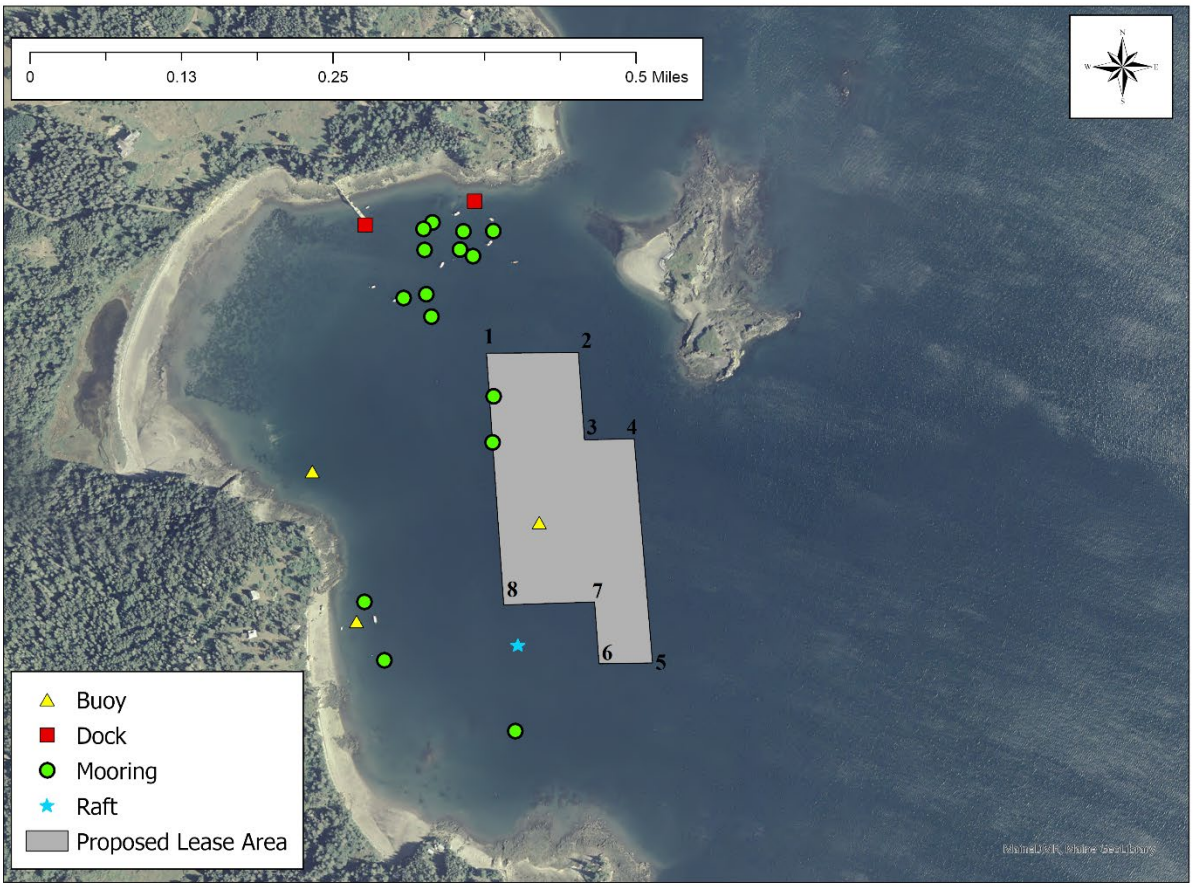

Figure 3. Nearby moorings, buoys, and docks observed on June 17, 2021.

[8] Measurements were made using digital orthophotography provided by The Maine Office of GIS (orthoCoastalCentralCoast2003and2005)

The criteria MDMR uses to determine the suitability of an aquaculture operation to a particular area (MDMR Regulations Chapter 2.37(1)(A)) are discussed, with respect to the proposal, below:

(1) Riparian Ingress and Egress

The proposed lease is in Marsh Cove, south of a small mooring field and west of Hog Island. During MDMR's site assessment on June 17, 2021, staff counted approximately 10 moorings in the mooring field, as well 2 moorings within the proposed lease boundaries and 3 moorings to the southwest of the proposal. While many of the moorings were observed to be empty, it is likely that more vessels are moored in the cove later in the season. During MDMR's site assessment, staff observed two motorboats on moorings, a rowboat on a dock, and an inflatable boat on an outhaul. Two docks were observed on the north end of the cove, near the mooring field, as well as several sets of shoreline stairs within the cove.

The presence of these pieces of access infrastructure, as well as significant lengths of sandy beach shoreline that could facilitate shore landing, suggests that shorefront landowners routinely access their properties via the water. Considering the proposed lease boundaries are 675 feet from the North Haven shoreline and 350 feet from the Hog Island shoreline at the nearest points, access to shorefront properties is unlikely to be prevented if the proposal were granted. Moreover, the nearest mooring in the mooring field is approximately 290 feet to the north at the nearest point, and therefore use of the mooring may be impacted by the proposal to some degree, depending on factors such as weather conditions and size and type of the vessel. Use of the two moorings located within the proposed lease boundaries, however, would be impeded by the proposed aquaculture operations.

Moreover, transiting to and from the moorings, docks, and stairs within March Cove has likely traditionally required navigating through the proposed lease area. Although this potential impact to shorefront landowners is not insignificant, it is discussed in "Section 2: Navigation" for concision.

(2) Navigation

Vessel flow entering and exiting Marsh Cove can occur in two general routes: through the ~450 foot entrance northwest of Hog Island, or through the ~1,950 foot entrance south of Hog Island (Figure 4, measurements made using NOAA Charts). Available NOAA Charts indicate that the low water depths in the entrance northwest of Hog Island are 9 feet, while the depths in the entrance south of Hog Island range from 21 to 27 feet. The shallower depth of the entrance northwest of Hog Island, in combination with the narrower space available for maneuvering, may discourage some mariners from taking this route. Therefore, the majority of traffic may transit through the area south of Hog Island.

During MDMR's site assessment on June 17, 2021, staff observed two sailboats transiting through the entrance northwest of Hog Island, and a sailboat being towed by a motorboat through the entrance south of Hog Island. The vessel towing a sailboat followed a route near the northeast boundaries of the proposed lease site.

The proposed lease site is located in the center of the deep water south of Hog Island and is therefore likely in the most direct route that many vessels have traditionally taken into and out of Marsh Cove. If the lease were to be granted, approximately 350 feet would remain unimpeded

between the proposal and Hog Island to the northeast. Likewise, approximately 700 feet would remain unimpeded between the proposal and North Haven to the southwest. Currently, there are approximately 1,950 feet between the southern shore of Hog Island and North Haven and therefore the proposal would occupy slightly more than half of this entrance. For vessels navigating outside of the 9-foot depth contours, there would be approximately 365 feet to the southwest of the proposal and approximately 300 feet to the northeast of the proposal for access to the cove through the entrance south of Hog Island. Currently, there are approximately 1,630 feet between the 9-foot contour line around Hog Island and the 9-foot contour line to the south, near North Haven's shoreline, at the narrowest point. Therefore, if the proposal were granted, vessel congestion may occur in the relatively narrow routes remaining on either side of the proposal.

It should be noted that from July to October, marine algae longlines would not be present at the site. During these months, if the proposal were granted, the 9-foot depth contour lines would be approximately 500 feet to the southwest of the lease and 325 feet to the northeast of the lease. Although this would result in a greater area available for navigation on both sides of the proposed lease than would be available when marine algae gear is deployed, it is still a significant reduction from the ~1,630 feet between 9-foot depth contours that is currently available for navigation at the narrowest point. Although the potential for congestion is highest in the summer months when vessel traffic is expected to be heaviest in the area, alteration to traditional navigation routes may be required throughout the year.

The applicant is proposing to suspend scallop longlines 20 feet below the surface of the water, and space scallop depth control buoys 100 feet apart, which could allow for mariners to transit through the proposed lease site and over the proposed longlines. However, the presence of required site markers and a relative concentration of buoys may encourage mariners, especially those without local familiarity, to avoid the proposed lease area altogether. Compared to the proposed scallop gear, the higher concentration of depth control buoys used for marine algae longlines from November-June, and the longlines being deployed at a shallower depth of 7 feet below the water surface, would be more likely to result in vessel avoidance of the area in question. Although less vessel traffic in the area is generally expected during winter months, there may be some overlap between increased vessel activity and marine algae longlines at the beginning and end of the marine algae growing season. Marine algae longlines are proposed to be deployed through June; during MDMR's site assessment in mid-June, several vessels were observed to be moored, docked, or motoring in Marsh Cove.

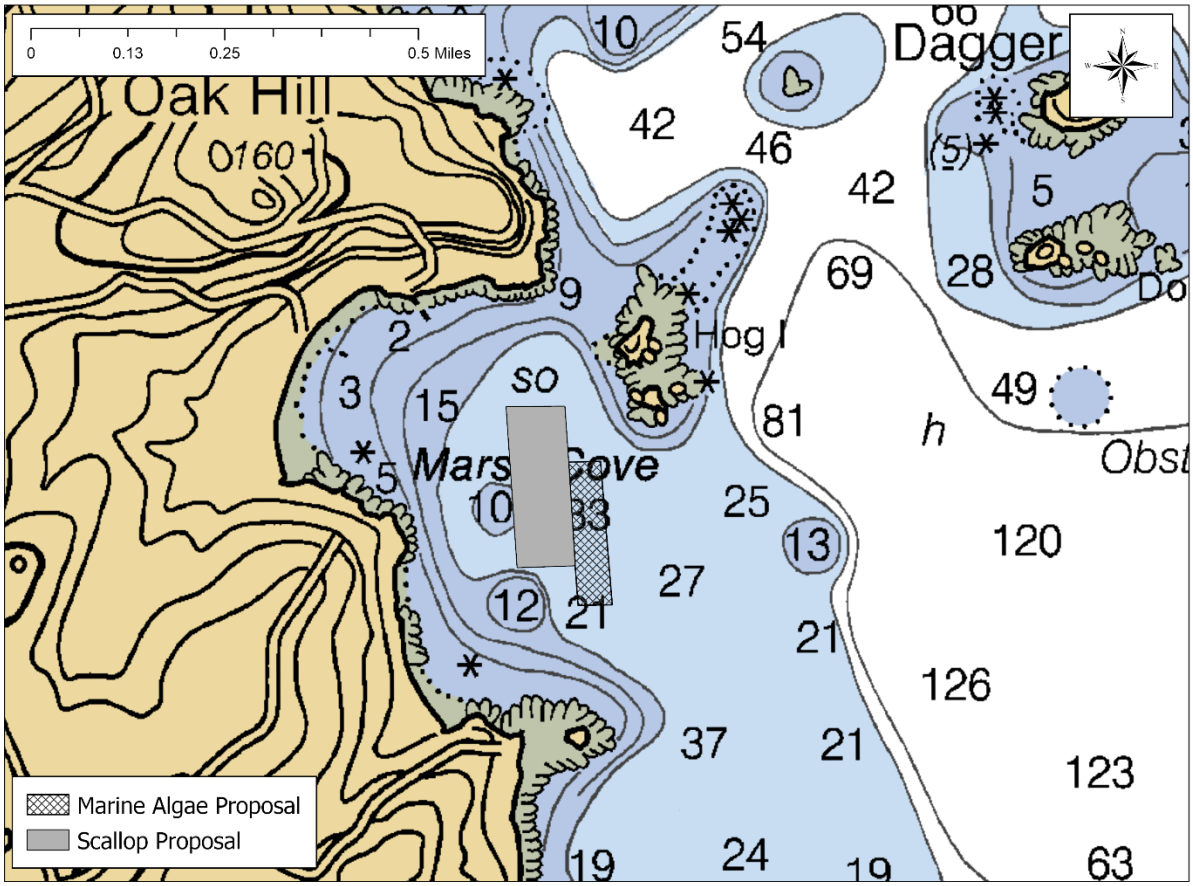

Figure 4. Proposed species and gear layout.

(3) Fishing and Water-Related Uses

On June 17, 2021, three lobster buoys were observed within Marsh Cove, one of which was within the proposed lease site (Figure 3). It was not clear if these buoys were lobster trap buoys, as some were heavily fouled. However, since the lobster fishery in Maine follows the annual migration and molt cycle of lobsters (*Homarus americanus*), it is possible that lobster fishing occurs to a greater extent or in closer proximity to the proposal during other times of the year than was observed during the site assessment. One lobster vessel was observed hauling traps outside of the cove. During the SCUBA transect, MDMR divers observed approximately five lobsters.

Additional commercially important species observed during the SCUBA transect include approximately 13 sea scallops (*Placopecten magellanicus*) and one green sea urchin (*Strogylocentrotus droebachiensis*). If either of these species are present in greater abundance in areas of Marsh Cove outside of the proposed lease footprint, it is possible that dive or drag harvesting could continue unimpeded if the leases were granted. However, the feasibility of dive or drag harvesting would likely depend on the proximity of the resource to the proposed lease boundaries. According to information obtained by the MDMR Scallop Program, there may be some fishing effort from drag vessels, but it is limited in relation to other nearby areas.[9] The

[9] Email from A. Lisi to C. Adams (2/18/2022)

application requests that, if the lease is granted, commercial and recreational fishing be excluded from taking place within the lease boundaries.[10]

The application is requesting that, if the lease were to be granted, the only fishing activity allowed within the site be commercial lobster fishing and recreational fishing, from July-October, in the southeastern section of the proposal reserved for kelp farming.[11]

(4) Other Aquaculture Uses

There are no active aquaculture leases and four active Limited Purpose Aquaculture (LPA) license sites within 1 mile of the proposal (Figure 5). These four LPA licenses are held by one of the owners of Maine Island Aquaculture, LLC and would be relinquished if the lease were to be granted.[12]

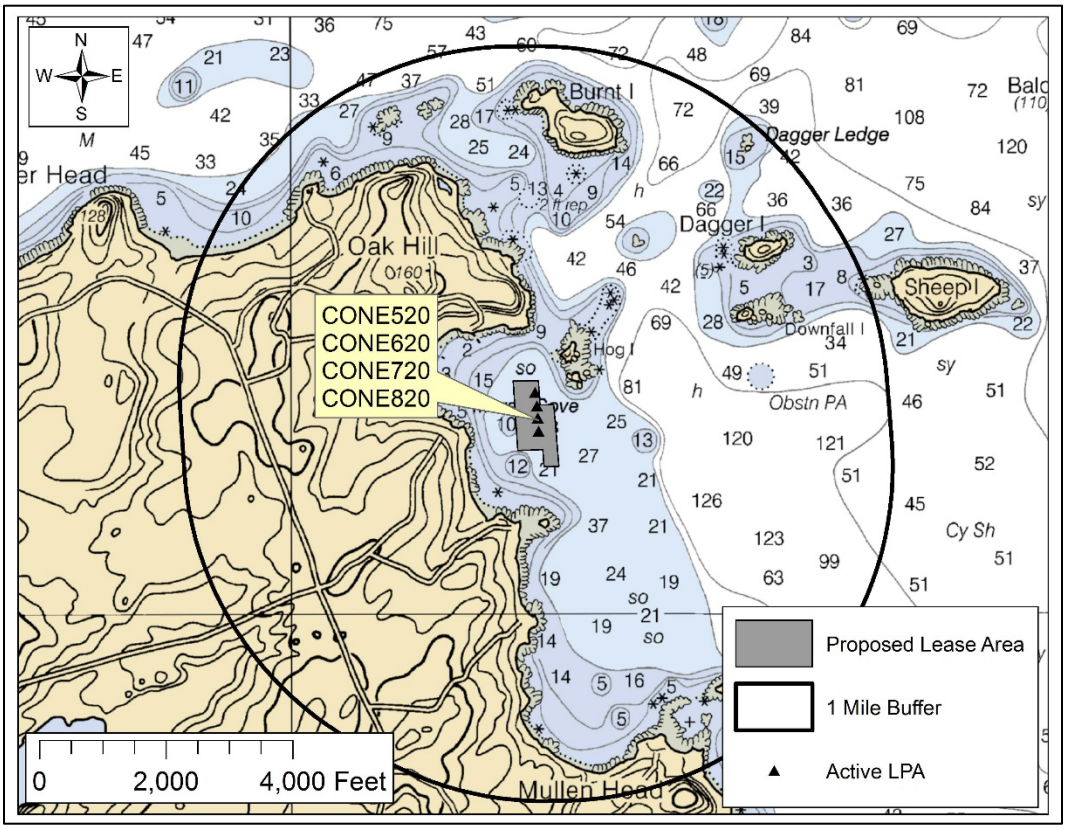

Figure 5: Active aquaculture leases and licenses nearby the proposed lease.

(5) Existing System Support

On June 17, 2021, a handheld digital video camera contained within an underwater housing was used to document the epibenthic ecology of the proposed lease area (Figure 2). The bottom of the proposed lease site is composed mostly of cobble on mud, with some sections of soft mud (Images 9 & 10). The most abundant species observed were the northern sea star (*Asteria rubens*) and an unidentified filamentous macroalgae. During the transect, MDMR divers observed approximately

[10] Application, page 31
[11] Application, page 31
[12] Application, page 27

13 sea scallops (*Placopecten magellanicus*) and 5 lobsters (*Homarus americanus*). Other species observed during the SCUBA transect are listed in Table 4.

Table 4: Species observed via SCUBA within the proposed lease site on June 17, 2021.

Species Observed	Abundance
Filamentous algae	Abundant
Northern sea star (*Asterias rubens*)	Abundant
Benthic diatoms	Patchily Abundant
Sugar kelp (*Saccharina latissima*) – unattached	Common
Colonial tunicate	Common
Sea scallop (*Placopecten magellanicus*)	Common
Rockweed (*Ascophyllum nodosum*) – unattached	Rare
Sea lettuce (*Ulva lactuca*)	Rare
Sea cucumber (*Cucumeria frondosa*)	Rare
Tube-dwelling anemone (*Cerianthus borealis*)	Rare
Unidentified macroalgae	Rare
Lobster (*Homarus americanus*)	Rare
Hermit crab (*Pagurus sp.*)	Rare
Green sea urchin (*Strongylocentrotus droebachiensis*)	Rare
Solitary tunicate (*Ciona intestinalis*)	Rare
Crab (*Cancer sp.*)	Rare
Sugar kelp (*Saccharina latissima*) – attached	Rare

Image 11: Northern sea star (*A. rubens*) observed on the proposed lease bottom (June 17, 2021).

Eelgrass (*Zostera marina*)

According to data collected by The Maine Department of Marine Resources in 2004, the closest record of eelgrass to the proposed lease site was located approximately 600 feet to the northwest, with a percent coverage of 10%-40% (Figure 6). No eelgrass was observed during the Department's underwater site assessment on June 17, 2021. Additionally, the site is expected to be too deep to allow adequate light penetration to support eelgrass growth.

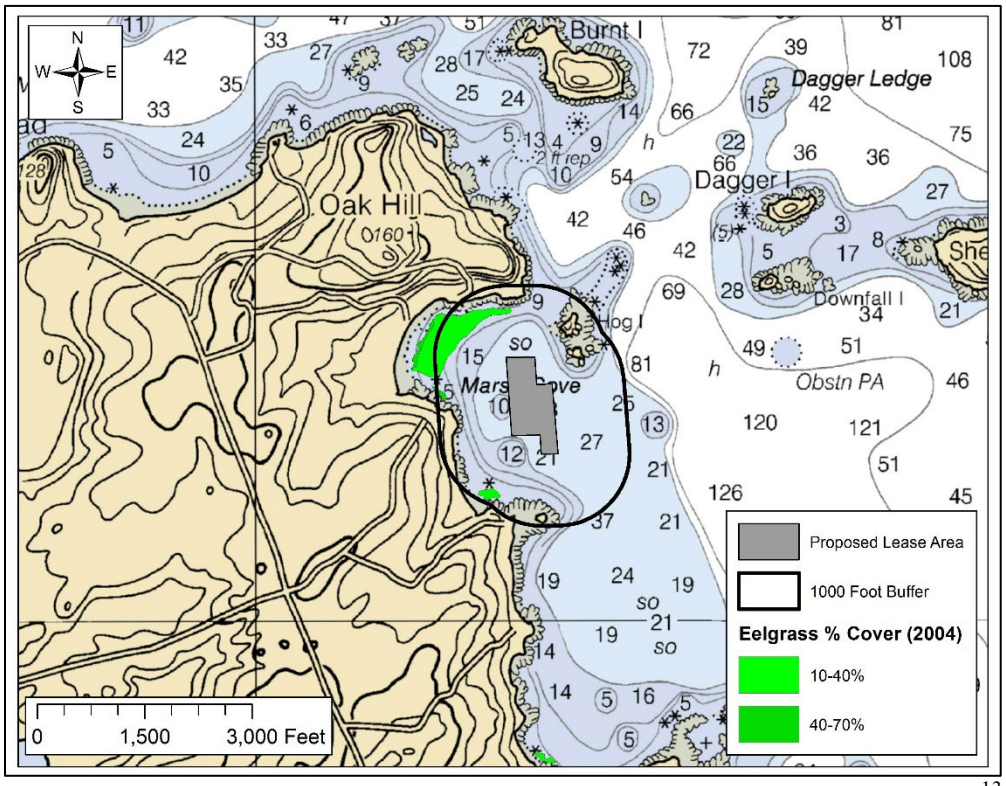

Figure 6: Historical records of eelgrass (*Z. marina*) near the proposed lease.[13]

Wildlife

According to GIS (Geographic Information System) data maintained by the Maine Department of Inland Fisheries and Wildlife (MDIF&W) and available through the Maine Office of GIS, the proposed lease is approximately 220 feet to the south of an area designated as Tidal Waterfowl and Wading Bird Habitat (Figure 7). Tidal Waterfowl and Wading Bird Habitat is defined under Maine's Natural Resources Protection Act (NRPA) as Significant Wildlife Habitat.

During MDMR's site assessment on June 17, 2021, staff observed 2 bald eagles (*Haliaeetus leucocephalus*), guillemots (*Cepphus grylle)*, and various gulls (*Larus sp.*)

[13] Data obtained from MDMR maintained SDE Feature Class "MaineDMR – Eelgrass 2010"

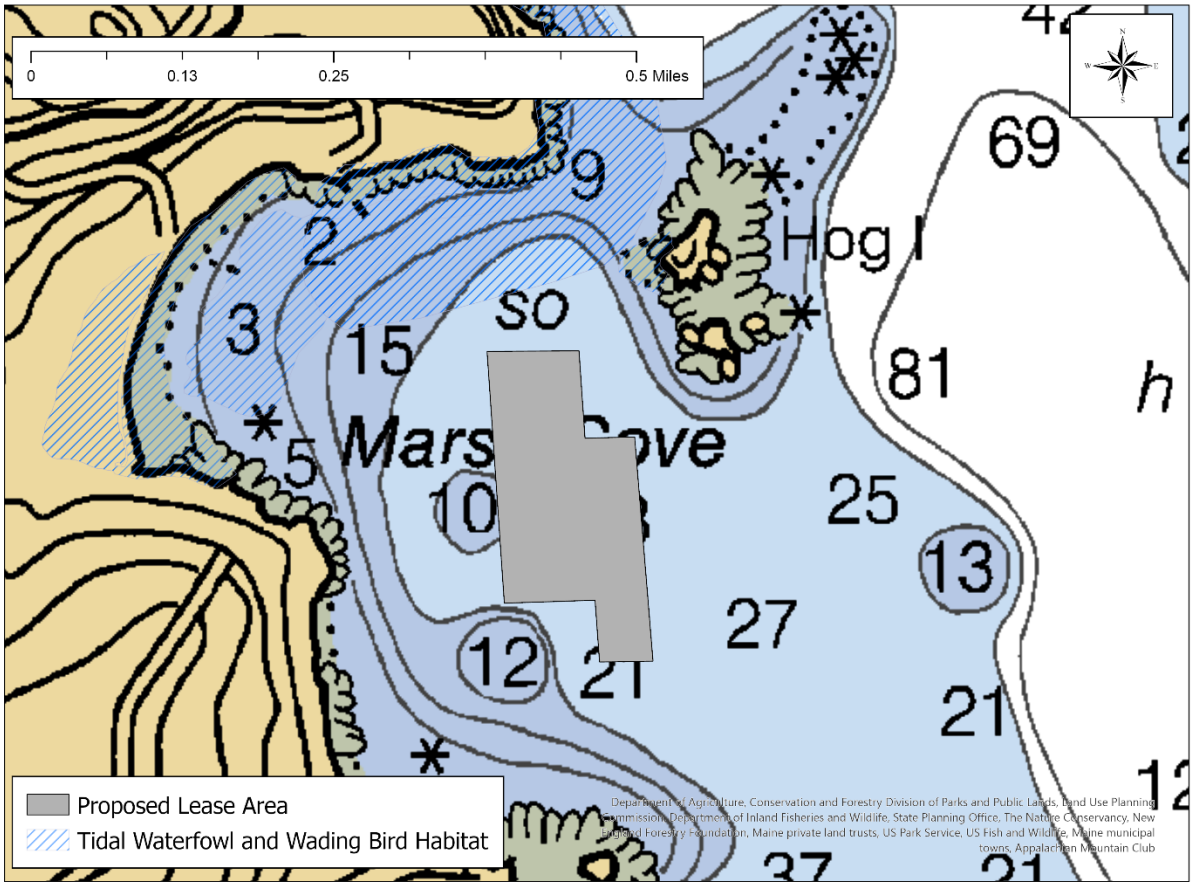

Figure 7: Tidal Wading Bird and Waterfowl Habitat[14] near the proposed lease site.

(6) Interference with Public Facilities

Downfall Island, a State Wildlife Management Area, is the nearest conserved land and is over 0.5 miles to the northeast of the proposal (Figure 8). The nearest land in public fee ownership is Burnt Island, over 0.6 miles to the north. Both islands, and 3 additional nearby islands, are managed by MDIF&W.

On February 24, 2021, a Wildlife Biologist with MDIF&W responded by email to a "Request for Agency Review and Comment", stating that the minimal impacts to wildlife are anticipated for this project.

[14] Data obtained from MDIWF maintained SDE Feature Class "*GISVIEW.MEIFW.Twwh*"

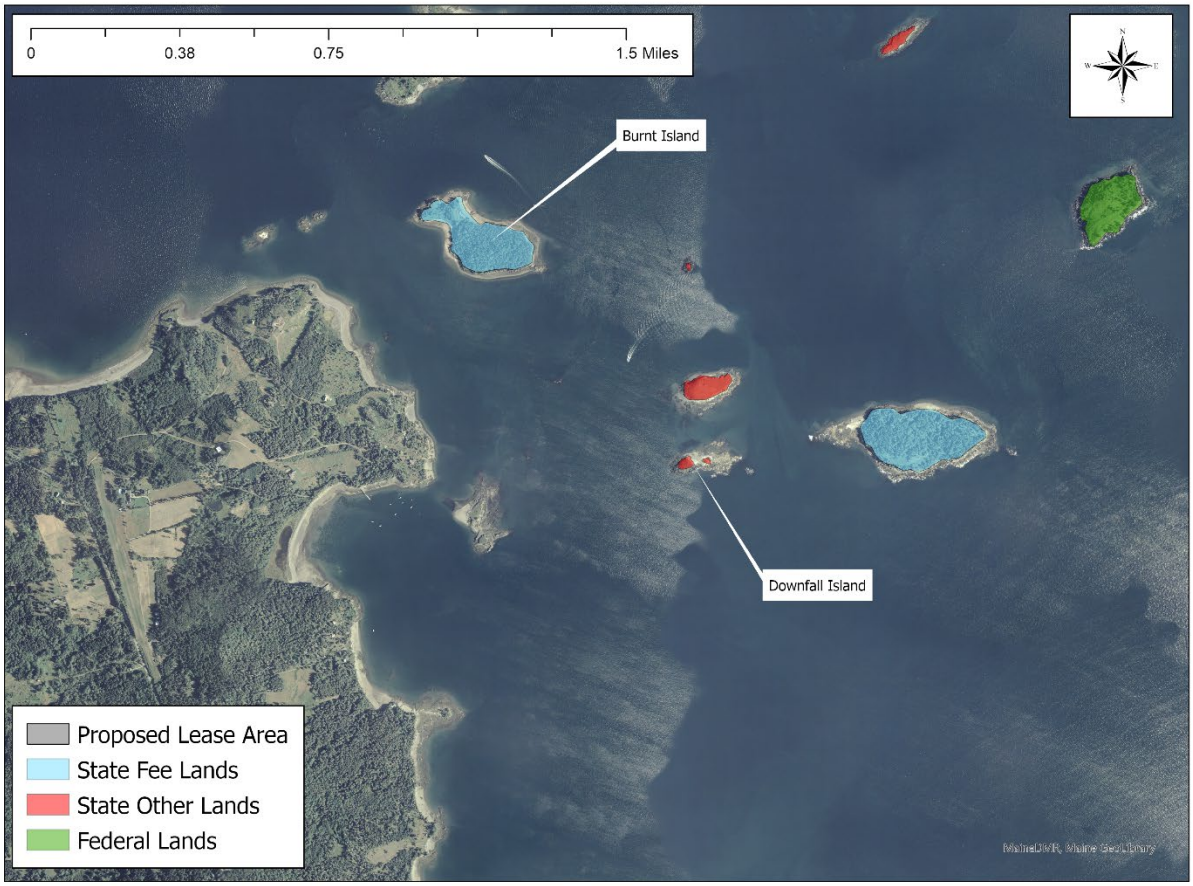

Figure 8: Conserved lands in vicinity of proposed lease site.[15]

(7) Water Quality

The proposed lease site is in an area currently classified as open/approved for the harvest of shellfish.

(8) Lighting

The applicant does not propose the use of lighting at the lease site or working beyond daylight hours except during a potential emergency.[16]

(9) Noise

According to the application, equipment used on site would include a propane-fueled hot tank, a gas-powered generator, and a barge (30' x 14') with a shed (96" x 48" x 48"). The applicant plans to install solar panels and use these, in combination with the generator, to power an electric sorting machine, electric hauler, a wash down/pressure pump, a mast and boom, and a net washer. The sorting machine and wash down/pressure pump would be used up to 12 weeks/year, and the hauler and mast and boom would be used up to 5 days/week.

[15]Data obtained from SDE Feature Class sourced from The Maine Office of GIS "*GISVIEW.MECONSLANDS.Conserved_Lands*"
[16] Application, page 26

Vessels used to service the site currently include a 22' outboard, but may include a larger vessel as part of future operations.[17]

(10) Visual Impact

The aquaculture equipment and vessels proposed for use, should the lease be granted, meet the visual impact standards as set forth in MDMR Regulation Chapter 2.37(A).

[17] Application, page 26