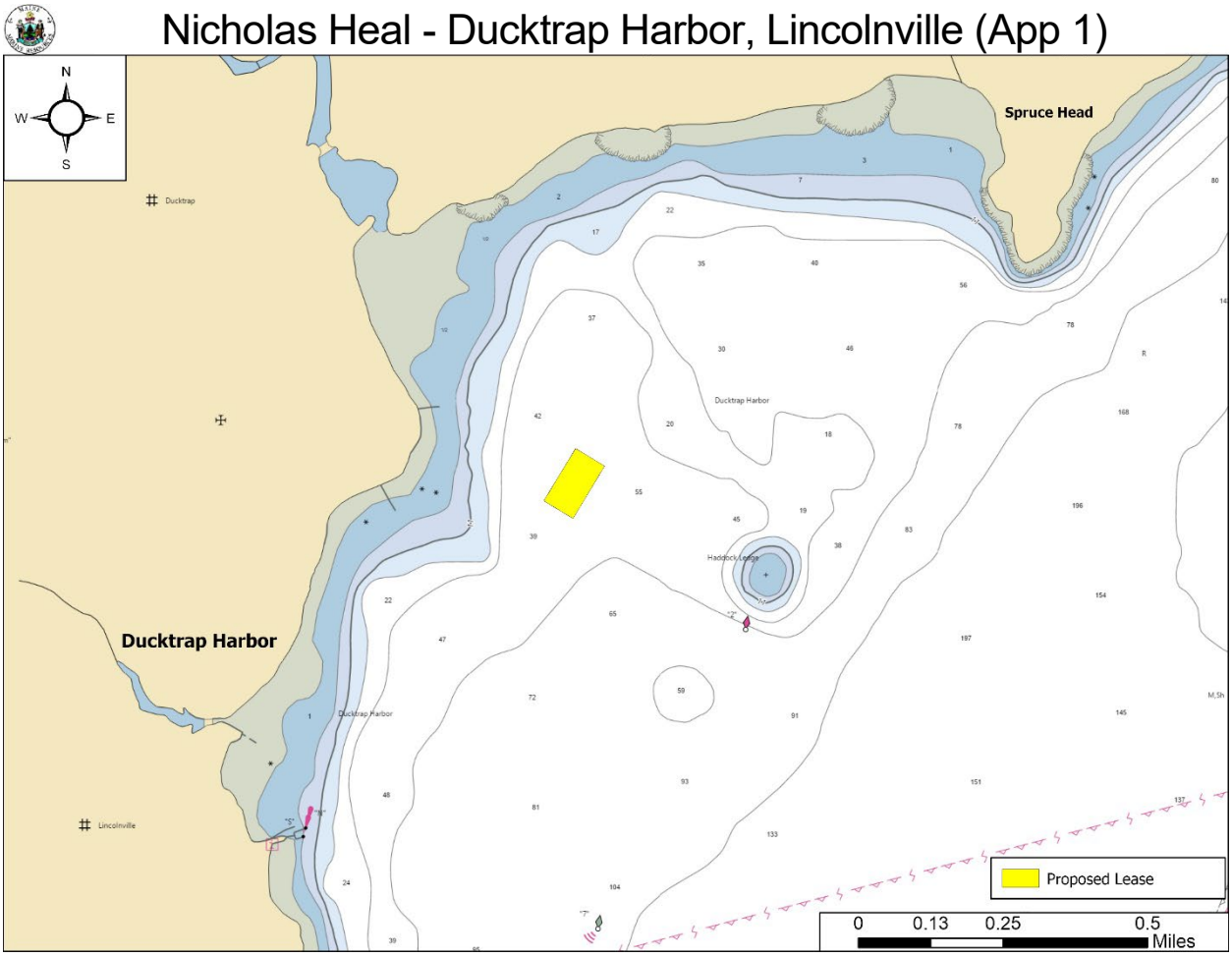

Figure 1. Vicinity map.[1]

Location: Ducktrap Harbor, Penobscot Bay, Lincolnville, Waldo County, Maine

Purpose: Experimental lease for suspended culture of sugar kelp (*Saccharina latissima*), skinny kelp (*Saccharina angustissima*), winged kelp (*Alaria esculenta*), horsetail/fingered kelp (*Laminaria digitata*), shotgun kelp (*Agarum clathratum*)[2], dulse (*Palmaria palmata*), Irish moss (*Chondrus crispus*), and sea lettuce (*Ulva lactuca*).

Site Review: Geoff Shook, Katie von Hohenleiten, and Heidi Bray[3]
Report Preparation: Katie von Hohenleiten, Geoff Shook, and Meryl Grady

[1] Unless otherwise noted, all figures in this report were created in ArcGIS Pro version 2.9 using digitized NOAA Nautical Charts or geo-referenced aerial photographs provided by The Maine Office of GIS.
[2] Application states the scientific name as *Agarum cribosum*, however the current accepted scientific name is *Agarum clathratum*.
[3] Dive support

Application Overview

The applicant, Nicholas Heal, is requesting a 3.98[4] acre experimental lease for the suspended culture of marine algae in Ducktrap Harbor, Penobscot Bay, within the town of Lincolnville. The applicant intends to remove all gear, except concrete mooring blocks and required lease markers, from June 16 through October 14. [5]

General Characteristics

On July 30, 2024, Maine Department of Marine Resources (MDMR) scientists assessed the proposed lease site. MDMR scientists arrived on site at approximately 7:40 AM. The general characteristics of the area surrounding the proposed lease consisted of rocky coastline leading to forested uplands with manicured residential lawns and one sandy beach in the vicinity.

Depth

MDMR scientists began collecting depths at the proposed site shortly after high tide at approximately 7:42 AM. Measured depths at corners of the proposed lease site ranged from 61.8 to 65.7 feet. Correcting for tidal variation derives water depths at the corners of the proposal at mean low water (MLW, 0.0 feet) to be from 52.5 to 56.4 feet (Table 1).

Table 1. Predicted tidal heights in Islesboro, Maine.[6]

Date	Time	Height (ft)
2024/07/30	1:07 AM	0.1 L
2024/07/30	7:21 AM	9.4 H
2024/07/30	1:18 PM	1.0 L
2024/07/30	7:40 PM	10.9 H

Bottom Characteristics

MDMR scientists observed the bottom characteristics of the proposed lease site via SCUBA transect. Bottom characteristics were categorized using the Coastal and Marine Ecological Classification Standard (CMECS), a national standard for describing features of the marine environment (Table 2). Sediment information was determined based on visual analysis of the video. The bottom of the proposed lease site is composed of mud.

Table 2. Bottom characteristics of the proposed site.

Substrate Origin	Substrate Class	Substrate Subclass	Substrate Group
Geologic Substrate	Unconsolidated Mineral Substrate	Fine Unconsolidated Substrate	Mud

[4] Applicant originally requested 3.99 acres. MDMR calculations indicate the area is 3.98 acres.
[5] Application page 9, 17
[6] https://www.usharbors.com/harbor/maine/gilkey-harbor-islesboro-me/tides/?tide=2024-07#monthly-tide-chart

Position and Distances to Shore

The measuring tool in ArcGIS Pro 2.9 was used to verify the distances and bearings between proposed lease corners. Distances to shore were determined by using the measuring tool in ArcGIS Pro 2.9, a nautical chart provided by the National Oceanic and Atmospheric Administration (NOAA), and the application coordinates (Table 3, Figures 2 and 3).

Application Coordinates (WGS84) – 3.98 Acres

Corner	Latitude	Longitude	
NW	44.29015°	-68.99579°	then 309.3 feet at 122° True to
NE	44.28971°	-68.99478°	then 557.7 feet at 211° True to
SE	44.28840°	-68.99588°	then 311.6 feet at 301° True to
SW	44.28884°	-68.99690°	then 559.1 feet at 032° True to NW

Table 3. Approximate distances from proposed lease corners to surrounding features (Figure 3).

Feature	Distance
NE corner to center of Haddock Ledge at MLW	~1,780.4’ to the southeast
SE corner to red nun navigational buoy “2”	~1,876.6’ to the southeast
SW corner to closest shoreline at MLW	~1,106.8' to the west
NW corner to northern shoreline at MLW	~2,521.4’ to the north

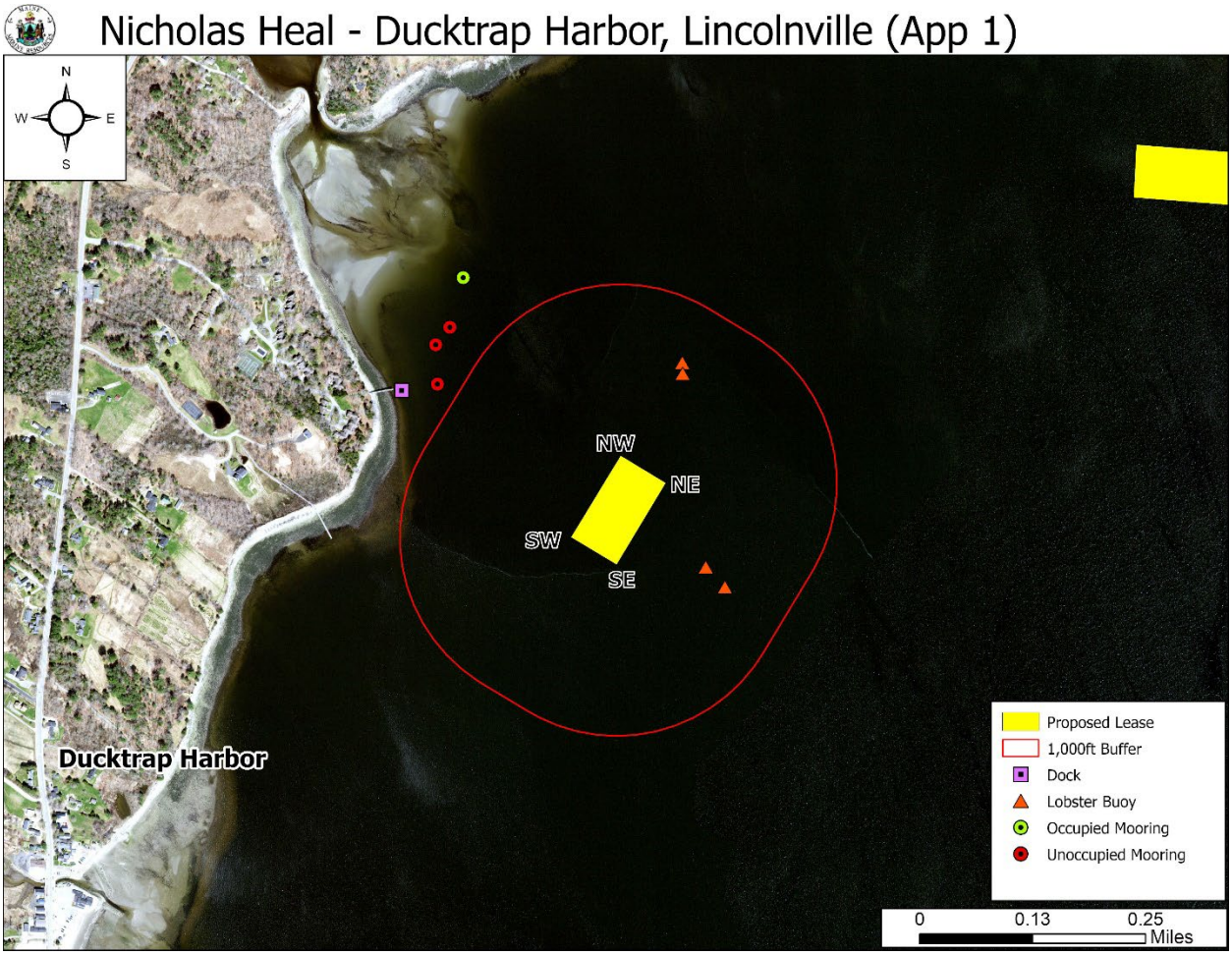

Figure 2. Proposed lease area with site visit observations.

Pursuant to statute and regulation, aquaculture leases are evaluated in consideration of applicable decision criteria. The site report documents MDMR's observations of the area and other information, in consideration of those criteria, as noted below:

(1) Riparian Ingress and Egress

MDMR did not observe any docks, moorings, or land within 1,000 feet of the proposal. Four moorings were observed northwest of the proposal with the closest approximately 1,131.5 feet northwest. One mooring was occupied with a 25-foot sailboat, and all others were unoccupied at the time of the site visit. MDMR observed one pier approximately 1,290.8 feet northwest of the proposal. At the time of the site visit, there was no associated dock in the water. The closest shoreline to the proposal is 1,106.8 feet to the west at MLW.

In a completed Harbormaster Questionnaire submitted to MDMR on August 10, 2023, it was indicated that riparian ingress and egress would not be affected.

(2) Navigation

The proposal is located approximately 1,876.6 feet northwest of red navigational buoy "2" that marks the northern edge of the navigational channel approaching Ducktrap Harbor and is approximately 1,106.8 feet east of the nearest shoreline at MLW (Figure 3).

During MDMR's site visit, one recreational powerboat was observed transiting along the shoreline to the north of the proposed lease, and a ferry service was observed operating to the south of the proposed lease.

The Harbormaster Questionnaire indicated the proposal would minimally affect navigation within the area.

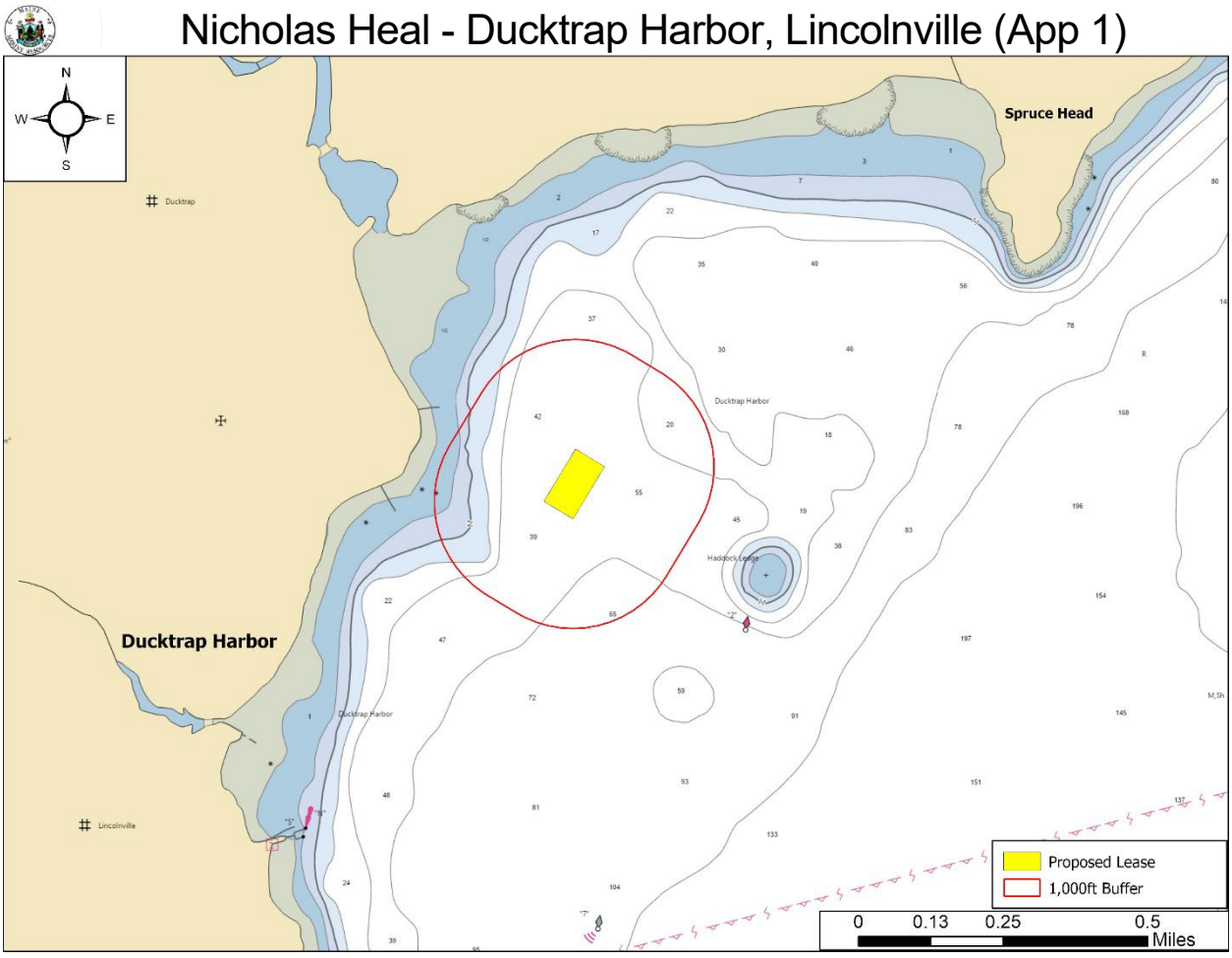

Figure 3. Navigational channels in the vicinity of the proposed lease area.

(3) Fishing and Other Uses

During the site visit, MDMR documented four lobster buoys within 1,000 feet of the proposal (Figure 2). The closest lobster buoy to the proposed lease was approximately 450.8 feet to the east. No active commercial or recreational fishing was observed during the site visit.

The Harbormaster Questionnaire indicated there is minimal commercial lobstering in the area around the proposed lease, and that the area has been occasionally dragged for scallops in the past.

(4) Other Aquaculture Uses

There are two limited purpose aquaculture (LPA) sites within 1,000 feet of the proposal. NHEA324 and NHEA424 are located within the boundaries of the proposal and are licensed to the applicant Nicholas Heal (Figure 4).[7] There are no other LPAs or aquaculture leases within 1,000 feet of the proposed lease site.

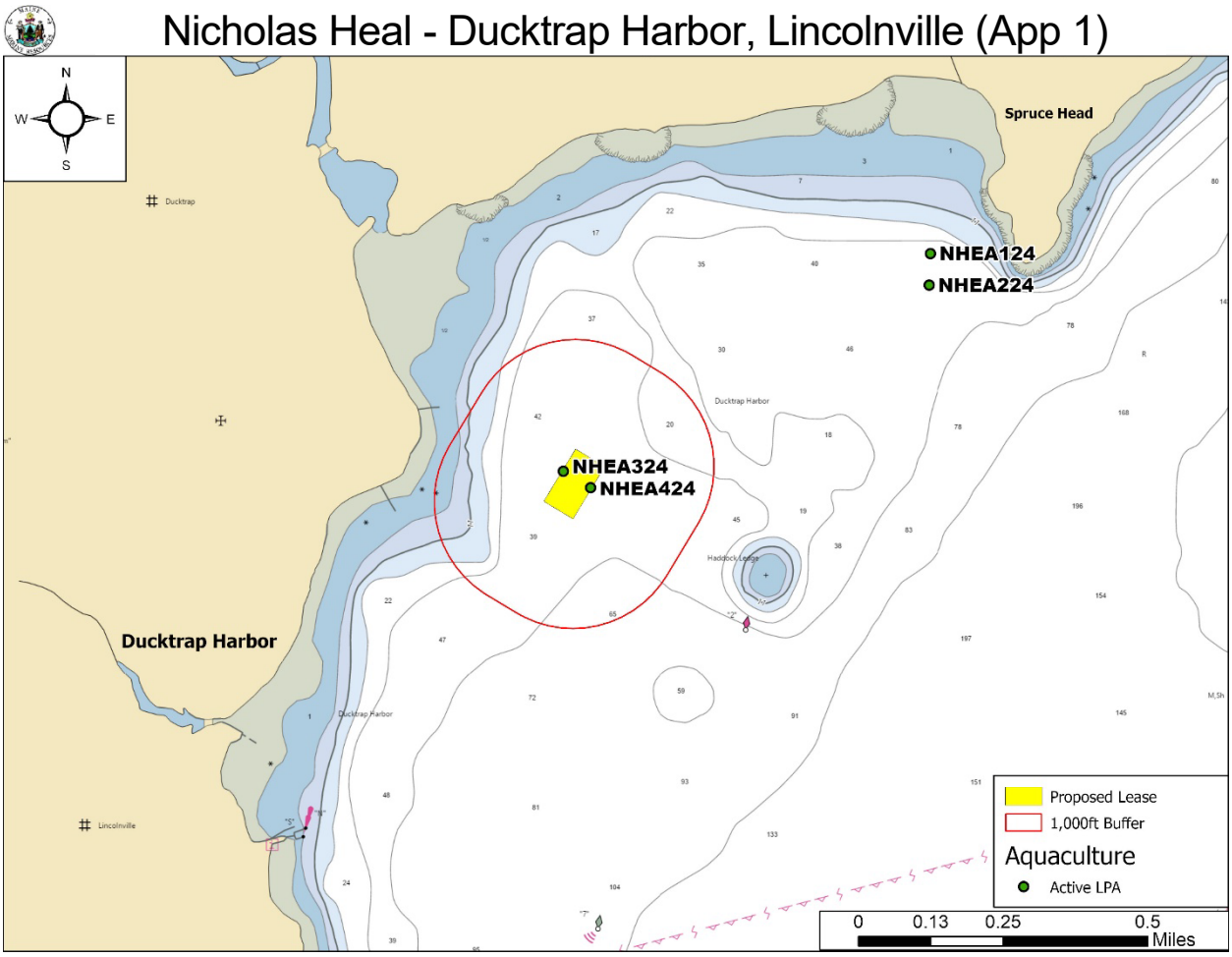

Figure 4. Aquaculture leases and LPA licenses in the vicinity of the proposed lease area.

[7] NHEA324 and NHEA424 were licensed after this application was deemed complete by MDMR.

(5) Existing System Support

Epibenthic Flora and Fauna

On July 30, 2024, MDMR scientists conducted a SCUBA dive to assess the epibenthic ecology of the proposed lease. The relative abundance of epibenthic flora and fauna observed in the video transect is described below in Table 4.

Table 4. Species observed on underwater camera footage.

Species Observed	Abundance
Fig Sponge (*Suberites ficus*)	Common
Rock Crab (*Cancer irroratus*)	Common
Kelp spp.	Occasional
Rockweed (*Ascophyllum nodosum*)	Occasional
Bladderwrack (*Fucus vesiculosus*)	Occasional
Crangon shrimp (*Crangon septemspinosa*)	Occasional
Jonah Crab (*Cancer borealis*)	Rare

Eelgrass (*Zostera marina*)

Records of eelgrass collected by MDMR in 2010 indicate no mapped eelgrass presence within 1,000 feet of the proposal. The nearest mapped eelgrass is approximately 1,119.3 feet west of the proposed lease (Figure 5).[8] No eelgrass was observed within the proposal boundaries during MDMR's site assessment.

[8] Data obtained from The Maine Office of GIS "GISVIEW.MEDMR.Eelgrass". Data from 2010 was the most current record of mapped eelgrass within the vicinity of the proposal at the time the site report was written.

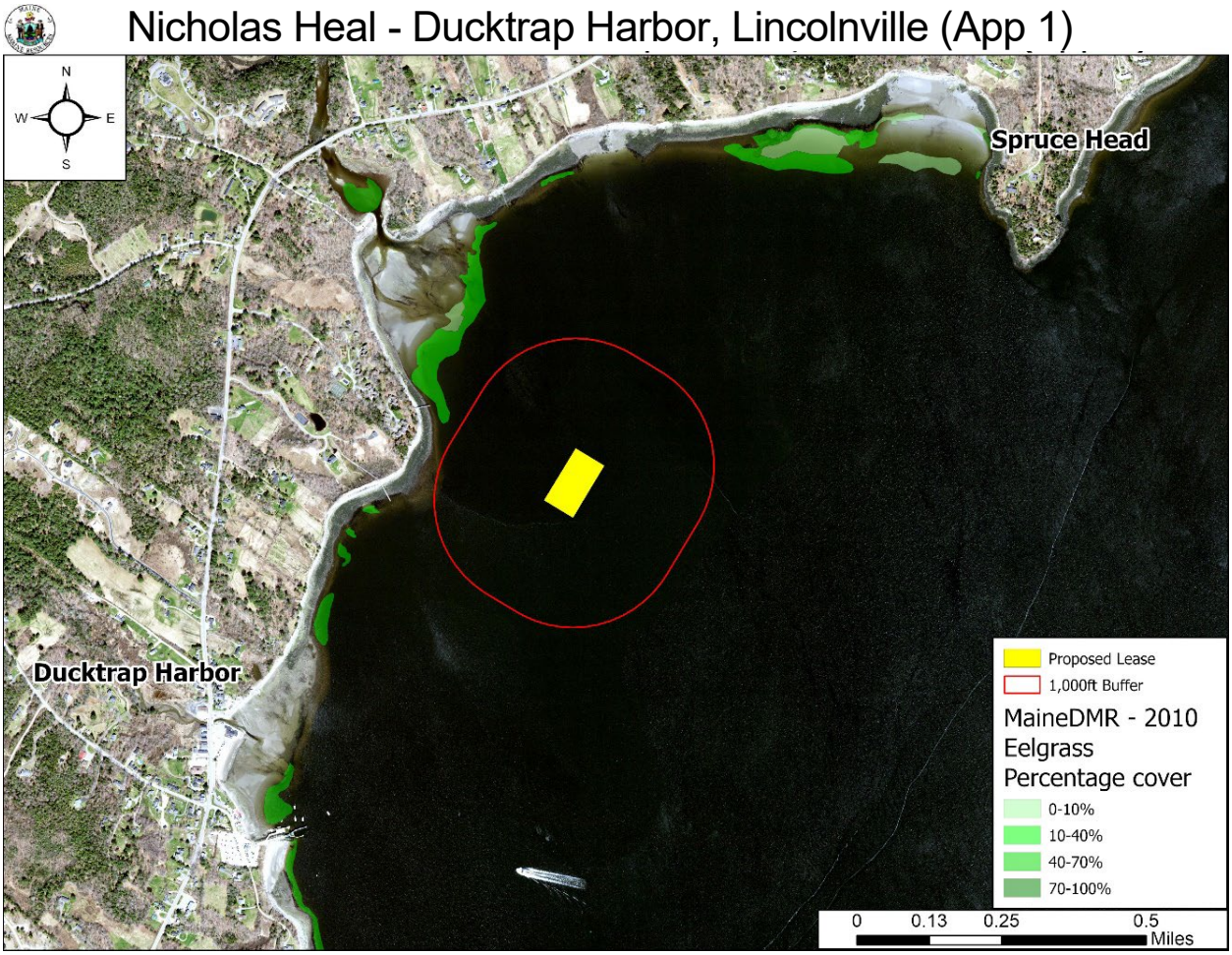

Figure 5. Mapped eelgrass (*Z. marina*) in the vicinity of the proposed lease area.

Wildlife

According to Geographic Information System (GIS) data maintained by the Maine Department of Inland Fisheries and Wildlife (MDIFW) and available through the Maine Office of GIS (MEGIS), the proposed lease is located approximately 1,119.3 feet to the east of mapped Tidal Waterfowl and Wading Bird Habitat (TWWH). Data collected by the United States Fish and Wildlife Service in 2023 by aerial nest survey shows no mapped bald eagle nesting site to be in the vicinity of the proposed lease (Figure 6).

During the site assessment, MDMR scientists observed double-crested cormorant (*Nannopterum auritum*), black guillemot (*Cepphus grylle*), and a loon (*Gavia immer*) in the general vicinity of the proposal.

On August 9, 2023, a Resource Biologist with MDIFW responded by email to a "Request for Agency Review and Comment" stating minimal impacts to wildlife are anticipated for this project.[9]

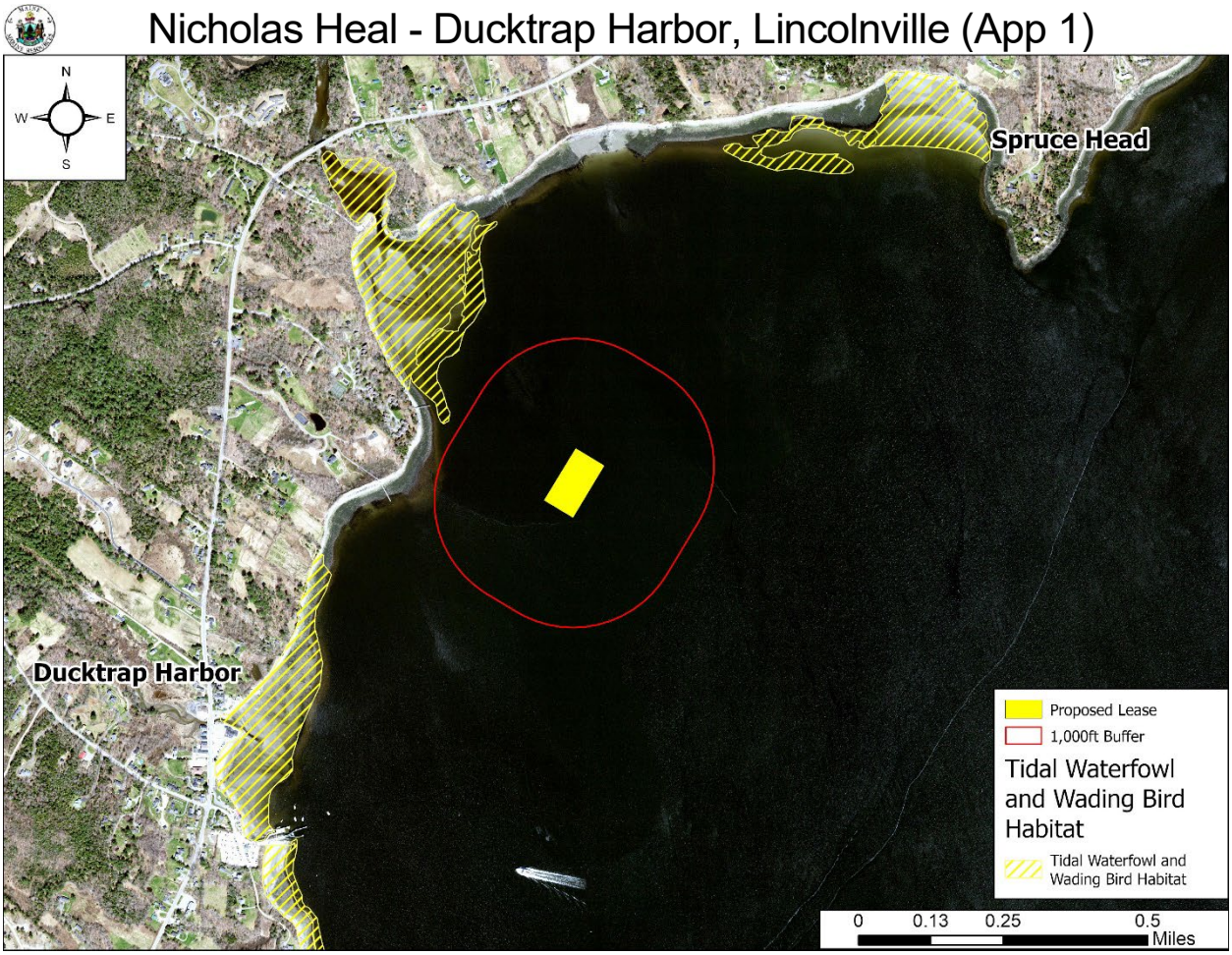

Figure 6. Mapped TWWH[10] in the vicinity of the proposed lease area.

(6) Interference with Public Facilities

The proposed lease is not within 1,000 feet of any beach, park, or docking facility owned by federal, state, or municipal governments.

(7) Water Quality

The proposed lease is currently located within an area classified as Open/Approved by the MDMR Bureau of Public Health and Aquaculture.

[9] Email correspondence between MDIFW and MDMR

[10] Data obtained from USFWS "Bald_Eagle_Nests_-_Maine_2023" and MDIFW maintained SDE Feature Class "GISVIEW.MEIFW.Twwh"