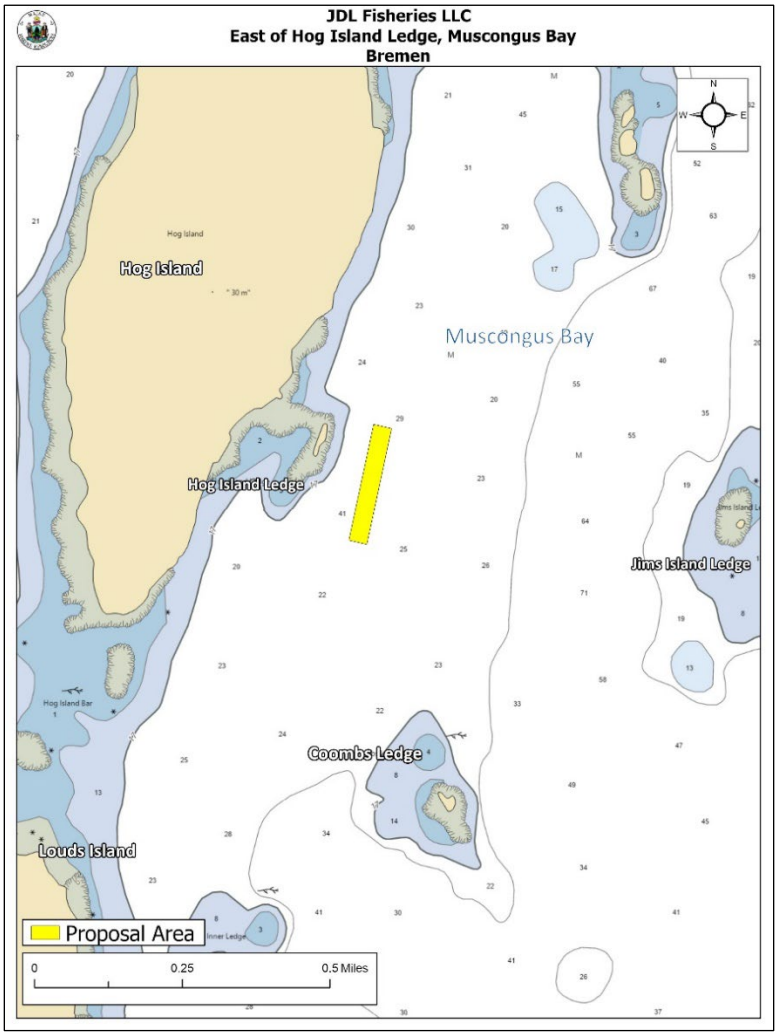

Figure 1. Vicinity map.[1]

Location: East of Hog Island Ledge, Muscongus Bay, Bremen, Lincoln County, Maine

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

Site Review: Geoffrey Shook and Katie Von Hohenleiten
Report Preparation: Geoffrey 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.

Application Overview

The applicant, JDL Fisheries LLC, is requesting a 4.0-acre experimental lease east of Hog Island Ledge, in Muscongus Bay, within the town of Bremen for the suspended culture of marine algae. The applicant intends for the site to be active seasonally from October 15 - May 31. Between June 1 – October 14 required lease markers, moorings, mooring lines and chains will remain on site with lines and chains sunk to the seafloor.[2]

General Characteristics

On June 13, 2024, Maine Department of Marine Resources (MDMR) scientists assessed the proposed lease site. MDMR scientists arrived on site at approximately 10:53 AM. The proposal is located in subtidal waters in Muscongus Bay approximately 347.6 feet east of Hog Island Ledge at mean low water (MLW) (Figure 1). The area in the vicinity of the proposal was observed to consist of a primarily rocky coastline with small sand bars and beaches leading to forested uplands. Hog Island Ledge is bare rock with a portion that remains exposed at high tide.

Depth

On June 13, 2024, MDMR scientists began collecting depths at the proposed site at approximately 10:54 AM. The tide was ebbing with the next low tide predicted at 11:04 AM (Table 1). Depths were determined to be between 29.1-38.7 feet. Correcting for tidal variations derives depths at mean low water (MLW, 0.0 feet) to be between 28.1-37.7 feet.

Table 1. Predicted tidal heights in Muscongus Harbor, Maine.[3]

Date	Time	Height (ft)
2024/06/13	4:36 AM	8.8 H
2024/06/13	11:04 AM	1.0 L
2024/06/13	5:20 PM	8.4 H
2024/06/13	11:26 PM	1.9 L

Bottom Characteristics

MDMR scientists observed the bottom characteristics of the proposed lease site via a remotely operated vehicle (ROV). 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 primarily composed of mud with a sheet algal bed overlay.

[2] Application pages 5,11
[3] https://www.usharbors.com/harbor/maine/muscongus-harbor-me/tides/?tide=2024-06#monthly-tide-chart

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
Benthic/Attached Biota	Aquatic Vegetation Bed	Benthic Macroalgae	Sheet Algal Bed

Position and Distances to Shore

The geodesic measuring tool in ArcGIS Pro 2.9 was 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, 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) – 4.0 Acres

Corner	Latitude	Longitude	
NW	43.96250°	-69.41996°	then 164.7 feet at 102° True to
NE	43.96240°	-69.41935°	then 1,057.6 feet at 192° True to
SE	43.95956°	-69.42017°	then 164.7 feet at 283° True to
SW	43.95966°	-69.42078°	then 1,057.6 feet at 012° True to NW

Table 3. Approximate distances from proposal to surrounding features (Figures 2 and 3).

Feature	Distance
NE corner to Jims Island Ledge at MLW	~2,987.9’ to the east
SE corner to Jims Island Ledge at MLW	~3,109.6’ to the east
NW corner to Hog Island at MLW	~745.3’ to the east
SW corner to Hog Island at MLW	~1,363.5’ to the west
SW corner to Hog Island Ledge at MLW	~653.0’ to the northwest
NW corner to Hog Island Ledge at MLW	~347.6’ to the west
NE corner to Coombs Ledge at MLW	~3,186.2’ to the south
SE corner to Coombs Ledge at MLW	~2,222.4’ to the south
SE corner to Louds Island at MLW	~3,755.7’ to the southwest
SW corner to Louds Island at MLW	~3,661.4’ to the southwest

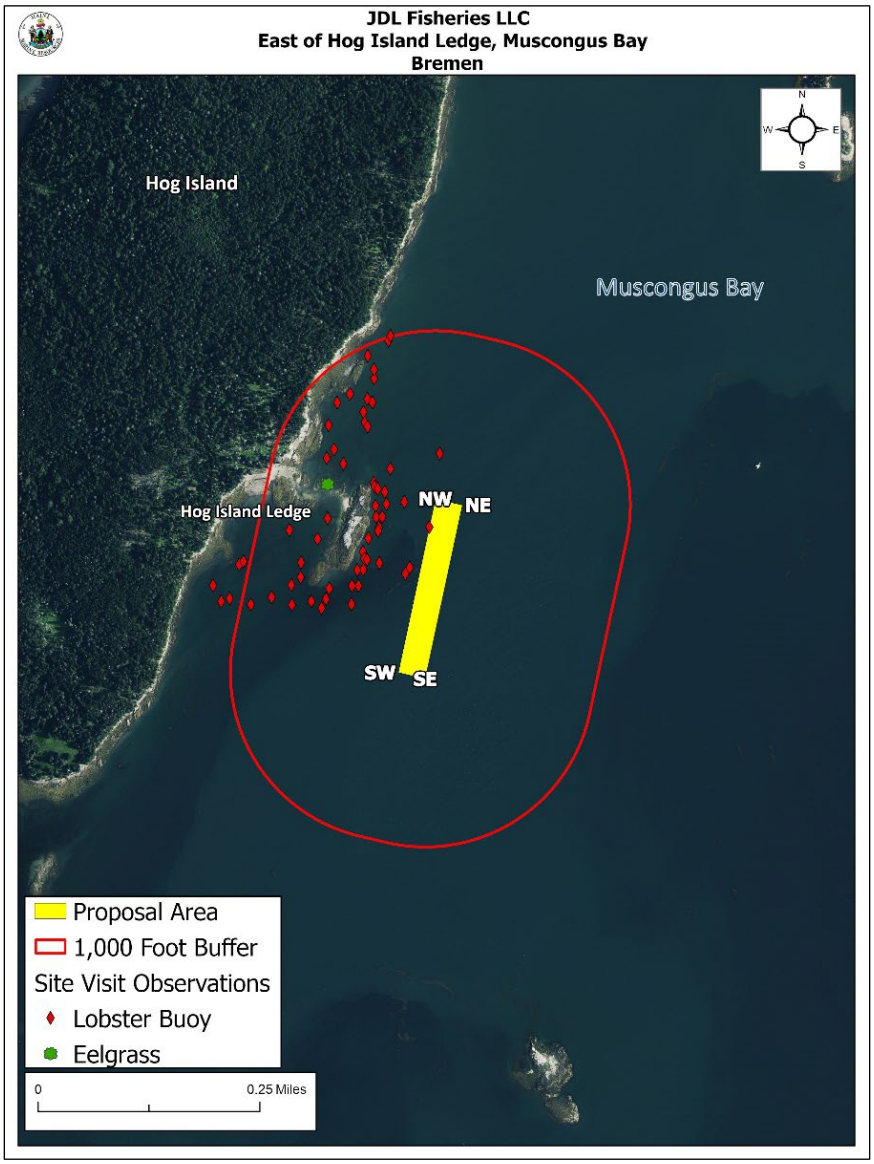

Figure 2. Proposed lease area with site visit observations.

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

During the site visit, MDMR did not observe any docks, houses, or moorings within the vicinity of the proposal. The proposal is approximately 745.3 feet east of Hog Island at MLW. Aerial imagery[4]

[4] Maine Orthoimagery Coastal Midcoast 2023

indicates that there are residential docks located on the northern tip of Hog Island and the northeastern side of Louds Island approximately 6,688.3 feet to the north and 7,216.9 feet to the south, respectively.

A Harbormaster Questionnaire was sent to the Town of Bremen. MDMR did not receive a response.

(2) Navigation

The proposal is located in subtidal, navigable waters approximately 347.6 feet east of Hog Island Ledge at MLW. There is approximately 2,987.9 feet of navigable water between the proposal and Jims Island Ledge to the east. The body of water where the proposal is located is part of a western approach to the Medomak River that continues to the west of Bremen Long Island. There is also a navigable approach to the Medomak River through a waterway to the east of Bremen Long Island (Figure 3).

During MDMR's site visit, scientists observed six powerboats transiting in the waterway to the east further than 1,000 feet from the proposal. Four boats were transiting to the north and two were transiting to the south.

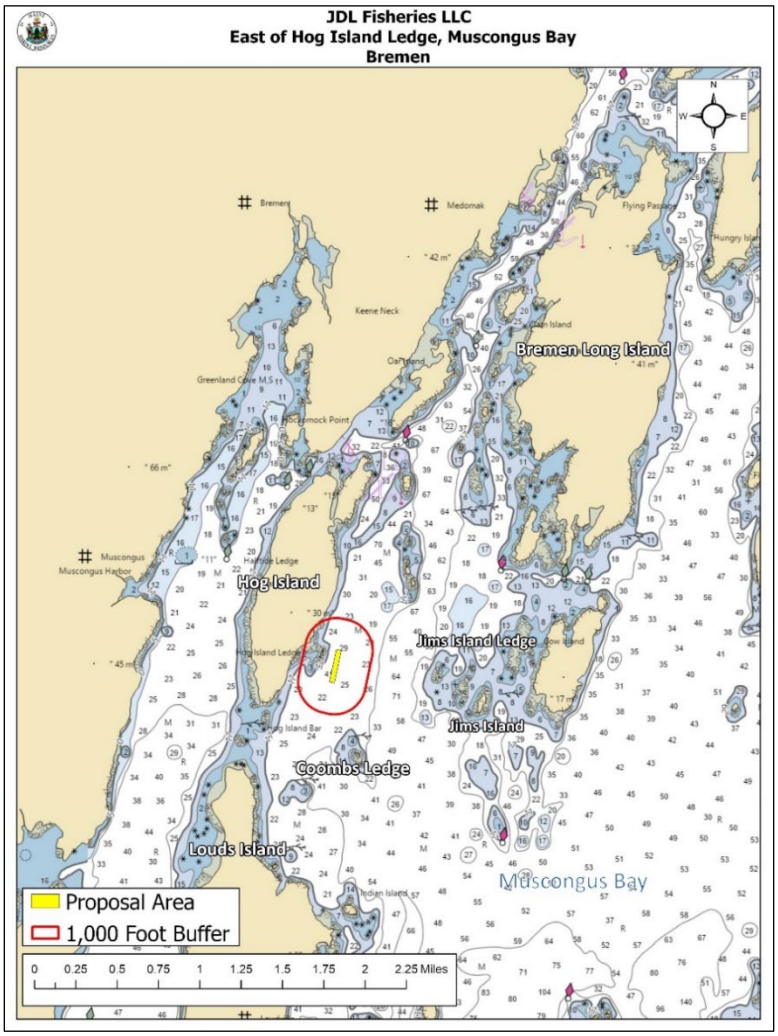

Figure 3. Navigational channels in the vicinity of the proposed lease area.

(3) Fishing and Other Uses

During MDMR's site visit, scientists observed 54 lobster buoys within 1,000 feet of the proposal, concentrated primarily around Hog Island Ledge with the closest buoy located within the proposal boundaries (Figure 2).

During MDMR's site visit, scientists observed three lobster boats working to the east of the proposal in the vicinity of Jims Island Ledge. Scientists also observed a menhaden (*Brevoortia tyrannus*) fishing boat working in the area around Jims Island Ledge.

Hog Island is located approximately 745.3 feet west of the proposal at MLW. It is privately owned by the National Audubon Society and is used as a camp that offers educational programs related to ornithology, conservation, and nature. [5] It has hiking trails around the island and residential

[5] https://fohi.org/about/

buildings on the northern end. The dock that provides access to the island is located approximately 6,688.3 feet north of the proposed lease area.

(4) Other Aquaculture Uses

There are not any active aquaculture leases or limited purpose aquaculture (LPA) sites within 1,000 feet of the proposed lease site (Figure 4).

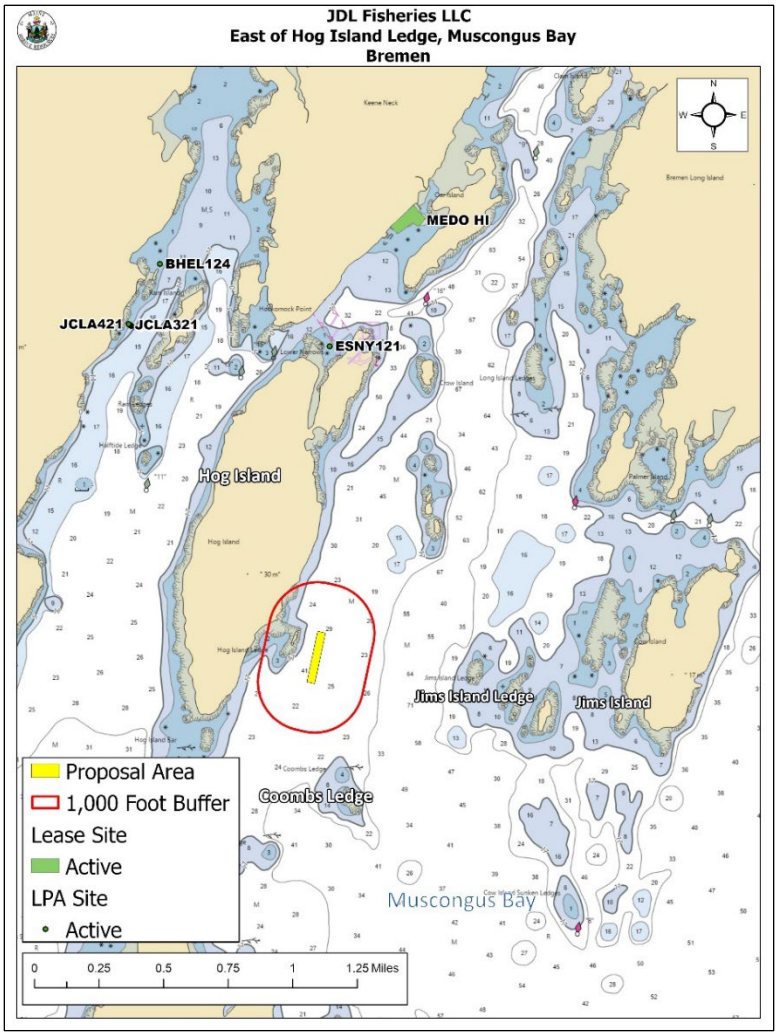

Figure 4. Aquaculture leases and LPA licenses in the vicinity of the proposed lease area.

(5) Existing System Support

Epibenthic Flora and Fauna

MDMR scientists utilized an ROV to assess the epibenthic ecology of the proposed lease. The relative abundance of epibenthic flora and fauna observed in the video footage is described below in Table 4.

Table 4. Species observed on underwater video footage.

Species Observed	Abundance
Mysid shrimp (*Mysis* spp.)	Abundant
Sand shrimp (*Crangon septemspinosa*)	Occasional
Cancer crab (*Cancer* sp.)	Rare

Eelgrass (*Zostera marina*)

Records of eelgrass collected by the Maine Department of Environmental Protection (MDEP) in 2023[6] indicate mapped eelgrass presence within 1,000 feet of the proposal. The nearest mapped eelgrass is approximately 552.1 feet west of the proposal (Figure 5).

During MDMR's site visit and on underwater video footage, no eelgrass was observed within the boundaries of the proposal. MDMR scientists observed a moderately dense patch of healthy eelgrass west of Hog Island Ledge approximately 646.2 feet west of the proposal (Image 1, Figure 5). The observed patch was concentrated in the shallow water around Hog Island Ledge. Charted water depths around the ledge range from intertidal to three feet at MLW.

Image 1. Eelgrass observed from the surface of the water near Hog Island Ledge.

[6] Data obtained from The Maine Office of GIS "GISVIEW.MEDEP.Seagrass2023". Widgeon grass was observed only in a tributary to the Great Salt Bay, upstream of a culvert that likely restricts tidal flow. Eelgrass was the dominant vascular species in all other locations. This is the most current record of mapped eelgrass within the vicinity of the proposal.

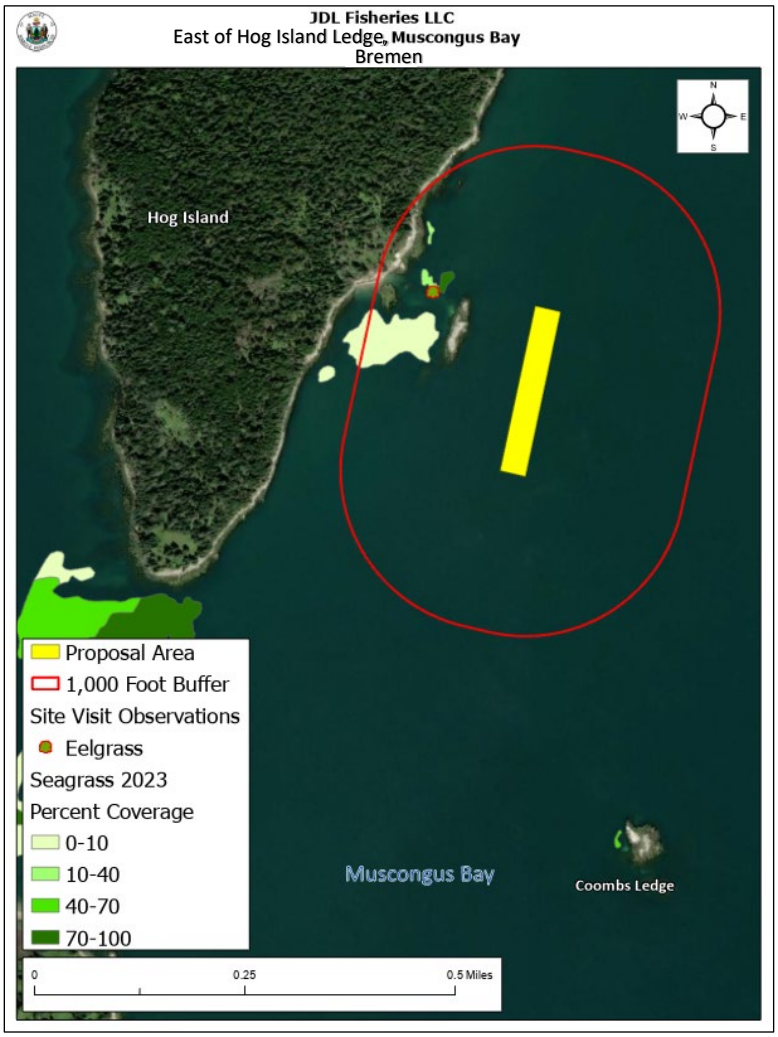

Figure 5. Mapped eelgrass (*Z. marina*) in the vicinity of the proposed lease area.[7]

Wildlife

During MDMR's site visit, scientists observed common eiders (*Somateria mollissima*), herring gulls (*Larus argentatus*), double crested cormorants (*Nannopterum auritum*), a harbor seal (*Phoca vitulina*), and a school of menhaden (*Brevoortia tyrannus*) in the general vicinity of the proposal.

The Maine Department of Inland Fisheries and Wildlife (MDIFW) has jurisdiction over inland fisheries and wildlife resources of the state. MDIFW also has the authority to conserve wildlife populations and their ecosystems through applicable state laws and rules. MDMR provides MDIFW with notice and the opportunity to comment on all complete lease applications. In addition, the site report also includes

[7] Aerial imagery from ESRI Firefly World Imagery

MDIFW designated and mapped habitat types that are within 1,000 feet of the lease proposal, if applicable.

According to Geographic Information System (GIS) data maintained by MDIFW and available through the Maine Office of GIS (MEGIS), there is one mapped habitat type within 1,000 feet of the lease proposal. The proposal is near Tidal Waterfowl and Wading Bird Habitat (TWWH) and a Seabird Nesting Island (SNI), which are types of Significant Wildlife Habitat designated and regulated by MDIFW. [8] Based on data maintained by MDIFW, the nearest mapped TWWH is located approximately 554.4 feet west of the proposal. The nearest mapped SNI is 3,010.0 feet northeast of the proposal (Figure 6).

Though bald eagles are no longer listed on Maine's Endangered and Threatened Species List, the United States Fish and Wildlife Service (USFWS) may also have jurisdiction over the management and conservation of the species based on applicable law and rule. Data collected by USFWS in 2023 by aerial nest survey shows the nearest mapped bald eagle nesting site to be approximately 4,575.9 feet northwest of the proposal (Figure 6).

MDIFW was provided with the opportunity to comment on this proposal. On May 15, 2024, a Resource Biologist with MDIFW responded by email to a "Request for Agency Review and Comment" stating that minimal impacts to wildlife are anticipated for this project. [9]

[8] https://www.maine.gov/ifw/programs-resources/environmental-review/significant.html
[9] Email correspondence between MDIFW and MDMR

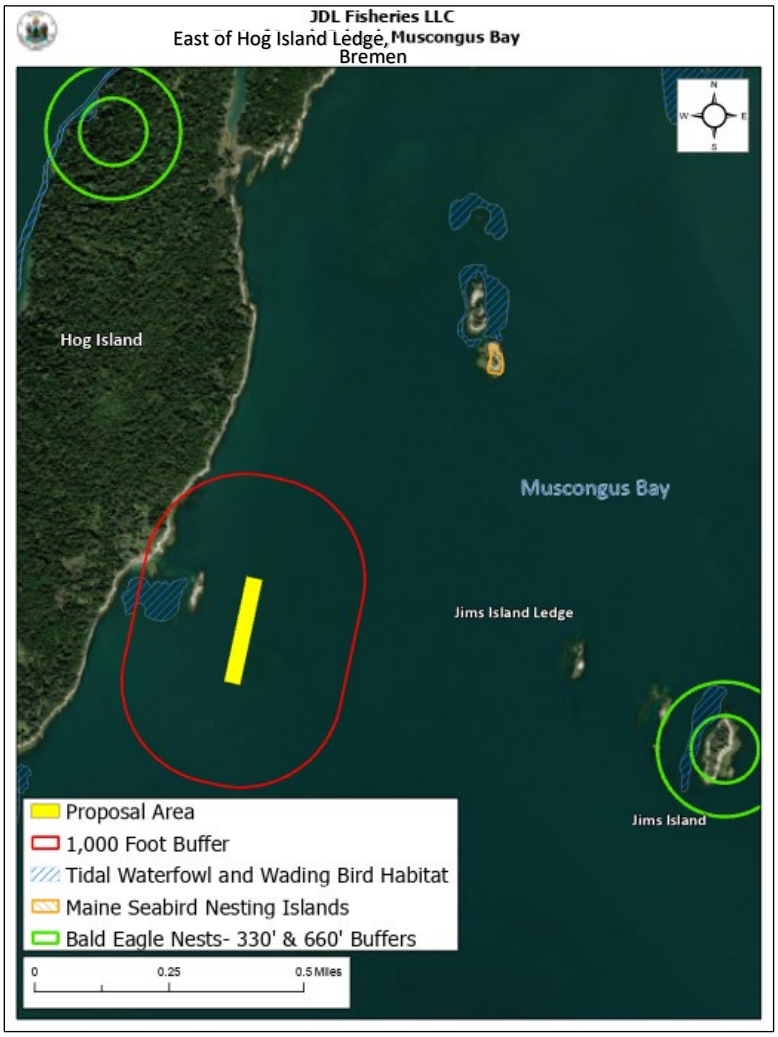

Figure 6. Mapped habitats in the vicinity of the proposed lease area. [10,11]

(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 Approved by the MDMR Bureau of Public Health and Aquaculture.

[10] Data obtained from USFWS "Bald_Eagle_Nests_-_Maine_2023" and MDIFW "EHRTERN", "EHPLVTRN", "GISVIEW.MEIFW.Twwh", "ShorebirdAreas", and "SNI".
[11] Aerial imagery from ESRI Firefly World Imagery