Department of Marine Resources
Site Review

Chris Green
8 Bonny Brook Place
Brunswick, ME 04011

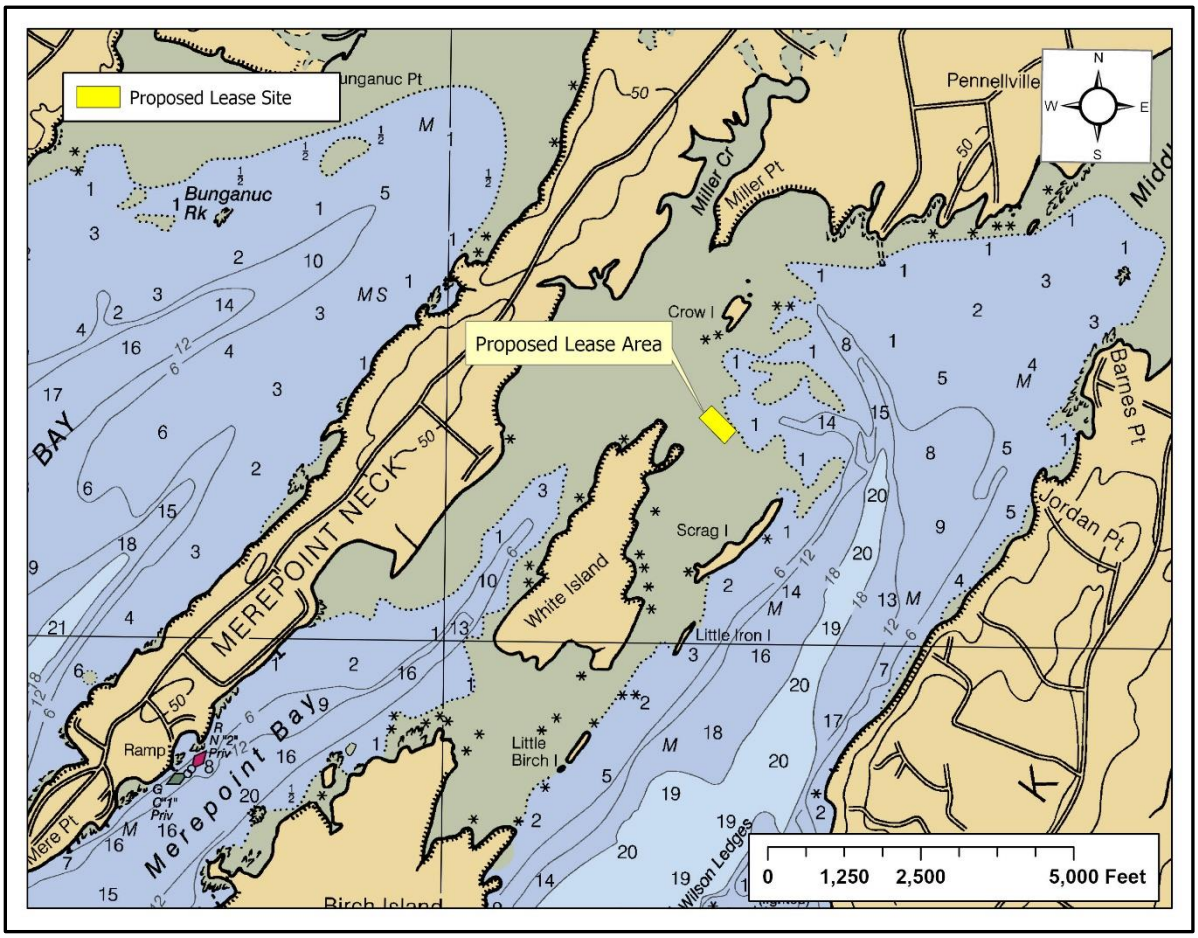

Figure 1: Vicinity map[1]

Location: Northeast of White Island in Merepoint Bay, Harpswell, Cumberland County, Maine

Purpose: Experimental lease for the suspended culture of Atlantic razor clam (*Ensis leei*[2]*),* soft-shelled clam (*Mya arenaria)* and hard clam/quahogs (*Mercenaria mercenaria*)

Site Review by: Cheyenne Adams and Geoffrey Shook
Report by: Geoffrey Shook and Cheyenne Adams

Report Completed: December 7, 2022

[1]All figures in this report were created in ArcGIS Pro 2.9 using digitized NOAA Nautical Charts or geo-referenced aerial photographs provided by The Maine Office of GIS (orthoCoastalCascoBay2018 and orthoRegionalMidcoast 2009).
[2] In the application, Atlantic razor clams were referred to as Ensis directus. The scientific name of this species was recently updated to Ensis leei and will be referred to in this report as such.

Maine Department of Marine Resources (MDMR) staff Geoffrey Shook, Cheyenne Adams, Ari Leach, Denis-Marc Nault and Katelyn Miller conducted an assessment of the proposed experimental lease on August 24, 2022. The site visit was conducted around high tide with the tide in the flood stage upon arrival and in the ebb stage upon departure.

The applicant is requesting 3.91 acres[3] in the intertidal zone in Middle Bay in Harpswell for the suspended culture of hard clams/quahogs (*M. mercenaria)* soft-shelled clams (*M. arenaria)* and Atlantic razor clams (*E. leei)*. A maximum of 10,800 soft nylon grow bags (3' x 4'), eight collection boxes (2' x 3'), and 120 rows of predator netting (4' x 290', 3/4" x 1" wire mesh) are proposed to be deployed on the site in addition to required corner marker buoys.[4] Clams are proposed to be cultured on the bottom. Seed would be planted on the bottom or grown out in soft grow bags resting on the ocean floor and would not be floating. PVC collection boxes may be staked to the bottom and predator netting may be deployed to cover up all of the seed and grow bags within the lease area. Product would be harvested by hauling bags up from the bottom onto a boat or hand harvesting at low tide. [5] The applicant proposes to tend the site throughout the year, and gear may be left on the site year-round. [6]

General Characteristics

The proposed lease occupies intertidal waters between Merepoint Neck, Scrag Island, White Island and Crow Island in Middle Bay, Casco Bay (Figure 1, Images 1-7). According to NOAA navigational charts almost all of the area in between Merepoint Neck and the above-mentioned islands is mudflat at low tide. Adjacent shorelines are rocky with marsh grass. Nearby islands have generally rocky shorelines with forested interiors. Nearby uplands are residential and primarily forested with some fields and lawns around residences.

[3] Application requests 4.0 acres. MDMR calculations, based on the coordinates provided in the application, indicate the area is 3.91 acres.
[4] Application, page 15
[5] Application, page 5
[6] Application, page 6 and 15

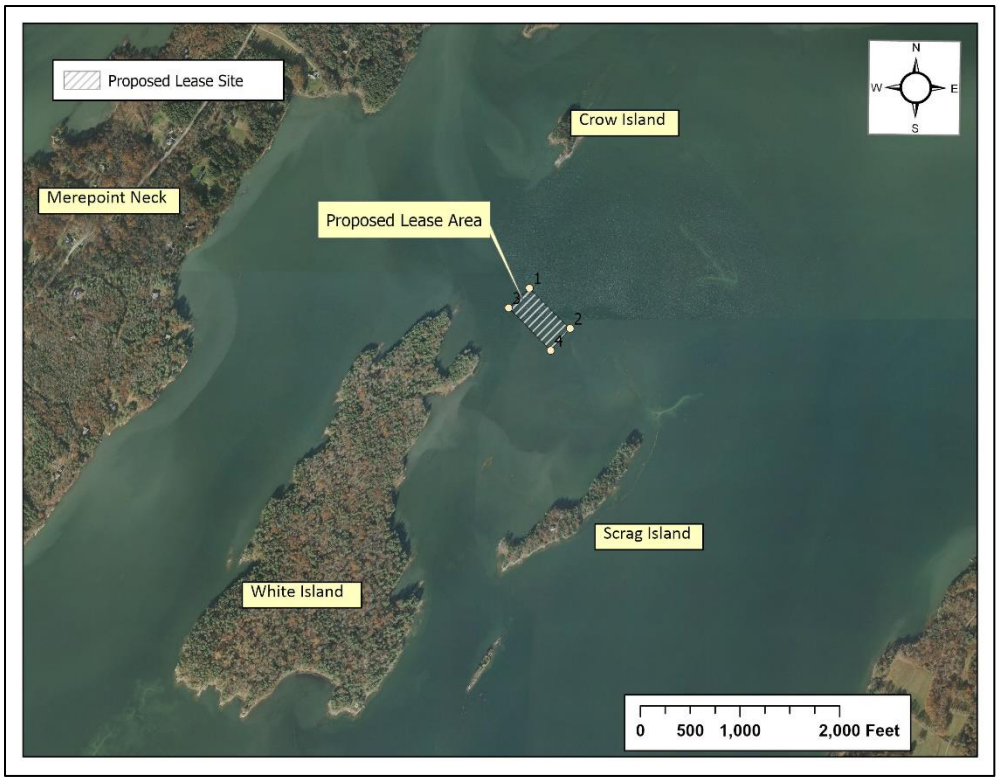

Figure 2: Proposed lease area[7].

Image 1: Facing east towards Harpswell neck from near corner 2 of the proposed lease site (August 24, 2022).

[7] Maine Office of GIS (orthoRegionalMidcoast 2009).

Image 2: Facing southeast toward Scrag Island and Harpswell Neck from near Corner 2 of the proposed lease site (August 24, 2022).

Image 3: Facing southwest toward White Island and Merepoint Neck from near Corner 2 of the proposed lease site (August 24, 2022).

Image 4: Facing West toward Mere Point Neck from near Corner 2 of the proposed lease site (August 24, 2022).

Image 5: Facing northwest toward Mere Point Neck and Crow Island from near Corner 2 of the proposed lease site (August 24, 2022).

Image 6: Facing north toward Crow Island from near Corner 2 of the proposed lease site (August 24, 2022).

Image 7: Facing northeast toward Middle Bay from near Corner 2 of the proposed lease site (August 24, 2022).

Depth

At the time of MDMR's site assessment on August 24, 2022, depths at the corners of the proposed lease site ranged from approximately 7.4 feet to 8.3 feet. MDMR staff observed the depths of the proposed lease site between 09:35 AM to 09:45 AM. High tide, with a height of 8.15 feet, was predicted to occur at 10:17 AM. Correcting for tidal height and variation derives water depths at the corners to be approximately 7.95 feet lower at mean low water (MLW, 0.0 feet) and therefore it appears that the proposed lease is likely in a combination of intertidal and shallow subtidal waters. Most of the site is likely exposed mudflat during negative tides.

Table 1: Tide predictions at Wilson Cove, Middle Bay, Maine (43° 49.5 N, 69° 58.6 W)[8]

Date	Time	Height (ft.)
8/24/22	04:08 AM	0.84 L
8/24/22	10:17 AM	8.15 H
8/24/22	04:08 PM	1.62 L
8/24/22	10:22 PM	9.43 H

Bottom of Proposed Lease Site

MDMR staff observed the bottom characteristics of the proposed lease site on August 24, 2022, via 10 lined bull-rake samples. Sediment information was determined based on sample data from bull-rake transects as well as observations of sediment that was stirred up while raking. No grain size analysis was performed. The bottom of the proposed lease site is composed of anoxic mud in most areas of the site with harder bottom observed at some sample locations. Shell hash was observed at all sample locations comprised primarily of blue mussels (*Mytilus edulis)* and quahog (*Mercenaria mercenaria*). Recently dead, whole quahogs were also observed at several sample locations. Scientists from the MDMR Bureau of Public Health processed the bull rake samples and determined that many shells showed signs of possible acidification, which may be due to the influence of freshwater on the benthos. Only three live quahogs were observed between the 10 sample locations within the lease site. Observations of low tide aerial imagery of the site and surrounding area also show that the bottom appears to be fairly uniform soft mud (Figure 3).

[8] https://tidesandcurrents.noaa.gov/stationhome.html?id=8417553

Position and Distances to Shore

The measuring tool and coordinate geometry (COGO) tool in ArcGIS Pro 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.

WGS84 Coordinates – 3.91 acres (Figure 2)

Corner	Latitude	Longitude	
NE	43.844046° N	69.983599° W	*then 576.14 feet at 134.92° True to*
SE	43.842943° N	69.982034° W	*then 293.01 feet at 221.55° True to*
SW	43.842335° N	69.982761° W	*then 600.37 feet at 315.49 ° True to*
NW	43.843496° N	69.984376° W	*then 286.65 feet at 46.31° True to NE.*

Table 2: Approximate Distances to Shore (Figures 1 & 2)

Feature	Distance
NE Corner to Crow Island, nearest point (~MLW)	~1,150 feet to the north
NE Corner to rocky shoreline of Merepoint Neck, nearest point (~MLW)	~2,300 feet to the northeast
SE Corner to Jordan Point, Harpswell Neck, nearest point (~MLW)	~4,850 feet to the east
NW Corner to northern tip White Island, nearest point (~MLW)	~460 feet to the west
SW Corner to Scrag Island, nearest point (~MLW)	~1,185feet to the southeast

The criteria MDMR uses to determine the suitability of an experimental aquaculture operation to a particular area (MDMR Regulations Chapter 2.64(7)(A)) are discussed, with respect to the proposal, below:

(1) Riparian Owners Ingress and Egress

The proposed lease is located in the intertidal zone between Crow Island and White Island in Middle Bay. During MDMR's August 24, 2022 site visit, approximately three to four docks were observed along the Mere Point Neck shoreline and a small mooring field for small boats was observed to the north along the Mere Point Neck shoreline. Due to water depths and tidal cycle close observations of the Mere Point Neck shoreline were not possible and visual observations were made from approximately ½ mile away. There were no moorings observed near the proposed lease site. Due to the intertidal nature of the area most shorefront houses were not observed to have docks or moorings. Aerial imagery from June of 2020 showed the presence of at least eleven shorefront properties and only four docks along the Mere Point Neck shoreline

opposite the site. A channel to the west of White Island in Merepoint Bay also provides access to the Merepoint Neck shoreline and surrounding area. Due to extensive intertidal flats in the area and the distance between the proposal and observed riparian access points, the proposed lease would be unlikely to cause a greater challenge to riparian access than natural features of the area.

(2) Navigation

The proposed lease is located in the intertidal zone between White Island and Crow Island in Middle Bay. Although Middle Bay and Merepoint Bay can experience significant recreational traffic and some commercial traffic the site is in the intertidal zone and over 600 feet away from the nearest deeper water subtidal channel. Small, depth appropriate vessels, and kayaks are likely to transit the general area when water depths permit. During MDMR's site assessment on August 24, 2022, two kayakers were seen paddling around the islands and in the area to the west of the proposed site. A small motorboat was also seen transiting to the southwest of the site. To the southwest of the proposed lease and White Island is Merepoint Bay. There is a public boat launch, marina, and mooring field in the deeper waters of Merepoint Bay. However, the deeper, navigable waters of the bay end approximately 3,000 feet to the southwest and navigable waters of Middle Bay are approximately 2,000 feet to the East. The applicant proposes the use of sunken soft bags and predator netting so there is the potential for vessels to become fouled in gear on the site at certain tide levels. It will be important for the applicant to maintain appropriate site markings, as indicated in Chapter 2 (Aquaculture Lease Regulations) of MDMR Regulations.

(3) Fishing and Water-Related Uses

At the time of MDMR's site assessment on August 24, 2022, no fishing activity or gear was observed in the area where the proposed lease is located. Schools of Atlantic menhaden (*Brevoortia tyrannus)*, locally known as pogie, were observed in the deeper waters along the eastern shore of Middle Bay. The applicant indicates that pogie fishing occurs to the east, north and south of Scrag Island during the commercial season but the applicant indicates that waters around the proposed site are too shallow for fishing[9]. However, DMR scientists familiar with menhaden fishing techniques have indicated that seine boats can, and do, fish in the intertidal when water depth permits. The applicant also indicates that recreational fishing for Striped Bass occurs in the area during the summer months, when water depths permit but access is limited[10].

During the August 24, 2022 site visit, MDMR staff only observed a total of three live quahogs (*Mercenaria mercenaria)* across ten bull rake sample locations within the proposed site. No other live shellfish were observed in any samples. The applicant indicates that they have observed no commercial shellfish harvesting in the area in more than 20 years but that clam

[9] Application Page 7
[10] Application Page 8

boats are observed travelling through the area at mid tides. The applicant also indicates that this information was confirmed by the harbormaster and local coastal resource manager.[11] MDMR Aquaculture Division utilizes the Mere Point boat launch, located southwest of the site, regularly for field operations, and staff have also observed clam harvest boats, such as airboats, approaching the boat launch from the north in the vicinity of the Mere Point Bay and Middle Bay mud flats. The applicant is requesting that dragging and all shellfish harvesting be prohibited within the lease site if the lease is granted.[12]

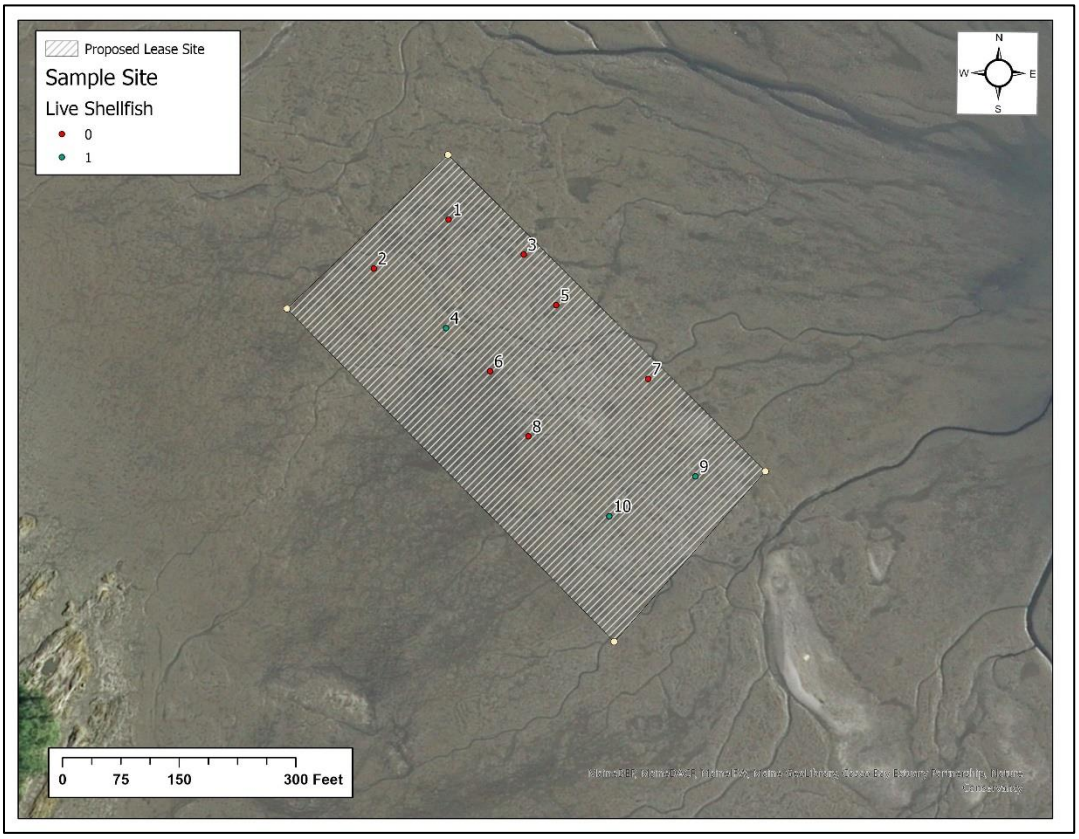

Figure 3: Location of lined bull rake sample sites.

(4) Other Aquaculture Uses

Fourteen Limited Purpose Aquaculture (LPA) licenses and one lease are located within one mile of the proposed lease (Figure 4). The closest active aquaculture activity to the proposal is LPA license DWIL422 which is permitted for an upweller for the culture of shellfish and located over 900 feet from the proposed lease. Also nearby is commercial lease MIDD CI which is over 1,000 feet away and permitted for the suspended and bottom culture of shellfish.

[11] Application Page 7
[12] Application page 10

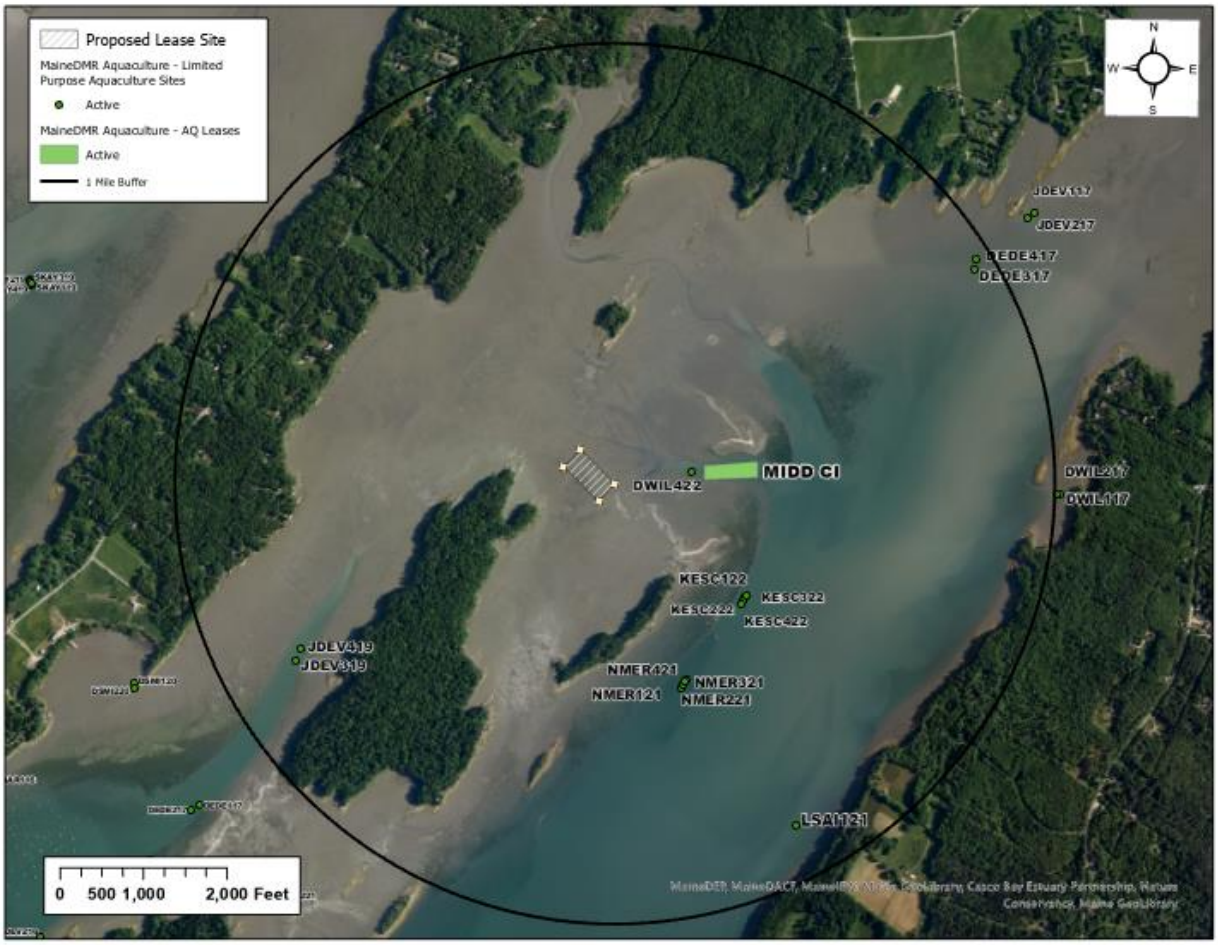

Figure 4: Aquaculture activity near the proposed lease area.

(5) Existing System Support

Epibenthic Flora and Fauna

During the site visit on August 24, 2022, staff observed the epibenthic ecology of the area by collecting samples using a lined bull rake. Observations showed that the bottom contained large amounts of shell hash, whole shells, shell fragments and mud. There were ten locations sampled within the lease site and only three live quahogs (*Mercenaria mercenaria)* were observed. No other live organisms were observed.

Wildlife

Seals were observed in the general vicinity during the August 24, 2022, site visit. The species of seal observed was most likely the Harbor seal (*Phoca vitulina)*. Schools of Atlantic Menhaden (*Brevoortia tyrannus)* were observed in deeper water to the east of the proposed site.

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 overlaps with Tidal Wading Bird and Waterfowl Habitat, which is defined under Maine's Natural Resources Protection Act (NRPA) as Significant Wildlife Habitat (Figure 5).

On April 1, 2022, Rebecca Settele (Wildlife Biologist, MDIF&W) responded, by email, to a "Request for Agency Review and Comment" stating "The proposed aquaculture project intersects with both Tidal Waterfowl and Wading Bird Habitat and Reef-Mudflat Complex. If total exclusion nets will be used to deter and exclude predatory sea ducks from the facility, we recommend a maximum mesh size of 6 inches with 3mm twine or larger for excluding eiders, and a maximum mesh size of 4 inches with twine of 3mm or larger for excluding scoters. Mesh larger than 6 inches (15cm) and paired with small twine of less than or equal two 2mm has been shown most likely to cause sea bird entanglement. We also recommend no gear be placed at less than 3' mean low water and that all gear is labeled. Activities in the intertidal zone should be minimized to the extent practicable."

MDIF&W was contacted for additional information and, in an email from December 7, 2022, Rebecca Settele indicated that the details of the proposed predator exclusion netting were reviewed by MDIF&W biologists, and they did not have specific concerns about the proposed predator nets and soft mesh bags.

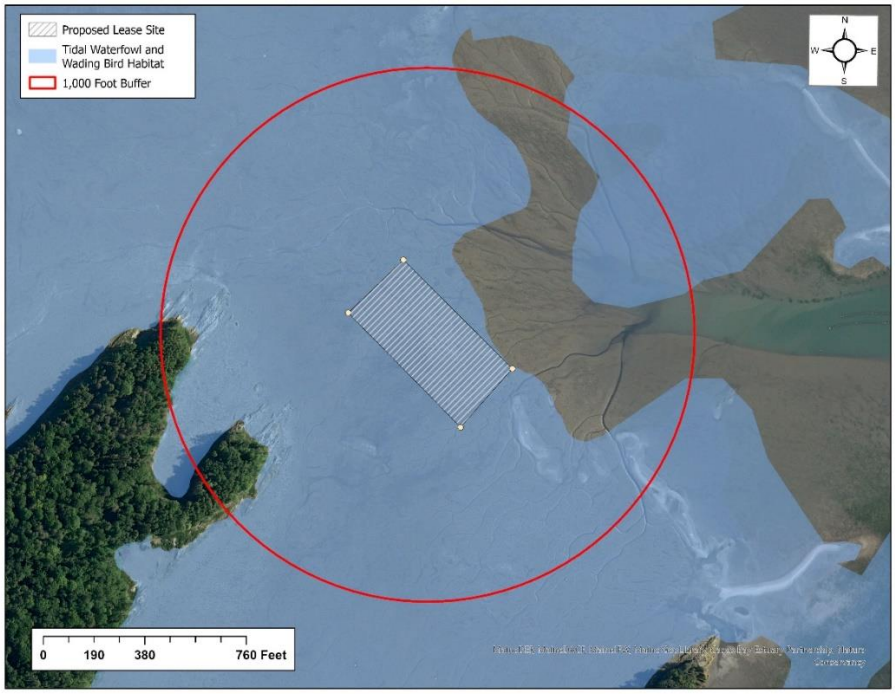

Figure 5: Tidal Wading Bird and Waterfowl Habitat[13] near the proposed lease site.

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

Eelgrass

Historical eelgrass (*Zostera marina*) data collected by The Maine Department of Environmental Protection in partnership with the Casco Bay Estuary Partnership indicate that, in 2018, the closest observed eelgrass bed was located over 700 feet to the northeast of the boundary of the proposed lease at corner 1 (Figure 6). The area within the proposal was a mapped eelgrass bed in 2010 but, MDMR assessed the bottom of the proposed lease during the site visit on August 24, 2022 and did not observe eelgrass at the bull-rake sample locations. No reductions to the proposed lease boundaries are recommended by MDMR science staff due to the fact that no eelgrass was observed. If the proposed lease is granted, rake and drag harvest activities, which could harm eelgrass beds, should only occur within the proposed lease boundaries. Due to the intertidal nature of the proposed lease, if eelgrass beds were to establish within the proposed lease area they could be observed from the surface at lower tidal stages and could therefore be avoided by harvesters.

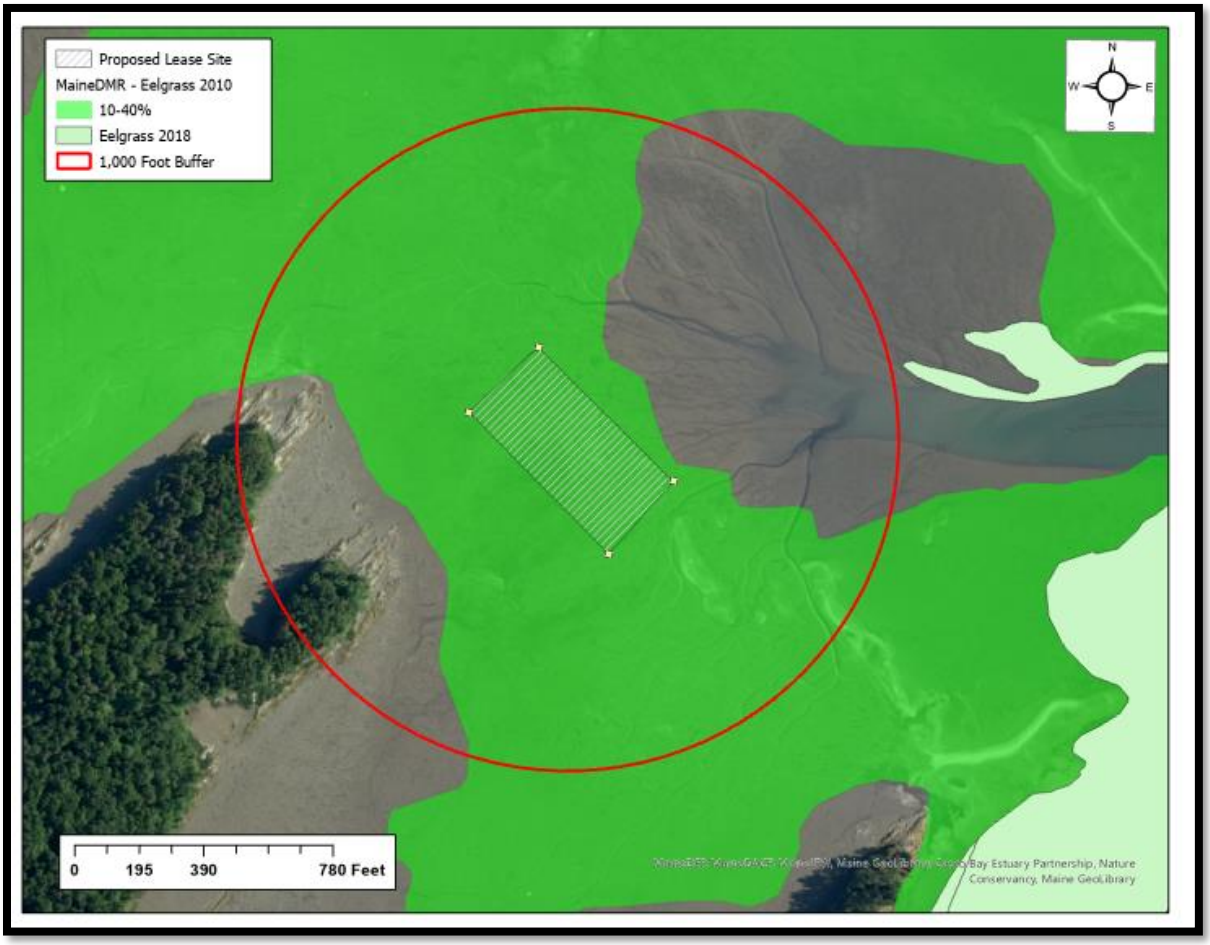

Figure 6: Historical eelgrass (*Z. marina*) in vicinity of proposed lease.[14]

[14] Data obtained from DEP maintained Feature Class available here: https://geolibrary-maine.opendata.arcgis.com/datasets/mainedep-eelgrass-2018-casco-bay-only

(6) Source of Organisms to be Cultured

The applicant lists Mook Sea Farms in Walpole, Maine, Muscongus Bay Aquaculture, in Bremen, Maine, and Downeast Research Institute in Beals, Maine as the proposed sources of quahogs (*M. mercenaria*) and soft-shelled clams (*M. arenaria)* and the Downeast Institute, in Beals, Maine as the proposed source of Atlantic razor clams (*E. directus)*. These sources are approved by MDMR for some of the listed species, but Downeast Institute is not currently listed as an approved source for razor clams, Muscongus Bay Aquaculture is not currently listed as an approved source for soft-shelled clams, and Mook Sea Farms is not currently listed as an approved source for quahogs or soft-shelled clams. Additional permits may be necessary before the specified shellfish seed may be utilized by these hatcheries.

(7) Interference with Public Facilities

The proposed lease is located on intertidal land associated with Crow Island. The island is a municipally owned island to the north of the proposal (Figure 7). The island is open to the public for camping and general use. The southern tip of White Island is also a public access point. It is open for general day use only. Due to the nature of this proposal, and its distance from Crow Island and the White Island preserve, it is unlikely that the proposal will interfere with use of these public locations.

Figure 7: Publicly owned land near the proposed lease site.