

Figure 1. Vicinity map¹

Location: Mount Desert Narrows/East of Googins Ledge, Eastern/Frenchman Bay, Bar Harbor, Hancock County, Maine

Purpose: Standard lease for the suspended culture of blue mussels (*Mytilus edulis*)

Site Review: Flora Drury and Cheyenne Adams

Report Preparation: Cheyenne Adams and Geoffrey Shook

Report Completed: December 16, 2022

¹Unless 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 (*orthoCoastalDownEastCoast2008*, previously known as *Low_Tide_2008*).

Application Overview

The applicant, Pemaquid Mussel Farms LLC, is requesting 31.66² acres east of Googins Ledge in Eastern Bay (northwest of Frenchman Bay) for the suspended culture of blue mussels (*Mytilus edulis*) sourced from wild spat collected at the site (Figure 1).³ The proposed lease footprint encompasses the applicant's active lease site EAST GL, which is 8 acres in size. The applicant proposes to cultivate blue mussels using up to 32 mussel rafts (50' x 40') that would be deployed year-round, but suspended 12 feet below the surface of the water during winter months. The application mentions two seed collection rafts (40' x 40') which are not included in the application Gear Table section, but communication with the applicant clarified that he does not intend to use seed collection rafts at the proposed lease site.⁴ Each raft would be equipped with 450 pegged mussel ropes hanging vertically from the raft, and 4 predator nets with 6" mesh. Additionally, the applicant is proposing to deploy up to 56 mooring buoys (0.9 m³) and up to 192 raft buoys (1.2 m³) that would provide buoyancy when the rafts are submerged.⁵ Routine maintenance and harvesting would be accomplished with the use of two 60-foot steel vessels and a 20-foot skiff; harvested product would be taken ashore at the Lamoine State Park Ramp.⁶ The applicant currently power washes predator nets every 3-6 months, and can wash 2-3 nets/day.⁷ Other power equipment that would be used on site include a crane, a declumper, a brush machine, conveyors, water pumps, a debysser, and graders.⁸

General Characteristics

On September 1, 2021, Maine Department of Marine Resources (MDMR) Scientists Flora Drury and Cheyenne Adams assessed the proposed lease site. MDMR staff Marcy Nelson, Cheyenne Adams, and Maria Eggett re-visited the site on May 25, 2022 to conduct a drop camera transect. The proposal is near the eastern end of Mount Desert Narrows (Image 1). The Mount Desert Island (MDI) shoreline (Images 2-4) is to the south of the proposal and is primarily ledge and hosts a mixed forest upland speckled with residential buildings and a few small rocky beaches around Leland Point. Frenchman Bay is to the southeast of the proposal (Images 5 & 6). The mainland and Town of Lamoine is north of the proposed lease area and hosts a forested shoreline with residential properties, Lamoine State Park, and Lamoine Beach (Images 7 & 8).

² Application requests 32 acres. DMR calculations, based on the coordinates provided by the applicant, indicate the area is 31.66 acres.

³ Application pages 1-2

⁴ Application page 8; email between C. Adams and Carter Newell on 12/7/2022

⁵ Application, page 4 and 7

⁶ Application, page 5 and 7

⁷ Application, page 7 and 9

⁸ Application, page 9



Image 1. Looking west toward the Mount Desert Narrows from near proposed corner 5 (May 25, 2022).



Image 2. Looking southwest toward the Mount Desert Island shoreline from near the proposed corner 5 (May 25, 2022).



Image 3. Looking south toward the Mount Desert Island shoreline from near the proposed corner 5 (May 25, 2022).



Image 4. Looking southeast toward the Mount Desert Island shoreline from near the proposed corner 5 (May 25, 2022).



Image 5. Looking east toward the Frenchman Bay from near the proposed corner 5 (May 25, 2022).



Image 6. Looking northeast toward Hancock Point and Frenchman Bay from near the proposed corner 5 (May 25, 2022).



Image 7. Looking north toward Lamoine mainland shoreline from near the proposed corner 5 (May 25, 2022).



Image 8. Looking northwest toward the Lamoine mainland shoreline from near the proposed corner 5 (May 25, 2022).

Depth

On September 1, 2021, MDMR staff collected depth measurements at approximately 2:30 PM using a transom-mounted depth sounder; the tide was ebbing (Table 1). Depths ranged from 83.8 to 96.9 feet at the proposed lease corners. Correcting for tidal variation derives water depths at the next high tide that range from 86.0 to 99.1 feet. Water depths at mean low water (MLW, 0.0 feet) range from 76.5 to 87.4 feet.

Table 1. Tide observations at Bar Harbor, Frenchman Bay, Maine (44° 23.5' N, 68° 12.3' W).⁹

Date	Time	Height (ft)
9/1/2021	11:00 AM	9.49 H
9/1/2021	4:58 PM	3.02 L
9/1/2021	11:00 PM	10.61 H

Bottom Characteristics

MDMR staff observed the bottom characteristics of the general vicinity via a drop camera transect on May 25, 2022 (Figure 2). 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; no sediment samples were collected, or grain size analysis performed. The observed sea floor was composed of soft mud sediment (Image 9).

Table 2. Bottom characteristics of proposed site.

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

⁹ <https://tidesandcurrents.noaa.gov/stationhome.html?id=8413320>



Images 9. Soft mud observed during drop camera transect (May 25, 2022).

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 using the measuring tool in ArcGIS Pro 2.9, digital orthophotography provided by the Maine Office of GIS, and the application coordinates.

<u>Application Coordinates (WGS84) – 31.66 Acres (Figure 2)</u>		
<u>Corner</u>	<u>Latitude</u>	<u>Longitude</u>
1	44.4489354° N	68.269755° W then 970.93 feet at 206° True to
3	44.446546° N	68.2714° W then 1,399.85 feet at 116° True to
4	44.444853° N	68.266587° W then 995.51 feet at 26° True to
5	44.447296° N	68.264881° W then 1,405.70 feet at 295° True to 1.

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

Feature	Distance
Corner 1 to Lamoine shoreline, nearest point (~MLW)	~2,500 feet to the northwest
Corner 3 to Red Nun “14”, nearest point (NOAA Chart)	~4,800 feet to the southwest
Corner 3 to Googins Ledge, nearest point (~MLW)	~4,180 feet to the southwest
Corner 4 to Mount Desert Island shoreline, nearest point (~MLW)	~1,910 feet to the southwest
Corner 5 to nearest point, Mount Desert Island shoreline (~MLW)	~2,900 feet to the southwest

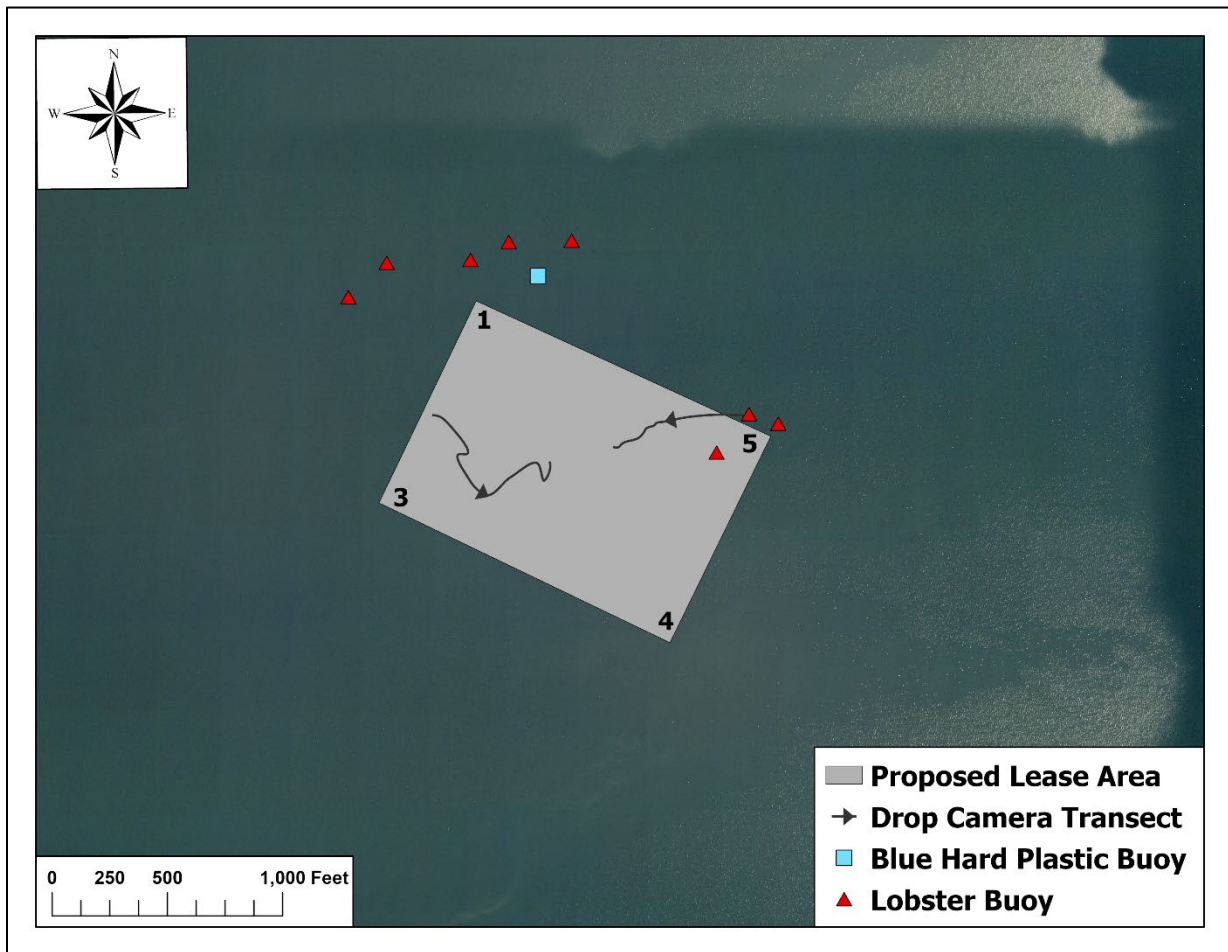


Figure 2. Approximate drop camera transect and buoys observed nearest to the proposal (September 1, 2021).

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

(1) Riparian Ingress and Egress

Although several houses were noted along the nearby shorelines, the Lamoine and Mount Desert Island shorelines are approximately 2,500 and 1,910 feet from the proposal at the nearest points, respectively. Therefore, there is likely sufficient space for riparian landowners to navigate around the proposal and access their shorelines at any tidal stage. Additionally, there are several moorings in the general vicinity, suggesting consistent vessel traffic by riparian landowners in the area. From observations made during the site visit on September 1, 2021 and other visits to the area, MDMR is aware of a mooring field southwest of the proposal in Salisbury Cove, a mooring field northwest of the proposal near the Lamoine State Park boat ramp, a mooring field near Morris Yachts boat ramp (Figure 3), and several other scattered moorings along the nearby shorelines. The distances between these moorings and the proposal are likely to preclude direct impacts to the use of the moorings by the requested lease.

A Harbormaster Questionnaire was sent to the harbormaster for the Town of Bar Harbor on May 7, 2021. As of the date this report was published, a response had not been received.

(2) Navigation

The proposal is located approximately in the middle of Eastern Bay, between the Lamoine and Mount Desert Island shorelines. During MDMR's site assessment on September 1, 2021, vessels under sail were observed to the southeast of the proposal, near the Gouldsboro shoreline. Additionally, two kayakers were observed paddling near the site and briefly transiting through the proposal.

Although limited vessel traffic was observed on the day of the site visit, it is expected that the general vicinity experiences moderate to heavy commercial and recreational traffic. This is supported by the fact that three small mooring fields and several scattered moorings have been observed in the area (as described in Section 1: Riparian Ingress and Egress), and two actively used boat ramps are located to the west of the proposal in Mount Desert Narrows (Figure 3). Commercial and recreational vessel traffic from both Lamoine State Park and Morris Yachts boat ramps, and vessels from all three mooring fields, would be required to either pass by the proposed lease site or transit under the Trenton Bridge in order to reach waters beyond Mount Desert Narrows. Passage under Trenton Bridge is limited by both water depth and bridge height, and therefore may not be an option for all vessels and/or at all tidal stages. Therefore, it is expected that mariners frequently navigate past the proposed lease area.

The flow of vessel traffic, as indicated by the NOAA navigational buoys, is likely to primarily pass between the proposed lease footprint and the Mount Desert Island shoreline (Figure 3). Vessel traffic from the direction of Racoon Cove would be expected to transit primarily between the Lamoine shoreline and the proposal. These expectations are largely confirmed by available Automated Identification System data for 2021 (Figure 4). However, not all vessels are equipped to collect AIS data, and therefore smaller recreational and commercial vessels may occur in a greater amount or closer proximity to the lease than is represented by AIS data.

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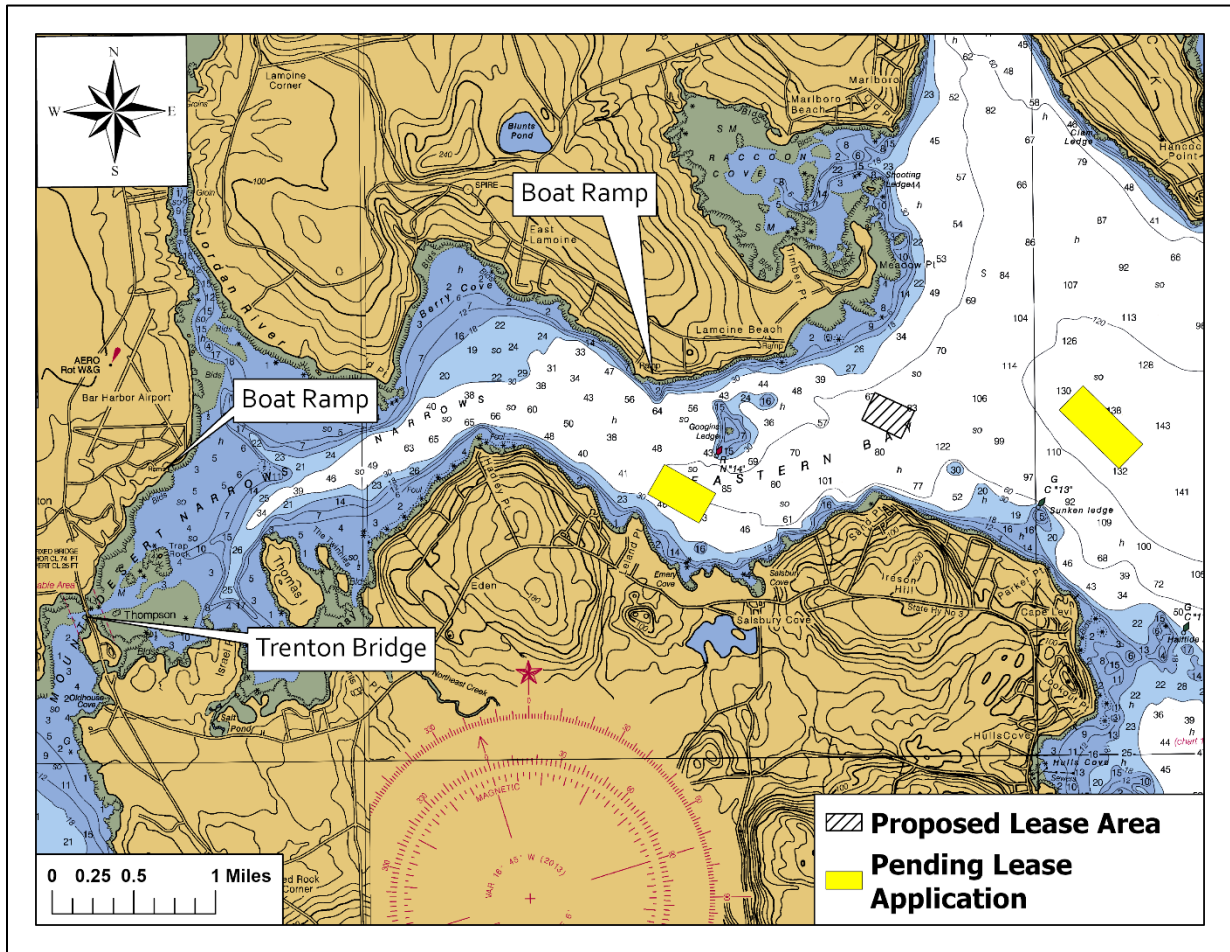


Figure 3. Proposed lease area, navigation channel marker, and nearby boat ramps.¹⁰

¹⁰ Although the Lamaine Beach boat ramp is indicated on NOAA charts, the Town of Lamaine website states that there is “no formal ramp for launching” at the beach

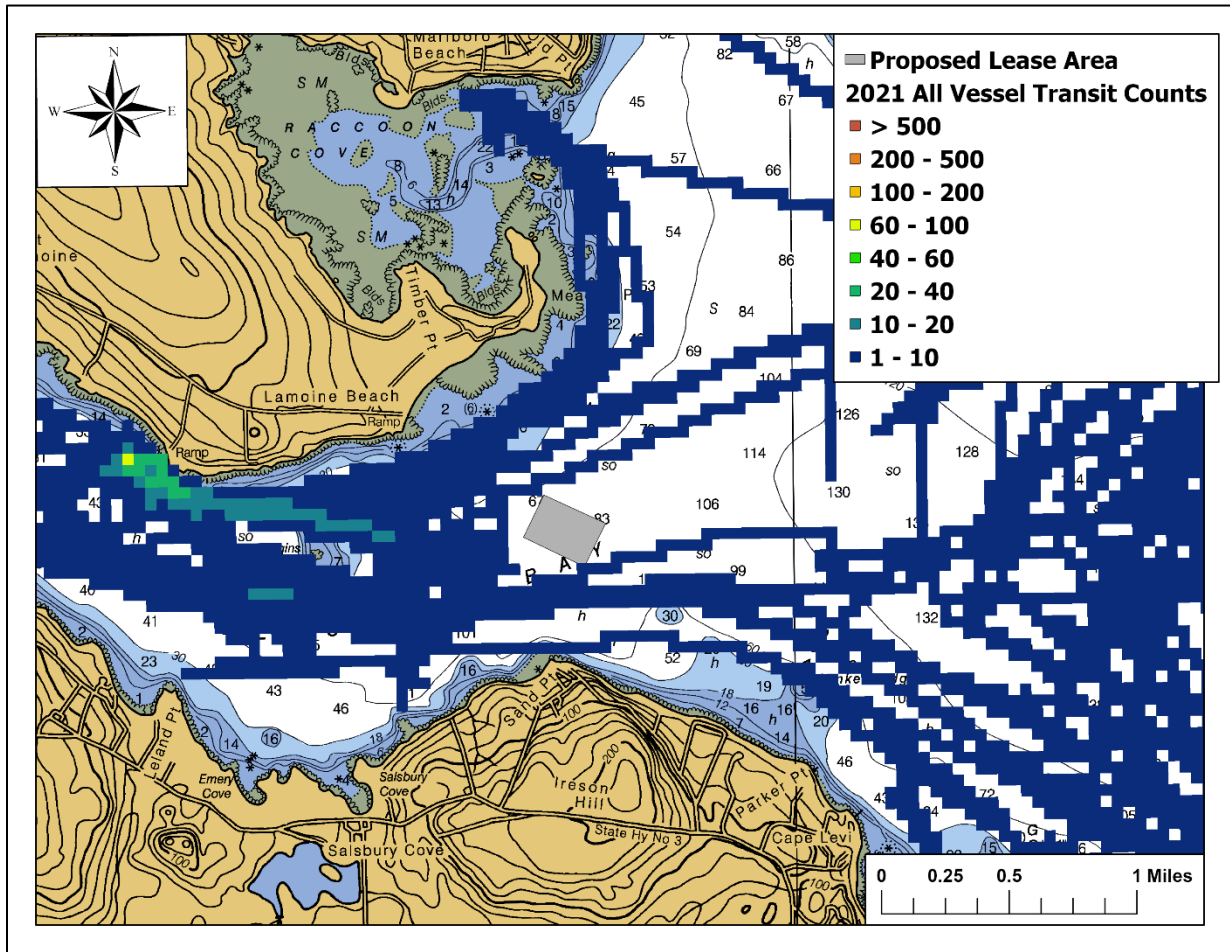


Figure 4. Automated Identification System (AIS) 2021 all vessel transit count data in the vicinity of the proposed lease.¹¹

(3) Fishing and Other Uses

During MDMR’s site assessment on September 1, 2021, staff observed moderate to high abundance of lobster (*Homarus americanus*) trap buoys to the north/northeast of the proposal. Additional lobster trap buoys were observed in moderate abundance to the east of the site and in low abundance, although still present, to the south and west. One lobster trap-style buoy was observed within the proposed lease site, with two additional buoys on the proposed lease boundary, and 5 more in the immediate vicinity (Figure 2). Finally, three lobster fishing vessels were observed operating to east/northeast of the site at the time of MDMR’s site assessment. No lobsters were observed on the drop camera transect videos. The lobster fishery in Maine follows the annual migration and molt cycle of lobsters and may be more prevalent in the area during other times of the year than when the site assessment was conducted. Moreover, the applicant is currently operating a standard lease, EAST GL, within the proposed lease footprint, which may deter a certain amount of nearby lobster fishing effort in order to avoid the potential for gear entanglement.

¹¹Annual Vessel Count Data, 2021 All Vessels:
<https://services.northeastoceandata.org/arcgis1/rest/services/MarineTransportation/MapServer>

Jonah crabs were observed occasionally throughout the drop camera transect videos and there is a commercial fishery for Jonah crabs in Maine, although most commonly as incidental catch in lobster traps.

Since the proposed lease site is relatively deep and exposed, it is expected that the majority of recreational activities in the area such as swimming and recreational fishing would remain closer to shore.

A Harbormaster Questionnaire was sent to the harbormaster for the Town of Bar Harbor on May 7, 2021. As of the date this report was published, a response had not been received.

(4) Other Aquaculture Uses

The applicant's active lease site EAST GL is located within the proposed lease boundaries and would be replaced if the proposal were granted (Figure 4). Additionally, there is another lease application (DMR ID 2021.03.18 S) within 1 mile of the proposal, which was received prior to the proposal considered in this report and is requesting 68.39¹² acres to the suspended culture of sea scallops (*Placopecten magellanicus*). At the time of this report, there were three LPA licenses within 1 mile of the proposal which are approved for the suspended culture of sea scallops and would be relinquished if application ID 2021.03.18 S were granted.

¹² Acreage calculated from the application coordinates

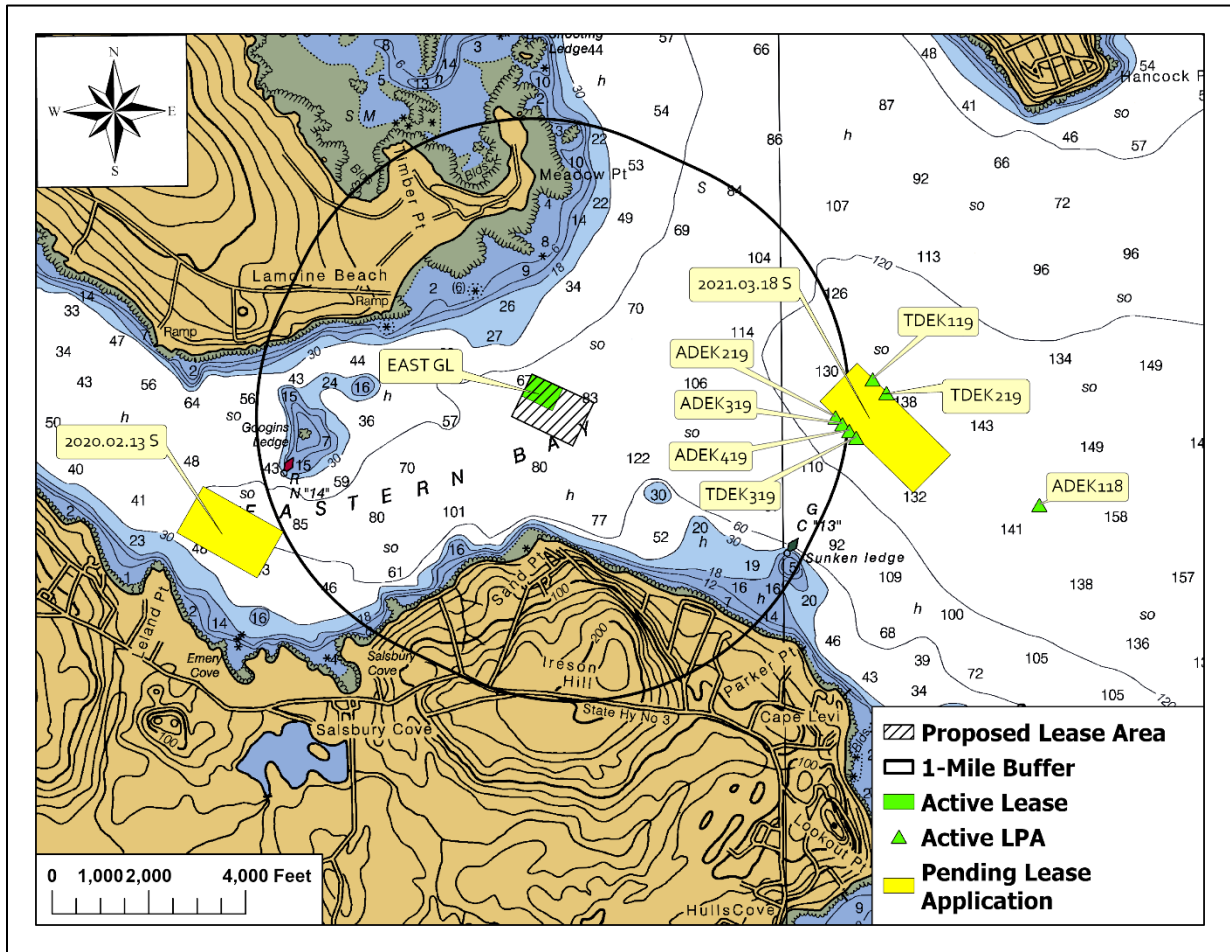


Figure 4. Aquaculture leases and Limited Purpose Aquaculture (LPA) licenses in the general area of the proposal.

(5) Existing System Support

Epibenthic Flora and Fauna

On May 25, 2022, MDMR staff conducted drop camera transects to assess the epibenthic ecology of the area (Figure 2). The observed bottom was primarily soft mud sediment (Image 9), with occasional drift rockweed, crabs, northern sea stars, and *Beggiatoa sp.* (Images 10-12). Additionally, abundant mysid shrimp and burrows were observed throughout the transects (Table 4).

Table 4. Species observed during MDMR drop camera transect on May 25, 2022.

Species Observed	Abundance
Mysid shrimp (species unknown)	Abundant
Burrows	Abundant
Drift rockweed (<i>Ascophyllum nodosum</i>)	Occasional
Jonah Crab (<i>Cancer borealis</i>)	Occasional
Northern sea star (<i>Asterias rubens</i>)	Occasional
<i>Beggiatoa sp.</i>	Occasional



Image 10 Drift rockweed (*Ascophyllum nodosum*), Jonah crabs (*Cancer borealis*), *Beggiatoa sp.*, mysid shrimp, and northern sea star (*Asterias rubens*) observed during the drop camera transect (September 1, 2021)



Image 11. Drift rockweed (*Ascophyllum nodosum*), northern sea star (*Asterias rubens*), *Beggiatoa sp.*, and mysid shrimp observed during the drop camera transect (September 1, 2021).



Image 12. Drift rockweed (*Ascophyllum nodosum*) and *Beggiatoa sp.* observed during the drop camera transect (September 1, 2021)

Eelgrass (*Zostera marina*)

The most recent historical eelgrass (*Zostera marina*) data, collected by MDMR in 2008, indicate that the closest eelgrass presence is a small, low-density bed approximately 2,000 feet to the south of the proposal, along the Mount Desert Island shoreline (Figure 5). No live or drifting eelgrass was observed during the drop camera transects. Additionally, eelgrass beds are typically observed in shallower water than the proposed lease site, which allows for adequate light penetration to support photosynthesis. Therefore, eelgrass beds are not expected to occur at the proposed lease site.

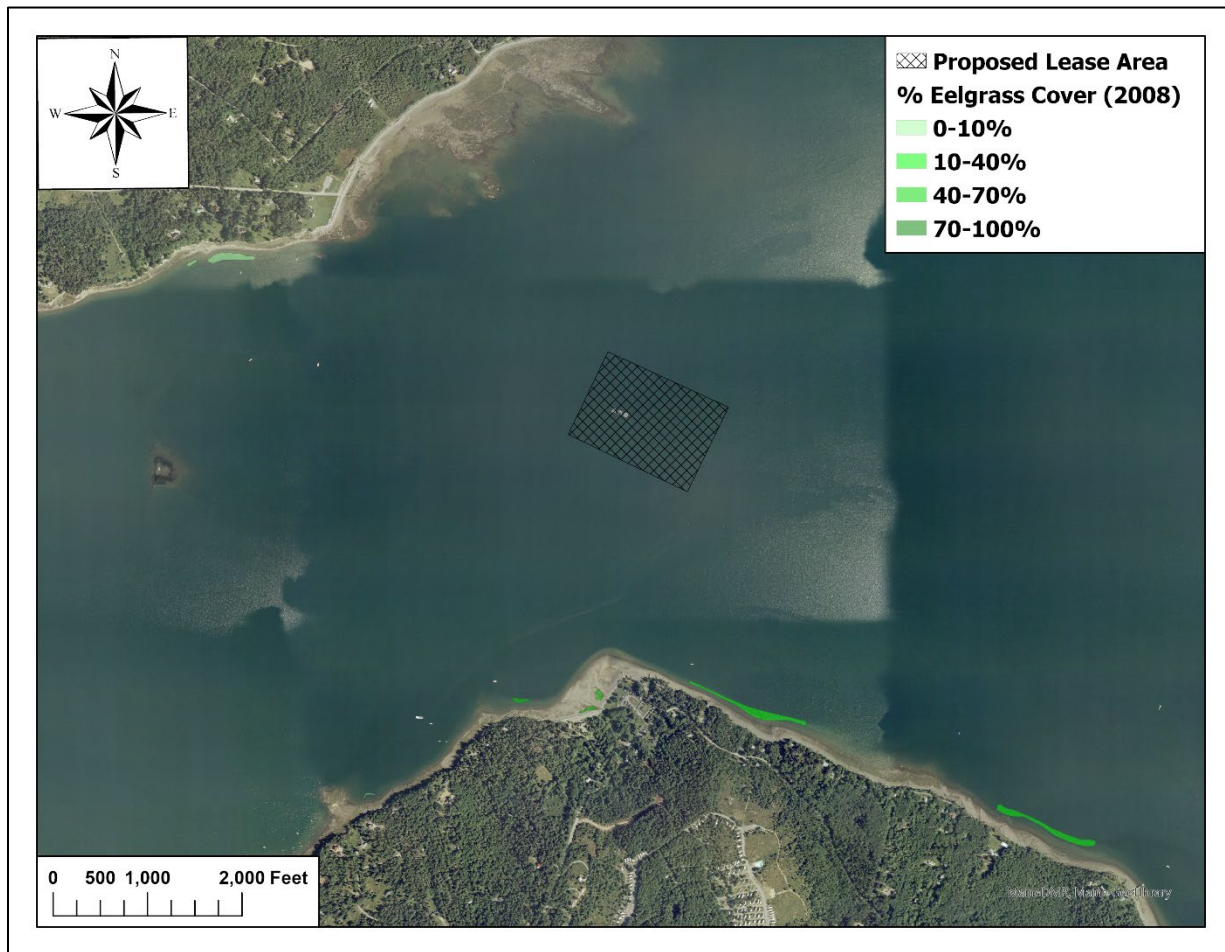


Figure 5. Historical eelgrass (*Z. marina*)¹³ near the proposed lease site from the 2008 survey.

Wildlife

During MDMR’s site assessment on September 1, 2021, staff observed double crested cormorants (*Phalacrocorax auritus*) and Canada geese (*Branta canadensis*) in the general vicinity of the proposal.

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, the proposed lease is located partially within tidal wading bird and waterfowl habitat (Figure 6). Shorebird habitat and a bald eagle nest are located in the general vicinity, but at distances greater than 3,700 feet from the proposal. Tidal wading bird and waterfowl habitat and shorebird habitat are both defined under Maine’s Natural Resource Protection Act (NRPA) as Significant Wildlife Habitat.

On May 19, 2021, a Wildlife Biologist with MDIFW responded by email to a “Request for Agency Review and Comment”, stating total exclusion nets should have a maximum mesh size of 6 inches with 3 mm twine or larger for excluding eiders and a maximum mesh size of 4 inches with 3 mm

¹³Data obtained from Maine Office of GIS (Eelgrass2010).

twine or larger for excluding scoters. The applicant is proposing to deploy predator nets with a mesh size of 6 inches, but does not specify the twine size.¹⁴ If the lease is granted, the applicant should be restricted to using twine of 3 mm or larger, and should not be allowed to use the proposed predator nets for the exclusion of scoters.

The comment goes on to recommend that boats and barges not ground out on reefs, aquatic beds, or mudflats, but considering the depth of the proposed lease area that is unlikely to occur. Finally, the comment recommends minimizing the project footprint to the extent practical. If the proposed northwestern boundary were shifted southeast by ~150 feet, the site would no longer be within Significant Wildlife habitat.

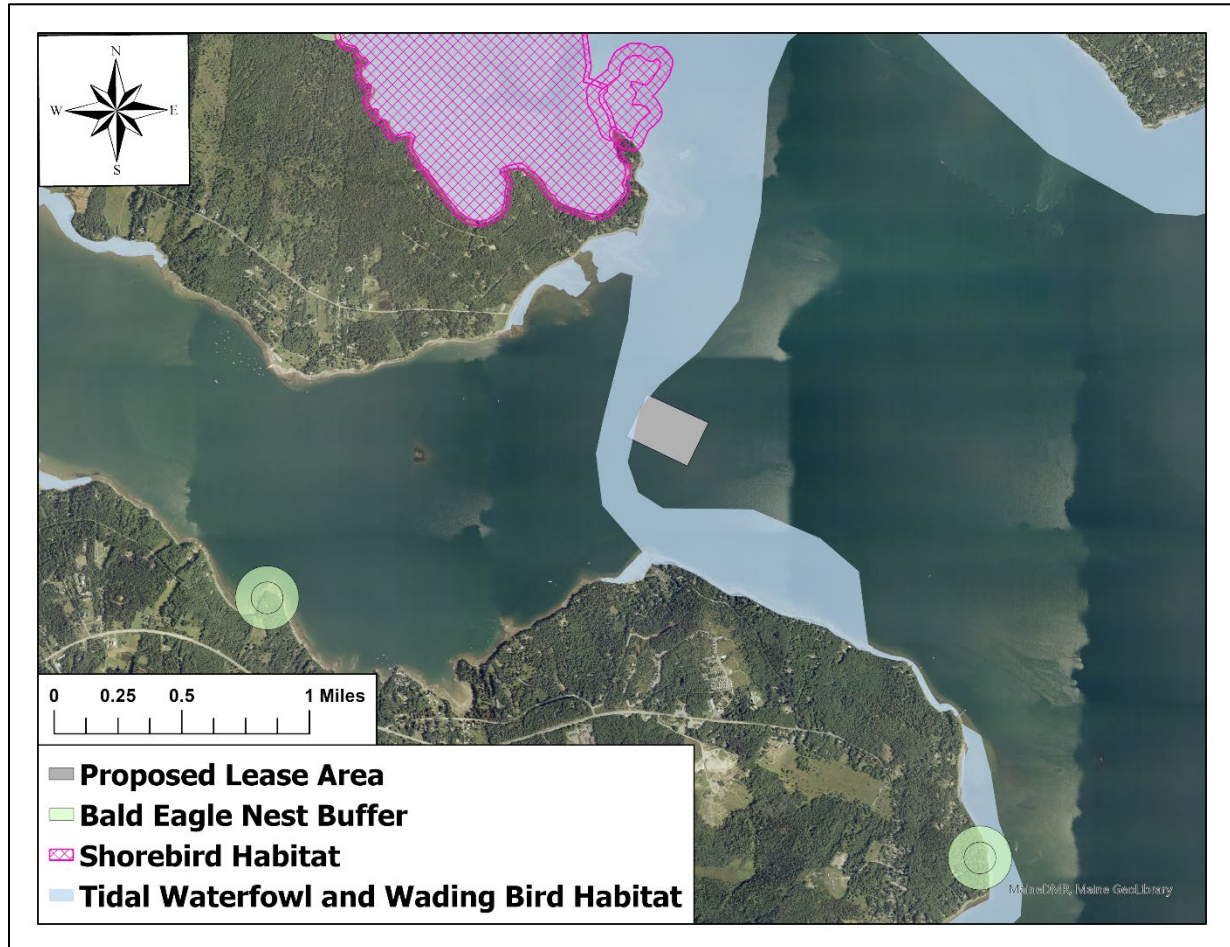


Figure 6. Tidal wading bird and waterfowl habitat,¹⁵ shorebird habitat,¹⁶ and bald eagle nests¹⁷ near the proposed lease site.

¹⁴ Application, page 4

¹⁵ Data obtained from MDIWF maintained SDE Feature Class "GISVIEW.MEIFW.Twwh"

¹⁶ Data obtained from MDIFW maintained SDE Feature Class "GISVIEW.MEIFW.Shorebird"

¹⁷ Data obtained from USFWS:

https://services.arcgis.com/QVENGdaPbd4LUkLV/arcgis/rest/services/Maine_Bald_Eagle_Nests_2021/FeatureServer

(6) Interference with Public Facilities

The proposed lease is not within 1,000 feet of any beach, park, docking facility, or conserved lands owned by the federal, state, or municipal governments (Figure 7). The closest conserved land to the proposal is Lamoine Beach, which is approximately 3,250 feet to the northwest and is held in public conservation by the State of Maine. Although NOAA charts indicate a boat ramp at Lamoine Beach, the Town of Lamoine website does not indicate that there is a formal ramp for launching.¹⁸ Regardless, the beach is likely used to launch hand-powered paddle craft during summer months, at a minimum. Considering the distance of the proposal from the state-owned beach, it is unlikely to prevent the continued use of this conserved land.

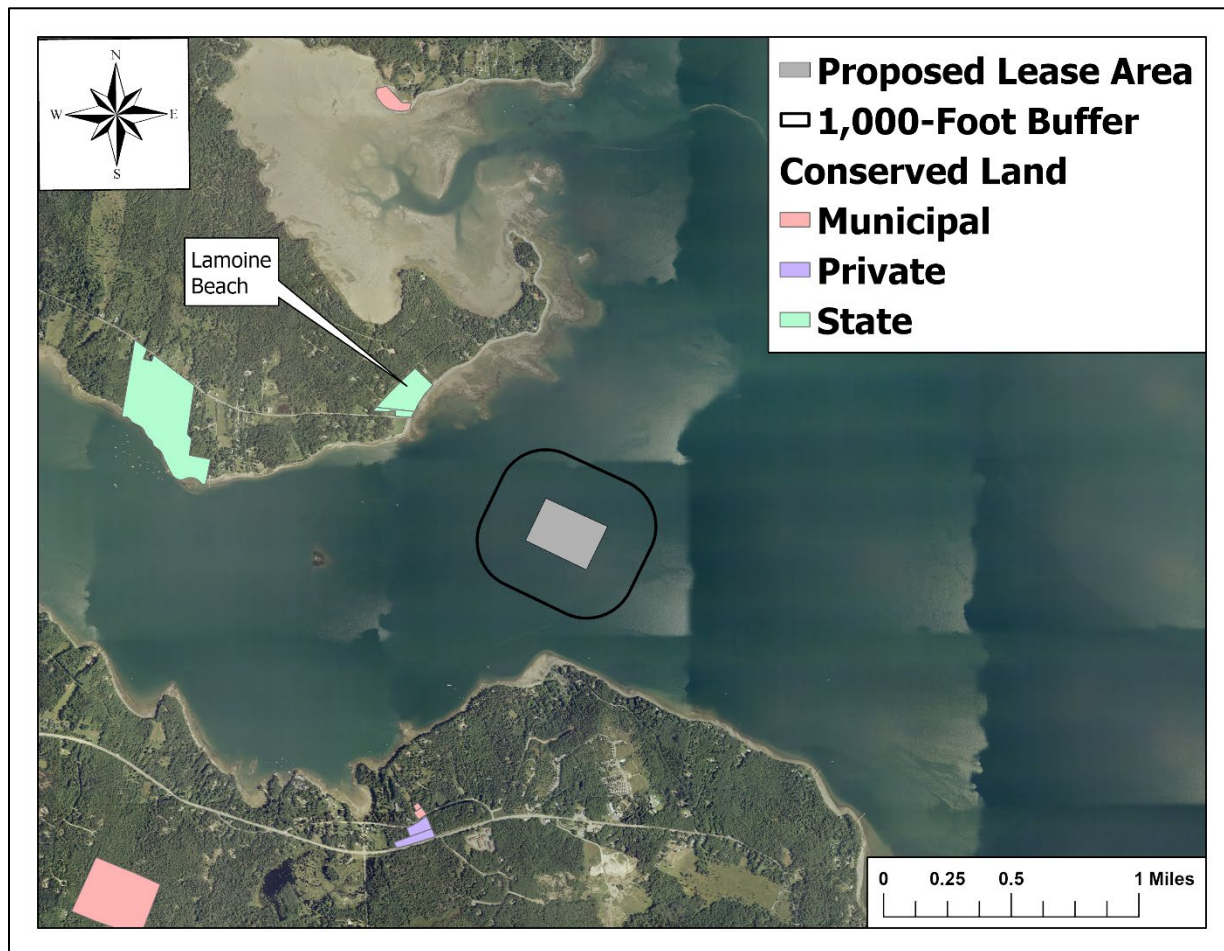


Figure 7. Public facilities near the proposed lease site.¹⁹

(7) Water Quality

The proposed lease area is currently classified as “Open/Approved” by the MDMR Bureau of Public Health for the harvest of shellfish.

¹⁸ <https://www.lamoine-me.gov/boards-committees/parks-commission/>

¹⁹ Data obtained from SDE Feature Class sourced from The Maine Office of GIS “GISVIEW.MECONSLANDS.Conserved_Lands”

(8) Lighting

Lighting is not proposed to be used at the site, except as required by the United States Coast Guard. The proposed service vessel may occasionally remain on the proposed lease site overnight, but no work is proposed for outside of daylight hours.²⁰

(9) Noise

The proposed lease would be routinely accessed and serviced by two 60-foot vessels and a 20-foot skiff. Power equipment employed on the site would include vessel hydraulic pumps and motors, a power washer, an air compressor, a crane, a declumper, a brush machine, conveyor belts, a debysser, and a grader. The use of various power equipment could occur daily at the site, based on the harvesting and maintenance schedule outlined in the application, and would be used between 3 and 6 hours per day, depending on the task being performed.²¹

To reduce noise levels, the applicant intends to power equipment and machinery with the vessel engines, which are in-turn equipped with mufflers and cowl silencers.²²

(10) Visual Impact

The applicant is proposing to use wooden rafts with black floatation and some steel components. The submersible raft buoys (1.2 m³) are proposed to be either yellow or gray.²³ In consideration of MDMR's requirement that aquaculture lease boundaries be marked with yellow marking devices that are readily distinguishable from other farm buoys, the submersible raft buoys should be gray in color, should the lease be granted.

²⁰ Application, page 10

²¹ Application, page 9

²² Application, page 9

²³ Application pages 4 and 6