

Figure 1. Vicinity map¹

Location: Southwest of Googins Ledge, Eastern/Frenchman Bay, Bar Harbor, Hancock County, Maine

Purpose: Standard lease for the suspended culture of blue mussels (*Mytilus edulis*), sea scallops (*Placopecten magellanicus*), soft shell clams (*Mya arenaria*), and hard clams (*Mercenaria mercenaria*)

Site Review: Marcy Nelson, Flora Drury, and Cheyenne Adams

Report Preparation: Cheyenne Adams, Flora Drury, and Marcy Nelson

Report Completed: December 18, 2020

¹Unless otherwise noted, all figures in this report were created in ArcMap version 10.6 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, Acadia Aqua Farms LLC, is requesting 48.11² acres southwest of Googins Ledge in Eastern Bay (northwest of Frenchman Bay) for the suspended culture of blue mussels (*Mytilus edulis*), sea scallops (*Placopecten magellanicus*), soft shell clams (*Mya arenaria*), and hard clams (*Mercenaria mercenaria*) (Figure 1). The applicant proposes to cultivate blue mussels with a pipe farm system, scallops with lantern nets and vertical lines for ear-hanging, and soft shell and hard clams with lantern nets. The mussel pipe farm system would consist of floating pipes (12.4-inch diameter) at the surface of the water that would be up to 466 feet long with spat collection nets (6.9-inch mesh) attached below and extending approximately 13 feet deep. The applicant proposes to arrange the pipes in 3 staggered sections of ~34 floating pipes each, with a minimum of 33 feet between the pipes and the buoys at the ends of each pipe.³ Predator exclusion nets (3-inch mesh)⁴ would also be deployed around the mussel pipe farm system.⁵ Mussel seed would be sourced from natural set on the spat collection nets, which would eventually be transferred to other bottom leases held by the applicant for grow out. Scallop seed would be sourced from off-site spat collection bags and grown in lantern nets until large enough to attach to vertical dropper lines via ear-hanging. Clam seed would be sourced either from a hatchery or from the wild with a special license. Regular maintenance would include thinning seed, hanging predator nets, adjusting buoyancy in the mussel pipe farm unit, and cleaning biofouling either by hand or with pressure washers. For mussel harvest, a purpose-built hydraulic machine would be placed over the pipes to brush the mussels off the nets and into a pump that transfers them to the harvesting vessel. The harvest machine would be moored on an onsite raft (20'x20').⁶ Scallops and clams would be harvested from the lantern nets or ear-hanging lines by hand.⁷

Gear would remain on the site year-round, and the scallop and clam longlines would be at least 10 feet below the surface of the water at all tidal stages. The site would be serviced by the applicant's 74' converted landing craft, as well as various small skiffs.⁸ While the application diagrams portray the lease fully utilized for both the mussel pipe farm system and the scallop/clam longline system, the application states that in practice there would be some combination of the two culture techniques and requests flexibility to add clam or scallop lines between or below the mussel pipes.⁹

General Characteristics

On September 18, 2020, Maine Department of Marine Resources (MDMR) Scientists Marcy Nelson, Flora Drury, and Cheyenne Adams assessed the proposed lease site. The Mount Desert Island (MDI) shoreline (Images 1-4) to the west, south, and east of the proposal is primarily ledge and hosts a mixed forest upland speckled with residential buildings and a few small rocky beaches around Leland Point. The Mount Desert Biological Laboratory, also on the MDI shoreline, is to the southeast of the proposed lease area between Emery and Salsbury Coves. 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 5-6 & Figure 7).

² Applicant originally requested 48 acres. DMR calculations, based on the coordinates provided by the applicant, indicate the area is 48.11 acres.

³ Application, pages 25-26 (labelled pages 4-5) & 32-33 (labelled pages 11-12)

⁴ Email between C. Adams and A. de Koning, 12/15/2020

⁵ Application, page 4

⁶ Application, page 5

⁷ Application, page 7

⁸ Application, page 8

⁹ Application, page 22 (labelled page 1)

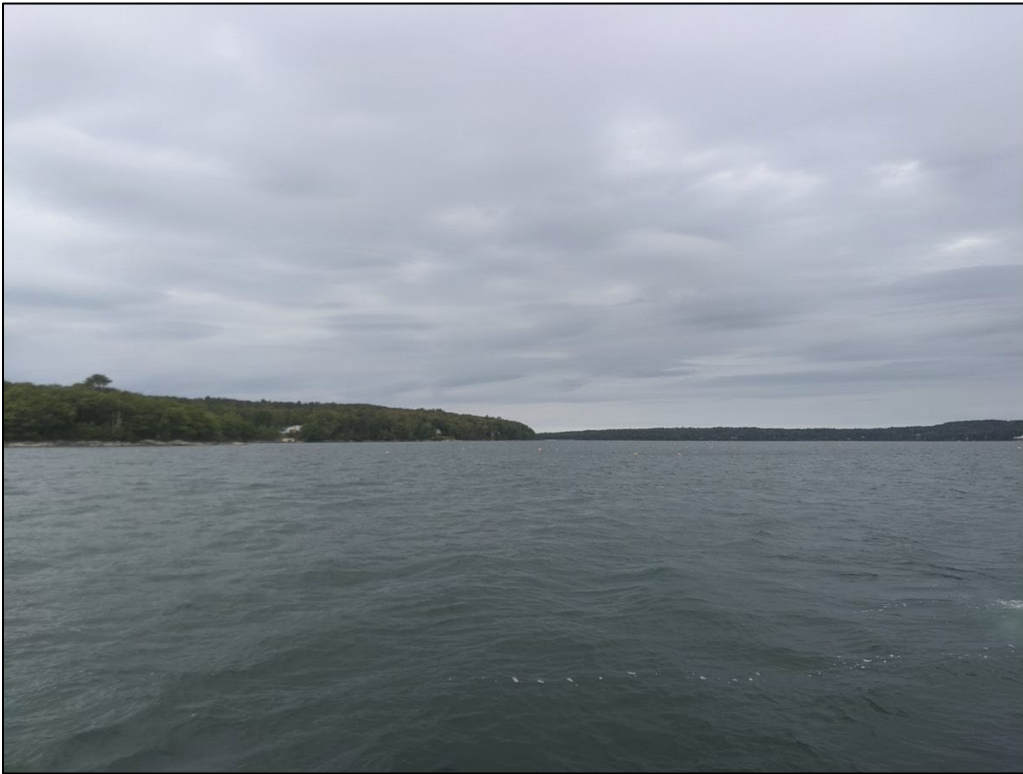


Image 1. Looking west toward the Mount Desert Island shoreline from near the proposed S corner (September 18, 2020).



Image 2. Looking southwest toward the Mount Desert Island shoreline from near the proposed S corner (September 18, 2020).

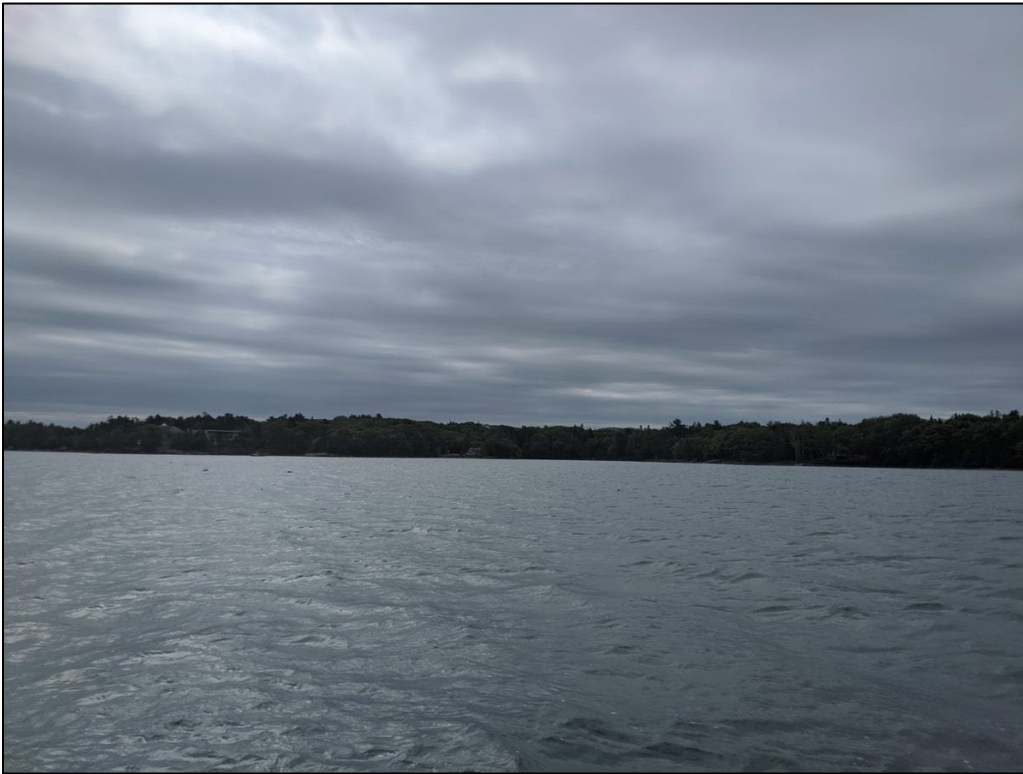


Image 3. Looking southeast toward the Mount Desert Island shoreline from near the proposed S corner (September 18, 2020).



Image 4. Looking east toward the Mount Desert Island shoreline from near the proposed S corner (September 18, 2020).



Image 5. Looking northeast toward the Lamoine mainland from near the proposed S corner (September 18, 2020).



Image 6. Looking northwest from near the proposed S corner (September 18, 2020).

Depth

On September 18, 2020, MDMR staff collected depth measurements at approximately 10:30 AM using a transom-mounted depth sounder; the tide was flooding (Table 1). Depths ranged from 57 to 90 feet at the proposed lease corners. Correcting for tidal variation derives water depths at the next high tide that range from 58.8 to 61.8 feet for the proposed S, W, and N corners and 91.8 feet for the proposed E corner. Water depths at mean low water (MLW, 0.0 feet) range from 46.2 to 49.2 feet for the proposed S, W, and N corners and 79.2 feet for the proposed E corner.

Table 1. Tide predictions at Bar Harbor, Frenchman Bay, Maine (44.3917° N, 68.2050° W).¹⁰

Date	Time	Height (ft)
9/18/2020	5:46 AM	-1.43 L
9/18/2020	11:56 AM	12.63 H
9/18/2020	6:08 PM	-1.37 L

Bottom Characteristics

MDMR staff observed the bottom characteristics of the general vicinity via a SCUBA transect on September 18, 2020 (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 bottom was composed primarily of soft mud sediment (Image 7) with a few scattered boulders (Image 8). Although much of the SCUBA transect was outside of the proposed lease site¹¹, conversations with the applicant, bottom characteristics described in the application, and depth sounder observations made by MDMR staff all indicate likely similar bottom conditions for the proposed lease site as were observed during the SCUBA transect.¹² The applicant, however, has not observed any boulders in the proposed lease site, and that topographical feature may therefore be limited to the more nearshore area of the MDMR SCUBA transect.

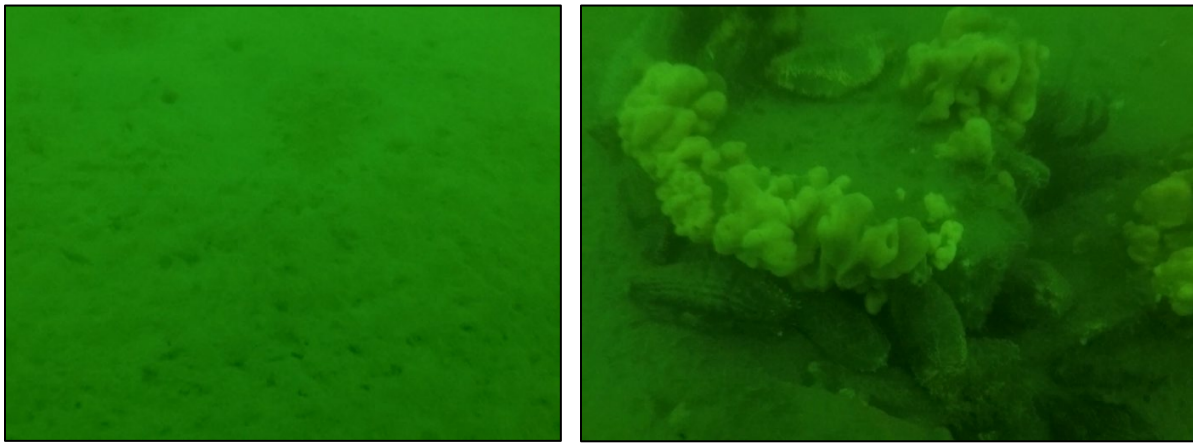
Table 2. Bottom characteristics of proposed site.

Substrate Origin	Substrate Class	Substrate Subclass	Substrate Group (Subgroup)
Geologic Substrate	Unconsolidated Mineral Substrate	Course Unconsolidated Mineral Substrate	Gravel (Boulder)
Geologic Substrate	Unconsolidated Mineral Substrate	Fine Unconsolidated Mineral Substrate	Mud

¹⁰ <http://tbone.biol.sc.edu/tide/tideshow.cgi>

¹¹ Likely due to wind and current at the proposed lease site resulting in drift of the tending vessel and divers

¹² Conversation between C. Adams and A. de Koning (11/24/2020); Application, page 11 (labelled as page 13); MDMR site assessment on 9/18/2020



Images 7 & 8. Soft mud and boulder observed during dive transect (September 18, 2020).

Position and Distances to Shore

POSAID Positioning Software was used to verify the distances and bearings between proposed lease corners. Distances to shore were determined using the measuring tool in ArcMap 10.6, digital orthophotography provided by the Maine Office of GIS, and the application coordinates.

Application Coordinates (WGS84) – 48.11 Acres (Figure 2)

<u>Corner</u>	<u>Latitude</u>	<u>Longitude</u>
W	44° 26.40774' N	68° 17.88006' W then 1,905.09 feet at 119.91 True to
S	44° 26.25138' N	68° 17.50074' W then 1,100.95 feet at 30.09° True to
E	44° 26.40816' N	68° 17.37396' W then 1,905.02 feet at 299.92° True to
N	44° 26.56452' N	68° 17.75328' W then 1,100.94 feet at 210.06° True to W.

Table 3. Approximate distances from proposed lease to surrounding features (Figures 1 & 2). Measurements were made using digital orthophotography provided by the Maine Office of GIS (*orthoCoastalDownEastCoast2008*).

Feature	Distance
W Corner to Leland Point, nearest point (~MLW)	~670 feet to the southwest
S Corner to MDI shoreline, nearest point (~MLW)	~1,450 feet to the south
S Corner to nearest mooring	~975 feet to the south
E-N Boundary to Red Nun “14” (NOAA chart)	~990 feet to the northeast
N Corner to Lamoine shoreline, nearest point (~MLW)	~2,600 feet to the north

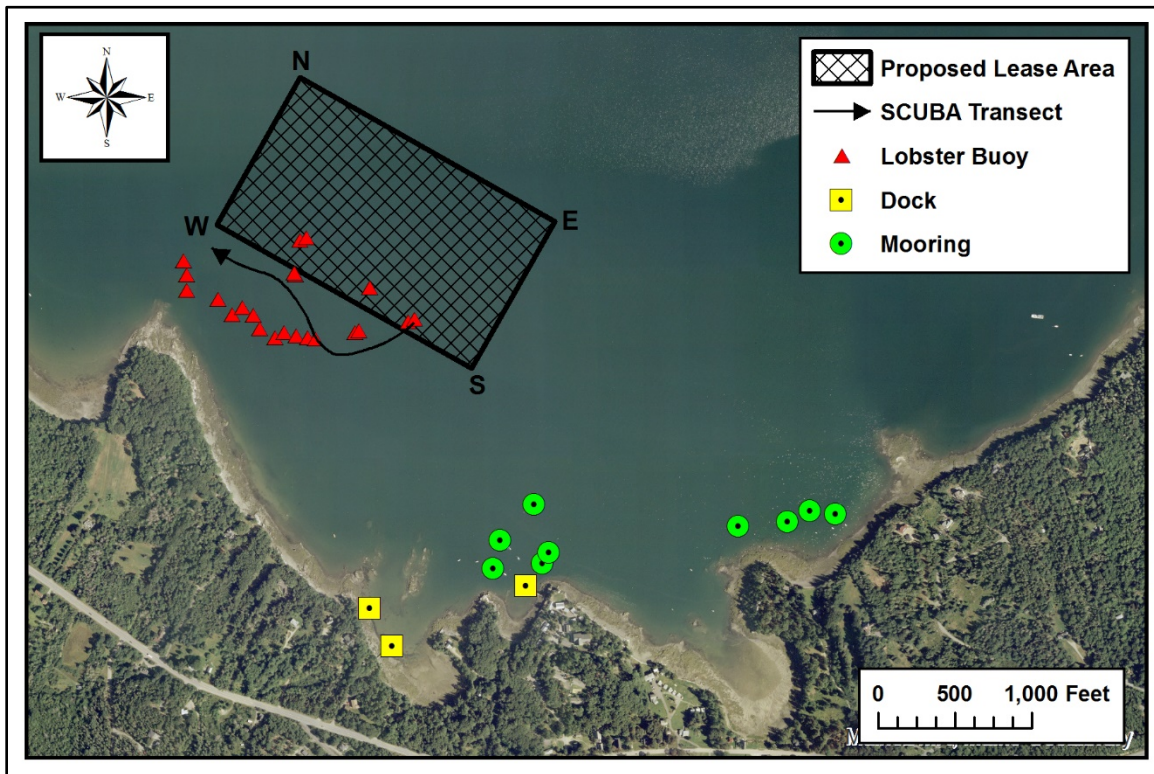


Figure 2. Approximate SCUBA dive transect and docks, moorings, and lobster trap buoys nearest to the proposal (September 18, 2020).

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

At the time of MDMR’s site assessment on September 18, 2020, there were three docks, five sets of stairs to the shoreline, and several moorings in the general vicinity of the proposal (Figure 2). One dock had multiple outhauls associated with it, and another had several kayaks and a small rowboat stored on and near the dock. The e stairs were located along the shoreline to the east of Leland Point. While Figure 2 includes the locations of the moorings nearest to the proposed lease site, additional moorings were observed closer to shore, within Salsbury and Emery Coves, and also farther northeast along the MDI shoreline. Vessels observed on the moorings included mostly small recreational motorized vessels and sailboats, with a few small lobster fishing vessels.

While ~670 feet remain between the proposed lease site and the MDI shoreline at the closest point, there is likely a high amount of activity that occurs on and near the shoreline and, therefore, the proposed lease, if granted, may alter some amount of vessel flow, particularly vessels traveling to and from the north and west, associated with accessing moorings, docks, or the shoreline.

In the Harbormaster Questionnaire submitted on February 28, 2020, the Bar Harbor Harbormaster indicated that if the proposal were to be granted, there would be no impediment to riparian owners.

(2) Navigation

The proposed lease site is located within the marked navigation channel between Eastern Bay and Mount Desert Narrows (Figure 3). If the proposal were granted, vessel flow between Eastern Bay and Mount Desert Narrows would be limited to the space between the E-N boundary of the proposed lease and the northern boundary of the navigation channel. It is expected that mariners frequently transit through this area for a variety of reasons.

Two boat ramps and the moorings associated with them, at Lamoine State Park and in Trenton, near Morris Yachts production facility, are expected to experience moderate to heavy use by both commercial and recreational vessels. These vessels likely include smaller recreational and commercial vessels, such as sailboats and clam harvesters, as well as larger vessels, such as mussel drag harvesters and at least one barge. The boat ramp in Trenton also experiences the traffic of larger motorized recreational vessels associated with the Morris Yachts production facility. Mariners accessing these ramps must travel either through the relatively narrow and shallow passage under the Trenton Bridge, or through the marked navigation channel leading to Eastern Bay, in which the proposed lease is located. Larger vessels, including barges and mussel drag harvesters, would be required to transit between the proposed lease and the boundary of the navigation channel. Additionally, the Bar Harbor Whale Watch vessels maintain storm moorings in Mount Desert Narrows and would therefore occasionally transit the navigation channel in which the proposed lease is located.

The deep water associated with the navigational channel is ~2,455 feet wide at the location of the proposed lease, as measured between Red Nun “14”, which identifies the hazard posed by Googins Ledge and marks the northern boundary of the channel, and the 30-ft contour line along the MDI shoreline, as seen on the NOAA chart. If the proposed lease were to be granted, there would remain ~990 feet between the E-N boundary of the proposed lease and Red Nun “14”. While ~670 feet separate the S-W boundary of the proposed lease from the MDI shoreline at the nearest point, only 180 feet would remain between the proposal and the 30-foot contour line, as seen on the NOAA chart.

While most vessels would likely be able to navigate unimpeded through the remaining ~990 feet of the navigation channel, the presence of the proposed lease site, if granted, would likely cause some mariners to alter their original course and may result in some amount of congestion of vessel flow in the area.

In the Harbormaster Questionnaire submitted on February 28, 2020, the Bar Harbor Harbormaster stated that while the proposed lease area is located within the east-west portion of the bay where vessels transit to and from the Trenton Bridge, “it should not be an unmanageable impediment” with sufficient markings.

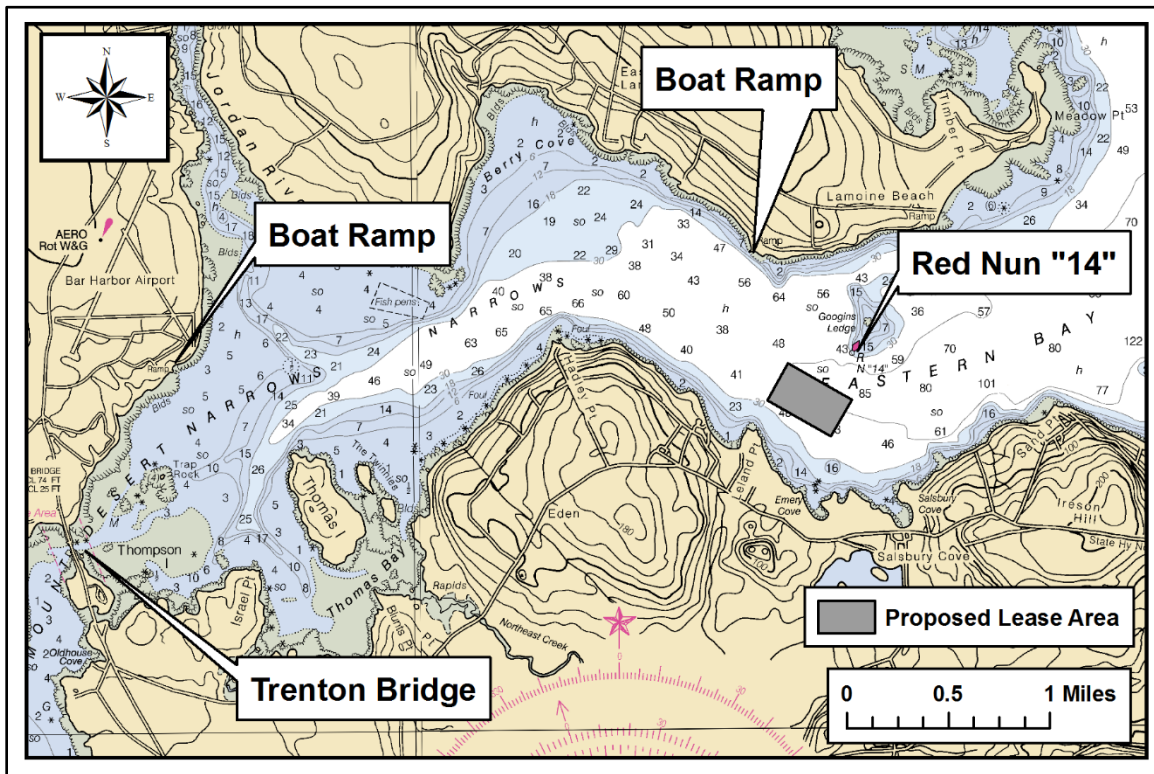


Figure 3. Proposed lease area, navigation channel marker, and nearby boat ramps.¹³

(3) Fishing and Other Uses

During MDMR’s site assessment on September 18, 2020, staff observed five lobster (*Homarus americanus*) trap buoys within the proposed lease boundaries and approximately 18 lobster trap buoys near the S-W boundary (Figure 2). Moderate lobstering activity was observed at a greater distance to the south and west of the proposal, and light lobstering activity was observed to the north and east. Additionally, one lobster vessel was observed in operation to the east of the proposed lease area. Although four lobsters were observed during the SCUBA transect, these were observed outside of the proposed lease site, in the more shoal water where more trap buoys were also observed. Moreover, all lobsters observed during the SCUBA transect were associated with boulder habitat that may not be present within the proposed lease area. 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.

The application notes that sea scallop (*Placopecten magellanicus*) and green sea urchin (*Strongylocentrotus droebachiensis*) dragging occurs occasionally near Googins Ledge.¹⁴ No scallops or urchins were observed during the dive transect. Additionally, the bottom of the proposed lease site is soft mud and DMR staff typically observe scallops on sand and shell substrate.

¹³ Although the Lamoine Beach boat ramp is indicated on NOAA charts, the Town of Lamoine website states that there is “no formal ramp for launching” at the beach

¹⁴ Application, page 13 (labelled as page 15)

In the Harbormaster Questionnaire submitted on February 28, 2020, the Bar Harbor Harbormaster stated that while some lobster fishing does occur in the proposed lease site during summer months, the effort is low compared to areas farther south.

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 kayaking would remain closer to shore. However, it is likely that some recreational paddle craft do transit through the proposed lease area. Although a minimum of 33 feet would remain navigable for shallow draft vessels between surface gear, which would likely accommodate most paddle craft, the presence of surface gear may deter recreational users from entering the lease site, if granted.

(4) Other Aquaculture Uses

At the time of this report, there were no other aquaculture activities within 1 mile of the proposed lease area. Other aquaculture leases and licenses in the general area, but greater than 1 mile from the proposal, are shown in Figure 4.

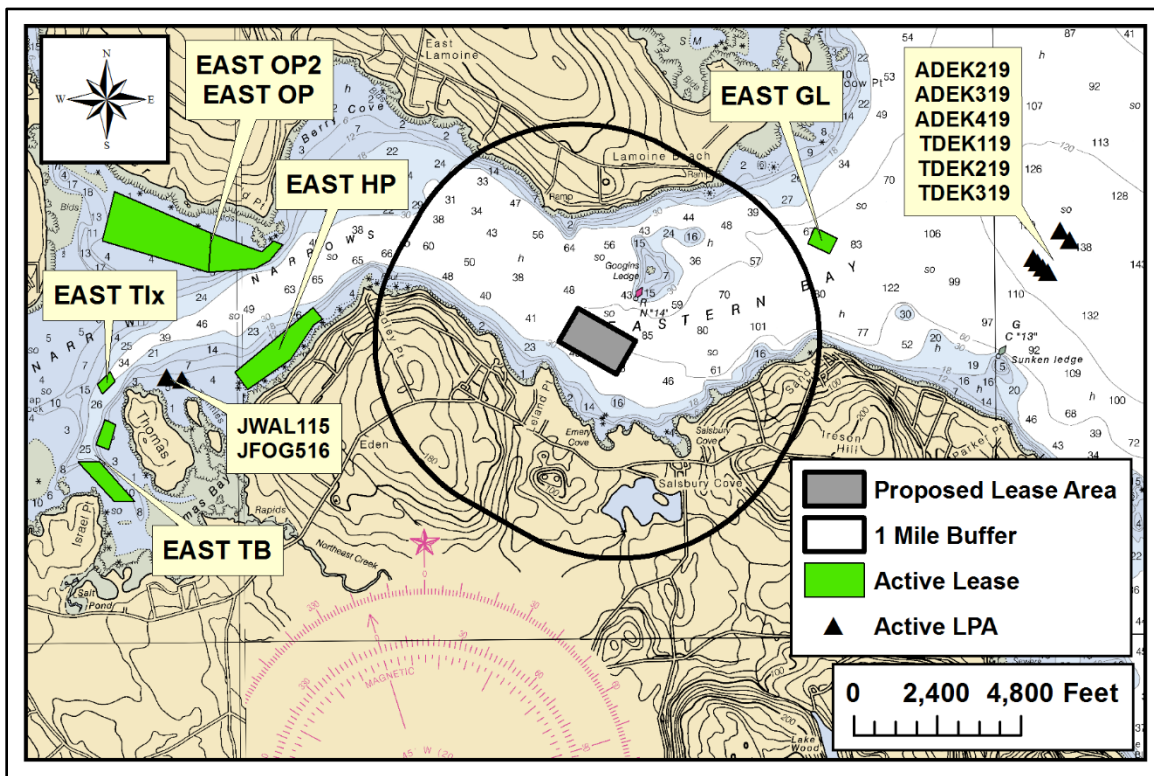


Figure 4. Aquaculture leases and Limited Purpose Aquaculture (LPA) licenses in the general area of the proposal.

(5) Existing System Support

Epibenthic Flora and Fauna

On September 18, 2020, MDMR staff conducted a SCUBA transect to assess the epibenthic ecology of the area (Figure 2). While the majority of the SCUBA transect occurred outside of the proposed lease boundaries, conversations with the applicant, bottom characteristics described in the application, and depth sounder observations made by MDMR staff all indicate that the epibenthic flora and fauna are likely not significantly different in the proposed lease site from what was observed during the SCUBA transect.¹⁵ The observed bottom was primarily soft mud sediment (Image 7), with occasional boulder substrate that supported a variety of epibenthic organisms (Images 8 & 9). However, the applicant has not observed any such boulders in the proposed lease site, and it is therefore likely that these benthic features, including the associated flora and fauna, are constrained to the more nearshore area of the MDMR SCUBA transect. Species were observed on and near boulder substrate only, unless otherwise noted (Table 4).

Table 4. Species observed during MDMR SCUBA transect on September 18, 2020.

Species Observed	Abundance
Colonial Tunicate (<i>Didemnum sp.</i>)	Common
Orange-Footed Sea Cucumber (<i>Cucumeria frondosa</i>)	Common
Northern Sea Star (<i>Asteria rubens</i>)	Occasional – on mud substrate
Lobster (<i>Homarus americanus</i>)	Occasional
Cerianthid Anemone (<i>Cerianthus borealis</i>)	Occasional – on mud substrate
Frilled Anemone (<i>Metridium senile</i>)	Rare
Crab (<i>Cancer sp.</i>)	Rare
Horse mussel (<i>Modiolus modiolus</i>)	Rare



Images 9 & 10. Boulder habitat and northern sea star (*A. rubens*) observed during the SCUBA transect (September 18, 2020)

¹⁵ Conversation between C. Adams and A. de Koning (11/24/2020); Application, page 11 (labelled as page 13); MDMR site assessment on 9/18/2020

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 2,500 feet to the north of the proposal, along the Lamoine shoreline (Figure 5). 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.

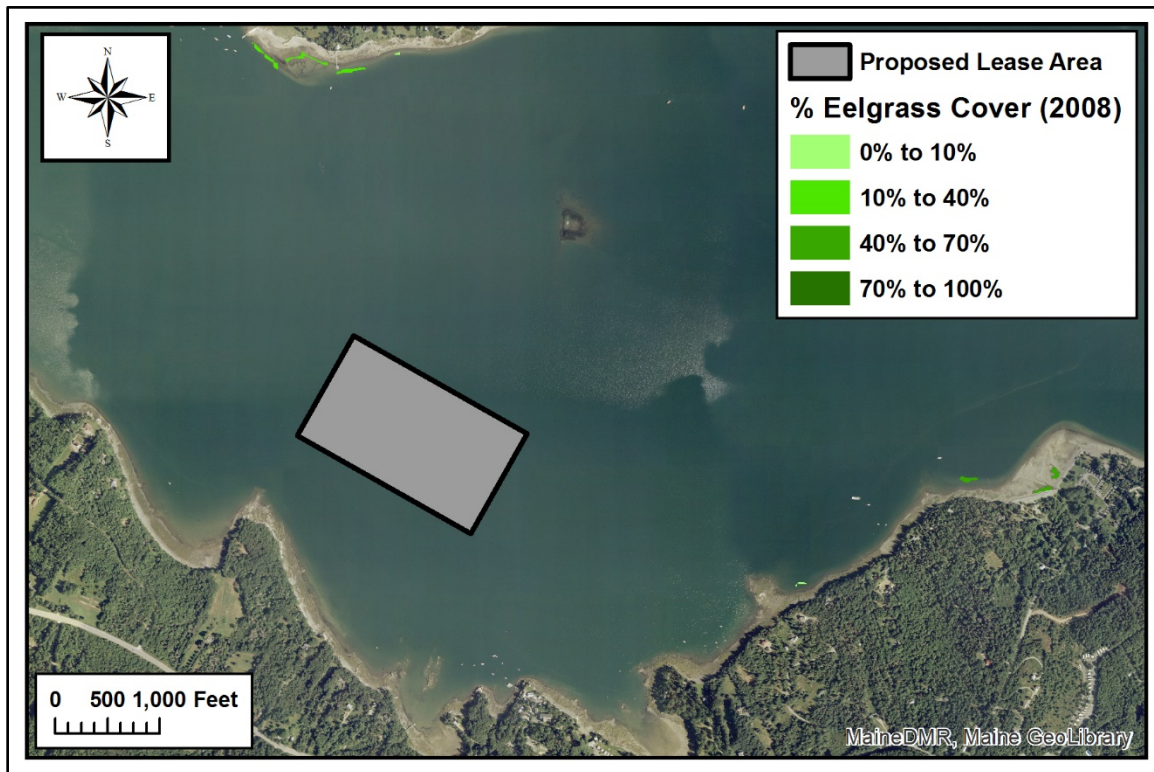


Figure 5. Historical eelgrass (*Z. marina*)¹⁶ near the proposed lease site from the 2008 survey.

Wildlife

During MDMR's site assessment on September 18, 2020, staff observed an osprey (*Pandion haliaetus*), a harbor seal (*Phoca vitulina*), a guillemot (*Cepphus grylle*), a double-crested cormorant (*Phalacrocorax auritus*), and two turkey vultures (*Cathartes aura*) 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 near the 660-foot buffer associated with a bald eagle (*Haliaeetus leucocephalus*) nest, and greater than 4,000 feet from the nearest tidal wading bird and waterfowl habitat and shorebird habitat (Figure 6). Tidal wading bird and waterfowl habitat and shorebird habitat are both defined under Maine's Natural Resource Protection Act (NRPA) as Significant Wildlife Habitat.

¹⁶Data obtained from Maine Office of GIS (Eelgrass2010).

On February 28, 2020, a Wildlife Biologist with MDIFW responded by email to a “Request for Agency Review and Comment”, stating that the minimal impacts to wildlife are anticipated for this project. The comment also mentions the nearby bald eagle nest. While bald eagles are no longer endangered, they are protected by the federal Bald and Gold Eagle Protection Act and the U.S. Fish and Wildlife Service (USFW) National Bald Eagle Management Guidelines. The proposed lease is approximately 400 feet to the northeast of the 660-foot USFWS-mandated protective buffer around the bald eagle nest, at the nearest point.¹⁷

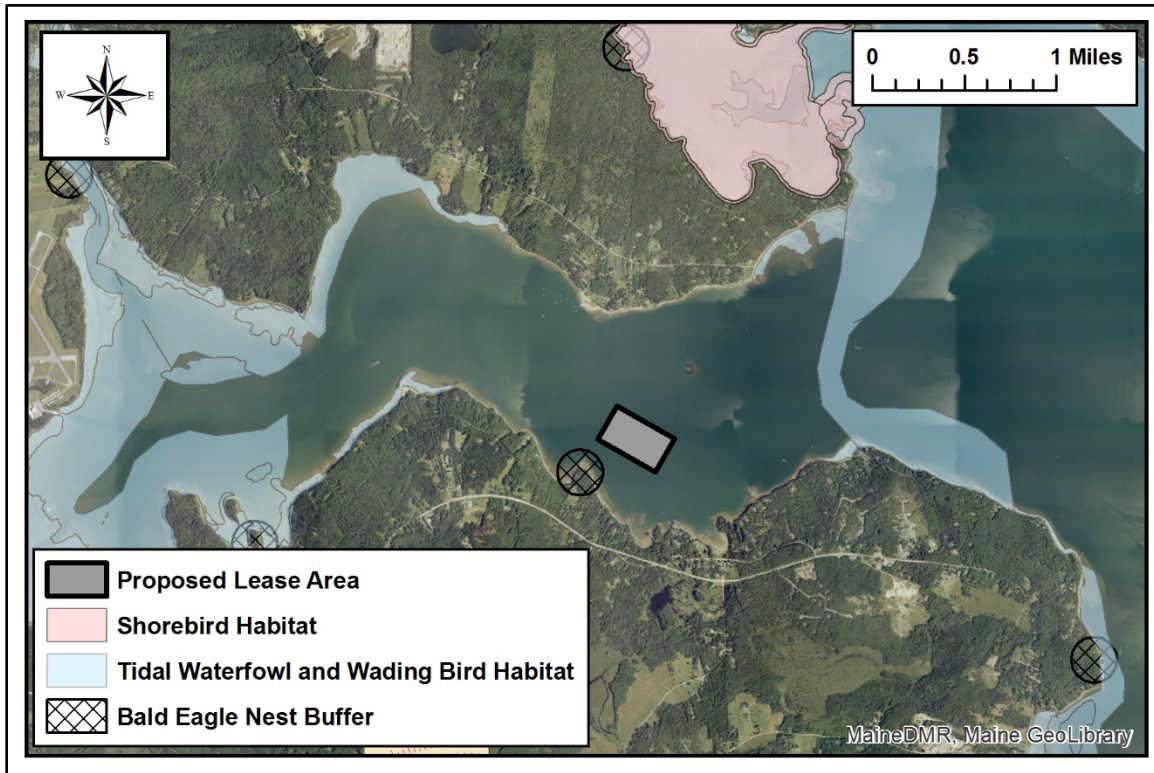


Figure 6. Tidal wading bird and waterfowl habitat,¹⁸ shorebird habitat,¹⁹ and bald eagle nests²⁰ near the proposed lease site.

(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 lands to the proposal are Lamoine State Park and boat ramp, 0.49 miles to the north, and Lamoine Beach, 1.03 miles to the northeast. Both are held in public conservation by the State of Maine.

The Lamoine State Park boat ramp is moderately used by recreational and commercial vessels throughout the year, including to launch and retrieve ~10-15 commercial lobster fishing vessels in the spring and fall, respectively, that are kept on nearby moorings.²¹

¹⁷ Measurement based on data obtained from USFWS: <https://services.arcgis.com/QVENGdaPbd4LUkLV/ArcGIS/rest/services>

¹⁸ Data obtained from MDIFW maintained SDE Feature Class “GISVIEW.MEIFW.Twwh”

¹⁹ Data obtained from MDIFW maintained SDE Feature Class “GISVIEW.MEIFW.Shorebird”

²⁰ Data obtained from USFWS: <https://services.arcgis.com/QVENGdaPbd4LUkLV/ArcGIS/rest/services>

²¹ MDMR Lamoine office location, staff observations

As the proposed lease would occupy part of the navigational channel leading from the Lamoine State Park boat ramp to Eastern Bay, it is possible that the proposal may, if granted, increase congestion of vessel flow associated with the Lamoine State Park boat ramp. However, the remaining ~990 feet of the navigational channel would likely be sufficient for all vessel types and in all weather conditions.

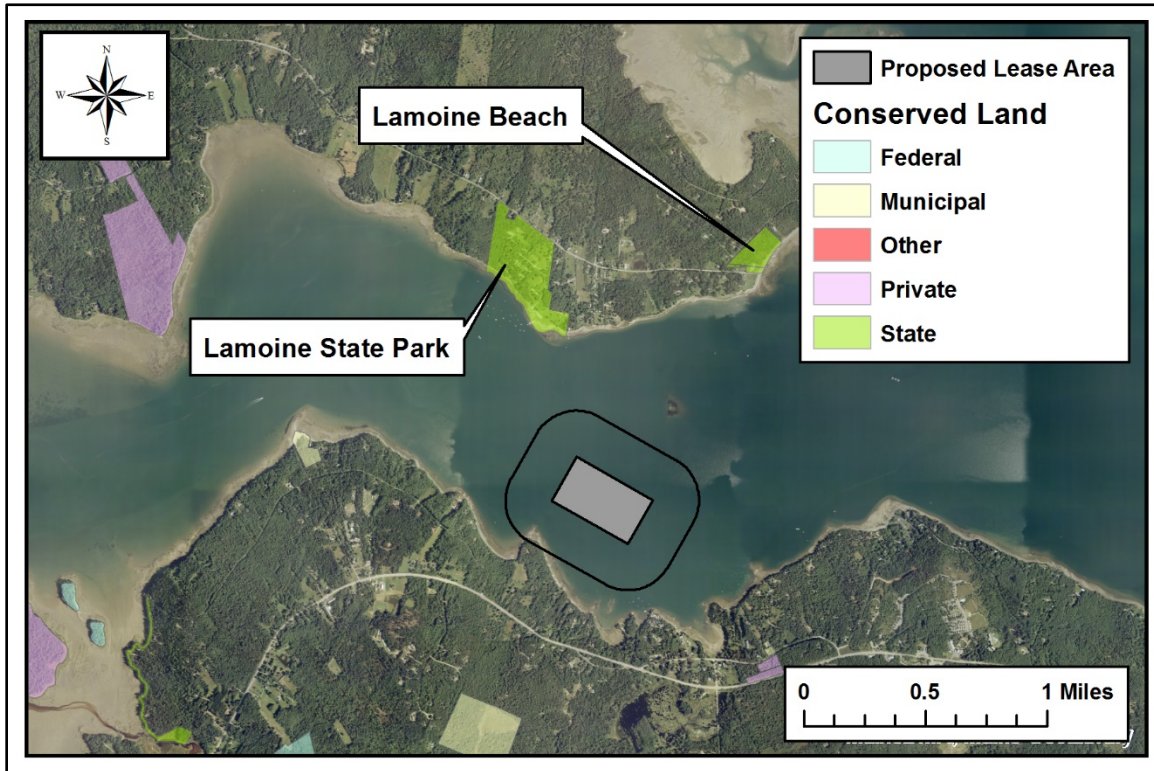


Figure 7. Public facilities near the proposed lease site.²²

(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.

(8) Lighting

Lighting may be used in the winter months between the hours of 6:00 AM and 6:00 PM, although the applicant intends to avoid working beyond daylight hours whenever possible.²³ Otherwise, lighting would be limited to emergency use only. In all circumstance where the applicant may be at the site beyond daylight hours, the flood lights on the applicant’s vessel and flashlights would be used for lighting.²⁴

²² Data obtained from SDE Feature Class sourced from The Maine Office of GIS “GISVIEW.MECONSLANDS.Conserved_Lands”

²³ Email between C.Adams and A. de Koning 12/16/2020

²⁴ Application, page 9 (labelled page 11)

(9) Noise

The proposed lease would be accessed and serviced by a variety of vessels, including small skiffs and the applicant's 74' converted landing craft. The harvest machine would be operated with the hydraulic system of the converted landing craft and have pumps running to deliver the harvested mussels to the vessel. Additionally, a pressure washer and grader may be used on-site. These machines would be powered by the generator aboard the converted landing craft.²⁵

To reduce noise levels, the applicant intends to house all non-portable internal combustion engines in secondary containment. When possible, the main engines of the converted landing craft would be shut down. According to information from the manufacturer of the harvest machine, the noise produced would be less than that generated by a 4-stroke outboard engine.²⁶

(10) Visual Impact

The proposed aquaculture operations comply with the MDMR's height and visual impact limitations.

²⁵ Application, page 8 (labelled page 10)

²⁶ Application, page 9 (labelled page 11)