

Department of Marine Resources
Site Review #2015-20

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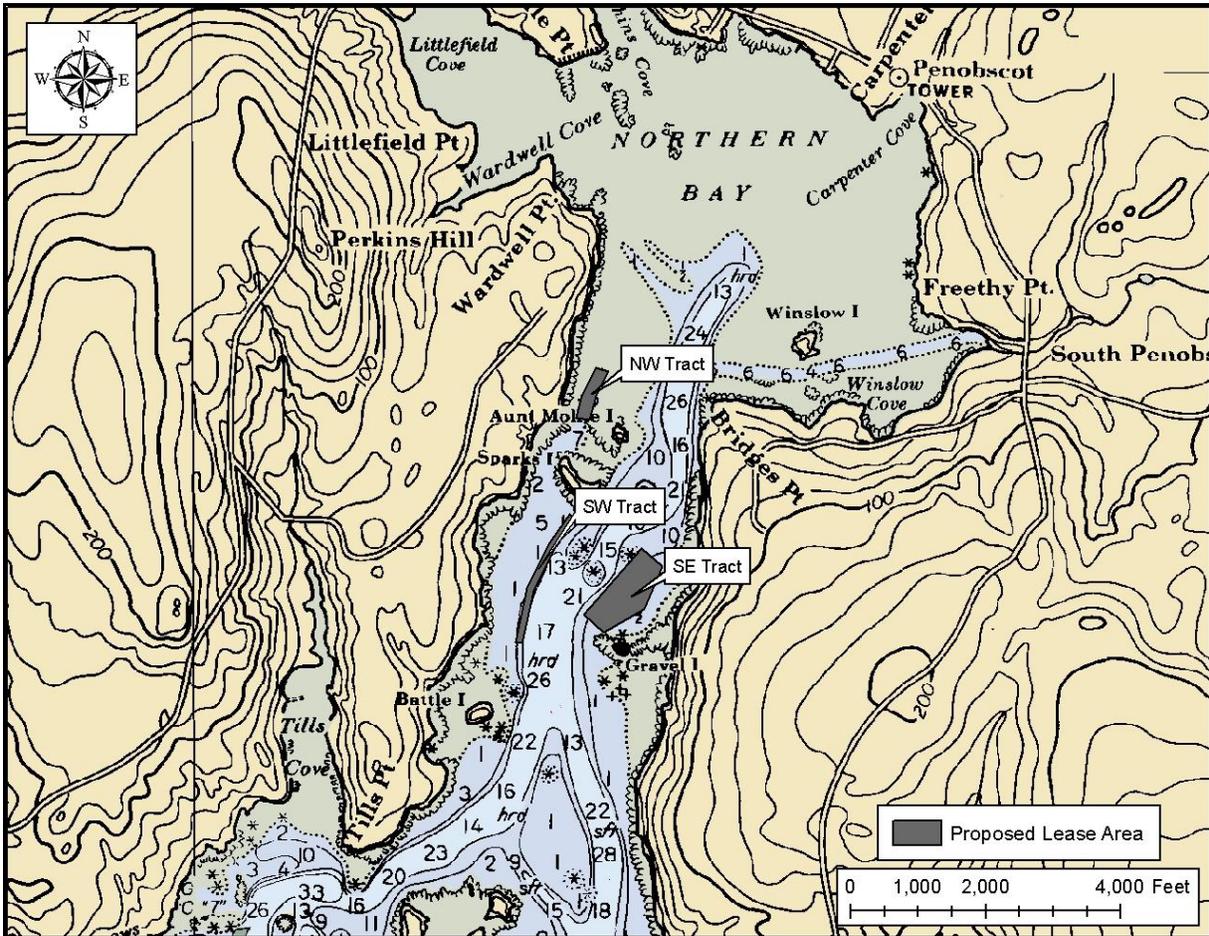


Figure 1* Vicinity Map

Location: Northern Bay (Bagaduce River), Town of Penobscot, Hancock County, Maine

Purpose: Suspended and bottom culture of American oysters (*Crassostrea virginica*)

Site Review by: Jon Lewis, Marcy Nelson, and Flora Drury

Report Preparation by: Flora Drury, Jon Lewis, and Marcy Nelson

September 12, 2016

* All figures in this report were created in ArcMap version 10.2 using digitized NOAA Nautical Charts or geo-referenced aerial photographs provided by The Maine Office of GIS (Low_Tide_2008).

On July 7, 2016, staff from The Maine Department of Marine Resources (MDMR) visited the site proposed for the suspended and bottom culture of American oysters (*Crassostrea virginica*) located in Hancock County's Northern Bay. MDMR staff arrived at the proposed lease site at 10:26 am. Depth collection, bottom topography analysis, and underwater video transects were conducted at this time along with observations of wildlife, riparian ingress and egress, and navigation. MDMR staff revisited the site on August 18, 2016 with Maine Department of Inland Fisheries and Wildlife (MDIFW) bird biologist Brad Allen to collect more information on wildlife, with a particular focus on birds in the area. MDMR staff also continued to examine navigation in the area at this time. On August 18, 2016 MDMR and MDIFW staff arrived on site at 10:40 am and departed around 1:00 pm.

The applicant is applying for a standard lease occupying three distinct tracts (Figure 1). Proposed gear to be used at the site include 72 strings comprised of 150 floating polyethylene oyster bags per string and 100 vinyl coated wire mesh cages that would be filled with oysters and placed on the ocean floor during the winter months. The proposed lease includes 10.88 acres of suspended shellfish culture and 12.87 acres of bottom culture. A total of **23.75 acres** are included in the proposed lease area (See below: Position and Distances to Shore, Application Corner Coordinates).

General Characteristics

Bottom Topography

DMR staff inspected the location of the proposed lease and collected underwater video using a digital video camera contained within underwater housing.

NW Tract (Tract 1): Proposed for bottom culture

The bottom of this proposed lease tract is composed primarily of scoured mud, gravel, and cobble with an increased depth along the tract's eastern boundary. The NW Tract sits in a slight indentation in the otherwise shallow area, and therefore the water depth decreases to the east of the tract's eastern boundary before it increases upon reaching the main channel (Figure 2).

SW Tract (Tract 2): Proposed for suspended culture

The bottom of this proposed lease tract is composed primarily of soft mud that turns to scoured peat at the north end of the tract. Water depth is deeper along the tract's eastern boundary which abuts the channel edge.

SE Tract (Tract 3): Proposed for bottom and suspended culture

The bottom of the proposed SE Tract is composed primarily of firm to semi-soft mud scattered with cobble and shells. The tract is shallowest in the southeast portion of the site and increases in depth to the north and west.

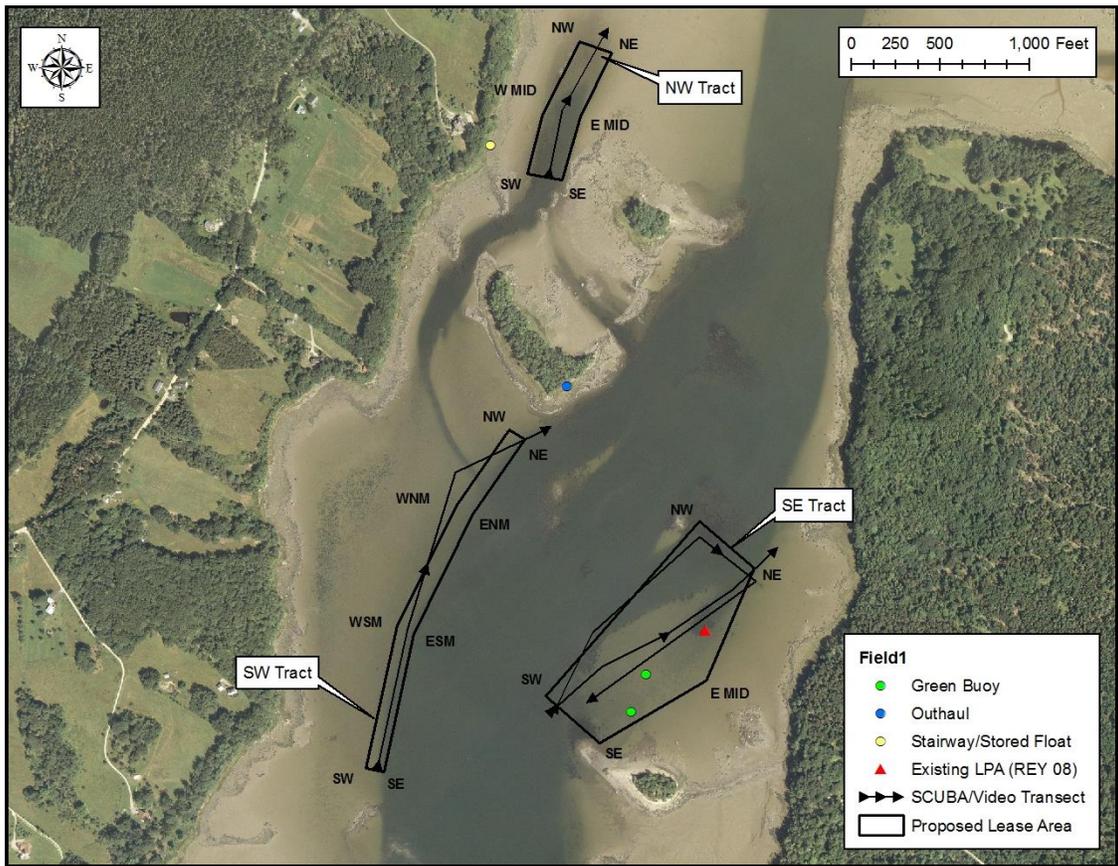


Figure 2*



Image 1: SE Corner (marked by white buoy) of NW Tract facing east towards Aunt Mollie Island



Image 2: Northern boundary of SW Tract facing north towards Sparks Island



Image 3: SE Corner of SE Tract facing southeast to Gravel Island

Depth

MDMR staff arrived on the site and collected depth measurements between 10:26 am and 11:00 am on July 7, 2016. The predicted time of low tide in Castine, Penobscot Bay, Maine on July 7, 2016 was 7:50am and tidal height was predicted at -1.03 feet below mean low water (MLW).

Water depths at the proposed lease site ranged from 3.2' to 13' during the MDMR site assessment on July 7, 2016. Correcting to the nearest high water (+10.75') results in water depths roughly 7 feet greater than depths observed during the Department's site visit. At mean low water (+/- 0.0') water depths can be expected to be roughly 3 feet lower than depths observed. However, the tide data collected from Castine, Penobscot Bay, Maine, is only an approximation of the tidal occurrences in Northern Bay. Navigational charts and aerial images of the area at low tide confirm that the majority of the proposed lease area is submerged at low tide with the exception of the northern portion of the NW Tract, which nautical charts indicate as becoming exposed at low water and aerial images show to be subtidal. The more recent aerial photos are likely more accurate than water depths displayed on navigational charts for the area. DMR staff contacted the NOAA charting office and confirmed the last time the area was sounded for chart development was September 1902. Considering the soft dynamic nature of the sediments, 1902 soundings likely are no longer accurate.

NW Tract (Tract 1):

Water depths within the NW Tract of the proposed lease site ranged between 3.7' and 7.8'. According to the lease application, this tract presents depths of 1' to 4' at low water. This tract is contained within a narrow channel with mudflats on three sides.

SW Tract (Tract 2):

Water depths within the SW Tract of the proposed lease site ranged between 3.2' and 13'. The lease application states that depths of 1' - 6' are observed at this proposed tract at low water.

SE Tract (Tract 3):

Water depths within the SE Tract of the proposed lease site ranged between 3.3' and 11.7'. According to the lease application, depths of 1' - 6' are observed here at low water.

Castine, Penobscot Bay, Maine*

(44.3867° N, 68.7967° W)

Date	Time	Height (ft)
7/7/16	01:30 AM	11.77 H
7/7/16	07:50 AM	-1.03 L
7/7/16	02:05 PM	10.75 H
7/7/16	8:07 PM	00.19 L

* <http://tbone.biol.sc.edu/tide/tideshow.cgi?site=Castine%2C+Penobscot+Bay%2C+Maine&units=f>

Ice

The proposed lease area is likely to ice over during winter months. Gear will need to be submerged and corner markers temporarily removed during this time.

Position and Distances to Shore

WAAS (Wide Area Augmentation System) GPS was used to navigate to each corner of the proposed lease site. POSAID Positioning Software was later used to verify the metes and bounds.

Application Corner Coordinates:

Total Acreage: 23.75 Acres

Northwest Tract (Tract 1): 3.54 acres for bottom culture

<u>Corner</u>	<u>Latitude</u>	<u>Longitude</u>	
NW	44° 27'07.02" N	68° 43'37.50" W	<i>thence 190.6 feet at 110.5° True to</i>
NE	44° 27'06.36" N	68° 43'35.04" W	<i>thence 395 feet at 206.8° True to</i>
E MID	44° 27'02.88" N	68° 43'37.50" W	<i>thence 372.2 feet at 195.6° True to</i>
SE	44° 26'59.34" N	68° 43'38.88" W	<i>thence 199.2 feet at 280.5° True to</i>
SW	44° 26'59.70" N	68° 43'41.58" W	<i>thence 338.4 feet at 14.1° True to</i>
W MID	44° 27'02.94" N	68° 43'40.44" W	<i>thence 465 feet at 27.3° True to NW.</i>

Southwestern Tract (Tract 2): 4.84 acres for suspended culture

<u>Corner</u>	<u>Latitude</u>	<u>Longitude</u>	
NW	44° 26'45.54" N	68° 43'43.08" W	<i>thence 102.8 feet at 122.1° True to</i>
NE	44° 26'45.00" N	68° 43'41.88" W	<i>thence 510.7 feet at 214.8° True to</i>
ENM	44° 26'40.86" N	68° 43'45.90" W	<i>thence 747.7 feet at 206.6° True to</i>
ESM	44° 26'34.26" N	68° 43'50.52" W	<i>thence 790.1 feet at 192.4° True to</i>
SE	44° 26'26.64" N	68° 43'52.86" W	<i>thence 101.8 feet at 280.3° True to</i>
SW	44° 26'26.82" N	68° 43'54.24" W	<i>thence 821.6 feet at 12.5° True to</i>
WSM	44° 26'34.74" N	68° 43'51.78" W	<i>thence 755.1 feet at 26.7° True to</i>
WNM	44° 26' 41.40" N	68° 43'47.10" W	<i>thence 510.7 feet at 34.8° True to NW.</i>

Southeastern Tract (Tract 3): 15.37 Acres for both bottom (9.33 acres) and suspended (6.04 acres) culture

<u>Corner</u>	<u>Latitude</u>	<u>Longitude</u>	
NW	44° 26'40.44" N	68° 43'28.38" W	<i>thence 404.7 feet at 130.2° True to</i>
NE	44° 26'37.86" N	68° 43'24.12" W	<i>thence 687.1 feet at 203.1° True to</i>
E MID	44° 26'31.62" N	68° 43'27.84" W	<i>thence 697.2 feet at 240.2° True to</i>
SE	44° 26'28.20" N	68° 43'36.18" W	<i>thence 398.1 feet at 311.0° True to</i>
SW	44° 26'30.78" N	68° 43'40.32" W	<i>thence 1306.7 feet at 41.5° True to NW.</i>

Distances to shore (Figures 1 and 2):

The below distances to shore are estimates based on the currently available aerial photography provided by The Maine Office of GIS (Low_Tide_2008) and Google Earth (October 2013), and observations made during the site assessment.

Northwest Tract (Tract 1):

NW Corner to nearest point on shore (MLW)	~80 feet to the west
NW Corner to nearest point on shore (MHW)	~330 feet to the west
W Boundary to stairway and floats on western shore	~235 feet to the west
SW Corner to nearest point on shore (MLW)	~60 feet to the west
SW Corner to nearest point on shore (MHW)	~230 feet to the west
E Boundary to nearest point, Aunt Mollie Island (MLW)	~25 feet to the east
SE Corner to nearest point, Aunt Mollie Island (MHW)	~350 feet to the east
NE Corner to nearest point on Northern Bay's eastern shore (MLW)	~1,380 feet to the east

Southwest Tract (Tract 2):

NE Corner to nearest point, Sparks Island (MLW) (NOAA Chart)	~60 feet to the north
NE Corner to nearest point, Sparks Island (MLW) (Low_Tide_2008)	~160 feet to the north
NE Corner to nearest point, Sparks Island (MHW)	~240 feet to the north
W Boundary to nearest point on shore (MLW)	~350 feet to the west
W Boundary to nearest point on shore (MHW)	~460 feet to the west
SE corner nearest intertidal (MLW)	~200 feet to the south
SE corner to nearest point, Battle Island (MHW)	~960 feet to the south
E Boundary to SE Tract (Tract 3)	~800 feet to the east

Southeast Tract (Tract 3):

NW Corner to Sparks Island (MLW)	~930 feet to the west
NE Corner to nearest intertidal (MLW)	~230 feet to the east
Eastern Boundary to nearest point on shore (MLW)	~185 feet to the east
SE Point to Gravel Island (MLW)	~10 feet to the south

The criteria MDMR uses to determine the suitability of an aquaculture operation to a particular area (DMR Regulations Chapter 2.37(1) (A)) are discussed, with respect to the application, below:

(1) Riparian Owners Ingress and Egress

Twenty-two privately owned lots are within 1,000 feet of the proposed lease site.

Site visits on July 7, 2016 and August 18, 2016 revealed one outhaul mooring located on the east side of Sparks Island. Additionally, a stairway to the shoreline was observed on the west bank of the Bagaduce River, ~235 feet west of the proposed NW Tract with multiple floats stored above high water (Figure 2).

The shallow nature of the water on the inshore side of all proposed lease tracts presents difficult conditions for riparian ingress and egress with or without the proposed lease. Additionally, the distance to which this shallow water extends from the shoreline before reaching the deeper channel would pose challenges for riparian owners interested in installing docks.

Riparian owners would maintain the ability to maneuver around the NW Tract (Tract 1) in a depth-appropriate vessel without difficulty because the proposed tract is intended for bottom culture. According NOAA Nautical Charts, the proposed SW Tract (Tract 2) sits ~60 feet from Sparks Island at MLW. The SW Tract will not inhibit the ingress and egress of riparian owners but it might force owners to take a longer route between the primary channel and the river's west bank than traditionally used. The proposed SE Tract (Tract 3), with the inclusion of Site A as the location for suspended gear, allows for riparian ingress and egress with potential for longer routes to and from the main channel and the river's east bank (Figure 3). The SE Tract with suspended gear located in Site B would leave ~10 feet at Mean Low Water (MLW) for transit between Gravel Island and the southeast corner of the tract.



Figure 3*

(2) Navigation

The main navigational channel to and from the Bagaduce River’s Northern Bay lies to the east of the NW and SW tracts of the proposed lease site and to the west of the proposed SE Tract. If granted, the NW Tract would sit ~800 feet from the main navigational channel and would be used for the bottom culture of shellfish. The NW Tract would likely have no impact on navigation in the area.

The SW Tract would lie parallel to, often abutting the western boundary of, the main navigational channel but would not extend into the water crucial for navigation at lower tidal stages. Approximately 60 feet would be available for navigation by shallow draft vessels between the proposed northern boundary of the SW Tract and Sparks Island at MLW.

The SE Tract of the proposed lease area sits roughly parallel to, and ~5 feet from (at the closest point), the eastern side of the main navigational channel. The inclusion of suspended gear in Site A within the SE Tract would result in suspended gear close to the main navigational channel (Figure 3). Due to the multiple rocks present in this portion of the channel it is possible that proposed Site A is located in water used by boats navigating in the area. The inclusion of suspended gear in the alternate site, referred to as Site B, within the proposed SE Tract would create a larger buffer between the main navigational channel and suspended aquaculture gear. Suspended gear in Site B would leave ~10 feet at Mean Low Water (MLW) for transit between Gravel Island and the southeast corner of the tract.

If the proposed lease was granted ~800 feet would remain for navigation between the SW and SE Tracts. All three proposed lease tracts are located in shallow water that would not likely be navigated

by most mariners in the area at low tides. Smaller vessels, such as kayaks, that would be suitable for accessing the area at low tide would be able to maneuver around the proposed lease tracts.

(3) Fishing And Other Uses

During the site visit on July 7, 2016 five lobster pot buoys were observed in the vicinity of the lease site. All of these buoys were located in the Bagaduce River channel. None were within the proposed lease site on July 7, 2016. Two green buoys and what appeared to be a lobster pot buoy in the general location of an existing Limited Purpose Aquaculture (REY08) were observed within the proposed SE tract on August 18, 2016 (Figure 2 and Image 4). MDMR staff was unable to tell the purpose of the green buoys.

Scallops (*P. magellanicus*) were observed in the NW Tract of the proposed lease site during the SCUBA survey conducted by DMR on July 7, 2016. They were not observed in commercially exploitable quantities.

Although not seen when conducting the site review, clam and worm harvesters use the intertidal zone in the vicinity of the proposed lease site. The area is also occasionally used by kayakers and other recreational boaters¹.



Image 4: One of two green buoys observed within the proposed SE Tract (August 18, 2016).

¹ Pers. Comm. with Marine Patrol Officer Chasse on 8.9.2016

(4) Other Aquaculture Uses

The names and distances to the DMR leases and Limited Purpose Aquaculture (LPA) licenses nearest the proposal are listed below. Distances were measured, straight-line, in ArcMap 10.2. See Figure 4 for a graphic representation of surrounding aquaculture activities.

Laurence Reynolds, LPA for the suspended culture of shellfish (**REY08**): within Southeast Tract (Tract 3) of proposed lease site and within area proposed for bottom culture on said tract. Laurence Reynolds was contacted and made aware of the proposed lease. Reynolds stated that he has no gear on the LPA site currently but plans to renew his LPA for 2017².

Jesse Leach, LPA for the suspended culture of shellfish (**LEA209**): ~0.99 miles to the south.

Robert Norden, LPA for the suspended culture of shellfish (**NOR207** and **NOR107**): ~1.18 miles to the south and ~1.32 miles to the south, respectively.

Jesse Leach, LPA for the suspended culture of shellfish (**LEA309**): ~1.9 miles to the south.

With the exception of Laurence Reynolds' LPA (REY08), the proposed activities are unlikely to impact existing aquaculture operations in the area.

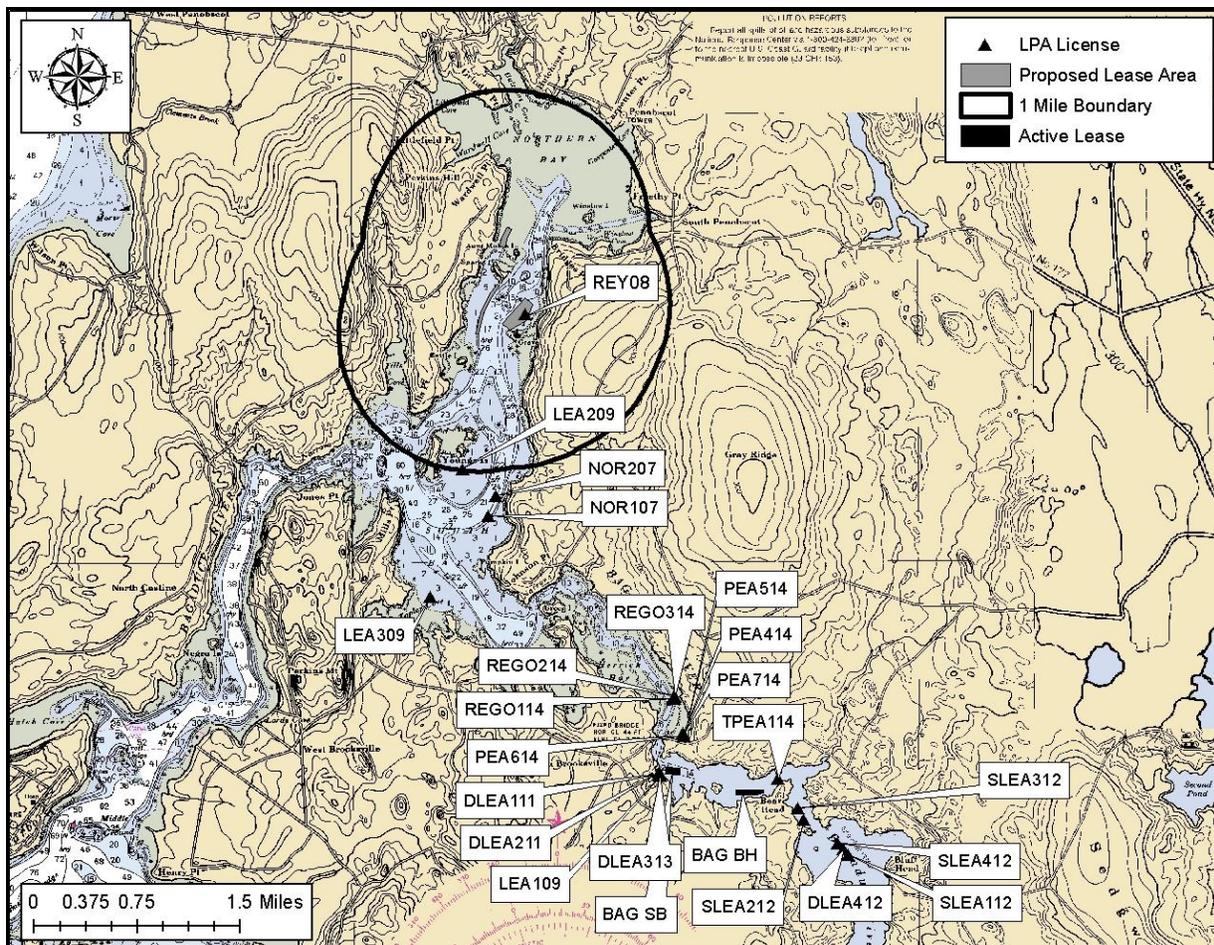


Figure 4*

² Pers. Comm. with L. Reynolds on 9.9.2016

(5) Existing System Support

Flora and fauna from underwater video observations

On July 7, 2016, Maine Department of Marine Resources (MDMR) staff documented the benthic ecology in the proposed lease area with a digital video camera contained in an underwater housing.

The relative abundance of epibenthic macroflora and fauna observed in each video transect is described below.

NW Tract (Tract 1):

Sea lettuce (*Ulva lactuca*) – common
Sugar kelp (*Saccharina latissima*) – abundant in southern 1/3rd of the tract
Bryozoan, Lacy Crust (*Membranipora membranacea*) - common
Smooth cord weed (*Chorda filum*) – common
Rock crab (*Cancer sp.*) – common
Green crab (*Carcinus maenas*) – common
Eelgrass (*Zostera marina*) - rare
Tufted red weed (*Gigartina stellata*) – common
Sea scallop (*Placopecten magellanicus*) – rare
Slipper shell (*Crepidula sp.*) – rare
Blood star (*Henricia sp.*) – common
Rockweed (*Fucus sp.*) – rare
Periwinkle (*Littorina sp.*) – common
Blue mussel (*Mytilus edulis*) – occasional clump
Other Phaeophyta and Rhodophyta - common

SW Tract (Tract 2):

Benthic diatoms – common
Blood star (*Henricia sp.*) – rare
Green crab (*Carcinus maenas*) – common
Asteriid Sea Star (*Asterias sp.*) – rare
Spongomorpha – rare
Frisled anemone (*Metridium senile*) – rare
Polychaete worm egg case (*Phyllodoce*) - rare

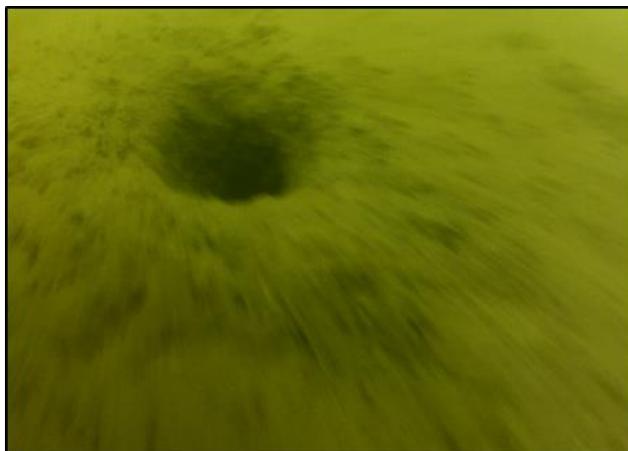
SE Tract (Tract 3):

Smooth cord weed (*Chorda filum*) - common
Sugar kelp (*Saccharina latissima*) - common
Sea lettuce (*Ulva lactuca*) – rare
Eelgrass (*Zostera marina*) – rare
Benthic diatoms – common
Tufted red weed (*Gigartina stelata*) – common
Frisled anemone (*Metridium senile*) - occasional clumps
Green crab (*Carcinus maenas*) – common
Periwinkle (*Littorina sp.*) – common
Hermit Crab (*Pagurus sp.*) – common
Blood star (*Henricia sp.*) – rare
Rockweed (*Fucus sp.*) – rare

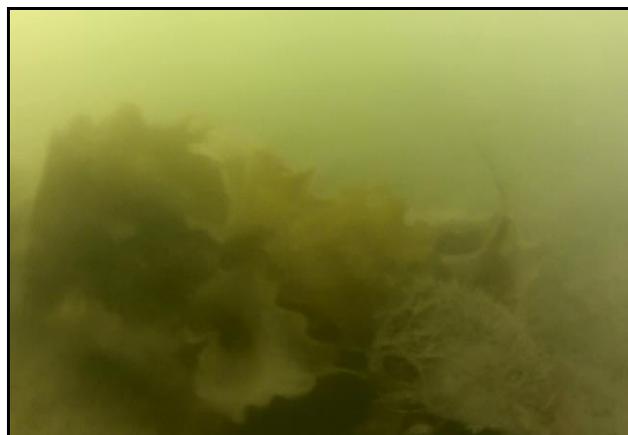
Golden star tunicate (*Botryllus schlosseri*) - rare
Rock crab (*Cancer sp.*) – rare
Slipper shell (*Crepidula sp.*) – rare
Other Phaeophyta and Rhodophyta - common



Images 5 and 6: Underwater screen shots from the NW/Tract 1 transect (sea scallop (*P. magellanicus*) in far left of Image 5).



Images 7 and 8: Underwater screen shots captured from the SW/Tract 2 transect



Images 9 and 10: Underwater screen shots captured from the SE/Tract 3 transect

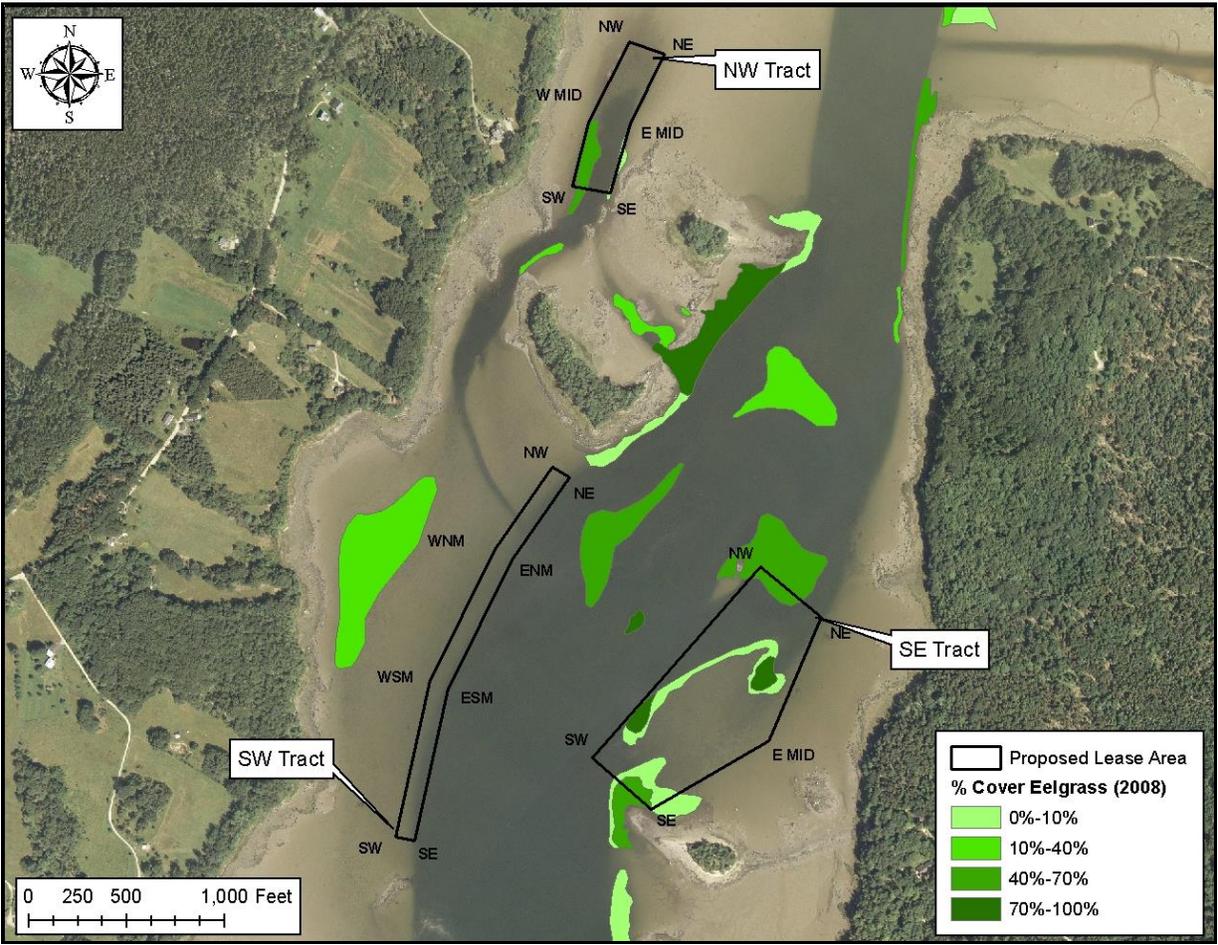


Figure 5: Historical density and distribution of eelgrass (*Zostera marina*) in relation to the proposal.

Eelgrass (*Zostera marina*)

According to data collected by the Maine Department of Marine Resources, there are historical records of eelgrass within the general vicinity of the proposed lease site. In 2008, the Department assessed the proposed NW and SE tracts to contain patches of eelgrass (Figure 5). Eelgrass was seen occasionally during the Department’s site assessment on July 7, 2016 in the proposed NW and SE tracts with an estimated cover of less than 10%.

Wildlife

Both the eastern and western shores of the Bagaduce River in the vicinity of the proposed lease site are classified as Tidal Waterfowl/Wading Bird Habitat by the Maine Department of Inland Fisheries and Wildlife (Figure 6). The proposed SW and SE tracts overlap only a small amount of this wildlife habitat, while the proposed NW tract almost entirely overlaps this habitat type.

During site visits on July 7, 2016, DMR staff observed a bald eagle (*Haliaeetus leucocephalus*) nest on the east side of Aunt Mollie Island. Upon returning to the site on August 18, 2016, a bald eagle was observed flying from Aunt Mollie Island.

Double-crested cormorants (*Phalacrocorax auritus*), herring gulls (*Larus argentatus*), and a species of yellowlegs (*Totanus sp.*) were observed loafing on rocks nearby the proposed tracts on July 7, 2016 and/or August 18, 2016 (Image 11). Common terns (*Sterna hirundo*) and Bonaparte’s gulls (*Larus*

philadelphia) were also seen in the area. Additionally, a harbor seal (*Phoca vitulina*) was seen swimming in the vicinity of the proposed lease site on both dates.

A statement made by Brad Allen, a Maine Department of Inland Fisheries and Wildlife (MDIFW) bird biologist present on MDMR's August 18, 2016 site visit, is included below:

“...one late summer trip during that time of year obviously does not capture the potential value of this area during bird migration or wintering periods. Our records indicate that Northern Bay in its present condition does not get the shorebird use I would predict based on the large acreage of mudflats. That said, we did however observe a small group of yellowlegs (spp.), some of the earlier migrating shorebirds through Maine. Northern Bay does however have a long history as an important area to migrating geese and American black ducks. I have been an aerial observer in an airplane during our midwinter waterfowl survey (conducted in January) for many of the past 25 years and I have observed significant numbers of waterfowl in the Bay in the past...I've also seen it totally iced over with no birds in the area. For reasons beyond my knowledge, I do not know why this area doesn't support the waterfowl it used to. I suspect the issue has something to do with habitat quality. In more contemporary times, I believe the specific area we looked at (south of the mudflats) would be more attractive to wintering diving ducks such as common goldeneyes, buffleheads, ad mergansers, all species we would not observe in August because they haven't migrated here from the north by then.

I was also interested in seeing the roosting gulls and cormorants on that spit of cobble on the island on the eastern shore. That really doesn't look like a normal roost to me except when birds cannot roost on other available structure(s). It is really easy for me to predict that any floating structures in that immediate area are going to receive significant use as a roost site for seabirds. I hope that you or the potential lease holder have a plan for that, other than lethal removal of roosting birds. This roosting will happen, in my opinion, as we have seen birds use similar structure in other areas of the coast³.”

³ Pers. Comm. with MDIFW Bird Biologist Brad Allen on 9.9.2016



Figure 6: Tidal Waterfowl/Wading Bird Habitat in vicinity of proposed lease area



Image 11: Seabirds roosting on the western side of Gravel Island

(6) Interference with Public Facilities

There are no publicly owned facilities within 1,000 feet of the proposed lease.

(7) Lighting

The applicant states that “there would be no lights on the proposed lease.”

(8) Noise

The applicant has proposed using a 21’ Carolina Skiff or similar boats, a pontoon boat, a power washer (or similar machinery) powered by a gasoline engine, a gasoline engine/hydraulic pump to power a mechanical grader, a winch, and an electric hauler. Boats would be powered by 4 stroke engines for noise and emission mitigation and would be shut off for long periods of time when tending nursery bags. Gasoline engines would be covered, employ a water exhaust system, or have the best available muffler system to mitigate noise. The applicant proposes to use the mechanical grader roughly 8-10 hours per week and approximates that the power washer (or similar machinery) would be used 5-8 hours every 7-14 day period. The applicant outlines his limited use of the other machinery in his application and plans to work only during the daylight hours.

(9) Visual Impact

The applicant has proposed utilizing Tract 1 and a portion of Tract 3 for the bottom culture of American oysters. The visual impacts of bottom culture operations would be minimal.

The applicant has also proposed utilizing a maximum of 32 strings of floating oyster bags on Tract 2 and 40 strings of the same gear on Tract 3. Each string would be 8’WX150’L and would contain 150 polyethylene oyster bags suspended at the ocean surface (16”LX4”HX30”W). Each oyster bag would be supported by two 3”WX30”L polyethylene floats. Oyster bags and floats would be black in color.

The proposed lease contains no plans for structures.

(10) Water Quality Classification

The proposed lease is in an area currently classified by the Department of Marine Resources Water Quality Classification program as “open/approved for the harvest of shellfish”.