Coastal Wetland Habitat Functions & Values Assessment Report

Maine Department of Transportation
Offshore Wind Port and Wind Turbine
Launch Site, Sears Island

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Prepared for:

Maine Department of Transportation
16 State House Station
24 Child Street
Augusta, ME 04333

Prepared by:

Stantec Consulting Services Inc.
30 Park Drive
Topsham, ME 04086

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1.0 INTRODUCTION AND PROJECT OVERVIEW

The Maine Department of Transportation (MaineDOT) is evaluating a location on the western shoreline of Sears Island in Searsport, Maine for a proposed Offshore Wind Port and Wind Turbine Launch Site (Project) (Figure 1). The Project is currently in the conceptual design phase. Figure 1 represents the preliminary design and potential impacts, including approximate placement of fill, and pier structures in intertidal and subtidal areas (Project Area). Since actual impact areas are still being determined, a 200-foot buffer around proposed impacts (Survey Area) were included as part of this assessment. This report by Stantec Consulting Services Inc. (Stantec) contains an assessment of the functions and values of the coastal wetland habitats to support permitting of the proposed the Project within Searsport Harbor in Searsport, Maine.

The total direct impact to intertidal and subtidal coastal wetlands based on the June 2023 Project conceptual design at Sears Island requires approximately 25 acres of filling of intertidal and subtidal habitat for a sheet pile in-fill pier and construction of a heavy lift wharf over approximately 5 acres of subtidal habitat (Figure 1). These intertidal and subtidal wetlands are regulated under the Maine Natural Resources Protection Act (NRPA) administered by the Maine Department of Environmental Protection (MEDEP) and the federal Clean Water Act (CWA) administered by the US Army Corps of Engineers (USACE). As part of the NRPA/CWA permit process, an assessment is required to evaluate how the proposed alterations will affect the functions and values of existing coastal wetlands.

Stantec's assessment is based on coastal wetland descriptions and sampling and assessment protocols outlined in MEDEP's coastal wetland assessment guidelines (Ward 1999 a,b), modified and adapted to include both intertidal and subtidal coastal wetlands.

1.1 SITE DESCRIPTION

Searsport Harbor is a deep water port located west of the confluence of the Penobscot River and Penobscot Bay in Waldo County, Maine. The boundaries of Searsport Harbor are defined as beginning at the southernmost point of land on Kidder Point and running southerly along the western shore of Sears Island to the southernmost point of Sears Island, then running due west to the shore of Mack Point. The Mack Point Terminal is located on the northern end of the harbor, approximately a half mile northwest of the Project Area. That terminal is used principally for the receipt of petroleum products and salt, and the export of lumber, paper, and much of Aroostook County's annual potato crop.

Searsport harbor is a sheltered anchorage, covering an area of roughly 2 by 3 miles, with a federally regulated navigation channel controlling depth of 35 feet at mean low water and an average tidal fluctuation of 10 feet. The Searsport Harbor Navigation Project completed in 1964, consists of an access channel, 35 feet deep and 500 feet wide, west of Sears Island; and a 35-foot-deep turning basin extending from the end of the access channel to the piers at Mack Point. The turning basin has a maximum width of 1,500 feet.

Searsport Harbor is classified by MEDEP as "SC". SC waters shall be satisfactory for recreation in and on the water, fishing, aquaculture, propagation and restricted harvesting of shellfish, industrial process and

cooling water supply, hydroelectric power generation, navigation and as a habitat for fish and other estuarine and marine life.

2.0 SURVEY METHODS

The assessment described in this report is based on the sampling and assessment protocols outlined in MDEP's coastal wetland assessment guidelines (Ward 1999a), modified and adapted for intertidal and subtidal wetlands where applicable. Substrate types were described and mapped per Ward (1999a) definitions but were also further described by dominate substrate types within each defined type. Stantec marine biologists conducted field surveys including visual observations of field conditions (e.g., habitat type and faunal assemblages), quantitative quadrat sampling in the intertidal, collection of underwater video footage, a side-scan sonar survey, sediment grabs, eelgrass (*Zostera marina*) survey, and an American lobster (*Homarus americanus*) and green sea urchin (*Strongylocentrotus droebachiensis*) survey. Separate field memos have been prepared for the eelgrass survey (Stantec 2024a), the lobster and urchin survey (Stantec 2024b), and the side-scan sonar survey (SAMC 2023).

Stantec also completed a survey of potential sand dune habitat in a depositional area south of the jetty on site. Coastal sand dune geology data available from the Maine Geological Survey (MGS) identified a portion of the site adjacent to an existing jetty as coastal sand dune, containing both frontal and back dune areas. On December 22, 2023, Stantec conducted a field survey to characterize the existing conditions of the MGS-mapped dune area (Stantec 2024c).

2.1 INTERTIDAL HABITATS

The flora and fauna inhabiting the shoreline zone (intertidal) were characterized through visual observations in the field on September 18, 2023. Initially, the intertidal habitat was mapped by sketching the locations of high, mid, and low intertidal and shallow subtidal areas; differing substrate types; and areas of varying energy levels. The boulder and cobble substrates were surveyed by searching for fauna under rocks, boulders, and other debris. A shovel was used to turn over silty and sandy substrates for fauna observations. Observations of species composition, abundance, and distribution were recorded. Surveys were conducted during low tide conditions so the maximum extent of the intertidal area could be observed. A handheld GPS was used to capture locations of exemplary, unique, or representative habitats or communities. Field characterization efforts also included a meander survey for presence of eelgrass within the intertidal zone.

Following initial observations during the qualitative survey, a quantitative quadrat survey was conducted in the Survey Area. The Survey Area and quadrats are depicted on Figure 2. The marine flora and fauna inhabiting the upper, middle, and lower tidal zones within the quantitative survey areas were characterized using a 0.25-meter^2 quadrat placed at random points. Quadrats were randomly placed by tossing them into the target tidal zone (Ward 1999a). A total of 10 quadrats were characterized from the three tidal zones (30 quadrats total). Sediments within the quadrat were excavated to a depth of 10 centimeters. At each quadrat location, the substrate types (e.g., boulder, cobble, rip rap, vegetation) and representative flora and macrofauna were characterized. Macrofauna and flora observed within the

quadrat were identified and categorized as to relative abundance (i.e., occasional, common, abundant) within the quadrat per the Ward (1999a) guidance.

Organisms that were not identifiable in the field were collected, preserved (in ethanol), and identified at by Haley and Ward, a qualified Maine taxonomic laboratory. Organisms were identified to the lowest extent practicable; where possible, classification was taken to the species level. Data collected during the intertidal survey was assessed to allow characterization of the dominant flora and fauna species and the relative abundance within the tidal zones of the Survey Area.

2.2 SUBTIDAL BENTHIC HABITATS

Subtidal habitats were characterized based on methods adapted from Ward (1999a), which include documenting substrate types, taking representative photographs, and completing a flora and fauna species list. The subtidal survey area was evaluated qualitatively with the addition of sediment grabs for quantitative infaunal analysis. Divers surveyed subtidal areas and collected underwater video. A side-scan sonar survey of the Survey Area was also completed to map substrate types. The following habitat and species surveys were completed and contribute to this Coastal Functions and Values Report:

- On August 23 and 24, 2022, Stantec completed dive surveys to map eelgrass, substrate types, and associated benthic habitats. This survey was completed using SCUBA and include additional benthic observations and underwater video of the Sears Island Survey Area as of August 2022 (Stantec 2024a).
- On September 20, 2023, Stantec completed dive surveys to map eelgrass, substrate types, and associated benthic habitats in an expanded survey area at Sears Island. This survey was completed using SCUBA and include additional benthic observations and underwater video at the alternative Mack Point Project Area (Stantec 2024a).
- On October 25 and 26, 2023, Steele Associates Marine Consultants, LLC. (SAMC) completed a side-scan sonar survey of the subtidal Sears Island Survey Area. Side-scan sonar transects were performed at 75-foot intervals oriented parallel to the shoreline (SAMC 2023).
- On December 6 and 7, 2023, Stantec completed dive surveys to estimate the density of American lobsters and green sea urchins present in the Sears Island Survey Area. This survey was completed using SCUBA and includes benthic observations and underwater video of the Sears Island Survey Area (Stantec 2024b).
- An additional underwater video survey is scheduled in spring 2024 to be conducted by SAMC. SAMC will use a remotely operated vehicle to collect underwater video along transects within the substrate types identified on the side-scan survey (SAMC 2023). These videos will be used to further characterize the substrate in these areas and document flora and fauna. This report will be updated when this video survey data has been analyzed.

2.3 BENTHIC INFAUNA

Subtidal areas in the Survey Area were characterized by collection of shallow sediment samples for analysis of macroinvertebrate communities. Samples were collected using a Ponar® grab sampler.

Subtidal benthic grab sample locations were determined in the field and are shown on Figure 2. Five benthic sediment samples were collected in the Survey Area. Upon retrieval, grab samples were visually inspected, photographed, and general observations of sediment texture, odor, and color were recorded. Sediments were sieved through a 500 µm mesh, sieved contents preserved in ethanol, and delivered to Haley and Ward for taxonomic analysis.

3.0 SURVEY RESULTS

The results of Stantec's functions and values field evaluation are provided below. In addition, the MEDEP Intertidal and Shallow Subtidal Field Survey Checklist required for NRPA permit applications is included as Appendix A. This checklist was developed by MEDEP for intertidal and shallow subtidal habitats; consequently, not all data fields are applicable to the subtidal areas within the Project Area.

3.1 COASTAL SAND DUNE

The Project Area includes a small coastal sand dune system on the south side of an existing jetty (Stantec 2023c). The site includes a sloping sand and gravel beach beginning at the approximate mean low water elevation and extending landward to the approximate high tide limit, which was identified by field characteristics including a prominent wrack line. Landward of the high tide limit, a narrow dune berm (approximately 20 to 25 feet wide) consisting predominantly of medium- to fine-grained slopes gently upward to a low frontal dune ridge. The dune berm is subject to occasional tidal inundation during extreme high tide and storm events as evidence by a scattering of wrack material (primarily seaweed) along the berm. The frontal dune consists of a very narrow (approximately 15 feet wide) and sparsely vegetated coarse sand and gravel ridge. The top of the ridge has large accumulations of coarse woody debris and wrack that has accumulated during extreme high tide and storm events. Based on the field observations, the sand dune system observed at the Sears Island site meets the NRPA definition of a coastal sand dune. This sand dune system has been created by placement of the jetty at the site and accumulation of sand south of the jetty.

3.2 INTERTIDAL HABITATS

The intertidal field surveys were completed on September 18, 2023. A complete species list for each tidal zone at the Sears Island Survey Area is presented in Appendix B. Representative photographs of intertidal and shallow subtidal areas area presented in Appendix C. Photographs of the quadrat survey locations for Sears Island are provided in Appendix D. The locations of approximate quadrat sampling locations are provided on Figure 2. Underwater videos are available upon request.

The Sears Island intertidal survey area extends approximately 2,000 feet north and south of the granite jetty onsite (Figure 2). The jetty has created a depositional area with a sand flat consisting of coarse sand and gravel to the south along a shoreline otherwise dominated by mixed coarse and fines habitat type (Appendix D: Photo 1 and 2). The adjacent upland is a mix of forested upland and wetland habitat, and several seeps drain into the high intertidal from these adjacent wetlands (Appendix D: Photos 3 and 4). The adjacent upland bank is steep and eroding in some locations (Appendix D: Photo 5). South of the jetty the high intertidal below the mean high water (MHW) line is characterized by mixed coarse and fines

(cobble and gravel with scattered coarse sand and boulders) (Appendix D: Photo 6). Spiral rockweed (*Fucus spiralis*) is common in this area. Between the MHW line and the upland bank the substrate is primarily mixed coarse and fines (coarse sand and gravel with scattered cobble and boulders) (Appendix D: Photo 7). North of the jetty the high intertidal is primarily mixed coarse and fines (cobble, gravel, and coarse sand with scattered boulders) (Appendix D: Photo 8; Figure 3).

The mid intertidal substrate at Sears Island is primarily mixed coarse and fines (cobble and gravel dominated with areas of sand/silt and scattered boulders in the upper mid intertidal). Mixed coarse and fines, boulder and cobble with scattered gravel, sand, and silt dominate the lower portions of the mid intertidal (Appendix D: Photos 9). Macroalgae is abundant in these substrate types and consists of knotted wrack (*Ascophyllum nodosum*) and rockweed (*Fucus vesiculosus*). Just south of the jetty, the substrate in the mid intertidal is primarily mixed coarse and fines (coarse sand and gravel) (Appendix D: Photo 10). Macroalgae is scattered in this finer grained substrate (Appendix D: Photo 11). Several areas of finer sediments are present within the dominant coarser grained areas, mostly associated with areas of freshwater discharge from the adjacent upland. Soft-shell clams (*Mya arenaria*) were common within this finer grained substrate (Appendix D: Photo 12). Excavation of survey quadrats revealed marine clay approximately 4 inches below the sediment surface in some areas. The boulders and cobble in this tidal zone are mostly embedded in the gravel, sand, and silt (Appendix D: Photo 13) (Figure 3).

The low intertidal at Sears Island is dominated by mixed coarse and fines, boulder, and cobble and abundant macroalgae (knotted wrack and rockweed) (Appendix D: Photo 14). Excavation of survey quadrats revealed marine clay approximately 4 inches below the sediment surface in some areas. The boulders and cobble in this tidal zone are mostly embedded in the gravel, sand, and silt (Figure 3).

3.3 SUBTIDAL BENTHIC HABITATS

3.3.1 Diver Based Observations

Subtidal habitats were surveyed using SCUBA during the eelgrass and lobster and urchin surveys (Stantec 2024a,b). The mixed coarse substrate consisting of boulder and cobble observed in the low intertidal extends into the subtidal to around -10 feet mean lower low water (MLLW) before grading to unconsolidated sediments consisting of sandy silt in deeper water. Green sea urchins are abundant in the subtidal zone on hard substrate and have grazed most macroalgae off the cobble and boulders (Appendix C: Photos 15 and 16; Stantec 2024b). Crustose coralline algae (*Corallinales*) is common on these hard surfaces (Appendix C: Photo 17). Green crabs (*Carcinus maenas*) were common in this substrate type and American lobsters were occasional during September 2023 dive surveys (Appendix C: Photos 18 and 19). No lobsters were observed in the subtidal during the December 7, 2023, survey. Divers observed lobster burrows that were not visibly occupied during the survey (Stantec 2024b).

Stantec completed eelgrass surveys on August 22 and 23, 2022, and September 20, 2023. No eelgrass was observed in the Survey Area, including in areas previously mapped with eelgrass in 2010 by the Maine Department of Marine Resources (MDMR) (Stantec 2024a).

Table 1 below summarizes the subtidal species observed during these field surveys and their associated abundance, per Ward (1999a).

Table 1. Subtidal Species List, Sears Island, 2023.

Common Name	Scientific Name	Site Abundance
Acadian hermit crab	*Pagurus acadianus*	C
American lobster	*Homarus americanus*	O
Amphipod	*Gammarus species*	O
Atlantic herring	*Clupea harengus*	O
Blue mussel	*Mytilus edulis*	O
Brown filamentous algae	*Ectocarpus* spp.	O
Burrowing anemone	*Ceriantheopsis austroafricanus*	O
Common periwinkle	*Littorina littorea*	A
Crustose coralline algae	*Corallinales*	A
Cunner	*Tautogolabrus adspersus*	O
Encrusting bryozoan	*Membranipora membranacea*	C
False Irish moss	*Mastocarpus stellatus*	O
Finger sponge	*Haliclona oculate*	O
Fourspine stickleback	*Apeltes quadracus*	C
Green crab	*Carcinus maenas*	C
Green sea urchin	*Strongylocentrotus droebachiensis*	A
Gutweed	*Ulva intestinalis*	O
Mummichog	*Fundulus heteroclitus*	O
Mysid shrimp	*Americamysis bahia*	O
Northern rock barnacle	*Semibalanus balanoides*	A
Pipefish	*Syngnathus fuscus*	O
Rock crab	*Cancer irroratus*	O
Rock gunnel	*Pholis gunnellus*	O
Sand shrimp	*Crangon septemspinosa*	O
Sand dollar	*Echinarachnius parma*	C
Sea scallop	*Placopecten magellanicus*	O
Sea star	*Asterias rubens*	C
Sea vase	*Ciona intestinalis*	O
Spirobus worm	*Spiroribis borealis*	O
Unidentified brown filamentous algae		C
Unidentified encrusting black tunicate		O
Unidentified globular sponges		O
Winter Flounder	*Pseudopleuronectes americanus*	O

Notes: A- Abundant; C- Common; O- Occasional

3.3.2 Steele Associates Marine Consultants, LLC. Side-Scan Sonar Survey Results

Figure 4 presents subtidal substrate mapping based on a side-scan sonar survey completed by SAMC (SAMC 2023). The substrate in the shallow subtidal is primarily mixed coarse and fines consisting of boulder and cobble interspersed with silty sands. This rocky substrate extends into the subtidal to approximately -10 feet MLLW before grading to unconsolidated sediments consisting of silty sands in deeper water. Beyond -10 feet MLLW, the benthic substrates in the Survey Area were unconsolidated sediments consisting of mud and silty sands. An area in the central portion of the Survey Area was identified has being primarily sand, gravel or shell hash based high backscatter received during the side-scan sonar survey (Figure 4). The substrate designations within these areas identified with side-scan will be further refined after the spring 2024 underwater video survey.

3.3.3 Benthic Infauna

On September 18, 2023, Stantec collected five grab samples from subtidal areas with unconsolidated sediments (Figure 2). The sediments in the five grab samples consisted of olive silt and fine sand (Appendix D: Photos 20–24). Macroinvertebrate samples from the sediment grabs were sent for sorting, enumeration, and speciation to Haley Ward, which is a qualified Maine taxonomic laboratory. Identified species, total number of individuals, individuals per meter squared, species richness (number of species), species evenness (a description of the relative abundance across species in a sample), Shannon-Weiner Index, and functional groups present for each sample per the methods in Ward (1999a) are presented in Appendix E.

3.4 FUNCTIONS AND VALUES

The Sears Island Project Area is part of the larger Searsport Harbor and Penobscot Bay, which supports a range of fish, shellfish, and wildlife habitat, as well as commercial and industrial uses. The Sears Island site consists of approximately of 242 acres of undeveloped upland owned by MaineDOT, with approximately 9,000 linear feet of undeveloped water frontage. Water depths at Sears Island range from the intertidal to approximately -56 feet MLLW. The Project will impact approximately 25 acres of intertidal and subtidal habitat for a sheet pile in-fill pier and construction of a heavy lift wharf over approximately 5 acres of subtidal habitat (Figure 1).

The surveyed intertidal areas are primarily mixed coarse and fine substrates with scattered boulders and cobbles (Figure 3). Dense macroalgae community dominated by knotted wrack and rockweed is present in the mid and low intertidal zones on hard substrate. In addition to the mixed coarse and fines substrate type, just to the south of the onsite granite jetty at Sears Island depositional area has been created with coarse sand and gravel. A small area of coastal sand dune is present in this area as a result of this deposition. Shallow subtidal substrates are dominated by mixed coarse and fines with boulders and cobbles, similar to the substrates observed in the low intertidal. In the deeper portions of the subtidal habitat the benthic substrate is unconsolidated sediments, primarily sandy silt and mud (Figure 4).

The multiple substrate types in the intertidal and subtidal within the Survey Area support a range of functions and values for invertebrates, fish, and wildlife. The dense cover of algae in the mid and low

intertidal on boulders and larger cobble and the boulders and cobble in the subtidal provides structured habitat for a variety of marine species. The sandy silt subtidal flats support marine worms, shellfish, and crustaceans and provide potential food sources for multiple functional groups. These habitat types are common in Penobscot Bay and along the Maine coast. The assessment narratives and the responses contained in Table 2 below address the primary MEDEP coastal wetland functions and values identified in the Ward (1999a) guidelines.

Table 2. Responses to MEDEP Qualifiers to Functions and Values.

Questions	Responses
Function/Value: Wildlife	
Subheading: Diversity and Productivity	
What is the marine diversity and abundance of the site? Does the site have a high or low density of vegetation? Does the intertidal or subtidal area have a high or low number of species?	The mix of substrate types in the intertidal and subtidal supports a diversity of marine species. Species such as the green sea urchin and crustose coralline algae on subtidal boulder and cobble habitat and knotted wrack, and northern rock barnacle in the intertidal are abundant (Table 1 and Appendix C). Invasive green crabs were also abundant at some intertidal sampling locations. Subtidal core locations for infauna indicated a species assemblage typical to soft-bottom substrates (Appendix E). The substrate types in the Survey Area are found throughout Searsport Harbor and the larger Penobscot Bay and the marine diversity and abundance within the Survey Area is typical of these habitats in mid-coast Maine. No eelgrass beds were documented during the field surveys within the Survey Area. The mid and low intertidal contain dense knotted wrack on boulder and larger cobble substrates. Green urchin browsing in the subtidal has limited grown of most algae besides crustose coralline.
Does the habitat at the site have the potential to contain a high population of benthic and epibenthic invertebrates?	Invertebrates were relatively common on intertidal and subtidal hard substrates as documented in Table 1 and Appendix C. The high rate of embeddedness of cobble and boulders into the sandy silt substrate limits habitat below this rocky substate for species such as lobsters and crabs. In the deeper subtidal portions of the Survey Area finer grained substrate types and presence of green crab likely limits some benthic and epibenthic invertebrates.
Does the coastal area support prey for higher trophic levels?	The Survey Area contains annelid worms, mollusks, crustaceans, and forage fish, all of which are potential prey for fish or wildlife at higher trophic levels.

Questions	Responses
Does the site have a high abundance of predators (fish, mammals, birds) or the potential to contain a high population of predators?	Several observations of predators were made during site visits, including bald eagles (*Haliaeetus leucocephalus*), great blue herons (*Ardea herodias*), common loons (*Gavia immer),* double crested cormorants (*Phalacrocorax auritus*), and eider ducks (*Somateria mollissima*). No seals or harbor porpoises were observed during the site visits, but harbor seals (*Phoca vitulina*), gray seals (*Halichoerus grypus*), and harbor porpoise (*Phocoena phocoena*) are likely occasionally present in the Survey Area. Predatory fish species observed during the site dive surveys included cunner (*Tautogolabrus adsperus*) and winter flounder (*Pseudopleronectes americanus*). Though not observed during dive surveys, other predatory fish species such as striped bass (*Morone saxatilis*), pollack (*Pollachius pollachius*), and Atlantic mackerel (*Scomber scombrus*) are likely seasonally present. The habitats present within the Survey Area are not anticipated to have higher abundance of predators than other similar habitats in Penobscot Bay.
Are deposits of unnatural sediments present (e.g., sawdust, wood chips)? How does this affect the wildlife functions and values?	No unnatural sediments were observed. The intertidal sediments were primarily mixed coarse fines (coarse sand, gravel, and cobble substrate with boulders). Shallow subtidal sediments were a continuation of the mixed coarse and fines present in the intertidal. Deeper subtidal sediments were primarily composed of sandy silt.
<u>Sub-heading: Sensitivity</u>	
Are there sensitive species (e.g., brittle stars, sea spiders, nudibranchs) present?	No sensitive species were observed during field surveys.
<u>Sub-heading: Seasonality</u>	
What species temporally utilize the habitat or adjacent waters for feeding or resting at different times of the year (i.e., winter habitat for lobsters, resting areas for sturgeon)?	During the warmer months of summer and fall, fish species such as juvenile Atlantic herring (*Clupea harengus*), Atlantic mackerel and striped bass are likely present in the Survey Area. American lobster is also expected to be present at higher abundance during the summer and fall. Occasional lobster buoys/gear were observed within the subtidal Survey Area during the September 2023 surveys. With seasonal movements/migrations and lack of refuge in winter months, these species are not likely to be present in the colder months.
Is it a spawning area for fish or a breeding area for birds or other wildlife?	The Survey Area is not a documented spawning area for fish, breeding birds, or wildlife (seals). Potential spawning habitat is present for commercially important species including, winter flounder and windowpane flounder (*Scophthalmus aquosus*), but this habitat is also present throughout Penobscot Bay.

Questions	Responses
Is it a nursery area for invertebrates (especially lobsters, urchins, clams), fish or birds?	The Survey Area contains habitats and substrate types suitable for larval and juvenile invertebrate and fish species, but this habitat is also present throughout Penobscot Bay. Eelgrass beds are absent and structured algae cover is limited to the intertidal and shallow subtidal zones, limiting these habitat types as nursery areas. • The cobble and boulder habitat in the low intertidal and shallow subtidal is suitable substrate type for American lobster settlement and juvenile life stages. The high rate of embeddedness of cobble and boulders in the finer substrates below does limit this function. • The cobble and boulder habitat in the subtidal is suitable habitat for green urchin settlement and juvenile growth as indicated by the high abundance of green urchins within this habitat type. • The finer sediments in the intertidal interspersed with the cobble and boulders are suitable settlement substrates for larval soft-shell clams and juvenile growth. MDMR also maps Atlantic surf clam (*Spisula solidissima*) habitat in the subtidal within the Survey Area[1]. • The silty sand and mud substrates in the subtidal are suitable substrates for winter flounder spawning/eggs and juvenile winter and windowpane flounder. • The very small dune habitat created by the jetty is not anticipated to support nesting shorebird species such as the piping plover (*Charadrius melodus*).
<u>Sub-heading: Wildlife Use</u>	
Is it a travel corridor for fish, birds, or mammals?	The Survey Area is located in the upper reach of Penobscot Bay and is not anticipated to be primary travel corridor for fish, birds, or mammals. Several diadromous fish species and American eel (*Anguilla rostrata*) may be present in the vicinity of the Survey Area during spawning migrations, but the Survey Area is located outside the main channel of the Penobscot River estuary where most species movement is occurring. Foraging migratory shorebirds are likely present in the intertidal during the spring and fall, but there are more suitable foraging habitats associated with mud and sand flats elsewhere in Penobscot Bay.

[1] https://webapps2.cgis-solutions.com/beginningwithhabitat/mapviewer/

Questions	Responses
Are there signs of use by birds or mammals (tracks, prints, scat, and direct observations)? If birds or mammals are present, could the potential development deter wildlife from continuing to use the area or adjacent regions?	Observations of several bird species were made during site visits, including bald eagles, great blue herons, common loons, double crested cormorants, and eider ducks and these species likely forage in the Survey Area. Following the construction of an Offshore Wind Port and Wind Turbine Launch Site this use would be lost for areas of intertidal and subtidal fill and diminished in the area of wharf development. The structure of the wharf and attached epifauna will provide some foraging opportunities for species such as eider ducks and double crested cormorants.
Is it a known feeding ground, roosting site, resting area, critical migratory pathway, or wintering ground for migratory or resident birds, fish, or mammals? If so, could the potential development interfere with one or more of these functions?	The Maine Department of Inland Fisheries and Wildlife (MDIFW) has identified and rated Tidal Waterfowl and Wading Bird Habitat (TWWH) in certain areas along the coast as high or moderate value to waterfowl and wading birds. The area south of the jetty in and adjacent to the Project Area was mapped TWWH based on the historically mapped eelgrass in this area.[1] As documented in the eelgrass survey memo (Stantec 2023), eelgrass in no longer present in this area. Some foraging by resident and migratory fish, birds, and seals likely occurs within the Survey Area currently, but the habitats present are common throughout this portion of Penobscot Bay. Following the construction of an Offshore Wind Port and Wind Turbine Launch Site this function would be lost for areas of intertidal and subtidal fill and diminished in the area of wharf development.
Does the habitat contain critical habitat for endangered or threatened species?	No critical habitat for federally threatened or endangered species has been designated within the Survey Area.
Function/Value: Recreational, Commercial, and Educational Values	
<u>Sub-heading: Recreational and Commercial</u>	
Is it an open clamming, fishing (recreational and/or commercial), algae harvesting, or hunting area? If so, is the town managing the flats?	The Survey Area is closed to shellfish harvest. Because of pollution, it is unlawful to dig, take or possess any clams, quahogs, oysters, mussels or whole or roe-on scallops from this area.[2] While soft-shell clams were observed to be common in the mid-intertidal, the rocky substrates make future commercial harvest unlikely due to the difficulty in digging. MDMR does map shellfish beds (soft-shell clam and Atlantic surf clam within the Survey Area.[3] The Survey Area is potentially open to algae harvest with abundant macroalgae in the intertidal, but there was no indication of this harvest during the field surveys. The Survey Area and Sears Island is currently open to hunting during regulated hunting seasons, but the Survey Area lacks waterfowl concentration areas that would make the site attractive to duck hunters.
Does the coastal wetland have any seeded clam flats or does it contain shellfish (e.g., oysters, mussels, clams) or finfish aquaculture sites?	There are no seeded clam flats or shellfish/finfish aquaculture sites in the Survey Area.

Questions	Responses
Is there public access and/or boat access?	The Survey Area is accessible by boat and has limited access from the shore, as access to Sears Island is limited to pedestrians and bikes. Following construction, the portion of Sear Island proposed for development would be restricted due to the industrial nature of the Offshore Wind Port and Wind Turbine Launch Site. The remaining approximately 600 acres of Sears Island would remain public land open to recreational activities.
Is it located near highly populated areas?	The Survey Area is located in mid-coast Maine and is not in a highly populated area.
Sub-heading: Educational	
Do school groups use the area for educational purposes?	Uknown. The limited accessibility of the Survey Area does not make it easily accessible for educational purposes.
Are there research sites or monitoring sites present?	No known research or monitoring sites are present within the Survey Area.

[1] https://webapps2.cgis-solutions.com/beginningwithhabitat/mapviewer/

[2] https://www.maine.gov/dmr/fisheries/shellfish/shellfish-closures-and-aquaculture-leases-map

[3] https://webapps2.cgis-solutions.com/beginningwithhabitat/mapviewer/

The construction of the proposed Offshore Wind Port and Wind Turbine Launch Site will result in a permanent loss of the coastal wetlands, associated benthic community, and associated coastal functions and values within areas of intertidal and subtidal fill. Coastal wetland functions and values will be diminished in the area of wharf development. The coastal wetlands present in the Project Area are not unique to this site; similar substrate and habitat types exist throughout Penobscot Bay. The intertidal and subtidal habitats discussed in this report are regulated under the Maine NRPA administered by the MEDEP and the federal CWA administered by the USACE. As part of the NRPA/CWA permit process, mitigation for the loss of the functions and values of existing coastal wetlands will need to be addressed through consultation MDMR, NOAA Fisheries, MEDEP and USACE.

4.0 REFERENCES

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Stantec. 2024c. Proposed Sears Island Offshore Wind Terminal Sand Dune Characterization Memo. April 2024.

Steele Associates Marine Consultants, LLC. (SAMC). 2023. Hydrographic and Marine Geophysical Site Characterization Surveys, Mack Point and Sears Island.

Ward, A.E. 1999a. Maine's coastal wetlands: recommended functional assessment guidelines, Volume II. Maine Department of Environmental Protection, Bureau of Land & Water Quality, Division of Environmental Assessment. Augusta, Maine.

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FIGURES

Legend

- 200 ft Buffer
- Potential Intertidal and Subtidal Project Footprint
- Uplands (77 acres)
- Uplands Infill (25 acres)
- Heavy Lift Wharf (5acres)
- Transportation Parcel (242 acres)

0 1,000 Feet

(At original document size of 8.5x11)
1" = 1,000'

N

Notes

1. Coordinate System: NAD 1983 StatePlane Maine East FIPS 1801 Feet
2. Vertical Datum: Mean Lower Low Water (MLLW).
3. Data Sources: Conceptual Design from Moffit and Nichol, June 2023.
4. Background: Maine Orthoimagery Regional, 2015

Stantec

Project Location
Searsport, Maine

Prepared by PWB on 2024-04-11
TR Review by KWH on 2024-04-11
IR Review by PS on 2024-04-11

Client/Project
195602718
Maine Department of Transportation

Figure No.
1

Title
Sears Island Conceptual Design

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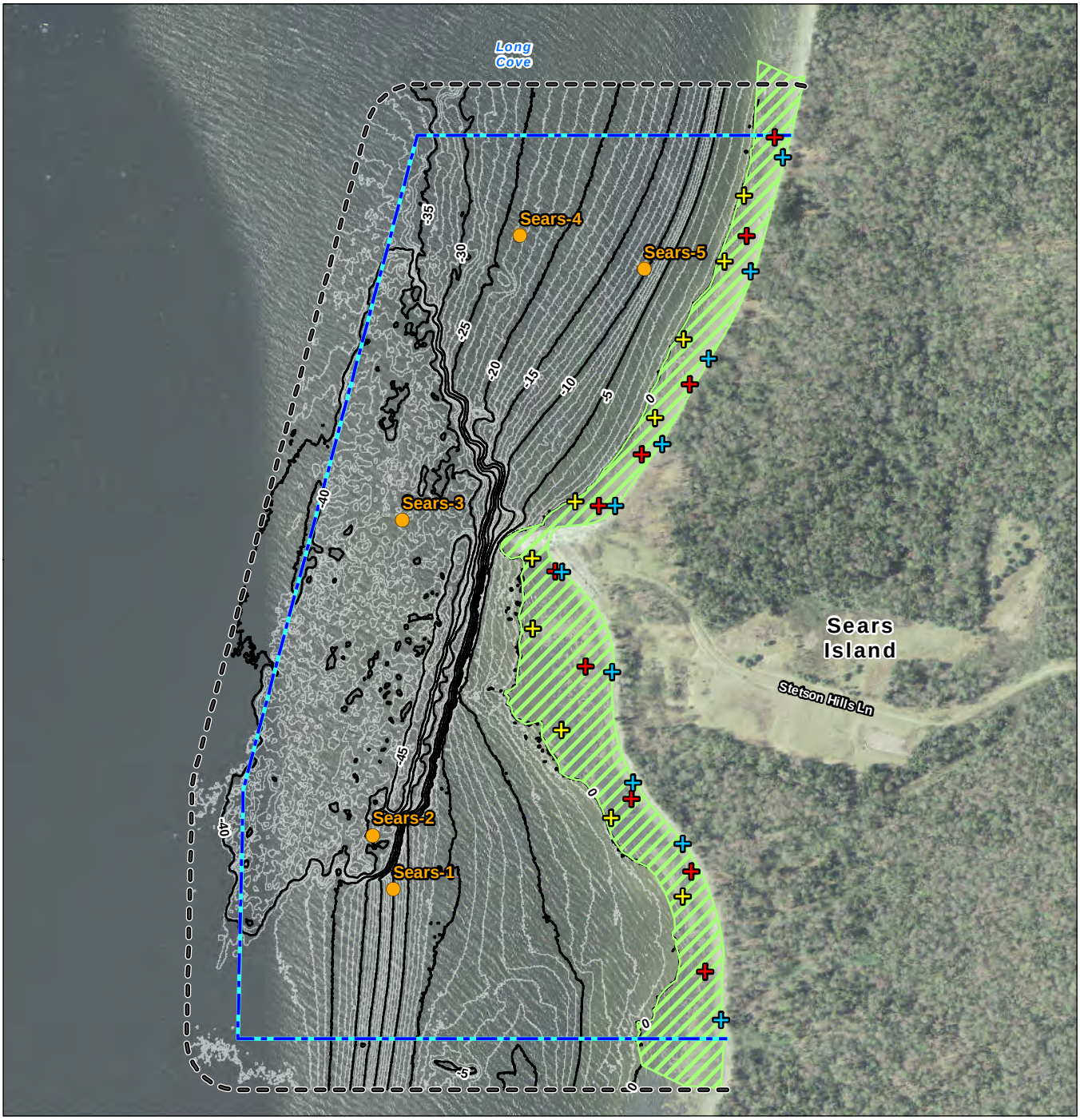

Legend

- Benthic Infauna Location
- 200 ft Buffer
- Potential Intertidal and Subtidal Project Footprint
- Approximate Intertidal Area (834,100 SQ. FT. /19.1 Acres)

Intertidal Quadrat Location

- Low
- Mid
- High

0 600 Feet

(At original document size of 8.5x11) 1" = 600'

N

Stantec

Project Location
Searsport, Maine

Prepared by PWB on 2023-11-08
TR Review by KWH on 2023-11-08
IR Review by PS on 2023-11-08

Client/Project
Maine Department of Transportation

195602718

Figure No.
2

Title
Sears Island Intertidal Quadrats and Benthic Grab Locations

Notes

1. Coordinate System: NAD 1983 StatePlane Maine East FIPS 1801 Feet
2. Vertical Datum: Mean Lower Low Water (MLLW).
3. Data Sources:MEDOT, Stantec
4. Background: Maine Orthoimagery Regional, 2015

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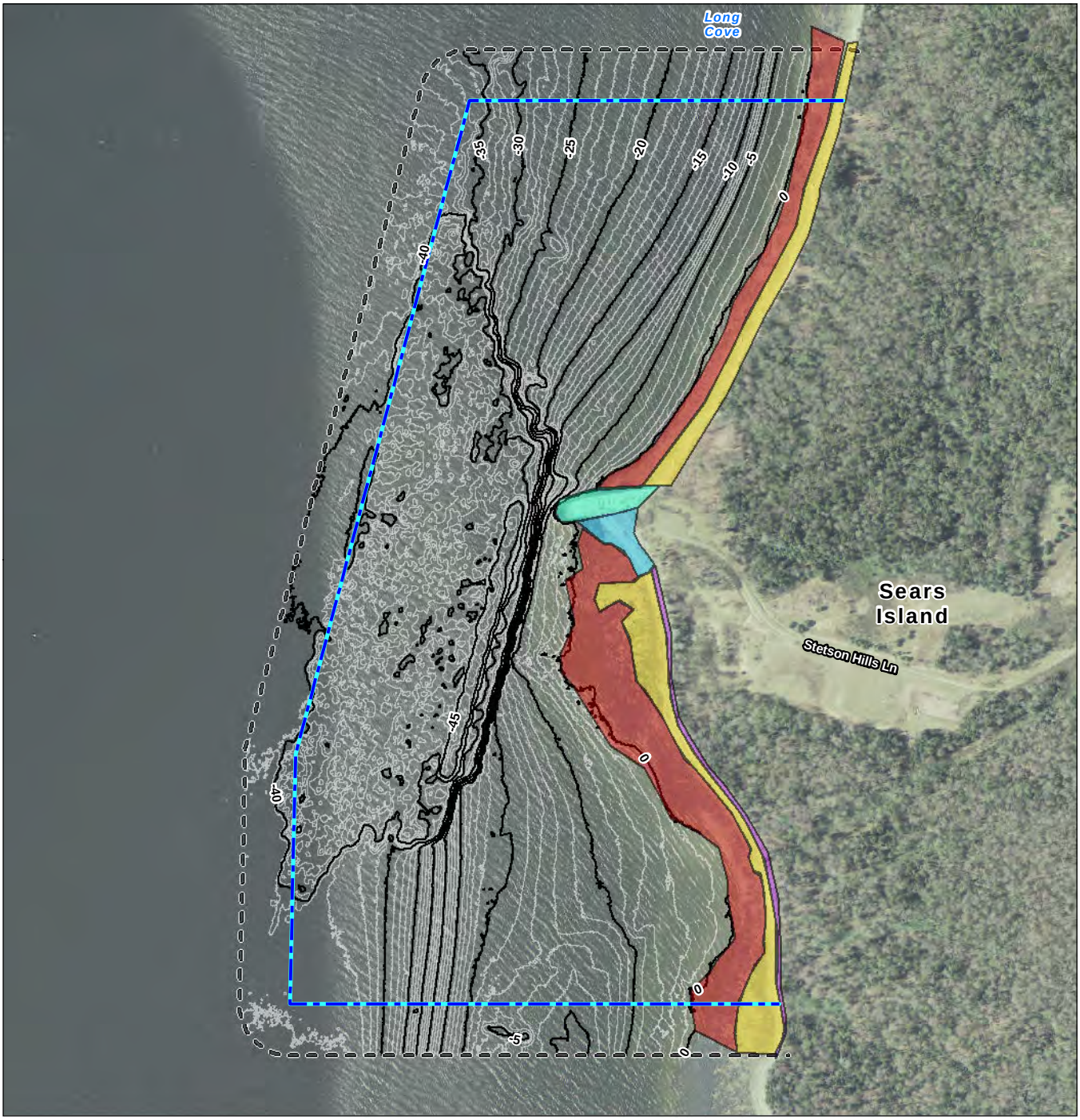

Legend

- 200 ft Buffer
- Potential Intertidal and Subtidal Project Footprint

Substrate Composition

- Mixed Coarse and Fine (Boulder and cobble dominated with gravel, sand and silt)
- Sand Flat (Coarse sand and gravel)
- Mixed Coarse and Fine (Coarse sand and gravel with scattered cobble and boulders)
- Mixed Coarse and Fine (Cobble and gravel dominated with sand/ silt and scattered boulders)
- Rip rap

0 600 Feet

(At original document size of 8.5x11)
1" = 600'

N

Stantec

Project Location
Searsport, Maine

Prepared by PWB on 2023-11-08
TR Review by KWH on 2023-11-08
IR Review by PS on 2023-11-08

Client/Project
Maine Department of Transportation

195602718

Figure No.
3

Title
Sears Island Intertidal Substrates

Notes

1. Coordinate System: NAD 1983 StatePlane Maine East FIPS 1801 Feet
2. Vertical Datum: Mean Lower Low Water (MLLW).
3. Data Sources:MEDOT, Stantec
4. Background: Maine Orthoimagery Regional, 2015

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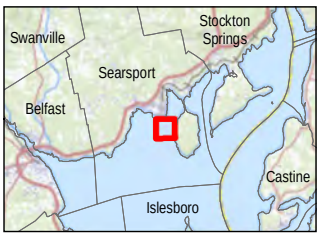

Notes

1. Coordinate System: NAD 1983 StatePlane Maine East FIPS 1801 Feet

2. Data Sources: Steele Associates Marine Consultants, LLC, Hydrographic and Marine Geophysical Site Characterization Surveys Mack Point and Sears Island Searsport, ME Report.

Not to Scale

N

Stantec

Project Location
Searsport, Maine

Prepared by PWB on 2024-04-02
TR Review by KWH on 2024-04-02
IR Review by PS on 2024-04-02

Client/Project
195602718
Maine Department of Transportation

Figure No.
3

Title
Side-Scan Backscatter Mosaic and Bottom Types

U:\195602718\03_data\gis_cad\gis\MXDs\02718_09_Mack_Side_scan.mxd Revised: 2024-04-03 By: pbarbera

April 2024

APPENDICES

Appendix A MEDEP SUBTIDAL FIELD SURVEY CHECKLIST

APPENDIX A: MDEP COASTAL WETLAND CHARACTERIZATION: INTERTIDAL & SHALLOW SUBTIDAL FIELD SURVEY CHECKLIST

NAME OF APPLICANT:_Maine Department of Transportation _____ PHONE:207-557-5089_____
APPLICATION TYPE:__NRPA Tier 3/Indiviudal _____
ACTIVITY LOCATION: TOWN:Searsport _____ COUNTY: Cumberland_____

ACTIVITY DESCRIPTION: ☐ pier ☐ lobster pound ☐ shoreline stabilization
☒Fill dredge ☐ other: _____

DATE OF SURVEY:18-September-2023__ OBSERVER: Paul Sokoloff, Stantec Consulting

TIME OF SURVEY: 0630 - 1130 TIDE AT SURVEY: Low/Mid_____

SIZE OF DIRECT IMPACT OR FOOTPRINT (square feet):
Intertidal area: __378,640_____Subtidal area:__4,836,244_____

SIZE OF INDIRECT IMPACT, if known (square feet):_ _____
Intertidal area: _____Subtidal area: _____

HABITAT TYPES PRESENT (check all that apply):
☒sand beach ☐boulder/cobble beach ☐ sand flat ☒mixed coarse & fines ☐salt marsh
☐ ledge ☒ rocky shore ☐ mudflat (sediment depth, if known:____)

ENERGY: ☐ protected ☒ semi-protected ☐ partially exposed ☐ exposed

DRAINAGE: ☐ drains completely ☒ standing water ☐ pools ☐stream or channel

SLOPE: ☐ >20% ☐ 10-20% ☒ 5-10% ☐ 0-5% ☐ variable

SHORELINE CHARACTER:
☐ bluff/bank (height from spring high tide:____) ☐ beach ☒rocky ☒ vegetated

FRESHWATER SOURCES: ☐ stream ☒ river ☒ wetland ☒ stormwater

MARINE ORGANISMS PRESENT:

	absent	occasional	common	abundant
mussels	☐	☒	☐	☐
clams	☐	☒	☐	☐
marine worms	☐	☐	☐	☒
rockweed	☐	☐	☐	☒
eelgrass	☒	☐	☐	☐
lobsters	☐	☒	☐	☐
other	☐	☐	☐	☐

SIGNS OF SHORELINE OR INTERTIDAL EROSION? ☒ yes no

PREVIOUS ALTERATIONS? ☒ yes no

CURRENT USE OF SITE AND ADJACENT UPLAND:
☒ undeveloped ☐ residential commercial degraded ☒ recreational

PLEASE SUBMIT THE FOLLOWING:
☒ Photographs ☒ Overhead drawing (pink)

Appendix B 2023 INTERTIDAL SURVEY RESULTS

2023 Intertidal Survey Results - Sears Island Maine Department of Transportation Offshore Wind Port and Wind Turbine Launch Site

Survey Area	Quadrat	Intertidal	Sample Date	Weather	Substrate	Spiral rockweed (*Fucus spiralis*)	Rockweed (*Fucus distichus*)	Rockweed (*Fucus vesiculosus*)	Knotted wrack (*Ascophyllum nodosum*)	Irish moss (*Chondrus crispus*)	Soft-shell clam (*Mya arenaria*)	Scale worm (*Polynoidae*)	Yellow periwinkle (*Littorina obtusata*)	Common periwinkle (*Littorina littorea*)	Blue mussel (*Mytilus edulis*)	Northern rock barnacle (*Semibalanus balanoides*)	Green crab (*Carcinus maenas*)	Beach flea (*Orchestia platensis*)	Crusting bryozoan (*Membranipora membranacea*)	Amphipods (*Gammarus sp.*)	Clam worm (*Nereis virens*)	Ninespine stickleback (*Pungitius pungitius*)	Rock gunnel (*Pholis gunnellus*)	Notes
Sears Island	1	Low	9/18/2023	Overcast	Cobble, Gravel, underlain by Sandy Gravel					O				O		C	O							
Sears Island	2	Low	9/18/2023	Overcast	Boulder, Cobble, Underlain by Gravelly Sandy Silt				A		O		C		C	A	A			O			O	Refusal at 4"
Sears Island	3	Low	9/18/2023	Overcast	Gravelly Sand									O		C								Boulders and cobble on edge
Sears Island	4	Low	9/18/2023	Overcast	Boulder, Cobble, Gravel				A					C		C	O							Underlain by sandy cobbly gravel refusal at 8"
Sears Island	5	Low	9/18/2023	Overcast	Boulder, Cobble, Gravel				A	O		O		C		C	O				O			
Sears Island	6	Low	9/18/2023	Overcast	Coarse Anoxic Sand																			H_2S odor while digging
Sears Island	7	Low	9/18/2023	Overcast	Sandy Gravelly Cobble					O				C		C								Underlain by marine clay at 4"
Sears Island	8	Low	9/18/2023	Overcast	Boulder and Gravelly Sand				C						O	A	C		C	O		O		Underlain by marine clay at 4"
Sears Island	9	Low	9/18/2023	Overcast	Boulder, Underlain by Gravelly Sandy Cobble				C					O	O	A	O		C	C				
Sears Island	10	Low	9/18/2023	Overcast	Coarse Sand surrounded by Cobble/Boulder			C								A								Refusal at 4"
Sears Island	11	Mid	9/18/2023	Overcast	Gravelly Sand																			
Sears Island	12	Mid	9/18/2023	Overcast	Gravelly Sand		C											O						Marine Clay at 3"
Sears Island	13	Mid	9/18/2023	Overcast	Gravelly Sand and Silt						O									O				Marine Clay at 6"
Sears Island	14	Mid	9/18/2023	Overcast	Cobble, Gravelly Silt and Sand				C					O			O			O	O			Marine Clay at 4 - 6"
Sears Island	15	Mid	9/18/2023	Overcast	Gravelly Sand												O							
Sears Island	16	Mid	9/18/2023	Overcast	Cobble and Sand											C	O							Marine Clay at 6"
Sears Island	17	Mid	9/18/2023	Overcast	Cobble and Gravelly Sand		C		C		C			O		C	O	A			O			
Sears Island	18	Mid	9/18/2023	Overcast	Cobble and Sand		O		O					O		O								
Sears Island	19	Mid	9/18/2023	Overcast	Cobble, Gravel, and Sand		O									C		O						
Sears Island	20	Mid	9/18/2023	Overcast	Cobble, Gravel, and Sand	O			O		O			O		C		C						Marine Clay at 8"
Sears Island	21	High	9/18/2023	Overcast	Gravel, Cobble, Sand													O						
Sears Island	22	High	9/18/2023	Overcast	Gravel, Cobble, Sand													C						

2023 Intertidal Survey Results - Sears Island Maine Department of Transportation Offshore Wind Port and Wind Turbine Launch Site

Survey Area	Quadrat	Intertidal	Sample Date	Weather	Substrate	Spiral rockweed (*Fucus spiralis*)	Rockweed (*Fucus distichus*)	Rockweed (*Fucus vesiculosus*)	Knotted wrack (*Ascophyllum nodosum*)	Irish moss (*Chondrus crispus*)	Soft-shell clam (*Mya arenaria*)	Scale worm (*Polynoidae*)	Yellow periwinkle (*Littorina obtusata*)	Common periwinkle (*Littorina littorea*)	Blue mussel (*Mytilus edulis*)	Northern rock barnacle (*Semibalanus balanoides*)	Green crab (*Carcinus maenas*)	Beach flea (*Orchestia platensis*)	Crusting bryozoan (*Membranipora membranacea*)	Amphipods (*Gammarus sp.*)	Clam worm (*Nereis virens*)	Ninespine stickleback (*Pungitius pungitius*)	Rock gunnel (*Pholis gunnellus*)	Notes
Sears Island	23	High	9/18/2023	Overcast	Gravel, Cobble, Sand													C						
Sears Island	24	High	9/18/2023	Overcast	Gravel, Cobble, Sand		O											C						
Sears Island	25	High	9/18/2023	Overcast	Gravel, Cobble, Sand												O	A						
Sears Island	26	High	9/18/2023	Overcast	Gravel and Sand																			
Sears Island	27	High	9/18/2023	Overcast	Cobble and Gravel													A						
Sears Island	28	High	9/18/2023	Overcast	Cobble and Gravel												C	A						
Sears Island	29	High	9/18/2023	Overcast	Cobble and Gravel													A						
Sears Island	30	High	9/18/2023	Overcast	Boulder, Cobble, Gravel, Sand												O	A						

Abbreviations: A- Abundant; O- Occasional; C- Common

Appendix C REPRESENTATIVE PHOTOS

Photo 1. Depositional area to the south of the riprap jetty at Sears Island. September 2023.

Photo 2. Depositional area to the south of the riprap jetty at Sears Island with boulder and cobble substrate in background. September 2023.

Photo 3. Freshwater seep from the forested wetland habitat at Sears Island draining into high intertidal. September 2023.

Photo 4. Freshwater seep from the forested wetland habitat at Sears Island draining into high intertidal. September 2023.

Photo 5. Steep eroding upland bank at Sears Island. September 2023.

Photo 6. High intertidal characterized by cobble and gravel with sand/silt and scattered boulders at Sears Island south of jetty. September 2023.

Photo 7. Coarse sand and gravel with scattered cobble in the high intertidal at Sears Island north of jetty. September 2023.

Photo 8. Mid intertidal substrate dominated by cobble, gravel and coarse sand with scattered boulders at Sears Island south of jetty. September 2023.

Photo 9. Boulder and cobble with scattered gravel, sand, and silt in the mid intertidal at Sears Island north of jetty. September 2023.

Photo 10. Coarse sand and gravel south of the jetty in the mid intertidal at Sears Island. September 2023.

Photo 11. Scattered macroalgae on boulders in the finer grained substrate present in the mid intertidal at Sears Island south of jetty. September 2023.

Photo 12. Soft-shell clams were common within this finer grained substrate in the mid intertidal at Sears Island. September 2023.

Photo 13. Boulders and cobble in the mid intertidal embedded in the gravel, sand, and silt at Sears Island south of jetty. September 2023.

Photo 14. Low intertidal dominated by boulder and cobble and abundant macroalgae (knotted wrack and rockweed) at Sears Island north of jetty. September 2023.

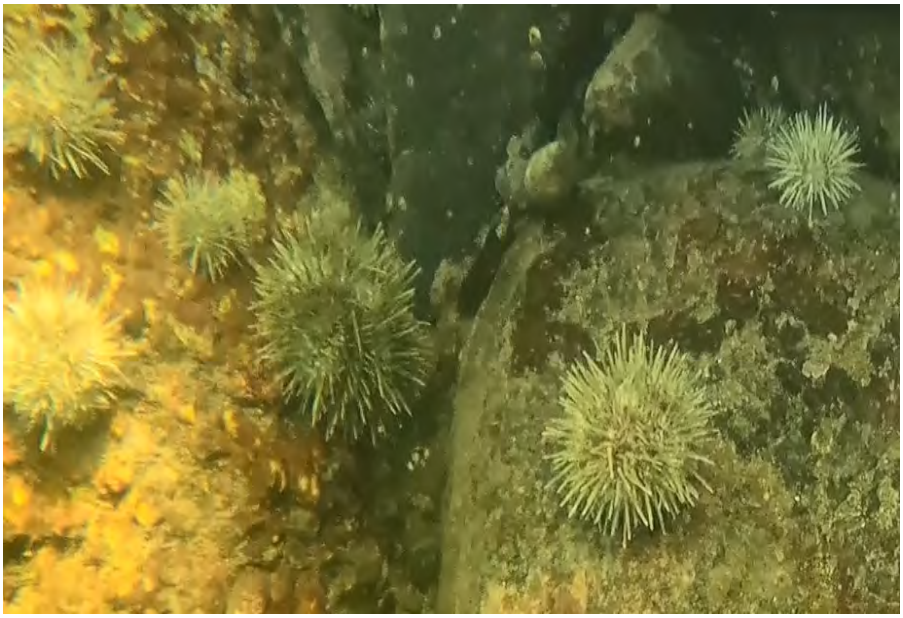

Photo 15. Green sea urchins at Sears Island in boulder and cobble habitat. December 2023.

Photo 16. Green sea urchins and crustose coralline algae at Sears Island. December 2023.

Photo 17. Green sea urchins and crustose coralline algae at Sears Island. December 2023.

Photo 18. Green grab in shallow subtidal at Sears Island. August 2022.

Photo 19. Lobster at Sears Island. August 2022.

Photo 20. Sears Island Benthic Sample 1. September 2023.

Photo 21. Sears Island Benthic Sample 2. September 2023.

Photo 22. Sears Island Benthic Sample 3. September 2023.

Photo 23. Sears Island Benthic Sample 5. September 2023.

Photo 24. Sears Island Benthic Sample 6. September 2023.

Appendix D INTERTIDAL FVA SURVEY QUADRAT PHOTOS

Stantec

Photographic Log

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 1 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 1	
Photograph ID: 2 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 2	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 3 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 2	
Photograph ID: 4 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 3	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 5 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 4	
Photograph ID: 6 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 5	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 7 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 6	
Photograph ID: 8 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 7	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 9 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 8	
Photograph ID: 10 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 8	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 11 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 9	
Photograph ID: 12 **Photo Location:** Low Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 10	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 13 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 11	
Photograph ID: 14 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 11	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 15 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 12	
Photograph ID: 16 **Photo Location:** **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 13	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 17 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 13	
Photograph ID: 18 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 14	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 19 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 14	
Photograph ID: 20 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 15	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 21 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 16	
Photograph ID: 22 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 17	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 23 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 17	
Photograph ID: 24 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 18	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 25 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 19	
Photograph ID: 26 **Photo Location:** Mid Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 20	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 27

Photo Location:
Mid Intertidal

Direction:

Survey Date:
9/18/2023

Comments:
Quadrat 20

Photograph ID: 28

Photo Location:
High Intertidal

Direction:

Survey Date:
9/18/2023

Comments:
Quadrat 21

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 29 **Photo Location:** High Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 22	
Photograph ID: 30 **Photo Location:** High Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 23	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 31 **Photo Location:** High Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 24	
Photograph ID: 32 **Photo Location:** High Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 25	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 33 **Photo Location:** High Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 26	
Photograph ID: 34 **Photo Location:** High Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 27	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 35 **Photo Location:** High Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 28	
Photograph ID: 36 **Photo Location:** High Intertidal **Direction:** **Survey Date:** 9/18/2023 **Comments:** Quadrat 29	

Client:	**Maine Department of Transportation**	**Project:**	**Intertidal FVA Survey**
Site Name:	**Sears Island, Searsport, Maine**	**Site Location:**	**Intertidal Quadrats**

Photograph ID: 37

Photo Location:
High Intertidal

Direction:

Survey Date:
9/18/2023

Comments:
Quadrat 30

Appendix E SUBTIDAL BENTHIC INFAUNAL DATA

2023 Benthic Infauna Survey Results -Sears Island

Maine Department of Transportation Offshore Wind Port and Wind Turbine Launch Site

				Sears Island				
Group	**Taxa**		**Functional Group**	**BEN-1**	**BEN-2**	**BEN-4**	**BEN-5**	**BEN-6**
Mollusca	*Mytilus edulis*	Blue Mussel	Filter Feeder		1			
	Nucula proxima	Atlantic nutclam	*Deposit Feeder*	6	66	19	11	8
	Tellina sp.	Tellin	Filter Feeder		4	2	1	2
Nematoda		Round worm	*Deposit Feeder*	1				
	Ampharetidae (damaged)	Bristle worm	Deposit Feeder	1				
	Aricidea suecica	Polychaete worm	*Deposit Feeder*	12	22	4		1
	Capitella sp.	Annelid worm	*Deposit Feeder*	2		4		2
	Cossura longocirrata	Polychaete worm	*Deposit Feeder*	79	42	31	18	12
	Eteone sp.	Bristle worm	*Deposit Feeder*	4		4		
	Nephtys incisa	Catworm	*Deposit Feeder*	88	91	19	26	51
	Ninoe nigripes	Polychaete worm	*Deposit Feeder*	6	1	6	2	5
	Pectinaria gouldii	Trumpet worm	*Deposit Feeder*	1				
	Prionospio steenstrupi	Segemented worm	*Suspension Feeder*	31	5	22	7	14
	Terebellides stroemii	Polychaete worm	*Deposit Feeder*		29			
	Tharyx acutus	Polychaete worm	*Deposit Feeder*	16			2	
Crustacea	*Casco bigelowi*	Bigelow's amphipod	*Deposit Feeder*	2	4			
	Ostrocoda	Seed shrimp	Deposit Feeder	3	31	14		
Shannon Index				**1.75**	**1.86**	**2.01**	**1.53**	**1.45**
Evenness				**0.66**	**0.77**	**0.87**	**0.78**	**0.7**
Richness (# of species)				**18**	**11**	**10**	**7**	**8**
Total # of Individuals				**252**	**296**	**125**	**67**	**94**
Individuals per m^2				**10,957**	**12,870**	**5,435**	**2,913**	**4,087**
Total Number of Functional Groups				**2**	**3**	**3**	**3**	**3**
Average Population Size				**18**	**26.9**	**12.5**	**9.57**	**11.9**