Sears Island

Searsport, Maine

A Report Prepared for

Sears Island Joint Use Planning Committee

by

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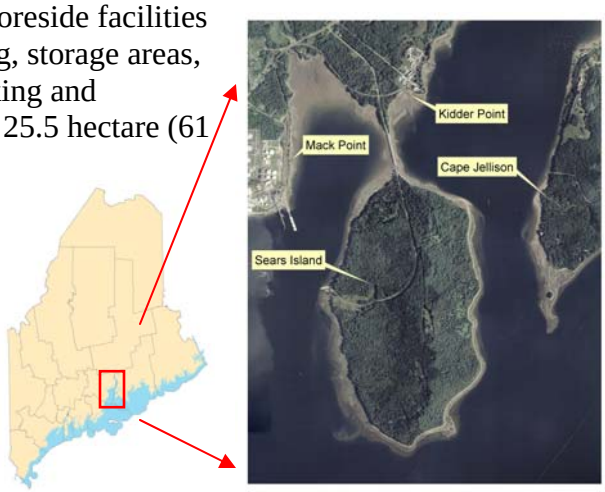
Sears Island

General Description

Sears Island is a 380 hectare (940 acre) island attached to the mainland in Searsport by a causeway that was constructed in 1989 (NAI 1995). The island was used in part as a grazing farm from the late 1700's to the 1930's (Eastman 1976). In 1983, preparatory work was done for a dry cargo terminal. A new marine dry cargo terminal, with rail and highway access, was proposed in the 1990's for west shore of the island to handle breakbulk (bulk cargo that has been unitized prior to loading, primarily paper and forest products), dry bulk (woodchips), and containerized cargoes (e.g., blueberries, eggs, manufactured wood products). Initial shoreside facilities were to include an administration building, storage areas, on-site sanitary waste treatment, and parking and construction alternatives included a 25 to 25.5 hectare (61 to 63 acre) working area with a conventional marginal wharf or offshore marginal wharf and two ship berths, with the potential for future expansion to a 35 to 38 hectare (86 to 95 acre) working area (VHB 1995). Development of the facility required the completion of a 2.4 kilometer (1.5 mile) railroad spur from the main railroad line at Kidder Point (VHB 1995).



Sears Island, Searsport, Maine

Geology and Soils

Bedrock geology here is generally Precambrian to Ordovician metasedimentary and metavolcanic rocks of the Penobscot belt (Osberg et al. 1985). The surficial geology is made up of glacial till deposited directly by glaciers that is a heterogeneous mixture of sand, silt, clay, and stones (Thompson and Borns 1985). Soils on Sears Island are of the Peru-Marlow-Brayton association and Lyman-Peru-Turnbridge association (Hedstrom and Popp 1984). In general, these soils are shallow to deep, nearly level to steep, somewhat excessively drained to poorly drained, and formed in dominantly moderately coarse textured compact glacial till (Hedstrom and Popp 1984).

Land Use History

Sears Island, known as Wassumkeag, was used by the native peoples of the area. Wassumkeag has been translated as 'bright sand beach' (Eastman 1976). However, Sears Island lies within traditional Penobscot lands (Native American Tribes of Maine 2007),

and the modern Penobscot translation for Wassumkeag is ‘darkly covered land’ (James Neptune, personal communication). The following synopsis of land use history on Sears Island is from Eastman (1976).

It is likely that early European explorers noticed Sears Island in their travels along the Maine Coast. The French and English claimed land along the Maine coast during the 1600’s. The first white resident of Sears Island, then called Brigadier’s Island, was a squatter who arrived sometime before 1775. The census in 1790 shows six families squatting on Brigadier’s Island. In 1792, a French mineralogist noted seven families on the island and that the island had rich, sandy soil, maple and birch as dominant timber, granitic bedrock with slaty micaceous quartz, and some indices of iron in one of the brooks.

In 1797, General Henry Knox, former US Secretary of War and Maine landowner, set up John Rynier as husbandman for a grazing farm for cattle and sheep on Brigadier’s Island. Access to the island at that time was along a bar (tombolo) between the mainland and the island. The base was exposed for most of the tide cycles and was traversable most of the time. Hogs were on the island at that time and oxen were soon brought in. Crops included buckwheat, corn, oats, barley, and potatoes. At one point Knox brought in quail from western Massachusetts, but they did not prosper. Knox soon had serious financial problems and sold Brigadier’s Island in 1804. One of the assets he listed for the island was 10,000 to 12,000 cords of hardwood. The island passed through a series of owners, and in 1809 was owned by the Thorndike, Sears, and Prescott agency. In 1813, David Sears bought out his partners.

General Henry Knox

In 1845, the people on the mainland petitioned the Maine Legislature for incorporation as a township named Searsport, after the major landowner of the area. David Sears II referred to the island as Brigadier’s Island, and there was still a working farm there at that time with 150 acres of ‘improved’ land. In 1853, David Sears III built a summer home on the southern tip of the island. David Sears IV added a wharf and boat house about 1875.

The 1880 Census of Agriculture showed the island farm at 140 acres of tilled land, 600 acres of permanent meadows, pasture, and orchard, and 200 acres of woodland. This was the second largest farm of the 175 in town at the time. In 1888, the island was leased to a breeder of thoroughbred Short horn cattle. In 1893, the Sears summer house burned, and this marked the beginning of the island’s use as a public recreation area.

Pavilion, Penobscot Park

In 1905, the Bangor Investment Company, a corporation set up by the Bangor and Aroostook Railroad, purchased Sears Island from David Sears IV for $55,000. They developed part of the mainland

area into ‘Penobscot Park’, a recreation destination via the railroad, which opened in 1906. The Bangor Investment Company continued to lease the farm on Sears Island, which still operated much as it had since the 1790’s by raising cattle, sheep, grain, hay, and with periodic lumbering in the woodlands and seasonal tending of the salmon weirs.

In 1917, gasoline powered farm equipment started a fire that burned virtually all of the farm buildings. The farm was rebuilt, but the lessee could not make the payments and in 1922 declared bankruptcy. The farm was leased to two other individuals in the 1920’s, and the island was used during that time as a landing point for smuggled liquor during the National Prohibition Act. In a 1934 Directors meeting of the Bangor Investment Company, it was noted that the farm buildings on Sears Island were in poor condition, largely due to vandalism, and that they had become a fire hazard. The buildings were ordered to be disposed of. The island gradually reverted to a more natural state and has since been used as an unofficial public recreation area (Eastman 1976). Sears Island is currently closed to motorized traffic, and existing uses include walking, beach use, fishing, hunting, bird watching, picnicking, and siteseeing (SIMAC 1995).

Recent History

In the late 1970’s, the Governor appointed a task force that targeted three areas for industrial and port development, including Searsport (T. Y. Lin 1994) as part of Maine’s Three Port Strategy of Portland, Eastport, and Searsport (Richard Bostwick, Maine Department of Transportation, MDOT, personal communication). A 1978 feasibility study recommended construction of a marine dry cargo terminal on Sears Island (T. Y. Lin 1994). State permits were issued in 1982-1983 (T. Y. Lin 1994). In 1984, federal project funding approvals and permits for a port facility on Sears Island were granted by the Federal Highway Administration and the U. S. Army Corps of Engineers, based on an Environmental Assessment and Finding of No Significant Impact under National Environmental Policy Act (T. Y. Lin 1994, VHB 1995, SIAUC 2005). The Sierra Club challenged the permits in federal court. Because of that litigation, work on the project halted in 1985 pending completion of Environmental Impact Statement (EIS). After the final EIS in 1987, a new set of federal permits was issued. Project construction was suspended in 1989 due to subsequent litigation by the Sierra Club. At the time the construction was interrupted, the access road, causeway, and marine dredging were complete; the staging area for construction had been cleared, temporary detention basins built, and a staging wharf completed. In July 1991, MDOT undertook a Supplemental Environmental Impact Statement due to the identification of a previously unmapped freshwater wetland area within the potential expansion area (T. Y. Lin 1994, VHB 1995, SIAUC 2005). The original wetland mapping on Sears Island was from the National Wetlands Inventory, which had under-estimated the amount of freshwater wetland here (Richard Bostwick, MDOT, personal communication). In 1992, the U. S. District Court dismissed the Sierra Club’s lawsuit (T. Y. Lin 1994, VHB 1995, SIAUC 2005).

The Sears Island Management Advisory Committee was established 1994 to develop a list of recommendations for public use and land management for the island outside of the area proposed for the cargo terminal (SIMAC 1995). In 2005, the Sears Island

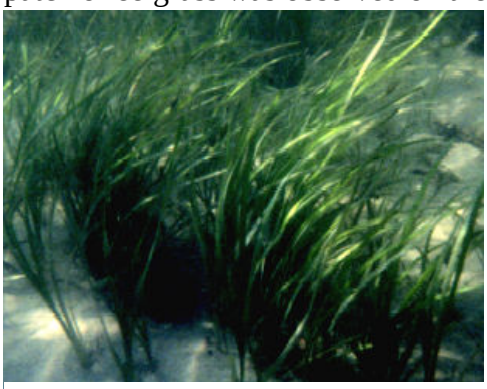
Alternative Uses Committee was formed to explore potential uses for the area of the island not suitable for future transportation consideration (SIAUC 2005).

In 2006, Governor Baldacci formed the Sears Island Planning Initiative who was charged with developing a set of recommendations for the use of Sears Island. As a result, a Consensus Agreement was developed outlining the uses of compatibly managed marine transportation, recreation, education and conservation. To implement the terms of this Agreement a Joint Use Planning Committee was created by MDOT and the Town of Searsport. This committee is to complete seven deliverables listed in the Agreement on or before May 1, 2008. This synopsis of all the natural resource information and study data has been developed by the Maine Natural Areas Program and reviewed by the Departments of Conservation, Marine Resources and Transportation for use by the Joint Use Planning Committee in completing this task.

Fisheries and Wildlife

Marine

Eelgrass beds are currently mapped for the east and west shores of Sears Island and along the east shore of the causeway (Maine Office of Geographic Information Systems 1997). Eelgrass beds help stabilize sediments and serve as nursery, habitat, and feeding areas for many fish, waterfowl, wading birds, invertebrates, and other wildlife, including commercially valuable fish and shellfish. Based on observation of 1992 aerial photographs, relatively large eelgrass beds were observed around the entire perimeter of Sears Island, except the southeastern and southern portion (NAI 1994a). In 1986, a small patch of eelgrass was observed on the eastern shore of Mack Point during transect surveys for commercially important fisheries resources; no eelgrass was observed along Sears Island at that time. Eelgrass has undergone long-term fluctuations in its standing crop in the region, perhaps in part due to wasting disease. In 1994, the Sears Island eelgrass beds appeared healthy, so if wasting disease is present, it is not prevalent. Sears Island eelgrass beds provide habitat for several invertebrate species and fish species, including winter flounder, cancer crabs, green crabs, and starfish.



Healthy eelgrass bed

Bloodworms have been harvested commercially from the tidal flats of Long Cove, but Sears Island does not have commercial worm beds (NAI 1994a).

Three clam flats totaling 3.8 acres were constructed in Stockton Harbor to create habitat for soft-shell clam, to mitigate the direct loss of clam habitat due to placement of causeway fills, and for the projected loss of habitat that would result upon construction of the proposed cargo pier (NAI 1994a, 1995). Efforts were initially successful, with

recruitment evident by 1989 and 1990. However, by 1994 clams were nearly non-existent. The cause of this decline is unknown, but factors include recruitment, substrate availability, food, predation, harvest, pollution, and disease, though historical surveys have noted long-term variability in standing crop (NAI 1994a, 1995).

The increasing population of green crabs and other predator species reduced the soft-shell clam population of Searsport and Stockton Springs by 90% between 1947 and 1963 (NAI 1994a). In 1966, management practices including predator control were implemented, and by the early 1970's the clam population had increased. Predators on clam spat observed at Sears Island include Polynices moon snails, and ribbon worms. In 1971, an oil pipeline leaked fuel into Long Cove for over three months, and by 1974, 86% of the standing crop of clams of the pre-spill Long Cove and western Sears Island population had died. Heavy mortality was also observed in 1977, when the 1971-1974 year classes had grown enough to burrow deeper into the oil saturated sediments that persisted in parts of Long Cove. A relatively high incidence of hematopoietic neoplasia, a fatal disease of clams that is a form of leukemia, was first recorded in the Searsport area in 1971. Neoplasia has been linked to oil spills, though experimental exposure of clams did not corroborate this, and to herbicides, which Long Cove was exposed to. Neoplasia may be caused by a viral infection and can be enhanced by environmental stresses. It is prevalent in New England clam populations. Clam harvesting has been restricted at Sears Island since 1987 due to bacterial contamination (NAI 1994a). The clam fishery is now open at Sears Island, but there are few clams available (Ron Aho, Maine Department of Marine Resources Regional Biologist, personal communication).

Lobster are ubiquitous in Penobscot Bay, but the most intensely fished lobster areas of northern Penobscot Bay are off the southwest tip and west side of Sears Island, and in two areas of Islesboro (NAI 1994a). Interviews in 1985 and 1992 with fishermen indicate that lobstering near Sears Island is similar to other areas of Penobscot Bay, and that the general quality of the lobster fishery in the bay is improving. Traps are placed in the waters west of Sears Island, though there has been a shift from the waters south of the island to the eastern side of the island. There was some concern that the State's cargo terminal could increase boat traffic and endanger lobstering gear, but it was also noted that small boats are more of a problem than ships (NAI 1994a).

There is currently little scalloping and no sea urchin harvesting around Sears Island (NAI 1994a). Sea scallop beds have historically been identified in the area of Sears Island, with a 1975 survey indicating highest density south and southeast of the island. One fisherman reported that there was a heavy harvest in 1975, and that there were few scallops near Sears Island in 1992. It appears that this resource has not yet recovered sufficiently to support harvest, but it could in the future. Habitat for sea urchins is limited around Sears Island, and it is unlikely that a large sea urchin fishery would ever develop here (NAI 1994a).

A 1974 study noted 29 species of finfish as eggs or larvae in plankton collections, all typical species of the Gulf of Maine (NAI 1994a). There was little change in total commercial harvest of finfish in 1991-1992 versus 1983-1984. The shipping channel

west of Sears Island is considered the best location for recreational fishing, which is generally centered around Atlantic mackerel. Weekdays typically have 6-12 recreational boats per day; that number increases to 30-40 on weekends (NAI 1994a).

The 1987 Penobscot Bay Conservation Plan drafted by the Maine Department of inland Fisheries and Wildlife with funding from the Maine State Planning Office's Coastal Program divides the shoreline of Sears Island into 3 distinct wildlife concentration area classifications based on observed use by marine birds and mammals. The three concentration areas are Long Cove designated as the area east of the existing Searsport Cargo facility to approximately the site of the proposed Sears Island facility; Long Cove, extending from the approximate location of the proposed facility to the northeastern "shoulder" of Sears Island; and Stockton Harbor that extends from the northeastern oriented shoreline of Sears Island to upper Stockton Harbor.
The waters included in the Sears Island and Long Cove concentration areas have been designated as Class B (regional significance) habitat for coastal wildlife (Woodward et al. 1986). Conservation guidelines for this habitat are as follows: (a) The existing habitat should be maintained in sufficient quality and quantity to support all coastal wildlife species indigenous to the area; (b) Types of activities and development within the area should not be modified; however, the intensity of use or development may be increased. A 40% increase in the intensity of compatible uses is suggested as an upper limit; and (c) A landuse/wildlife conservation plan should be developed detailing specific wildlife values and identifying compatible human uses of the area (Woodward et al. 1986). The Stockton Harbor area that includes northeast Sears Island and the east shore of the causeway is rated as a Class A (statewide significance). This area was noted for significant waterfowl use during multiple seasons, as well as significant shorebird use during migration and post-dispersal use by terns and osprey. Recommended conservation guidelines for Class A areas are as follows: (a) the existing habitat should not be degraded through alteration or development; (b) a detailed land-use/wildlife conservation plan should be included in local comprehensive plans; and (c) the level and intensity of existing uses in these areas should not increase.

Many marine waterfowl are recorded from Sears Island (NAI 1978, 1994b, Woodward et al. 1987). Black ducks and common eider are the most abundant year-round residents, though are not know to nest on the west side of Sears Island. Species frequently observed on the west side of Sears Island include common loon, common and redbreasted merganser, common goldeneye, bufflehead, oldsquaw, scoters, and grebes, and during migration, gadwall, American widgeon, and greater scaup. Three osprey nests are noted for Sears Island (Woodward et al. 1987).

Sears Island Ledge is a haul-out area used by seals as a resting spot in upper Penobscot Bay. Though pups are occasionally observed on the ledge, pupping has not been observed here (NAI 1994b). More recently, the Maine Department of Inland Fisheries and Wildlife has mapped the entire area around Sears Island as Tidal Wading Bird and Waterfowl Habitat (MDIFW 2007).

Terrestrial

Wood frog

Five species of amphibian have been recorded from Sears Island including spotted salamander, red-backed salamander, wood frog, green frog, and spring peeper (NAI 1994b). Spotted salamanders and wood frogs show strong fidelity to natal pools and/or breeding pools used in previous years, so destruction of a pool may lead to demise of that pool's population (Vasconcelos and Calhoun 2004). During their terrestrial phase, wood frogs and spotted salamanders are more likely to be found in forested than edge habitat. Studies of movement patterns of these species suggest that it may be possible to conserve key forested wetland areas around breeding pools without having to conserve the entire area around the pool. Peak migrations of spotted salamanders and wood frogs are linked to temperature and precipitation events, so monitoring, studies, and conservation measures such as road closures should take this into account (Vasconcelos and Calhoun 2004).

Three wetland pools were created in 1997 as mitigation for filling 4 ha of forested wetlands during preliminary site preparation (DES 1997, Vasconcelos and Calhoun 2006). These pools were monitored over a 5 year period to determine if the two Environmental Protection Agency stated measures of success were met within three years, specifically presence of breeding wood frogs and spotted salamanders and colonization by wetland vegetation, and to determine if the stated measures of success reflected longer-term reproductive success of wood frogs and spotted salamanders. Only one of the created pools replicated the desired seasonal water regime, the other two pools developed permanent and semi-permanent hydroperiods, allowing them to support populations of green frogs, a predator on wood frog eggs and embryos. Spotted salamander success was also reduced in these pools. Green frogs are not found in the natural vernal pools on Sears Island. This study suggested that monitoring of created seasonal pools continue for a minimum of 15 years, possibly more for created forested wetlands, before determining pool success (Vasconcelos and Cahoun 2006).

Spotted salamander

Four species of reptile have been seen on Sears Island, including red bellied snake, garter snake, ribbon snake, and smooth green snake (NAI 1994b). Three large blocks of forest provide habitat for area-sensitive bird species. In total, 142 bird species have been recorded on and around Sears Island. Osprey and double-crested cormorants are known to nest here. Mammals on Sears Island are locally and regionally common, with 22 probable resident species including short-tailed shrew, masked shrew, starnose mole, snowshoe hare, eastern chipmunk, gray squirrel, red squirrel, northern flying squirrel, meadow jumping mouse, woodland jumping mouse, field mouse, redback vole, meadow vole, southern bog lemming, muskrat, porcupine, coyote, red fox, domestic dog, raccoon, ermine, longtail weasel, mink, and white-tailed deer. Moose and bear have been

observed here, but they are unlikely to be resident species. Muskrat are a recent addition, likely due to recently created detention basins (NAI 1994b).

Rare Animal and Plant Species

There is one bald eagle nest on Sears Island and two nearby on Cape Jellison (MDIFW 2007). Peregrine falcons have been observed on Sears Island, but they are likely to be coastal migrants or non-breeding individuals (NAI 1994b).

A ribbon snake, a Maine Special Concern species, was found on Sears Island in 1974 (MDIFW 2007). Although not confirmed during the 1992 surveys, it is likely to inhabit Sears Island where there is suitable habitat (NAI 1994b, 1994c). Ribbon snakes are semi-aquatic and use a variety of wetland habitats. They also need dense cover such as shrubs around woodland vernal pools and an abundance of amphibian prey. Suitable habitats on Sears Island most likely include, but are not necessarily limited to, areas of highest amphibian abundance such as the freshwater pond, artificial detention basins, and other amphibian breeding sites (NAI 1994b, 1994c).

Southern bog lemmings (formerly a state watch list species) were recorded on Sears Island in 1977 and are assumed to still occur here (NAI 1994b). Much of Sears Island is dominated by habitats used by southern bog lemmings, including thick early-successional deciduous habitats, sphagnum bogs, orchards, moist deciduous, and mixed woodlands with a thick layer of loose duff (NAI 1994b).

The sedge *Carex silicea* was recorded from the dune grassland on the east side of Sears Island (MNAP). This plant was removed from the rare plant list in 2005 (MNAP).

Natural Communities

Second growth forest on Sears Island

Natural communities on Sears Island are characteristic of second-growth forests, abandoned farmland, and protected coastal waters (MNAP 2007 field forms). Enough time has passed since the 1934 abandonment of nearly three centuries of intensive agriculture to restore most of the island to an intermediate successional stage of forest growth (1994b). Periodic light cutting and successional trends have resulted in multi-aged stands with strong vertical structure (MNAP 2007 field forms). There is substantial understory development with balsam fir and red spruce common, especially in mixed and softwood stands (MNAP 2007 field forms). Three types of forest cover can be found here: (1) hardwoods, dominated by red maple, paper birch, northern red oak, and white ash, (2) softwoods, dominated by red spruce, balsam fir, tamarack, and

white pine, and (3) mixed hardwood-softwood stands (NAI 1994b). Other areas were abandoned later and are typified by an earlier successional stage-shrubs, fern meadows, and grassy meadows (NAI 1994b). There is no evidence of recent timber management, but the forest appears well-managed as there are varying age classes of trees with the oldest red spruce aged at 90-130 years (MNAP 2007 field forms).

In 1992, the Maine Natural Areas Program, then called the Maine Natural Heritage Program, visited Sears Island and identified hardwood seepage forest communities and two saltmarshes. Based on a 2007 visit, the saltmarshes have recently been reclassified as a dune grassland community. Dune grasslands are considered imperiled in Maine (S2), meaning there are only 6-20 occurrences or few remaining acres. These areas are small dune – swale formations and support characteristic dune grassland species including beach grass, beach pea, seaside goldenrod, New York aster, bentgrass, along with a number of other less common species. The patch on the northeast shore is approximately 3.5 acres and includes a series of low but mostly dry swales. There are small areas of salt hay grass and salt marsh bulrush near the back of the dune where it is wetter. The patch on the northwest shore is approximately 1.5 acres and consists of a single, long, narrow sand and gravel berm behind which is a small area of salt marsh (MNAP 2007 field forms).

All of the predominant natural communities identified on Sears Island are apparently secure (S4) or demonstrably secure (S5). MNAP tracks only outstanding examples of these common communities, and the predominant natural communities on Sears Island are not tracked due to quality, size, and landscape context. Vernal pools are also found on Sears Island, but regional data on vernal pool abundance are not available. Concern for vernal pools in Maine is due to their vulnerability to local eradication and their importance to amphibians, dragonflies and damselflies, and other species, versus that they are rare.

Dune Grassland, northwest side Sears Island

Dune Grassland, northeast side Sears Island

Wetlands

Scattered through the upland forest are small and large pockets of seepage wetlands (NAI 1991, 1994c). These wetlands are mostly forested and follow broad, linear drainages

down the gentle slopes. In a couple of the larger wetlands, the canopy is partially open and rough-leaved alder is common. The herb layer in the wetlands is much more diverse than that of the uplands. Wetlands on Sears Island are mostly seasonally saturated mixed forested wetlands that are mid-slope discharge seeps on poorly drained glacial till (NAI 1994b). They originate at mid-slope elevations and have impermeable hardpan below that forces percolating groundwater to the surface along sloping terraces. The few other herbaceous wetland areas occur in created temporary detention basins within the area proposed for the terminal (NAI 1994c).

A total of 73 wetlands comprising 89.2 hectares (~223 acres) occur on Sears Island (NAI 1994c). Wetland size ranges from 0.05 acre to ~23 acres. Thirty-five (35) wetlands totaling 45.6 hectares (114 acres) are located within or abutting the high intensity study area where the dry cargo terminal is proposed (NAI 1994c).

All areas below the influence of tidal action (identifiable debris lines, etc.) are coastal wetlands and considered wetlands of special significance under MDEP's Natural Resources Protection Act as are all freshwater wetlands within 250-feet of the high water line. Freshwater wetlands within the shoreland zone, regardless of size, function in the treatment of overland runoff prior to it reaching tidal waters. Other freshwater wetland functions likely to occur on Sears Island include wildlife habitat, especially as amphibian breeding areas (see fisheries and wildlife), floodflow alteration, groundwater discharge, and shoreline stabilization.

Project Impacts / Management Considerations

Effects on regional biological diversity due to the cargo terminal project are expected to be minimal because the species and communities on Sears Island are common in the Penobscot Bay area (VHB 1995). Environmental impacts of the different construction alternatives are summarized in Vanasse Hangen Brustlin (VHB 1995), and losses of habitat are presented here in Table 1.

Table 1. Current and Predicted Losses of Habitat Due to Dry Cargo Facility. A range of values is presented for the initial and expanded facility, because these losses will vary depending on the construction alternative chosen (VHB 1995).

	Terrestrial Vegetation	**Upland Wildlife Habitat**	**Vegetated Wetlands**	**Marine-Eelgrass**	**Marine-Benthic**
Earlier Action	15.1 ha (37.3 ac)	8.7 ha (21.4 ha)	4.7 ha (11.6 ac)	0.3 ha (0.8 ac)	~2.5 ac (1.1 ha)
Initial Facility	10.7-21.7 ha (26.5-53.6 ac)	9.3-19.2 ha (22.9-44.6 ac)	1.5-4.8 ha (3.6-11.8 ac)	0.1-5.3 ha (0.2-13.1 ac)	4.2-12.2 ha (10.4-30.1 ac)
Expanded Facility	25.0-36.8 ha (61.6-91 ac)	22.5-30.2 ha (55.5-74.4 ac)	2.2-6.8 ha (5.5-16.8 ac)	0.1-5.3 ha (0.2-13.1 ac)	4.9-12.2 ha (12.2-30.1 ac)

Earlier action refers to construction completed through 1989 under previously issued permits. Initial facility refers to the design of the terminal for which permits will be sought as part of the present federal and state proceedings. The expanded facility refers to estimated facility characteristics in the future (VHB 1995).

In general, the intensity of effects on biological diversity would decrease with distance from the terminal (NAI 1994d, VHB 1995). It is assumed that all terrestrial species and communities would be lost within the terrestrial footprint of the project. All species and communities found within the areas of direct and secondary effects are found elsewhere on and around Sears Island, so it is possible that no species or communities that inhabit the island and its adjacent waters would be lost as a result of the dry cargo terminal. A decline in species abundance of marine benthic organisms not affected by human activity is expected to be confined to the zone of direct and secondary habitat loss. Direct effects are losses of marine habitats due to discharge of dredged or fill materials, which occur within the dredge or fill footprint or at the dredge material disposal site. Secondary effects are associated with discharge of dredge or fill materials and occur outside of the dredge or fill footprint. A broader zone of decreased species abundance expected for species sensitive to human activity, e.g., black duck, bald eagle (NAI 1994d, VHB 1995).

If the facility is constructed as proposed on the west side of the island, and a rail line is built, the Maine Natural Areas Program suggests that a 100 foot forested buffer be retained in the area of the dune grassland (Don Cameron, MNAP, personal communication). A forested buffer should also be retained as much as possible along other shoreline areas adjacent to the facility to minimize impacts to Tidal Wading Bird and Waterfowl habitat, to prevent erosion, and to retain the scenic character of the island (Don Cameron, MNAP). In addition, forested corridors should be left intact along any wetlands impacted or created within the project area to minimize harm to amphibian populations by providing a travel corridor to other vernal pools in undeveloped areas of Sears Island (per Vasconcelos and Calhoun 2004).

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