FINAL NATURAL RESOURCE ASSESSMENT REPORT
HARPSWELL, MAINE

SEPTEMBER 2011

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HARPSWELL, MAINE

Prepared for
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1.0 INTRODUCTION

The purpose of this report is to document the results of literature and field studies conducted on five parcels (i.e., Parcels A though E) owned by the Town of Harpswell (the Town) (Figure 1). The purpose of the study is to assist the community in a natural resource assessment of Town owned property. The assessment was implemented to determine the portions of land that are of high ecological value and best retained for conservation, and areas that lend themselves to other uses. This assessment will be the first step toward separating buildable land from the valuable conservation and recreational land. A portion of the land may be used for affordable housing and/or municipal buildings in the future.

The project includes five (5) parcels of land owned by the Town located along Mountain Road, Strawberry Creek and/or Long Reach Area The town hall is currently located on one of the five parcels (i.e., Parcel B) and the remaining four are in close proximity and some abut the parcel occupied by the town hall (see Figure 1). The five parcels and their sizes and tax map number are listed below.

Parcel	**Map/Lot**	**Area (acres)**
A	42/54	76.45
B	42/70	112.54
C	42/72	5.06
D	41/77	9.73
E	42/04	0.75
Total		**204.53**

The study of the parcels consisted of a literature and data search followed by a field reconnaissance. The literature and data search involved obtaining available published data on the parcels including soil mapping, habitat mapping, published topographic information, and information of significant wildlife habitats documented on the parcels. Specific sources used are discussed in Subsection 2.1 and the results of the literature and data search are summarized in Section 3.0.

During the reconnaissance, wetlands, vernal pools and streams were located with a Global Positioning System (GPS) capable of sub-meter accuracy. Formal wetland delineations for the purposes of permitting were not conducted, but rather flags were placed every 50 to 100 feet around the wetland and located. A wetland delineation, for permitting purposes, typically would involve hanging flags every 25 to 50 feet to capture small variations in the boundary. In

addition to locating natural resource features, the existing trails on the parcels were also located with the Global Positioning System (GPS). During the field reconnaissance, a rare ecosystem, *Low-elevation Bald*, that occurs on lands nearby, was searched for as well.

The land was also reviewed for two conditions named in the Harpswell Shoreland Zoning Ordinance. The first condition is greater than 2 acres of land with greater than 20% slopes in the shoreland zone. The second condition is two or more contiguous acres of wetland that is not connected hydrologically to a surface water feature. The Harpswell Zoning Ordinance specifies that land with either of the conditions should be in a resource protection zone. Additional details of the field reconnaissance are discussed in Subsection 2.2 and the results are described in Section 4.0

Section 5.0 evaluates the literature search and field data as it relates to potentially developing lands within the parcels. It describes features that should be avoided and areas that appear most suitable for development. Section 6.0 describes conclusions and recommendations for use of the lands based on data collected and the evaluation conducted in Section 5.0.

2.0 STUDY METHODOLOGY

The following subsections describe the methodology, sources of information, and field data collection procedures used for the assessment.

2.1 DESKTOP STUDY

Normandeau reviewed and compiled existing natural resource data for the five Town-owned parcels as an initial step in the natural resource assessment. Data was gathered from available information on flora and fauna that exist on, and/or adjacent to, the Town-owned parcels. Information that was used included data that depicts: wetlands; mapped soil series, documented occurrences of rare, threatened, endangered, and species of special concern; special marine resources; forest stand information; land cover; as well as information on recreation, aesthetics, transportation and land use.

Normandeau's comprehensive review of available GIS data included the following sources:

- The Town of Harpswell;
- Maine office of GIS (MEGIS);
- Maine Natural Areas Program (MNAP);
- Beginning with Habitat Maps;
- Maine Department of Inland Fisheries and Wildlife (MDIFW);

- Maine Department of Marine Resources (MDMR);
- United States Fish and Wildlife Service (USFWS);
- Natural Resources Conservation Service (NRCS);
- National Marine Fisheries (NMFS);
- National Wetlands Inventory Program;
- Maine Historic Preservation Commission (MHPC);
- Gulf of Maine Coastal Program; and
- United States Geological Survey.

Normandeau prepared and submitted formal letters of inquiry as needed to MDIFW, MNAP, USFWS, MHPC, Maine Atlantic Salmon Commission, and NMFS to request information regarding any rare, threatened, endangered, or special concern plant and animal species and significant habitats present in the project area. Responses to the inquiries are contained in Attachment A.

Data was compiled and processed, as necessary, to get it into the same coordinate system and format for the Town. Processing included re-projection, clipping, and merging of the data. Data processing and map creation was done using Environmental Systems Research Institute (ESRI) ArcMap 10 software. Information compiled from existing data, online searches, and agency responses, was overlain on publicly available aerial photography from the Maine Office of GIS, to locate areas with higher ecological values, as well as to concentrate our field efforts. Field maps were prepared based on the existing GIS data and pertinent additional information, identifying potential unique habitats or features, for identification and ground-truthing during the field assessments. Aerial photos were also obtained and used for interpretation to facilitate the reconnaissance.

GPS data collected during the course of field work was post-processed using Trimble Pathfinder Office 5.1, to ensure the greatest possible accuracy. Post processing data is important to refine the accuracy and uses fixed beacons on land in known locations to increase accuracy of the satellite derived positions. Post-processed data was then overlaid on aerial photography and used in combination with field notes and sketches to delineate resource boundaries located in the field. Figures were created utilizing a combination of field data and publicly available data.

A Digital Elevation Model (DEM) from the National Elevation dataset (USGS) was used to calculate slopes for the project area. A 1/3 Arc Second DEM was downloaded and re-projected to UTM NAD 83 Zone 19 North meters to match other project data. The Slope tool in the Spatial Analyst extension toolbox was run in ArcMap to determine the degree of slope. Slopes greater than 20% were then extracted from the dataset to illustrate areas where steep slopes would cause issues for development.

2.2 FIELD RECONNAISSANCE

The five parcels were evaluated by field staff in the month of April on the 19th and 25th, 2011. Field staff located land features and resources using a Trimble Yuma Global Positioning System (GPS) unit and antenna. Staff located and documented potential vernal pools harboring egg masses of wood frogs, spotted salamanders, or blue spotted salamanders. Spring pools observed in April were visited a second time on May 9th, 2011 to count any additional salamander egg masses.

Field staff noted several landscape ecosystem types throughout the study area, and a vegetation plot was created to better classify one unique, Low Elevation Bald Habitat area, a rare ecosystem type in Maine. Additional discussion of Low Bald Habitat is provided in Subsection 4.5. Wetlands, surface waters, and the landfill area were located with select GPS points along the boundaries. Staff also shot photo's of each wetland. Based on the scope of the assessment, wetlands were approximately located with a minimum amount of flags to allow time to cover the entire property. The wetland delineation completed for this project is not sufficient for permitting as the delineation would need refinement and additional supporting data.

Maintained trails were also located using a GPS, and erosion issues were documented with a photograph and notes. Wildlife habitat, soils, and other sensitive features of interest were documented during one of the three field reconnaissance visits. The results of the field investigation are discussed in Section 4.0.

3.0 DESKTOP STUDY RESULTS

Data viewed as pertinent to the assessment obtained during the desktop study was compiled into Figures 2 through 5 in this report. Figure 2 shows the location of moderate to high value tidal wading bird and waterfowl habitat in the areas of the five parcels or the "property". For the purposes of the report the "property" is defined as the total area comprised of the five town-owned parcels. As depicted in the figure, it generally covers the edges of the coastline on east and west sides of the parcels.

Figure 3 shows the project area that would be affected by a 100 year flood in the area as depicted by Federal Emergency Management Agency (FEMA) on the Flood Rate Insurance Maps (FIRM). Note that the 100 year flood is predicted to envelope land over 500 feet from the northern most extent of Strawberry Creek. It also shows flooding to occur up to approximately

275 feet inland of the "normal" eastern edge in Strawberry Creek, north of the Mountain Road crossing.

Figure 4 shows the soil series mapped by the NRCS on the property. Of note is the extensive coverage by Lyman soil. Lyman is a shallow to bedrock soils derived from glacial till deposits. The series describes bedrock as occurring between 10 and 20 inches. Because of this soil series is so thin, development on these soils can be problematic as construction of foundations and infrastructure can be cost prohibitive. Official descriptions of the soil series mapped on the project site are contained in Attachment B.

Other soil series mapped on the property include Scantic, Buxton, and Sebago. These soils are derived from marine sediments. These are hydric soils, and wetlands are often found where these series occur. This is the case of this property as the Sebago is mapped in the area of Wetland 2 (WL-2). Another soil series of note is Belgrade, which is a somewhat poorly drained non-hydric soil. Typically these soils are deep (i.e., > than 4 feet) and dry enough to host development without severe water issues. This soil is mapped in the center of Parcels A and B.

Figure 5 was developed from publicly available elevation data processed as described in Subsection 2.1. The data was manipulated to interpret where slopes occur in excess of 20 percent on the property. Slopes in excess of 20 percent present challenges when developed as special foundations are required and excessive detrimental erosion can occur once the soil is disturbed. On this figure, four areas, each measuring over two acres and containing greater than 20 percent slopes, are highlighted and should be considered for Resource Protection Zoning in accordance with the Harpswell Zoning ordinance.

4.0 FIELD RECONNAISSANCE RESULTS

The following subsections discuss the results of the field reconnaissance. Discussions include trail observations, natural resource observations, and wildlife observations.

4.1 TRAILS

The two trails, Cliff Trail and Old Road Trail, are both located on Parcels A and B. Both trails appear to be well maintained, however, eleven erosion or maintenance issues were observed along the Cliff Trail (Figure 6). The issues are summarized on Table 1 below. Recommendations for correcting these areas are contained in Table 3 in Section 6.0.

Table 1. Erosion Points Along Cliff Trail.

Name	Issue
1	minimal erosion
2	moderate erosion
3	moderate erosion into marsh
4	moderate flooding/mud
5	minimal erosion
6	moderate erosion and muddy trail
7	major mud issue
8	moderate mud issue
9	major runoff erosion
10	major runoff erosion
11	major erosion off cliff

Photos 1 and 2: Major erosion. 1) Erosion Point 10, drainage erodes trail and surrounding terrain ; 2) Erosion Point 11, dangerous erosion at edge of cliff to Long Reach.

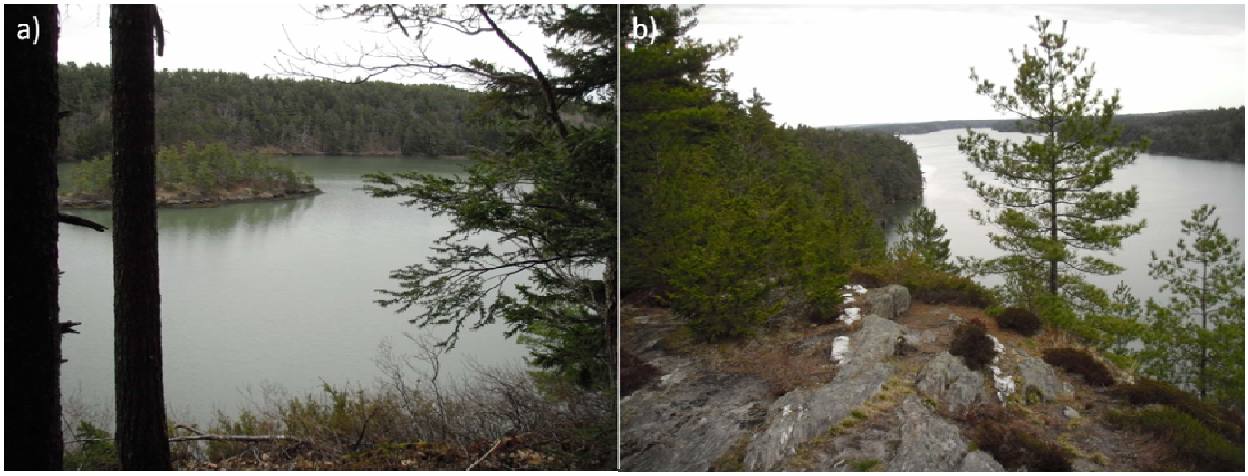
All issues noted occur along the Cliff trail and are concentrated along Strawberry Creek and the NWI wetland. Erosion points 7, 9, 10, and 11 are the most crucial issues. Point 7 is a wet spot in the trail that tends to collect surface water after precipitation. Points 9 and 10 represent a drainage running down the steep trail. Erosion point 11 erodes directly off a steep cliff into Long Reach (Photo 2 and Figure 6). This location could become a safety hazard if not remedied.

Between visits on the dates of 4/19/11 and 5/9/11, it appears someone had begun creating their own trail system in and around Wetland 8 (Figure 7). The trail starts on Navigators Road, but at this point impact is minimal.

Photo 3: Unauthorized trail creation in and around Wetland 8.

4.2 LANDS WITH SCENIC VALUE

Parcels A, B and E have the highest scenic value on the property in question. Parcel E has fine views of Harpswell Sound at the property's waterfront. Parcel B contains the less visually desirable capped landfill, transfer station, and cell tower yet offers the best views of Long Reach along the Cliff Trail. Scenery along Strawberry Creek on Parcel B is also readily accessible to the public by way of the Cliff Trail.



Photos 4 and 5: Scenic Views of Long Reach. a) Parcel A view; b) Parcel B view at the bald overlook.

Parcel A has the most diverse scenic areas. This parcel borders the upper reaches of Strawberry Creek and affords a viewpoint of the cascade into the creek. There are also views of Henry's

Creek and Long Reach (Figure 6). Parcel D contains the highest point in the Town of Harpswell but the parcel is heavily forested and does not currently afford any panoramic views.

Photo 6: Cascade flowing into Strawberry Creek located less than 2,000 ft from the Town Office via the Cliff Trail.

4.3 WETLANDS AND STREAMS

The following subsections discuss the types and locations of wetlands and surface water bodies observed on the town-owned parcels.

4.3.1 Wetlands

The field reconnaissance team located 32 wetlands on the five parcels (Table 3 and Figure 7). Wetland locations are approximate and are not suitable for permitting. The mapped wetlands, however, may be used as a guideline to start the planning process. No freshwater wetlands were found on Parcel E. Six small wetlands were found on Parcels D and C. Parcel B had 10 wetlands, 6 of which move down slope into Parcel C. Parcel A contained the largest wetlands and number of wetlands in the investigation area with a total of 16.

The majority of wetlands were palustrine forested wetlands with mixed deciduous/coniferous overstory (PFO1/4). Six wetlands were coniferous forested wetlands. One wetland (Wetland 10) was dominated by emergent vegetation. Common plant species within the forested wetlands in the investigation area are balsam fir (*Abies balsaemia*), red spruce (*Picea rubens*), red maple (*Acer rubrum*), and peat moss (*Sphagnum spp.*). There is very little understory within the forested wetlands due to the dense canopy cover. Many of the wetlands have pit and

mound topology, partially created by the bedrock outcropping and decaying fallen conifers (Photo 7). This pit and mound relief creates many areas for pooling which may promote use by vernal pool species.

Photo 7: Pit and mound coniferous forested Wetland 27. Pit and mound topography with little understory vegetation.

Table 2. Summary of Wetlands.

Wetland Number	Parcel	Wetland Type	Dominant Plant Type	Stream within 25ft	WOSS
1	A	PFO1/4	Mix BL deciduous and NL evergreen	X	*
2	A	PFO4	NL evergreen	X	X
3	A	PFO1/4	Mix BL deciduous and NL evergreen		X
4	A	PFO4	NL evergreen		X
5	A	PFO1/4	Mix BL deciduous and NL evergreen	X	Coastal wetland
6	A	PFO1/4	Mix BL deciduous and NL evergreen		
7	A	PFO1/4	Mix BL deciduous and NL evergreen	X	*
8	A	PFO1/4	Mix BL deciduous and NL evergreen	X	*
9	A	PFO4	NL evergreen	X	*
10	D	PEM1	Persistent		
11	D	PFO1/4	Mix BL deciduous and NL evergreen	X	*
12	D	PFO1/4	Mix BL deciduous and NL evergreen		
13	D	PFO1/4	Mix BL deciduous and NL evergreen		
14	D	PFO1/4	Mix BL deciduous and NL evergreen		
15	D	PFO1/4	Mix BL deciduous and NL evergreen		
16	A	PFO1/4	Mix BL deciduous and NL evergreen	X	*
17	A	PFO1/4	Mix BL deciduous and NL evergreen		X
18	A	PFO1/4	Mix BL deciduous and NL evergreen	X	*
19	A	PFO1/4	Mix BL deciduous and NL evergreen	X	*
20	A	PFO1/4	Mix BL deciduous and NL evergreen	X	*
21	B	PFO4	NL evergreen	X	*
22	B/C	PFO1/4	Mix BL deciduous and NL evergreen	X	*
23	B/C	PFO1/4	Mix BL deciduous and NL evergreen		
24	B	PFO1/4	Mix BL deciduous and NL evergreen		
25	B/C	PFO1/4	Mix BL deciduous and NL evergreen		
26	B/C	PFO1/4	Mix BL deciduous and NL evergreen		
27	B/C	PFO1/4	Mix BL deciduous and NL evergreen		
28	A/B	PFO1/4	Mix BL deciduous and NL evergreen	X	-
29	B	PFO4	NL evergreen		
30	B/C	PFO1/4	Mix BL deciduous and NL evergreen		
31	B	PFO1/4	Mix BL deciduous and NL evergreen		
32	A	PFO4	NL evergreen		

*wetland within 25ft of stream would be a WOSS only if stream meets NRPA stream definition.
PFO=palustrine forested PEM=palustrine emergent WOSS=wetland of special significance BL=broad-leaved NL=needle-leaved

Wetland 5 is the one wetland that was mapped during the reconnaissance which is a coastal wetland. It is a coastal wetland because it is influenced by tides. The tidal influence ends over 150 ft north of where the Cliff trail crosses the wetland. Wetland 2 is the only freshwater wetland mapped on the National Wetlands Inventory (NWI). The NWI maps are prepared using aerial photography to locate and classify wetlands. Often, ground-truthing of NWI wetlands reveals a wetland with a somewhat different shape and cover class. The size and cover class of the wetland is different from the NWI mapping. Most notably, the wetland does not connect to the Strawberry Creek coastal wetland and it was classified as a PFO4, not a PSS4E as indicated by NWI.

Wetlands 2, 3, 17, and the wetland mapped by Woodlot Alternatives around the town hall building are all within the 100-year flood zone and are, therefore, freshwater wetlands of special significance (WOSS) as defined by the state. All wetland areas within 25 ft of a state-defined river, stream or brook are also freshwater wetlands of special significance. A few streams (S-2, S-6, S-11, S-3, and S-7) within the project area, which were mapped in the reconnaissance effort, may not be considered streams by the state. If impacts to these water bodies are planned, it would be advised to have a MEDEP personnel review the characteristics of these streams in the field to make the final determination. Wetland 32 is a WOSS because of its proximity (within 250 feet) to the coastal wetland, Wetland 5.

4.3.2 Streams and Waterbodies

Parcels A and B are bordered to the east by Long Reach. The upper reach of Strawberry Creek extends into a southern portion of Parcel A and the creek borders Parcels B and E to the west (see Figure 7). The far northern reach of the brackish water of Henry's Creek extends to the northernmost section of Parcel A, approximately 150 feet north of the Cliff Trail.

Table 3. Summary of Streams.

Name	Parcel	Associated Wetland	Flow
S-1	A	1	Perennial
S-2	A	8, 9	Intermittent
S-3	A	2	Ephemeral
S-4	A	5	Perennial
S-5	A/B	18, 19, 20, 21	Perennial
S-6	A/B	28	Perennial
S-7	D	11	Ephemeral
S-8	A	16	Intermittent
S-9	B	21	Intermittent
S-10	B	21	Intermittent
S-11	B	21, 22	Perennial
S-12	A	2	Perennial

Eight streams are located in Parcel A, 5 streams in Parcel B, one stream in Parcel D and no streams in Parcels C or E. All streams located have associated wetlands. Six streams are perennial, 4 are intermittent and two have ephemeral flow. Streams classified as perennial meet the definition of a stream under the state regulations. Streams S-2, S-6, and S-11 all flow along old roads for a portion of their length while stream S-4 is an extension of Henry's Creek. Located streams which flow into Strawberry Creek (S-8, S-2, S-6, S-9, S-1) have a marine clay substrate with deep channels (up to 4 feet). Perennial streams are slow flowing, meandering and deep.

Photo 8: Deep, meandering, slow-flowing perennial stream S-5.

4.4 TERRESTRIAL WILDLIFE

The following subsections discuss the wildlife noted on the property during the three site visits.

4.4.1 Vernal Pools

Eight vernal pools were located on town owned property. Three were found on Parcel A, 3 on Parcel B, one on Parcel C, one in Parcel D, and none in Parcel E. The majority of pools served as breeding habitat for spotted salamanders this breeding season. Pool VP3 had one blue-spotted salamander egg mass. There are no vernal pools on any of the parcels which meet the State of Maine definition of a Significant Vernal Pool.

Photos 9 through 12: Vernal pools. a) VP1 habitat; b) VP4 spotted salamander egg mass; c) VP5 habitat, slow moving stream; d) VP6 habitat; natural-modified – a natural wetland with a roadside berm.

In order for pools to be protected by the State of Maine, a threshold of abundance of egg masses as well as criteria on the physical characteristics of the pool, need to be met. According to state definitions, a significant pool does not have a permanent inlet or outlet, predatory fish, and is not man-made (but may be man-modified). Pool VP5 occurs within a slow moving stream, and therefore, does not meet the state's physical description of a vernal pool. A significant vernal pool, as defined by state regulations, needs 10 or more blue-spotted salamander egg masses, 40 or more wood frog egg masses, 20 or more spotted salamander egg masses or presence of fairy shrimp. The only pool meeting the criteria for egg mass numbers was pool VP5, which cannot be State significant because it is within a stream and has an inlet and outlet. Stream 1, which flows out of Wetland 1, and Stream 12 that outflows Wetland 2, are most notable for their spotted salamander breeding activity with 18 and 14 egg masses counted within, respectively.

Pools were visited twice in order to properly document the peak breeding activity wood frogs and salamanders. Numbers of egg masses within a pool can vary season to season, and also within one season. For example, when observing pools for a second visit, egg masses in VP3 were gone. One possible explanation is predation. Table 2 displays the highest number of egg masses found at each pool.

Table 4. Vernal Pool Biological and Physical Characteristics.

Name	Wood Frog Egg Masses	Spotted Salamander Egg Masses	Blue-spotted Salamander Egg Masses	Fairy Shrimp	Inlet/Outlet	Natural?	State form
VP1	1	16	0	none	no	yes	X
VP2	0	3	0	none	intermittent	yes	X
VP3	0	1	1	none	no	yes	
VP4	0	4	0	none	intermittent	modified	X
VP5	0	7	0	none	no	yes	
VP6	0	3	0	none	intermittent	modified	X
VP7	0	9	0	none	no	modified	X
VP8	0	3	0	none	no	yes	
VP9	0	30	0	none	permanent	yes	X

Regardless of state status (i.e., significant or not significant), these pools represent biological resources and serve as critical features to the wildlife food web of the entire area. Attachment C contains completed State data forms for selected pools.

4.4.2 Other Wildlife

Deer sign was observed throughout Parcels A and B. Common songbirds observed included Blue Jays, black-capped chickadee, and northern cardinal. We observed osprey habitat and one active nesting site along the cliffs to Long Reach (Photo 13). A total of three Ospreys were observed perching on the cliffs on April 19th, 2011. The osprey nest is visible from the trail and hikers easily disturb the osprey when walking in its vicinity. We recommend closing portion of the cliff trail, beginning at the bald overlook and ending where the cliff trail takes a sharp turn west, away from the Long Reach cliffs. This portion of the cliff trail should be closed beginning April and, if the nest is not abandoned, continue through June. The purpose of this time period is to allow undisturbed nesting and rearing of young to the point where the young can leave the nest in late June. The location of recommended trail closure is shown in Figure 6.

Photos 13 and 14: Osprey perched along cliff of Long Reach. Inset: Fox kit on Parcel B.

A fox den with three kits was observed on the slope next to cell tower on Parcel B (Photo 14). It is expected that other small mammals native to Maine are also using these parcels including Skunks, Raccoons, and Opossums.

A table of species that use portions of shoreline habitat in Maine is contained in Attachment E-1. Of the listed species, many including the Spotted salamander, Wood frog, Great blue heron, Osprey, Wood thrush, Red-eyed vireo, Black and white warbler, and Red fox have been observed or evidence that they are present have been observed.

In the water surrounding the land parcels, many fish and shellfish species exist. Eel grass beds have been mapped close to the parcels as shown on the maps in Attachment F. Eel grass beds provide valuable cover for many species native to Maine's coastal waters. A listing of species that are expected to occur in the ocean habitat surrounding the parcels is provided in Attachment E-2 (Maine Audubon Society, 2006b).

4.5 RARE HABITATS

The vast majority of the properties are upland spruce-fir forests with a regenerative spruce-fir understory. Using the ""Natural Landscapes of Maine: A Guide to Natural Communities and Ecosystems" (Gawler and Cutko, 2010), it was determined that the site is a Spruce-Fir-Broom-moss Forest community which is a common community type for the State of Maine.

The Cliff Trail Viewpoint (Photo 15) is a near-half-acre rock outcrop ecosystem which is characterized by exposed bedrock with thin soil pockets, little tree cover (<30%), and dominated by low shrubs and herbs. Specifically, the viewpoint is likely to be a rare S3 Low Elevation Bald ecosystem represented by the Three-toothed Cinquefoil-Blueberry Low Summit community described by Gawler and Cutko (Gawler and Cutko, 2010). Rare habitats are described as occurring only 20 to 100 times in the state. This community type occurs in small patches, has sparse vegetation (10-50% cover), and little to no tree canopy cover. Broom-crowberry (*Cormea conradii*), lowbush blueberry (*Vaccinium angustifolium*), awned hair-capped moss (*Polytrichum piliferum*), and reindeer lichen (*Cladina spp.*) were observed growing on the viewpoint and are all characteristic plants of a Three-toothed Cinquefoil-Blueberry Low Summit community as described in "Natural Landscapes of Maine"" (Gawler and Cutko, 2010). Characteristic plants of Three-toothed Cinquefoil-Blueberry Low Summit communities that were not found on the Cliff Trail Viewpoint include black chokeberry (*Photinia melanocarpa*), poverty oatgrass (*Danthonia spicata*), and three-toothed cinquefoil (*Sibbaldiopsis tridentate*). It is possible that the unknown grass speculated as being *Danthonia spp*. could be poverty oatgrass. Investigations of the site later in the summer may reveal this species as well some rare plants associated with this community type.

In response to our inquiry letter to the Maine Natural Areas Program, a table of rare and exemplary botanical features occurring in the vicinity of the project site was provided and is contained in Attachment A.

Photo 15: Cliff Trail Viewpoint plant community is characteristic of a Three-toothed Cinquefoil-Blueberry Low Summit.

5.0 EVALUATION OF LANDS FOR POTENTIAL DEVELOPMENT

Several restrictions to development exist on these parcels. The eastern side of the property (eastern side of Parcel A and B, and Parcel D) contains slopes greater than 20 percent and soils that are shallow to bedrock. Slopes and the presence of bedrock can make development expensive as blasting may be required for foundations and infrastructure installation. Development on slopes greater than 20 percent may also cause erosion of the land without proper engineering controls. It can also have scenic impacts due to extensive cut and fills.

The central and western portion of Parcel A contains wetlands, vernal pools, and streams (see Figure 7). The 100 year flood zone is also predicted on a portion of the parcel around Strawberry Creek (see Figure 3) and a majority of Strawberry Creek is mapped as Tidal Wading Bird and Waterfowl Habitat.

Resource Protection zoning is currently shown along the water's edge of these parcels, likely due to the presence of mapped moderate to high value tidal wading bird and waterfowl habitat and/or the land occurs within the 100 year floodplain. An additional area of land was found that was considered to qualify for Resource Protection zoning as described by the Harpswell Shoreland Zoning Ordinance. An area of slopes greater than 20 percent was identified but the area was found to be less than 2 acres in size and therefore, does not qualify for Resource Protection zoning under the ordinance. The location of this area is shown on Figure 6 near the southern boundary of Parcel B.

Two areas were identified as preferable for potential development. The first area is located east of Wetland 2 (WL-2) on Parcel A. In this area, about 2 acres of development could occur without impacts to natural resources, and staying outside the flood zone mapped to the southwest. Soils in the area are mapped as Belgrade and should be deep enough for most types of infrastructure and foundations. To access this area of the site, a road would need to be constructed, likely from Town Hall, and cross at least one stream. The location of this area is shown on Figure 8.

A second area of potential development without severe limitations is the area that makes up Parcel E. Deep, upland soils (>4 feet) are mapped in this area. Structures proposed on this parcel would need to be constructed outside of the 100 year flood zone but that would still leave about 16,000 square feet for development. This site is of particular interest as it may be able to host a boat ramp or waterfront park. Scenic views are offered from the land as it has frontage on Harpswell Sound. Any use should be consistent with the preservation of valuable shellfish beds and scenic value that Harpswell Sound provides.

Any plan for development of these areas should involve additional detailed assessment of the areas to plan foundation types, infrastructure routing and costs, and formal wetland delineations for permitting purposes. Additional information may also be required to obtain required permits. The MEIFW recommended that a buffer of 100 feet, versus 75 feet required by law, be maintained between any development, and streams and associated wetlands due to the sensitive nature of the fisheries resources in the area (See Attachment A).

The area east of the Town Hall (between the Town hall and Stream S-11) is also relatively flat but soil mapping and observations made indicate soils are thin in this location and bedrock could hamper development.

This was also true of land in the southwest corner of Parcel A. There were no natural resources mapped in this area but soils are mapped as shallow to bedrock and rock outcrops were observed in the area. Slopes approaching 20 percent were also observed in this location.

The next steps in development would be to:

1. Select a development location based on needs,
2. Conduct formal wetland and natural resource assessment for permitting purposes,
3. Complete a formal conceptual design of the development and cost estimate,
4. Complete a geotechnical evaluation and soil mapping, as required by state and local ordinances,
5. Complete a formal design of the facility,
6. Apply for required permits for the development.

Step 1 would be completed by the Town. Step 2 can be completed by Normandeau or a similar firm. Steps 3 and 5 would be completed by a consulting engineer to be hired by the Town. Steps 4 and 6 would likely be a combined effort of the consulting engineer and Normandeau Associates or a similar firm. Information on local engineering companies can be provided upon request.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the data collected through existing literature sources and through field data collection, the following conclusions can be made:

- The existing trail network provides a good opportunity for the public to enjoy this property. Many views are scenic and the existing trail network provides views of a variety of habitats and natural features.

- Some areas of erosion along the Cliff Trail were observed and should be addressed to prevent further degradation.

- A good portion of land on the east side of the property, comprised of the five parcels, are shallow to bedrock and contain severe slopes that will present challenges for development. This portion of the property (i.e., the 5 parcels) also affords very scenic views of Long Reach and the surrounding landforms.

- Common natural resources including wetlands, vernal pools and streams occur on the property.

Based on the conclusions made during the assessment, the following recommendations are made:

- The Cliff Trail should undergo some maintenance for erosion. The erosion points described in Section 4 are listed in Attachment D to this report. The table in Attachment D also contains recommended actions to correct the conditions.

- The parcels provide public access to high quality scenic views in a relatively undisturbed natural setting. Therefore, it is recommended that the areas on the east side of Parcels A and B and all of Parcel D be preserved for public recreational use. These areas have soils that are shallow to bedrock and have severe slopes that may greatly add to the cost of development in these areas.

- Closure of portions of the Cliff Trail is recommended during Osprey and raptor nesting periods (April through June). This will allow time for Osprey and other birds to build nests, incubate and nestle their young without being displaced. Alternatively, the trail could be relocated to provide more of a buffer between the nesting area and the trail.

- Two areas on the five parcels were identified as most suitable for development as they had the fewest limitations. Other areas of the parcels could be developed but have limitations based on soil depth, severe slopes, and/or the presence of natural resources.

- It is recommended that the vernal pool data forms be filed with the MDIFW. By submitting these forms, the vernal pools surveyed will always be classified as non-significant vernal pools and there will be no need to survey them again in the future.

7.0 REFERENCES

Gawler and Cutko, 2010. "Natural Landscapes of Maine: A Guide to Natural Communities and Ecosystems". Mine Natural Areas Program, Maine Department of Conservation, Augusta, Maine.

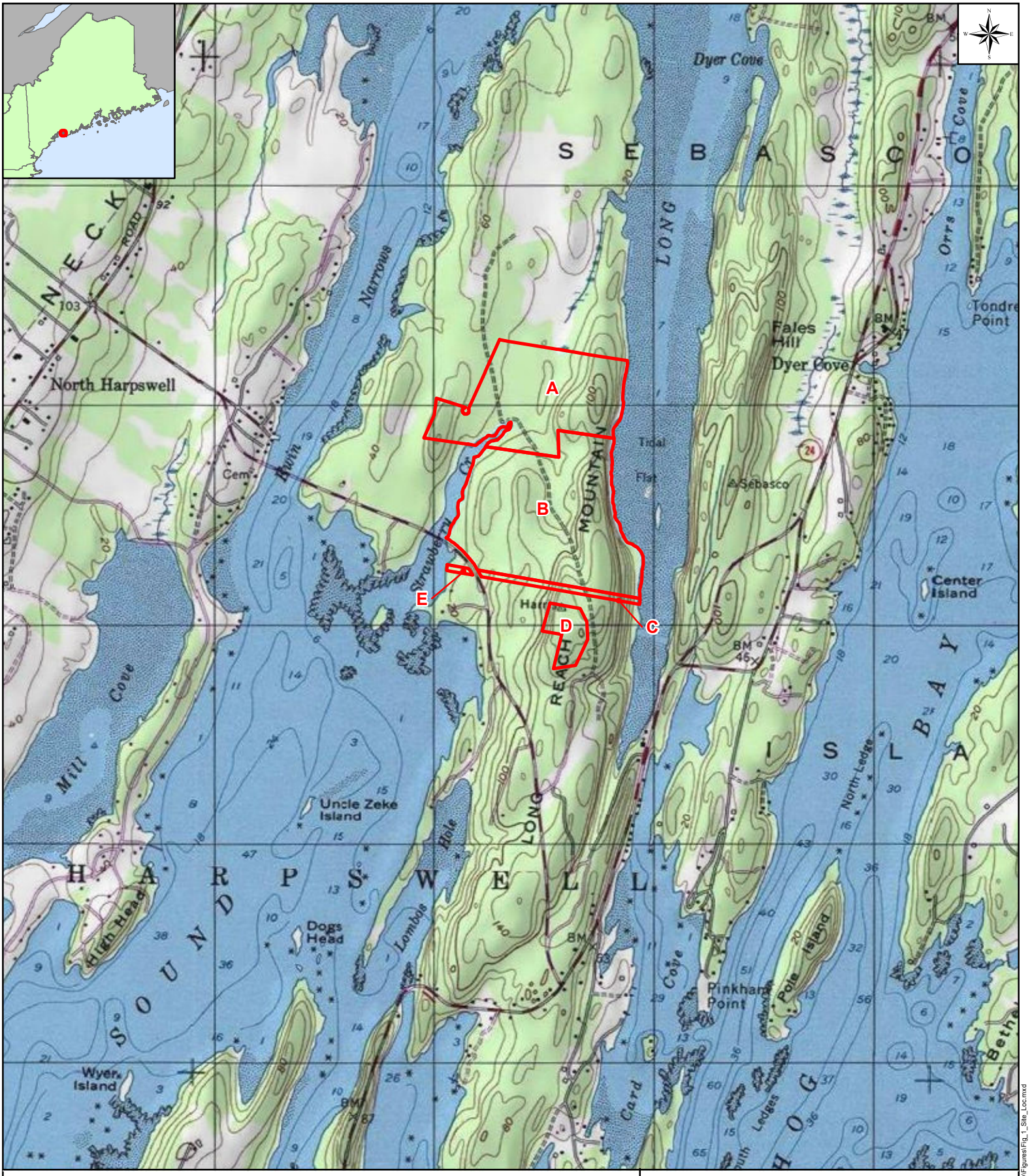
Maine Audubon Society, 2006a."Conserving Wildlife in Maine's Shoreland Habitats". Maine Audubon Society, Falmouth, Maine, 2006.

Maine Audubon Society, 2006b. "Conserving Wildlife in Maine's Coastal Habitats". Maine Audubon Society, Falmouth, Maine, 2006.

MEGIS, 2011. Maine Office of GIS; Maine Office of Information Technology ; Various Data Layers. March and April, 2011, Augusta, Maine.

Woodlot Alternatives, 2001. "Figure 2-Wetland Delineation Map; Town Hall Project". Topsham, Maine.

FIGURES



Project Parcels

A Parcel ID

Figure 1. Site Location Map and Parcels
Harpswell Town-owned Parcels

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
8 Fundy Road, Falmouth, ME 04105

Source: ArcGIS Data Online, USA Topo Maps

2,000 0 2,000
Feet

Harpswell

Cumberland Co., Maine

Filename:	Drawn By:	Date:	NAI Project No:
Fig_1_Site_Loc.mxd	jlavallee	7/14/2011	22422.000

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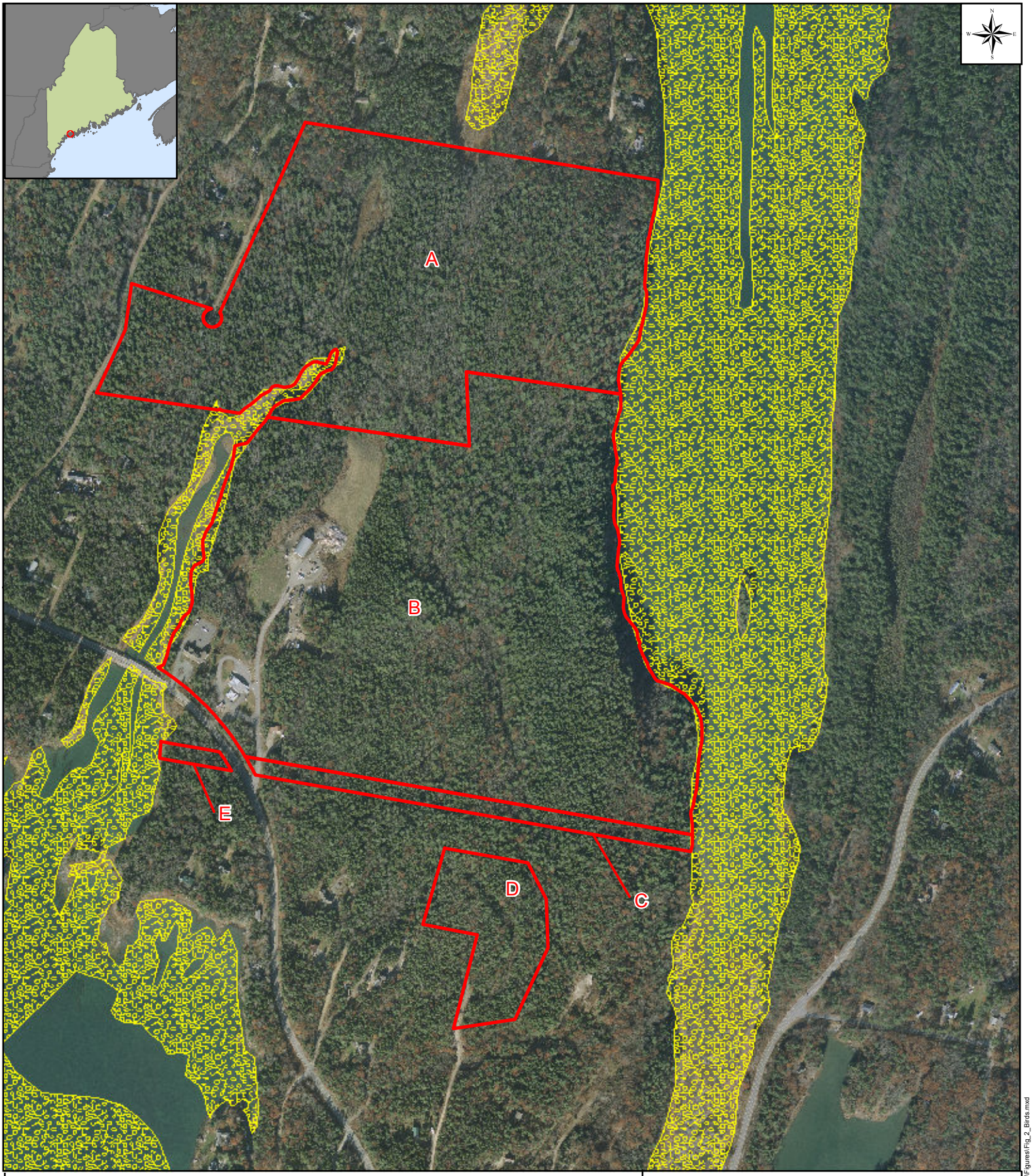

Legend

Project Parcels

A Parcel ID

Tidal Wading Bird and Waterfowl Habitat (High and Moderate Values)

Figure 2. Moderate to High Tidal Waterfowl and Wading Bird Habitat Harpswell Town-owned Parcels

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
8 Fundy Road, Falmouth, ME 04105

Source: Maine DEP, Tidal Wading Waterfowl; MEGIS WMS Maine Orthos, Cumberland County 1Ft, 2009.

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Harpswell

Cumberland Co., Maine

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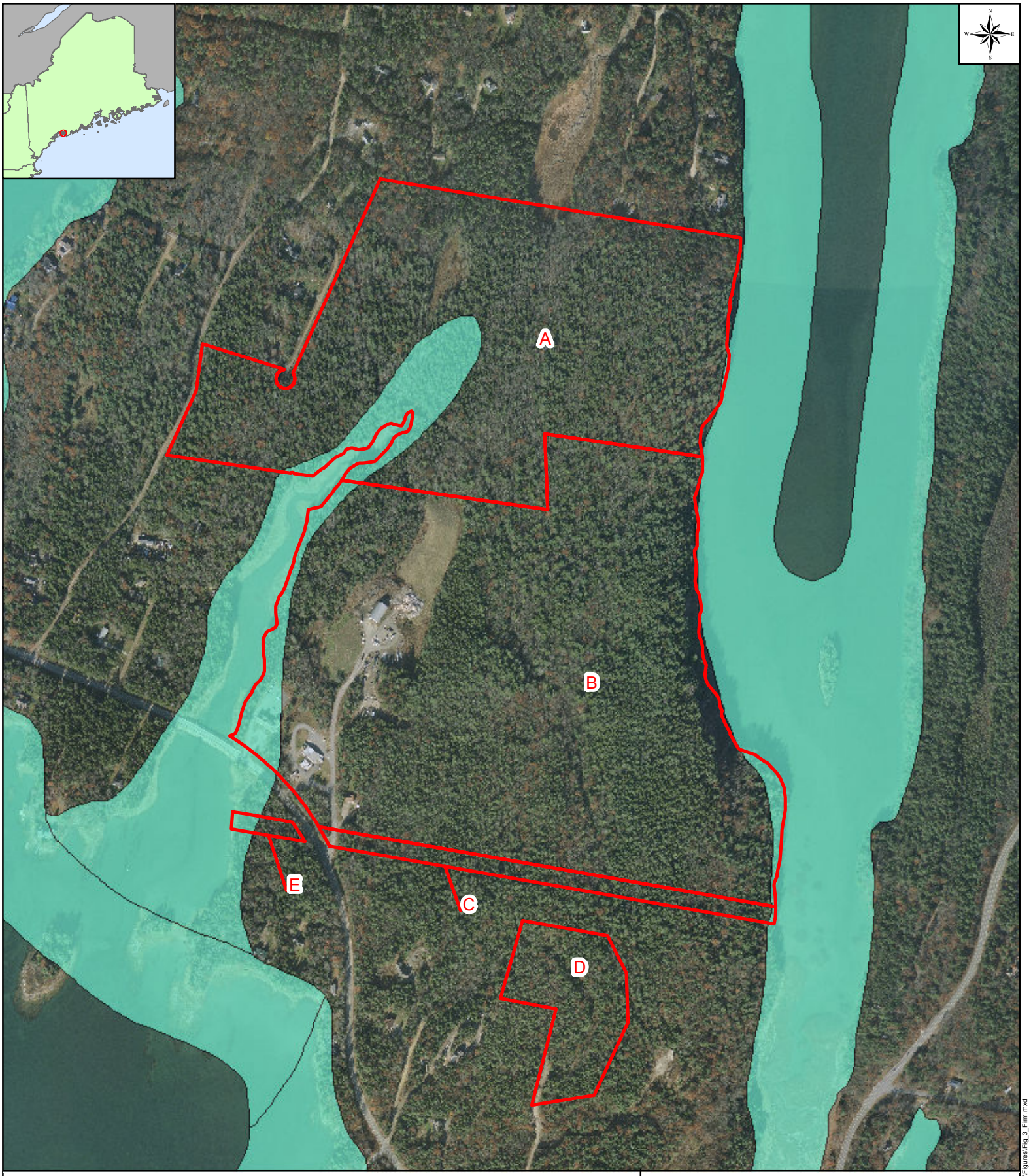

Legend

Project Parcels

100-Year Floodplain

Figure 3. 100-Year Floodplain Harpswell Town-owned Parcels

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
8 Fundy Road, Falmouth, ME 04105

Source: FEMA, MEGIS, FEMA Q3 Flood Data, 2002; MEGIS WMS Maine Orthos, Cumberland County 1Ft, 2009.

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Harpswell

Cumberland Co., Maine

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Drawn By: jlavallee

Date: 7/14/2011

NAI Project No: 22422.000

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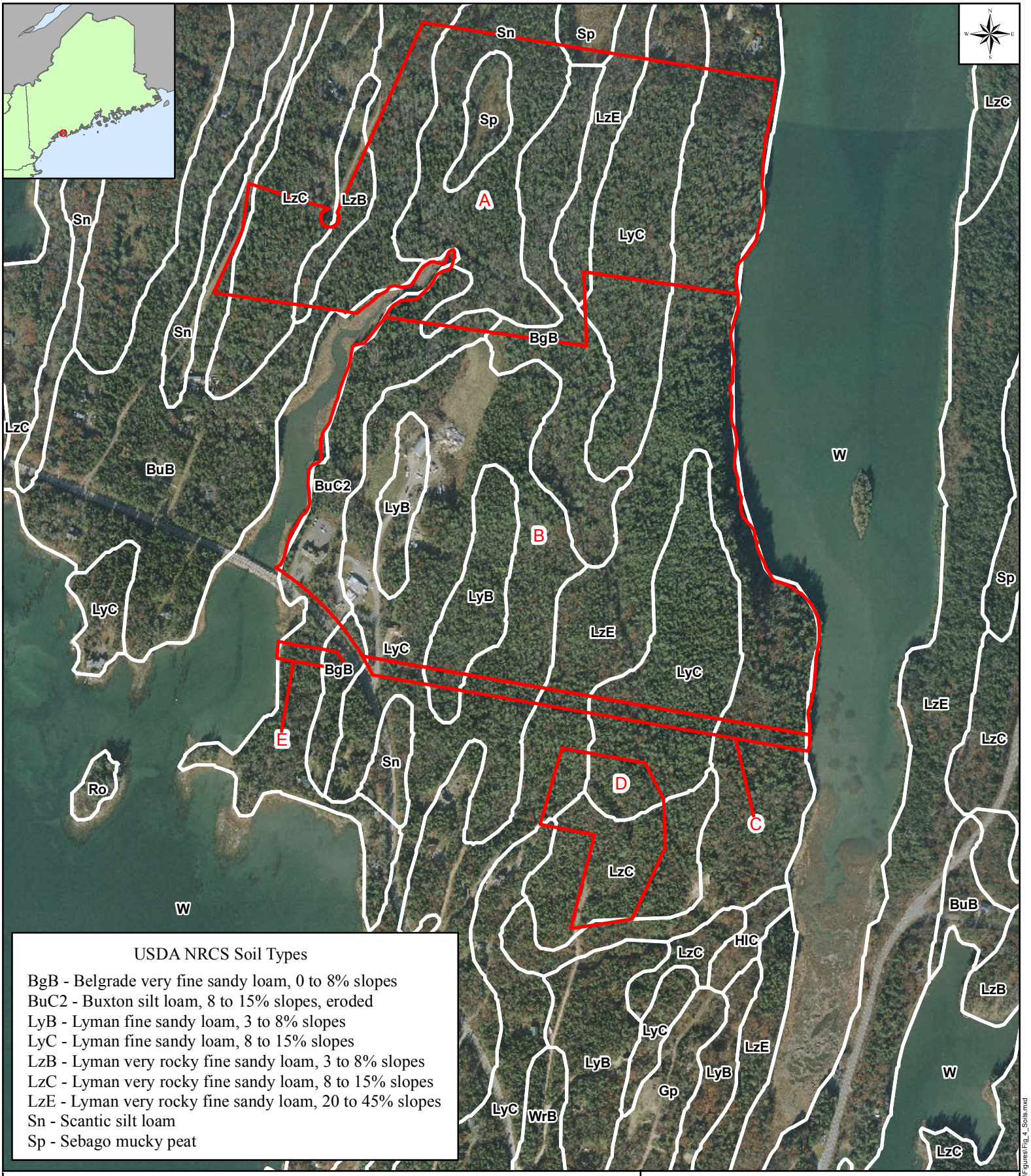

Legend

Project Parcels

Figure 4. USDA NRCS Soils
Harpswell Town-owned Parcels

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
8 Fundy Road, Falmouth, ME 04105

Source: USDA NRCS SSURGO Soils Cumberland County, 2009; MEGIS WMS Maine Orthos, Cumberland County 1Ft, 2009.

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Harpswell | Cumberland Co., Maine

Filename: Fig_4_Soils.mxd | Drawn By: jlavallee | Date: 7/14/2011 | NAI Project No: 22422.000

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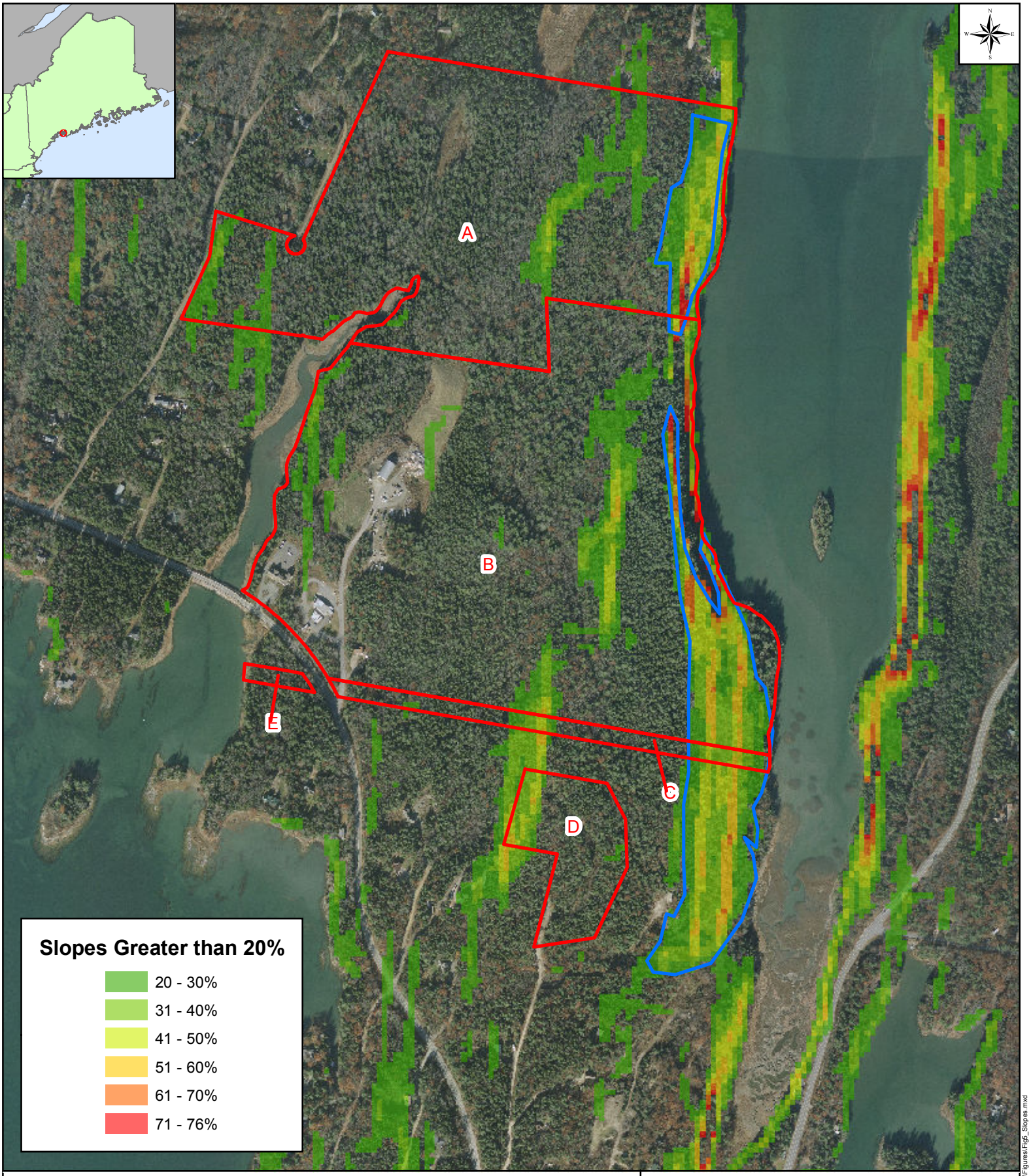

Legend

Project Parcels

Area to be Considered for Resource Protection Zoning

Figure 5. Areas with Slopes Greater than 20%
Harpswell Town-owned Parcels

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
8 Fundy Road, Falmouth, ME 04105

Source: USGS, NED, 1/3 Arc Second, 2009;
MEGIS WMS Maine Orthos, Cumberland County 1Ft, 2009.

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Feet

Harpswell

Cumberland Co., Maine

Filename: Fig5_Slopes.mxd

Drawn By: jlavallee

Date: 7/15/2011

NAI Project No: 22422.000

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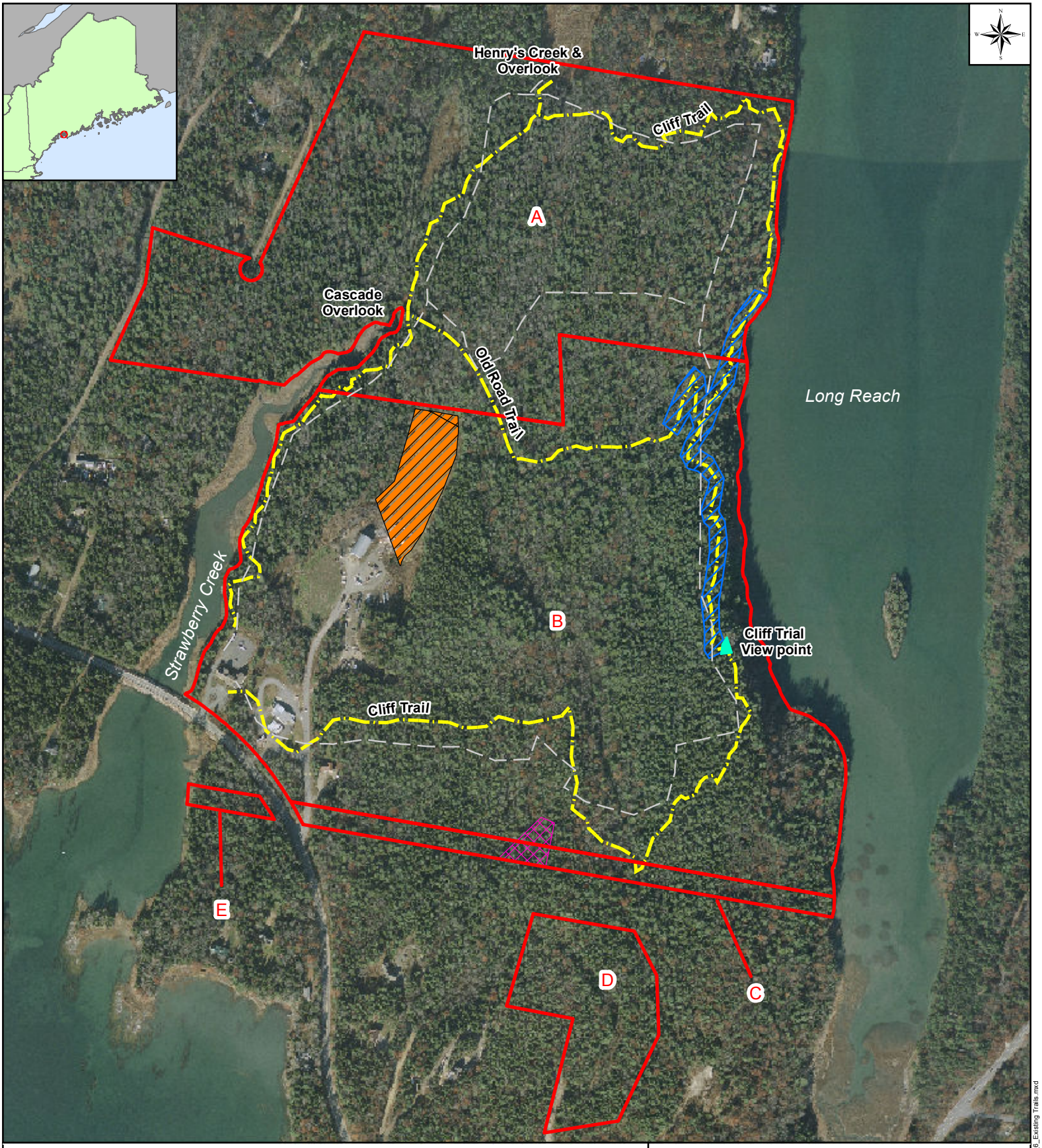

Legend

- Project Parcels
- NAI Delineated Trails
- Previously Mappped Trails
- Trail Closure Area
- Low Elevation Bald Community
- Slope Area
- Landfill

Figure 6. Existing Trails
Harpswell Town-owned Parcels

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
8 Fundy Road, Falmouth, ME 04105

Source: Normandeau Associates, 2011; Town of Harpswell Trail Map 2010; MEGIS WMS Maine Orthos, Cumberland County 1Ft, 2009.

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Feet

Harpswell

Cumberland Co., Maine

Filename: Fig_6_Existing Trails.mxd
Drawn By: jlavallee
Date: 7/14/2011
NAI Project No: 22422.000

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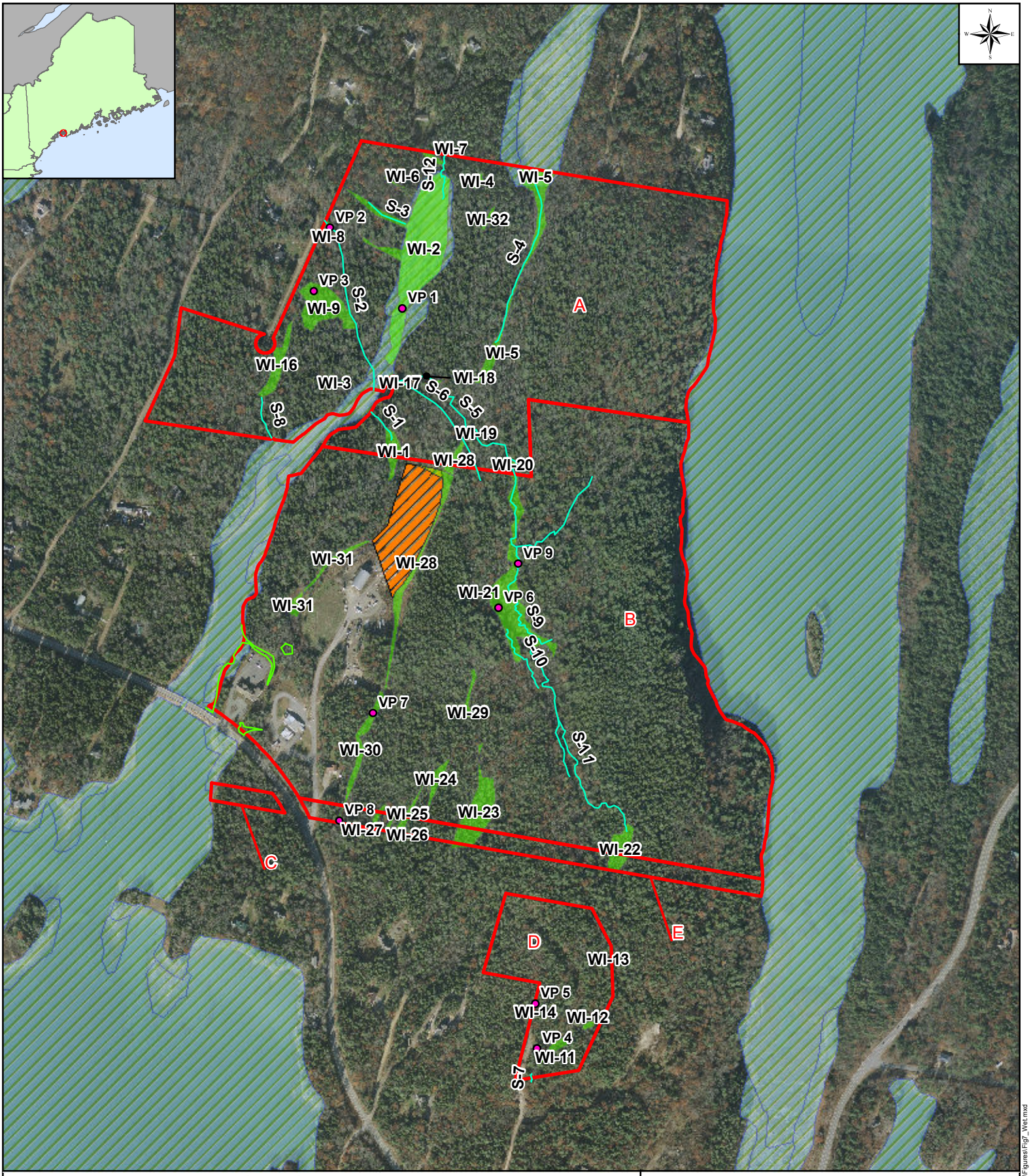

Legend

Project Parcels — Previous Delineation Data* — Landfill
Stream — Vernal Pool — A Parcel ID
Wetlands — NWI Wetlands

Figure 7. Observed Wetlands, Streams and Vernal Pools Harpswell Town-owned Parcels

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
8 Fundy Road, Falmouth, ME 04105

Source: * Woodlot Alternatives Delineation, 2001; Normandeau Associates, 2011; MEGIS WMS, Maine Orthos, Cumberland County 1Ft, 2009.

500 0 500 1,000
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Harpswell | Cumberland Co., Maine

Filename:	Drawn By:	Date:	NAI Project No:
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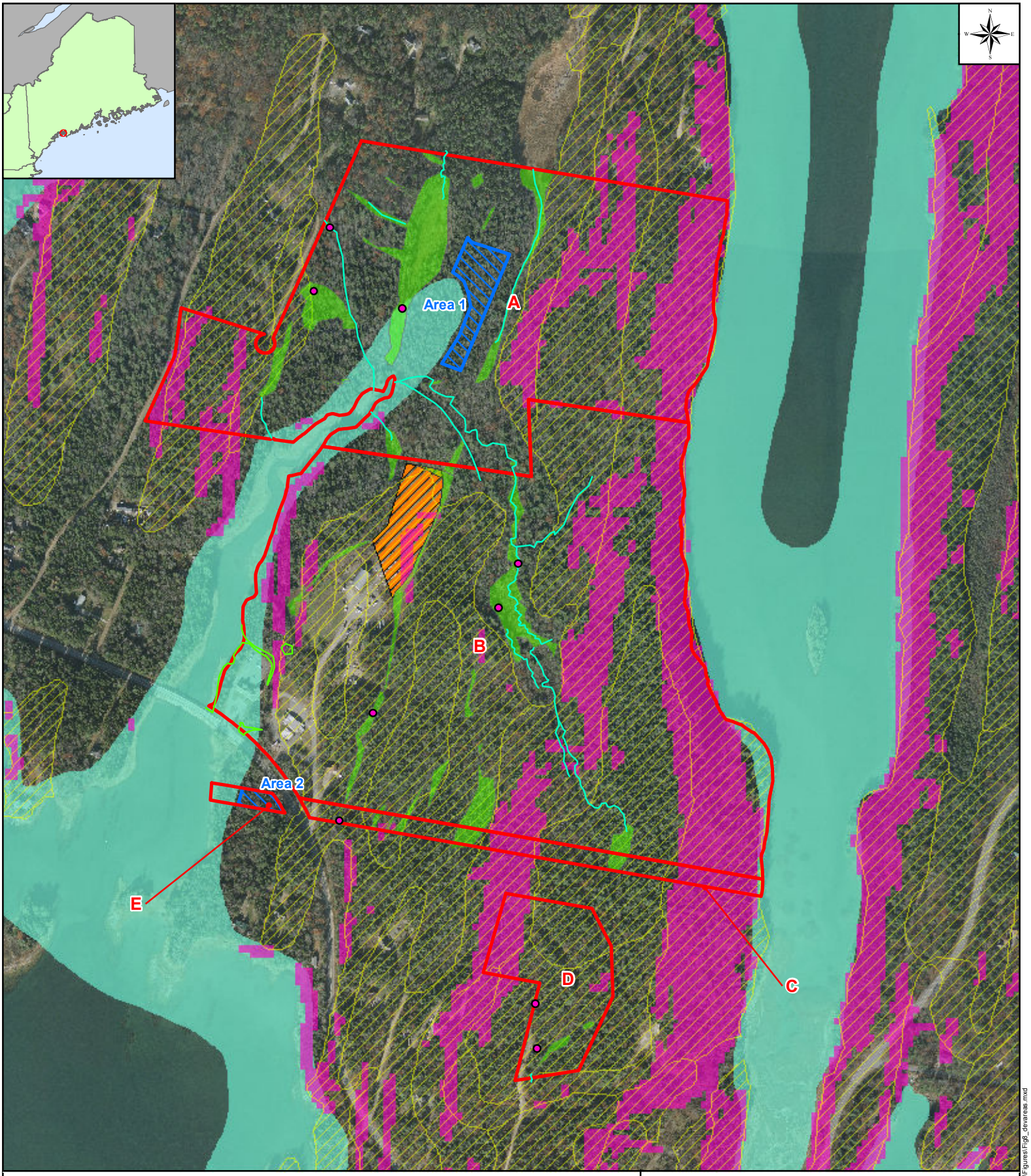

Project Parcels
Suitable Development Area
Soils Shallow to Bedrock
Previous Delineation Data*
Wetlands
Stream
Slopes greater than 20%
Vernal Pool
100-Year Floodplain
Landfill

Figure 8. Areas Most Suitable for Development Harpswell Town-owned Parcels

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
8 Fundy Road, Falmouth, ME 04105

Source: * Woodlot Alternatives Delineation, 2001; Normandeau Associates, 2011; MEGIS WMS Maine Orthos, Cumberland County 1Ft, 2009.

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Harpswell | Cumberland Co., Maine

Filename: Fig8_devareas.mxd | Drawn By: jlavallee | Date: 7/15/2011 | NAI Project No: 22422.000

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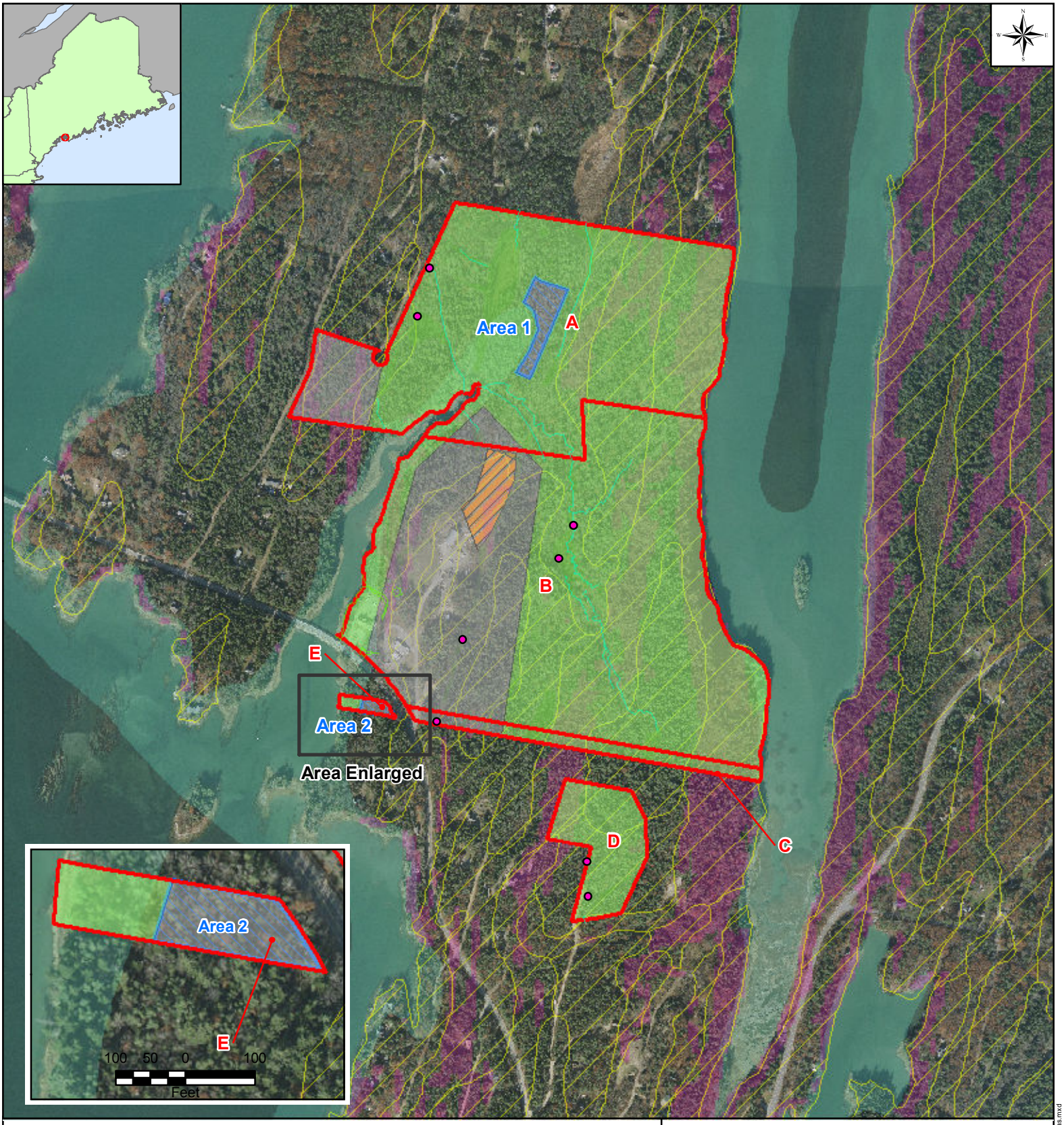

Project Parcels
Recreational and Natural Resource Conservation Area
Potential Developement Area
Most Suitable Development Area
Soils Shallow to Bedrock
Previous Delineation Data*
Wetlands
Stream
Slopes greater than 20%
Vernal Pool
100-Year Floodplain
Landfill

Figure 9. Areas of Potential Development and Conservation Harpswell Town-owned Parcels

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
8 Fundy Road, Falmouth, ME 04105

Source: * Woodlot Alternatives Delineation, 2001; Normandeau Associates, 2011; MEGIS WMS Maine Orthos, Cumberland County 1Ft, 2009.

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Harpswell | Cumberland Co., Maine

Filename: Fig9_dev&consareas.mxd
Drawn By: jlavallee
Date: 9/15/2011
NAI Project No: 22422.000

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ATTACHMENT A

RESPONSES TO REGULATORY AGENCY INQUIRY LETTERS

Maine Department of Inland
Fisheries and Wildlife
358 Shaker Road
Gray, Maine 04039

Telephone: 207-657-2345 ext.113
Fax: 207-657-2980
Email: brian.lewis @maine.gov

Paul R.. LePage, Governor

Chandler E. Woodcock,
Commissioner

April 20, 2011

Leah Koch
8 Fundy Road
Falmouth, Maine 04105

RE: Land parcels, Town of Harpswell

Dear Leah Koch

I have reviewed your request for fishery resource information, and there are no known threatened/endangered fish species or habitat in the vicinity of the proposed project. There are also no known inland fisheries resources within the indicated parcels. However, some of the indicated land borders on tidal water. The Maine Department of Marine Resources should be contacted regarding resource concerns with land bordering tidal waters. Our regional riparian buffer policy is outlined below.

Stream systems are vulnerable to environmental impacts associated with increased development and encroachment. If present, this project should be sensitive to these resource issues by including provisions for riparian buffers and minimizing any other potential stream impacts. Our regional buffer policy requests 100 foot undisturbed buffers along both sides of any stream or stream-associated wetlands. Buffers should be measured from the upland wetland edge of stream-associated wetlands, and if the natural vegetation has been previously altered then restoration may be warranted. This buffer requirement improves erosion/sedimentation problems; reduces thermal impacts; maintains water quality; supplies leaf litter and woody debris for the system; and provides valuable wildlife habitat. Protection of these important riparian functions insures that the overall health of the stream habitat is maintained.

Stream crossings, if applicable, must include provisions for adequate fish passage, and any in-stream work needs to be done between the first of July and the first of October. Project design should minimize the number of stream crossings. If you have any additional questions or concerns then feel free to contact us.

Sincerely,

Brian Lewis
Fishery Specialist
MDIFW

NORMANDEAU ASSOCIATES, INC.
8 Fundy Road
Falmouth, ME 04105
(207) 797-7717
(207) 797-7771 (Fax)
www.normandeau.com

RECEIVED
MAR 17 2011
0431-11

March 15, 2011

Earle G. Shettleworth, Jr.
Maine Historic Preservation Commission
55 Capitol Street
Augusta, ME 04333

Subject: **Significant Historic Resources Information**
Town of Harpswell, Maine Natural Resource Assessment Assistance

Dear Mr. Shettleworth,

Normandeau Associates, Inc. (Normandeau) is working on behalf of the Town of Harpswell, Maine to delineate and characterize the natural resources of five Town-owned parcels on the western side of Long Reach in Harpswell. The purpose of the natural resources investigation is to determine appropriate future land uses for these parcels.

As part of this evaluation, we would like to request any information regarding listed historic or archaeological resources or other sensitive areas associated with the project area. The attached map depicts the location of the five parcels.

Thank you for your time. Please return your response to my attention at the address listed above.

Sincerely,

Leah Koch
Project Scientist

Based on the information submitted, I have concluded that there will be no historic properties affected by the proposed undertaking, as defined by Section 106 of the National Historic Preservation Act. Consequently, pursuant to 36 CFR 800.4(d)(1), no further Section 106 consultation is required unless additional resources are discovered during project implementation pursuant to 36 CFR 800.13.

Kirk F. Mohney, 4/4/11
Kirk F. Mohney, Date
Deputy State Historic Preservation Officer
Maine Historic Preservation Commission

STATE OF MAINE
DEPARTMENT OF CONSERVATION
93 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0093

PAUL R. LEPAGE
GOVERNOR

WILLIAM H. BEARDSLEY
COMMISSIONER

March 17, 2011

Leah Koch
Normandeau Associates, Inc.
8 Fundy Road
Falmouth, ME 04105

Re: Rare and exemplary botanical features in proximity to: Proposed Project #22422.000, Town Parcels, Harpswell, Maine

Dear Ms. Koch:

I have searched the Natural Areas Program's Biological and Conservation Data System files in response to your request of March 15, 2011 for information on the presence of rare or unique botanical features documented from the vicinity of the project site in Harpswell, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare botanical features. To our knowledge no botanical surveys have been conducted at this site. Based on the map sent it appears the parcel may include and area, in the northwest corner that has characteristics that are sometimes associated with certain rare plant species (see area noted on attached topo map). The characteristics are steep slope, ledge, talus, and a southerly orientation. If this area is on the parcel, and it will be impacted by the proposed development, then we would suggest a rare plant survey be conducted. If this area is not on the parcel, or will not be impacted by the proposed development, then no survey would be recommended.

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features that have been known to occur historically in the area as well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

This finding is available and appropriate for preparation and review of environmental assessments,

MAINE NATURAL AREAS PROGRAM
MOLLY DOCHERTY, DIRECTOR

PHONE: (207) 287-8044
FAX: (207) 287-8040
TTY: (207) 287-2213

Rare and Exemplary Botanical Features in the Project Vicinity

Documented within a four-mile radius of the NAI Project #22422.000, Town Parcels, Harpswell, Maine.

Feature Name	Global Rank	State Rank	State Status	EO Number	Last Seen	Habitat
Three-toothed cinquefoil - blueberry low summit bald	GNR	S3		2	1989-04-17	Rocky summits and outcrops (non-forested, upland)
Rhododendron maximum	G5	S1	T	9	2006-06-19	Hardwood to mixed forest (forest, upland)
Suaeda calceoliformis	G5	S2	T	4	1899	Tidal wetland (non-forested, wetland)
Allium canadense	G5	S2	SC	7	1920-08-03	Forested wetland
Cypripedium reginae	G4	S3	T	38	1907-07-09	Open wetland, not coastal nor rivershore (non-forested, wetland)
Aletris farinosa	G5	SX	PE	1	1884	Dry barrens (partly forested, upland)
Carex vestita	G5	S1	E	1	1898-06-15	Dry barrens (partly forested, upland)
Sassafras albidum	G5	S2	SC	10	1906	Old field / roadside (non-forested, wetland or upland)
Lonicera dioica	G5	S2	E	4	1933-09	Dry barrens (partly forested, upland)
Mikania scandens	G5	SH	PE	1	1916-08	Dry barrens (partly forested, upland)
Bidens eatonii	G2G3	S2	SC	5	1921-09-17	Tidal wetland (non-forested, wetland)
Lonicera dioica	G5	S2	E	3	1912-06	Hardwood to mixed forest (forest, upland)
Three-toothed cinquefoil - blueberry low summit bald	GNR	S3		1	1989-04-17	Rocky summits and outcrops (non-forested, upland)
Lonicera dioica	G5	S2	E	2	1911-06	Hardwood to mixed forest (forest, upland)
Spartina saltmarsh	G5	S3		25	2006-10-30	Tidal wetland (non-forested, wetland)
Chimaphila maculata	G5	S2	E	26	2006-10-04	Hardwood to mixed forest (forest, upland)

STATE RARITY RANKS

S1	Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
S2	Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
S3	Rare in Maine (20-100 occurrences).
S4	Apparently secure in Maine.
S5	Demonstrably secure in Maine.
SH	Known historically from the state, not verified in the past 20 years.
SX	Apparently extirpated from the state, loss of last known occurrence has been documented.
SU	Under consideration for assigning rarity status; more information needed on threats or distribution.
S#?	Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

Note: **State Rarity Ranks** are determined by the Maine Natural Areas Program.

GLOBAL RARITY RANKS

G1	Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extinction.
G2	Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
G3	Globally rare (20-100 occurrences).
G4	Apparently secure globally.
G5	Demonstrably secure globally.

Note: **Global Ranks** are determined by NatureServe.

STATE LEGAL STATUS

Note: State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's **Endangered** and **Threatened** plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

E	ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.
T	THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.

NON-LEGAL STATUS

SC	SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.
PE	Potentially Extirpated; Species has not been documented in Maine in past 20 years or loss of last known occurrence has been documented.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
55 Great Republic Drive
Gloucester, MA 01930-2290

RESPONSE TO INFORMATION REQUEST

This standard form is provided in response to your request for information regarding the presence and distribution of essential fish habitat (EFH) and fishery resources in the vicinity of your proposed action.

Essential Fish Habitat
A complete list of species and life stages for which EFH has been designated can be found on the National Marine Fisheries Service (NMFS) Habitat Conservation Division website at: http://www.nero.noaa/ro/doc/webintro.html. The website also contains information on descriptions of EFH for each species, guidance on the EFH consultation process including EFH assessments, and information relevant to other NMFS mandates.

The Magnuson-Stevens Fisheries Conservation and Management Act (MSA) and the Fish and Wildlife Coordination Act (FWCA) require federal agencies to consult with the NMFS on their proposed activities. Insofar as a project involves EFH, this process is guided by the requirements of our EFH regulations at 50 CFR 600.905, which mandates the preparation of EFH assessments and generally outlines each agency's obligations in this consultation procedure.

The required contents of an EFH assessment include: 1) a description of the action; 2) an analysis of the potential adverse effects of the action on EFH and the managed species; 3) the federal agency's conclusion regarding the effects of the action on EFH; and 4) proposed mitigation, if applicable. Other information that should be contained in the EFH assessment, if appropriate, includes: 1) the results of on-site inspections to evaluate the habitat and site-specific effects; 2) the views of recognized experts on the habitat or the species that may be affected; 3) a review of pertinent literature and related information; and 4) an analysis of alternatives to the action that could avoid or minimize the adverse effects on EFH. Upon submittal of an EFH assessment by the federal action agency, the NMFS will provide conservation recommendations for the proposed project, as necessary.

Protected Species
Information regarding the Endangered Species Act or Marine Mammal Protection Act will be provided under separate cover from the NMFS Protected Resources Division. Questions regarding Endangered Species Act Section 7 consultations should be directed to Julie Crocker, Julie.Crocker@noaa.gov, 978-281-9300 x 6530.

Additional Information
Should you require additional information regarding EFH or FWCA consultations, please contact Lou Chiarella, New England Field Office Supervisor for Habitat Conservation, Lou.Chiarella@noaa.gov, 978-281-9277.

NORMANDEAU ASSOCIATES, INC.
8 Fundy Road
Falmouth, ME 04105
(207) 797-7717
(207) 797-7761 (Fax)
www.normandeau.com

March 15, 2011

Shawn McDermott
National Marine Fisheries Service
P.O. Box 190
Gloucester, MA 01930-2298

Subject: **Essential Fish Habitat Information**
Town of Harpswell, Maine Natural Resource Assessment Assistance

Dear Mr. McDermott,

Normandeau Associates, Inc. (Normandeau) is working on behalf of the Town of Harpswell, Maine to delineate and characterize the natural resources of five Town-owned parcels on the western side of Long Reach in Harpswell. The purpose of the natural resources investigation is to determine appropriate future land uses for these parcels.

As part of this evaluation, we would like to request any information regarding essential fish habitat in proximity to the project area. The attached map depicts the location of the five parcels.

Thank you for your time. Please return your response to my attention at the address listed above.

Sincerely,

Leah Koch
Project Scientist

MAR 22 2011

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Maine Field Office – Ecological Services
17 Godfrey Drive, Suite #2
Orono, ME 04473
(207) 866-3344 Fax: (207) 866-3351

FWS/Region5/ES/MEFO

March 22, 2011

Leah Koch
Normandeau Associates
8 Fundy Road
Falmouth, ME 04105

Dear Ms. Koch:

Thank you for your letter dated March 15, 2011 requesting information or recommendations from the U.S. Fish and Wildlife Service. This letter provides the Service's response pursuant to Section 7 of the Endangered Species Act (ESA), as amended (16 U.S.C. 1531-1543), Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250) and the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661-667d).

Project Name/Location: Harpswell Natural Resource Assessment Assistance

Log Number: 53411-2011-SL-0151

Federally listed species

Based on the information currently available to us, no federally threatened or endangered species under the jurisdiction of the Service are known to occur in the project area. Accordingly, no further action is required under Section 7 of the ESA, unless: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by the identified action.

Other protected species

We have not reviewed this project for state-threatened and endangered wildlife, wildlife species of special concern, and significant wildlife habitats protected under the Maine Natural Resources Protection Act. I recommend that you contact the Maine Department of Inland Fisheries and Wildlife:

TAKE PRIDE® IN AMERICA

Steve Timpano
Maine Department of Inland Fisheries and Wildlife
284 State St.
State House Station 41
Augusta, ME 04333-0041
Phone: 207 287-5258

Non-federally listed Atlantic salmon may occur in the project area. I recommend that you contact the Department of Marine Resources for additional information:

Norm Dube
Maine Department of Marine Resources
650 State St.
Bangor, ME 04401

I recommend that you contact the Maine Natural Areas Program for additional information on state-threatened and endangered plant species, plant species of special concern, and rare natural communities:

Lisa St. Hilaire
Maine Natural Areas Program
Department of Conservation
93 State House Station
Augusta, ME 04333
Phone: 207 287-8046

Bald eagles

Occasional, transient bald eagles (*Haliaeetus leucocephalus*) may occur in the area. Based on the information currently available to us, there are no bald eagle nests near your project. The bald eagle was removed from the federal threatened list on August 9, 2007 and is now protected from take under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. "Take" means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. The term "disturb" under the Bald and Golden Eagle Protection Act was recently defined within a final rule published in the Federal Register on June 5, 2007 (72 FR. 31332). "Disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle; 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

Further information on bald eagle delisting and their protection can be found at http://www.fws.gov/migratorybirds/baldeagle.htm.

Please consult with our new national bald eagle guidelines, which can found at http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf.

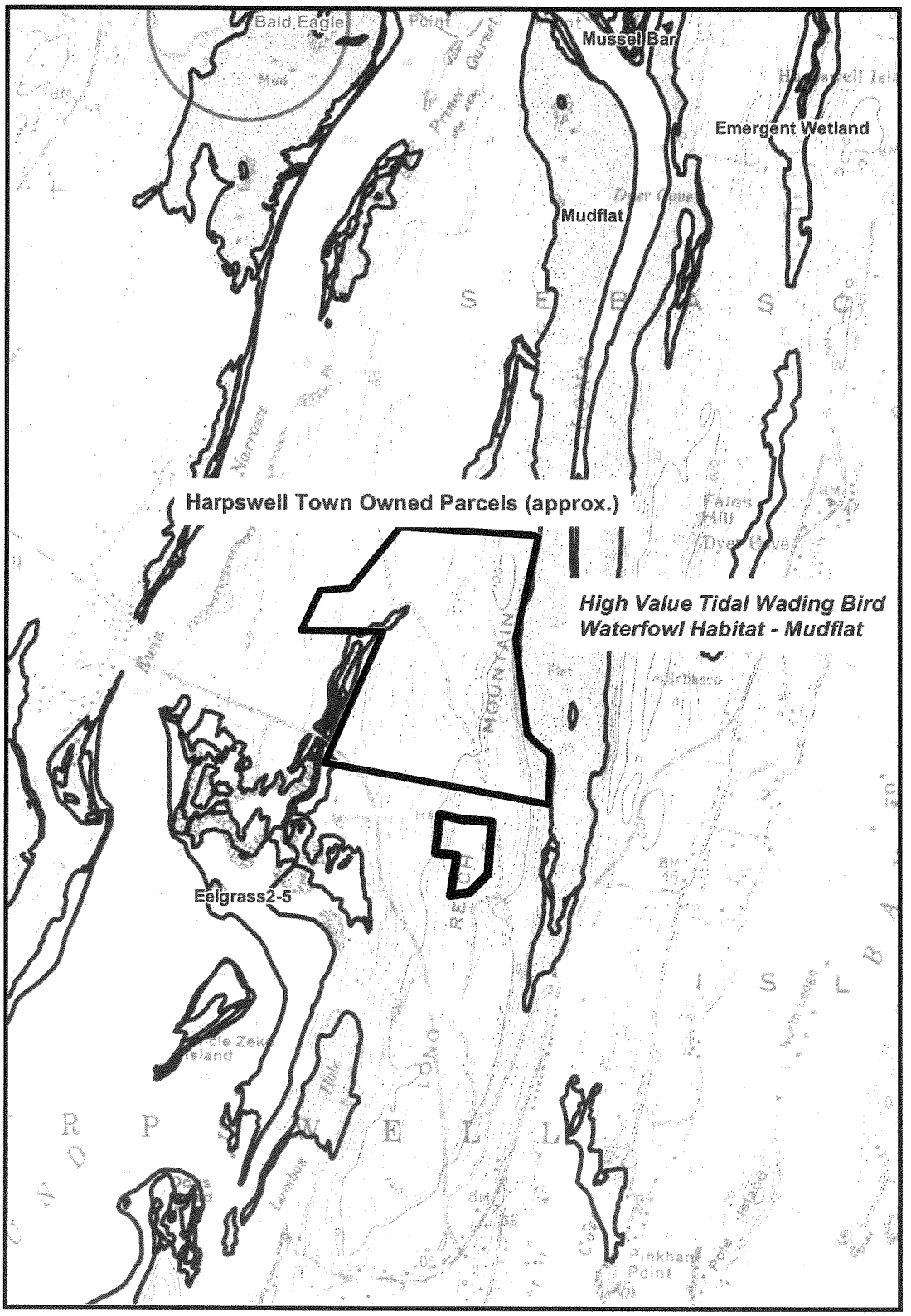
These Guidelines are voluntary and were prepared to help landowners, land managers and others meet the intent of the Eagle Act and avoid disturbing bald eagles. If you believe your project will result in taking or disturbing bald or golden eagles, please contact our office for further guidance. We encourage early and frequent consultations to avoid take of eagles.

If you have any questions, please call Mark McCollough, endangered species biologist, at (207) 866-3344 ext.115.

Sincerely,

Laury Zicari, Field Supervisor
Maine Field Office

Search for Wildlife Observations & Habitat



- Piping Plover / Least Tern Nesting, Feeding, & Brood-rearing Area
- Roseate Tern Nesting Area
- Deer Winter Area
- Inland Waterfowl / Wading Bird Habitat
- Tidal Waterfowl / Wading Bird Habitat
- Seabird Nesting Island
- Shorebird Area
- Significant Vernal Pool
- Endangered, Threatened, & Special Concern Species Habitat
- Township Boundary
- County

No upland wildlife habitats of management concern. Property is adjacnet to high value TWWH within Long Rea

0 0.2 0.4 0.6 0.8 Miles

1 = 25,073

UTM Projection, Zone 19N, NAD83

N

RR1, 358 Shaker Road
Gray, ME 04039
Voice: (207) 657-2345
Fax: (207) 657-2980
April 29, 2011

ATTACHMENT B

SOIL SERIES DESCRIPTIONS

LOCATION BELGRADE MA+CT NH NY VT

Established Series
Rev. WHT-CAW-MFF
06/2007

BELGRADE SERIES

The Belgrade series consists of very deep, moderately well drained soils formed in glaciolacustrine material. They are nearly level to moderately steep soils on terraces. Slope ranges from 0 to 25 percent. Saturated hydraulic conductivity is moderately high or high in the solum and moderately low to high in the substratum. Mean annual precipitation is about 44 inches, and the mean annual temperature is about 49 degrees F.

TAXONOMIC CLASS: Coarse-silty, mixed, active, mesic Aquic Dystric Eutrudepts

TYPICAL PEDON: Belgrade silt loam - on a 1 percent slope in a cultivated field at an elevation of about 8 meters. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 9 inches; very dark grayish brown (10YR 3/2) very fine sandy loam, light brownish gray (10YR 6/2) dry; very weak fine and medium granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary. (5 to 10 inches thick)

Bw1--9 to 20 inches; yellowish brown (10YR 5/6) very fine sandy loam; weak fine granular structure; very friable; common fine roots; slightly acid; clear wavy boundary. (6 to 32 inches thick)

BC--20 to 30 inches; light olive brown (2.5Y 5/4) very fine sandy loam; massive; very friable; few very fine roots; common prominent distinct strong brown (7.5YR 5/6) masses of iron accumulation and gray (5Y 5/1) iron depletions; slightly acid; clear wavy boundary. (0 to 12 inches thick)

C1--30 to 42 inches; light olive brown (2.5Y 5/4) very fine sandy loam; massive; very friable; many medium and coarse prominent yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) masses of iron accumulation, and gray (5Y 6/1) iron depletions; slightly acid; abrupt wavy boundary.

C2--42 to 65 inches; gray (5Y 6/1) loamy very fine sand; massive; very friable; common lenses of fine sand; many coarse prominent yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) masses of iron accumulation; neutral.

TYPE LOCATION: Essex County, Massachusetts; Town of Amesbury, 3.2 miles southwest of Amesbury Village, 550 feet north of Pleasant Valley Road and 700 feet east of Amesbury-Merrimac town line. Lat. 42 degrees 49 minutes 30 seconds N., and long. 70 degrees 58 minutes 04 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Solum thickness ranges from 20 to 44 inches. Reaction ranges from very strongly acid to neutral in the solum and from moderately acid to slightly alkaline in the C horizon; however, some subhorizon between depths of 10 and 30 inches is moderately acid to neutral. Redox depletions with a chroma of 2 or less are within a depth of 24 inches (60 cm). Gravel content ranges from 0 to 5 percent to a depth of 40 inches and 0 to 30 percent below 40 inches.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4. Dry value is 6 or more. It is silt loam or very fine sandy loam. Undisturbed areas have an A horizon with colors and textures similar to the Ap.

The Bw horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 3 to 6. Some pedons have lower Bw horizons with hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 6, with common or many redoximorphic features. The Bw horizon is typically silt loam or very fine sandy loam but includes loamy very fine sand. Structure is weak coarse prismatic, weak fine subangular blocky or weak or moderate, fine or medium granular, or the horizon is massive. Consistence ranges from firm to very friable.

The BC horizon, where present, has characteristics similar to those of the lower Bw horizons.

The C horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 to 4. It is silt loam, very fine sandy loam, or loamy very fine sand in the fine-earth fraction. Some pedons have thin strata of loamy fine sand, fine sand, or silt. Below a depth of 40 inches some pedons have unconforming strata of sand or sand and gravel, or very thin strata or varves of contrasting material. The C horizon has common to many redoximorphic features. It is usually massive, but some pedons have platy structure. Consistence ranges from firm to loose.

COMPETING SERIES: There are no other series in this family. The Bridgehampton, Boxford, Dartmouth, Enfield, Georgia, Hartland, Raynham, Scio, Suffield, Tisbury, Unadilla, and Wapping are similar soils in related families. Boxford soils are fine. Georgia soils are coarse-loamy. Suffield soils are coarse-silty over clayey. Bridgehampton, Dartmouth, Enfield, Scio, Tisbury, Unadilla, and Wapping soils have base saturation of less than 60 percent in the upper 30 inches. In addition, Enfield and Tisbury soils have sand and gravel within a depth of 40 inches. Hartland soils do not have redox depletions within a depth of 24 inches. Raynham soils have dominant chroma of 2 or less within a depth of 20 inches.

GEOGRAPHIC SETTING: Belgrade soils are nearly level to moderately steep soils on glaciolacustrine terraces. Slope ranges from 0 to 25 percent. The upper part of the soil formed in water or wind deposited material high in silt and very fine sand. The material below 40 inches is variable and ranges from gravelly sand to silt. Mean annual temperature ranges from 45 to 52 degrees F. and mean annual precipitation ranges from 40 to 47 inches. The frost free season ranges from 135 to 195 days.

GEOGRAPHICALLY ASSOCIATED SOILS: Belgrade soils are in a drainage sequence with the well drained Hartland, poorly drained Raynham, and very poorly drained Birdsall soils. Agawam, Deerfield, Enfield, Haven, Merrimac, Ninigret, Sudbury, Tisbury, and Windsor soils are on nearby glacial outwash landforms. Hadley, Limerick, Occum, Pootatuck, Rippowam, and Winooski soils are on nearby flood plains.

DRAINAGE AND PERMEABILITY: Moderately well drained. Runoff is negligible to high. Saturated hydraulic conductivity is moderately high or high in the solum and moderately low to high in the substratum.

USE AND VEGETATION: Most areas are cleared and are used mainly for growing grasses, and legumes for hay or pasture, and for silage. Some areas are used for growing potatoes, sweet corn, vegetables, and other crops and some areas are used as urban land. Common trees in woodlots are white, red and black oak, hickory, sugar maple, red maple, ash, tulip, black birch, yellow birch, beech, white pine, and hemlock.

DISTRIBUTION AND EXTENT: Massachusetts, New Hampshire, New York, and Vermont (MLRAs 142, 144A, 144B, 145, and 149B). The soil is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Hartford County, Connecticut, 1959.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

1. Ochric epipedon - the zone from the soil surface to a depth of 9 inches (Ap horizon).
2. Cambic horizon - the zone from 9 to 30 inches (Bw and BC horizon).
3. Coarse-silty feature - the zone from 10 to 40 inches contains less than 15 percent sand that is coarser than very fine sand, including gravel, and about 5 to 10 percent clay (Bw, BC and Cl horizons).

National Cooperative Soil Survey
U.S.A.

LOCATION BUXTON ME+MA NH NY VT

Established Series
Rev. GBJ-PAH-WDH
01/2000

BUXTON SERIES

The Buxton series consists of very deep, moderately well drained soils that formed in glaciolacustrine or glaciomarine deposits on coastal lowlands and river valleys. Slope ranges from 3 to 50 percent. Permeability is moderate or moderately slow in the surface horizon, moderately slow or slow in the upper part of the subsoil, and slow or very slow in the lower part of the subsoil and in the substratum. Mean annual temperature is about 45 degrees F, and mean annual precipitation is about 44 inches at the type location.

TAXONOMIC CLASS: Fine, illitic, frigid Aquic Dystric Eutrudepts

TYPICAL PEDON: Buxton silt loam, on a 13 percent slope in an abandoned hayfield. (Colors are for moist soil unless otherwise noted.)

Ap--0 to 8 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; strong medium granular structure; friable; many very fine and common fine and medium roots; moderately acid; abrupt smooth boundary. (5 to 10 inches thick)

Bw1--8 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; moderate very fine and fine granular structure; friable; common very fine and few fine and medium roots; slightly acid; abrupt wavy boundary.

Bw2--16 to 21 inches; light olive brown (2.5Y 5/4) silty clay loam; moderate thin and medium platy structure parting to weak very fine angular blocky; firm; common very fine roots; common medium prominent olive gray (5Y 5/2) iron depletions, and common medium prominent dark brown (7.5YR 4/4) masses of iron accumulation; slightly acid; clear wavy boundary. (Combined thickness of the B horizon is 8 to 26 inches.)

BC--21 to 35 inches; olive (5Y 5/3) silty clay; weak very coarse prismatic structure parting to weak fine and medium angular blocky; firm; few very fine roots; light brownish gray (2.5Y 6/2) faces of prisms and a few faint silt films on faces of peds within prisms; common prominent dark reddish brown (5YR 2/2) oxide coatings on faces of peds within prisms; common medium faint olive gray (5Y 5/2) iron depletions, and common medium prominent dark brown (7.5YR 4/4) masses of iron accumulation; slightly acid; gradual wavy boundary. (5 to 20 inches thick)

C--35 to 65 inches; olive gray (5Y 4/2) silty clay; weak very coarse prismatic structure parting to weak fine and medium angular blocky; very firm; olive gray (5Y 5/2) faces of prisms; many prominent dark reddish brown (5YR 2/2) oxide coatings on faces of peds within prisms; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation that increase in size and abundance with depth; slightly acid.

TYPE LOCATION: Hancock County, Maine; Town of Hancock; 1 mile west of junction of U.S. Route 1 and Maine Route 182, 200 feet north of U.S. Route 1 in an abandoned hayfield; USGS Hancock

topographic quadrangle; lat. 44 degrees 32 minutes 19 seconds N. and long. 68 degrees 20 minutes 22 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 18 to 55 inches. Depth to bedrock is more than 60 inches. Rock fragment content throughout the soil is less than 5 percent by volume. Stones cover from 0 to 3 percent of the surface. Iron depletions occur within 24 inches of the mineral soil surface. Reaction ranges from very strongly acid to slightly acid in the surface horizon, unless limed, from strongly acid to neutral in the subsoil, and from moderately acid to neutral in the substratum.

The Ap horizon has hue of 7.5YR to 2.5Y, with value and chroma of 2 to 5. Undisturbed areas have an A horizon 1 to 6 inches thick, that has hue of 7.5YR to 2.5Y, with value and chroma of 2 to 5. They are silt loam or silty clay loam. They have weak to strong, very fine to medium granular structure. Consistence is very friable or friable.

The B horizon has hue of 7.5YR to 5Y, value of 3 to 6 and chroma of 2 to 8, with chroma of 2 being inherited. It is silt loam, silty clay loam, or silty clay. It has weak or moderate, very fine to medium granular, very fine to coarse blocky or thin to thick platy structure. Consistence is friable or firm.

The BC horizon has hue of 2.5Y or 5Y, value of 4 to 6 and chroma of 2 to 4. It is silt loam, silty clay loam, or silty clay. It has blocky or platy structure or has primary structure that is prismatic. Consistence is firm or very firm.

The C horizon has hue of 2.5Y or 5Y, value of 4 to 6 and chroma of 2 to 6. It is silty clay loam, silty clay, or clay. It has blocky, platy or prismatic structure, all of which are considered inherited, or the horizon is massive. Consistence is firm or very firm. Common or many black to dark reddish brown patchy oxide coatings are on faces of peds. Some pedons have films on faces of peds that appear to be silt.

COMPETING SERIES: There are currently no other series in the same family. Similar soils in related families are the Boothbay and Elmwood series. Boothbay soils have a fine-silty particle-size class. Elmwood soils have a coarse-loamy over clayey particle-size class.

GEOGRAPHIC SETTING: Buxton soils are on coastal lowlands and river valleys. Slope ranges from 3 to 50 percent. The soils formed in medium, moderately fine, and fine textured glaciolacustrine or glaciomarine deposits. The climate is humid and cool temperate. Mean annual precipitation ranges from 34 to 48 inches, and mean annual temperature ranges from 43 to 46 degrees F. The frost-free season ranges from 90 to 160 days. Elevation ranges from 5 to 900 feet above mean sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Biddeford, Elmwood, Lamoine, Melrose, Scantic, Swanton and Whately soils. The very poorly drained Biddeford soils are in depressions on the landscape. The somewhat poorly drained Lamoine soils and poorly drained Scantic soils are in lower positions on the landscape. The Elmwood, Melrose, Swanton, and Whately soils all have a coarse-loamy over clayey particle-size class. Elmwood soils are in similar positions on the landscape; Melrose soils are in higher positions; Swanton soils are in lower positions and Whately soils are in depressions.

DRAINAGE AND PERMEABILITY: Moderately well drained. Surface runoff is medium or rapid depending on slope. Permeability is moderate or moderately slow in the surface horizon, moderately slow or slow in the upper part of the subsoil, and slow or very slow in the lower part of the subsoil and

in the substratum.

USE AND VEGETATION: Cleared areas are used mainly for hay, forage crops, or pasture. Some areas are used for silage corn or vegetables. The remaining areas are forested. Common tree species include eastern white pine, balsam fir, paper birch, white spruce, eastern hemlock, and northern red oak.

DISTRIBUTION AND EXTENT: Maine, Massachusetts, New Hampshire, New York, and Vermont. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: York County, Maine, 1941.

REMARKS: 1. Some pedons have been described with a bisequum profile. 2. Diagnostic horizons and features recognized in this pedon are:
a. Ochric epipedon - the zone from 0 to 8 inches (Ap horizon).
b. Cambic horizon - the zone from 8 to 21 inches (Bw1 and Bw2 horizons).
c. Aquic feature - Iron depletions within 24 inches of the mineral soil surface.
d. Dystric feature - no carbonates within a depth of 40 inches.

ADDITIONAL DATA: Source of data used in establishing taxonomic class and range in characteristics is Maine Agricultural Experiment Station, Technical Bulletin 29, February 1968.
Soil interpretation Record Numbers for the Buxton series are: Buxton, ME0043; Buxton, stony, ME0084.

National Cooperative Soil Survey
U.S.A.

LOCATION LYMAN MA ME NH NY VT

Established Series
Rev. DGG-WHT-CAW
03/2011

LYMAN SERIES

The Lyman series consists of shallow, somewhat excessively drained soils formed in till. They are on rocky hills, mountains and high plateaus. Estimated saturated hydraulic conductivity is moderately high or high in the mineral soil. Slope ranges from 3 through 80 percent. Depth to bedrock ranges from 10 to 20 inches. Mean annual precipitation is about 40 inches and mean annual temperature is about 43 degrees F.

TAXONOMIC CLASS: Loamy, isotic, frigid Lithic Haplorthods

TYPICAL PEDON: Lyman loam, on a 55 percent northwest facing slopes in a very rocky forested area. (Colors are for moist soil.)

Oe -- 0 to 1 inches; moderately decomposed plant material. (O horizon thickness is 0 to 6 inches.)

A -- 1 to 3 inches; black (N 2/0) loam; weak fine granular structure; very friable; many fine and medium roots; extremely acid; abrupt wavy boundary. (0 to 4 inches thick.)

E -- 3 to 5 inches; reddish gray (5YR 5/2) fine sandy loam; very weak fine granular structure; very friable; many fine and medium roots; 10 percent gravel; extremely acid; abrupt broken boundary. (0 to 10 inches thick.)

Bhs -- 5 to 7 inches; very dusky red (2.5YR 2.5/2) loam; very weak fine granular structure; friable; many fine and medium roots; 10 percent fine gravel; extremely acid; abrupt broken boundary. (0 to 8 inches thick.)

Bs1 -- 7 to 11 inches; dark red (2.5YR 3/6) loam; weak fine and medium granular structure; friable; many fine and medium roots; 10 percent fine gravel; few mica flakes; very strongly acid; clear wavy boundary.

Bs2 -- 11 to 18 inches; brown (7.5YR 4/4) grading with depth to brown (10YR 5/3) channery loam; weak coarse subangular blocky structure parting to medium and fine granular; friable; many fine and medium roots; 15 percent channers of schist and quartzite; common flakes of mica; very strongly acid; abrupt smooth boundary. (Combined thickness of the Bs horizon is 5 to 17 inches.)

R -- 18 inches; dark gray mica schist bedrock.

TYPE LOCATION: Franklin County, Massachusetts; Town of Monroe, about 1/2 mile west southwest of the village of Monroe Bridge and about 180 feet south of the Deerfield River; Latitude 42 degrees, 43 minutes, 10 seconds N. and Longitude 72 degrees, 57 minutes, 07 seconds W., NAD 1927.

RANGE IN CHARACTERISTICS: Mineral solum thickness ranges from 10 to 20 inches and corresponds to the depth to bedrock. Rock fragments consist of usually 5 to 25 percent gravel, but can be

below 5 percent in some pedons. Rock fragments range from 0 to 10 percent cobbles throughout, 0 to 15 percent stones in the A horizon and 0 to 3 percent stones in the B horizon. Rock fragments are schist with lesser amounts of phyllite, granite, and gneiss. The soil ranges from moderately acid through extremely acid throughout unless limed.

The O horizon consists of fibric, hemic and/or sapric material.

The A horizon is neutral or has hue of 5YR through 10YR, value of 2, 2.5, or 3, and chroma of 0 through 2. Some pedons have Ap horizons with value and chroma of 2 through 4. Ap horizons are typically 6 inches or more thick. Texture is sandy loam, fine sandy loam, very fine sandy loam, loam or silt loam in the fine-earth fraction.

The E horizon has hue of 5YR through 10YR, value of 4 through 6, and chroma of 1 or 2. Texture is loamy sand, loamy fine sand, sandy loam, fine sandy loam, very fine sandy loam, loam or silt loam in the fine-earth fraction.

The Bhs horizon has hue of 2.5YR through 10YR, value of 2 through 3, and chroma of 1 through 3.

The Bs horizon has hue of 5YR through 10YR, value of 3 through 5, and chroma of 3 through 8. Some pedons have a Bh horizon with chroma of 5YR through 10YR, value of 2 through 3, and chroma of 1 through 4. Texture of the Bhs, Bs, and Bh is sandy loam, fine sandy loam, very fine sandy loam, loam or silt loam in the fine-earth fraction.

Some pedons have a BC horizon with hue of 10YR through 5Y, value of 3 through 5, and chroma of 3 or 4. It is sandy loam, fine sandy loam, very fine sandy loam, loam, or silt loam in the fine-earth fraction.

The R or 2R layer is generally dark gray, greenish gray or nearly black mica schist bedrock, but in places the underlying bedrock is phyllite, granite or gneiss.

COMPETING SERIES: These are the Abram, Creasey, and Monson series. Abram soils are 10 inches or less thick. Creasey soils formed in till derived mainly from reddish brown sandstone and conglomerate. Monson soils have more than 10 percent clay in the particle size control section.

GEOGRAPHIC SETTING: These soils are on rocky hills, mountains and high plateaus. Slope ranges from 3 through 80 percent. The soils developed in a thin mantle of till and frost fractured rock fragments derived principally from gray, greenish gray, or nearly black mica schist rocks with lesser amounts of phyllite, granite, and gneiss. Mean annual precipitation ranges from 30 through 50 inches; the mean annual temperature ranges from 38 through 46 degrees F.; and the frost-free season ranges from 90 through 160 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Berkshire, Marlow, Tunbridge, Peru, and Pillsbury soils. Berkshire and Marlow soils are well drained and are very deep to bedrock. Berkshire soils formed in friable till and Marlow soils formed in dense till. Tunbridge soils are well drained and are moderately deep to bedrock. Peru soils are moderately well drained and Pillsbury soils are poorly and somewhat poorly drained. They formed in dense till and are very deep to bedrock.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Somewhat excessively drained. Potential for runoff is very high. Estimated saturated hydraulic conductivity is moderately high or high in the mineral soil.

USE AND VEGETATION: Predominantly forested. Vegetation is mainly eastern white pine, eastern hemlock, red spruce, white, black and yellow birch, sugar maple, beech, fir, white ash and basswood. Small acreages have been cleared and used for growing hay or pasture, or are idle.

DISTRIBUTION AND EXTENT: Northern New England, western Massachusetts, and northern New York. Principally in the Green and White Mountains, the Adirondack Mountains, the Berkshire uplands, and eastern and western Maine. MLRA's 143, 144A, and 144B. The series is extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts.

SERIES ESTABLISHED: Grafton County, New Hampshire, 1935.

REMARKS: The use of Lyman in 144A is a relic from before temperature class families.

Diagnostic horizons and features recognized in this pedon are:
1. Ochric epipedon - the zone from 0 to 5 inches (Oe, A, and E horizons).
2. Albic horizon - the zone from 3 to 5 inches (E horizon).
3. Spodic horizon - the zone from 5 to 18 inches (Bhs, Bs1 and Bs2 horizons).
4. Lithic feature - bedrock at 18 inches from the mineral soil surface.

National Cooperative Soil Survey
U.S.A.

LOCATION SCANTIC ME+MA NH NY VT

Established Series
Rev. KJL-GBJ-WDH
11/2005

SCANTIC SERIES

The Scantic series consists of very deep, poorly drained soils formed in glaciomarine or glaciolacustrine deposits on coastal lowlands and river valleys. Slope ranges from 0 to 8 percent. Permeability of the surface and subsurface horizons is moderate or moderately slow and it is slow or very slow in the subsoil and substratum. Mean annual temperature is about 44 degrees F, and mean annual precipitation is about 46 inches at the type location.

TAXONOMIC CLASS: Fine, illitic, nonacid, frigid Typic Epiaquepts

TYPICAL PEDON: Scantic silt loam, on a 1 percent slope in an idle field. (Colors are for moist soil unless otherwise noted.)

Ap1--0 to 4 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; very friable; many very fine, fine, medium and coarse roots; moderately acid; abrupt smooth boundary.

Ap2--4 to 9 inches; dark grayish brown (2.5Y 4/2) silt loam, light brownish gray (2.5Y 6/2) dry; moderate very fine granular structure; very friable; common very fine, fine, medium and coarse roots; common medium distinct olive gray (5Y 5/2) irregularly shaped iron depletions throughout; moderately acid; abrupt wavy boundary. (Combined thickness of the Ap horizon is 5 to 9 inches.)

Eg--9 to 11 inches; olive gray (5Y 5/2) silt loam; weak medium platy structure parting to weak very fine subangular blocky; friable; common very fine, fine, medium and coarse roots; common medium prominent light olive brown (2.5Y 5/6) masses of iron accumulation in the matrix and along root channels; moderately acid; abrupt smooth boundary. (0 to 8 inches thick)

Bg1--11 to 16 inches; olive gray (5Y 5/2) silty clay loam; moderate thin platy structure; firm; common very fine, fine, and medium and few coarse roots; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix and along pores; many coarse prominent olive brown (2.5Y 4/4) masses of iron accumulation in the matrix and along pores; common medium faint gray (5Y 6/1) irregularly shaped iron depletions in the matrix; light olive gray (5Y 6/2) silt coatings on walls of earthworm channels and on 50 percent of faces of peds; few medium dark gray (5Y 4/1) oxide coats on faces of peds; slightly acid; clear wavy boundary.

Bg2--16 to 22 inches; olive gray (5Y 5/2) silty clay; weak medium platy structure parting to moderate very fine subangular blocky; firm; few very fine and fine roots; few pores; common medium faint gray (5Y 6/1) irregularly shaped iron depletions in the matrix; common medium prominent light olive brown (2.5Y 5/4) masses of iron accumulation in the matrix and along pores; light olive gray (5Y 6/2) silt coatings on walls of earthworm channels and on 50 percent of faces of peds; few fine prominent dark reddish brown (5YR 2/2) oxide coats on faces of peds; slightly acid; gradual wavy boundary.

Bg3--22 to 29 inches; olive gray (5Y 4/2) silty clay; moderate very fine and fine subangular blocky

structure; firm; few pores; common medium prominent light olive brown (2.5Y 5/6) masses of iron accumulation in the matrix and along pores; common medium faint olive gray (5Y 5/2) irregularly shaped iron depletions in the matrix; gray (5Y 6/1) silt coatings on 50 percent of faces of peds and pores; common medium prominent dark reddish brown (5YR 2/2) oxide coats on 10 percent of faces of peds; slightly acid; clear wavy boundary. (Combined thickness of the Bg horizon is 9 to 35 inches.)

Cg--29 to 65 inches; olive gray (5Y 4/2) clay; weak thick platy structure; firm; few medium prominent light olive brown (2.5Y 5/6) masses of iron accumulation in the matrix; few fine faint gray (5Y 5/1) irregularly shaped iron depletions in the matrix; gray (5Y 6/1) silt coatings on 50 percent of faces of peds; many medium prominent dark reddish brown (5YR 2/2) oxide coats on 30 percent of faces of peds; slightly acid.

TYPE LOCATION: Washington County, Maine; Town of Whitneyville; 0.25 mile south of railroad track on U.S. Route 1A, and 200 feet northwest of the road; USGS Whitneyville topographic quadrangle; lat. 44 degrees 42 minutes 34 seconds N. and long. 67 degrees 31 minutes 29 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: Thickness of the solum ranges from 25 to 50 inches. Depth to bedrock is more than 60 inches. The soil is commonly free of rock fragments but a few pedons contain up to 3 percent gravel. Stones cover from 0 to 3 percent of the surface. Reaction ranges from very strongly acid to slightly acid in the surface and subsurface horizons, unless limed, and from strongly acid to neutral in the upper part of the subsoil. The reaction in the lower part of the subsoil and in the substratum is moderately acid to neutral.

The Ap horizon has hue of 10YR to 5Y, value of 3 to 5 and chroma of 1 or 2. It has weak or moderate, very fine to coarse granular structure. Undisturbed areas have an A horizon 2 to 5 inches thick, that has hue of 10YR, value of 3 and chroma of 1 or 2. It is silt loam, silty clay loam, or loam. Consistence is very friable or friable.

The Eg horizon, has hue of 2.5Y or 5Y, value of 4 or 5 and chroma of 1 or 2 and few or common redoximorphic features. It has weak or moderate, thin to thick platy, fine or medium granular or very fine subangular blocky structure. It is silt loam, silty clay loam, or loam. Consistence is very friable or friable.

The Bg horizon has hue of 2.5Y or 5Y, value of 4 to 6 and chroma of 1 or 2 and has faint to prominent redoximorphic features. It is silt loam, silty clay loam, or silty clay. It has subangular blocky or platy structure but some pedons have primary structure that is prismatic. Consistence is friable or firm.

The BCg horizon, where present, has hue of 2.5Y or 5Y, value of 4 to 6 and chroma of 1 or 2 with faint to prominent redoximorphic features. It is silty clay loam, silty clay, or clay. It has platy or angular blocky structure but some pedons have primary structure that is prismatic. Consistence is friable to very firm.

The Cg horizon is neutral or has hue of 2.5Y, 5Y or 10Y, value of 4 to 6 and chroma of 0 to 2 and redoximorphic features are less abundant than in the B horizon or are lacking. It is silty clay loam, silty clay, or clay. Platy or prismatic structure is dominant but some pedons are massive. Consistence is firm or very firm. Patchy or discontinuous oxide coatings are common in the B and C horizons in pedons from marine deposits and are less common or lacking in those from lacustrine deposits.

COMPETING SERIES: There are currently no other series in the same family. The Lamoine,

Swanton, and Swanville series are similar soils in related families. Lamoine soils have dominant chroma of 3 or more between the A or Ap horizon and 30 inches below the mineral soil surface. Swanton soils have a coarse-loamy over clayey particle-size class. Swanville soils have less clay in the particle-size control section.

GEOGRAPHIC SETTING: Scantic soils are on coastal lowlands and river valleys. Slope ranges from 0 to 8 percent. The soils formed in medium, moderately fine and fine textured glaciomarine or glaciolacustrine deposits. The climate is humid and cool temperate. Mean annual temperature ranges from 43 to 46 degrees F, and mean annual precipitation ranges from 34 to 48 inches. The frost-free season ranges from 90 to 160 days. Elevation ranges from 5 to 900 feet above mean sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Biddeford, Buxton, Elmwood, Lamoine, Melrose, Swanton, and Whately soils. The Biddeford, Buxton and Lamoine soils are members of a drainage sequence with Scantic soils on the same landscape, Buxton and Lamoine soils are in higher positions and Biddeford soils are in depressions. The Elmwood, Melrose, Swanton and Whately soils all have a coarse-loamy over clayey particle-size class. Elmwood and Melrose soils are in higher positions on the landscape. Swanton soils are in similar positions and Whately soils are in depressions.

DRAINAGE AND PERMEABILITY: Poorly drained. Surface runoff is slow. Permeability of the surface and subsurface horizons is moderate or moderately slow and that of the subsoil and substratum is slow or very slow.

USE AND VEGETATION: Mostly idle or woodland, some areas are used for growing hay and pasture. Common tree species include red maple, elm, gray birch, white ash, balsam fir, red and white spruce, tamarack, and some eastern white pine.

DISTRIBUTION AND EXTENT: Maine, Massachusetts, New Hampshire, New York, and Vermont. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Penobscot County, Maine, 1947.

REMARKS: 1. This revision reflects a change in classification from Typic Haplaquepts to conform with Keys To Soil Taxonomy, sixth edition, 1994. 2. Diagnostic horizons and features recognized in this pedon are:
a. Ochric epipedon - the zone from 0 to 11 inches (Ap and Eg horizons).
b. Cambic horizon - the zone from 11 to 29 inches (Bg horizon).
c. Nonacid - the pH is 5.0 or more in 0.01M calcium chloride in at least some part of the control section (10 to 40 inches).
d. Aquic conditions - redoximorphic features at 4 inches.
e. Episaturation - a perched water table.

ADDITIONAL DATA: Source of data used in establishing taxonomic class and range in characteristics is Maine Agricultural Experiment Station, Technical Bulletin 94, September 1979.
Soil interpretation record numbers for the Scantic series are: Scantic, ME0044; Scantic, stony, ME0062.

National Cooperative Soil Survey
U.S.A.

LOCATION SEBAGO ME+NH NY

Established Series
Rev. KJL-WDH
02/2000

SEBAGO SERIES

The Sebago series consists of very deep, very poorly drained soils formed in herbaceous and woody organic deposits more than 51 inches thick. They are in bogs and swamps. Slope is less than 2 percent. Permeability is moderately rapid. Mean annual precipitation is about 42 inches and mean annual temperature is about 45 degrees F at the type location.

TAXONOMIC CLASS: Dysic, frigid Fibric Haplohemists

TYPICAL PEDON: Sebago mucky peat, in an open bog. (Colors are for moist soil.)

Oe1--0 to 24 inches; black (5YR 2/1) rubbed and pressed, mucky peat (hemic material); about 60 percent fibers, 50 percent rubbed; massive; nonsticky; about 50 percent herbaceous fibers and 50 percent woody fibers; pale brown (10YR 6/3) sodium pyrophosphate test; extremely acid (pH 5.2 in water and about 4.3 in 0.01 M calcium chloride); abrupt smooth boundary.

Oe2--24 to 36 inches; black (5YR 2/1) rubbed and pressed, mucky peat (hemic material); about 70 percent fibers, 50 percent rubbed; massive; nonsticky; about 70 percent herbaceous fibers and 30 percent woody fibers; estimated mineral content is 20 percent; pale brown (10YR 6/3) sodium pyrophosphate test; extremely acid (pH 5.3 in water and about 4.4 in 0.01 M calcium chloride); abrupt smooth boundary.

Oi--36 to 65 inches; very dark gray (10YR 3/1) rubbed and pressed, peat (fibric material); about 80 percent fibers, 50 percent rubbed; massive; nonsticky; about 50 percent herbaceous fibers and 50 percent woody fibers; estimated mineral content is about 40 percent; white (10YR 8/1) sodium pyrophosphate test; extremely acid (pH 5.1 in water and about 4.3 in 0.01 M calcium chloride).

TYPE LOCATION: Cumberland County, Maine; Town of Naples; on the east side of Maine Route 35, about one mile south of the Naples-Harrison town line, about 500 feet out onto the bog from the highway at the outlet; USGS Casco topographic quadrangle; lat. 44 degrees 00 minutes 27 seconds N. and long. 70 degrees 36 minutes 52 seconds W., NAD 27.

RANGE IN CHARACTERISTICS: The thickness of the organic material is greater than 51 inches. The depth to bedrock is more than 60 inches. Slightly decomposed woody fragments throughout the soil range up to 15 percent by volume. They consist of small limbs, logs, and a few stumps. The coarse fragments range from about 3/4 inch in diameter for small limbs to several feet in diameter for stumps. The reaction for any tier is less than pH 4.5 in 0.01 M calcium chloride, but ranges to pH 5.5 in water.

The surface tier has hue of 2.5YR to 10YR, value of 2 or 3, and chroma of 1 or 2. Upon air drying the value or chroma or both increases by one or two units. It is massive or has weak or moderate, very fine to medium granular structure.

The subsurface and bottom tiers have hue of 2.5YR to 10YR, value of 2 to 4, and chroma of 1 to 4. They are commonly massive but they include weak thick platy structure. Hemic material dominates in the subsurface tier, but more than 10 inches of the subsurface and bottom tiers consists of fibric materials.

COMPETING SERIES: There are currently no other series in the same family. The Chocorua, Greenwood, Ossipee and Rifle soils are in related families. Chocorua soils are underlain by sandy material at a depth of 16 to 51 inches. Greenwood and Rifle soils have less than 10 inches of the subsurface and bottom tiers occupied by fibric materials; in addition, the Rifle soils have a pH that is greater than 4.5 in 0.01 M calcium chloride. Ossipee soils are underlain by loamy material at a depth of 16 to 51 inches.

GEOGRAPHIC SETTING: Sebago soils are in bogs and swamps that are in depressions on glaciated uplands, glaciofluvial deposits and lake and marine lowlands. They range from small enclosed bogs to areas of several hundred acres. Slope is less than 2 percent. Sebago soils formed in moderately and slightly decomposed herbaceous and woody materials. The climate is humid and cool temperate. The mean annual temperature ranges from 38 to 46 degrees F, and mean annual precipitation ranges from 34 to 48 inches. The frost-free season ranges from 80 to 160 days. Elevation ranges from 5 to 2100 feet above mean sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Adams, Biddeford, Brayton, Buxton, Chocorua, Colton, Croghan, Hermon, Peacham, Scantic, Togus, Waskish, and Wonsqueak soils. Adams and Croghan are mineral soils on nearby outwash plains and deltas. Brayton, Hermon and Peacham are mineral soils on nearby glaciated uplands. Biddeford, Buxton, and Scantic are mineral soils on nearby lacustrine or marine plains. Chocorua and Togus are organic soils underlain by sandy mineral material within 51 inches. Waskish soils are organic soils that are dominantly fibric material derived from sphagnum mosses. Wonsqueak soils are organic soils underlain by loamy mineral material within 51 inches.

DRAINAGE AND PERMEABILITY: Very poorly drained. Surface runoff is ponded or very slow. Permeability is moderately rapid.

USE AND VEGETATION: These soils are covered by vegetation primarily consisting of shrubs, cattails, and sedges, with scattered clumps of trees. The shrubs include leatherleaf, labrador tea, highbush blueberry, bog cranberry, huckleberry, and sheep laurel. Common tree species include black spruce, balsam fir, tamarack, and red maple.

DISTRIBUTION AND EXTENT: Maine. (MLRA'S 143, 144B and 146) This series is of moderate extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Cumberland County, Maine, 1970.

REMARKS: Diagnostic features recognized in the pedon are:
a. Hemists - dominantly hemic material in the subsurface tier (12 to 36 inches).
b. Fibric subgroup - have at least 10 inches of the subsurface and bottom tiers consisting of fibric material (36 to 51 inches).
c. Dysic - the pH is 4.5 (in 0.01M calcium chloride) in all parts of the organic material in the control section.

ADDITIONAL DATA: Soil Interpretation record number for the Sebago series is: Sebago, ME0047.

National Cooperative Soil Survey
U.S.A.

ATTACHMENT C

VERNAL POOL DATA FORMS

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: VP1 MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: L. Lapierre

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ● Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ● same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ○ Yes

c. Project Name: Harpswell Town Owned Parcels Natural Resource Assessment

NOTE: ***Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required by nonprofessional observers and encouraged by all observers.***

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ● No If no, was landowner permission obtained for survey? ○ Yes ○ No

b. Landowner's contact information (required)

Name: Town of Harpswell Phone: 207-833-5771

Street Address: 263 Mountain Road City: Harpswell State: ME Zip: 04079

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Harpswell

Brief site directions to the pool (using mapped landmarks):

Pool is located 500 feet north of Strawberry Creek in Harpswell

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one: ● GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

VP1

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): 5/9/11

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated upland depression
- ○ Floodplain depression
- ● Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☒ Forested swamp
- ☒ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake/Pond
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain overflow / oxbow
- ☐ Headwater seepage
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ● Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ● Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

only 1½" deep. most of pool has already dried

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ● 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 20 ○ m ● ft Length: 150 ○ m ● ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ● Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☒ Wet site ferns (e.g. royal fern, marsh fern)
- ☒ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ● No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

VP1

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/9/11

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? ● Yes ○ No; what % of pool surveyed?_____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog															
Spotted Salamander		16			3			M							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (looser matrix, curved embryos), H= Hatched or hatching
3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Check the method(s) of verification and fill in the confidence level (CL) for each species observation. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

● SVP ○ Potential SVP ○ Non Significant VP ○ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Within large pit & Mound wetland. most of high water mark dry or not contiguous w/ egg masses water pool.

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date:_____ Initials:_____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: VP2 MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: L. Lapierre

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ● Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ● same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ● Yes

c. Project Name: Harpswell Town Parcels Natural Resource Assessment

NOTE: ***Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required by nonprofessional observers and encouraged by all observers.***

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ● No If no, was landowner permission obtained for survey? ○ Yes ○ No

b. Landowner's contact information (required)

Name: Town of Harpswell Phone: (207) 833-5771

Street Address: _____ City: _____ State: ME Zip: _____

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Harpswell

Brief site directions to the pool (using mapped landmarks):

VP-2 is located approximately 1000 feet northwest of the northern extent of Strawberry Creek.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one: ● GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

VP2

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): 5/9/11

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated upland depression
- ○ Floodplain depression
- ● Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☒ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake/Pond
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain overflow / oxbow
- ☐ Headwater seepage
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ● Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ● Ephemeral (drying out completely in most years)
- ○ Unknown

Explain: already almost dry ~6" deep 3'x7'

■ Maximum depth at survey: ● 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 7 ○ m ● ft Length: 20 ○ m ● ft

■ Predominate substrate in order of increasing hydroperiod:

- ● Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☐ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ● Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

VP 2

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/9/11

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? ● Yes ○ No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog															
Spotted Salamander		3			3			M							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (looser matrix, curved embryos), H= Hatched or hatching
3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Check the method(s) of verification and fill in the confidence level (CL) for each species observation. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

○ SVP ○ Potential SVP ● Non Significant VP ○ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date:_____ Initials:_____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: VP4 MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: L Lapierre

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ● Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ● same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ● Yes

c. Project Name: Harpswell Town Owned Parcels Natural Resource Assessment

NOTE: ***Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required by nonprofessional observers and encouraged by all observers.***

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ● No If no, was landowner permission obtained for survey? ○ Yes ○ No

b. Landowner's contact information (required)

Name: Town of Harpswell Phone: (207) 833-5771

Street Address: 263 Mountain Road City: Harpswell State: ME Zip: 04079

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Harpswell

Brief site directions to the pool (using mapped landmarks):

VP-4 is located ≈ 2000 feet southeast of Town Hall on Parcel D.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one: ● GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

VP4

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): 5/9/11

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- (●) Isolated upland depression
- ( ) Floodplain depression
- ( ) Pool associated with larger wetland complex
- ( ) Other: _____

■ Check all wetland types that best apply to this pool:

- [x] Forested swamp
- [ ] Shrub swamp
- [ ] Peatland (fen or bog)
- [ ] Emergent marsh
- [ ] Wet meadow
- [ ] Lake/Pond
- [ ] Abandoned beaver flowage
- [ ] Active beaver flowage
- [ ] Slow stream
- [ ] Floodplain overflow / oxbow
- [ ] Headwater seepage
- [ ] Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ( ) Natural (●) Natural-Modified ( ) Unnatural ( ) Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

culvert [illegible] up

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ( ) Permanent
- (●) Semi-permanent (drying partially in all years and completely in drought years)
- (●) Ephemeral (drying out completely in most years)
- ( ) Unknown

Explain:

lots of sphagnum throughout.

■ Maximum depth at survey: ( ) 0-12" (0-1 ft.) ( ) 12-36" (1-3 ft.) ( ) 36-60" (3-5 ft.) ( ) >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 8 ( ) m (●) ft Length: 25 ( ) m (●) ft

■ Predominate substrate in order of increasing hydroperiod:

- ( ) Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ( ) Mineral soil (sphagnum moss present)
- (●) Organic matter (peat/muck) shallow or restricted to deepest portion
- ( ) Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- [ ] Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- [ ] Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- [x] Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- [ ] Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- [x] Sphagnum moss (anchored or suspended)
- [ ] Wet site ferns (e.g. royal fern, marsh fern)
- [x] Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- [x] Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- [ ] Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- [ ] Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- [ ] No vegetation in pool

■ Faunal indicators (check all that apply): none

- [ ] Fish
- [ ] Bullfrog or Green Frog tadpoles
- [ ] Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ( ) No inlet or outlet
- (●) Intermittent inlet or outlet
- ( ) Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ( ) Other or Unknown (explain): _____

VP4

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: _____

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of pool surveyed? _____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp) 5/9			Tadpoles/Larvae	
	#	Confidence Level[1]	Egg Mass Maturity[2]	Observed	Confidence Level[1]
Wood Frog					
Spotted Salamander	4	3	M		
Blue-spotted Salamander					
Fairy Shrimp[3]					

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (looser matrix, curved embryos), H= Hatched or hatching
3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Check the method(s) of verification and fill in the confidence level (CL) for each species observation. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

○ SVP ○ Potential SVP ◉ Non Significant VP ○ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date:_____ Initials:_____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: VP5 (new) MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: L Lapire

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ● Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ● same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ● Yes

c. Project Name: Harpswell Town Owned Parcels Natural Resource Assessment

NOTE: ***Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required by nonprofessional observers and encouraged by all observers.***

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ● No If no, was landowner permission obtained for survey? ○ Yes ○ No

b. Landowner's contact information (required)

Name: Town of Harpswell Phone: (207) 883-5771

Street Address: 263 Mountain Road City: Harpswell State: ME Zip: 04079

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Harpswell

Brief site directions to the pool (using mapped landmarks):

VP-5 is located ≈ 100 feet north of VP-4.
VP-5 is ≈ 1900' southeast of townhall on Parcel D

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one: ● GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

VP 5

Maine State Vernal Pool Assessment Form

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): 5/9/11

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated upland depression
- ○ Floodplain depression
- ○ Pool associated with larger wetland complex
- ● Other: floodplain oxbow/ slow stream

■ Check all wetland types that best apply to this pool:

- ☒ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake/Pond
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☒ Slow stream
- ☒ Floodplain overflow / oxbow
- ☐ Headwater seepage
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ● Natural ○ Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ● Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ○ Ephemeral (drying out completely in most years)
- ○ Unknown

Explain: Portions where stream occurs are perm, on the outskirts - eph.

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ● 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 100 ○ m ● ft Length: 50 ○ m ● ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ● Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☐ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☒ Wet site ferns (e.g. royal fern, marsh fern)
- ☒ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☒ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ○ Intermittent inlet or outlet
- ● Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

Maine State Vernal Pool Assessment Form

VP5

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/9/11

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? ● Yes ○ No; what % of pool surveyed?_____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)			Tadpoles/Larvae		
	#	Confidence Level[1]	Egg Mass Maturity[2]	Observed	Confidence Level[1]	
Wood Frog						
Spotted Salamander	30	3	M			
Blue-spotted Salamander						
Fairy Shrimp[3]						

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (looser matrix, curved embryos), H= Hatched or hatching
3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Check the method(s) of verification and fill in the confidence level (CL) for each species observation. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

○ SVP ○ Potential SVP ○ Non Significant VP ● Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

portion of pool disconnected from stream part of year.

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date:_____ Initials:_____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: VP 6 MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: L Lapiere

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ● Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ● same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ● Yes

c. Project Name: Harpswell Town owned Parcels Natural Resource Assessment

NOTE: ***Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required by nonprofessional observers and encouraged by all observers.***

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ● No If no, was landowner permission obtained for survey? ○ Yes ○ No

b. Landowner's contact information (required)

Name: Town of Harpswell Phone: (207) 833-5771

Street Address: 263 Mountain Road City: Harpswell State: ME Zip: 04079

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Harpswell

Brief site directions to the pool (using mapped landmarks):

VP-6 is located approximately 800 feet due east of town hall.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one: ● GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

VP6

Maine State Vernal Pool Assessment Form

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): 5/9/11

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated upland depression
- ○ Floodplain depression
- ● Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- [x] Forested swamp
- [ ] Shrub swamp
- [ ] Peatland (fen or bog)
- [ ] Emergent marsh
- [ ] Wet meadow
- [ ] Lake/Pond
- [ ] Abandoned beaver flowage
- [ ] Active beaver flowage
- [ ] Slow stream
- [ ] Floodplain overflow / oxbow
- [ ] Headwater seepage
- [ ] Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ● Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

Berm created from old ditch rd may have caused pooling

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ● Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

No perm in/outlet, fairly shallow

■ Maximum depth at survey: ○ 0-12" (0-1 ft.) ● 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 15 ○ m ● ft Length: 150 ○ m ● ft

■ Predominate substrate in order of increasing hydroperiod:

- ○ Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ● Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- [ ] Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- [ ] Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- [ ] Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- [ ] Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- [x] Sphagnum moss (anchored or suspended)
- [ ] Wet site ferns (e.g. royal fern, marsh fern)
- [ ] Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- [ ] Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- [ ] Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- [ ] Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- [ ] No vegetation in pool

■ Faunal indicators (check all that apply):

- [ ] Fish
- [ ] Bullfrog or Green Frog tadpoles
- [ ] Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ○ No inlet or outlet
- ● Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

VP6

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates: 5/9/11

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of pool surveyed?_____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)									Tadpoles/Larvae					
	#			Confidence Level[1]			Egg Mass Maturity[2]			Observed			Confidence Level[1]		
Wood Frog															
Spotted Salamander		3			3			M							
Blue-spotted Salamander															
Fairy Shrimp[3]															

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (looser matrix, curved embryos), H= Hatched or hatching
3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Check the method(s) of verification and fill in the confidence level (CL) for each species observation. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

○ SVP ○ Potential SVP ◉ Non Significant VP ○ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

along side of old rd.

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date:_____ Initials:_____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

Maine State Vernal Pool Assessment Form

INSTRUCTIONS: Complete all 3 pages of form as thoroughly as possible. Most fields are required for pool registration.

Observer's Pool ID: VP7 MDIFW Pool ID: _____

1. PRIMARY OBSERVER INFORMATION

a. Observer name: L Lapierre

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ● Yes

2. PROJECT CONTACT INFORMATION

a. Contact name: ● same as observer ○ other _____

b. Contact and credentials previously provided? ○ No (submit Addendum 1: observer credential form) ● Yes

c. Project Name: Harpswell Town-Owned Parcels Natural Resource Assessment

NOTE: ***Clear photographs or digital images of a) the pool and b) the indicators (one example of each species egg mass) are required by nonprofessional observers and encouraged by all observers.***

3. LANDOWNER CONTACT INFORMATION

a. Are you the landowner? ○ Yes ● No If no, was landowner permission obtained for survey? ○ Yes ○ No

b. Landowner's contact information (required)

Name: Town of Harpswell Phone: (207) 833-5771

Street Address: 263 Mountain Road City: Harpswell State: ME Zip: 04079

4. VERNAL POOL LOCATION INFORMATION

a. Location Township: Harpswell

Brief site directions to the pool (using mapped landmarks):

VP-7 is ≈ 500 feet South of Town hall.

b. Mapping Requirements: At least 2 of the 3 must be submitted (check those submitted):

☐ USGS topographic map with pool clearly marked.

☒ Large scale aerial photograph with pool clearly marked.

☒ GPS data (complete section below).

GPS location of vernal pool

Longitude/Easting: _____ Latitude/Northing: _____

Check Datum: ○ NAD27 ○ NAD83 / WGS84 Coordinate system: _____

Check one: ● GIS shapefile
- send to Jason.Czapiga@maine.gov; observer has reviewed shape accuracy (best)

○ The pool perimeter is delineated by multiple GPS points. (excellent)
- Include map or spreadsheet with coordinates.

○ The above GPS point is at the center of the pool. (good)

○ The center of the pool is approximately _____ m ○ /ft ○ in the compass direction of _____ degrees from the above GPS point. (acceptable)

Maine State Vernal Pool Assessment Form

VP 7

5. VERNAL POOL HABITAT INFORMATION

a. Habitat survey date (only if different from indicator survey dates on page 3): _____

b. Wetland habitat characterization

■ Choose the best descriptor for the landscape setting:

- ○ Isolated upland depression
- ○ Floodplain depression
- ● Pool associated with larger wetland complex
- ○ Other: _____

■ Check all wetland types that best apply to this pool:

- ☒ Forested swamp
- ☐ Shrub swamp
- ☐ Peatland (fen or bog)
- ☐ Emergent marsh
- ☐ Wet meadow
- ☐ Lake/Pond
- ☐ Abandoned beaver flowage
- ☐ Active beaver flowage
- ☐ Slow stream
- ☐ Floodplain overflow / oxbow
- ☐ Headwater seepage
- ☐ Other: _____

c. Vernal pool status under the Natural Resources Protection Act (NRPA)

i. Pool Origin: ○ Natural ● Natural-Modified ○ Unnatural ○ Unknown

If modified, unnatural or unknown, describe any modern or historic human impacts to the pool (required):

ends at culvert

ii. Pool Hydrology

■ Select the pool's estimated hydroperiod AND provide rationale for opinion.

- ○ Permanent
- ○ Semi-permanent (drying partially in all years and completely in drought years)
- ● Ephemeral (drying out completely in most years)
- ○ Unknown

Explain:

shallow, no deep muck

■ Maximum depth at survey: ● 0-12" (0-1 ft.) ○ 12-36" (1-3 ft.) ○ 36-60" (3-5 ft.) ○ >60" (>5 ft.)

■ Approximate size of pool (at spring highwater): Width: 25 ○ m ● ft Length: 100 ○ m ● ft

■ Predominate substrate in order of increasing hydroperiod:

- ● Mineral soil (bare, leaf-litter bottom, or upland mosses present)
- ○ Mineral soil (sphagnum moss present)
- ○ Organic matter (peat/muck) shallow or restricted to deepest portion
- ○ Organic matter (peat/muck) deep and widespread

■ Pool vegetation indicators in order of increasing hydroperiod (check all that apply):

- ☐ Terrestrial nonvascular spp. (e.g. haircap moss, lycopodium spp.)
- ☐ Dry site ferns (e.g. spinulose wood fern, lady fern, bracken fern)
- ☐ Moist site ferns (e.g. sensitive fern, cinnamon fern, interrupted fern, New York fern)
- ☒ Moist site vasculars (e.g. skunk cabbage, jewelweed, blue flag iris, swamp candle)
- ☐ Sphagnum moss (anchored or suspended)
- ☒ Wet site ferns (e.g. royal fern, marsh fern)
- ☐ Wet site shrubs (e.g. highbush blueberry, maleberry, winterberry, mountain holly)
- ☐ Wet site graminoids (e.g. blue-joint grass, tussock sedge, cattail, bulrushes)
- ☐ Aquatic vascular spp. (e.g. pickerelweed, arrowhead)
- ☐ Floating or submerged aquatics (e.g. water lily, water shield, pond weed, bladderwort)
- ☐ No vegetation in pool

■ Faunal indicators (check all that apply):

- ☐ Fish
- ☐ Bullfrog or Green Frog tadpoles
- ☐ Other: _____

iii. Inlet/Outlet Flow Permanency

Type of inlet or outlet (a seasonal or permanent channel providing water flowing into or out of the pool):

- ● No inlet or outlet
- ○ Intermittent inlet or outlet
- ○ Permanent inlet or outlet (channel with well-defined banks and permanent flow)
- ○ Other or Unknown (explain): _____

VP7

Maine State Vernal Pool Assessment Form

6. VERNAL POOL INDICATOR INFORMATION

a. Indicator survey dates:_____

b. Indicator abundance criteria

- Was the entire pool surveyed for egg masses? ◉ Yes ○ No; what % of pool surveyed?_____
- For each indicator species, indicate the exact number of egg masses, confidence level for species determination, and egg mass maturity. Separate cells are provided for separate survey dates.

INDICATOR SPECIES	Egg Masses (or adult Fairy Shrimp)			Tadpoles/Larvae	
	#	Confidence Level[1]	Egg Mass Maturity[2]	Observed	Confidence Level[1]
Wood Frog					
Spotted Salamander	9	3	M		
Blue-spotted Salamander					
Fairy Shrimp[3]					

1-Confidence level: 1 = <60%, 2 = 60-95%, 3 = >95%
2-Egg mass maturity: F= Fresh (<24 hrs), M= Mature (round embryos), A= Advanced (looser matrix, curved embryos), H= Hatched or hatching
3-Fairy Shrimp: X = present

c. Rarity criteria

- Note any rare species associated with vernal pools. Check the method(s) of verification and fill in the confidence level (CL) for each species observation. Observations should be accompanied by photographs (labeled with observer name, pool location, and date).

SPECIES	Method of Verification*			CL**	SPECIES	Method of Verification*			CL**
	P	H	S			P	H	S	
Blanding's Turtle	☐	☐	☐		Wood Turtle	☐	☐	☐	
Spotted Turtle	☐	☐	☐		Ribbon Snake	☐	☐	☐	
Ringed Boghaunter	☐	☐	☐		Other:	☐	☐	☐	

*Method of verification: P = Photographed, H = Handled, S = Seen
**CL - Confidence level in species determination: 1= <60%, 2= 60-95%, 3= >95%

d. Optional observer recommendation:

○ SVP ○ Potential SVP ○ Non Significant VP ○ Indicator Breeding Area

e. General vernal pool comments and/or observations of other wildlife:

Fox den within 50' of pool, 3 kits.

Send completed form and supporting documentation to: Maine Dept. of Inland Fisheries and Wildlife
Attn: Vernal Pools
650 State Street, Bangor, ME 04401

NOTE: Digital submission (to Jason.Czapiga@maine.gov) of vernal pool field forms and photographs is only acceptable for projects with 3 or fewer assessed pools; larger projects must be mailed as hard copies.

For MDIFW use only Reviewed by MDIFW Date:_____ Initials:_____

This pool is: ☐ **Significant** ☐ **Potentially Significant** but lacking critical data ☐ **Not Significant** due to: ○ does not meet biological criteria. ○ does not meet MDEP vernal pool criteria.

Comments:

ATTACHMENT D
RECOMMENDED ACTIONS TO ADDRESS EROSION ON CLIFF TRAIL

Table D-1. Recommended Actions to Address Erosion on Cliff Trail.

ID	Issue	Recommended Action
1	minimal erosion	monitor for change
2	moderate erosion	no action necessary, bog-bridge in place
3	moderate erosion into marsh	relocate trail
4	moderate flooding/mud	bog bridge
5	minimal erosion	stepping stones or corduroy mat
6	moderate erosion - muddy trail	bog-bridge, stepping stones or corduroy mat
7	major mud issue	bog-bridge or corduroy mat
8	moderate mud issue	bog-bridge, stepping stones or corduroy mat
9	major runoff and erosion	waterbar needed to divert flow or relocate trail
10	major runoff erosion	relocate trail
11	major erosion off cliff	relocate trail

Corduroy mats are mats made of wood slash typically placed perpendicular to the trail orientation. Advantages to them are the wood is free and no artificial materials are required. Point 7 could be easily remedied with a few bog-bridges for hikers. A well constructed waterbar would remedy Point 9 but at Point 10 there is no place to divert the water to. Therefore, trail relocation is recommended at Point 10.

ATTACHMENT E

LIST OF EXPECTED SPECIES IN SHORELINE AND COASTAL HABITATS

Attachment E-1

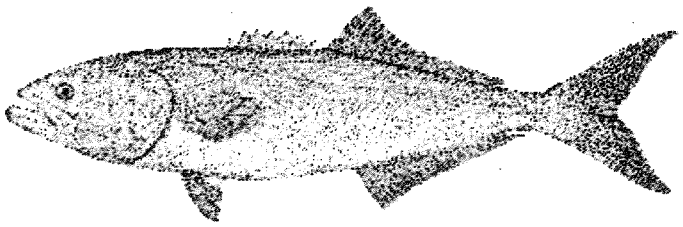
How Maine Wildlife Uses Shoreland Habitat

Wide Shoreland Habitat Conservation Area (600 ft. or more)[1]	
Wood turtle	Nests in dry, sandy uplands typically within 900 ft. of slow-moving streams
Spotted turtle[2], Blanding's turtle[2]	Nest and travel in uplands; feed and winter in vernal pools, small streams, and wetlands[3] in Southern Maine. The Maine Department of Inland Fisheries and Wildlife recommends conserving habitat within ¼ mile of known populations.
Spotted salamander, wood frog	Breed in vernal pools but reside in adjacent forest. Biologists who study vernal pool species recommend no site disturbance within 100 ft. of the pool and limiting development to 25 percent of the zone from 100-750 ft.
Northern leopard frog, pickerel frog	Move into wet meadows and fields near wetlands after the breeding season. Dispersing juveniles may be found up to 2,600 ft. from water.
Great blue heron	Nests in colonies, typically near water but sometimes in uplands. Sensitive to development within ¼ mile.
Osprey, bald eagle[2]	Nest in large trees up to three miles from water, usually within 2,300 ft. State rules require a ¼ mile buffer around eagle nests.
Moose	In summer, feeds in wetlands, rivers, and ponds in extensive forests. Typically requires blocks of forest 1,000 acres and larger.
Bats (red, silver-haired, little brown myotis, small-footed myotis, eastern pipistrelle)	Forage over open water (streams, ponds, wetlands) and roost in forests within 1,100 ft. of water. Roosting and nesting habitat varies by species and includes large trees with cavities or loose bark and canopies of large deciduous trees.
Wood duck, common goldeneye, hooded merganser, common merganser	Nest in cavities in large trees typically within 600 ft. of inland streams, rivers, lakes and ponds. Limited by availability of cavity trees.
Mallard, black duck, green-winged teal, blue-winged teal	Nest on ground in dry or marshy areas, typically within 600 ft. of water. Very sensitive to human disturbance and susceptible to predation from pets and other animals.
Forest-interior birds (red-shouldered hawk, wood thrush, hermit thrush, red-eyed vireo, black and white warbler)	Red-shouldered hawks nest in bottomland forests of more than 500 acres near wetlands, ponds, and rivers and over 3,000 ft. from the nearest house. Forest songbirds prefer blocks of mature forests 250 acres or larger, which are often associated with shoreland areas. As forest is converted to other uses, larger patches (500+ acres) are preferred by some species.
Medium Shoreland Habitat Conservation Area (330–600 ft.)	
Snapping turtle	Inhabits ponds, rivers, marshes, and tidal fresh water with muddy bottoms. Nests in open upland sites with light soils within 400 ft. of water.
Star-nosed mole	Feeds in wet, mucky soil within 330 ft. of water.
Beaver	Feeds on deciduous trees within several hundred feet of ponds and slow-moving steams.
River otter	Home range may encompass up to 50 linear miles of waterways.
Mink	Dens in uplands under logs, rocks, or tree roots adjacent to water.
Bobcat, red fox, coyote, fisher	Prey on animals within the shoreland zone and use shorelands as a travel corridor. Research in Maine has shown that these species are found within 330 ft. of water 85 percent of the time.
Narrow Shoreland Habitat Conservation Area (75–250 ft.)	
Brook trout, landlocked salmon, Atlantic salmon[4]	Found in coldwater streams, ponds, and lakes in forest-dominated watersheds. A forested buffer that increases with slope, runoff potential, and declining canopy cover will minimize stream sedimentation. Within this buffer harvesting that leaves a well-distributed stand and an uncut buffer of 25 ft. wide or more will moderate stream temperatures and provide food to stream animals. Clearing forests for other uses within the watershed is detrimental to coldwater fisheries.
Dusky salamander and spring salamander	Inhabits edges of intermittent and small perennial forest streams. Significant population declines occur in watersheds that are less than 80 percent forested.
Tree swallow	Nests in tree cavities within 300 ft. of water.

1. Desired conservation zone width may vary with species present and site characteristics. For detailed shoreland habitat management information and guides, see page 8. You also may want to contact a regional biologist.
2. Threatened or endangered species. Check Beginning with Habitat maps for possible locations (see page 8) and, if species are present, consult with Maine Department of Inland Fisheries and Wildlife.
3. Wetlands, as used here, includes only those wetlands with seasonal or permanent standing water that provides aquatic habitat, such as vernal pools, swamps, marshes, bogs, and fens.
4. Recommended buffers for Atlantic salmon extend up to 330 ft. depending on site conditions.

Maine Audubon Society, 2006a

Attachment E-2



NEFSC NOAA

Numerous species, such as bluefish, live in the water column.

Water Column

THE **water column** (see glossary) of the Gulf of Maine links all of Maine's marine and estuarine habitats. It is a dynamic habitat that includes both brackish water (a mixture of salt and fresh water) and salt water. Plankton (microscopic plants and animals) that live from the water surface down to the limit of sunlight form the base of the food chain for animals in the ocean. In addition, these microscopic plants produce about 70 percent of the oxygen in the atmosphere.

THREATS

- ❑ Poor water quality

WILDLIFE

The water column is a nursery for many bottom-dwelling species such as barnacles, lobsters, urchins, and clams, which release their young to drift in the water. The young eventually settle out of the water onto the seabed and transform into the more recognizable adult forms. Numerous species such as jellyfish, squid, bluefin tuna, bluefish, mako sharks, and the endangered northern right whale live in the water column. Many seabirds including the Atlantic puffin, razorbill, and most terns depend upon small fish, squid, shrimp, and other creatures that live in the water column. ▪

Coastal Species by Habitat

SALT MARSHES

- Ribbed mussel, mud and salt marsh snail, crabs, worms, grass shrimp
- Mummichog, silverside, winter flounder, striped bass, stickleback
- Great blue heron, little blue heron, glossy ibis, snowy egret, Nelson's and saltmarsh sharp-tailed sparrow

SANDY HABITATS

- Moon snail, sand dollar, surf clam
- Winter and summer flounder, Atlantic halibut
- Piping plover, least tern, sanderling, semipalmated plover

ROCKY HABITATS

- Barnacles, dog whelk, periwinkles, limpets, sea stars, mussels, American lobster, amphipods, worms, crabs, brittlestars
- Juvenile herring, pollock, winter flounder, rock gunnel
- Gulls, crows, herons, eider duck, peregrine falcon, Atlantic puffin, razorbill, Leach's storm petrel, black guillemot, common eider
- Seals, mink, otter, deer, raccoon

MUD FLATS

- Amphipods, mussels, clams, crabs, brittle stars, northern shrimp, soft-shelled clam, blue mussel, blood and sand worm
- Red hake, winter flounder, alewife, rainbow smelt, Atlantic mackerel
- Greater and lesser yellowlegs, whimbrel, red knot, black duck, Canada goose, 25 species of migrating and resident shorebirds

SHELLFISH BEDS

- Blue mussel, horse mussel, oyster, barnacles, snails, crabs, sea stars, whelks, moon snail
- Common eider, harlequin duck, bufflehead, greater scaup, common goldeneye

EELGRASS BEDS

- Larval blue mussel and bay scallop, sand shrimp, worms, crabs, amphipods
- Pollock, winter flounder, striped bass
- Black duck, Canada goose, Atlantic brant, piping plover, sanderling

KELP FORESTS

- Green urchin, periwinkles, limpets, sponges, sea squirt, acorn barnacle
- Rock gunnel, lumpfish, Atlantic herring

WATER COLUMN

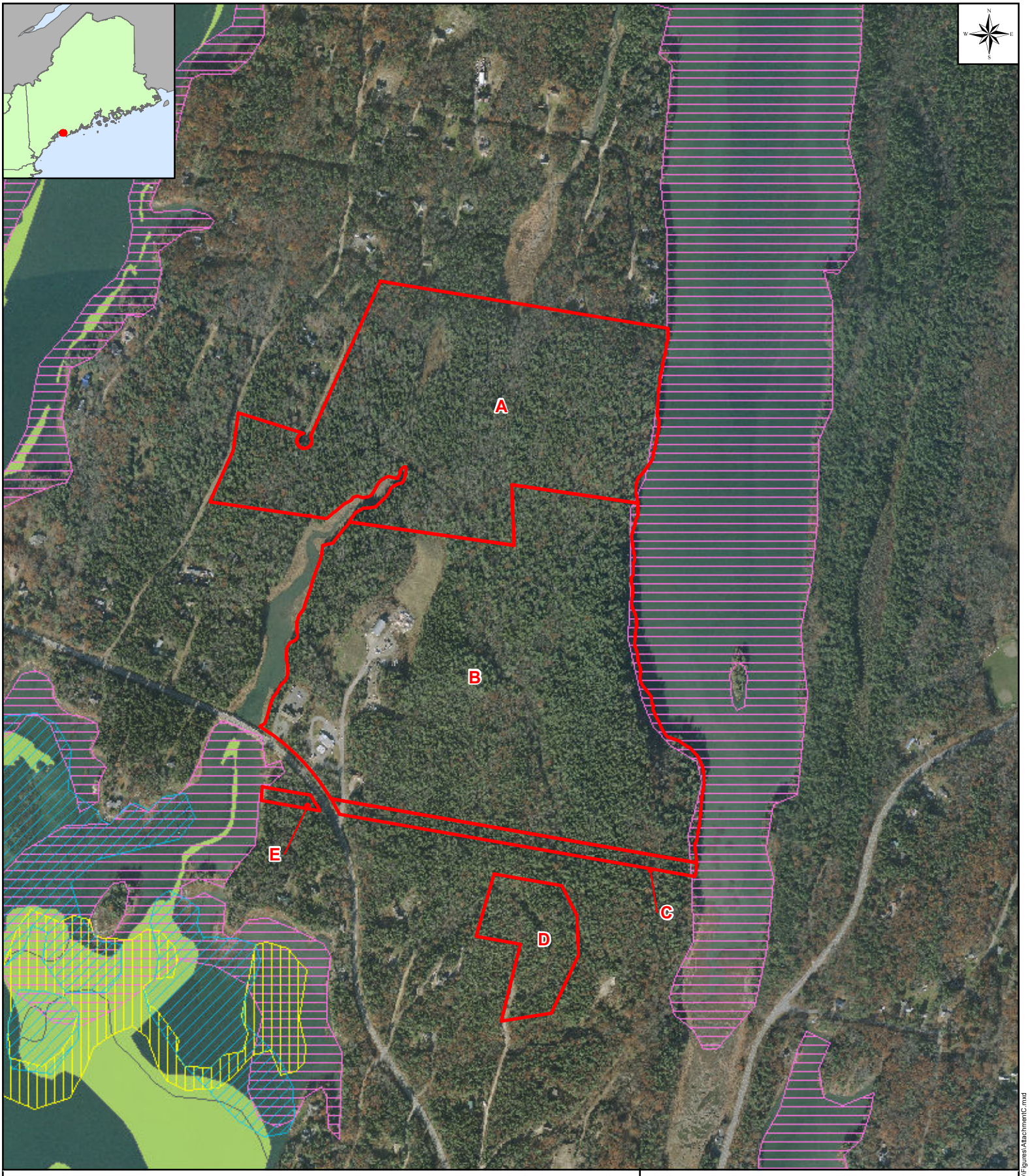
- Phytoplankton; zooplankton, larvae of barnacles, fish, American lobster, urchins, clams, squid, shrimp, jellyfish
- Bluefin tuna, bluefish, mako shark, sand launce, alewife, capelin, swordfish, sunfish
- Atlantic puffin, razorbill, terns
- Northern right whale

Please note that this is a representative sample of coastal species in Maine.

Maine Audubon Society, 2006b.

ATTACHMENT F

EEL GRASS BEDS AND SHELLFISH BEDS MAPPED NEAR THE PROJECT SITE



Project Parcels
Eelgrass Bed
Blue Mussels
European Oysters
Softshell Clams

Eelgrass and Shellfish Beds Mapped Near the Project Site Harpswell Town-owned Parcels

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
8 Fundy Road, Falmouth, ME 04105

Source: * Woodlot Alternatives Delineation, 2001; Normandeau Associates, 2011; MEGIS WMS Maine Orthos, Cumberland County 1Ft, 2009.

500 0 500 1,000
Feet

Harpswell

Cumberland Co., Maine

Filename:	Drawn By:	Date:	NAI Project No:
AttachmentC.mxd	jlavallee	7/15/2011	22422.000

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