Middletown-Norwalk Project

New Haven Harbor to East Devon Marine Route Review

PREPARED FOR

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Project No. N397-001.3

May 2004

MIDDLETOWN-NORWALK 345-Kv TRANSMISSION LINE
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1.0 INTRODUCTION AND SUMMARY

Concomitant with reviews of a variety of land-based alternative routes (e.g., railroad corridors, interstate highways, and pipeline rights-of-way), an offshore cable routing assessment was conducted between the East Shore Substation (SS) in New Haven and East Devon SS in Milford as part of the Middletown-Norwalk 345-kV Transmission Line Project (Project) in May 2004. This assessment was conducted in response to a request by the Connecticut Siting Council on April 22, 2004 for additional information on potential offshore routes between these substations. The submarine routing analysis was performed with the intent of ensuring a complete review of a range of alternatives for siting the Project.

The objective of the review was to identify potential cable routes by taking into consideration the locations of coastal and marine resources, as well as the locations of existing submarine utility rights of way and Federal Navigation Channels. This review does not address regulatory and permitting issues that would be associated with the installation of a submarine cable, nor does it reflect detailed engineering design or construction considerations.

Particular effort was made to minimize potential impacts of an offshore route on shellfish resources, given their sensitivity and the high level of public interest in these resources. Such efforts included minimizing the number of shellfish beds and lease areas that would be crossed and routing the cables seaward of the -55 foot depth contour; i.e., beyond the depth at which most shellfish (particularly oysters and clams) are located in Connecticut waters (Volk, 2003). The optimized offshore route (see Figures 1 through 4) stays seaward of this water depth necessitating a longer route in deeper waters. However, even with these impact minimization efforts, a substantial number and area of shellfish beds would be disturbed by construction of an offshore cable system in the study area (see Figures 1 through 4 and Table 1).

Several other critical routing criteria were also considered. As discussed in the sections below, routing was selected that minimized potential impacts to wetlands and habitat for protected species. Geological constraints such as shallow bedrock, navigational obstacles such as federal navigation channels, and dredge material dumping grounds were avoided. And potential impacts to nearby historic resources and sensitive land uses such as parks and schools were minimized.

In addition, the route optimization process included routing along existing infrastructure rights-of-way (ROW) to the extent possible, consistent with the recommendations of the Task Force on Long Island Sound's Comprehensive Assessment and Report Part II: Environmental Resources and Energy Infrastructure of Long Island Sound (LIS Task Force, 2003). For this study, these proximate existing ROWs included those of the Cross Sound Cable; the AT&T Cable; the Iroquois Gas Transmission System Pipeline from Milford to Northport, New York; and the proposed Eastern Long Island Extension Pipeline from Milford to Shoreham, New York (see Figure 1).

Due to the substantial offshore distance between interconnection points (25.3 miles) and other installation and operational constraints, the only currently available technology for the 345-kV submarine transmission line between East Shore SS and East Devon SS is self-contained fluid-filled (SCFF) cable (Lawson et al., 2002). Each of the six cables would be approximately 8 inches in diameter, with a 1-inch diameter interior core containing dielectric fluid kept under pressure. To prevent damage and interference with shipping and fishing activities, the cables would need to be buried 6 feet deep in most areas, and 10 to 15 feet in some places, consistent with U.S. Army Corps of Engineers (USACE) requirements for similar cables in federal navigation channels. System operation and maintenance requirements as well as water depths also dictated a typical spacing between cables of approximately 200 feet in deep water and 90 feet in harbor and nearshore areas (see Figures 1 through 4), increasing the area of disturbance and potential impacts to shellfish and other benthic resources.

TABLE 1. ROUTE ALTERNATIVES COMPARISON

CRITERIA	HOUSATONIC ROUTE ALTERNATIVE (EAST OF NEW HAVEN FNC)	HOUSATONIC ROUTE ALTERNATIVE (WEST OF NEW HAVEN FNC)	IROQUOIS ROUTE ALTERNATIVE (EAST OF NEW HAVEN FNC)	IROQUOIS ROUTE ALTERNATIVE (WEST OF NEW HAVEN FNC)
Total Submarine Length (miles)	25.3	25.4	20.9	20.9
Total Submarine Length (nautical miles)	22.0	22.1	18.1	18.2
Leased Shellfish Beds Crossed (#)	8	19	16	28
Leased Shellfish Beds Crossed (feet)	13,810	44,192	26,546	56,928
Leased Shellfish Beds Crossed (miles)	2.6	8.4	5.0	10.9
Leased Shellfish Beds Crossed (nautical miles)	2.3	7.3	4.4	9.4
Natural Shellfish Beds/Concentration Areas Crossed (#)	6	5	2	1
Natural Shellfish Beds/Concentration Areas Crossed (feet)	9,477	7,586	7,377	5,486
Natural Shellfish Beds/Concentration Areas Crossed (miles)	1.8	1.4	1.4	1.1
Natural Shellfish Beds/Concentration Areas Crossed (nautical miles)	1.5	1.2	1.2	0.9
Does Route Cross Iroqouis Cable?	Yes	Yes	No	No
Does Route Cross Cross Sound Cable?	Yes	No	Yes	No
Length of HDD at New Haven (feet)	1,500	1,500	1,500	1,500
Length of HDD at Milford (feet)	400	400	1,400	1,400
Total Length of HDD (feet)	1,900	1,900	2,900	2,900
Does Route Cross New Haven FNC?	No	Yes	No	Yes
Length of Cable in New Haven FNC (feet)	0	800	0	800
Is Route in Housatonic FNC?	Yes	Yes	No	No
Length of Cable in Housatonic FNC (miles)	4.8	4.8	0	0
Milford Landfall Location	Housatonic North of Devon Station	Housatonic North of Devon Station	Silver Beach	Silver Beach
Miles Upland in Milford	1.2	1.2	3.2	3.2

1.1 Optimized Route Identification

As an initial step in the offshore alternatives review, potential landfalls, submarine approaches, and upland interconnection routes were identified and evaluated for the East Shore SS to East Devon SS link (Figures 1 through 4). Sources of information considered in this review include available municipal, state, and federal environmental resource maps, plans, and studies; navigation charts; topographic maps; shellfish resource maps; wetland maps; interviews with agency officials; and site visits. Recent permit applications and regulatory decisions on other offshore transmission projects in Long Island Sound[1] and Long Island Sound project siting guidance (e.g., Rocque, 2000) were also considered, as were Connecticut's concerns about the protection of Long Island Sound's natural resources as evidenced in Public Act No. 02-95 and Executive Order No. 26 and the Task Force on Long Island Sound's Comprehensive Assessment and Report Part II: Environmental Resources and Energy Infrastructure of Long Island Sound (LIS Task Force, 2003).

Several sources were reviewed to identify habitat for protected or otherwise sensitive fish and wildlife species in the study area and were used in conjunction with other data to optimize routes for further consideration. The Environmental Sensitivity Index (ESI) and accompanying maps (see Appendix A), a compilation of sensitive biological and physical resources produced by NOAA (2001) for coastal areas in the U.S., NOAA Essential Fish Habitat (EFH) maps, CTDEP Natural Diversity Database mapping, and consultations with CTDEP and NOAA staff indicate that state- and federally-listed protected, endangered, threatened, and special concern species may be present in the vicinity of the study area. The optimized route sought to avoid habitat for these species to the extent practicable.

During the process of identifying potential offshore routes, general consultations were conducted with the Connecticut Department of Agriculture's Bureau of Aquaculture, NOAA, the USACE, physical oceanographers studying the area, and marine surveyors having worked in the area. Overall, issues identified during these consultations - to the extent allowed by technical constraints such as seabed conditions and engineering requirements - were incorporated into the selection of an optimized route that could be used in evaluating the merits of an offshore routing alternative.

After an initial screening of potential offshore conditions, four (4) potential route alternatives were identified for further review as described in Figures 1 through 4 and Table 1. These route alternatives are comprised of two sub-routes from East Shore SS through New Haven Harbor to Long Island Sound and two sub-routes from Long Island Sound to East Devon SS (via either the Housatonic River or the Iroquois Gas Pipeline alignment). The sub-routes in New Haven Harbor run on the east and west sides of the New Haven Federal Navigation Channel (FNC). These routes were

[1] Other project decisions considered include Siting Council Docket No. 134 (1990) pertaining to the Iroquois Gas Transmission System and Docket No. 208 pertaining to the Cross Sound Cable.

identified because they minimize the amount of shellfish beds crossed and avoid the FNC[2], consistent with the Opinion of the Siting Council for the Cross Sound Cable.[3] The four routes evaluated are listed below and are depicted on Figure 1:

- HOUSATONIC ROUTE (EAST OF NEW HAVEN FNC)
- HOUSATONIC (WEST OF NEW HAVEN FNC)
- IROQUOIS (EAST OF NEW HAVEN FNC)
- IROQUOIS (WEST OF NEW HAVEN FNC)

Applying the routing criteria summarized above and further described in Section 1.2 below, the HOUSATONIC ROUTE (EAST OF NEW HAVEN FNC) was identified as the optimized offshore route. In addition, this was the route in New Haven Harbor preferred by Bureau of Aquaculture (BOA) should an offshore route between East Shore SS and East Devon SS be considered further (David Carey, pers. comm., 5/17/04) given that it would cross fewer shellfish beds than the other offshore alternatives.[4] (Mr. Carey said that BOA would be very concerned about any route up the Housatonic River, given that the state's largest natural shellfish bed runs up the river from Long Island Sound to the Merritt Parkway.) However, even this optimized route includes segments the Siting Council previously found to be problematic in its Opinion on the Cross Sound Cable.[5]

There are several reasons the optimized route in New Haven Harbor was not within the FNC. The New Haven FNC is approximately 400 FT wide. To allow room should the Cross Sound Cable need to be spliced and re-laid should an external incident require repair of the cable, another cable would have to be a minimum of 100 FT away from Cross Sound Cable, located to the west of the Cross Sound Cable due to bends in the Cross Sound Cable alignment. Geometrically, a new offshore cable in New Haven Harbor would need to be 100 FT from the edge of the FNC. However, this would not leave adequate room to splice and re-lay both cables should an external incident require repair of both cables. This location would also place the new offshore cable in an area near the channel side-slope, where maintenance dredging is more likely to occur.

Also, it is well known (based on the Cross Sound Cable experience) that removal of rock (likely blasting) would be required from the area located approximately 1,200 FT north of Red Buoy No. 8 to

[2] One objective was to avoid the New Haven Harbor FNC to the extent that it may conflict with future dredging and operation and maintenance of the Cross Sound Cable. In the Housatonic, the optimized route is in the FNC as this has sufficient water depth for cable installation and would avoid most geological constraints.

[3] The CSC Opinion on the Cross Sound Cable (Docket 208, 1/3/02) said "a second cable system within the FNC could make maintenance dredging more difficult, and may have to be relocated to accommodate future deepening of the FNC."

[4] Mr. Carey noted that any route from East Shore SS into New Haven Harbor and then into Long Island Sound would have to traverse shellfish lease areas, including those that have been established over the FNC in that area. If a route had to be selected in New Haven Harbor, he said a route that would traverse adjacent to and east of the FNC (essentially paralleling Cross Sound Cable to the east) would result in comparatively fewer impacts to shellfish resources that would a route to the west. It was this alignment that BOA found acceptable during review of the Cross Sound Cable project (Docket No. 208).

[5] The Siting Council's 3/28/01 Opinion on the Cross Sound Cable (Docket 197) denied the project permission to use a route running from East Shore SS south along east side of the New Haven FNC in part because of the Siting Council's "concern that the installation…would result in unacceptable impacts to existing shellfish resources and benthic habitat within New Haven Harbor."

achieve a required cable burial depth of -48 FT MLLW. The use of blasting in this area may require that the Cross Sound Cable be temporarily relocated to protect it. This would also be required if the cable had to be spliced in this area and reburied to -48 FT MLLW.

In summary, while a new offshore cable could fit geometrically in the New Haven Harbor FNC, installation and repair of a new cable would likely cause conflicts between it and the Cross Sound Cable. Therefore, it does not appear to be as viable an alternative as the EAST AND WEST OF NEW HAVEN FNC routes, which are adjacent to the channel.

1.2 Routing Alternatives Analysis Process

Potential submarine routes, landfall locations, and associated upland routes were evaluated against key routing and installation criteria to determine which overall route alternative would potentially reflect environmental sensitivities, economic considerations, and engineering design factors based on a relative assessment of impacts. The key criteria used for this evaluation were:

- Alignment along existing previously disturbed infrastructure ROWs, where possible;[6]
- Significant geological/navigational offshore constraints such as rocky areas (e.g., near Charles Island tombolo), mooring buoys (e.g., “RS” in New Haven Harbor), and USACE set-backs from FNCs;
- Disturbance of shellfish resource areas (concentration areas, lease areas, and natural beds);
- Required crossings of existing/proposed cables/pipelines;
- Significant shoreline alterations/disturbances;
- Potential to alter state-listed wildlife species habitat and significant natural communities;
- Potential impacts to coastal and inland wetlands and water resources;
- Potential impacts to historical and archaeological resources; and
- Disturbance of public recreational resources and other sensitive land uses.

After preliminary screening of the general coastal and offshore area between New Haven and Milford for potential route alternatives, a total of four (4) potential route alternatives were identified for more intensive study (Figures 1 through 4 and Table 1). These routes were then screened against the above criteria. This optimization process led to the selection of the HOUSATONIC ROUTE (EAST OF NEW HAVEN FNC) as the overall route with the least potential for physical and environmental impacts for the following reasons:

1. This route would utilize existing previously disturbed infrastructure ROW except where this would result in increased impact to shellfish lease areas.

[6] As stated in footnote 3, the Siting Council was reluctant to allow additional cables in the New Haven FNC given channel maintenance requirements. In addition, there is an area of known bedrock in the FNC shallower than the -48 ft MLLW required depth for the Cross Sound Cable which is the subject of ongoing review of that project. Any new cable in this FNC would likely be similarly constrained by this feature.

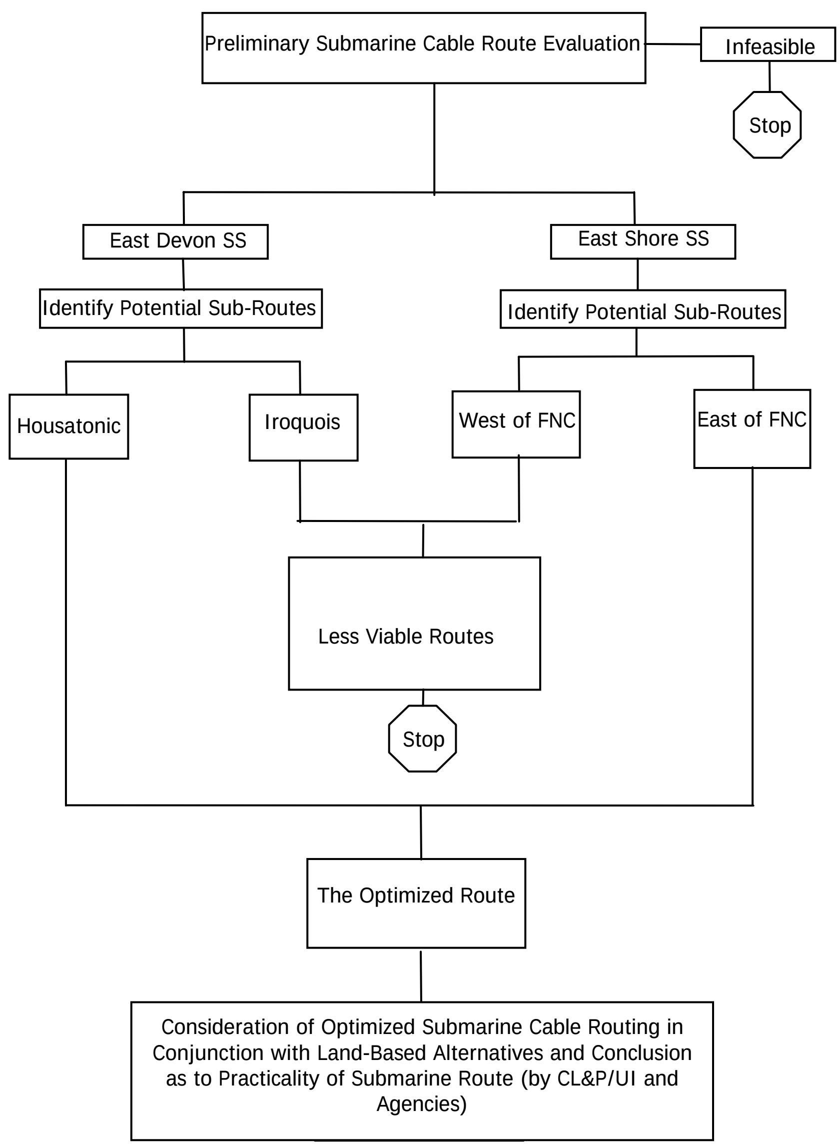
2. For the portions of this route where data were available, geophysical survey data indicate that seabed conditions are likely to be suitable for embedment of the cable system.
3. Known areas of shallow bedrock would be avoided to the extent practicable.
4. Mapped shipwrecks and offshore designated dredged material dumping grounds would be avoided.
5. This route would avoid and/or minimize impacts to critical navigational and ecological features in the study area identified on resource maps and by the agency officials.
6. This route would minimize impacts to mapped shellfish resource areas, disturbing less shellfish habitat than the WEST OF FNC sub-route and Iroquois alternative.
7. This route would avoid mapped habitat for state- and federally-listed protected species.
8. Known cultural resources would be avoided.
9. Inland, to the extent possible, this route was located to minimize disturbance to residential areas and areas where the facility might interfere with other uses.

However, even this optimized route has considerable uncertainties and the potential to cause environmental impacts compared to routing alternatives that would not involve a submarine component. These issues include:

1. This route would be substantially longer than the inland/underground alternatives being studied. Specifically, the distance of the HOUSATONIC ROUTE (EAST OF NEW HAVEN FNC) between East Shore SS and East Devon SS would be more than 25 miles, as opposed to a total route length of approximately 22 miles for the primary inland/underground route (the proposed route) under consideration.
2. Even though this route would minimize the crossing of shellfish beds, approximately 2.6 miles of shellfish lease area and 1.8 miles of shellfish concentration area would be crossed (see Figures 1 through 4 and Table 1).
3. Even though this route would capitalize on existing submarine utility alignments in New Haven Harbor, there would be no such utility alignment available for the remainder of the route. Furthermore, the optimized route would require crossing two to three cables/pipelines, adding to the cost and complexity of the project and having potentially greater environmental impacts.
4. Open cut trenching or directional drilling would be required at the landfalls, resulting in temporary impacts to resources in the vicinity.
5. The quality of soils and sediments along the route has not been thoroughly evaluated. Disturbance of potentially contaminated sediments during cable installation and maintenance, particularly in the Housatonic River, may pose a risk to aquatic resources. In addition, contaminated sediments in the vicinity of the landfall area of the East Shore SS and New Haven Generating Station were identified during the Cross Sound Cable siting process.

A flowchart summarizing the decision process for the routing analysis is presented on the following page.

Submarine Cable Routing Analysis – Process Summary



An added concern for offshore routing stems from both the type and the nature of the cables that have to be utilized for the submarine portion of this installation. Based on the preliminary design information on which this analysis is based, six 345-kV self-contained fluid-filled (SCFF) cables would be required which, at a minimum, would necessitate two trenches sufficiently separated so that repair of one cable circuit can be safely carried out without de-energizing the other. Such cable is extremely reliable and its operation does not have significant environmental effects so long as it is well protected from external forces that could damage it. However, if hit by a dragging anchor or other similar object, it can break, which may result in an unauthorized discharge of insulating fluid into the environment. To minimize the likelihood of this happening, in areas where such damage might occur, the cable must either be buried deeply (this study presumes 6 feet in most areas and 10 to 15 feet at FNCs and other sensitive areas) or otherwise protected by concrete mattresses or riprap. The installation of mattress and riprap protection, combined with the number and length of the cable trenches, would increase the impact of the cable installation on the seabed across shellfish beds and other sensitive resources, and may not be approved by state and federal regulators.

State and federal regulations and policies (e.g., the Coastal Zone Management Act and Clean Water Act) favor water-dependent uses over non-water-dependent ones. That is, when there is a reasonable opportunity to locate an activity inland as a means of avoiding significant impacts on a water-dependent resource, one must do so. As is evident from the above, a submarine route from East Shore SS to East Devon SS does have the potential to impact coastal and offshore natural resources. Hence, the ability of an offshore route to be permitted depends very much on a demonstration that a marine alternative is the only practicable one. Since the Middletown-to-Norwalk 345-kV Transmission Line Project is located entirely within Connecticut and does not necessarily have to cross Long Island Sound, such a demonstration becomes all the more critical.

Greater detail on each potential route alternative, environmental conditions in the study area, and potential impacts is presented in the sections that follow. This study is preliminary. Should further review of an offshore alternative be requested, additional technical studies and consultations with involved agencies would be required to better determine the feasibility of a submarine route (from engineering, economic, and regulatory perspectives) and to define the specific nature of potential environmental impacts that may result from offshore installation and operation of a cable system in the study area. Also, the actual cable configuration and its alternatives would have to be examined further in light of specific capabilities of particular cable manufacturers and installers.

2.0 IROQUOIS GAS TRANSMISSION ALIGNMENT ALTERNATIVE

2.1 New Haven Harbor and Landfall

The route optimization process from East Shore SS to Long Island Sound considered a variety of physical, environmental, and navigational factors including:

- Alignment along existing previously disturbed infrastructure ROWs, where possible.[7] From New Haven Harbor to Long Island Sound, these proximate existing ROWs included those of the Cross Sound Cable and the AT&T Cable.
- Minimization of the amount of shellfish beds crossed and avoiding placement of additional cables in the FNC, consistent with the Opinion of the Siting Council for the Cross Sound Cable.[8]
- Avoidance of significant geological/navigational offshore constraints such as rocky areas, mooring buoys (e.g., "RS" in New Haven Harbor), and USACE set-backs from FNCs.
- Avoidance of crossings of existing/proposed cables/pipelines.
- Maintenance of a safe horizontal separation of at least 105 feet from the New Haven Harbor Federal Channel limits, as required by the USACE.
- Avoidance of shallow water areas on the west side of the Harbor.

Using these criteria, two primary sub-routes were identified in New Haven Harbor:

- EAST OF NEW HAVEN FNC
- WEST OF NEW HAVEN FNC

The EAST OF NEW HAVEN FNC sub-route (see Figures 1 through 4) was identified as the optimized sub-route primarily because it minimizes the number and length of shellfish beds crossed and avoids crossing the FNC. However, even the optimized route (HOUSATONIC ROUTE - EAST OF NEW HAVEN FNC) includes segments the Siting Council previously found to be problematic in its Opinion on the Cross Sound Cable.[9] The sections below provide specific information about the physical and environmental conditions in this area.

[7] As stated in footnote 3, the Siting Council was reluctant to allow additional cables in the New Haven FNC given channel maintenance requirements. In addition, there is an area of known bedrock in the FNC shallower than the -48 ft MLLW required depth for the Cross Sound Cable which is the subject of ongoing review of that project. Any new cable in this FNC would likely be similarly constrained by this feature.

[8] The CSC Opinion on the Cross Sound Cable (Docket 208, 1/3/02) said "a second cable system within the FNC could make maintenance dredging more difficult, and may have to be relocated to accommodate future deepening of the FNC."

[9] The Siting Council's 3/28/01 Opinion on the Cross Sound Cable (Docket 197) denied the project permission to use a route running from East Shore SS south along east side of the New Haven FNC in part because of the Siting Council's "concern that the installation…would result in unacceptable impacts to existing shellfish resources and benthic habitat within New Haven Harbor."

2.1.1 Geology and Seabed Conditions

The West, Quinnipiac and Farm Rivers flow within valleys incised into bedrock, and converge in inner New Haven Harbor to occupy a single linear valley trending to the southwest (Poppe, 1998). The inactive Eastern Boundary Fault trends northeasterly across the Middle Breakwater west of the FNC and along the southern part of Morris Cove in outer New Haven Harbor. The fault separates the coarse-grained sedimentary New Haven Arkose (sandstone bedrock) to the north from metamorphic amphibolites and hornblende gneiss to the south, named locally as the Lighthouse Gneiss (Stone et al., 1998; Poppe et al., 1998). Lighthouse Gneiss is described as a pink or gray to red, medium grained generally well foliated granitic gneiss of Proterozoic age (Poppe et al., 1998).

Cores obtained in 2002 as part of the Cross Sound Project within the outer New Haven Harbor FNC generally encountered a layer of organic silts and clay overlying reddish brown poorly sorted sand and gravel (possible glacial till) (ESS, 2002). Underlying bedrock recovered in rock cores generally consisted of competent light grey, medium to coarse-grained, granodioritic gneiss with variable foliation. This rock is generally consistent with the published description of Lighthouse Gneiss (above).

The bedrock surface is irregular and variable in the vicinity of New Haven Harbor and intermittently outcrops at or above the seabed in the vicinity of the breakwaters both east and west of the FNC, and in the area south of the West Breakwater at the entrance to New Haven Harbor.

Much of the New Haven Harbor seabed is composed of organic-rich silts and muds overlying bedrock, as encountered in the vibracore program noted above. The sediments contain gases generated as a by-product of decomposition of the organic material, which are remnants of an earlier paleo-estuarine environment. The gases trapped in the sediment inhibit acoustic propagation and reduce the ability of geophysical subbottom profiler instruments to resolve underlying seismic reflectors, which are used to differentiate types of underlying sediments and/or rock. The gaseous sediments, which can be expected along both sub-routes parallel to the FNC, can sometimes mask subsurface conditions surveyed during geophysical investigations. These surficial sediments overlay a sequence of earlier post-glacial sediments, including fluvially deposited sands and silts of varying thickness. Poorly sorted glacial tills may also be present directly over bedrock.

Geologic conditions specific to each of the New Haven Harbor alternative routes are described below.

East of FNC Sub-Route

Gaseous sediments which may limit geophysical resolution of underlying subsurface conditions (discussed above) can be expected in the inner Harbor east of the FNC.

Between the east side of the FNC and the southwest tip of the East Breakwater is an area of rocks and coarse-grained sediments. This area is named Southwest Ledge on the NOAA Navigation Chart No. 12371 (NOAA, 1992), a nomenclature which may be indicative of shallow bedrock in this area. The bedrock is likely the competent Lighthouse Gneiss, which was cored in the excavated FNC and is exposed at Lighthouse Point (Poppe et al., 1998). Bedrock outcrops above the seafloor occur at The Chimneys and Old Head Reef, north and south of East Breakwater and east of this alternative route.

New Haven Harbor is Connecticut's largest port, and has supported active industrial uses over the last two centuries. Results of chemical analysis of shallow sediments directly off the East Shore SS landfall as part of the Cross Sound Project detected chemical contaminants (certain metals, one pesticide, PCBs and PAHs) above two sediment quality criteria commonly used to define the potential to induce toxic effects in macrobenthos (Long et al., 1996 and 1998). The concentrations detected exceeded the Effects Range-Low (ER-L) and Effects Range-Medium (ER-M) for the specified contaminants in marine sediments at three core locations in 1996 (ESS, 2001). Directional drilling for cable installation off the landfall should avoid disturbance of these sediments.

Chemical analysis of one shallow sediment sample just east of the FNC off the center of Morris Cove detected mercury above ER-M marine sediment guidelines. The extent of the mercury is not known at this time. No guidelines where exceeded in sediment samples analyzed approximately 2,000 feet north and south of this location just east of the FNC in 1996 (ESS, 2001). Chemical constituents detected during sediment sampling in and east of the FNC in 1996 and 1999 generally decreased in concentrations towards the outer Harbor.

West of FNC Sub-Route

Gaseous sediments limiting geophysical resolution of underlying subsurface conditions (discussed above) can also be expected in the inner Harbor west of the FNC.

Based upon a review of available information, the bedrock surface appears quite shallow and variable in the vicinity and south of the Middle and West Breakwaters. Seismic subbottom profiles run parallel and adjacent to Middle Breakwater west of the FNC indicated bedrock outcropping sporadically above the seafloor (Poppe et al., 1998). In addition, a cross-section published by USGS in cooperation with the Connecticut DEP suggest a bedrock dome may rise to near the seafloor generally south of West Breakwater, in the vicinity of the West Sub-Route (Stone et al., 1998).

No sediments west of the FNC were analyzed for chemical constituents as part of the Cross Sound Cable Project. However, due to the long-time industrial uses in New Haven Harbor, chemical analysis of surficial marine sediments should be performed if this route is considered further.

2.1.2 Commercial Shellfish

Shellfish commercially managed and harvested in New Haven Harbor include the eastern oyster (*Crassostrea virginica*) and the hard-shell clam (*Mercenaria mercenaria*). Commercial shellfish resources for this area have been mapped by the BOA and the CTDEP (Figures 1 through 4). Any route from East Shore S/S into New Haven Harbor and then into Long Island Sound would have to traverse shellfish lease areas, including those that have been established over the FNC in that area. If a route had to be selected in New Haven Harbor, the BOA suggested a route that would traverse adjacent to and east of the FNC (essentially paralleling Cross Sound Cable to the east) would result in comparatively fewer impacts to shellfish resources that would a route to the west (David Carey, pers. comm. , 5/17/04). Table 2 identifies potential impacts from the cable route alternatives to shellfish resources within New Haven Harbor. Mapped commercial shellfish resources in the Study area are discussed below.

Table 2
Shellfish Resource Impacts
New Haven Harbor Alternatives

CRITERIA	WITHIN NEW HAVEN HARBOR	WEST OF NEW HAVEN HARBOR
Total Submarine Length (miles)	3.6	6.2
Total Submarine Length (nautical miles)	3.1	5.4
Leased Shellfish Beds Crossed (#)	6	16
Leased Shellfish Beds Crossed (feet)	10,787	30,425
Leased Shellfish Beds Crossed (miles)	2	5.8
Leased Shellfish Beds Crossed (nautical miles)	1.8	5
Natural Shellfish Beds/Concentration Areas Crossed (#)	0	0
Natural Shellfish Beds/Concentration Areas Crossed (feet)	0	0
Natural Shellfish Beds/Concentration Areas Crossed (miles)	0	0
Natural Shellfish Beds/Concentration Areas Crossed (nautical miles)	0	0

Managed Shellfish Beds and Shellfish Concentration Areas

The BOA manages shellfish beds seaward of the mean high water (MHW) line. Shellfish beds located landward of the extension of the MHW line across most harbors, bays, and creeks are typically managed by local municipalities. However, along the cable route the BOA, under agreements with the New Haven Harbor municipalities (New Haven, West Haven, and East Haven), monitors and governs all shellfish beds in New Haven Harbor, as well as those outside of the breakwater.

The CTDEP Shellfish Concentration Maps for the Project area indicate that there are shellfish concentrations located within or adjacent to the cable submarine route alternatives. Mapped concentration areas in the vicinity of the study area are shown in Figure 2.

Hard Shell Clam

Hard shell clams spawn in New Haven Harbor from late June through September and are dormant in winter months. Clam beds within New Haven Harbor are present primarily as a result of natural conditions, rather than the result of cultivation or seeding.

2.1.3 Finfish

New Haven Harbor supports a diverse fish assemblage including year round resident species, anadromous species, summer migrants and winter migrants. Many of these species are important commercial and recreational species while others are important forage species. New Haven Harbor also functions as a nursery area by providing spawning grounds for resident and migratory species and feeding areas for some adult species (NAI, 1985). Some of the more common species identified in the finfish trawl surveys and monitoring programs are discussed below.

Year Round Resident Species

Common year round resident species in New Haven Harbor are all demersal (associated with the bottom) and include winter flounder (*Pseudopleuronectes americanus*), windowpane flounder (*Scopthalmus aquosus*), tautog (*Tautog onitis*), and cunner (Tautogolabrus *adspersus)*. Of these species, winter flounder and windowpane flounder are the most abundant. Winter flounder spawn in various areas of New Haven Harbor including Morris Cove, New Haven Long Wharf, and the Quinnipiac River. Spawning adults are reported as common and abundant in Long Island Sound from March through June (Stone et al., 1994). Winter flounder eggs are demersal, meaning that the eggs are either deposited on or sink to the seabed floor. Larvae are also demersal and were collected in New Haven Harbor from February through June with peak densities in April through June (NAI, 1985).

Peak juvenile and adult abundance of windowpane flounder occurred during the spring and fall (NAI, 1985). Spawning adults are reported as common, abundant, or highly abundant in Long

Island Sound from April through August (Stone et al., 1994). Windowpane flounder eggs are buoyant and were present in April through October with highest abundance in May. Larvae were present in low densities from June through October, but were most abundant in June (NAI, 1985).

Juvenile and adult cunner are most abundant in New Haven Harbor from May through August and higher catches occurred in the outer harbor (NAI, 1985). Cunner eggs were most numerous in June and July but were present April through October. Cunner larvae were present from May through July. Tautog have a life history and abundance similar to that of cunner (NAI, 1985).

Migratory and Anadromous Species

Common migratory species in New Haven Harbor are both demersal and pelagic. Abundant demersal summer migrants include scup (*Stenotomus chrysops*), striped searobin (*Prionotus evolans*), northern searobin (*Prionotus carolinus*), and smooth dogfish (*Mustelus canis*) (NAI, 1985). Overall, according to NAI, "the demersal fish assemblage was most abundant during the summer nursery period and least abundant during mid-winter, when only the winter flounder and windowpane were active" (NAI, 1985).

Pelagic species that utilize New Haven Harbor include one winter migrant - Atlantic herring (*Clupea harengus*); summer migrants – bluefish (*Potatomus salatrix*), weakfish (*Cynoscion regalis*), northern kingfish (*Menticirrhus saxatilis*), butterfish (*Peprilus triacanthus*), Atlantic menhaden (*Brevoortia tyrannus*), bay anchovy (*Anchoa mitchilli)*, Atlantic mackerel (*Scomber scombrus*), and northern puffer (*Sphoeroides maculates*); and anadromous species - striped bass (*Morone saxatilis*), white perch (*Morone americana*), alewives (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), brown trout (*Salmo trutta*), and rainbow smelt (*Osmerus mordax*).

There are several fish species identified as having essential fish habitat ("EFH") in New Haven Harbor according to the Magnuson-Stevens Fishery Conservation and Management Act ("Magnuson-Stevens Act"). Essential fish habitat is defined by the Magnuson-Stevens Act as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity". (16 U.S.C. 1802 § 3). EFH designations are based on research of habitat requirements for the individual life stages (generally eggs, larvae, juveniles, adults, and spawning adults). Habitat within New Haven Harbor has been designated EFH for 16 species (Table 3; NMFS, 2003).

Table 3. Summary of specific life stage EFH designations for species in the NMFS designated 10 x 10 minute squares encompassing the Cable Route Alternatives

SPECIES	EGGS	LARVAE	JUVENILES	ADULTS
Atlantic salmon			X	X
Pollock			X	X
Whiting				X
Red hake	X	X	X	X
Winter flounder	X	X	X	X
Windowpane flounder	X	X	X	X
American plaice			LIS, HR	LIS, HR
Atlantic sea herring			X	X
Bluefish			X	X
Atlantic mackerel	X	X	X	X
Summer flounder			X	
Scup	X	X	X	X
Black sea bass			X	
King mackerel	X	X	X	X
Spanish mackerel	X	X	X	X
Cobia	X	X	X	X
Sand tiger shark		X		

X = designations apply to all portions of each alternative route

LIS = designation applies to the Long Island Sound portion of the alternative routes

HR = designation applies to the Housatonic River and landfall portion of the Housatonic River Alternative.

2.1.4 Benthos

Benthic organisms (or benthos) include those organisms that either live on or beneath the seabed floor such as worms, crustaceans, small clams, and other macrovinvertebrates. Benthos in New Haven Harbor have been referred to as spatially and seasonally variable for species composition, faunal densities and species richness. The New Haven Harbor benthos also has an extreme year-to-year variability in these parameters. With the exception of managed shellfish resources, abundant fauna are either opportunists, have short life spans or are mobile species rarely present throughout an entire yearly cycle (NAI, 1985). A study conducted by NAI characterized the inner harbor as a community of variable species composition, with the spionid polychaete worm (*Streblospio benedicti)* as the dominant species. Other species of importance in the inner harbor assemblage were the coot clam (*Mulinia lateralis*), the tube building amphipod (*Ampelisca abdita*), oligochaete worms, the mysid (*Neomysis Americana*), and the tellinid bivalve

(*Tellina agilis*) (NAI, 1985). The outer harbor assemblage was dominated by a similar suite of species including *Ampelisca, Streblospio, Tellina, Mulinia,* and the polychaete worms *Nephtys* and *Nereis* (NAI, 1985).

Studies conducted for the Cross Sound Cable Project (ESS 2001) indicated that a total of nine species occurred in the vicinity of New Haven Harbor near the East Shore Substation. Dominant taxa were members from the Class Bivalvia (bivalves), Gastropoda (gastropods) and Polychaeta (bristle worms).

The American lobster (*Homarus americanus*) is highly abundant throughout Long Island Sound and is also likely present in New Haven Harbor (Stone et al., 1994). Lobsters are found in Long Island Sound during all seasons with peak occurrences in the month of July. Other crustaceans found in and around New Haven Harbor include blue crab (*Callinectes sapidus*), lady crab (*Ovalipes osceilatus*), Atlantic rock crab (*Cancer irroratus*) and hermit crab (*Pagurus longicarpus*).

2.1.5 Protected Species and Habitats and Wildlife

A letter requesting information regarding the presence of protected species and their habitats in the Project area was submitted to the CTDEP Natural Diversity Database (NDDB). The response to this request indicated that further information would be provided once the routing process was further advanced. The NDDB lists state- and federally-listed threatened, endangered, or special concern species with the potential to occur in a given area.

Previous resource reviews for the New Haven Harbor area have indicated that four species of marine turtles are reportedly summer inhabitants of Long Island Sound: the Kemps Ridley (*Lepidochelys kempi*) and the Leatherback (*Dermochelys coricea*) which are both state and federally listed endangered species, as well as the Loggerhead (*Caretta caretta*) and Green turtle (*Chelonia mydas*) which are both state and federally listed threatened species (Ludwig, 1999a). These sea turtles (except the Green turtle) are found in the nearshore waters of Long Island Sound from May 15 through November 15, after which they migrate out of the Sound toward southern nesting grounds (Ludwig, 1999a). The Green turtle is considered a resident species of Long Island Sound (Ludwig, 1999b). The piping plover, a state and federally listed threatened species, occurs at Sandy Point, approximately 2,200 feet west of the landfall at East Shore Substation (Figure 2).

Environmental Sensitivity Index (ESI) maps produced by NOAA (2001) identify vulnerable coastal resources for use in oil spill response activities. Although these maps focus on species and habitats that are sensitive to oil spills, they provide useful information on species and habitats potentially present in the coastal areas of New Haven Harbor and also introduce some of the "Threatened/Endangered/Species of Special Concern" that may be present in the area. Table A-1 (in Appendix A) lists the environmental sensitivity index species that may be present along the cable route alternatives evaluated. This information is also depicted in Figure A-1 (Appendix A). The ESI identifies seven state- and/or federally-listed protected species (Appendix A, Table and Figure A-1).

Wildlife along the New Haven Harbor portion of the submarine cable route alternative is comprised mainly of avian species. Four common classifications of birds found in New Haven Harbor are swimming birds, wading birds, aerialists, and waterfowl. Typical bird species found in New Haven Harbor include the horned grebe (*Podiceps auritus*), common goldeneye (*Blucephala clangula*), sanderling (*Calidris alba*), herring gull (*Larus argentatus*), common tern (*Sterna hirundo*), and the black-bellied plover (*Pluvialis squatarola*). Occasionally the black-headed gull (*Larus ridibundus*) and little gull (*Larus minutus*) will visit the area (Demos, 1993). Migrating species may also use New Haven Harbor for feeding and resting habitat.

Wildlife species in the vicinity of the upland portion of the cable route alternative in New Haven mainly consist of avian species. Several open area species reported in the vicinity of the upland cable route include: American robins (*Turdus migratorius*), European starling (*Sturnus vulgaris*), common grackles (*Quiscalus quiscula*), American crows (*Corvus brachyrhynchos*), fish crows (*Corvus ossifragus*), cedar waxwings (*Bombycilla cedrorum*), house sparrows (*Passer domesticus*), and mockingbirds (Family Mimidae). Shrubland species reported as abundant include yellow warblers (*Dendroica petechia*), herring gulls, eastern kingbirds (*Tyrannus tyrannus*), common yellowthroats (*Geothlypis trichas*), red-winged blackbirds (*Agelaius phoeniceus*), song sparrows (*Melospiza melodia*), catbirds (Family Mimidae), and chestnut-sided warblers (*Dendroica pensylvanica*) (NEA, 1998). Non-avian species, such as Eastern chipmunks (*Tamias striatus*), red fox (*Vulpes vulpes*), and coyote (*Canis latrans*) have also been reported on the East Shore Substation Site.

2.1.6 Coastal and Inland Wetland/Water Resources

Coastal and wetland resources in the vicinity of New Haven Harbor are discussed below.

Wetlands and Waters of the United States

The National Wetlands Inventory Maps (NWI) identifies estuarine resources in the vicinity of the submarine cable route in New Haven Harbor (Figure 5). The submarine portion of this route transverses New Haven Harbor, considered a water of the United States. Within New Haven Harbor, the NWI map defines the flats near the East Shore Substation as estuarine intertidal flat, regularly flooded (E2USN). The NWI map defines New Haven Harbor as estuarine subtidal open water (E1UBL).

No wetlands have been identified in the upland area of the East Shore Substation (Figure 5). The Substation is located in the Federal Emergency Management Agency (FEMA) 100-year Coastal Flood Hazard Area as identified by FEMA.

Coastal Resources

The CTDEP Coastal Resources Map identifies coastal resources under the jurisdiction of the Connecticut Coastal Management Act (CCMA) as defined at C.G.S. § 22a-93(7). A sub-set of the mapped coastal resources within the New Haven portion of the cable route alternative and the landfall are shown on Figure 2 and include:

- Developed Shorefront - highly engineered and developed land resulting in impairment or alteration of natural features or systems.
- Intertidal Flats - very gently sloping or flat areas located between high and low tides composed of muddy, silty and fine sandy sediments and generally devoid of vegetation.

Water Resources

According to the Water Quality Classifications Map of Connecticut, the water of New Haven Harbor has a current classification of SD and an attainment classification of SB (SD/SB). SD/SB waters may be suitable for bathing or other recreational purposes; certain fish, shellfish and wildlife habitat; and industrial and other legitimate uses including navigation. These waters, however, do not meet attainment water quality criteria for one or more designated uses due to severe pollution. The water quality classification map notes "SD/SB conditions severely inhibit one or more of these designated uses for extended time periods or totally preclude attainment of one or more designated uses. SD/SB waters may have good aesthetic value." The goal of SD/SB waters is to attain SB classification, and therefore, standards for protection of SB waters apply.

There is an unnamed tidally-influenced drainage swale in the vicinity of the upland portion of the cable route alternative in New Haven. According to the Water Quality Classification Map of Connecticut, the upland portion of the cable route alternative is located in an area that has a current groundwater classification of GB. The designated uses for GB waters include industrial process water and cooling waters and base flow for hydraulically-connected surface water bodies. These waters are presumed not suitable for human consumption without treatment.

2.1.7 Navigation

Key navigational features within the Project Area were identified by reviewing nautical charts, the *Coast Pilot* and publicly available permit applications for the Cross Sound Cable Project. These features include: the New Haven Harbor Federal Navigation Channel (authorized depth of -35 feet at Mean Low Water (MLW)), the New Haven Harbor breakwaters (East, Middle and West), lighthouses, buoys, and an Uncharted Anchorage Area. The locations of these features relative to the submarine cable route are shown on Figure 2.

New Haven Harbor is an important harbor of refuge (NOAA, 2004). The natural harbor is approximately 4.5 miles long and varies from one to four miles in width. Three stone breakwaters protect the harbor entrance and limit vessel access at the mouth of the harbor to four paths between either the breakwaters and the shoreline, or between the breakwaters themselves.

New Haven's leading import commodities are petroleum based products, making up approximately 80 percent of the total freight in 1999 (ACOE, 1999). Other commodities with a considerable percentage of the freight traffic in New Haven Harbor include ferrous and non-ferrous metals as well as cement and concrete. Given the generally shallow water depths within the harbor, most of these commercial vessels are restricted to navigation only within the main navigation channel. The USCG restricts traffic movement through the channel to no more than one vessel with a draft greater than 30 feet at a time. Smaller vessels, such as tugs and barges, may use the channel at the same time but are restricted to no more than 140 feet total width. The number of piloted commercial vessels using the channel is variable but averages three or four vessels per day (ESS, 2001). Pilotage is mandatory for foreign vessels and registered US vessels.

Commercial fishing is an important commerce in New Haven Harbor (Pope and Polloni, 1998). Approximately 15 oyster boats fish from the harbor per day (ESS, 2001). Finfishing boats are also based out of New Haven Harbor.

Recreational vessels in New Haven Harbor can be divided into two general types: marine anglers and pleasure boaters. On average, these vessels constitute only about 5% of the traffic within New Haven Harbor (ESS, 2001). There is a pronounced increase in the amount of recreational vessel activity in the Harbor during peak recreational boating months, May through September. This traffic is not usually limited to harbor entrance via the Federal Channel.

2.1.8 Historical and Archaeological Resources

Previous correspondence from the Connecticut State Historic Preservation Office (CT SHPO) for the New Haven landfall at East Shore SS and south within the FNC identified no significant historic or archaeological resources that could be affected by installation and operation of a submarine transmission cable system within those areas. The FNC itself has been previously disturbed and is maintained by dredging. Should either alternative route east or west of the FNC be considered further, information regarding the general area of potential project effect will be provided to the CTSHPO for its review. If it is determined that resources are likely to be present, these features would need to be either be avoided or investigated further prior to submission of permit applications.

Onshore historic structures or districts would not be physically affected by either of these route alternatives within New Haven Harbor, and would not be visually affected by operation of the Project, as the cable system would be below the seabed. Cable installation activities in this area may be visible from onshore historic resources, such as Five Mile Point (Old New Haven) Light at the southeast entrance to the Harbor. This light, constructed in 1835, is listed on the NRHP, and is now part of Lighthouse Point Park.

2.1.9 Public Recreational Resources and Land Use

The East Shore Substation is located on the eastern shore of New Haven Inner Harbor on Waterfront Street. Land uses within and adjacent to the substation are primarily industrial including a municipal wastewater treatment facility and petroleum terminal and storage facilities. East Shore Park, owned by the City of New Haven, is located approximately ¼ mile south of the East Shore Substation. Figure 6 identifies public resources and other features including land uses in proximity to the New Haven portion of the cable route alternative. Some of the public recreational resources for New Haven and the New Haven Harbor occur at the following locations:

- East Shore Park
- Nathan Hale Park
- Sandy Point Park

2.2 Long Island Sound Portion of Route

The offshore route optimization process in Long Island Sound considered a variety of physical, environmental, and navigational factors including:

- Minimizing length of cable in areas with charted water depths less than 55 feet (Volk, 2003) to avoid shellfish impacts;
- Avoiding crossing the AT&T telecommunications cable;
- Routing cables through northwest portion of Uncharted Anchorage Area in area where Cross Sound Cable and AT&T telecommunications already cable cross the anchorage; and
- Routing cables midway between Cross Sound Cable and AT&T telecommunications cable within Uncharted Anchorage Area.

Using these criteria, the HOUSATONIC ROUTE (EAST OF NEW HAVEN FNC) was identified as the optimized offshore route (see Figures 1 through 4). The sections below provide specific information about the physical and environmental conditions in this area.

2.2.1 Geology and Seabed Conditions

In the offshore portion of the study area between New Haven Harbor and the Housatonic River, sediments consist of deltaic and varved lake deposits of glacial Lake Connecticut, which variously overlie bedrock and stratified drift deposited by glacial meltwaters (Poppe et al., 1998). A fine grained marine facies overlies these drift and glacial lacustrine sediments, which were deposited in quiet-water areas during the postglacial marine transgression. The area is currently accumulating fine grained sediments, which is indicative of a generally low current regime (USEPA, 2004).

As a result, unconsolidated sands, silts and clays can be expected along this portion of the alternate routes (see Figures 7 and 8). Glacial tills, where encountered, may be loose to compact, with numerous sub rounded boulders. Bedrock may be the Lighthouse Gneiss, described in Section 2.1.1; estimated depth to bedrock is not currently known at this time. Much of the offshore route traverses and area currently undergoing deposition of fine-grained material. Sediment erosion or non deposition is occurring at the mouths of New Haven Harbor and the Housatonic River, with sorting and reworking of sediments occurring in linear areas further to the south into Long Island Sound (see Figures 7 and 8).

A USGS study of mercury distribution in shallow sediments in Long Island Sound found an area of elevated mercury in marine surficial sediments off the mouth of the Housatonic River and easterly, including the western half of the Long Island Sound portion of the route. Average concentrations detected ranged from 150 to 635 ppb in the surficial sediments (Varekamp et al., 1998). These concentrations are above (ER-L) for mercury (at 150 ppb) in marine sediments, but are less than the ER-M of 710 ppb for mercury (Long et al., 1998).

The main sources of mercury in the regional area, as cited in the study, are atmospheric deposition, waste water treatment plant effluent, and local point sources, which may be present in the Housatonic River. If this route is considered further, additional chemical analysis of shallow marine sediments should be performed along this alternative.

2.2.2 Commercial Shellfish

Commercial shellfishing is a very important use of Long Island Sound. Shellfish species commercially managed and harvested in the Sound include the eastern oyster and the hard-shell clam (Figure 1). In order to minimize impacts to commercial shellfish populations, the BOA previously recommended avoiding disturbances, to the extent feasible, to portions of Long Island Sound inside of the -55 foot Mean Lower Low Water (MLLW) contour (Volk, 2003). Potential impacts from the cable route alternatives to shellfish resources within the Sound are identified in Table 4. A more detailed discussion of these resources is provided in Section 2.1.2.

Table 4
Shellfish Resource Impacts
Long Island Sound Alternatives

CRITERIA	Housatonic Route Alternative (East Of New Haven FNC)	Housatonic Route Alternative (West Of New Haven FNC)	Iroquois Route Alternative (East of New Haven FNC)	Iroquois Route Alternative (West of New Haven FNC)
Total Submarine Length (miles)	17	14.5	16.3	13.7
Total Submarine Length (nautical miles)	14.8	12.6	14.1	11.9
Leased Shellfish Beds Crossed (#)	2	3	6	7
Leased Shellfish Beds Crossed (feet)	3,023	13,767	11,750	22,494
Leased Shellfish Beds Crossed (miles)	0.6	2.6	2.2	4.3
Leased Shellfish Beds Crossed (nautical miles)	0.5	2.3	1.9	3.7
Natural Shellfish Beds/Concentration Areas Crossed (#)	1	0	2	1
Natural Shellfish Beds/Concentration Areas Crossed (feet)	1,891	0	2,351	460
Natural Shellfish Beds/Concentration Areas Crossed (miles)	0.4	0	0.4	0.1
Natural Shellfish Beds/Concentration Areas Crossed (nautical miles)	0.3	0	0.4	0.1

2.2.3 Finfish

More than 83 species of finfish (Table 5) have been identified in central Long Island Sound in DEP annual marine trawl surveys from 1984 through 1994 (CTDEP, 1998; Gottschall et al., 2000). Many of these species utilize Long Island Sound year-round and others are present seasonally. The relative abundance of finfish species in Long Island Sound is presented in Table 6 (Stone et al 1994).

Table 5
Finfish Species in Long Island Sound Captured in Connecticut Fisheries Division Bottom Trawl Surveys (1984-1994)

Common Name	Scientific Name	Characteristics
Alewife	*Alosa pseudoharengus*	Anadromous, schooling, shallow water fish
American shad	*Alosa sapidissima*	Anadromous, schooling, shallow water fish
Atlantic croaker	*Micropogonias undulatus*	Demersal, Brackish, Marine

Common Name	Scientific Name	Characteristics
Atlantic herring	*Clupea harengus*	Schooling, shallow water fish
Atlantic mackerel	*Scomber scombrus*	Pelagic
Atlantic menhaden	*Brevoortia tyrannus*	Schooling, pelagic, shallow water fish
Atlantic sturgeon	*Acipenser oxyrhynchus*	Anadromous, demersal
Bigeye scad	*Selar crumenophthalmus*	Schooling, pelagic, nocturnal, marine
Black sea bass	*Centropristis striata*	Groundfish
Blueback herring	*Alosa aestivalis*	Anadromous, schooling, shallow water fish
Bluefish	*Pomatomus saltatrix*	Pelagic, schooling oceanic fish
Butterfish	*Peprilus triacanthus*	Coastal/oceanic, pelagic
Clearnose skate	*Raja eglanteria*	Elasmobranch, demersal
Crevalle jack	*Caranx hippos*	Schooling, pelagic, brackish, marine
Cunner	*Tautogolabrus adspersus*	Demersal
Fourbeard rockling	*Enchelyopus cimbrius*	Demersal, sedentary, marine
Fourspot flounder	*Paralichthys oblongus*	Demersal
Goosefish	*Lophius americanus*	Demersal
Grubby	*Myoxocephalus aeneus*	Demersal, brackish, marine, occurs in estuaries
Hickory shad	*Alosa mediocris*	Anadromous, pelagic
Hogchoker	*Trinectes maculatus*	Demersal
Little skate	*Raja erinacea*	Elasmobranch, demersal, marine
Long-finned squid	*Loligo pealei*	
Longhorn scuplin	*Myoxocephalus octodecemspinosus*	Demersal, brackish, marine
Mackerel scad	*Decapterus macarellus*	Pelagic, marine
Moonfish	*Selene setapinnis*	Demersal, brackish, marine
Northern kingfish	*Menticirrhus saxatilis*	Demersal, brackish, marine, prefers shallow coastal waters
Northern pipefish	*Syngnathus fuscus*	Demersal
Northern puffer	*Sphoeroides maculates*	Demersal, brackish, marine, prefers bays and estuaries
Northern searobin	*Prionotus carolinus*	Demersal
Ocean pout	*Macrozoarces americanus*	Demersal, brackish, marine
Oyster toadfish	*Opsanus tau*	Demersal
Planehead filefish	*Monacanthus hispidus*	Demersal, marine, associated with Sargassum
Pollock	*Pollachius virens*	Groundfish
Rainbow smelt	*Osmerus mordax*	Anadromous
Red hake	*Urophycis chuss*	Demersal
Rock gunnel	*Pholis gunnellus*	Demersal, brackish, marine. In shallow water, deep in winter, can be out under rocks
Rough scad	*Trachurus lathami*	Schooling, benthopelagic, marine
Round herring	*Etrumeus teres*	Pelagic, marine
Scup	*Stenotomus chrysops*	Demersal, prefers bays and shallow waters
Sea raven	*Hemitripterus americanus*	Demersal, marine, prefers rocky hard bottom
Silver hake	*Merluccius bilinearis*	Demersal, marine, prefers sandy ground

Common Name	Scientific Name	Characteristics
Smallmouth flounder	*Etropus microstomus*	Demersal, marine
Smooth dogfish	*Mustelus canis*	Elasmobranch, demersal, brackish, marine
Spanish mackerel	*Scomberomorus maculates*	Schooling, pelagic, marine
Spiny dogfish	*Squalus acanthius*	Elasmobranch, benthopelagic, brackish, marine
Spot	*Leiostomus xanthurus*	Demersal, brackish, marine
Spotted hake	*Urophycis regia*	Demersal, marine
Striped bass	*Morone saxitilis*	Anadromous, schooling
Striped searobin	*Prinotus evolans*	Reef associated, brackish, marine
Summer flounder	*Paralichthys dentatus*	Demersal, marine, prefers bays and shallow coastal waters
Tautog	*Tautoga onitis*	Demersal, shore fish
Tomcod	*Microgadus tomcod*	Demersal
Weakfish	*Cynoscion regalis*	Pelagic
Windowpane flounder	*Scophthalmus aquosus*	Demersal
Winter flounder	*Pseudopleurinectes americanus*	Demersal
Winter skate	*Raja ocellata*	Elasmobranch, demersal, marine
Yellow Jack	*Caranx bartholomaei*	Reef associated, marine

Reference: Gottschall, K., M.W. Johnson, and D.G. Simpson. February 2000. The Distribution and Size Composition of Finfish, American Lobster and Long-Finned Squid in Long Island Sound Based on the Connecticut Fisheries Division Bottom Trawl Survey, 1984-1994.

Table 6
Finfish Species in Long Island Sound

Common Name	Scientific Name	Characteristics
Highly Abundant		
Alewife	*Alosa pseudoharengus*	Anadromous, schooling, shallow water fish
Atlantic menhaden	*Brevoortia tyrannus*	Schooling, pelagic, shallow water fish
Atlantic silversides	*Menidia menidia*	Estuarine, schooling
Blueback herring	*Alosa aestivalis*	Anadromous, schooling, shallow water fish
Butterfish	*Peprilus triacanthus*	Coastal/oceanic, pelagic
Skates	*Raja species*	Elasmobranch, demersal
Scup	*Stenotomus chrysops*	Demersal, prefers bays and shallow waters
White perch	*Morone americana*	Anadromous
Windowpane flounder	*Scophthalmus aquosus*	Demersal
Winter flounder	*Pseudopleurinectes americanus*	Demersal
Abundant		
American eel	*Anguilla rostrata*	Catadromous
American sand lance	*Ammodytes americanus*	Demersal, burrowing fish
American shad	*Alosa sapidissima*	Anadromous, schooling, shallow water fish

Common Name	Scientific Name	Characteristics
Atlantic herring	*Clupea harengus*	Schooling, shallow water fish
Atlantic tomcod	*Microgadus tomcod*	Demersal
Bay anchovy	*Anchoamitichilli*	Schooling, shallow water fish
Bluefish	*Pomatomus saltatrix*	Pelagic, schooling oceanic fish
Killifishes	*Fundulus species*	Small schooling fish
Red hake	*Urophycis chuss*	Demersal
Striped bass	*Morone saxitilis*	Anadromous, schooling
Weakfish	*Cynoscion regalis*	Pelagic
Yellow perch	*Perca flavescens*	Primarily freshwater; semi-anadromous
Common		
Atlantic mackerel	*Scomber scombrus*	Pelagic
Black sea bass	*Centropristis striata*	Groundfish
Channel catfish	*Ictalurus punctatus*	Freshwater species, demersal
Cunner	*Tautogolabrus adspersus*	Demersal
Gobies	*Gobiosoma species*	Estuarine, often associated with oyster reefs
Hogchoker	*Trinectes maculatus*	Demersal
Northern pipefish	*Syngnathus fuscus*	Demersal
Northern searobin	*Prionotus carolinus*	Demersal
Oyster toadfish	*Opsanus tau*	Demersal
Pollock	*Pollachius virens*	Groundfish
Rainbow smelt	*Osmerus mordax*	Anadromous
Sheepshead minnow	*Cyprinodon variegatus*	Estuarine, prefers open vs. vegetated bottom
Shortnose sturgeon	*Acipenser brevirostrum*	Anadromous (amphidromous)
Tautog	*Tautoga onitis*	Demersal, shore fish
Rare		
Atlantic stingray	*Dasyatis sabina*	Elasmobranch, anadromous, demersal
Cownose ray	*Rhinoptera bonasus*	Benthopelagic, brackish, marine
Atlantic sturgeon	*Acipenser oxyrhynchus*	Anadromous, demersal
Atlantic salmon	*Salmo salar*	Anadromous, benthopelagic
Atlantic cod	*Gadus morhua*	Schooling, benthopelagic, brackish, marine
Haddock	*Melanogrammus aeglefinus*	Demersal, marine
Spot	*Leiostomus xanthurus*	Demersal, brackish, marine
Northern kingfish	*Menticirrhus saxatilis*	Demersal, brackish, marine, prefers shallow coastal waters
Mullets	*Mugil species*	Schooling, anadromous, benthopelagic
Summer flounder	*Paralichthys dentatus*	Demersal, marine, prefers bays and shallow coastal waters

Reference: Stone, S.L., T.A. Lowery, J.D. Field, C.D. Williams, D.M. Nelson, S.H. Jury, M.E. Monaco, and L. Anderson. 1994. Distribution and abundance of fishes and invertebrates in Mid-Atlantic estuaries, ELMR Rep. No. 12. NOAA/NOS Strategic Environmental Assessments Division, Silver Spring, MD.

The most common year-round species of finfish found in Long Island Sound include winter flounder, windowpane flounder, Atlantic menhaden, Atlantic silversides (*Menidia menidia)*, butterfish, and scup. The most common anadromous species of finfish found in these waters include striped bass, alewife, blueback herring, white perch, and American shad. These anadromous species migrate to streams and rivers, such as the Hudson and Connecticut, to spawn, and then return to Long Island Sound. Spawning adult winter flounder are common and abundant in Long Island Sound from March through June (Stone et al., 1994). Spawning adult windowpane flounder are common and abundant in Long Island Sound from April through August.

Many of the finfish species in Long Island Sound are commercially and recreationally important. The Connecticut commercial fisheries harvest more than three million pounds from Long Island Sound annually (Gottschall et al., 2000). Commercial and recreational fisheries in Long Island Sound are valued at over one billion dollars (LIS Task Force 2003). In 2001, over 325,000 Connecticut anglers made over 1.7 million fishing trips, catching nearly 6.5 million fish. Four species, bluefish, striped bass, scup, and summer flounder (*Paralichthys dentatus*), composed over 90% of the catch. Tautog and winter flounder were once important recreational species, but catches have been low in recent years (LIS Task Force 2003).

Based on an evaluation of trawl data (from the CTDEP Long Island Trawl Survey) in support of the EIS for the designation of dredged material disposal sites in Long Island Sound (USEPA 2004), the general finfish habitat in the vicinity of “Long Island Sound Portion of the Route” was designated as shallow transitional. In general, these shallow transitional habitats were found to contain sampling stations with some of the highest finfish abundance and species richness in Long Island Sound. The average Catch per Unit Effort (CPUE) estimates showed the productivity to generally increase along the cable route from New Haven to Milford (Figure 9). In addition, trawl surveys conducted in the fall months in the vicinity of the Long Island Sound portion of the cable route, yielded higher average numbers of fish than during the spring trawl survey (USEPA 2004).

Atlantic sturgeon (*Acipenser oxyrinchus*) (a state listed threatened fish) has been documented as occurring within Long Island Sound, although the population was observed to be small and migratory (USEPA 2004). Refer to section 2.2.6 for a more complete discussion of threatened/endangered species, and special concern species, in the vicinity of the Long Island Sound portion of the Route.

Habitat within the Long Island Sound portion of the cable route alternatives has been designated EFH for 17 species (Table 3). Refer to section 2.1.3 for a definition of EFH.

2.2.4 Benthos

Substrate and depth are the predominant factors affecting invertebrate communities. Sediment grain size in particular affects the distribution of invertebrates (LIS Task Force 2003). In general, the benthic habitats of the central basin of Long island Sound are primarily depositional areas interrupted occasionally by north-south bands of sediment extending from the Connecticut shore (Figure 8).

Studies by Sanders (1956), Rhoads and Michael (1974), Reid (1979) and Pellegrino and Hubbard (1983) described the benthos in the central offshore region of Long Island Sound as dominated by deposit feeders: *Nephtys incisa, Mediomastus ambiseta* and *Polydora cornuta* (polychaetes); *Yoldia limatula*, *Nucula annulata* and *Mulinia lateralis* (bivalve clams); and *Ampelisca abdita* (amphipod) communities. These deposit feeders are characteristic of the sandy/clay/silt substrate present in this area along the Long Island Sound portion of the cable route (Figure 7). Pellegrino and Hubbard (1983) confirmed several general trends in community structure which were found previously by Reid et al. (1979). They confirmed that species richness increased from west to east in the Sound, and the mean density of individuals per sample was generally higher in the central and eastern basins of LIS than in the western portions. In general, soft bottom (particularly muddy) communities within the central region of Long Island Sound have distinctive persistent features (consistent faunal assemblages), which undergo periodic change in response to environmental factors (USEPA 2004). In addition, the benthic communities of Long Island Sound have also been shown to exhibit the seasonal changes in composition and abundance generally expected for this geographic area (Iroquois 2002).

Eastern oyster (*Crassostrea virginica*) and Northern quahog (*Mercenaria mercenaria*) are both common shellfish species present directly outside (South) and in the mouth of New Haven Harbor. Refer to section 2.2.2 for a more complete discussion of commercial shellfish in the Long Island Sound portion of the cable route.

Recreational surveys indicate that important crabs in Long Island Sound include spider crab (*Libinia emarginata*), lady crab, Atlantic rock crab, blue crab and flat claw hermit crab (*Pagurus pollicaris*). Most abundant are lady crab (most abundant in fall), followed by Atlantic rock crab (most abundant in spring). The remainder are relatively uncommon (LIS Task Force, 2003). In addition, horseshoe crab (*Limulus polyphemus*) were found to be second only to lobster in abundance in the DEP trawl surveys (LIS Task Force, 2003).

2.2.5 Lobster

The American lobster (*Homarus americanus*), a commercially important crustacean, is highly abundant throughout Long Island Sound (Stone et al., 1994). Results from Connecticut bottom trawl surveys conducted from 1984 through 1994 indicated that the area south of New Haven Harbor is one of three particular areas in Long Island Sound that contain mud bottom where lobsters are highly concentrated (Gottschall et al., 2000). Lobster presence and lobster fishing gear are widespread throughout the Study area (Johnson, 2003).

2.2.6 Protected Species and Habitats

A letter requesting information regarding the presence of protected species and their habitats in the Project area was submitted to the CTDEP Natural Diversity Database (NDDB). The response to this request indicated that further information would be provided once the routing process was further advanced. The NDDB lists state- and federally-listed threatened, endangered, or special concern species with the potential to occur in a given area.

Arctic and American peregrine falcons (*Falco peregrinus anatum*) are endangered migrant species that are reported to fly over the Sound in the fall and the spring (Demos, 1993). However, these species do not nest in the nearshore areas of the Sound. Finback (*Balaenoptera physalus*) and humpback (*Megaptera novaeangliae*) whales (federally listed endangered species) are occasional migrants that have been observed in Long Island Sound (Demos, 1993).

Previous resource reviews indicate that there is the potential to encounter federal and state endangered or threatened marine turtles along the proposed cable route in Long Island Sound. Four species of marine turtles, listed under the Endangered Species Act of 1973, have been observed in the waters between the East Shore Substation site and the open waters of Long Island Sound: the Kemps ridley, the Loggerhead, the Leatherback and the Green turtle. The Green turtle is considered a resident species of Long Island Sound and may occur in Long Island Sound year-round (Ludwig, 1999c).

Environmental Sensitivity Index (ESI) maps produced by NOAA (2001) identify vulnerable coastal resources for use in oil spill response activities. Although these maps focus on species and habitats that are sensitive to oil spills, they provide useful information on species and habitats potentially present in the coastal areas of New Haven Harbor and also introduce some of the “Threatened/Endangered/Species of Special Concern” that may be present in the area. The ESI identifies nine state- and/or federally-listed protected species (Appendix A, Table and Figure A-1) in Long Island Sound.

2.2.7 Navigation

Long Island Sound is a deep navigable waterway lying between the shores of Connecticut, New York and Long Island. The waters are well marked by navigational aids making navigation relatively easy. Its waters are used for many purposes including shipping, commercial and recreational boating, tourism and industry.

An uncharted anchorage area is located approximately 1.2 miles southeast of the entrance to New Haven Harbor in Long Island Sound. This uncharted anchorage is typically used by deep-draft vessels awaiting berthing assignments in New Haven Harbor. The route alternatives which pass to the east of the New Haven Federal Navigation Channel are within this anchorage area for approximately 2 miles.

2.2.8 Historical and Archaeological Resources

No shipwrecks are charted within or in the vicinity of this alternative route on NOAA's Navigation Chart Nos. 12370 and 12371 (NOAA, March 6, 1993; NOAA, July 25, 1992). The Staff Archaeologist at the Connecticut Historical Commission/SHPO indicated he knew of no shipwrecks or submerged prehistoric (pre-European Contact Period) archaeological sites in the vicinity of the nearshore area between New Haven Harbor and the Housatonic River (Poirier, personal communication, May 10, 2004). Dr. Poirier noted that shoreline and coastal areas between New Haven to Milford are likely sensitive for potential submerged prehistoric sites, although no surveys have been done in this area to date. A marine archaeological study would likely be requested by the SHPO to evaluate this route for the presence/absence of historic and prehistoric cultural resources if this route were considered further.

2.3 The Gulf and Silver Beach Landfall

The routing process approaching the Iroquois Gas Pipeline landfall in Milford at Silver Sand Beach (see Figure 4) involved staying within the area of seabed previously disturbed by installation of the Iroquois Pipeline while maintaining a safe distance from the pipeline itself (500 foot separation was considered adequate). This route also sought to avoid the entrance to Milford Harbor FNC and rocky areas near the Charles Island tombolo. The sections below provide specific information about the physical and environmental conditions in this area.

2.3.1 Geology and Seabed Conditions

Surficial marine sediments off Silver Beach and in the Gulf consist of very fine sands (ENSR, 2001). Sediments can be expected to become finer in a seaward direction. If this route is selected, cable installation by HDD in the upland to the marine transition area would minimize impacts to the shoreline at Silver Beach. Installation of the upland cable system within the Iroquois ROW from the landfall to the East Devon SS would limit Project disturbance to previously disturbed areas, and minimize impacts to native soils.

2.3.2 Commercial Shellfish

The CTDEP Shellfish Concentration maps indicate that the majority of The Gulf consists of an extensive hard shell clam bed. Gulf Pond and Milford Harbor both contain concentrations of eastern oyster (Figures 1 and 4). The BOA also manages approximately 10 leased beds in this area (Figures 1 and 4). These more enclosed areas typically are managed by the local municipalities. However, the BOA is under agreements with the City of Milford and monitors and governs all shellfish beds within the area. The hard shell clam and the eastern oyster are discussed in more detail in Section 2.1.2. Table 7 identifies potential impacts from the cable route alternatives to shellfish resources within The Gulf. In order to minimize impacts to the shellfish beds, the proposed cable route through The Gulf would be located within the existing footprint of the Iroquois pipeline.

Table 7
Shellfish Resource Impacts The Gulf/Silver Sands

CRITERIA	
Total Submarine Length (miles)	1
Total Submarine Length (nautical miles)	0.9
Leased Shellfish Beds Crossed (#)	5
Leased Shellfish Beds Crossed (feet)	4,009
Leased Shellfish Beds Crossed (miles)	0.8
Leased Shellfish Beds Crossed (nautical miles)	0.7
Natural Shellfish Beds/Concentration Areas Crossed (#)	1
Natural Shellfish Beds/Concentration Areas Crossed (feet)	5,026
Natural Shellfish Beds/Concentration Areas Crossed (miles)	1
Natural Shellfish Beds/Concentration Areas Crossed (nautical miles)	0.8

2.3.3 Finfish

Species found to be present in the 1984-1994 Connecticut Marine Trawl Surveys (Gottschall et al., 2000) throughout the trawl sampling season (typically April through November) in the waters nearshore to the "Gulf and Silver Beach landfall" include alewife American shad, Atlantic herring, Atlantic menhaden, butterfish, cunner, fourspot flounder (*Paralichthys oblongus*), little skate (*Raja erinacea*), scup, striped sea robin, summer flounder, weakfish, windowpane flounder and winter flounder. Atlantic herring and scup in particular were identified by Gottschall et al. (2000) as being especially abundant south of Milford. Of those most common and present seasonally, bluefish were found to be most abundant from July through October, smooth dogfish from April through October, tautog and red hake (*Urophycis chuss*) from April through June and striped bass from April through June and then again in November (Gottschall et al., 2000). Long-finned squid (*Loligo pealei*) was also recorded in trawls throughout the sampling season in the waters nearshore to the "Gulf and Silver Beach landfall" (Gottschall et al., 2000).

Based on an evaluation of trawl data (from the CTDEP Long Island Trawl Survey) in support of the EIS for the designation of dredged material disposal sites in Long Island Sound (USEPA 2004), the average Catch per Unit Effort (CPUE) estimates showed the Charles Island/Silver Beach area to be moderate in its productivity compared to the rest of the sound (Figure 9). In addition, trawl surveys conducted in the fall months in the Charles Island/Silver Beach area yielded higher average numbers of fish than during the spring trawl survey (USEPA 2004).

Silver beach, located within the Silver Sands State Park, is a popular recreational fishing location (ctfisherman, 2004). In addition, Charles Island, as well as reefs and artificial structures along the Milford shoreline, are heavily fished (USEPA, 2004).

Game fish most often caught in the coastal waters of Connecticut are: Atlantic bonito (*Sarda sarda*), Atlantic mackerel, Atlantic cod (*Gadus morhua)*, black sea bass (*Centropristis striata*), tautog, bluefin tuna (*Thunnus thynnus*), bluefish, blue shark (*Prionace glauca*), cunner, monkfish (*Lophius americanus*), grey triggerfish (*Balistes capriscus*), false albacore (*Euthynnus alletteratus*), mako shark (*Isurus oxyrinchus*), oyster toadfish (*Opsanus tau*), scup, Spanish mackerel (*Scomberomorous maculates*), striped bass, summer flounder, weakfish and winter flounder (ctfisherman, 2004).

Habitat within the nearshore area of the Gulf and Silver Beach landfall alternative has been designated as EFH for 16 species (Table 3). Refer to section 2.1.3 for a definition of EFH.

2.3.4 Benthos

Substrate and depth are the predominant factors affecting invertebrate communities, sediment grain size in particular affects the distribution of invertebrates (LIS Task Force, 2003). The benthic habitats in the vicinity of the Silver Beach/Charles Island landfall are primarily depositional areas, characterized by sand and sand with silt and clay (Figures 7 and 8).

The sound wide survey conducted by Reid et al. (1979) found that the benthic community of the shallow waters, characterized by sandy muds along the Connecticut shore, was comprised of the polychaetes *Polydora cornuta*, *Streblospio benedicti*, and *Tharyx acutus*; the clams *Tellina agilis* and *Ensis directus*; and the amphipods *Ampelisca abdita* and *Ampelisca vadorum*. In addition, Zajac (1998) conducted an analysis of overall community structure based on 35 species that were most abundant throughout Long Island Sound according to Pellegrino and Hubbard (1983). This analysis was resolved into 12 main community types. The community type typical of nearshore waters of Milford was found to be characterized by moderate to high abundances of the polychaetes *Asabellides occulata*, *Spiophanes bombyx* and *Clymenella zonalis* and the bivalve *Tellina agilis*.

While it is well known that benthic species richness generally increases from west to east in Long Island Sound, the detailed data provided in Pellegrino and Hubbard (1983) indicates a fair degree of spatial variation in species richness. Based on the information in Pellegrino and Hubbard (1983), Zajac (1998) developed a figure depicting species richness ranges at a number of stations in the northern half of Long Island Sound (1998) (Figure 10). This figure indicates that the benthic species richness at the sampling stations closest to Charles Island and the Silver Beach Landfall ranges from 0 – 5 species per sample directly south of Charles Island and from 16 – 20 species per sample approximately 1.5 miles offshore from the Silver Beach landfall (directly south of Welches Point). These species richness values are on the low side compared to species richness observed in the eastern sections of Long Island Sound.

The Horseshoe crab population is generally believed to be in decline coastwide. A population of these crabs is known to exist in the Silver Sands State Park area (Hogan, 2002; LIS Task Force, 2003). Softshell clams (*Mya arenaria*) are also commonly found in the vicinity of the Silver Beach landfall (LIS Task Force, 2003).

2.3.5 Protected Species and Habitats

A letter requesting information regarding the presence of protected species and their habitats in the Project area was submitted to the CTDEP Natural Diversity Database (NDDB). The response to this request indicated that further information would be provided once the routing process was further advanced. The NDDB lists state- and federally-listed threatened, endangered, or special concern species with the potential to occur in a given area.

Environmental Sensitivity Index (ESI) maps produced by NOAA (2001) identify vulnerable coastal resources for use in oil spill response activities. Although these maps focus on species and habitats that are sensitive to oil spills, they provide useful information on species and habitats potentially present in the coastal areas of New Haven Harbor and also introduce some of the "Threatened/Endangered/Species of Special Concern" that may be present in the area. The ESI identifies five state- and/or federally-listed protected species (Appendix A, Table and Figure A-1) in the Milford Harbor/Gulf area.

2.3.6 Coastal and Inland Wetland/Water Resources

The submarine portion of this route transverses The Gulf, considered a water of the United States. Within this water body, the NWI map defines the Gulf as estuarine subtidal waters (E1UBL). The NWI map also identifies estuarine intertidal regularly flooded waters (E2USN) and estuarine intertidal irregularly flooded waters (E2USP) in the area of the Silver Beach landfall.

The CTDEP Coastal Resources Map identifies mapped coastal resources within this portion of the cable route alternative as:

- Intertidal flats; very gently sloping or flat areas located between high and low tides composed of muddy, silty and fine sandy sediments and generally devoid of vegetation.
- Beaches and dunes; moderately sloping shores composed of water worked sand, gravel, or cobble deposits, and when present wind deposited sands.
- Freshwater wetlands and undesignated tidal wetlands; includes resources that are unregulated by the state tidal wetland program (Connecticut General Statutes Section 22a-38 to 22a-35).

The cable route between Silver Beach and the East Devon Substation transverses wetland soils, and a segment of the route lies within the 100-year floodplain. The NWI map identifies these wetland resources over land as estuarine intertidal emergent irregularly flooded waters (E2EMP5), palustrine forested (PFO1), and palustrine scrub-shrub (PSS5 & PSS1) (Figure 11). In 2001, a biological field survey of the East Devon Substation site was conducted and found no wetlands, water bodies, or permanently flooded bodies of water within the substation (Iroquois, 2001).

Water Resources

The Connecticut Water Quality Classification Maps have identified The Gulf as having a current classification of SB for the inner Gulf, and SB/SA for the outer Gulf. Class SB waters are designated for habitat for marine fish, other aquatic life and wildlife; commercial shellfish harvesting; recreation; industrial water supply; and navigation (CTDEP, 2002). According to the Water Quality Classification Maps, the upland portion of the cable route alternative at Silver Beach landfall is located in an area that has a current groundwater classification of GB. The designated uses of GB waters include industrial process water and cooling waters and base flow for hydraulically-connected surface water bodies. These waters are presumed not suitable for human consumption without treatment. For a discussion of surface and groundwater classifications at the East Devon Substation site please refer to Section 3.3.6.

Other surface water bodies in the vicinity of the cable route alternative through Milford include Great Creek, the Milford Reservoir and Beaver Brook.

2.3.7 Navigation

The Gulf is a bight between Welches Point and Charles Island in Milford, about 6.5 miles west of the New Haven Harbor entrance. The entrance is approximately 0.8 miles wide and is reported as clear (NOAA, 2004). Water depths are recorded as approximately 20 feet at Mean Low Low Water (MLLW) at the entrance and gradually shoal upward to the proposed IGTA alternative landfall at Silver Beach. The western side of Welches Point and the reefs around Charles Island extending to the mainland shoal abruptly and should be approached with caution. A reef extends 0.2 miles south of Welches Point and is marked by a buoy. A rocky area extends 0.4 miles south of Charles Island and is marked by a lighted bell buoy. A buoy marks the end of a shoal, which extends 750 feet east-northeast of Charles Island (NOAA, 2004).

Milford Harbor, comprising the lower portion of the Wepaqaug River, is entered at the mouth of the river between two jetties at the head of The Gulf, approximately 1 mile east of the proposed IGTA alternative landfall. A dredged Federal Channel leads from The Gulf through the jettied entrance to a point 0.6 miles above Burns Point, is marked by a light and lighted and unlighted buoys. The harbor is used chiefly for recreational boating and occasionally for the receipt of shellfish and fish. Only 4 total trips (2 inbound and 2 outbound) related to waterborne commerce were reported in Milford Harbor for 2002 (USACE, 2002).

2.3.8 Historical and Archaeological Resources

Information on known historic properties in Milford was compiled from a review of records at the Connecticut Historical Commission on May 10, 2004, including the listings of the National and State Registers of Historic Places (NRHP and SRHP), as well as consultation with staff as referenced below.

No historic structures or districts on the NRHP are on, within, or in the immediate vicinity of the upland route in Milford, from Silver Beach to the East Devon SS. The River Park Historic District is northeast of Fort Trumbull Beach and well outside the upland alternative route.

No information on previously identified upland archaeological resources is available at this time. However, use of the Iroquois ROW, which is likely previously disturbed, will minimize concerns about the potential for known and unknown intact archaeological sites.

Selection of this route should have no effect, including no visual effect, on known historic properties and districts.

2.3.9 Public Recreational Resources and Land Use

This cable route alternative enters the City of Milford at Silver Beach. Land use at this location consists primarily of open space and residential uses (Figure 12). From the landfall location to East Devon Substation site, land uses range from residential and open space near Silver Sands Park to commercial and industrial in proximity to the Substation. The Substation is located approximately 500 feet east of the Housatonic River, separated by industrial properties (Milford Transfer Station), forestland, and New Oronoque Road (Iroquois, 2001).

This route would be located within/adjacent to the existing Iroquois pipeline ROW. Figure 12 identifies public resources and other features including land uses and schools in proximity to the landfall location and cable route. Some of the public recreational resources for this route alternative in Milford occur at the following locations:

- Silver Sands State Park
- Silver Sands Beach
- Myrtle Beach
- The Milford Reservoir
- Devon Park

The waters of Milford Harbor are used for boating activities. A public boat launch is located at the Head of the Harbor, the city dock on the west side of the Harbor, and a publicly owned transient marina at the north end of the harbor (City of Milford, 2003). There are approximately 144 moorings available in Milford Harbor which are located to the east and west sides of the federal channel extending from the Head to the mouth of the Harbor (City of Milford, 2003). Recreational and commercial vessels using the harbor exit into Long Island Sound through waters of The Gulf.

3.0 HOUSATONIC RIVER ALTERNATIVE

3.1 New Haven Harbor and Landfall

Please refer to Section 2.1.1.

3.2 Long Island Sound Portion of Route

Please refer to Section 2.2.2.

3.3 Housatonic River and Landfall

The Housatonic River was named one of the 10 most endangered American rivers in 2004 by the American Rivers conservation group (American Rivers web site www.americanrivers.org). The

Housatonic River flows 149 miles from its source in western Massachusetts and Connecticut, discharging into Long Island Sound between Milford and Stratford, Connecticut. Industries have utilized the river for power generation and as a receptacle for their wastes for over two centuries. Some of the highest levels of PCBs in river sediments in the nation have been detected in the 10-mile reach downstream of the General Electric plant in Pittsfield, Massachusetts, behind the Wood Pond Dam (American Rivers web site www.americanrivers.org). Portions of this reach, which is over 100 miles upstream from the alternative route, are undergoing remedial action under the direction of USEPA.

3.3.1 Geology and Seabed Conditions

Native surficial sediments at the upland landfall are a mixture of gravel and sand layers. Much of the East Devon SS site is previously disturbed. Underlying bedrock is mapped as the metamorphic Oronoque Schist, a gray to silver medium grained schist and granofels (Iroquois ELI Project, 2001).

Shallow sediments within the Housatonic River itself are expected to be fine grained sands, silts and clays (see Figures 7 and 8), with a high organic content. The sedimentary environment is likely erosional, with a depositional regime in Long Island Sound off the mouth of the river (Varekamp et al., 1998 and Figures 7 and 8). Fine grained organic-rich sediment types in depositional environments tend to adsorb or capture chemical contaminants onto the surface areas of particles. Elevated concentrations of contaminants such as PCBs, PAHs, hydrocarbons, pesticides and metals, including mercury (discussed below), are often found in organic-rich fine sediments downstream of historic industrial point sources.

Analytical data from salt marsh cores taken in the Housatonic River estuary off Nell's Island (also called Knell's Island) detected high mercury concentrations of up to 1.5 parts per million (ppm), well above background values in Long Island Sound shallow sediments of 30 to 80 parts per billion (ppb) (Varekamp et al.., 1998). The highest concentrations are within sediments at depths between 10 to 18 centimeters (cm) below the seafloor.

Lead concentrations within the river sediments and off the mouth of the river are also expected to be elevated, due to anthropogenic activities such as operation of the Remington Gun Club at Stratford Point (Mecray et al., 1998; Finkelstein, 2004).

3.3.2 Commercial Shellfish

The CTDEP Shellfish Concentration maps indicate that the Housatonic River consists of eastern oyster beds between the breakwater located at the mouth of the river and the Washington Bridge (Figures 1 and 3). Consultation with the BOA has indicated that the entire tidal portion of the Housatonic River up to the Merritt Parkway is a natural shellfish (oyster) seed bed managed by the Stratford Shellfish Commission (David Carey, pers. comm., 5/17/04). Seed oysters can be found throughout the river, including in the Federal Navigation Channel. Direct harvest of shellfish from the river is prohibited due to contamination. As a result, oysters from this area under 2 ¾" are transferred to grow out beds (where they must remain for 6 months, in 50 degree or above water, before harvesting). No clams can be taken from the river due to contamination.

The state's largest natural state seed oyster bed (approximately 3,000 acres in Stratford and Bridgeport) is located east of the mouth of the Housatonic River (David Carey, pers. comm., 5/17/04). Of the shellfish harvested from the Housatonic, most is taken from within the river channel as sedimentation has significantly shallowed the banks (Barber, 2004).

3.3.3 Finfish

There are three different types of habitat within the Housatonic River that need to be discussed in order to accurately summarize the existing finfish resources in the vicinity of the cable route.

- The mouth of the Housatonic River, part of Long Island Sound, characterized by shallow waters and depositonal/muddy sediments.
- The Charles E. Wheeler salt marsh located at the confluence of the Housatonic River and Long Island Sound.
- The estuarine waters of the Lower Housatonic River running from the confluence of the Housatonic River and Long Island Sound up to the East Devon area.

A discussion of the general finfish resources for each of these areas follows:

The Mouth of the Housatonic River:
Species found to be present in the 1984 – 1994 Connecticut Marine Trawl Surveys (Gottschall et al., 2000) throughout the trawl sampling season (typically April through November) in the vicinity of the mouth of the Housatonic River include American shad, Atlantic herring, Atlantic menhaden, butterfish, little skate, scup, striped sea robin, windowpane flounder and winter flounder. Of those most common and present seasonally, blueback herring were found to be most abundant from April through August, bluefish from July through October, tautog, red hake and silver hake (*Merluccius bilinearis*) from April through June and striped bass from April through June and then again from September through November (Gottschall et al., 2000). Striped bass in particular was identified by Gottschall et al., 2000 as being especially abundant at the mouth of the Housatonic River. Long-finned squid was also recorded in trawls throughout the sampling season in the waters nearshore to and in the vicinity of the mouth of the Housatonic River (Gottschall et al., 2000).

In general, recent studies have found that finfish species richness within Long Island Sound is greatest within the area of shallow water over transitional sediments near the mouth of the Housatonic River (Gottschall et al., 2000 & LIS Task Force 2003). In addition, shallow estuarine areas along the shoreline of Long Island Sound (such as the mouth of the Housatonic) have been identified as important areas for forage fish (i.e., short-lived, inshore species that are food for larger fish) and also as nursery areas for commercial species such as winter flounder (LIS Task Force 2003).

Based on an evaluation of trawl data (from the CTDEP Long Island Trawl Survey) in support of the EIS for the designation of dredged material disposal sites in Long Island Sound (USEPA 2004), the average Catch per Unit Effort (CPUE) estimates showed the mouth of the Housatonic River to be average in its productivity compared to the rest of Long Island Sound (Figure 9). In addition, trawl surveys conducted in the fall months in the vicinity of the mouth of the Housatonic River, yielded higher average numbers of fish than during the spring trawl survey (USEPA 2004).

Atlantic sturgeon (a state listed threatened fish) has been documented as occurring within the Housatonic estuary, although a spawning population is not believed to be present (NOAA 1998). Refer to section 3.3.5 for a more complete discussion of threatened/endangered species and species of special concern in the project area.

<u>The Charles E. Wheeler Salt Marsh:</u>
The vegetation community of the marsh is dominated by Saltwater cord grass (*Spartina alterniflora*) and occupied by occasional small meadows of Saltmeadow cordgrass (*Spartina patens*), Common Reed (*P. australis*) exists in small isolated stands, as a fringe along the upland-marsh border or in large contiguous stands (Osgood et al., 2003). During low tide, the channels of this wetland are completely drained, so that only temporary habitat is available for fish. Fish species typically found within the salt marsh from May to October (Osgood et al, 2003) are:

- Mummichog (*Fundulus heteroclitus*)
- Atlantic silverside (*Menidia menidia*)
- Striped killifish (*Fundulus majalis*)
- Spotfin killifish (*Fundulus luciae*)
- American eel (*Anguilla rostrata*)

In general coastal wetlands are highly productive in terms of plant material, which allows the support of dense populations of macroinvertebrates, providing nursery areas for fish (LIS Task Force., 2003). Fish species likely to use the marsh area as nursery ground are: Atlantic menhaden, bay anchovy, black seabass, inland silversides, summer flounder, windowpane flounder, and spotted hake (*Urophycls regia*), (NOAA 1997). In addition the higher density of juvenile mummichog (*Fundulus heteroclitus*) caught in late June and late July at the Charles E.

Wheeler Marsh suggests the use of the marsh habitat as a nursery by this species also (Osgood et al., 2003).

<u>The Estuarine Waters of the Lower Housatonic River:</u>

Most of the Housatonic River is estuarine below the Derby Dam; which lies approximately 20 km (12.5 miles) upstream from the river mouth. There are estuarine fish throughout the lower river, except for the first few kilometers below Derby Dam, which are freshwater tidal (NOAA 1999). Ten anadromous fish species use the lower Housatonic River below the Derby Dam (Table 8). White perch complete their life cycle within the saline reaches of the estuary, so Housatonic River populations likely spawn, rear, and reside in the lower river. Adult blueback herring, alewife, American shad, and gizzard shad (*Dorosoma cepidianum*) reside in coastal areas of Long Island Sound and migrate into the river during spawning runs. Juveniles of these four species use the river as a nursery area before returning to the Sound (NOAA 1999). Numerous estuarine fish and several small forage species also occupy the Housatonic estuary (Table 8) see below. Of these it is likely that tomcod (*Microgadus tomcod*) spawn in the lower Housatonic, as well as winter flounder, windowpane flounder, skate, bluefish and weakfish (Stone et al. 1994).

Table 8. Common NOAA trust species of concern in the Housatonic River and Estuary.

Species		Habitat			Fisheries	
Common Name	Scientific Name	Spawning Ground	Nursery Ground	Adult Forage	Comm. Fishery	Recr. Fishery
<u>ANADROMOUS/CATADROMOUS FISH</u>						
Alewife	*Alosa pseudoharangus*	◆	◆			
American eel	*Anguilla rostrata*		◆			◆
American shad	*Alosa sapidissima*	◆	◆			◆
Brown trout	*Salmo trutta*		◆			
Blueback herring	*Alosa aestivalis*	◆	◆			
Gizzard shad	*Dorosoma cepidianum*	◆	◆			
Hickory shad	*Alosa mediocris*		◆			
Sea lamprey	*Petromyzon marinus*		◆			◆
Striped bass	*Morone saxatilis*		◆			◆
White perch	*Morone americana*	◆	◆	◆		
<u>ESTUARINE FISH</u>						
Atlantic menhaden	*Brevoortia tyrannus*		◆	◆		◆
Atlantic tomcod	*Microgadus tomcod*	◆	◆	◆		
Bay anchovy	*Anchoa mitchilli*		◆	◆		◆
Bluefish	*Pomatomus saltatrix*		◆			
Cunner	*Tautoga onitis*	◆	◆	◆		
Goby	*Gobiosoma* sp.	◆	◆	◆		
Killifish	*Fundulus* sp.	◆	◆	◆		
Red hake	*Urophycis chuss*		◆			
Sheepshead minnow	*Cyprinodon variegatus*	◆	◆	◆		
Skates	*Raja* sp.	◆	◆	◆		
Silversides	*Menidia* sp.	◆	◆	◆		
Tautog	*Tautogolabrus adspersus*	◆	◆	◆		◆
Weakfish	*Cynoscion nebulosus*		◆			
Windowpane flounder	*Scophthalmus aquosus*	◆	◆	◆		◆
Winter flounder	*Pleuronectes americanus*	◆	◆	◆		

Reference: NOAA, 1999. Coastal Hazardous Waste Site Review / GE Housatonic. (http://response.restoration.noaa.gov/cpr/wastesites/PDFs/1999/GE_housa.pdf)

Bluefish can be found in the lower Housatonic River from May to November and support a popular sport fishery for the area (NOAA 1997). Other recreational fish species such as crevalle jack (*Caranx hippos*), scup, weakfish, northern kingfish, black seabass, spot (*Leiostomus xanthurus*), Atlantic croaker (*Micropogonius undulates*), butterfish, and tautog all use the lower Housatonic River primarily as nursery grounds for juveniles. Therefore, recreational fishing for these species in this area is not significant. However, adjacent areas in Long Island Sound do have important recreational fisheries for some of these species (NOAA 1997). These fisheries depend on the Housatonic River to support fish in their juvenile life-history stages.

<u>EFH Designations for Housatonic River and Landfall Alternative:</u>
Habitat within the Housatonic River and nearshore portions of the Housatonic River Alternative has been designated EFH for 17 species (Table 9). Refer to section 2.1.3 for a definition of EFH.

3.3.4 Benthos

Benthic resources in the vicinity of the Housatonic River and landfall area are described below for three different habitat types: the mouth of the Housatonic, the Charles E. Wheeler salt marsh and the estuarine waters of the lower Housatonic River.

<u>The Mouth of the Housatonic River:</u>

Substrate and depth are the predominant factors affecting invertebrate communities, sediment grain size in particular affects the distribution of invertebrates (LIS Task Force, 2003). The benthic habitats in the vicinity of the mouth of the Housatonic River are primarily depositional areas, characterized by sand and sand with silt and clay (Figures 7 and 8).

The sound wide survey conducted by Reid et al (1979) found that the benthic community of the shallow waters characterized by sandy muds along the Connecticut shore was comprised of the polychaetes *Polydora cornuta*, *Streblospio benedicti*, and *Tharyx acutus*; the clams *Tellina agilis* and *Ensis directus*; and the amphipods *Ampelisca abdita* and *Ampelisca vadorum*. As described in section 2.3.4, Zajac (1998) conducted an analysis of overall community structure throughout Long Island Sound and introduced 12 main community types. The community type typical of the mouth of the Housatonic was found to be characterized by very high abundances of the bivalves *Mulinia lateralis* and *Nucula annulata*; the polychaetes *Mediomastus ambiseta* and *Clymenella zonalis*; as well as relatively high abundances of the polychaetes *Nephtys incise* and *Streblospio benedicti*; the bivalves *Tellina agilis, Pectinaria gouldii, Pitar morhuanna, Yoldia limatula* and *Pandora gouldiana*; and the amphipod *Ampelisca abdita.*

As discussed in section 2.3.4, Zajac (1998) developed a figure depicting species richness ranges at a number of stations in the northern half of Long Island Sound (1998) (Figure 10). This figure indicates that the benthic species richness at the sampling stations closest to the mouth of the Housatonic River ranges from 11 – 15 species per sample directly south of Stratford Point and from 16 – 20 species per sample along the cable route close to the mouth of the Housatonic (almost directly east of Stratford Point). These species richness values are on the low side compared to species richness observed in the eastern sections of Long Island Sound.

A population of horseshoe crabs is known to exist at Milford Point (Hogan 2002 & LIS Task Force 2003). A monitoring study of the Horseshoe Crab population at Milford Point is underway. This is a long-range research project, similar to federally sponsored research in the Delaware Bay to assess a rapid decline in the horseshoe crab population (Watkins-Colwell 2001).

The Charles E. Wheeler Salt Marsh:

In general, coastal wetlands are highly productive in terms of plant material, which allows the support of dense populations of macroinvertebrates (LIS Task Force 2003). Benthic macroinvertebrate species typically found within the salt marsh from June to October (Osgood et al, 2003) include:

Paleomonetes pugio (Grass shrimp)
Hemigrapsus sanguineus (Asiatic Shore Crab)

(The following species rank in order of abundance within the marsh)
Enchytraeidae (Oligochaete worm)
Tubificidae (Oligochaete worm)
Tanytarsus (Chironmomid midge)
Gammarus (Scud)
Manayunkia speciosa (Polychaete worm)
Lumbriculidae (Oligochaete worm)
Gammarus mucronatus (Scud)
Paranais littoralis (Polychaete worm)
Ceratopogonidae (No-See-Ums/Biting Midges)
Turbellaria (Polychaete worm)
Gammarus tigrinus (Scud)
Hypogastruridae (Springtail)
Psychodidae (Moth flies)
Naididae (Oligochaete worm)
Orchestia grillus (Amphipod)
Leptocheirus (Amphipod)
Edotia triloba (Ispod)
Tipulidae (Crane flies)
Hydrobiidae (Snail)
Hydrozetes (Parasitic arachnid)
Physidae (Snail)
Rhynchocoela (Proboscis Worms)

The Estuarine Waters of the Lower Housatonic River:
Numerous invertebrate species occupy the Housatonic estuary (Table 9). Of these, the most common mollusks are the Eastern oyster and Northern quahog (NOAA 1999). Refer to section 3.3.2 for further information on commercial shellfish populations in the Housatonic River. Grass shrimp and bay shrimp (*Crangon septemspinosa*) also are abundant year-round residents of nearshore estuaries (Stone et al. 1994) and would likely be found in the Housatonic River. Atlantic rock crab, green crab (*Carcinus maenas*), lady crab, mud crab (*Panopeus spp.*), sand shrimp (*Crangon septemspinosa*) and shore shrimp (*Palaemontes spp.*) are also commonly found in the Lower Housatonic (NOAA 1997).

Table 9: Common NOAA trust species of concern in the Housatonic River and Estuary

Species		Habitat			Fisheries	
Common Name	Scientific Name	Spawning Ground	Nursery Ground	Adult Forage	Comm. Fishery	Recr. Fishery
INVERTEBRATES						
Bay shrimp	*Crangon septemspinosa*	♦	♦	♦		
Blue crab	*Callinectes sapidus*	♦	♦	♦		
Blue mussel	*Mytilus edulis*	♦	♦	♦		♦
Eastern oyster	*Crassostrea virginica*	♦	♦	♦	♦	
Grass shrimp	*Palaemonetes pugio*	♦	♦	♦		♦
Northern quahog	*Mercenaria mercenaria*	♦	♦	♦		♦
Soft shell clam	*Mya arenaria*	♦	♦	♦		

Reference: NOAA, 1999. Coastal Hazardous Waste Site Review / GE Housatonic. (http://response.restoration.noaa.gov/cpr/wastesites/PDFs/1999/GE_housa.pdf)

In November 2003, ESS Group Inc. sampled the Housatonic River immediately downstream of the I95 bridge (ESS Group, 2004). The macroinvertebrate community was found to be dominated by the Polychaete worms *Scolecolepides viridis* and *Nereis diversicolor*, Oligochaete worms, the amphipods *Leptocheirus pinguis* and *Gammarus spp*, and the isopods *Cyathura polita* and *Chiridotea almyra*. Based on metrics scores recommended by the U.S. EPA bioassessment technical guidance document for marine and estuarine waters (Gibson et al., 2000), the Lower Housatonic River showed signs of habitat impairment (i.e. the observed macroinvertebrate assemblage was not representative of a particularly healthy or significant community).

3.3.5 Protected Species and Habitats

A letter requesting information regarding the presence of protected species and their habitats in the Project area was submitted to the CTDEP Natural Diversity Database (NDDB). The response to this request indicated that further information would be provided once the routing process was further advanced. The NDDB lists state- and federally-listed threatened, endangered, or special concern species with the potential to occur in a given area.

Environmental Sensitivity Index (ESI) maps produced by NOAA (2001) identify vulnerable coastal resources for use in oil spill response activities. Although these maps focus on species and habitats that are sensitive to oil spills, they provide useful information on species and habitats potentially present in the coastal areas of New Haven Harbor and also introduce some of the "Threatened/Endangered/Species of Special Concern" that may be present in the area. The ESI identifies 11 state- and/or federally-listed protected species (Appendix A, Table and Figure A-1) in the Housatonic River in the area of the route.

State regulated diamondback terrapins (*Malaclemys terrapin terrapin)* have been observed in the Charles E. Wheeler Management Area and documented as abundant in tidal estuaries west of the Connecticut River (CTDEP, 2000).

3.3.6 Coastal and Inland Wetland/Water Resources

This portion of the route is within the Housatonic River, considered a water of the United States. Within this water body the NWI map defines the river as estuarine subtidal (E1UBL) and estuarine subtidal, brackish water (E1UBL3). The NWI map also identifies estuarine resources in the vicinity of the cable route alternative through the Housatonic (Figure 11).

The CTDEP Coastal Resources Map identifies mapped coastal resources within this portion of the cable route alternative as:

- Intertidal flats; very gently sloping or flat areas located between high and low tides composed of muddy, silty and fine sandy sediments and generally devoid of vegetation.
- Regulated tidal wetlands; official state designated and regulated tidal wetlands located within the coastal boundary
- Beaches and dunes; moderately sloping shores composed of water worked sand, gravel, or cobble deposits, and when present wind deposited sands.
- Estuarine embayments; protected coastal water bodies with an open connection to the Sound including tidal rivers, bays, coves and lagoons.
- Developed shorefront; port and harbor areas which have been highly engineered and developed resulting in the functional impairment or substantial alteration of their natural physiolgraphic features or systems.

Water Resources

The Connecticut Water Quality Classification Maps have identified this area of the lower Housatonic as having a current classification of SC and an attainment classification of SB (SC/SB). These waters may have good aesthetic value and may be suitable for certain fish and wildlife habitat, certain recreational activities, certain aquaculture operations, industrial use and navigation (CTDEP, 2002). Examples of conditions that warrant a Class SC designation include combined sewer overflows, urban runoff, inadequate municipal or industrial wastewater treatment, and community-wide septic system failures, however the goal of SC/SB waters is to attain SB classification, and therefore, standards for protection of SB waters apply (CTDEP, 2002).

The East Devon Substation Site is located in the Housatonic River Drainage Basin, which covers approximately 1,900 square miles within the states of Connecticut, Massachusetts and New York (USGS, 2003). According to the Water Quality Classification maps, the substation is located in an area that has a current groundwater classification of GB. As discussed previously, uses for GB waters include industrial purposes, and are presumed not suitable for human consumption.

No public water supply wells are located in the vicinity of the Devon Compressor Station. Public water is supplied by the South Central Connecticut Regional Water Authority (SCCRWA), which operates wells in the Towns of Cheshire and Hamden Connecticut. The landfall area is not located within 150 feet of a public or private drinking water supply well, nor is it within an area of contribution of a public water supply well. The station is not located over a primary, principle, or sole source aquifer mapped by USEPA (ENSR, 2001).

3.3.7 Navigation

The Housatonic River empties into Long Island Sound about 10 miles southwest of the New Haven Harbor entrance. On the east side of the entrance to the Housatonic River, a breakwater extends out from Milford Point across the bar and is marked at its south end by Housatonic River Breakwater Light 2A. The inner section of the breakwater is awash at high water. A Federal Navigation Project (Federal Channel) provides for an 18-foot (MLLW) dredged channel in the Housatonic River from Long Island Sound between the outer breakwater on the east side of the channel entrance and Stratford Point on the west, upriver for about 4.3 miles to the lower end of the Culver Bar, which lies approximately 1,200 feet north of the proposed landfall. The Federal Channel in the Housatonic River is narrow (approximately 200 to 370 feet wide) and crooked, with little depth on either side. The channel is as narrow as 100 feet wide where bars crossing the channel have been dredged. The tidal currents are strong in the lower portion of the Housatonic River, and the *Coast Pilot* advises larger vessels use a pilot vessel to navigate. The channel was last dredged from 1975 to 1976 to the project depth of 18 feet MLLW. The USACE is planning a maintenance dredging project that could begin in October 2006, depending on the availability of a disposal site (Karalius, 2004).

Bridges are important navigational features for the Housatonic Route Alternative, and will limit the height and width of vessels able to work along this route. About 3.8 miles above the entrance, U.S. Route 1 crosses the river. This bridge has a horizontal clearance of 125 feet and a vertical clearance of 32 feet at Mean High Water (MHW). Two bridges cross the river about 0.3 mile upriver of the U.S Route 1 bridge. The first is the Interstate 95 fixed highway bridge which has a horizontal clearance of 100 feet and a vertical clearance of 65 feet at MHW. The second is a railroad bridge with a horizontal clearance of 83 feet and a vertical clearance of 19 feet at

MHW. Overhead power cables cross over the Housatonic near Pecks Mill approximately 1 mile north of the proposed landfall with a vertical clearance of 79 feet at MHW.

According to the *Coast Pilot* (NOAA, 2004), the waterborne commerce on the river is principally in barge shipments of aggregate, fuel oil to the power plant at Devon, and seasonal commercial shellfishing. Only 18 total trips (9 upbound and 9 downbound) related to waterborne commerce were reported in the Housatonic River for 2002 (USACE, 2002). Recreational vessel activity in the river increases during peak recreational boating months, typically May through September.

3.3.8 Historical and Archaeological Resources

Information on known historic properties in Milford was compiled from a review of records at the Connecticut Historical Commission on May 10, 2004, including the listings of the NRHP and SRHP, as well as consultation with staff as referenced below. Information on known historic properties in Stratford was obtained from the National Register Information System (NRIS) on-line database (www.nr.nps.gov), accessed on May 13, 2004.

Stratford Upland

Upland historical resources listed on the NRHP and located in the vicinity of the Housatonic River route include:

- The Stratford Point Light, located approximately 0.5 nautical miles southwest of the proposed route at the mouth of the Housatonic. The tower and keepers cottage were constructed in 1881 in the Carpenter Gothic style, and the structures were listed on the NRHP in 1990. The light continues to operate as an aid to navigation maintained by the USCG;
- The Stratford Center Historic District (south of I-95), bordered on the east by the Housatonic River;
- The Housatonic River Railroad Bridge within the Amtrak ROW, immediately north of the I-95 bridge;

Milford Upland

With the exception of the Housatonic River Railroad Bridge (listed above), the remaining NRHP-listed historic structures and districts in Milford appear to be located well to the east of the Housatonic River, in or near Milford Center north of Fort Trumbell Beach and northeast of the upland alternative route. No resources listed on the State Register of Historic Places (SRHP) were identified within or near the Housatonic River alternative route.

Cable installation along this route would not be likely to affect known upland historic properties and districts.

Marine

No shipwrecks are charted within or in the vicinity of this alternative route on NOAA's Navigation Chart Nos. 12370 and 12371 (NOAA, March 6, 1993; NOAA, July 25. 1992). The Staff Archaeologist at the Connecticut Historical Commission/State Historic Preservation Office (SHPO) was not aware of any known shipwrecks or submerged prehistoric (pre-European Contact Period) archaeologic sites in the vicinity of the Housatonic River route (Poirier, personal communication, May 10, 2004). Dr. Poirier indicated shoreline and coastal areas between New Haven to Milford are likely sensitive for potential submerged prehistoric sites, although no surveys have been done in this area to date. A marine archaeological study would likely be requested by SHPO to evaluate this route for the presence/absence of historic and prehistoric cultural resources should this route be further considered.

Because the offshore route runs within the dredged FNC in the Housatonic River, no intact submerged archaeological resources are expected within the Project's Area of Potential Effect (APE). Therefore, an archaeological survey within the APE in FNC of the Housatonic River is unlikely to be requested by the Connecticut SHPO.

3.3.9 Public Recreational Resources and Land Use

Land uses along the lower Housatonic River consist of a mix of open space, residential, commercial and industrial uses. As discussed in Section 2.3.9, land uses within and adjacent to the East Devon Substation are primarily for industrial, manufacturing and utility purposes. Figure 12 identifies public resources and other features including land uses and schools in proximity to the cable route alternative in the Housatonic River. Some of the public recreational resources for this alternative occur at the following locations:

- Smith-Hubbell Wildlife Refuge and Bird Sanctuary
- Charles E. Wheeler Wildlife Management Area
- Short Beach Park
- The Housatonic Boat Club
- The Pootatuck Yacht Club
- Bonds Dock Park

The Housatonic River is used for recreational boating activities. The City of Milford operates approximately 60 moorings on the East Side of the Housatonic River opposite the Housatonic Boat Club (City of Milford, 2003). Two yacht clubs, the Housatonic Boat Club and the Pootatuck Yacht Club, are located along the western side of the Housatonic River in Stratford, CT (Town of Stratford, 2004). Beacon Point Marina, Brewer Stratford Marina and the Stratford Boat Launch Ramp are also located on the Housatonic River in close proximity to the project.

4.0 REFERENCES

ACOE, Waterborne Commerce of the United States, Calendar year 1999, Part 1 - Waterways and Harbors Atlantic Coast, District Engineer, U.S. Army Engineer District, New Orleans.

American Rivers web site www.americanrivers.org, accessed May 14, 2004.

Barber, T. [Personal Communication] Stratford Shellfish Commission. Conversation May 12, 2004.

Carey, D. [Personal Communication] Connecticut Bureau of Agriculture, Department of Aquaculture. Conversation May 17, 2004.

CAS, Connecticut Audubon Society, Center at Milford Point. http://www.ctaudubon.org/centers/coastal/costal.htm

City of Milford (2003), The Milford Harbor Commission http://milfordct.virtualtownhall.net/Public_Documents/MilfordCT_Harbor/index

CTDEP (2000) Wildlife in Connecticut Informational Series, Northern Diamondback Terrapin http://dep.state.ct.us/burnatr/wildlife/factshts/dmbkterp.htm

CTDEP (2002) Water Quality Standards http://dep.state.ct.us/wtr/wq/wqs.pdf.

ctfishermen 2004. Local recreational fishing website. (www.ctfisherman.com)

Demos, Catherine. (1993) Environmental Assessment Finding of No Significant Impact Section 404 (b)(1) Evaluation, Maintenance Dredging of New Haven Harbor, New Haven, Connecticut. ACOE-NED.

ENSR. March 25, 2002. Application for a Certificate of Environmental Compatibility and Public Needs: Iroquois Extension Project. Prepared on behalf of Iroquois Gas Transmission System, L.P.

ESS, Inc. August 2001. Permit Application for the Office of Long Island Sound Programs: Electric Transmission and Fiber Optic Submarine Cable System: New Haven Harbor and Long Island Sound. Prepared on behalf of the Cross Sound Cable Company, LLC.

ESS, Inc. October 22, 2002. Cross Sound Cable Project: Area 6/7 Geotechnical Investigation. New Haven Harbor. Prepared in association with Ocean Surveys, Inc. for Cross Sound Cable Company, LLC.

ESS Group Inc. 2004. Benthic Survey and Assessment at Underground River Crossings: Proposed Middletown to Norwalk 345kV Transmission Project. Project No. N407-000. April 5, 2004.

Finkelstein, Ken. May 14, 2004. NOAA. Email correspondence with Jenny Sheppard, ESS Group, Inc.

Gibson, G.R., M.L. Bowman, J. Gerritsen and B.D. Snyder. 2000. Estuarine and Coastal Marine Waters : Bioassment and Biocriteria Technical Guidance. EPA 822-B-00-024. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.

Gottschall, Kurt F., Johnson, Mark W., Simpson, David G., 2000. National Oceanographic Atmospheric Administration Technical Report NMFS 148, The Distribution and Size Composition of Finfish, American Lobster, and Long-Finned Squid in Long Island Sound Based on Connecticut Fisheries Bottom Trawl Survey, 1984-1994.

Hogan Neil, 2002. Studying Horseshoe Crab Population Decline. (Archived from CT Audubon Society News Spring 2002). Accessed via web site: (http://www.ctaudubon.org/archive /horsehoe_coastalcenter.htm)

Iroquois, 2001. ELI Project: Devon Compressor Station. CT Department of Environmental Protection. November 16, 2001.

Iroquois, 2002. Iroquois Gas Transmission System. Application for a Certificate of Environmental Compatibility and Public Need. March 25, 2002.

Karalius, J. [Personal Communication] U.S. Army Corps of Engineers, New England Division. Conversation on May 13, 2004.

LIS Task Force 2003. Comprehensive Assessment and Report. Environmental Resources and Energy Infrastructure of Long Island Sound. Prepared by the Task Force on Long Island Sound. Pursuant to Public Act No. 02-95 and Executive Order No. 26. June 3, 2003.

Long, E.R.; Robertson, A.; Wolfe, D.A.; Hameedi, J.W.; and Sloane, G.M. 1996. Estimates of the Spatial Extent of Sediment Toxicity in Major U.S. Estuaries. Environmental Science and Technology. Vol. 30, pp. 3582-3592.

Long, E.R.; Field, L.J.; and MacDonald, D.D. 1998. Predicting Toxicity in Marine Sediments with Numerical Sediment Quality Guidelines. Environmental Toxicology and Chemistry. Vol. 17, pp. 714-727.

Ludwig, M. (1999a) [Letter] National Marine Fisheries Service, Habitat conservation Division (NMFS). Sent to Susan Herz, dated June 8, 1999; Ludwig, M. [Personal Communication] National Marine Fishery Service, Habitat Conservation Division (NMFS) conversation on June 30, 1999.

Ludwig, M. (1999b) [Email] National Marine Fisheries Service, Habitat Conservation Division (NMFS). Sent to Susan Herz on August 3, 1999.

Ludwig, Michael. 1999c. [Email] National Marine Fisheries Service, Habitat Conservation Division (NFMS). Sent to Susan McCarthy Herz [sherz@essgroup.com] from M. Ludwig [michael.ludwig@noaa.gov]. Sent on August 3, 1999.

Mecray, Ellen L.; Buchholtz ten Brink, Marilyn R.; and Sunita Shah. 1998. USGS Open File Report 98-502, edited by Lawrence J. Poppe and Chris Polloni. Long Island Sound Environmental Studies: Chapter 6. Metal Distributions in the Surface Sediments of Long Island Sound.

NAI (1985) Summary Report Supplement 2 1981-1984, New Haven Harbor Ecological Studies 1985. Prepared for UI.

National Register Information System (NRIS) on-line database, (www.nr.nps.gov, accessed on May 13, 2004.

NMFS, 2003. National Marine Fisheries Service: Guide to Essential fish Habitat Designations in the Northeast United States. http://www.nero.nmfs.gov/ro/doc/index2a.htm

Northern Ecological Associates, Inc. (NEA). (1998) New Haven Harbor Station Ecological Assessment Report. Prepared for GEI Consultants, Inc. July 23, 1998.

NOAA, July 25, 1992. NOAA Chart No. 12371: New Haven Harbor, 22nd Edition.

NOAA, March 6, 1993. NOAA Chart No. 12370: Housatonic and Milford Harbor, 17th Edition.

NOAA. United States Coast Pilot, Volume 2: Atlantic Coast: Cape Cod to Sandy Hook. 2004, 33rd Ed. Pope, L.J. and C. Polloni, eds., 1998. Long Island Sound Environmental Studies. USGS, Coastal and Marine Geology Program, Open File Report 98-502.

NOAA, 1997. Raymark Industries Phase II Ecological Risk Assessment. Final. Coastal Resources Coordination Branch, Hazardous Materials Response and Assessment Division, Office of Natural Resources Conservation and Assessment, National Ocean Service, National Oceanicand Atmospheric Administration, U.S. Department of Commerce. October 1997.

NOAA, 1998. Status Review of Atlantic Sturgeon. NOAA Office of Protected Resources. (http://www.nmfs.noaa.gov/prot_res/readingrm/statrvws/atl_sturgeon.PDF)

NOAA, 1999. Coastal Hazardous Waste Site Review / GE Housatonic. (http://response.restoration.noaa.gov/cpr/wastesites/PDFs/1999/GE_housa.pdf)

NOAA, 2001. Environmental Sensitivity Index (ESI) maps: Bridgeport CT-6, Sherwood Point CT-5, and Norwalk South CT-4. National Oceanographic Atmospheric Administration, National Ocean Service, Published October 2001

Ocean Surveys, Inc. (OSI), Preliminary Geophysical and Geotechnical Investigations for Proposed Submarine Cable Crossings of Long Island Sound. Report to Environmental Science Services, Inc., December 1996; OSI, Report of Findings, Geophysical and Geotechnical Investigations. Report to Environmental Science Services, Inc., August 1999.

Osgood, David T., David J. Yozzo, Randy M. Chambers, Dana Jacobson, Timothy Hoffman, and Jason Wnek, 2003. Tidal Hydrology and Habitat Utilization by Resident Nekton in Phragmites and Non-Phragmites Marshes. Estuaries Vol. 26, No. 2B, p. 522–533 April 2003

Pellegrino, P. and W. Hubbard. 1983. Baseline shellfish data for the assessment of potential environmental impacts associated with energy activities in Connecticut's coastal zone. Volumes I and II. Report to State of Connecticut, Department of Agriculture, Aquaculture Division, Hartford, CT. 177 pp. (In Zajac 1998).

Poirier, David A., Staff Archaeologist. Conversation with Karen Hanecak of ESS Group, May 10, 2004. Connecticut Historical Commission. Hartford, Connecticut.

Poppe, Lawrence J.; Lewis, Ralph S.; Knebel, Harley J.; Haase, Eric A.; Parolski, Kenneth F.; and DiGiacomo-Cohen, Mary L. 1998. USGS Open File Report 98-502, edited by Lawrence J. Poppe and Chris Polloni. Long Island Sound Environmental Studies: Chapter 2, Survey Number 8. Sidescan Sonar Images, Surficial Geologic Intrpertations, and Bathymetry of New Haven Harbor, Connecitcut, and the New Haven Dumping Ground, North-Central Long Island Sound.

Pope, L.J. and C. Polloni, eds., (1998). Long Island Sound Environmental Studies. USGS, Coastal and Marine Geology Program, Open File Report 98-502.

Reid, R.N., A.B. Frame, and A.F. Draxler. 1979. Environmental baselines in Long Island Sound, 1972-73. U.S. National Oceanic and Atmospheric Administration Technical Report NMFS-SSRF-738, Washington, DC, U.S. National Marine Fisheries Service, 31 p (In USEPA 2004).

Rhoads, D.C. and Michael. 1974. Summary of Benthic Biologic sampling in Long Island Sound and New Haven Harbor, July 1972-August 1973. Yale University, Department of Geology and Geophysics (unpublished) Report to US Army Corps of Engineers.

Rocque, Arthur J. 2000. Connecticut Coastal Management Manual - Connecticut Department of Environmental Protection, Arthur J. Rocque Jr., Commissioner, Hartford, CT September 2000.

Sanders, H.L. 1956. Oceanography of Long Island Sound. The biology of marine bottom communities. *Bulletin of the Bingham Oceanographic Collection* 15:345-415.

Stone, Janet Radway; Schafer, John P.; London, Elizabeth Haley; DiGiacomo-Cohen, Mary; Lewis, Ralph S.; and Thompson, Woodrow B. Thompson. 1998. Quaternary Geologic map of Connecticut and Long Island Sound Basin. Open-File Report 98-371. United States Geologic Survey, in Cooperation with the State of Connecticut Department of Environmental Protection: Geological and Natural History Survey.

Stone, S.L., T.A. Lowery, J.D. Field, C.D. Williams, D.M. Nelson, S.H. Jury, M.E. Monaco, and L. Andreasen. 1994. Distribution and abundance of fishes and invertebrates in Mid-Atlantic estuaries. ELMR Rep. No. 12. NOAA/NOS Strategic Environmental Assessments Division, Silver Spring, MD. 280 p.

Task Force on Long Island Sound (Institute for Sustainable Energy), June 3, 2003. Comprehensive Assessment and Report. Environmental Resources and Energy Infrastructure of Long Island Sound.

Town of Stratford (2004) Stratford Harbor and Housatonic River http://www.townofstratford.com/waterfront/index.htm

USEPA 2004. Final Environmental Impact Statement for the Designation of Dredged Material Disposal Sites in Central and Western Long Island Sound, Connecticut and New York. United States Environmental Protection Agency, April 2004.

USGS (2003) Housatonic River Drainage Basin http://ma.water.usgs.gov/basins/housatonic.htm

Varekamp, Johan C.; Buchholtz ten Brink, Marilyn R.; Mecray, Ellen L.; Kreulen, B. USGS Open File Report 98-502, edited by Lawrence J. Poppe and Chris Polloni. Long Island Sound Environmental Studies: Chapter 7: The Distribution of Mercury in Sediment from Long Island Sound and Surrounding Marshes.

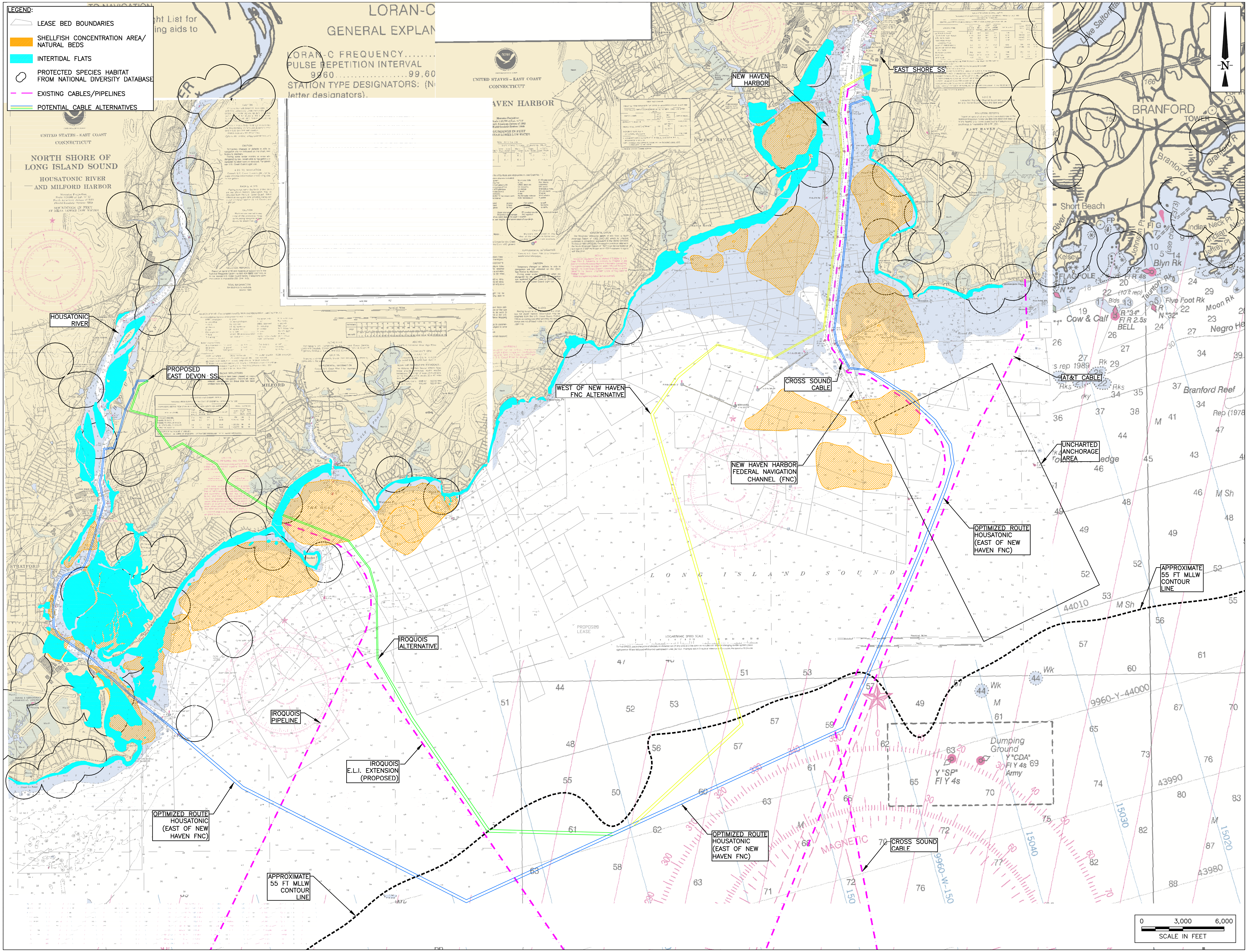
Volk, John [Personal Communication]. Connecticut Department of Agriculture/Bureau of Aquaculture, March 20, 2003.

Walker, T. [Personal Communication] Long Island Sound Pilots Association. Conversation on May 25, 1999.

Watkins-Colwell 2001. Connecticut Audubon News, Summer 2001 issue, page 1 article, Horseshoe Crabs and Shorebirds.

WRSC. The Ports of Southern New England.

Zajac, R.N. 1998. A Review of Research On Benthic Communities Conducted In Long Island Sound and An Assessment of Structure and Dynamics. Chapter 4, in Poppe, L.M., and C. Polloni (Eds.) *Long Island Sound Environmental Studies.* U.S. Geological Survey Open-File Report 98-502, Chapter 4, CD-ROM. URL: http://pubs.usgs.gov/of/of98-502/chapt4/rz1cont.htm.



NOTES:

1. BASE PLAN COMPILED WITH THE FOLLOWING NOAA NAUTICAL CHARTS:
   - CHART NO. 12363 EAST LONG ISLAND SOUND
   - CHART NO. 12370 HOUSATONIC RIVER AND MILFORD HARBOR
   - CHART NO. 12371 NEW HAVEN HARBOR
2. LEASE BED SOURCE MAPS PROVIDED BY CONNECTICUT DEP-COASTAL AREA MANAGEMENT PROGRAM
3. SHELLFISH CONCENTRATION SOURCE MAPS PROVIDED BY CONNECTICUT DEPARTMENT OF AGRICULTURE-AQUACULTURE DIVISION

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United Illuminating
Middletown - Norwalk Project

Conceptual Route Alternatives
And Constraints
East Shore Substation to East Devon Substation

PROJECT No.: N397-001.3	DRAWING No.
DATE OF ISSUE: 5/26/04	1
SHEET No.:	
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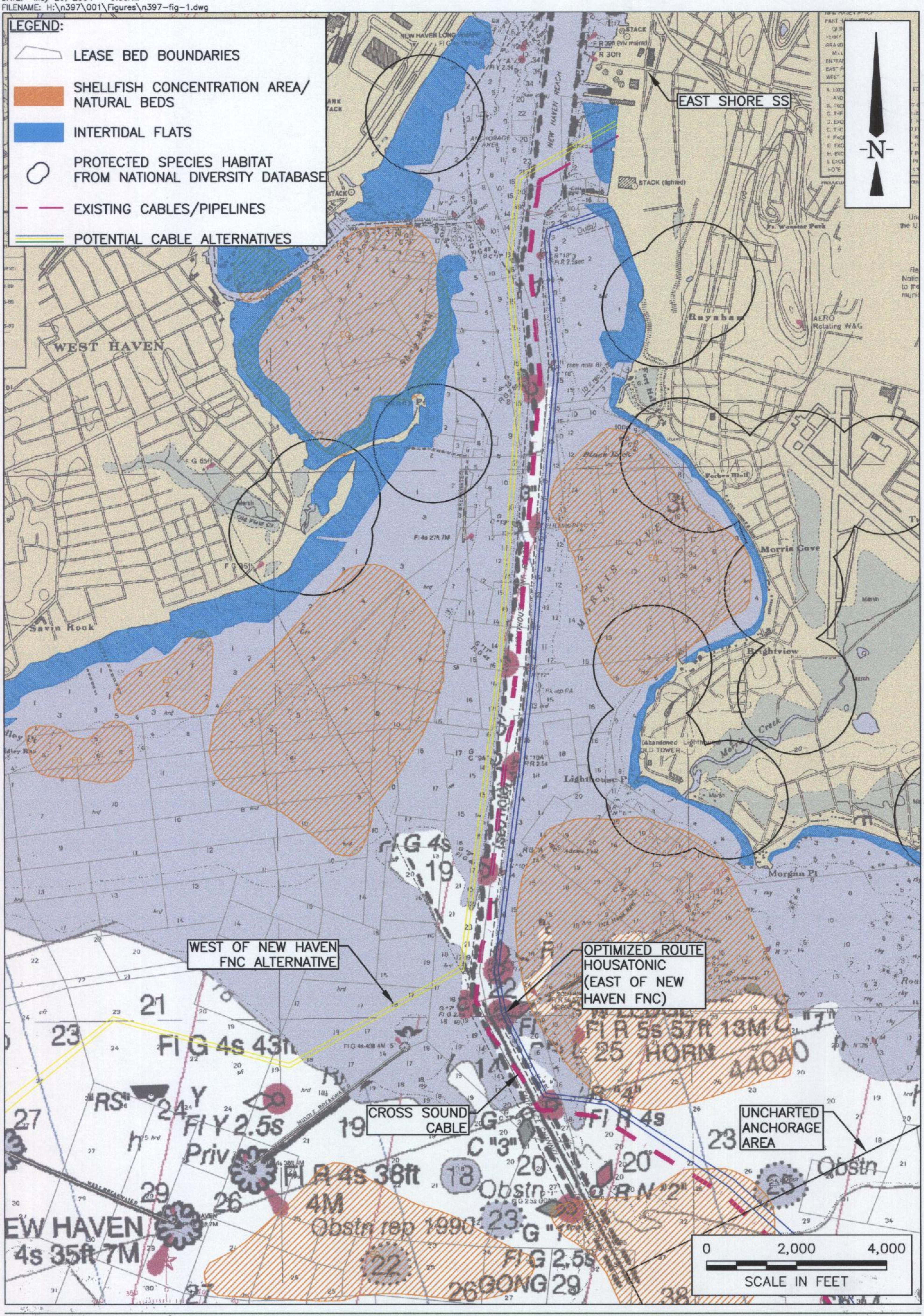

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Scale: As Shown

New Haven Harbor
Conceptual Route Alternatives and Constraints

Figure 2

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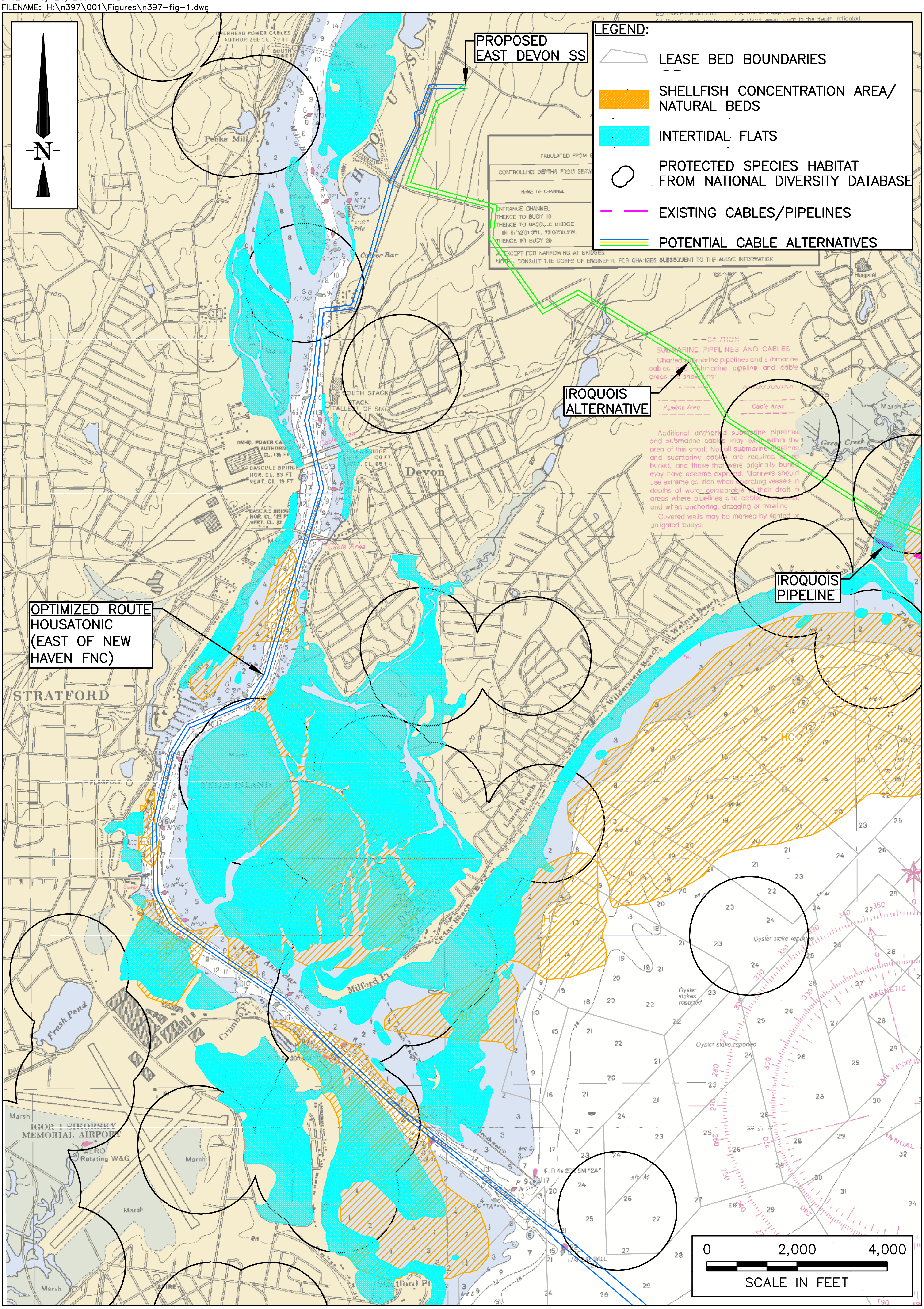

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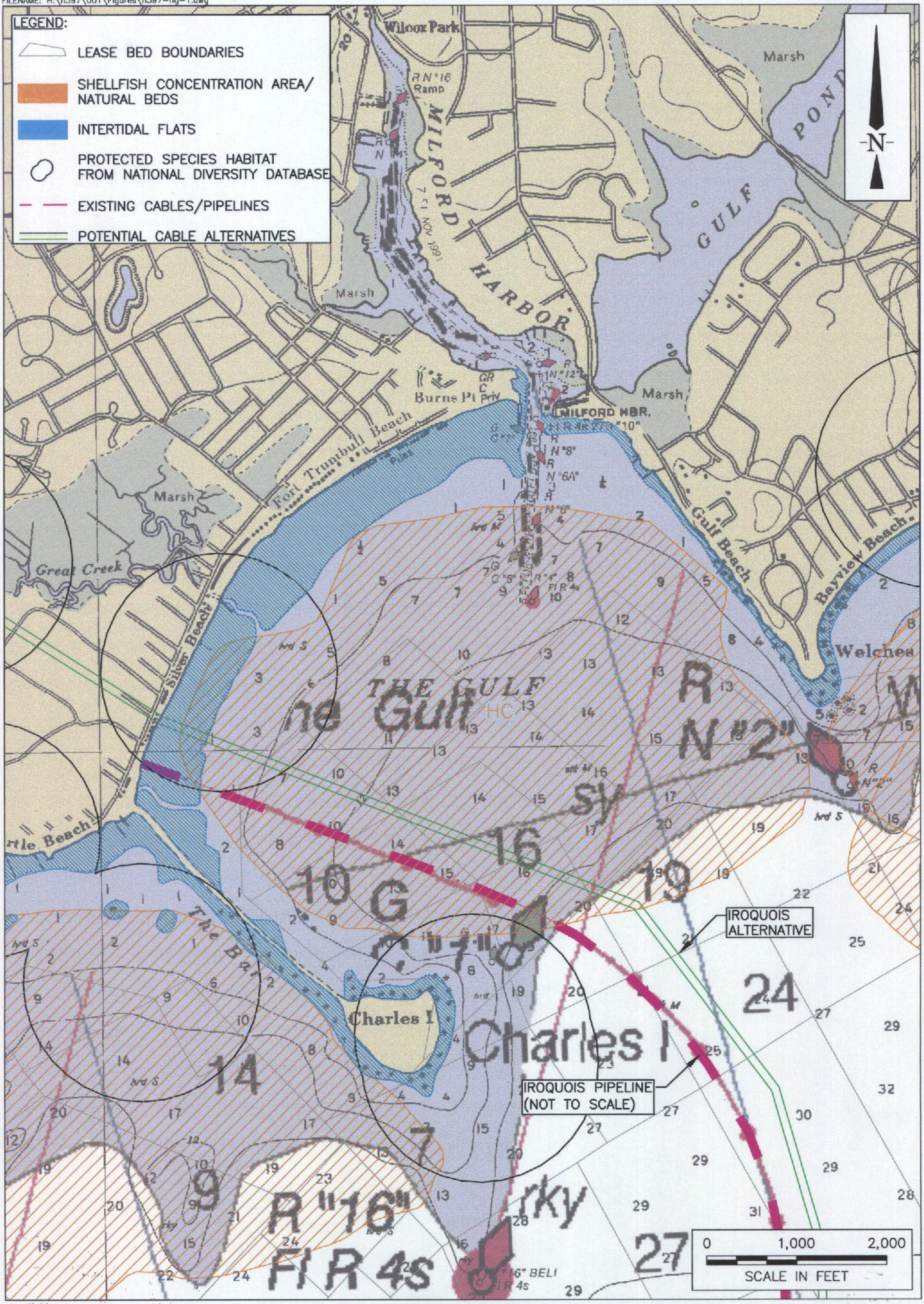
Housatonic River
Conceptual Route Alternatives and Constraints

Figure 3

DATE: May 26, 2004 - 1:51PM
FILENAME: H:\n397\001\Figures\n397-fig-1.dwg



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The Gulf
Conceptual Route Alternatives and Constraints

Figure
4

Location: G:\GIS-Projects\N397\NU-Locus.apr Layout: NWI - New Haven

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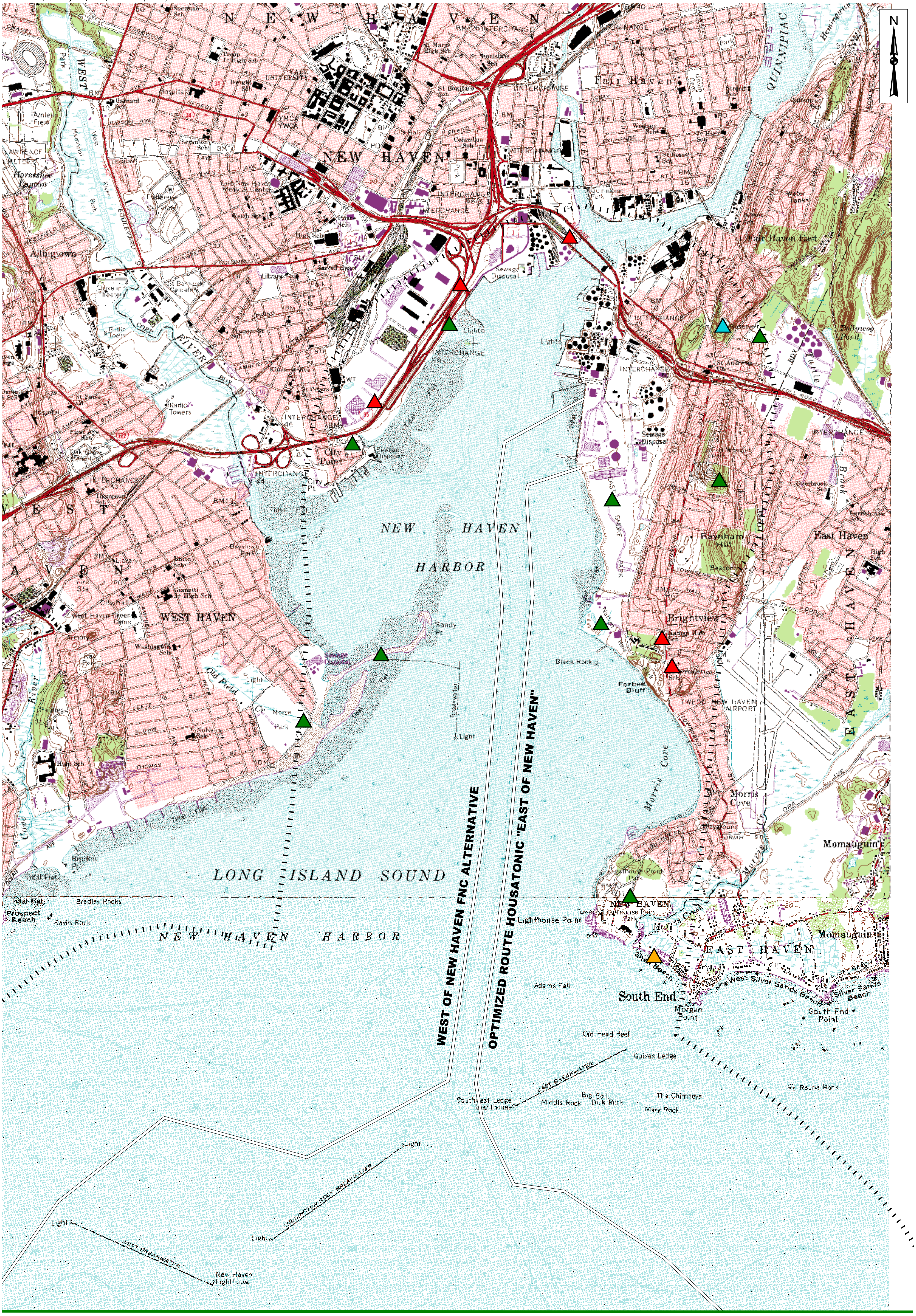
Scale: 1" = 2,500'
Source: 1) CTDEP, Roads, 1969-84
2) FWS, NWI Classification (New Haven), 1973
3) FWS, NWI Classes (Ansonia, Bridgeport, Long Hill, & Woodmont), 1980
4) FWS, NWI Classification (Milford), 1985

National Wetlands Inventory (NWI) Classification (New Haven)

Figure 5

Location: G:\GIS-Projects\N397\NU-Locus.apr Layout: Public Resources - New Haven



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Middletown to Norwalk, CT 345 kV Cable Project

Scale: 1" = 3,000'

Source: 1) MAGIC, USGS DRG, 1997
2) ESS, Public Resources, 2004

LEGEND

Proposed Cable Routes

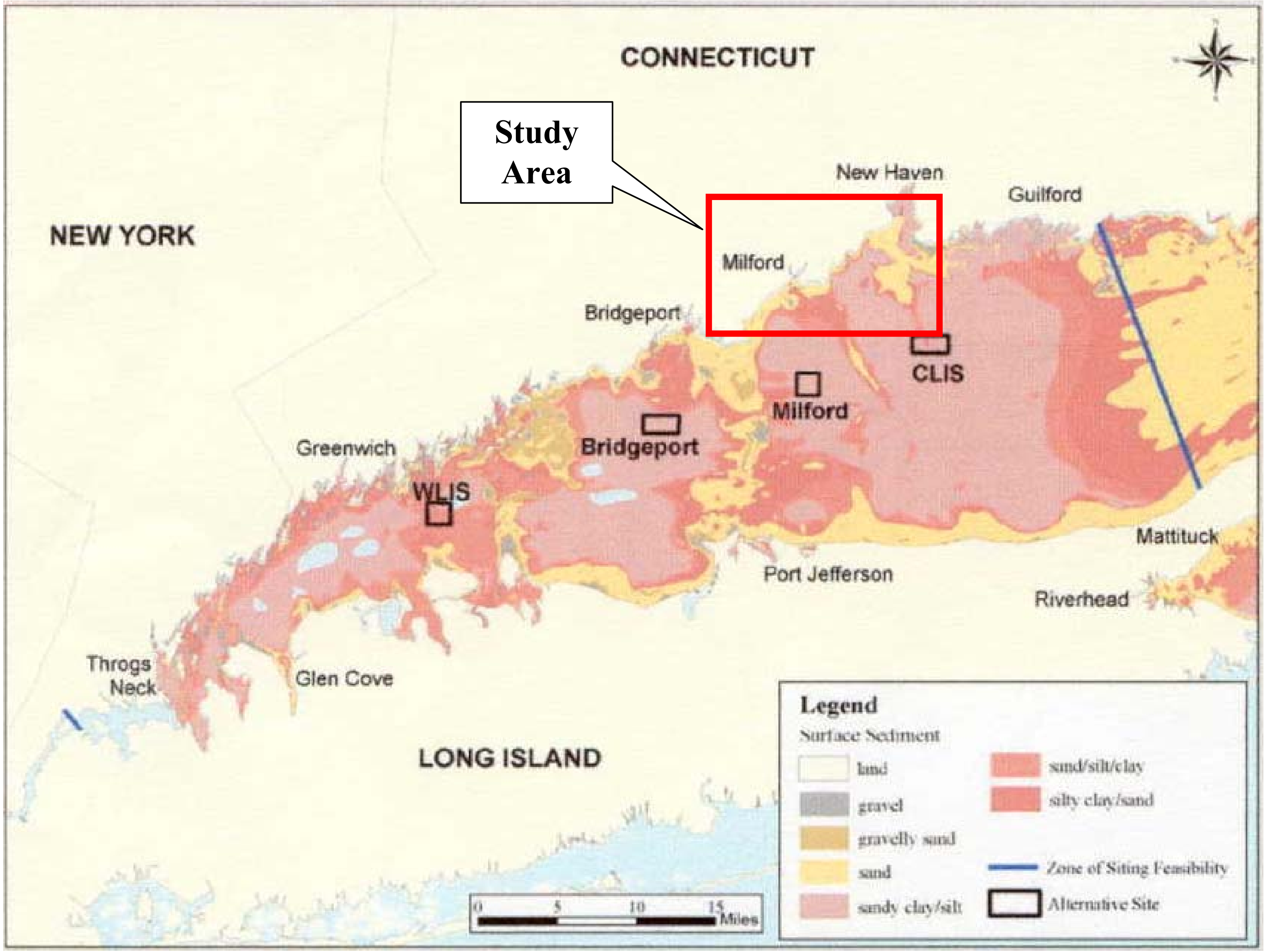
1 Mile Buffer from Proposed Routes

Public Resources Classification

- Park
- Reservoir
- School
- Beach

Land Use and Public Recreational Resources (New Haven)

Figure 6



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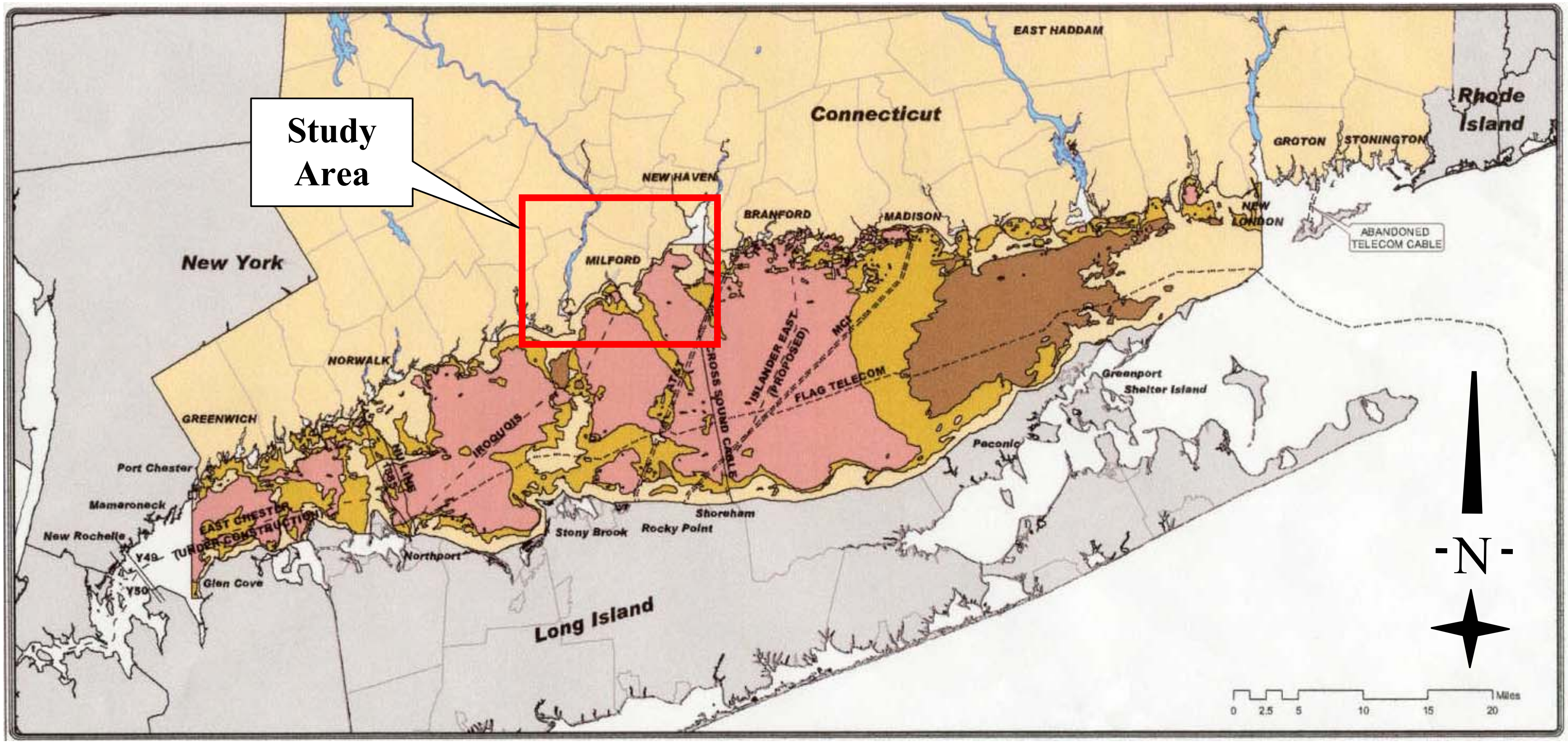
Offshore Cable Feasibility Review
East Shore SS, New Haven to East Devon SS, Milford
Middletown to Norwalk 345KV Cable Project
NUSCO/UI

Source: Developed from Poppe et al, 2000
Scale: As Indicated

Distribution of Major Sediment Grain Size Characteristics in Surficial Sediments of Long Island Sound

Figure 7



Legend

- erosion or nondeposition
- coarse-grained bedload transport
- sorting & reworking
- fine-grained deposition

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East Shore SS, New Haven to East Devon SS, Milford
Middletown to Norwalk 345KV Cable Project
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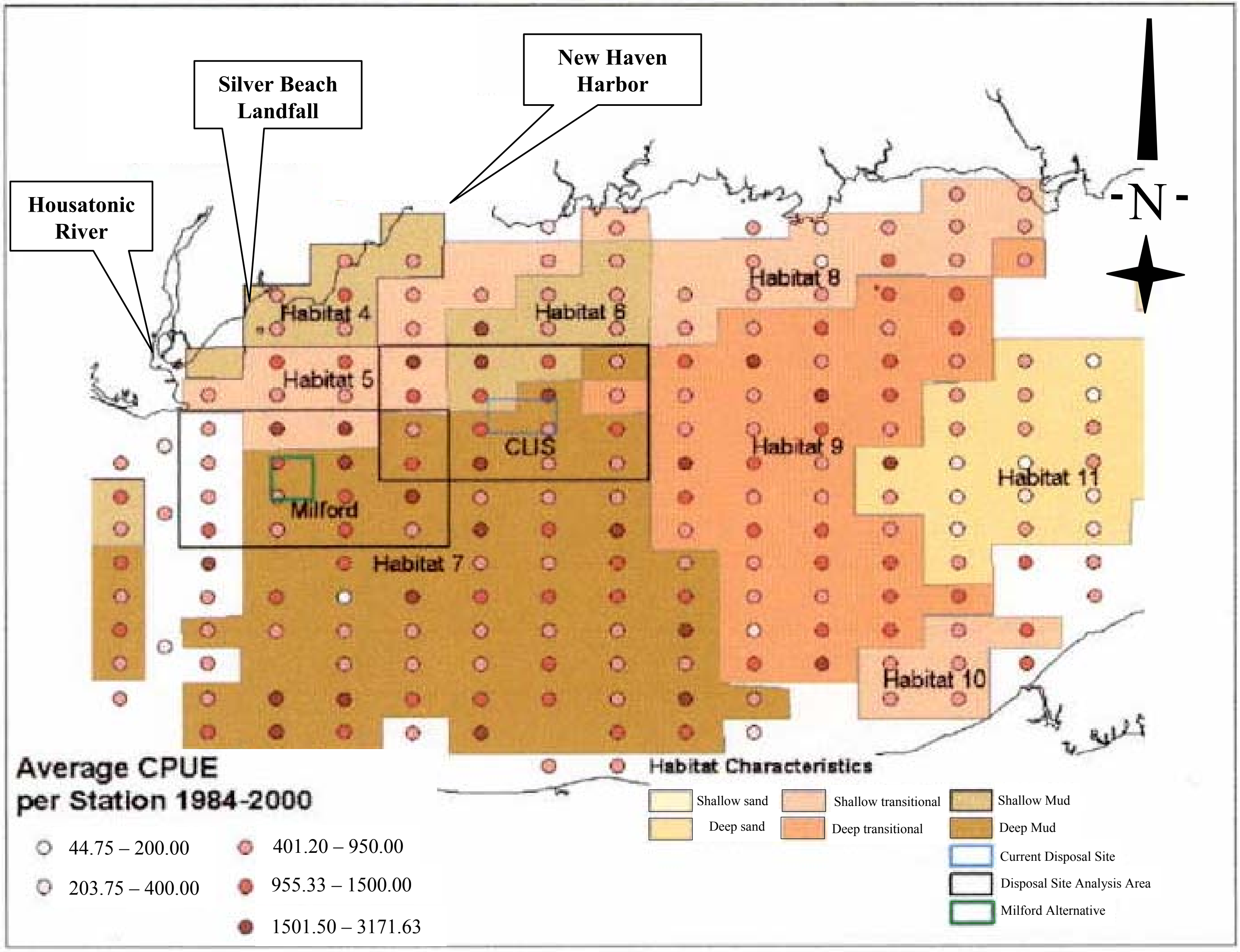
Source: Institute of Sustainable Energy 2003
Scale: As Indicated

Sedimentary Environments of Long Island Sound

Figure 8



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East Shore SS, New Haven to East Devon SS, Milford
Middletown to Norwalk 345KV Cable Project
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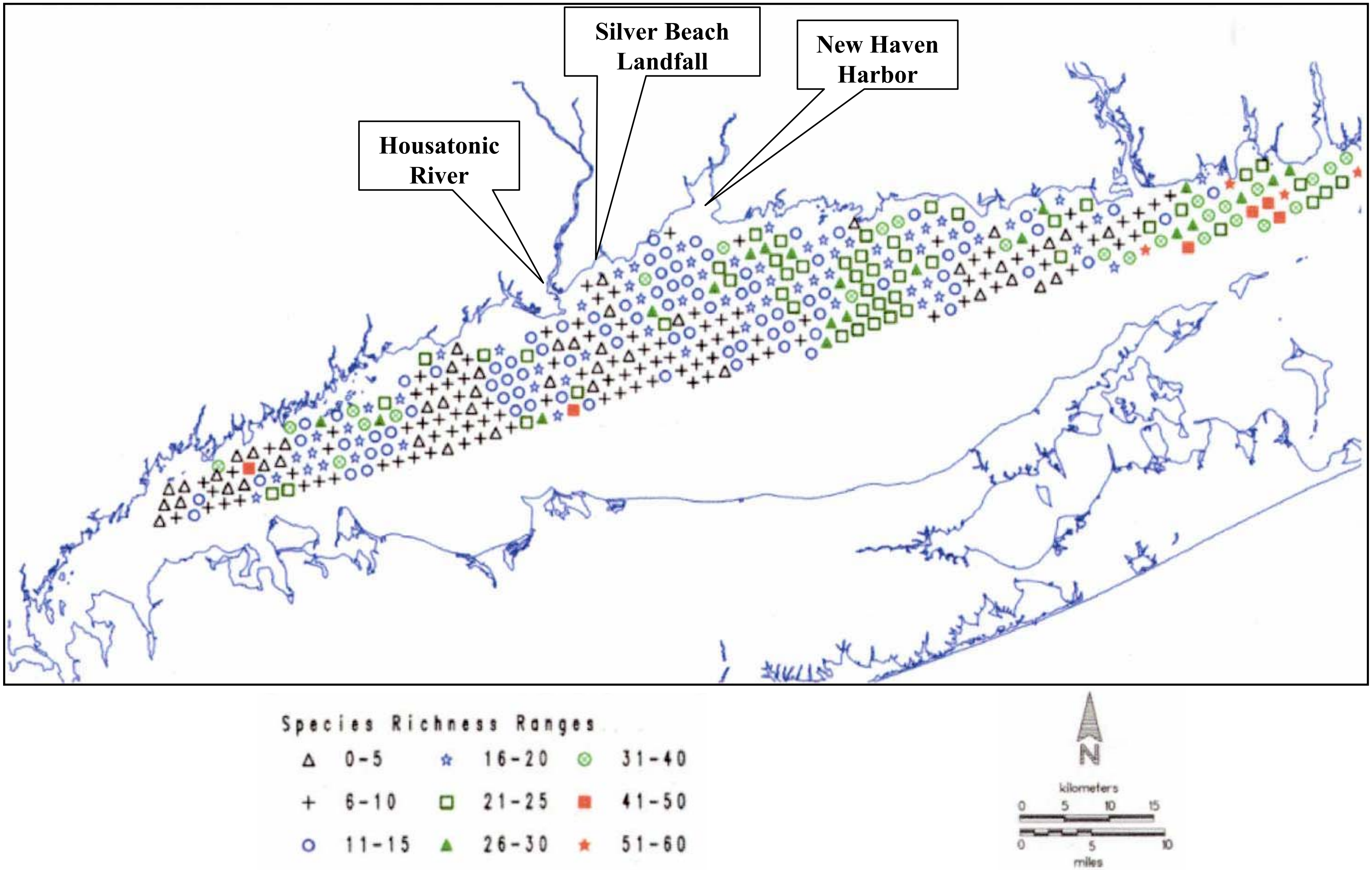
Source: USEPA 2004

Average Catch per Unit Effort for the Central Basin, 1984 to 2000

Figure 9



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Source: Zajac 1998 (Based on information in Pellegrino & Hubbard 1983)
Scale: As Indicated

Long Island Sound Benthic Species Richness

Figure 10

Location: G:\GIS-Projects\N397\NU-Locus.apr   Layout: NWI - Milford

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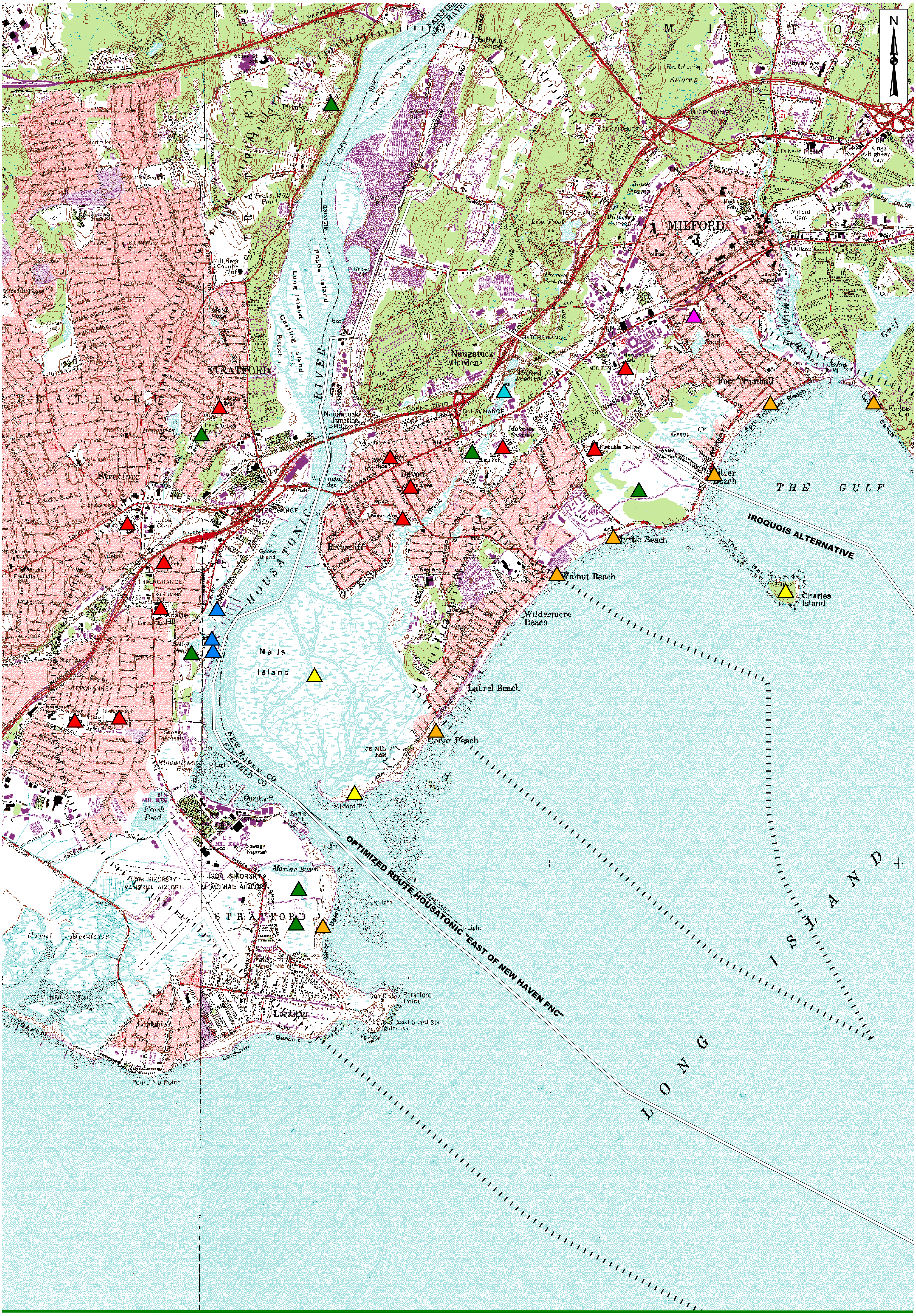
Scale: 1" = 2,500'

Source: 1) CTDEP, Roads, 1969-84
2) FWS, NWI Classification (New Haven), 1973
3) FWS, NWI Classes (Ansonia, Bridgeport, Long Hill, & Woodmont), 1980
4) FWS, NWI Classification (Milford), 1985

National Wetlands Inventory (NWI) Classification (Milford)

Figure 11

Location: G:\GIS-Projects\N397\NU-Locus.apr   Layout: Public Resources - Milford



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Scale: 1" = 3,000'

Source: 1) MAGIC, USGS DRG, 1997
2) ESS, Public Resources, 2004

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LEGEND

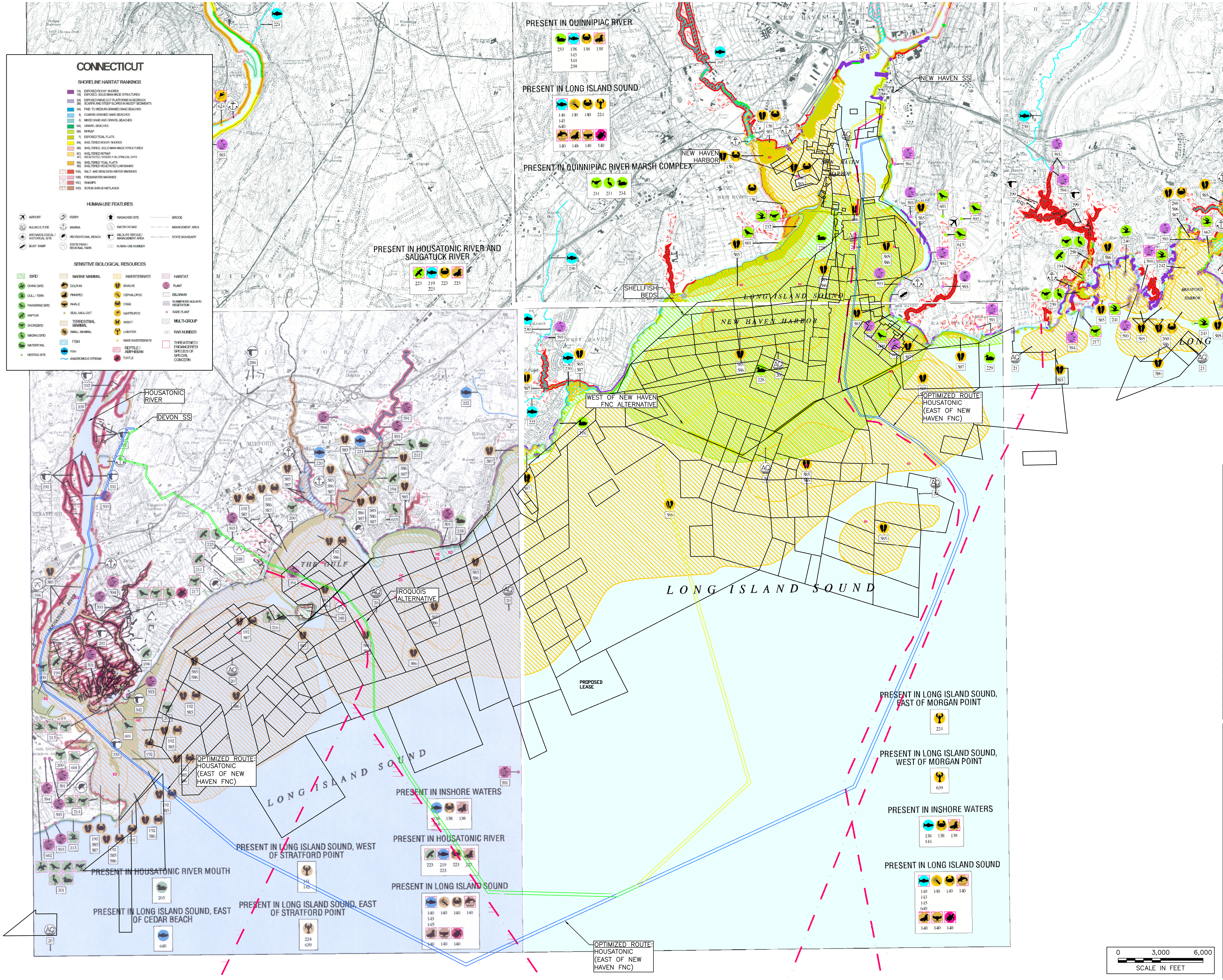
Proposed Cable Routes
1 Mile Buffer from Proposed Routes

Public Resources Classification

- Beach
- Boating Activities
- Park
- Reservoir
- School
- Wildlife Sanctuary
- Hospital

Land Use and Public Recreational Resources (Milford)

Figure 12



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345kV Cable Project

Environmental Sensitivity
and
Index Resources

PROJECT No.: N397-003.1
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TABLE A-1. Environmental Sensitivity Index Species that May be Present Along Route Alternatives Evaluated

Species	HOUSATONIC ROUTE ALTERNATIVE (EAST OF NEW HAVEN FNC)	HOUSATONIC ROUTE ALTERNATIVE (WEST OF NEW HAVEN FNC)	IROQUOIS ROUTE ALTERNATIVE (EAST OF NEW HAVEN FNC)	IROQUOIS ROUTE ALTERNATIVE (WEST OF NEW HAVEN FNC)
Finfish				
Alewife	X	X		
American eel	X	X	X	X
American Shad	X	X		
Atlantic Herring	X	X	X	X
Atlantic Menhaden	X	X	X	X
Atlantic Sturgeon[B]	X	X	X	X
Blueback herring	X	X		
Bluefish	X	X	X	X
Brown Trout (sea run)	X	X		
Butterfish	X	X	X	X
Gizzard shad	X	X		
Hickory shad	X	X		
Scup (porgy)	X	X	X	X
Sea lamprey	X	X		
Shortnose Sturgeon[F]	X	X	X	X
Skates	X	X	X	X
Striped Bass	X	X	X	X
Summer Flounder	X	X	X	X
Tautog	X	X	X	X
Weakfish	X	X	X	X
White Perch	X	X	X	X
Winter Flounder	X	X	X	X
Marine Mammals				
Atlantic white-sided dolphin	X	X	X	X
Gray Seal[A]	X	X	X	X

TABLE A-1. Continued

Species	HOUSATONIC ROUTE ALTERNATIVE (EAST OF NEW HAVEN FNC)	HOUSATONIC ROUTE ALTERNATIVE (WEST OF NEW HAVEN FNC)	IROQUOIS ROUTE ALTERNATIVE (EAST OF NEW HAVEN FNC)	IROQUOIS ROUTE ALTERNATIVE (WEST OF NEW HAVEN FNC)
Harbor porpoise[A]	X	X	X	X
Harbor Seal	X	X	X	X
Harp Seal	X	X	X	X
Hooded Seal	X	X	X	X
Humpback whales[D]	X	X	X	X
Minke whale	X	X	X	X
Saddle-backed whale	X	X	X	X
Reptile				
Green sea turtle[E]	X	X	X	X
Kemp's Ridley sea turtle[F]	X	X	X	X
Leatherback sea turtle[F]	X	X	X	X
Loggerhead sea turtle[E]	X	X	X	X
Avian Life				
American black duck	X	X	X	X
American oystercatcher[A]	X	X		
Bald eagle[G]	X	X		
Black crowned night heron			X	X
Black rail[C]	X	X		
Bufflehead	X	X	X	X
Canada goose			X	X
Canvasback	X	X	X	X
Common Tern	X	X	X	X
Great egret[B]			X	X
Goldeneye	X	X	X	X
Greater Scaup		X		X
Horned Lark[B]	X	X		
Ipswich sparrow[A]	X	X		

TABLE A-1. Continued

Species	HOUSATONIC ROUTE ALTERNATIVE (EAST OF NEW HAVEN FNC)	HOUSATONIC ROUTE ALTERNATIVE (WEST OF NEW HAVEN FNC)	IROQUOIS ROUTE ALTERNATIVE (EAST OF NEW HAVEN FNC)	IROQUOIS ROUTE ALTERNATIVE (WEST OF NEW HAVEN FNC)
Least tern[B]	X	X		
Lesser Scaup		X		X
Long eared owl[C]			X	X
Mallard	X	X	X	X
Osprey	X	X		
Piping plover[E]	X	X		
Purple martin[A]	X	X		
Saltmarsh sharp-tailed sparrow[A]	X	X		
Seaside sparrow[B]	X	X		
Shorebids	X	X	X	X
Snowy egret[B]			X	X
Wading birds	X	X	X	X
Invertebrates				
American lobster	X	X	X	X
Blue crab	X	X	X	X
Eastern oyster	X	X	X	X
Horseshoe Crab	X	X	X	X
Longfin squid	X	X	X	X
Northern Quahog	X	X	X	X
Softshell Clam	X	X	X	X

A: Special concern species (State)
B: Threatened species (State)
C: Endangered species (State)
D: Endangered species (Federal)
E: Threatened species (State & Federal)
F: Endangered species (State & Federal)
G: Endangered species (State) & Threatened species (Federal)

Reference: Based on NOAA, 2001 Environmental Sensitivity Index Maps: Bridgeport CT-6: Sherwood Point CT-5: and Norwalk South, CT-4

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 4

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Laying	Hatching	Fledging
159	American black duck					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Canvasback					X	X	X							X	X	X	-	-	-	-
	Hooded merganser					X	X	X							X	X	X	-	-	-	-
	Mallard					X	X	X							X	X	X	-	-	-	-
162	Wading birds								X	X	X	X	X	X	X			-	-	-	-
163	Great black-backed gull				1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				20 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
164	Gulls					X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	-	-	-
165	American oystercatcher	CT	S	S	1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Great black-backed gull				1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				14 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
166	Great black-backed gull				2 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				15 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
167	American oystercatcher	CT	S	S	1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Great black-backed gull				22 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Great egret	CT	S	T						X	X	X	X	X	X			MAY-AUG	-	-	-
	Herring gull				264 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
168	American oystercatcher	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Common tern	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Great black-backed gull				1 PAIR	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				5 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
169	Black-crowned night-heron				175 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Cattle egret	CT	S	S	15 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Glossy ibis	CT	S	S	5 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Great black-backed gull				15 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Great egret	CT	S	T	1 NEST					X	X	X	X	X	X			MAY-AUG	-	-	-
	Green heron				1 NEST				X	X	X	X	X	X	X	X	X	MAY-SEP	-	-	-
	Herring gull				40 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Least tern	CT	S	T						X	X	X	X					MAY-AUG	-	-	-
	Little blue heron	CT	S	S	2 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Snowy egret	CT	S	T	100 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Yellow-crowned night-heron	CT	S	S	4 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
170	American oystercatcher	CT	S	S	1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Common tern	CT	S	S	24 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Great black-backed gull				15 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				117 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Least tern	CT	S	T	1 PAIR					X	X	X	X					MAY-AUG	-	-	-
171	American oystercatcher	CT	S	S	1 PAIR	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Common tern	CT	S	S	1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Great black-backed gull				7 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				70 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
172	American oystercatcher	CT	S	S	1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Black-crowned night-heron				875 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Cattle egret	CT	S	S	21 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Glossy ibis	CT	S	S	11 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Great black-backed gull				60 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Great egret	CT	S	T	87 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Green heron				11 PAIRS				X	X	X	X	X	X	X	X	X	MAY-SEP	-	-	-
	Herring gull				2000 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Little blue heron	CT	S	S	12 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Snowy egret	CT	S	T	231 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Yellow-crowned night-heron	CT	S	S	2 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
173	Great black-backed gull				5 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				106 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
174	American oystercatcher	CT	S	S	1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Black-crowned night-heron				250 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Cattle egret	CT	S	S	1 NEST					X	X	X	X	X	X			MAY-AUG	-	-	-
	Glossy ibis	CT	S	S	1 NEST					X	X	X	X	X	X			MAY-AUG	-	-	-
	Great black-backed gull				50 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Great egret	CT	S	T	1 NEST					X	X	X	X	X	X			MAY-AUG	-	-	-
	Green heron				1 NEST				X	X	X	X	X	X	X	X	X	MAY-SEP	-	-	-
	Herring gull				376 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Little blue heron	CT	S	S	3 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Snowy egret	CT	S	T	125 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
175	Double-crested cormorant				15 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	-	-	-
	Great black-backed gull				3 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				127 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
176	American black duck					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Hooded merganser					X	X	X							X	X	X	-	-	-	-
177	American black duck					X	X	X							X	X	X	-	-	-	-
178	American black duck					X	X	X							X	X	X	-	-	-	-
	American wigeon					X	X	X							X	X	X	-	-	-	-
	Canada goose					X	X	X							X	X	X	-	-	-	-
179	American black duck					X	X	X							X	X	X	-	-	-	-
	Brant					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
180	American black duck					X	X	X							X	X	X	-	-	-	-
	Brant					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Greater scaup					X	X	X							X	X	X	-	-	-	-
	Lesser scaup					X	X	X							X	X	X	-	-	-	-
181	American black duck					X	X	X							X	X	X	-	-	-	-
	Black (common) scoter					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Oldsquaw					X	X	X							X	X	X	-	-	-	-
	Red-breasted merganser					X	X	X							X	X	X	-	-	-	-
	Surf scoter					X	X	X							X	X	X	-	-	-	-
	White-winged scoter					X	X	X							X	X	X	-	-	-	-
182	Common tern	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
183	Piping plover	CT	S/F	T/T				X	X	X	X	X	X					MAR-AUG	-	-	-
184	Common tern	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Double-crested cormorant					X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	-	-	-
	Gulls					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
190	American oystercatcher	CT	S	S	1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Common tern	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Double-crested cormorant				185 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	-	-	-
	Gulls					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Herring gull				44 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
195	American oystercatcher	CT	S	S	1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Double-crested cormorant				200 PAIRS	X	X		X	X	X	X	X		X	X	X	APR-JUL	-	-	-
	Great black-backed gull				250 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				576 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Least tern	CT	S	T						X	X	X	X					MAY-AUG	-	-	-
	Roseate tern	CT	S/F	E/E						X	X	X	X					MAY-AUG	-	-	-

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 4 (cont.)

BIOLOGICAL RESOURCES: (cont.)

FISH:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
138	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	-	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
139	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
140	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Butterfish									X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-NOV	MAY-DEC	MAY-DEC
	Scup (porgy)									X	X	X	X	X	X			JUN-JUL	JUN-AUG	JUN-AUG	MAY-OCT	MAY-OCT
	Shortnose sturgeon	CT	S/F	E/E		X	X	X	X	X	X	X	X	X	X	X	X	APR-MAY	APR-MAY	APR-AUG	JAN-DEC	JAN-DEC
	Skates					X	X	X	X	X	X	X	X	X	X	X	X	JAN-DEC	JAN-DEC	-	JAN-DEC	JAN-DEC
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-SEP	JAN-DEC	JAN-DEC
	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
143	Atlantic sturgeon	CT	S	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
144	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
145	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
187	Winter flounder				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
188	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV
189	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV
	Gizzard shad									X	X	X		X	X	X		JUN-JUN	JUN-JUL	JUN-JUL	SEP-NOV	MAY-JUL
	Rainbow smelt					X	X	X	X	X	X	X	X	X	X	X	X	FEB-MAR	MAR-MAY	APR-JUN	MAR-AUG	OCT-MAR
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-SEP	JAN-DEC	JAN-DEC
640	Tautog				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC

HABITAT:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D
591	Threatened plant			T		X	X	X	X	X	X	X	X	X	X	X	X
593	Rare plant					X	X	X	X	X	X	X	X	X	X	X	X

INVERTEBRATE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawn/Mate	Eggs	Larvae	Juveniles	Adults
138	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
140	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
	Longfin squid									X	X	X	X	X	X			MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT
141	American lobster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-NOV	JAN-DEC	-	JAN-DEC	JAN-DEC
142	American lobster				HIGH					X	X	X	X	X				-	-	MAY-SEP	-	-
161	Eastern oyster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-AUG	JUN-AUG	JUN-SEP	JAN-DEC	JAN-DEC
	Northern quahog (hard clam)					X	X	X	X	X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-SEP	JAN-DEC	JAN-DEC
585	Eastern oyster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-AUG	JUN-AUG	JUN-SEP	JAN-DEC	JAN-DEC
586	Northern quahog (hard clam)					X	X	X	X	X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-SEP	JAN-DEC	JAN-DEC
587	Softshell clam					X	X	X	X	X	X	X	X	X	X	X	X	APR-SEP	APR-SEP	APR-SEP	JAN-DEC	JAN-DEC
620	Mottled duskywing	CT	S	S					X	X	X	X	X					-	-	-	-	APR-AUG

MARINE MAMMAL:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Mating	Calving	Pupping	Molting
138	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
140	Atlantic white-sided dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor porpoise	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
	Humpback whale	CT	F	E	UNCOMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Minke whale					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Saddle-backed dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
185	Seals					X	X	X	X						X	X	X	-	-	-	-

REPTILE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Hatching	Internesting	Juveniles	Adults
140	Green sea turtle	CT	S/F	T/T	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Kemp's ridley sea turtle	CT	S/F	E/E	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Leatherback sea turtle	CT	S/F	E/E							X	X	X	X	X	X		-	-	-	-	-
	Loggerhead sea turtle	CT	S/F	T/T							X	X	X	X	X	X		-	-	-	-	-
186	Diamondback terrapin					X	X	X	X	X	X	X	X	X	X	X		APR-OCT	-	-	-	-

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HUMAN USE RESOURCES:

AQUACULTURE:

HUN#	Name	Owner	Contact	Phone
20	AQUACULTURE: SHELLFISH	CT BUREAU OF AQUACULTURE		203/874-0696

WILDLIFE REFUGE:

HUN#	Name	Owner	Contact	Phone
353	USFWS STEWART B. MCKINNEY NWR			

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. This is particularly important to recognize when considering potential impacts to protected species.

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 5

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Laying	Hatching	Fledging
177	American black duck					X	X	X							X	X	X	-	-	-	-
180	American black duck					X	X	X							X	X	X	-	-	-	-
	Brant					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Greater scaup					X	X	X							X	X	X	-	-	-	-
	Lesser scaup					X	X	X							X	X	X	-	-	-	-
181	American black duck					X	X	X							X	X	X	-	-	-	-
	Black (common) scoter					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Oldsquaw					X	X	X							X	X	X	-	-	-	-
	Red-breasted merganser					X	X	X							X	X	X	-	-	-	-
	Surf scoter					X	X	X							X	X	X	-	-	-	-
	White-winged scoter					X	X	X							X	X	X	-	-	-	-
191	American black duck					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Canada goose					X	X	X							X	X	X	-	-	-	-
	Canvasback					X	X	X							X	X	X	-	-	-	-
	Mallard					X	X	X							X	X	X	-	-	-	-
	Shorebirds								X	X	X	X	X	X	X			-	-	-	-
194	Osprey							X	X	X	X	X	X	X				MAR-SEP	-	-	-
195	American oystercatcher	CT	S	S	1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Double-crested cormorant				200 PAIRS	X	X		X	X	X	X	X		X	X	X	APR-JUL	-	-	-
	Great black-backed gull				250 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				576 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Least tern	CT	S	T						X	X	X	X					MAY-AUG	-	-	-
	Roseate tern	CT	S/F	E/E						X	X	X	X					MAY-AUG	-	-	-
196	American oystercatcher	CT	S	S	1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Black-crowned night-heron				22 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Common tern	CT	S	S	5 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Great black-backed gull				2 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Great egret	CT	S	T	12 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Herring gull				8 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Least tern	CT	S	T	40 NESTS					X	X	X	X					MAY-AUG	-	-	-
	Little blue heron	CT	S	S	1 PAIR					X	X	X	X	X	X			MAY-AUG	-	-	-
	Piping plover	CT	S/F	T/T	1 NEST			X	X	X	X	X	X					MAR-AUG	-	-	-
	Snowy egret	CT	S	T	17 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
198	Shorebirds								X	X	X	X	X	X	X			-	-	-	-
601	Horned lark	CT	S	T						X	X	X	X					MAY-AUG	-	-	-

FISH:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
138	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	-	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
140	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Butterfish									X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-NOV	MAY-DEC	MAY-DEC
	Scup (porgy)									X	X	X	X	X	X			JUN-JUL	JUN-AUG	JUN-AUG	MAY-OCT	MAY-OCT
	Shortnose sturgeon	CT	S/F	E/E		X	X	X	X	X	X	X	X	X	X	X	X	APR-MAY	APR-MAY	APR-AUG	JAN-DEC	JAN-DEC
	Skates					X	X	X	X	X	X	X	X	X	X	X	X	JAN-DEC	JAN-DEC	-	JAN-DEC	JAN-DEC
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-SEP	JAN-DEC	JAN-DEC
	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
143	Atlantic sturgeon	CT	S	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
144	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
145	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
150	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Rainbow smelt					X	X	X	X	X	X	X	X	X	X	X	X	FEB-MAR	MAR-MAY	APR-JUN	MAR-AUG	OCT-MAR
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
157	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV
	Rainbow smelt					X	X	X	X	X	X	X	X	X	X	X	X	FEB-MAR	MAR-MAY	APR-JUN	MAR-AUG	OCT-MAR
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
189	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV
	Gizzard shad									X	X	X		X	X	X		JUN-JUN	JUN-JUL	JUN-JUL	SEP-NOV	MAY-JUL
	Rainbow smelt					X	X	X	X	X	X	X	X	X	X	X	X	FEB-MAR	MAR-MAY	APR-JUN	MAR-AUG	OCT-MAR
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-SEP	JAN-DEC	JAN-DEC
197	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV
	Sea lamprey							X	X	X					X	X		MAR-MAY	-	-	OCT-NOV	MAR-MAY
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
640	Tautog				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC

HABITAT:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D
591	Threatened plant			T		X	X	X	X	X	X	X	X	X	X	X	X
593	Rare plant					X	X	X	X	X	X	X	X	X	X	X	X
594	Endangered plant			E		X	X	X	X	X	X	X	X	X	X	X	X

INVERTEBRATE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawn/Mate	Eggs	Larvae	Juveniles	Adults
138	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
140	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
	Longfin squid									X	X	X	X	X	X			MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT
141	American lobster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-NOV	JAN-DEC	-	JAN-DEC	JAN-DEC
142	American lobster				HIGH					X	X	X	X	X				-	-	MAY-SEP	-	-
161	Eastern oyster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-AUG	JUN-AUG	JUN-SEP	JAN-DEC	JAN-DEC
	Northern quahog (hard clam)					X	X	X	X	X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-SEP	JAN-DEC	JAN-DEC
192	Horseshoe crab				MEDIUM	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	MAY-JUL	MAY-JUL	JAN-DEC	APR-JUL
585	Eastern oyster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-AUG	JUN-AUG	JUN-SEP	JAN-DEC	JAN-DEC
586	Northern quahog (hard clam)					X	X	X	X	X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-SEP	JAN-DEC	JAN-DEC
587	Softshell clam					X	X	X	X	X	X	X	X	X	X	X	X	APR-SEP	APR-SEP	APR-SEP	JAN-DEC	JAN-DEC
634	Tiger beetle	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 5 (cont.)

BIOLOGICAL RESOURCES: (cont.)

MARINE MAMMAL:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Mating	Calving	Pupping	Molting
138	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
140	Atlantic white-sided dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor porpoise	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
	Humpback whale	CT	F	E	UNCOMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Minke whale					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Saddle-backed dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-

REPTILE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Hatching	Internesting	Juveniles	Adults
140	Green sea turtle	CT	S/F	T/T	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Kemp's ridley sea turtle	CT	S/F	E/E	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Leatherback sea turtle	CT	S/F	E/E							X	X	X	X	X	X		-	-	-	-	-
	Loggerhead sea turtle	CT	S/F	T/T							X	X	X	X	X	X		-	-	-	-	-
193	Diamondback terrapin					X	X	X	X	X	X	X	X	X	X	X		APR-OCT	-	-	-	-

HUMAN USE RESOURCES:

AQUACULTURE:

HUN#	Name	Owner	Contact	Phone
20	AQUACULTURE: SHELLFISH	CT BUREAU OF AQUACULTURE		203/874-0696

PARK:

HUN#	Name	Owner	Contact	Phone
247	SHERWOOD ISLAND STATE PARK			

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. This is particularly important to recognize when considering potential impacts to protected species.

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 6

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Laying	Hatching	Fledging
198	Shorebirds								X	X	X	X	X	X	X			-	-	-	-
199	Peregrine falcon	CT	S	E					X	X	X	X						APR-JUL	-	-	-
200	Common tern	CT	S	S	35 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Herring gull				1 PAIR	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Horned lark	CT	S	T						X	X	X	X					MAY-AUG	-	-	-
	Ipswich sparrow	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Least tern	CT	S	T	137 NESTS					X	X	X	X					MAY-AUG	-	-	-
	Piping plover	CT	S/F	T/T	11 NESTS			X	X	X	X	X	X					MAR-AUG	-	-	-
	Roseate tern	CT	S/F	E/E						X	X	X	X					MAY-AUG	-	-	-
	Spotted sandpiper				1 PAIR	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
201	American bittern	CT	S	E					X	X	X	X	X					MAY-AUG	-	-	-
	American black duck					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Common moorhen	CT	S	E						X	X	X	X	X	X	X		MAY-JUL	-	-	-
	Gadwall					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Green-winged teal					X	X	X							X	X	X	-	-	-	-
	Least bittern	CT	S	T					X	X	X	X	X	X				MAY-JUL	-	-	-
	Mallard					X	X	X							X	X	X	-	-	-	-
	Northern harrier	CT	S	E					X	X	X	X						APR-JUL	-	-	-
	Pied-billed grebe	CT	S	E		X	X	X	X	X	X	X	X	X	X	X	X	APR-MAY	-	-	-
	Rails								X	X	X	X	X					MAY-AUG	-	-	-
	Saltmarsh sharp-tailed sparrow	CT	S	S					X	X	X	X	X	X	X	X		APR-JUL	-	-	-
	Savannah sparrow	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Seaside sparrow	CT	S	S				X	X	X	X	X	X	X	X	X		APR-JUL	-	-	-
	Upland sandpiper	CT	S	E									X	X	X			AUG-OCT	-	-	-
	Willet	CT	S	S						X	X	X	X	X	X			MAY-AUG	-	-	-
202	Shorebirds				HIGH								X	X	X			-	-	-	-
203	Shorebirds								X	X	X	X						-	-	-	-
205	American black duck					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Canada goose					X	X	X							X	X	X	-	-	-	-
	Canvasback					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Green-winged teal					X	X	X							X	X	X	-	-	-	-
	Mallard					X	X	X							X	X	X	-	-	-	-
209	Shorebirds									X	X	X	X	X				-	-	-	-
223	Bald eagle	CT	S/F	E/T		X	X	X							X	X	X	-	-	-	-
601	Horned lark	CT	S	T						X	X	X	X					MAY-AUG	-	-	-
603	Sedge wren	CT	S	E					X	X	X	X						APR-JUL	-	-	-
605	American bittern	CT	S	E					X	X	X	X	X					MAY-AUG	-	-	-
608	Ipswich sparrow	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
640	Saltmarsh sharp-tailed sparrow	CT	S	S				X	X	X	X	X	X	X	X	X		MAR-JUL	-	-	-

FISH:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
138	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	-	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
139	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
140	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Butterfish									X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-NOV	MAY-DEC	MAY-DEC
	Scup (porgy)									X	X	X	X	X	X			JUN-JUL	JUN-AUG	JUN-AUG	MAY-OCT	MAY-OCT
	Shortnose sturgeon	CT	S/F	E/E		X	X	X	X	X	X	X	X	X	X	X	X	APR-MAY	APR-MAY	APR-AUG	JAN-DEC	JAN-DEC
	Skates					X	X	X	X	X	X	X	X	X	X	X	X	JAN-DEC	JAN-DEC	-	JAN-DEC	JAN-DEC
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-SEP	JAN-DEC	JAN-DEC
	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
143	Atlantic sturgeon	CT	S	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
144	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
145	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
204	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
219	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	American shad							X	X	X	X	X		X	X	X		MAR-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAR-JUL
	Atlantic sturgeon	CT	S	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV
	Gizzard shad									X	X	X		X	X	X		JUN-JUN	JUN-JUL	JUN-JUL	SEP-NOV	MAY-JUL
	Hickory shad								X	X								-	-	-	APR-MAY	APR-MAY
	Sea lamprey							X	X	X					X	X		MAR-MAY	-	-	OCT-NOV	MAR-MAY
	White perch				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
223	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV

HABITAT:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D
591	Threatened plant			T		X	X	X	X	X	X	X	X	X	X	X	X
593	Rare plant					X	X	X	X	X	X	X	X	X	X	X	X
594	Endangered plant			E		X	X	X	X	X	X	X	X	X	X	X	X
640	Rare plant					X	X	X	X	X	X	X	X	X	X	X	X

INVERTEBRATE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawn/Mate	Eggs	Larvae	Juveniles	Adults
138	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
140	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
	Longfin squid									X	X	X	X	X	X			MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT
141	American lobster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-NOV	JAN-DEC	-	JAN-DEC	JAN-DEC
142	American lobster				HIGH					X	X	X	X	X				-	-	MAY-SEP	-	-
161	Eastern oyster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-AUG	JUN-AUG	JUN-SEP	JAN-DEC	JAN-DEC
	Northern quahog (hard clam)					X	X	X	X	X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-SEP	JAN-DEC	JAN-DEC
192	Horseshoe crab				MEDIUM	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	MAY-JUL	MAY-JUL	JAN-DEC	APR-JUL
207	Horseshoe crab				VERY HIGH	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	MAY-JUL	MAY-JUL	JAN-DEC	APR-JUL
208	Horseshoe crab				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	MAY-JUL	MAY-JUL	JAN-DEC	APR-JUL
223	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 6 (cont.)

BIOLOGICAL RESOURCES: (cont.)

INVERTEBRATE: (cont.)

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawn/Mate	Eggs	Larvae	Juveniles	Adults
585	Eastern oyster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-AUG	JUN-AUG	JUN-SEP	JAN-DEC	JAN-DEC
586	Northern quahog (hard clam)					X	X	X	X	X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-SEP	JAN-DEC	JAN-DEC
587	Softshell clam					X	X	X	X	X	X	X	X	X	X	X	X	APR-SEP	APR-SEP	APR-SEP	JAN-DEC	JAN-DEC

MARINE MAMMAL:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Mating	Calving	Pupping	Molting
138	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
140	Atlantic white-sided dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor porpoise	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
	Humpback whale	CT	F	E	UNCOMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Minke whale					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Saddle-backed dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
223	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-

REPTILE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Hatching	Internesting	Juveniles	Adults
140	Green sea turtle	CT	S/F	T/T	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Kemp's ridley sea turtle	CT	S/F	E/E	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Leatherback sea turtle	CT	S/F	E/E							X	X	X	X	X	X		-	-	-	-	-
	Loggerhead sea turtle	CT	S/F	T/T							X	X	X	X	X	X		-	-	-	-	-
193	Diamondback terrapin					X	X	X	X	X	X	X	X	X	X	X		APR-OCT	-	-	-	-

HUMAN USE RESOURCES:

AQUACULTURE:

HUN#	Name	Owner	Contact	Phone
20	AQUACULTURE: SHELLFISH	CT BUREAU OF AQUACULTURE		203/874-0696

PARK:

HUN#	Name	Owner	Contact	Phone
194	AMERICAN SHAKESPEARE STATE PARK			
196	BEARDSLEY STATE PARK			

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. This is particularly important to recognize when considering potential impacts to protected species.

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 7

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Laying	Hatching	Fledging
194	Osprey							X	X	X	X	X	X	X				MAR-SEP	-	-	-
201	American bittern	CT	S	E					X	X	X	X	X					MAY-AUG	-	-	-
	American black duck					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Common moorhen	CT	S	E						X	X	X	X	X	X	X		MAY-JUL	-	-	-
	Gadwall					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Green-winged teal					X	X	X							X	X	X	-	-	-	-
	Least bittern	CT	S	T					X	X	X	X	X	X				MAY-JUL	-	-	-
	Mallard					X	X	X							X	X	X	-	-	-	-
	Northern harrier	CT	S	E					X	X	X	X						APR-JUL	-	-	-
	Pied-billed grebe	CT	S	E		X	X	X	X	X	X	X	X	X	X	X	X	APR-MAY	-	-	-
	Rails								X	X	X	X	X					MAY-AUG	-	-	-
	Saltmarsh sharp-tailed sparrow	CT	S	S					X	X	X	X	X	X	X	X		APR-JUL	-	-	-
	Savannah sparrow	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Seaside sparrow	CT	S	S				X	X	X	X	X	X	X	X	X		APR-JUL	-	-	-
	Upland sandpiper	CT	S	E									X	X	X			AUG-OCT	-	-	-
	Willet	CT	S	S						X	X	X	X	X	X			MAY-AUG	-	-	-
205	American black duck					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Canada goose					X	X	X							X	X	X	-	-	-	-
	Canvasback					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Green-winged teal					X	X	X							X	X	X	-	-	-	-
	Mallard					X	X	X							X	X	X	-	-	-	-
209	Shorebirds									X	X	X	X	X				-	-	-	-
210	American oystercatcher	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Black rail	CT	S	E					X	X	X	X	X	X	X	X		APR-JUN	-	-	-
	Purple martin	CT	S	S				X	X	X	X	X	X	X	X	X		MAR-JUL	-	-	-
	Saltmarsh sharp-tailed sparrow	CT	S	S					X	X	X	X	X	X	X	X		APR-JUL	-	-	-
	Seaside sparrow	CT	S	S				X	X	X	X	X	X	X	X	X		APR-JUL	-	-	-
	Wading birds								X	X	X	X	X	X	X			-	-	-	-
	Yellow-crowned night-heron	CT	S	S						X	X	X	X	X	X			MAY-AUG	-	-	-
211	Long-eared owl	CT	S	E					X	X	X	X						APR-JUL	-	-	-
212	American black duck					X	X	X							X	X	X	-	-	-	-
	Canada goose					X	X	X							X	X	X	-	-	-	-
	Canvasback					X	X	X							X	X	X	-	-	-	-
	Green-winged teal					X	X	X							X	X	X	-	-	-	-
	Wading birds								X	X	X	X	X	X	X			-	-	-	-
213	Least tern	CT	S	T	34 PAIRS					X	X	X	X					MAY-AUG	-	-	-
214	Least tern	CT	S	T	3 NESTS					X	X	X	X					MAY-AUG	-	-	-
	Piping plover	CT	S/F	T/T	2 NESTS			X	X	X	X	X	X					MAR-AUG	-	-	-
215	Ipswich sparrow	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Least tern	CT	S	T	70 NESTS					X	X	X	X					MAY-AUG	-	-	-
	Piping plover	CT	S/F	T/T	5 NESTS			X	X	X	X	X	X					MAR-AUG	-	-	-
216	Black-crowned night-heron				200 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Canada goose				2 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	-	-	-
	Great egret	CT	S	T	27 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Snowy egret	CT	S	T	75 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
217	Piping plover	CT	S/F	T/T				X	X	X	X	X	X					MAR-AUG	-	-	-
218	American black duck					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Greater scaup					X	X	X							X	X	X	-	-	-	-
	Lesser scaup					X	X	X							X	X	X	-	-	-	-
223	Bald eagle	CT	S/F	E/T		X	X	X							X	X	X	-	-	-	-
225	Long-eared owl	CT	S	E					X	X	X	X						APR-JUL	-	-	-
	Wading birds								X	X	X	X	X	X	X			MAY-AUG	-	-	-
601	Horned lark	CT	S	T						X	X	X	X					MAY-AUG	-	-	-
635	Yellow-crowned night-heron	CT	S	S						X	X	X	X	X	X			MAY-AUG	-	-	-

FISH:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
138	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	-	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
140	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Butterfish									X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-NOV	MAY-DEC	MAY-DEC
	Scup (porgy)									X	X	X	X	X	X			JUN-JUL	JUN-AUG	JUN-AUG	MAY-OCT	MAY-OCT
	Shortnose sturgeon	CT	S/F	E/E		X	X	X	X	X	X	X	X	X	X	X	X	APR-MAY	APR-MAY	APR-AUG	JAN-DEC	JAN-DEC
	Skates					X	X	X	X	X	X	X	X	X	X	X	X	JAN-DEC	JAN-DEC	-	JAN-DEC	JAN-DEC
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-SEP	JAN-DEC	JAN-DEC
	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
143	Atlantic sturgeon	CT	S	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
144	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
145	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
219	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	American shad							X	X	X	X	X		X	X	X		MAR-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAR-JUL
	Atlantic sturgeon	CT	S	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN	-	-	APR-JUN	APR-JUN
																		OCT-NOV			OCT-NOV	OCT-NOV
	Gizzard shad									X	X	X		X	X	X		JUN-JUN	JUN-JUL	JUN-JUL	SEP-NOV	MAY-JUL
	Hickory shad								X	X								-	-	-	APR-MAY	APR-MAY
	Sea lamprey							X	X	X					X	X		MAR-MAY	-	-	OCT-NOV	MAR-MAY
	White perch				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
220	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Brown trout (sea run)								X	X	X				X	X		APR-JUN	-	-	APR-JUN	APR-JUN
																		OCT-NOV			OCT-NOV	OCT-NOV
221	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Brown trout (sea run)								X	X	X				X	X		APR-JUN	-	-	APR-JUN	APR-JUN
																		OCT-NOV			OCT-NOV	OCT-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
222	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
223	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
640	Tautog				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 7 (cont.)

BIOLOGICAL RESOURCES: (cont.)

HABITAT:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D
591	Threatened plant			T		X	X	X	X	X	X	X	X	X	X	X	X
593	Rare plant					X	X	X	X	X	X	X	X	X	X	X	X
594	Endangered plant			E		X	X	X	X	X	X	X	X	X	X	X	X
642	Rare plant					X	X	X	X	X	X	X	X	X	X	X	X
	Threatened plant			T		X	X	X	X	X	X	X	X	X	X	X	X

INVERTEBRATE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawn/Mate	Eggs	Larvae	Juveniles	Adults
138	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
140	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
	Longfin squid									X	X	X	X	X	X			MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT
141	American lobster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-NOV	JAN-DEC	-	JAN-DEC	JAN-DEC
142	American lobster				HIGH					X	X	X	X	X				-	-	MAY-SEP	-	-
192	Horseshoe crab				MEDIUM	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	MAY-JUL	MAY-JUL	JAN-DEC	APR-JUL
223	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
224	American lobster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-NOV	JAN-DEC	MAY-SEP	JAN-DEC	JAN-DEC
585	Eastern oyster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-AUG	JUN-AUG	JUN-SEP	JAN-DEC	JAN-DEC
586	Northern quahog (hard clam)					X	X	X	X	X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-SEP	JAN-DEC	JAN-DEC
587	Softshell clam					X	X	X	X	X	X	X	X	X	X	X	X	APR-SEP	APR-SEP	APR-SEP	JAN-DEC	JAN-DEC
639	American lobster				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	JUN-NOV	JAN-DEC	MAY-SEP	JAN-DEC	JAN-DEC

MARINE MAMMAL:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Mating	Calving	Pupping	Molting
138	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
140	Atlantic white-sided dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor porpoise	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
	Humpback whale	CT	F	E	UNCOMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Minke whale					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Saddle-backed dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
223	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-

REPTILE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Hatching	Internesting	Juveniles	Adults
140	Green sea turtle	CT	S/F	T/T	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Kemp's ridley sea turtle	CT	S/F	E/E	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Leatherback sea turtle	CT	S/F	E/E							X	X	X	X	X	X		-	-	-	-	-
	Loggerhead sea turtle	CT	S/F	T/T							X	X	X	X	X	X		-	-	-	-	-
210	Diamondback terrapin					X	X	X	X	X	X	X	X	X	X	X		APR-OCT	-	-	-	-

HUMAN USE RESOURCES:

AQUACULTURE:

HUN#	Name	Owner	Contact	Phone
20	AQUACULTURE: SHELLFISH	CT BUREAU OF AQUACULTURE		203/874-8496

PARK:

HUN#	Name	Owner	Contact	Phone
194	AMERICAN SHAKESPEARE STATE PARK			
248	SILVER SANDS STATE PARK			

WILDLIFE REFUGE:

HUN#	Name	Owner	Contact	Phone
284	BALDWIN MARSH WILDLIFE AREA			
292	CHARLES E. WHEELER WILDLIFE AREA			
332	POPES ISLAND WILDLIFE AREA			
342	SMITH-HUBBELL WILDLIFE SANCTUARY			
353	USFWS STEWART B. MCKINNEY NWR			

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. This is particularly important to recognize when considering potential impacts to protected species.

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 8

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Laying	Hatching	Fledging
209	Shorebirds									X	X	X	X	X				-	-	-	-
223	Bald eagle	CT	S/F	E/T		X	X	X							X	X	X	-	-	-	-

FISH:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
197	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN	-	-	APR-JUN	APR-JUN
																		OCT-NOV			OCT-NOV	OCT-NOV
	Sea lamprey							X	X	X					X	X		MAR-MAY	-	-	OCT-NOV	MAR-MAY
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
219	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	American shad							X	X	X	X	X		X	X	X		MAR-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAR-JUL
	Atlantic sturgeon	CT	S	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN	-	-	APR-JUN	APR-JUN
																		OCT-NOV			OCT-NOV	OCT-NOV
	Gizzard shad									X	X	X		X	X	X		JUN-JUN	JUN-JUL	JUN-JUL	SEP-NOV	MAY-JUL
	Hickory shad								X	X								-	-	-	APR-MAY	APR-MAY
	Sea lamprey							X	X	X					X	X		MAR-MAY	-	-	OCT-NOV	MAR-MAY
	White perch				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
221	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Brown trout (sea run)								X	X	X				X	X		APR-JUN	-	-	APR-JUN	APR-JUN
																		OCT-NOV			OCT-NOV	OCT-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
223	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV

HABITAT:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D
591	Threatened plant			T		X	X	X	X	X	X	X	X	X	X	X	X
593	Rare plant					X	X	X	X	X	X	X	X	X	X	X	X

INVERTEBRATE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawn/Mate	Eggs	Larvae	Juveniles	Adults
223	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
624	Turret snail	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-

MARINE MAMMAL:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Mating	Calving	Pupping	Molting
223	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-

HUMAN USE RESOURCES:

PARK:

HUN#	Name	Owner	Contact	Phone
235	INDIAN WELL STATE PARK			

WILDLIFE REFUGE:

HUN#	Name	Owner	Contact	Phone
292	CHARLES E. WHEELER WILDLIFE AREA			
297	DUCK ISLAND NATIONAL AREA PRESERVE			

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. This is particularly important to recognize when considering potential impacts to protected species.

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 9

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Laying	Hatching	Fledging
219	American black duck					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Greater scaup					X	X	X							X	X	X	-	-	-	-
	Lesser scaup					X	X	X							X	X	X	-	-	-	-
228	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Greater scaup					X	X	X							X	X	X	-	-	-	-
	Lesser scaup					X	X	X							X	X	X	-	-	-	-
229	American black duck					X	X	X							X	X	X	-	-	-	-
	Black (common) scoter					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Greater scaup				HIGH	X	X	X							X	X	X	-	-	-	-
	Lesser scaup				HIGH	X	X	X							X	X	X	-	-	-	-
	Surf scoter					X	X	X							X	X	X	-	-	-	-
	White-winged scoter					X	X	X							X	X	X	-	-	-	-
608	Ipswich sparrow	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-

FISH:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
138	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	-	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
140	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Butterfish									X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-NOV	MAY-DEC	MAY-DEC
	Scup (porgy)									X	X	X	X	X	X			JUN-JUL	JUN-AUG	JUN-AUG	MAY-OCT	MAY-OCT
	Shortnose sturgeon	CT	S/F	E/E		X	X	X	X	X	X	X	X	X	X	X	X	APR-MAY	APR-MAY	APR-AUG	JAN-DEC	JAN-DEC
	Skates					X	X	X	X	X	X	X	X	X	X	X	X	JAN-DEC	JAN-DEC	-	JAN-DEC	JAN-DEC
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-SEP	JAN-DEC	JAN-DEC
	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
143	Atlantic sturgeon	CT	S	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
144	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
145	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
222	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
230	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
640	Tautog				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC

HABITAT:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D
591	Threatened plant			T		X	X	X	X	X	X	X	X	X	X	X	X
593	Rare plant					X	X	X	X	X	X	X	X	X	X	X	X

INVERTEBRATE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawn/Mate	Eggs	Larvae	Juveniles	Adults
138	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
140	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
	Longfin squid									X	X	X	X	X	X			MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT
224	American lobster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-NOV	JAN-DEC	MAY-SEP	JAN-DEC	JAN-DEC
595	Eastern oyster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-AUG	JUN-AUG	JUN-SEP	JAN-DEC	JAN-DEC
596	Northern quahog (hard clam)					X	X	X	X	X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-SEP	JAN-DEC	JAN-DEC
597	Softshell clam					X	X	X	X	X	X	X	X	X	X	X	X	APR-SEP	APR-SEP	APR-SEP	JAN-DEC	JAN-DEC
639	American lobster				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	JUN-NOV	JAN-DEC	MAY-SEP	JAN-DEC	JAN-DEC

MARINE MAMMAL:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Mating	Calving	Pupping	Molting
138	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
140	Atlantic white-sided dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor porpoise	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
	Humpback whale	CT	F	E	UNCOMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Minke whale					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Saddle-backed dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-

REPTILE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Hatching	Internesting	Juveniles	Adults
140	Green sea turtle	CT	S/F	T/T	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Kemp's ridley sea turtle	CT	S/F	E/E	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Leatherback sea turtle	CT	S/F	E/E							X	X	X	X	X	X		-	-	-	-	-
	Loggerhead sea turtle	CT	S/F	T/T							X	X	X	X	X	X		-	-	-	-	-

HUMAN USE RESOURCES:

AQUACULTURE:

HUN#	Name	Owner	Contact	Phone
20	AQUACULTURE: SHELLFISH	CT BUREAU OF AQUACULTURE		203/874-0696

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. This is particularly important to recognize when considering potential impacts to protected species.

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 10

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Laying	Hatching	Fledging
194	Osprey							X	X	X	X	X	X	X				MAR-SEP	-	-	-
228	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Greater scaup					X	X	X							X	X	X	-	-	-	-
	Lesser scaup					X	X	X							X	X	X	-	-	-	-
231	Shorebirds								X	X	X	X	X	X	X			-	-	-	-
	Wading birds								X	X	X	X	X	X	X			-	-	-	-
232	Black skimmer									X	X	X	X	X	X			MAY-SEP	-	-	-
	Common tern	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Least tern	CT	S	T	400 NESTS					X	X	X	X					MAY-AUG	-	-	-
	Piping plover	CT	S/F	T/T	10 NESTS			X	X	X	X	X	X					MAR-AUG	-	-	-
233	American black duck					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Canvasback					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Mallard					X	X	X							X	X	X	-	-	-	-
234	American black duck					X	X	X							X	X	X	-	-	-	-
	Canada goose					X	X	X							X	X	X	-	-	-	-
	Canvasback					X	X	X							X	X	X	-	-	-	-
	Green-winged teal					X	X	X							X	X	X	-	-	-	-
	Mallard					X	X	X							X	X	X	-	-	-	-
235	Clapper rail					X	X		X	X	X	X	X				X	APR-AUG	-	-	-
	Common moorhen	CT	S	E		X	X	X							X	X	X	-	-	-	-
	King rail	CT	S	E				X	X	X	X	X	X	X	X	X		MAR-JUN	-	-	-
	Virginia rail					X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUN	-	-	-
	Waterfowl					X	X	X							X	X	X	-	-	-	-
590	Least tern	CT	S	T						X	X	X	X					MAY-AUG	-	-	-
592	Savannah sparrow	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
595	Northern harrier	CT	S	E					X	X	X	X						APR-JUL	-	-	-
601	Horned lark	CT	S	T						X	X	X	X					MAY-AUG	-	-	-
612	Willet	CT	S	S						X	X	X	X	X	X			MAY-AUG	-	-	-
615	Grasshopper sparrow	CT	S	E				X	X	X	X	X	X	X	X	X		APR-NOV	-	-	-
618	Seaside sparrow	CT	S	S				X	X	X	X	X	X	X	X	X		APR-JUL	-	-	-

FISH:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
138	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	-	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
140	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Butterfish									X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-NOV	MAY-DEC	MAY-DEC
	Scup (porgy)									X	X	X	X	X	X			JUN-JUL	JUN-AUG	JUN-AUG	MAY-OCT	MAY-OCT
	Shortnose sturgeon	CT	S/F	E/E		X	X	X	X	X	X	X	X	X	X	X	X	APR-MAY	APR-MAY	APR-AUG	JAN-DEC	JAN-DEC
	Skates					X	X	X	X	X	X	X	X	X	X	X	X	JAN-DEC	JAN-DEC	-	JAN-DEC	JAN-DEC
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-SEP	JAN-DEC	JAN-DEC
	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
143	Atlantic sturgeon	CT	S	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
144	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
197	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV
	Sea lamprey							X	X	X					X	X		MAR-MAY	-	-	OCT-NOV	MAR-MAY
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
230	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
236	Sea lamprey							X	X	X					X	X		MAR-MAY	-	-	OCT-NOV	MAR-MAY
237	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	American shad							X	X	X	X	X		X	X	X		MAR-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAR-JUL
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
238	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	American shad							X	X	X	X	X		X	X	X		MAR-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAR-JUL
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV
	Gizzard shad									X	X	X		X	X	X		JUN-JUN	JUN-JUL	JUN-JUL	SEP-NOV	MAY-JUL
	Rainbow smelt					X	X	X	X	X	X	X	X	X	X	X	X	FEB-MAR	MAR-MAY	APR-JUN	MAR-AUG	OCT-MAR
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
239	Winter flounder				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
640	Tautog				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC

HABITAT:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D
591	Threatened plant			T		X	X	X	X	X	X	X	X	X	X	X	X
593	Rare plant					X	X	X	X	X	X	X	X	X	X	X	X
594	Endangered plant			E		X	X	X	X	X	X	X	X	X	X	X	X

INVERTEBRATE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawn/Mate	Eggs	Larvae	Juveniles	Adults
138	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
140	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
	Longfin squid									X	X	X	X	X	X			MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT
158	Horseshoe crab				VERY HIGH	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	MAY-JUL	MAY-JUL	JAN-DEC	APR-JUL
224	American lobster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-NOV	JAN-DEC	MAY-SEP	JAN-DEC	JAN-DEC
585	Eastern oyster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-AUG	JUN-AUG	JUN-SEP	JAN-DEC	JAN-DEC
586	Northern quahog (hard clam)					X	X	X	X	X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-SEP	JAN-DEC	JAN-DEC
587	Softshell clam					X	X	X	X	X	X	X	X	X	X	X	X	APR-SEP	APR-SEP	APR-SEP	JAN-DEC	JAN-DEC

MARINE MAMMAL:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Mating	Calving	Pupping	Molting
138	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 10 (cont.)

BIOLOGICAL RESOURCES: (cont.)

MARINE MAMMAL: (cont.)

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Mating	Calving	Pupping	Molting
140	Atlantic white-sided dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor porpoise	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
	Humpback whale	CT	F	E	UNCOMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Minke whale					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Saddle-backed dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-

REPTILE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Hatching	Internesting	Juveniles	Adults
140	Green sea turtle	CT	S/F	T/T	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Kemp's ridley sea turtle	CT	S/F	E/E	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Leatherback sea turtle	CT	S/F	E/E							X	X	X	X	X	X		-	-	-	-	-
	Loggerhead sea turtle	CT	S/F	T/T							X	X	X	X	X	X		-	-	-	-	-
235	Diamondback terrapin					X	X	X	X	X	X	X	X	X	X	X		APR-OCT	-	-	-	-

TERRESTRIAL MAMMAL:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D
235	Muskrat					X	X	X	X	X	X	X	X	X	X	X	X

HUMAN USE RESOURCES:

AQUACULTURE:

HUN#	Name	Owner	Contact	Phone
20	AQUACULTURE: SHELLFISH	CT BUREAU OF AQUACULTURE		203/874-8496

PARK:

HUN#	Name	Owner	Contact	Phone
251	WEST ROCK RIDGE STATE PARK			

WILDLIFE REFUGE:

HUN#	Name	Owner	Contact	Phone
333	QUINNIPIAC RIVER MARSH WILDLIFE AREA			

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. This is particularly important to recognize when considering potential impacts to protected species.

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 11

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Laying	Hatching	Fledging
194	Osprey							X	X	X	X	X	X	X				MAR-SEP	-	-	-
217	Piping plover	CT	S/F	T/T				X	X	X	X	X	X					MAR-AUG	-	-	-
229	American black duck					X	X	X							X	X	X	-	-	-	-
	Black (common) scoter					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Greater scaup				HIGH	X	X	X							X	X	X	-	-	-	-
	Lesser scaup				HIGH	X	X	X							X	X	X	-	-	-	-
	Surf scoter					X	X	X							X	X	X	-	-	-	-
	White-winged scoter					X	X	X							X	X	X	-	-	-	-
231	Shorebirds								X	X	X	X	X	X	X			-	-	-	-
	Wading birds								X	X	X	X	X	X	X			-	-	-	-
233	American black duck					X	X	X							X	X	X	-	-	-	-
	Bufflehead					X	X	X							X	X	X	-	-	-	-
	Canvasback					X	X	X							X	X	X	-	-	-	-
	Goldeneye					X	X	X							X	X	X	-	-	-	-
	Mallard					X	X	X							X	X	X	-	-	-	-
234	American black duck					X	X	X							X	X	X	-	-	-	-
	Canada goose					X	X	X							X	X	X	-	-	-	-
	Canvasback					X	X	X							X	X	X	-	-	-	-
	Green-winged teal					X	X	X							X	X	X	-	-	-	-
	Mallard					X	X	X							X	X	X	-	-	-	-
235	Clapper rail					X	X		X	X	X	X	X				X	APR-AUG	-	-	-
	Common moorhen	CT	S	E		X	X	X							X	X	X	-	-	-	-
	King rail	CT	S	E				X	X	X	X	X	X	X	X	X		MAR-JUN	-	-	-
	Virginia rail					X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUN	-	-	-
	Waterfowl					X	X	X							X	X	X	-	-	-	-
240	Great black-backed gull				3 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				38 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
241	Common tern	CT	S	S	13 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Herring gull				10 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
242	Common tern	CT	S	S	53 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Great black-backed gull				1 PAIR	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Roseate tern	CT	S/F	E/E	1 NEST					X	X	X	X					MAY-AUG	-	-	-
243	Great black-backed gull				1 PAIR	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				2 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
244	Green heron				1 NEST				X	X	X	X	X	X	X	X	X	MAY-SEP	-	-	-
	Herring gull				15 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
245	Double-crested cormorant				44 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	-	-	-
	Great black-backed gull				24 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				200 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
246	Great black-backed gull				4 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				10 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
247	Double-crested cormorant				9 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	-	-	-
	Great black-backed gull				17 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				25 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
248	Double-crested cormorant				26 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	-	-	-
	Great black-backed gull				28 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				53 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
249	Black-crowned night-heron				30 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Great black-backed gull				2 PAIR	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Great blue heron				5 NESTS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Great egret	CT	S	T	2 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
	Green heron				2 PAIRS				X	X	X	X	X	X	X	X	X	MAY-SEP	-	-	-
	Herring gull				150 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Snowy egret	CT	S	T	100 PAIRS					X	X	X	X	X	X			MAY-AUG	-	-	-
250	Great black-backed gull				16 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Green heron				11 NESTS				X	X	X	X	X	X	X	X	X	MAY-SEP	-	-	-
	Herring gull				45 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
251	Double-crested cormorant				4 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	-	-	-
	Great black-backed gull				45 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				120 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
252	Green heron				1 NEST				X	X	X	X	X	X	X	X	X	MAY-SEP	-	-	-
	Herring gull				18 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
253	Great black-backed gull				5 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				44 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
254	Herring gull				45 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
255	Common tern	CT	S	S	2 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Great black-backed gull				1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				3 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Least tern	CT	S	T	4 NESTS					X	X	X	X					MAY-AUG	-	-	-
	Piping plover	CT	S/F	T/T	1 NEST			X	X	X	X	X	X					MAR-AUG	-	-	-
256	Herring gull				35 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
257	Herring gull				2 PAIRS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
258	Common tern	CT	S	S	83 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Great black-backed gull				1 NEST	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
	Herring gull				11 NESTS	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	-	-	-
259	Shorebirds								X	X	X	X	X	X	X			-	-	-	-
	Wading birds								X	X	X	X	X	X	X			-	-	-	-
606	Purple martin	CT	S	S				X	X	X	X	X	X	X	X	X		MAR-JUL	-	-	-
614	Roseate tern	CT	S/F	E/E						X	X	X	X					MAY-AUG	-	-	-
629	Common tern	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
643	Common tern	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	-	-	-
	Roseate tern	CT	S/F	E/E						X	X	X	X					MAY-AUG	-	-	-
644	Great egret	CT	S	T						X	X	X	X	X	X			MAY-AUG	-	-	-
	Snowy egret	CT	S	T						X	X	X	X	X	X			MAY-AUG	-	-	-

FISH:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
138	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	-	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
140	American eel					X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-SEP	JAN-DEC	SEP-NOV
	Atlantic herring					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAY-OCT	NOV-APR
	Atlantic menhaden								X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-DEC	APR-NOV	APR-NOV
	Bluefish										X	X	X	X	X			-	-	-	JUL-OCT	JUN-OCT
	Butterfish									X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-NOV	MAY-DEC	MAY-DEC
	Scup (porgy)									X	X	X	X	X	X			JUN-JUL	JUN-AUG	JUN-AUG	MAY-OCT	MAY-OCT
	Shortnose sturgeon	CT	S/F	E/E		X	X	X	X	X	X	X	X	X	X	X	X	APR-MAY	APR-MAY	APR-AUG	JAN-DEC	JAN-DEC
	Skates					X	X	X	X	X	X	X	X	X	X	X	X	JAN-DEC	JAN-DEC	-	JAN-DEC	JAN-DEC
	Striped bass					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	MAY-OCT
	Summer flounder								X	X	X	X	X	X	X	X		-	-	-	APR-NOV	APR-NOV
	Weakfish									X	X	X	X	X	X	X		MAY-SEP	MAY-SEP	JUN-OCT	JUL-NOV	MAY-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-SEP	JAN-DEC	JAN-DEC
	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
143	Atlantic sturgeon	CT	S	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
144	Winter flounder					X	X	X	X	X	X	X	X	X	X	X	X	JAN-MAR	FEB-MAY	MAR-JUN	JAN-DEC	JAN-DEC
145	Tautog					X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC
188	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN OCT-NOV	-	-	APR-JUN OCT-NOV	APR-JUN OCT-NOV

Table A-2. ESI Species and Seasonal Presence

CONNECTICUT ESIMAP 11 (cont.)

BIOLOGICAL RESOURCES: (cont.)

FISH: (cont.)

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
197	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN	-	-	APR-JUN	APR-JUN
																		OCT-NOV			OCT-NOV	OCT-NOV
	Sea lamprey							X	X	X					X	X		MAR-MAY	-	-	OCT-NOV	MAR-MAY
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
230	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN	-	-	APR-JUN	APR-JUN
																		OCT-NOV			OCT-NOV	OCT-NOV
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
238	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	American shad							X	X	X	X	X		X	X	X		MAR-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAR-JUL
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN	-	-	APR-JUN	APR-JUN
																		OCT-NOV			OCT-NOV	OCT-NOV
	Gizzard shad									X	X	X		X	X	X		JUN-JUN	JUN-JUL	JUN-JUL	SEP-NOV	MAY-JUL
	Rainbow smelt					X	X	X	X	X	X	X	X	X	X	X	X	FEB-MAR	MAR-MAY	APR-JUN	MAR-AUG	OCT-MAR
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
241	Alewife					X	X	X	X	X	X	X	X	X	X	X		JAN-MAY	JAN-JUL	JAN-JUL	MAY-NOV	JAN-MAY
	American shad							X	X	X	X	X		X	X	X		MAR-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAR-JUL
	Blueback herring									X	X	X	X	X	X	X		MAY-JUL	MAY-JUL	MAY-JUL	SEP-NOV	MAY-JUL
	Brown trout (sea run)								X	X	X				X	X		APR-JUN	-	-	APR-JUN	APR-JUN
																		OCT-NOV			OCT-NOV	OCT-NOV
	Sea lamprey							X	X	X					X	X		MAR-MAY	-	-	OCT-NOV	MAR-MAY
	White perch					X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUN	JUN-JUL	JUN-JUL	JAN-DEC	JAN-DEC
640	Tautog				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	JUN-AUG	JAN-DEC	JAN-DEC

HABITAT:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D
593	Rare plant					X	X	X	X	X	X	X	X	X	X	X	X
594	Endangered plant			E		X	X	X	X	X	X	X	X	X	X	X	X

INVERTEBRATE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Spawn/Mate	Eggs	Larvae	Juveniles	Adults
138	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
140	Blue crab					X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-SEP	MAY-SEP	JAN-DEC	JAN-DEC
	Longfin squid									X	X	X	X	X	X			MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT	MAY-OCT
224	American lobster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-NOV	JAN-DEC	MAY-SEP	JAN-DEC	JAN-DEC
240	Horseshoe crab				HIGH	X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	MAY-JUL	MAY-JUL	JAN-DEC	APR-JUL
585	Eastern oyster					X	X	X	X	X	X	X	X	X	X	X	X	JUN-AUG	JUN-AUG	JUN-SEP	JAN-DEC	JAN-DEC
586	Northern quahog (hard clam)					X	X	X	X	X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-SEP	JAN-DEC	JAN-DEC
587	Softshell clam					X	X	X	X	X	X	X	X	X	X	X	X	APR-SEP	APR-SEP	APR-SEP	JAN-DEC	JAN-DEC

MARINE MAMMAL:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Mating	Calving	Pupping	Molting
138	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
140	Atlantic white-sided dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Gray seal	CT	S	S		X	X	X	X	X						X	X	-	-	-	-
	Harbor porpoise	CT	S	S		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Harbor seal					X	X	X	X	X						X	X	-	-	-	-
	Harp seal					X	X	X	X	X						X	X	-	-	-	-
	Hooded seal					X	X	X	X	X						X	X	-	-	-	-
	Humpback whale	CT	F	E	UNCOMMON	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Minke whale					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	Saddle-backed dolphin					X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-

REPTILE:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Hatching	Internesting	Juveniles	Adults
140	Green sea turtle	CT	S/F	T/T	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Kemp's ridley sea turtle	CT	S/F	E/E	VERY RARE						X	X	X	X	X	X		-	-	-	-	-
	Leatherback sea turtle	CT	S/F	E/E							X	X	X	X	X	X		-	-	-	-	-
	Loggerhead sea turtle	CT	S/F	T/T							X	X	X	X	X	X		-	-	-	-	-
235	Diamondback terrapin					X	X	X	X	X	X	X	X	X	X	X		APR-OCT	-	-	-	-

TERRESTRIAL MAMMAL:

RAR#	Species	ST	S/F	T/E	Concen	J	F	M	A	M	J	J	A	S	O	N	D
235	Muskrat					X	X	X	X	X	X	X	X	X	X	X	X

HUMAN USE RESOURCES:

AQUACULTURE:

HUN#	Name	Owner	Contact	Phone
21	AQUACULTURE: SHELLFISH LEASE BEDS	CT BUREAU OF AQUACULTURE		203/874-8496

WILDLIFE REFUGE:

HUN#	Name	Owner	Contact	Phone
298	BRANFORD RIVER WILDLIFE AREA			
299	EAST HAVEN MARSH WILDLIFE AREA			
328	RAWSON PARK MARSH WILDLIFE AREA			
330	PINE ORCHARD MARSH WILDLIFE AREA			
333	QUINNIPIAC RIVER MARSH WILDLIFE AREA			

Biological information shown on the maps represents known concentration areas or occurrences, but does not necessarily represent the full distribution or range of each species. This is particularly important to recognize when considering potential impacts to protected species.