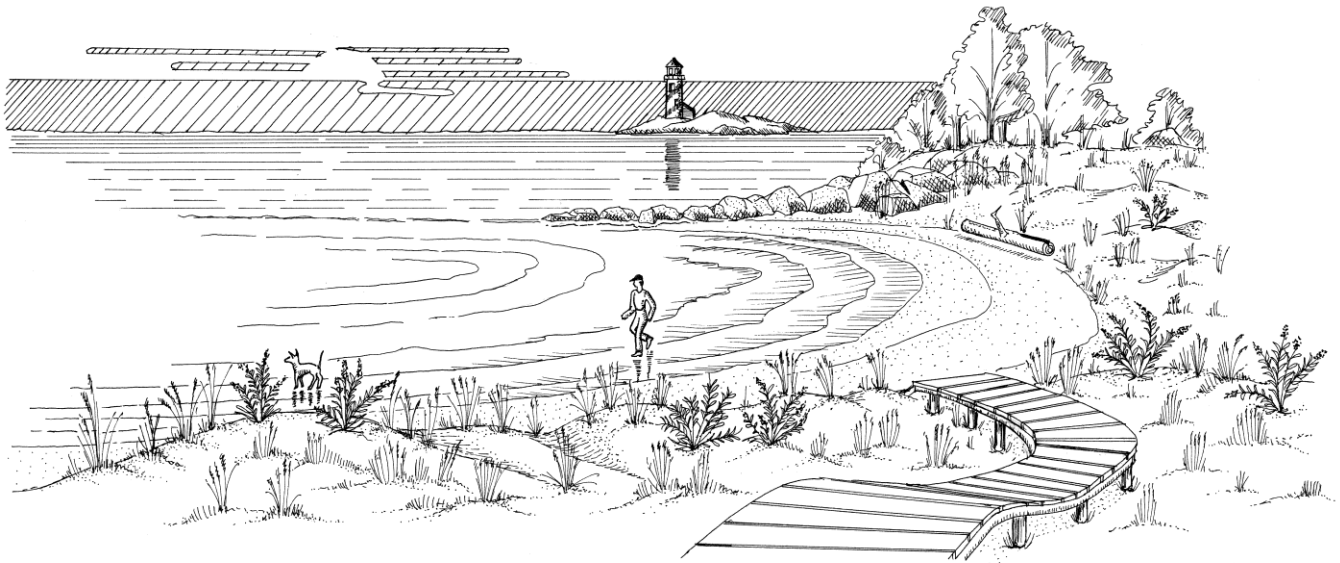


# Connecticut Coastal and Estuarine Land Conservation Program Plan



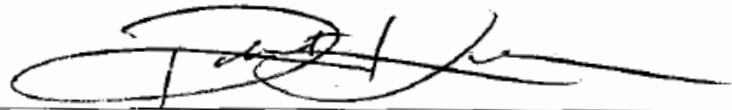
**Connecticut Department of Energy and Environmental Protection  
79 Elm Street  
Hartford, CT 06106-5127**



**October 2015**

## Certification and Approval

This certifies that the *Connecticut Coastal and Estuarine Land Conservation Program Plan* is consistent with the federally-approved *Connecticut Coastal Management Program* and is adopted by the Connecticut Department of Energy and Environmental Protection pursuant to the *Coastal and Estuarine Land Conservation Program Final Guidelines* (June 2003) issued by the National Ocean Service, National Oceanic and Atmospheric Administration, Office for Coastal Management.



Robert J. Klee, Commissioner  
Connecticut Department of Energy and Environmental Protection

Date: 10/30/15

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# Connecticut Coastal and Estuarine Land Conservation Program Plan

## I. Introduction

### A. Program Background

The national Coastal and Estuarine Land Conservation Program (CELCP) was established by the Department of Commerce, Justice, and State Appropriations Act of 2002. It directs the Secretary of Commerce, through the National Oceanic and Atmospheric Administration (NOAA), to administer a federal financial assistance program available to coastal states for coastal land acquisition. The purpose of CELCP is to “protect important coastal and estuarine areas that have significant conservation, recreation, ecological, historical, or aesthetic values, or that are threatened by conversion from their natural or recreational state to other uses, giving priority to lands which can be effectively managed and protected and that have significant ecological value”<sup>1</sup>. Available program funds are administered through a competitive grant program by NOAA’s Office for Coastal Management (formerly Office of Ocean and Coastal Resource Management) pursuant to the *Coastal and Estuarine Land Conservation Program Final Guidelines (2003)*<sup>2</sup>. Prior to 2007, CELCP funds were directed by Congress through federal agency appropriation bills rather than through a NOAA-administered competitive state coastal land acquisition grant program. Beginning in fiscal year 2007, CELCP funds were awarded through a NOAA-administered competitive state grant program which is expected to continue in future federal funding cycles. Notices of CELCP federal funding opportunities are usually issued in early winter with proposals due in early spring.

In order to receive CELCP coastal land acquisition funding through the NOAA-administered competitive state grant program, coastal states are expected to:

- Develop a state CELCP plan for approval by NOAA-OCRM;
- Solicit land acquisition project proposals (which may include acquisition of conservation easements) from stakeholders (e.g., coastal municipalities, land trusts, regional planning agencies, state agencies) consistent with the conservation priorities outlined in its CELCP plan;
- Nominate its highest priority coastal land acquisition projects for review by a national project review selection committee;
- Successfully compete with other coastal state land acquisition project proposals pursuant to a national CELCP project review committee’s scoring and ranking of land acquisition project proposals.

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<sup>1</sup> Public Law 107–77

<sup>2</sup> Unless otherwise defined here, the *Guidelines*’ definitions apply to the terms used in Connecticut’s Coastal and Estuarine Land Conservation Program Plan (CELCP Plan). The *Guidelines* may be accessed at <http://www.coast.noaa.gov/czm/landconservation/media/CELCPfinal02Guidelines.pdf>

## **B. Purpose**

Connecticut's CELCP Plan describes the State's coastal land conservation needs and prioritizes the types of coastal land acquisition opportunities that can be nominated for federal CELCP grant financing assistance. The Plan outlines a process to promote partnerships with municipalities and land trusts to identify land acquisition opportunities that address Connecticut's priority conservation needs, which provide the basis for Connecticut's CELCP Plan. In addition to describing Connecticut's three general classes of priority coastal land conservation needs, the Plan provides guidance for selecting coastal land acquisition projects for nomination to the national CELCP project selection competition.

In the past, coastal land acquisitions by the State of Connecticut were typically made on an ad hoc basis in response to acquisition opportunities offered to the Connecticut Department of Energy and Environmental Protection (CT DEEP) by landowners or others who became aware of properties being offered for sale. Although this approach to coastal land acquisition has resulted in successful acquisitions, important coastal land acquisition opportunities have been missed because they were not identified and acted upon early enough in the landowner's property disposition decision-making process. Connecticut's CELCP Plan offers a more proactive and strategic approach to coastal land acquisition based on:

- Priority coastal land conservation values identified in consultation with resource experts and land conservation interest groups;
- Land acquisition targets within areas where acquisition opportunities are most likely to address priority coastal land conservation needs;
- Cooperation with coastal land acquisition partners to identify possible coastal land acquisition opportunities that meet a priority coastal land conservation need;
- Strong working relationships with owners of high priority coastal conservation land who have been contacted in advance of NOAA CELCP Program funding announcements;
- Partnering with other land acquisition funding programs with objectives complementary to CELCP; and
- Land stewardship for newly acquired properties through partnerships with local land trusts and other land managers, especially if state or municipal agencies holding title to acquisitions do not have the resources to effectively manage acquired properties.

## **II. Coastal and Estuarine Land Protection Priorities**

### **A. Connecticut's Coastal and Estuarine Planning Area**

National CELCP Guidelines require coastal states to identify areas within which coastal land conservation values and potential coastal land conservation acquisition opportunities should be evaluated. This area, referred to as the coastal estuarine planning area, defines the broadest area in which to evaluate coastal land conservation values and potential coastal land acquisition opportunities (see Section II. B. for a description of Connecticut's priority coastal land conservation values). Connecticut has adopted approximately one-half of its federally-approved coastal nonpoint source pollution management (CNPM) area as its Coastal and Estuarine

Planning Area (see Figure 1- Coastal and Estuarine Planning Area and Appendix 1 - Coastal and Estuarine Planning Area Municipalities).<sup>3</sup>

Three fundamental water quality protection planning factors used to define Connecticut's CNPM area are also appropriate for defining Connecticut's Coastal and Estuarine Planning Area. They include: (1) existing land uses likely to contribute pollutants of concern to Long Island Sound; (2) proximity of those uses to the Sound; and (3) existing condition of coastal waters, including areas with existing impaired uses as well as those that might be threatened by future development, particularly by land uses known to generate significant pollutant loads.

Connecticut's CNPM area was determined to be appropriate to ensure implementation of Coastal Zone Act Reauthorization Amendments (CZARA) required management measures to restore and protect Connecticut's coastal and estuarine waters. The CNPM area includes the area containing all 13 classes of Connecticut's statutorily defined coastal resources (see Appendix 2 - Connecticut's Coastal Resources) and other coastal resources identified as a conservation priority through resource conservation planning initiatives (e.g., coastal forests identified through the Long Island Sound (LIS) Stewardship Initiative). The national *CELCP Final Guidelines* provide that a state's coastal watershed is the maximum allowable Coastal and Estuarine Area. Connecticut's coastal watershed<sup>4</sup> includes a 4,600 square-mile area within Connecticut, as shown in Figure 2. Connecticut's Coastal and Estuarine Planning Area contains 2,073 square miles, or 45 percent of Connecticut's coastal watershed. Connecticut's Coastal and Estuarine Area therefore is a reasonable area within which to evaluate possible coastal land acquisition opportunities that address Connecticut's priority coastal land conservation needs.

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<sup>3</sup> The CNPM area was developed pursuant to Section 6217 of Coastal Zone Act Reauthorization Amendments (CZARA) of 1990 [16 USC Section 1455] that required states with approved coastal management programs to develop coastal nonpoint source pollution control plans. This planning area was adopted in lieu of Connecticut's federally-recognized Coastal Zone Management Program's coastal area (defined by the boundaries of Connecticut 36 cities and towns containing coastal waters the limits of which are approximated by the coastal boundary line shown in Figure 1) because it better identified those areas where conversions in land use could adversely affect coastal water quality or provide new water-dependent outdoor recreation opportunities along tidal watercourses. See 16 USC Section 1455.

<sup>4</sup> Coastal watersheds are defined in NOAA's Coastal Boundary Review (1992) as the watershed area defined by the inland boundary of those USGS cataloguing units that contain the extent of tidal influence (i.e., head of tide).

Figure 1  
Coastal and Estuarine Planning Area

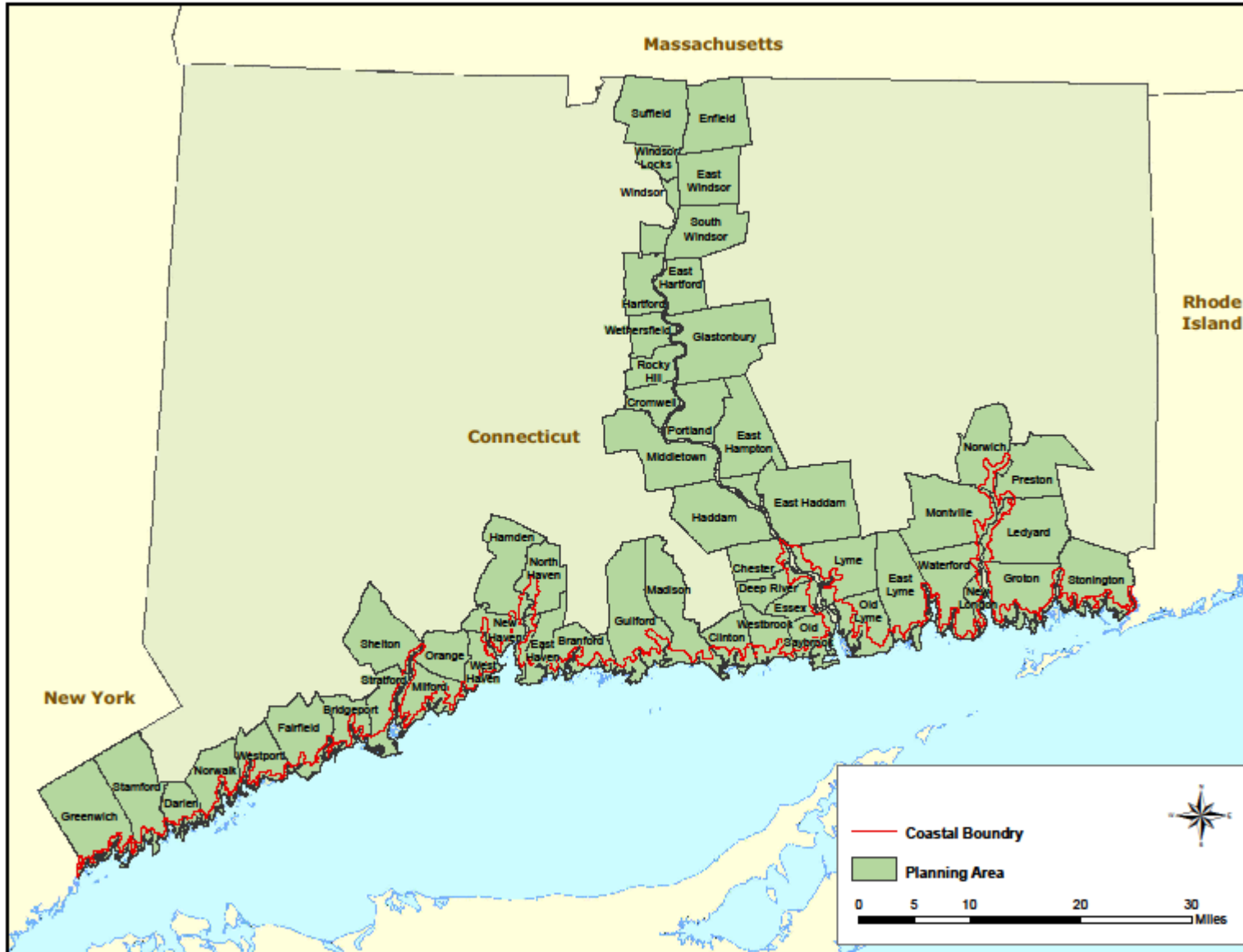
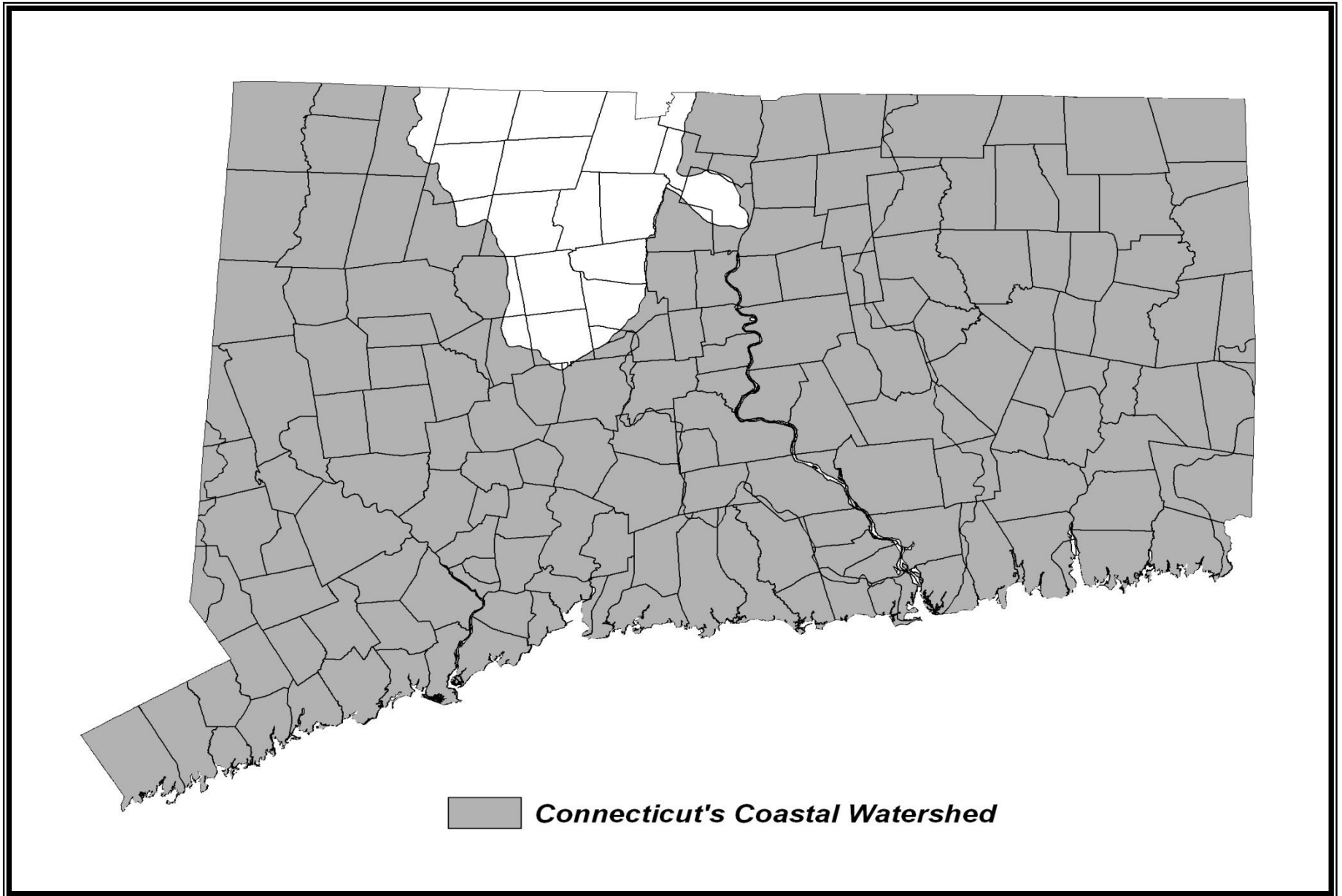




Figure 2  
Connecticut's Coastal Watershed



## **B. Connecticut's Priority Coastal Land Conservation Values and Areas**

### ***B.1 Priority Coastal Land Conservation Values and Areas Defined***

Connecticut's priority coastal land conservation values and areas are those that provide or are capable of providing: (1) Ecologically significant areas, especially unique, rare or representative LIS habitat and landscape types under-represented in Connecticut's system of protected open space; (2) coastal access recreation sites providing coastal resource-based outdoor recreation opportunities serving areas of significant unmet need; and (3) other areas of exceptional or unique ecological productivity or value and sites of significant cultural or historic heritage value. These conservation values, as further described below, serve as the basis for Connecticut's CELCP Plan and will be used to help identify the State's most critical coastal land conservation needs.

#### ***B.1.1 Ecologically Significant Areas***

Connecticut's ecologically significant coastal areas are those areas: (1) typical or representative of Long Island Sound coastal systems; (2) providing outstanding examples of those coastal systems; or (3) providing rare species habitat or habitat for species warranting special management attention or greatest conservation need.

##### ***B.1.1.1 Coastal systems typical or representative of the Long Island Sound ecosystem***

Preserving through acquisition the best of Connecticut's remaining unprotected largely intact representative coastal habitats or landscape types is critical to sustaining the ecological services of core areas providing such benefits. Such conservation actions will also ensure that future generations will be able to study and understand Connecticut's coastal natural heritage as only remnants of many of these coastal systems persist today and new threats to these areas are expected. Emphasis will be placed on acquiring property containing coastal habitats or landscape types under-represented in Connecticut's system of existing protected open space (e.g., state and municipal parks, preserves, wildlife management areas or land in conservation ownership held for dedication conservation purposes). Table 1 provides a description of coastal systems, habitats, and landscapes typical or representative of Connecticut's Coastal and Estuarine Area and lists their conservation priority.

Table 1  
 Typical or Representative Coastal Systems of Long Island Sound<sup>5</sup>

Coastal Habitat/System/Landscape	Under-Represented in Existing System of Protected Open Space (✓)	Highest Conservation Priority (✓)
Barrier beach/dune <sup>6</sup>	✓	✓
Brackish/salt water tidal marsh <sup>*7</sup>		✓
Freshwater tidal marsh*	✓	✓
Rocky shorefronts		
Bluffs/escarpments (unarmored)	✓	✓
Estuarine embayments*		
Coves within estuarine embayments*		
Islands – Long Island Sound	✓	✓
Islands- riverine	✓	✓
Large unfragmented coastal forest**	✓	✓
Intertidal mud flats*		
Coastal area grasslands	✓	✓
Secondary dunes/back barrier sand flats***	✓	✓

<sup>5</sup> Not including subtidal resource systems (e.g., submerged aquatic vegetation, selfish beds, etc.) which are already held as State public trust land

<sup>6</sup> Beaches and dunes with significant biologic and/or flood control value designated as units of the Federal Coastal Barrier Resources System (CBRS) are a high conservation priority within this class (see general locations for CBRS units in Connecticut at <http://www.fws.gov/cbra/Maps/Locator/CT.pdf> then select corresponding Connecticut CBRS unit # of interest to access more detailed maps using the following link: <http://www.fws.gov/cbra/Maps/CBRS/index.html>

<sup>7</sup> Only upland areas adjacent to these resources capable of supporting marine transgression are considered a highest conservation priority resource area

\* Refers only to undeveloped uplands adjacent these intertidal resource areas

\*\* Coastal forests are characterized by a vegetation pattern influenced by a climate regime affected by the moderating effects of Long Island Sound that extends 5 to 7 miles inland of Long Island Sound. On well-drained soils, coastal hardwoods often with dense thickets of vines and shrub dominate. Coastal hardwoods are dominated by Red (*Quercus rubra*), White (*Quercus alba*) and especially Black Oak (*Quercus velutina*), Hickories, especially Mockernut (*Carya tomentosa*), Black Cherry (*Prunus serotina*), and Sassafras (*Sassafras albidum*), (Dowhan and Craig, 1976). Coastal forests occurring on less well-drained soils, referred to as “moist coastal forests” are characterized by a predominance of less drought resistant trees, shrubs and vines.

\*\*\* Secondary dunes are those dunes landwards of primary dune systems. Back barrier sand flats are gently sloping sandy unvegetated or sparsely vegetated intertidal areas of coarse sediment on the inland side of barrier beaches.

*B.1.1.2 Outstanding habitats and systems representative of Long Island Sound ecosystems*

This class of ecologically significant areas includes those that provide outstanding examples of coastal systems because of their quality or scarcity in the regional landscape. Such areas offer the best examples of Connecticut’s coastal landscapes, or are the last remaining examples of their kind, and therefore are a high priority conservation target, especially where they are part of a larger high conservation priority coastal system. Table 2 provides descriptions and examples of these systems.

Table 2  
Outstanding Coastal Habitats or Systems

Habitat/Ecosystem/Landscape Type	Site Example
Undeveloped LIS islands	Duck Island (Westbrook)
Unditched tidal marsh*	Nells Island marsh (Milford)
Secondary dunes	Black Point Beach (East Lyme)
Riverine cove/embayment*	Poquetanuck Cove (Preston/Ledyard)
LIS cove/embayment*	Wequetequock Cove (Stonington)
Sand plain grassland	Lower Quinnipiac River grassland (North Haven)
Estuarine embayments with extraordinary aquatic habitat value* (e.g., shellfish/SAV)	Niantic River/Bay (East Lyme/Waterford)
Coastal forest	Barn Island WMA (Stonington)
Coastal grass land	Niering Natural Area Preserve (Waterford)
Traprock ridge	West Rock (New Haven/Hamden)
Colonial waterbird complex*	Falkner Island (Guilford)
Sites of significant diadromous fish runs*	Head-of-tide Hammonasset River (Madison)

\* Refers to adjacent upland riparian areas that buffer these water areas

*B.1.1.3 Habitat for rare species or species requiring special management attention*

These sites provide habitat for species identified as: (a) Rare by virtue of being listed as Federally or State-endangered, threatened or species of special concern;<sup>8</sup> (b) Greatest Conservation Need (GCN) pursuant to *Connecticut’s Comprehensive Wildlife Conservation Strategy*;<sup>9</sup> or (c) rated “near-threatened” or greater according to the IUCN “Red List”.<sup>10</sup> Conservation emphasis is placed on sites with multiple species or high concentrations of a single

<sup>8</sup> See [State list](http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323486&depNav_GID=1628&depNav=|) at [http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323486&depNav\\_GID=1628&depNav=|](http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323486&depNav_GID=1628&depNav=|) and Federal list [www.fws.gov/northeast/endangered/](http://www.fws.gov/northeast/endangered/)

<sup>9</sup> See Chapter 4 of CT CWCS at [www.ct.gov/DEEP/cwp/view.asp?a=2723&q=329520&DEEPNav\\_GID=1719](http://www.ct.gov/DEEP/cwp/view.asp?a=2723&q=329520&DEEPNav_GID=1719) Area)

<sup>10</sup> See International Union for the Conservation of Nature and Natural Resources (IUCN) Red-List at <http://www.iucnredlist.org/>

species. These sites are therefore a conservation priority and in some cases should be acquired solely to meet ecological conservation objectives rather than supporting multiple use objectives.

### ***B.1.2 Coastal Recreation and Access***

A hallmark of Connecticut's coastal management program is the enhancement of public access to coastal waters for coastal resource-based recreation. Areas capable of providing coastal access opportunities, particularly in areas underserved by existing recreational access and "distressed municipalities"<sup>11</sup> are a conservation priority.<sup>12</sup> Access opportunities range from sites providing visual access to coastal waters (e.g., scenic overlooks) to those providing direct physical access to coastal waters (e.g., boating access facilities) and include:

- Car-top boating not requiring trailered-launch facilities;
- Shore-based fishing, crabbing, or recreational shellfishing access especially those sites identified as an acquisition priority through coastal access surveys;
- Passive recreation activities (e.g., hiking) in areas of significant or unique geologic or biologic interest or part of an existing or planned greenway, trail or linear park;
- Wildlife observation (particularly birding) access areas especially observation areas underserved by existing public access sites (e.g., Quinnipiac River marshes);
- Waterfowl hunting;
- Sandy beach areas providing access to saltwater bathing opportunities;
- Urban waterfront sites with coastal recreation value (e.g., waterfront 'pocket-parks' in high density residential neighborhoods) that meet a priority municipal recreation need (e.g., fishing access) as identified in a municipal plans of conservation and development or recreation plan.

### ***B.1.3 Other Areas of Significant Coastal Conservation Value***

Other coastal resource values that meet a significant coastal land conservation need but are not identified above constitute an additional category of coastal conservation values and include:

- Significant foraging/nesting habitat for water birds, shorebirds, and migratory waterfowl, including uplands adjacent to these habitats that provide protective buffers;<sup>13</sup>
- Sites identified as priority coastal resource restoration sites pursuant to the Long Island Sound Habitat Restoration Initiative<sup>14</sup> where public ownership is necessary to complete a proposed restoration project and for which funding has already been secured or is imminent;

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<sup>11</sup> Defined in Connecticut General Statutes Section 32-9p(b)

<sup>12</sup> Although coastal resource based outdoor recreation is a priority conservation value it should be noted that CELCP grants can only be used to fund land acquisition and cannot fund construction of recreation facilities.

<sup>13</sup> See Appendix 17 and Appendix 18 for locations and descriptions of waterfowl concentration areas. Other areas not yet documented believed to serve as important habitat functions may qualify as priority acquisition areas.

<sup>14</sup> See Appendix 14 - LIS Habitat Restoration Sites Map. Restoration projects must include a detailed description of the proposed restoration plan and confirmation of a restoration funding source.

- Lands adjacent to, or significantly contributing to the quality of, coastal waters of exceptional quality or aquatic resource value (e.g., shellfish concentration areas and natural seed beds);
- Sites of statewide historic or cultural significance as confirmed by the Connecticut State Historic Preservation Office;
- Scenic areas visible from an area accessible to the general public (e.g., state or municipal parks, state highway, etc.) that significantly contribute to defining a local coastal landscape;
- Parcels adjacent to or in-holdings within existing CT DEEP or other regionally-significant protected open space which, if developed, would significantly diminish existing or potential plant or wildlife habitat or create public lands management problems;
- Inland wetlands with significant or rare ecological/habitat value (e.g., highly productive vernal pools, fens, bogs);
- Sites capable of providing connections for public access or habitat between existing protected open space parcels;
- Sites that can be documented as significantly contributing to watershed health especially by protecting coastal water quality.

## ***B.2 Assessment of Need and Threats to Coastal Land Values:***

### ***B.2.1 The Need for Coastal Land Conservation***

#### ***B.2.1.1 Context and obstacles to coastal land conservation***

From Connecticut's earliest colonial period, Connecticut's shoreline communities have been principal centers of trade, commerce and transportation. Over 350 years of post-European settlement history along Long Island Sound has resulted in the conversion of much of Connecticut's coastal area to uses that have adversely affected coastal land conservation values. For example, it is estimated that approximately 30 percent of Connecticut's tidal wetlands have been filled and up to 90 percent may have been ditched or otherwise altered through human activity.<sup>15</sup> It is within such context that Connecticut must develop coastal land strategies to conserve its most significant remaining unprotected coastal areas capable of supporting important ecological services and coastal resource based outdoor recreation opportunities.

Competition for use and development of Connecticut's coastal area continues to diminish Connecticut's priority land conservation values and result in lost conservation acquisition opportunities. Development, population densities, and land values within Connecticut's coastal area exceed statewide averages. The municipalities that comprise Connecticut's Coastal and Estuarine Program Project Area<sup>16</sup> are highly urbanized [see Figures 3, 4a, 4b and 6]. For

<sup>15</sup> *Tidal Marshes of Long Island Sound*, Bulletin No. 34, The Connecticut College Arboretum and U.S. Environmental Protection Agency, *Technical Support for Coastal Habitat Restoration*

<sup>16</sup> Connecticut's Coastal and Estuarine Land Conservation Program Project Area is described in Section 2. C. on

example, 37% of the Connecticut's population resides within the State's 36 coastal municipalities, which comprise only 19% of the State's land area.<sup>17</sup> Further, 34% of the land area within the municipalities that comprise Connecticut's CELCP Project Area and 51% of the area within Connecticut's coastal boundary<sup>18</sup> is classified as "developed" land cover compared to 23% statewide.<sup>19</sup> These population density and land development statistics indicate that there is a disproportionate need to address Connecticut's most significant remaining coastal land acquisition opportunities.

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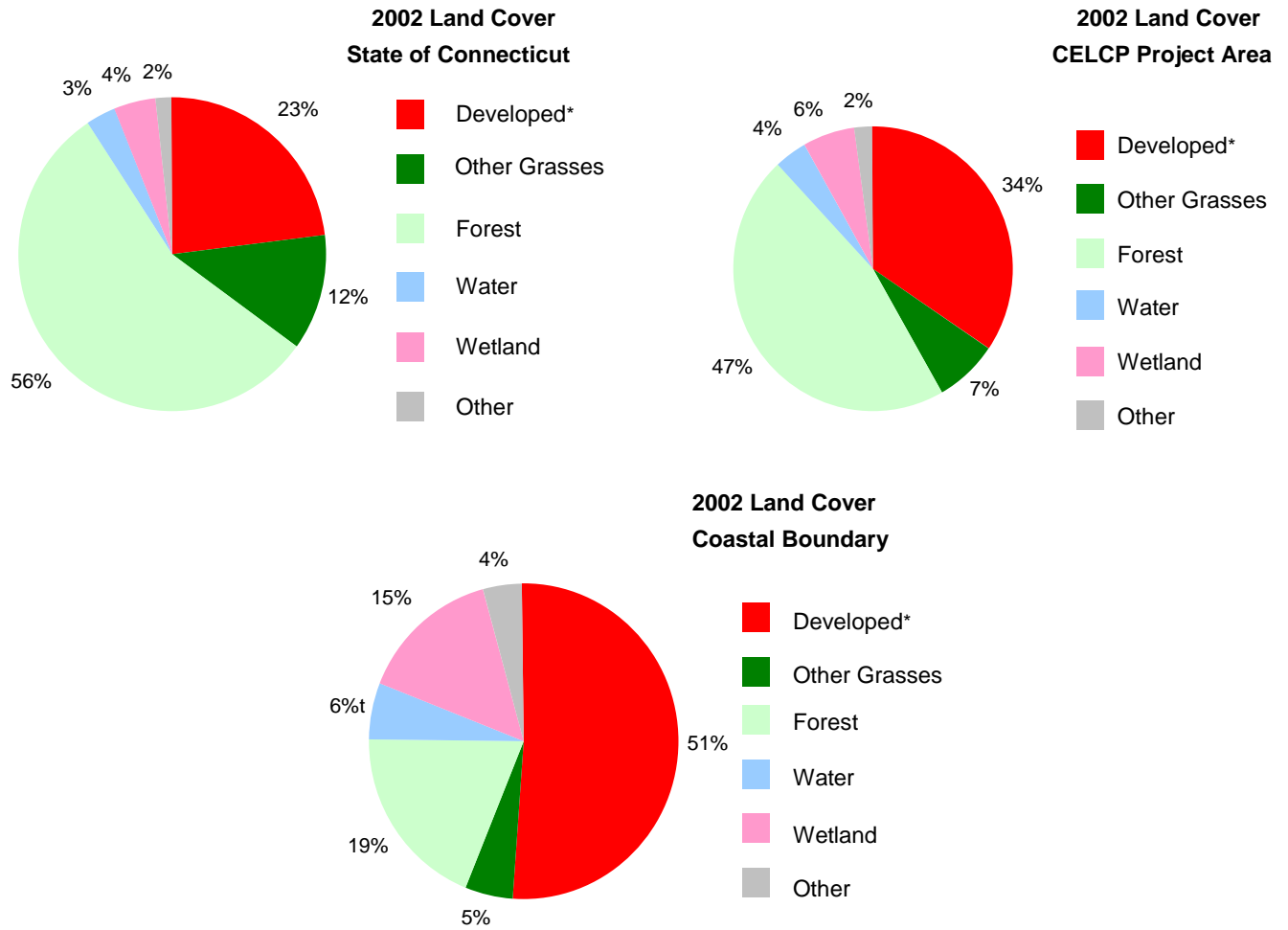
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<sup>17</sup> 2000 Census data provided Connecticut Office of Policy and Management

<sup>18</sup> Connecticut's coastal boundary is generally defined by a line 1000 feet inland of a coastal water body or tidal wetland, whichever is further inland.

<sup>19</sup>University of Connecticut Changing Landscape Project (2003)

Figure 3  
Connecticut Land Cover

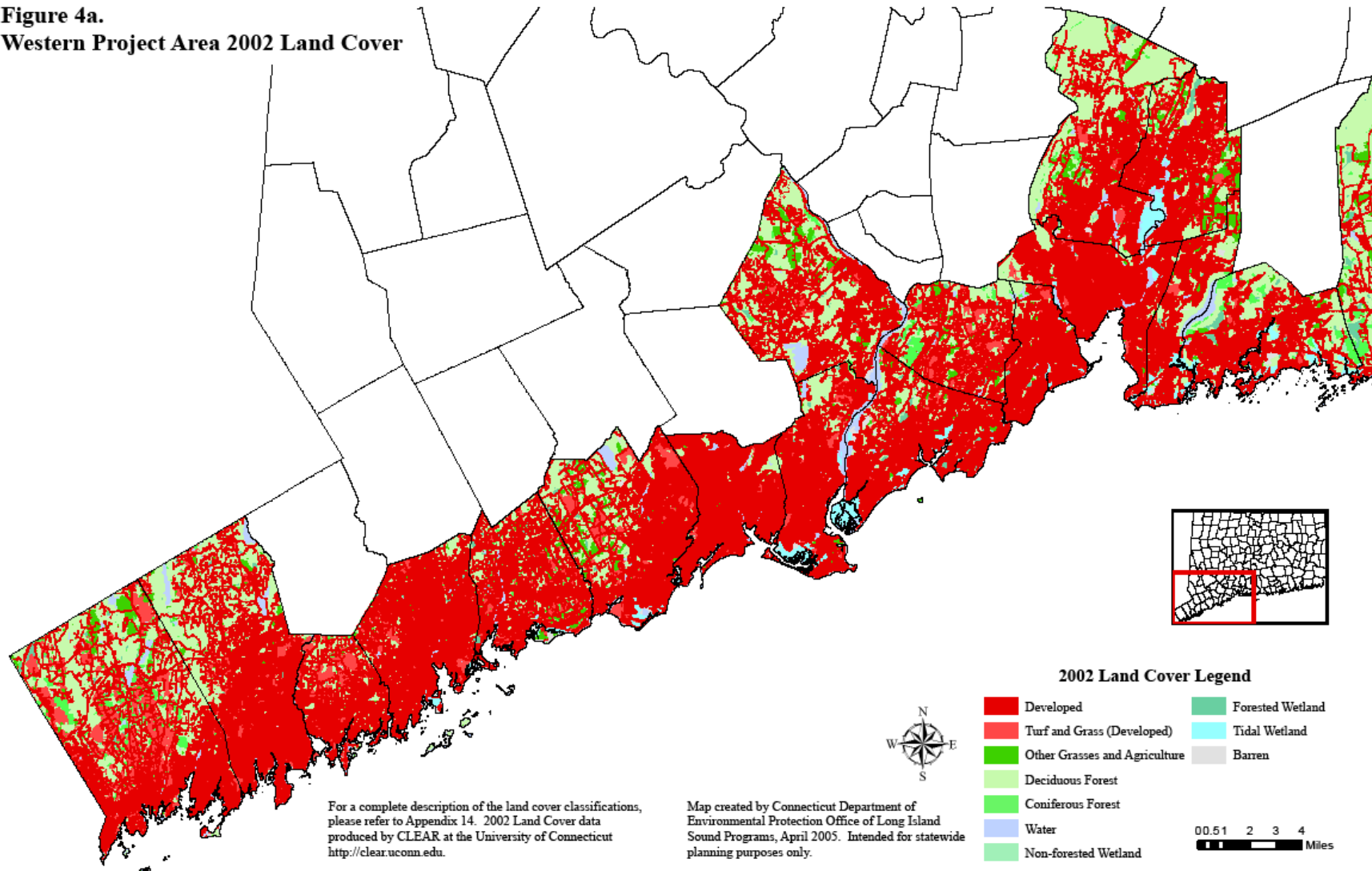


\* Developed land includes built areas containing impervious surface such as roads, parking lots, structures and maintained turf/grass (distinguished from the “other grasses” land cover) associated with commercial, industrial and residential uses

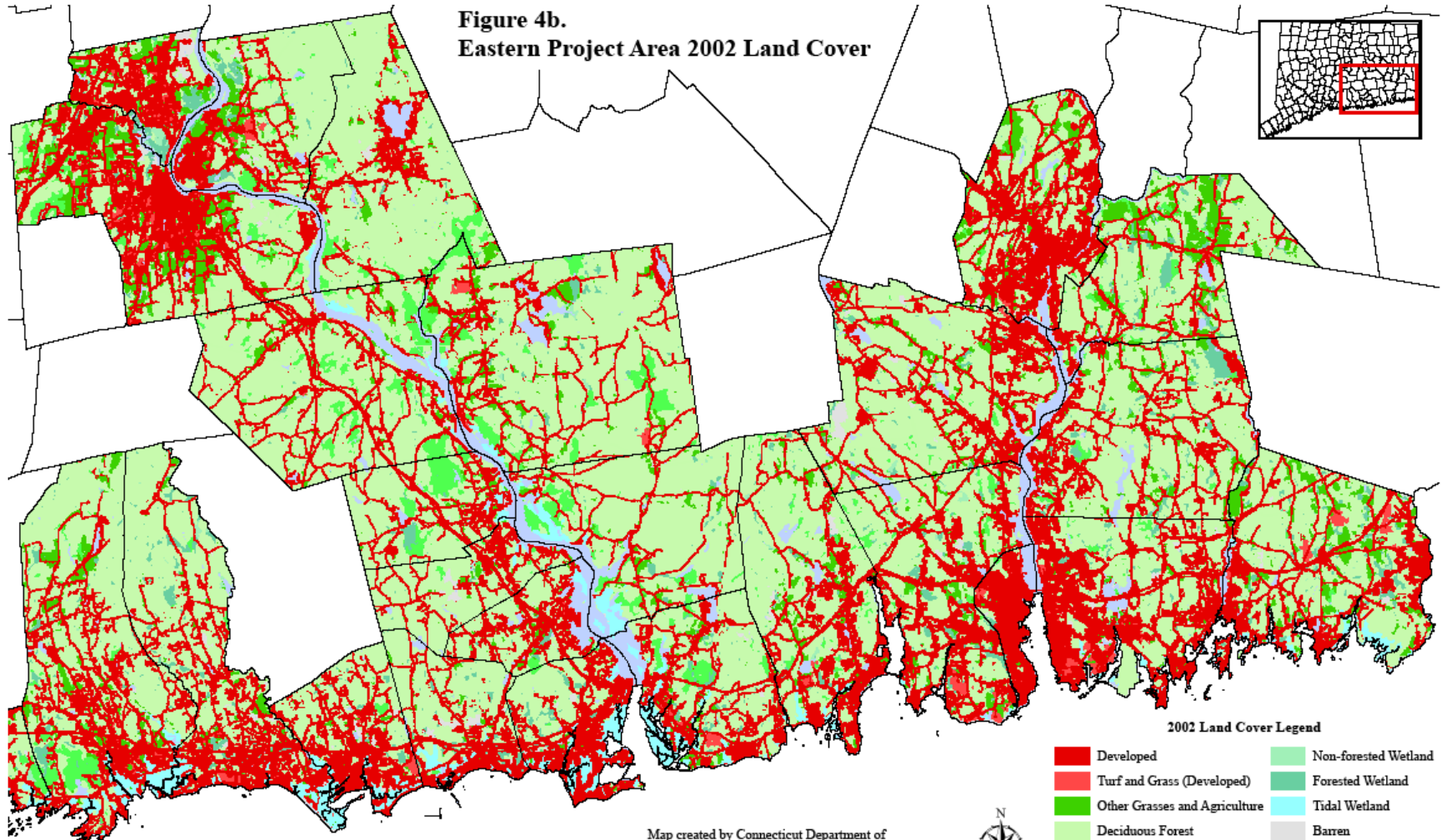
Source: University of Connecticut-CLEAR, *Coastal Area Land Cover Analysis Project*



**Figure 4a.**  
**Western Project Area 2002 Land Cover**



**Figure 4b.  
Eastern Project Area 2002 Land Cover**



**2002 Land Cover Legend**

- |   |  |
|---|--|
|  Developed                     |  Non-forested Wetland |
|  Turf and Grass (Developed)    |  Forested Wetland     |
|  Other Grasses and Agriculture |  Tidal Wetland        |
|  Deciduous Forest              |  Barren               |
|  Coniferous Forest             |  |
|  Water                         |  |

0 0.5 1 2 3 4  
Miles

For a complete description of the land cover classifications, please refer to Appendix 14. 2002 Land Cover data produced by CLEAR at the University of Connecticut <http://clear.uconn.edu>.

Map created by Connecticut Department of Environmental Protection Office of Long Island Sound Programs, April 2005. Intended for statewide planning purposes only.



When interpreting the maps shown in Figures 4a and 4b, it is important to note that Connecticut coastal land cover is depicted at a statewide scale which is intended to show general patterns of coastal land cover at a moderate (i.e., 30 square meter) resolution.<sup>20</sup> These maps are not intended for site level coastal land acquisition planning. For example, although the Western Connecticut Project Area 2002 Land Cover Map indicates that much of the near shore area in Western Connecticut Project Area is developed, important conservation acquisition opportunities may still exist in this region. When such opportunities arise, they should be given special consideration if they advance priority conservation values identified in Section II. B. of this Plan. When land cover data is projected at a larger scale and combined with other parcel-scale land conservation data, land that may warrant protection through acquisition, particularly for coastal recreation purposes, may still be identified. However, it is expected that larger undeveloped parcels with significant ecological value are more likely to occur in the eastern Connecticut CELCP Project Area where land values are significantly lower than along the western Connecticut shoreline. It is therefore within this region that Connecticut will likely identify its best remaining coastal land conservation opportunities that may qualify for CELCP land acquisition funding assistance.

Table 3 compares the amount of land fronting on Connecticut coastal waters in conservation ownership with land not managed for conservation purposes or without conservation restrictions. The table, derived from data obtained through the Connecticut Shoreline Statistics Project, classifies Connecticut's shore by type of shoreline (e.g., direct Long Island Sound frontage, embayments, saltwater rivers, etc.) and ownership (i.e., protected vs. unprotected classes of ownership).<sup>21</sup> Table 3 also describes the type of ownership for each of these classes of shoreline. These data indicate that 31% of Connecticut's total coastal shoreline (1,065 miles) is held in protective forms of ownership or subject to conservation restrictions. The State of Connecticut (almost entirely the Department of Energy and Environmental Protection) holds title to 13% of the State's shoreline, or 140 miles of protected shorefront.

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<sup>20</sup> See the University of Connecticut CLEAR project website <http://clear.uconn.edu/projects/landscape/index.htm> for more current land cover data for individual municipalities and <http://clear.uconn.edu/projects/landscape/v1/analysis/CALCAP/index.htm> for more on this map's scale and resolution.

<sup>21</sup> The project defined coastal shoreline as any land fronting on tidal waters up to Connecticut's statutorily defined coastal boundary (Connecticut's coastal boundary generally extends 1,000 feet upland of the inland boundary of tidal waters with at least .5 parts per thousand of salt). For the purposes of these statistics, coastal shoreline is classified according to the following classes of coastal water bodies they abut, or a unique type of shoreline including: (1) directly fronting on Long Island Sound; (2) bays, harbors and coves; (3) major rivers including their tributaries; (4) minor coastal rivers; (5) islands in Long Island Sound; (6) islands within rivers; and (7) shoreline created through artificial fill (such as filled piers, groins or jetties).

Table 3  
Connecticut Shoreline Statistics <sup>1,2</sup>

Ownership Class:	LIS Direct Miles <sup>3</sup>	B/H/C Miles <sup>4</sup>	Major River Miles <sup>5</sup>	Minor River Miles <sup>6</sup>	Island (LIS) Miles	Island (River) Miles	Artificial Fill Miles <sup>7</sup>	Total		Sandy Beach <sup>8</sup>	
								Miles	% of CT	Miles	% of CT
<b>Protected: Public</b>	<b>25</b>	<b>53</b>	<b>34</b>	<b>69</b>	<b>22</b>	<b>45</b>	<b>2</b>	<b>250</b>	<b>23</b>	<b>27</b>	<b>3</b>
Federal	0	12	2	2	6	0	0	22	2	1	0
State	9	13	26	45	2	44	1	140	13	9	1
Municipal	16	28	6	22	13	2	0	88	8	17	2
<b>Protected: Private</b>	<b>4</b>	<b>9</b>	<b>27</b>	<b>27</b>	<b>4</b>	<b>7</b>	<b>0</b>	<b>78</b>	<b>7</b>	<b>4</b>	<b>0</b>
Land Trusts	0	5	10	17	2	3	0	38	4	0	0
Utility	0	0	0	1	0	0	0	1	0	0	0
Churches	0	0	0	0	0	0	0	0	0	0	0
Private	3	4	12	7	2	4	0	33	3	2	0
Conserv Easement	1	0	4	1	0	0	0	6	1	1	0
Other	0	0	0	0	0	0	0	0	0	0	0
<b>Total Protected</b>	<b>29</b>	<b>62</b>	<b>61</b>	<b>96</b>	<b>26</b>	<b>52</b>	<b>2</b>	<b>328</b>	<b>31</b>	<b>31</b>	<b>3</b>
<b>Unprotected</b>	<b>84</b>	<b>157</b>	<b>160</b>	<b>227</b>	<b>60</b>	<b>24</b>	<b>25</b>	<b>737</b>	<b>69</b>	<b>57</b>	<b>5</b>
<b>Total Shoreline</b>	<b>113</b>	<b>219</b>	<b>221</b>	<b>323</b>	<b>86</b>	<b>77</b>	<b>27</b>	<b>1065</b>	<b>100</b>	<b>88</b>	<b>8</b>

<sup>1</sup> Protected shoreline is land, classified as protected open space, fronting on coastal waters, including rivers within Connecticut's coastal boundary. Protected open space is defined as land or an interest in land held for the permanent protection of: natural features of the state's landscape, essential habitat for endangered or threatened species, non facility-based outdoor recreation (does not include ballfields, cemeteries, school grounds, etc.), forestry and fishery activities, and other wildlife or natural resource conservation or preservation purposes. Ownership data is from 2004 municipal land records.

<sup>2</sup> All measurements are rounded to the nearest tenth of a mile

<sup>3</sup> LIS Direct = Direct Long Island Sound frontage not including frontage on bays, harbors, coves, or the mouths of rivers, on Long Island Sound.

<sup>4</sup> B/H/C = Bay, harbor, cove frontage on Long Island Sound.

<sup>5</sup> Includes coastal (i.e. saltwater influenced) segments of the Housatonic, Connecticut Thames Rivers, and their tributaries up to Connecticut's statutorily defined coastal boundary. (For example, frontage on the Eight Mile River, a tributary to the Connecticut River was included in major river shoreline frontage.) Major river shoreline frontage includes coves within major rivers. Frontage on watercourses that originate in tidal wetlands were excluded from all shoreline frontage calculations.

<sup>6</sup> All coastal (i.e. saltwater influenced) rivers not classified as major rivers up to Connecticut's statutorily defined coastal boundary.

<sup>7</sup> Shoreline created through the placement of fill material in coastal waters that can be readily identified, such as artificial shoreline perpendicular to the course of the natural shoreline. This does not include existing transportation infrastructure such as railroad causeways.

<sup>8</sup> Sandy beach shoreline occurs within several shoreline types in this table, but is reported separately because it is a significant ecological and recreational resource in Connecticut.

Much of Connecticut's coastal area not protected through public or private non-profit land conservation organization ownership is already developed.<sup>22</sup> An assessment of the larger remaining undeveloped and unprotected parcels within 32 of Connecticut's 36 coastal municipalities indicates that only 78 undeveloped parcels greater than 25 acres exist within 1,000 feet of coastal waters (see Appendix 3-Coastal Land Assessment Methodology Results). Of these, approximately 50 may have significant conservation value warranting further investigation. These larger undeveloped parcels are also expected to be highly desirable for future residential development. Once such properties are acquired by developers, and particularly after municipal land use permits have been issued, it is difficult to acquire these properties for conservation purposes at prices approximating their pre-permit approval appraised values. Acquiring properties for conservation after ownership is transferred or is under option for sale to a developer accelerates the depletion of limited conservation acquisition resources.

The coastal real estate market for undeveloped land in Connecticut is highly constrained. Very few undeveloped waterfront or near-waterfront properties on Long Island Sound, including coves, embayments and the mouth of major tributaries, are placed on the market each year. Those parcels that are offered tend to be less than 10 acres.

Seven coastal area properties greater than 10 acres with water or tidal marsh frontage within Connecticut's CELCP Project Area were acquired by CT DEEP for conservation purposes between 2001 and 2011 (see Table 4). These properties were acquired at acquisition prices ranging from \$7,500/acre to \$228,689/acre with a median value of \$24,173/acre. Excluding the two lowest-value waterfront/marsh-front acquisitions that were largely undevelopable, the average cost of these acquisitions was \$71,866/acre. The average cost of a CT DEEP non-coastal fee acquisition (i.e., not including conservation easement acquisitions) from 2005-2014 was \$8,138/acre (73 properties). Such a differential in coastal versus inland parcel acquisition cost often makes it difficult to justify allocating limited state land acquisition funding for coastal land acquisition projects. Although average value of coastal land acquisitions were derived from a small sample of coastal acquisitions and cannot confidently be interpreted to represent 'typical' coastal area marsh or waterfront land values, compared to average acquisition costs for inland parcels, the cost of land acquisition along the coast is significantly greater than comparable inland parcels.

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<sup>22</sup> "Developed" is defined as built areas typically associated with commercial, industrial and residential uses containing impervious surface such as roads, parking areas and structures and also includes maintained turf/grass.

Table 4  
2001-2009 CT DEEP Coastal Project Area Land Acquisitions with Water/Marsh Frontage

<b>Property Name</b>	<b>Town</b>	<b>Purchase Date</b>	<b>Purchase Price (\$)</b>	<b>Size (Acres)</b>	<b>\$/Acre</b>
Harkness State Park-Verkades Nursery	Waterford	2002	3,800,000	157.2	24,173
Clark Creek WMA-Camelot Cruise	Haddam	2003	1,350,000	17.4	77,586
Eagle Landing State Park - Camelot Cruises	Haddam	2003	2,790,000	12.2	228,689
Barn Island WMA-Manousus	Stonington	2003	1,400,000	144.1	9,715
Barn Island WMA-Crowley 1	Stonington	2009	920,000	48.0	19,167
East River Marsh WMA*	Guilford	2010	360,000	48.0	7,500
Barn Island WMA-Crowley 2	Stonington	2011	1,512,500	17.0	94,531

As a result, the single greatest impediment to acquiring coastal land for conservation is the gap between available funding and the cost of such acquisitions. Nevertheless, another impediment to effective state coastal land acquisition has been the lack of a comprehensive evaluation of the most significant remaining potential coastal land acquisition opportunities based on identified coastal land conservation needs. Until recently, Connecticut used a more opportunistic approach to coastal land conservation relying on ad hoc acquisition decisions as land acquisition opportunities were offered to CT DEEP. In the past, the Department did not pursue opportunities to acquire high conservation value lands not yet formally offered on the open real estate market. Such opportunities are often identified only after a property with significant conservation value is proposed for development or has already been sold to a developer.

Developers sometimes acquire open land to speculate of future increases in the property’s value upon obtaining the necessary municipal land development approvals, irrespective of their plans to actually develop the property. At times, developers have attempted to enhance the potential value of such lands by proposing more intensive development than what is allowed “as-of-right” by municipal zoning regulations. In this scenario, a developer applies to a municipal zoning agency to re-zone the property or applies for a special use permit, or affordable housing development,<sup>23</sup> to develop the land beyond its existing permitted uses or densities to maximize the developer’s potential return on investment. Such an investment includes costs associated with identifying developable land, negotiating and executing the land acquisition, holding the property (e.g., cost to acquire an option, debt service, and real estate taxes), designing the

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<sup>23</sup> See [Connecticut General Statutes Sections 8-30g](#) (et seq.) for description of how municipal zoning and affordable housing law generally places the burden of proof on municipal land use commissions denying an affordable housing permit application to demonstrate that a denial is necessary to protect substantial public interests in health, safety or other matters which the commission may legally consider and such public interests clearly outweigh the need for affordable housing.

development (e.g., engineering services) and obtaining permits to develop the property. Once these costs are incurred, the value of the property increases to reflect the uses allowed by “up-zoning” the property or upon issuance of development permits. At this point, the risk associated with developing the property declines (i.e., permits have been secured) and the price the developer will sell the property (e.g., to a builder or land conservation organization) will increase significantly, sometimes eliminating, or greatly reducing, opportunities to acquire it for conservation. The price of several recent DEEP coastal land acquisitions listed in Table 4 were affected by this land speculation process and other acquisition opportunities were forgone because they became ‘unaffordable’ or they were sold to other developers or builders. By identifying priority coastal land acquisition opportunities and negotiating land acquisition deals with landowners before they sell to developers or begin the development permitting process, DEEP and other coastal land conservation partners can more effectively use limited land conservation acquisition funds to conserve lands that meet Connecticut’s coastal land conservation objectives.

#### *B.2.1.2 Need for coastal recreation opportunities*

There are approximately 300 public access sites providing a range of outdoor recreation opportunities along Connecticut’s coastal shoreline. Of these sites, approximately 75 percent are either small municipally-owned (less than 10 acres) or privately-owned sites (less than 1 acre) open to public access through public access easements or other enforceable municipal land use permit conditions. About 20 percent of the access sites are larger state-owned properties (e.g., State Parks), while relatively few (5 percent) properties are private non-profit land conservation organization holdings or a unit of the Stewart B. McKinney National Wildlife Refuge (NWR).<sup>24</sup> However, the number of coastal sites is not an entirely accurate indicator of the extent of Connecticut’s shoreline accessible to the general public. That is, the number of public access sites does not describe the miles or percent of Connecticut shoreline available for public use or degree to which Connecticut’s shoreline is under protective ownership (for statistics describing Connecticut’s shoreline ownership, see Table 3 Shoreline Ownership Statistics). Nor do these shoreline access statistics indicate the quality of shoreline recreation experience at public access sites or whether the sites can accommodate some of the most popular coastal recreational activities (such as saltwater bathing, boating access, saltwater fishing, or wildlife viewing).

Demand for many of the state’s most popular coastal recreational activities along some parts of the coast already exceeds, and will likely continue to exceed, the capacity of existing coastal recreation areas to accommodate these uses. Opportunities for new public saltwater swimming beaches are limited because there are few significant lengths of sandy beach not already under public ownership or operated by a private beach association. These factors, and the proximity of several of the state’s most densely populated metropolitan areas to the coastline, are expected to continue to generate significant demand for coastal recreation opportunities at Connecticut’s shoreline state and municipal parks. Two of the state’s four coastal parks with saltwater swimming beaches periodically must turn away prospective patrons by mid-day on summer weekends when parking lots meet capacity. Similarly, municipally-owned shoreline beach parks routinely operate near capacity during summer weekends. State boat-launching facilities on

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<sup>24</sup> S.B. McKinney NWR is the only federal agency land generally available for public use.

coastal and tidal waters are also consistently unable to meet the public’s boating access needs on summer weekends. Of the 13 state-owned boat launch ramps located directly on Long Island Sound, four routinely turn away boaters on popular summer weekends due to parking space limitations<sup>25</sup>.

Pursuant to a 2002 NOAA-OCRM national effectiveness study of state coastal public access programs, coastal states were encouraged to conduct needs assessments of coastal land conservation and public access enhancement priorities. In 2004, Connecticut distributed over 1,000 surveys to members of coastal recreation user groups and individuals with an interest in coastal recreation seeking to identify public access facilities needs and the recreation habits of saltwater anglers, waterfowl hunters, marine boaters and wildlife observation enthusiasts. The principal purpose of the survey was to assess whether existing coastal recreation facilities in Connecticut were meeting demand for these popular recreation activities and how these facilities could be managed to better meet user needs identified through the surveys.

The survey responses are summarized in Table 5 by type of recreational activity.<sup>26</sup> The responses indicate a continued need to acquire sites capable of accommodating these coastal recreation activities.

Table 5  
Demand for Coastal Public Access by Type of Activity

Recreational Activity	% Indicating Additional Access Needed	% Crossing Private Land to Access Shore
Wildlife Observation	81	N/A
Boating Access	83	N/A
Saltwater Angling	N/A	36

### ***B.2.2 Threats***

#### *B.2.2.1 Threats to Connecticut’s coastal conservation values*

Human disturbance, particularly through new residential development, is the principal threat to Connecticut’s remaining unprotected coastal lands with significant ecological or outdoor recreation value. If such development is not managed through regulatory review processes to protect these resources to the maximum extent possible, the habitats and recreational uses they support are diminished, sometimes irretrievably. The following describes the principal threats to Connecticut’s highest priority coastal conservation values and discusses strategies to identify and manage sites that support these values, principally through land acquisition.

<sup>25</sup> Personal communication, DEEP Bureau of Outdoor Recreation, State Parks Field Operations Division

<sup>26</sup> Saltwater swimming, a highly popular coastal recreation activity, was not included in the survey because existing information already confirms that demand for this activity exceeds the capacity of existing facilities to meet demand. Further, a lack of available sites to develop new salt water swimming facilities would make futile any investigation of new facilities, save the unlikely event that private beach clubs and associations with suitable sandy beach make their land available for acquisition.



### *B.2.2.2 Threats to ecological values*

Human encroachment and land disturbance within the coastal area has resulted in the loss or degradation of essential estuarine and coastal habitats. The extirpation or population declines of several species of plants and animals within the coastal area, with the consequent biological diminution of the region, can be attributed to many factors. Historically, destruction of natural habitats through dredging, filling, ditching, and draining of wetlands was associated with the construction of transportation infrastructure. However, the enactment and improved administration of regulatory programs governing such activities since the late 1970s has greatly reduced the direct adverse effects of large scale infrastructure projects on coastal resources. Despite additional controls and conditions placed on permits for coastal area residential development and attendant ancillary shoreline structures (e.g., docks, piers, bulkheads, etc.), cumulative and secondary impacts associated with such development often fragment habitat, diminishing its ability to support species of conservation concern (U.S. Fish and Wildlife Service, Northeast Coastal Areas Study and personal communication with DEEP-Geological and Natural History Survey staff). New threats to coastal resources, particularly threats to tidal marshes such as sea-level rise, also should be considered when identifying coastal land acquisition targets to preserve priority coastal land conservation values.

#### *B.2.2.2.1 Foraging/nesting habitat for water birds, shorebirds, and waterfowl*

Human disturbance associated with public recreational use of foraging and nesting habitat for water birds, shorebirds, and waterfowl can adversely affect these important bird habitats. In some coastal areas, repeated disturbances can result in abandonment or limited productivity of important habitats such as coastal mudflats and sandy beach nesting areas affecting, in some cases, species of continental or global conservation concern. Development along coastal, estuarine, and contributing upstream areas is believed to alter hydrologic regimes in essential habitats, such as tidal marshes, resulting in displacement of native plant species by invasive species and the degradation of water quality in shallow water habitats such as obstructed coves. Activities that disturb water bird colonies in Long Island Sound during the nesting period (mid March to August), including significant pedestrian traffic, low flying aircraft, recreational vehicle use, boat landings and nearby boat traffic, can impair breeding success. Freedom from human disturbance while early spring roosts are established and maintained may also be critical to colony use in the ensuing breeding season.

#### *B.2.2.2.2 Undeveloped coastal islands/riparian areas/coastal forest*

Undeveloped coastal resource areas including coastal islands, riparian habitats and coastal forests provide important ecological 'services' such as maintaining coastal water quality in estuarine embayments. As these areas are converted to support primarily residential use, the ecological services they provide are increasingly at risk. For example, residential development at waterfront and marsh front sites frequently results in further proposals for shoreline alterations such as flood and erosion control structures and docks exacerbating the adverse effects of the site's principal residential use. In particular, the development of off-shore islands adversely affects colonial

waterbird and shorebird populations by reducing the number of limited feeding and resting areas that these areas provide and migrating populations depend upon to rest and feed. Off-shore islands and other marginally-developable sites, such as bluffs and escarpments, previously thought to be immune to significant development, are increasingly being evaluated as developable land as coastal property values increase. Island development generally requires significant land disturbance due to the need for docks, utility line extensions, and on-site sewage disposal systems that can adversely affect coastal resources. Removal or disturbance of vegetation and direct loss of habitat through development on coastal islands has a significant impact on colonial nesting water bird populations in Long Island Sound. Disturbance or elimination of vegetation and preferred wetland feeding areas may also affect birds nesting on islands. Introduction or attraction of mammalian predators, including pets attendant with residential development, into nesting areas is also detrimental to the colonial bird populations.

#### *B.2.2.2.3 Undeveloped coves, estuarine embayments and tidal rivers*

As indicated above, much of Connecticut's coastal area has already been developed and developed land cover is common along Connecticut's waterfront (see Figures 4a and 4b). The lack of undeveloped waterfront land directly fronting on the Sound has resulted in increased interest in developing land with frontage, views or access to waters on coves, estuarine embayments, tidal rivers and tidal marshes. These lands are believed to have potential for significant appreciation in value and marketability (personal communication, Chris Miner, Miner & Silverstein Appraisal Company), principally for residential development. Development of such parcels, particularly within riparian areas, can adversely affect the ecological value that coves, embayments and tidal rivers provide, particularly if the development is not properly sited and designed to maintain the property's ecological values. Some of these areas are valuable as nursery habitat for commercially and recreationally important fish species, and provide essential habitat for all or part of the life cycle of many forage species on which other fish species depend. Development activities that degrade the water quality of streams and ponds and wetlands that are part of these critical sub-estuary systems impair the biological integrity of Connecticut's coastal area as a whole.

#### *B.2.2.2.4 Diadromous fish migration corridors*

Diadromous fishes are species that migrate between freshwater and saltwater habitats and include such species as American eel, shad, and alewife. Some species migrate only short distances inland from Long Island Sound while others penetrate a great distance to the hills and mountains of interior Connecticut and New England. The streams, lakes, and ponds through which these species migrate are known as riverine migratory corridors. Modifications to these corridors—mostly by human development such as dams—have created barriers to migration and resulted in partial or complete extirpation of populations of diadromous species. The degree of extirpation varies depending upon the species involved, the habitat, and the nature of the development. The restoration of these populations is a high priority but cannot always be realized unless these physical barriers can be removed. Solutions, usually involving dam removal or fish-way construction, can be complex when structures are owned by parties unwilling or simply not interested in cooperating to remove the barriers. Thus, the best approach

is often for the site to be acquired by an interested party who will then participate in a partnership to provide a solution.

Lands critical to the effective management and restoration of diadromous fish are not limited to fish passage projects. Other locations critical to the well-being of these species are often located at the head-of-tide, the upstream terminus of saltwater penetration, or at a physical constriction in an estuarine embayment or river system. Physiological and behavioral activities in affected species often occur in these areas. Therefore, the protection of these key parcels through conservation acquisitions is sometimes the most appropriate management action for conserving diadromous fish runs (personal communication, Steve Gephard, CT DEEP- Supervising Fisheries Biologist).

#### *B.2.2.2.5 Tidal wetland and associated upland buffer areas*

Tidal wetlands are especially vulnerable to development activities that disrupt or reduce tidal exchange or disturb the wetland's adjacent upland areas (sometimes referred to as the riparian areas). Because there are few large undeveloped waterfront parcels available for residential development, residential developers are developing larger parcels with frontage on tidal marshes that provide views of marshes and open water, placing these critical coastal resource areas increasingly at risk of secondary impacts from development (e.g., stormwater runoff discharges). Although Connecticut's Tidal Wetlands Act and Regulations provide significant protection from filling, excavation or other direct disturbance, these laws do not regulate development within upland areas adjacent to tidal wetlands that frequently generate indirect or secondary impacts to coastal resources. Further, some activities affecting tidal wetlands, such as the construction of docks, although regulated to avoid or minimize direct impacts, can pose potential indirect impacts such as habitat fragmentation and tidal wetland shading. Development within the upland vegetated buffer area also can result in unauthorized and often undetected minor encroachments into wetlands often associated with residential development activities such as construction of ancillary support structures (e.g., sheds, gazebos, etc.), landscape retaining walls and disposal of yard debris at the wetland edge. Other potential adverse impacts from such activities include obstruction of culverts that provide tidal water exchange between tidal wetlands and tidal creeks and rivers and removal of the upland buffer areas vegetation diminishing the riparian area's effectiveness in filtering pollutants from storm water prior to discharge to coastal waters and marshes. A more recently recognized threat to tidal wetlands is the accelerating rate of sea level rise in Long Island Sound. One forecast for the Northeast by the year 2100 predicts a 41 to 55 inch increase in mean sea-level by the end of the century under a 'rapid Greenland and West Antarctica ice-melt sea level rise' scenario.<sup>27</sup> Regardless of an absolute rate of sea level rise, increased rates of sea level rise will threaten tidal wetlands if upland areas adjacent to tidal marshes do not provide appropriate conditions to support the inland migration of these marshes. Accommodating this phenomena of 'marine transgression' will require support for management recommendations expected to be made as part of an on-going study of how sea-level rise (SLR) is affecting marsh migration, one of the purposes of which is to identify potential tidal marsh migration areas. Such recommendations are expected to be part of the first update to

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<sup>27</sup> New York City Panel on Climate Change (NPCCC). 2009. Climate Risk Information. PlaNYC. City of New York, NY.

Connecticut's CELCP Plan. To view potential SLR inundation scenarios along Connecticut's coast, use NOAA's Sea Level Rise viewer at <http://coast.noaa.gov/slr/> and select 'Connecticut' under the 'Zoom to State or Territory' tab in the upper right of this web page.

#### *B.2.2.2.6 Estuarine embayments with extraordinary aquatic habitat value*

Estuarine embayments with exceptional water quality, especially those supporting extraordinary aquatic habitats (such as productive shellfish beds), provide critical ecological values that are particularly vulnerable to degradation. For example, eelgrass beds and other submerged aquatic vegetation (SAV) are particularly sensitive to water quality degradation from development within local coastal drainage basins, especially if riparian areas are disturbed. Maintaining water quality, particularly water clarity for light penetration to SAV beds such as eelgrass, are critical to maintaining scallop and hard clam fisheries. Development within coastal forests draining to such embayments that contribute to estuarine water quality, particularly within riparian areas, often increases pollutant loads from storm water runoff and creates on-site sewage disposal system discharges to groundwater. These discharges increase nitrogen loads and phytoplankton growth, thereby reducing water clarity light penetration within the water column that in turn adversely affects the health and abundance of SAV.

#### *B.2.2.3 Threats to coastal recreational values*

##### *B.2.2.3.1 Car-top (e.g., kayak, paddleboard) boating access*

As previously indicated, surveys of non-motorized boaters indicate there is significant unmet demand for car-top boating access facilities. Additional boating access for kayaks and paddleboards is especially needed within the lower Connecticut River region and areas where existing launch facilities are restricted to municipal residents, primarily along Connecticut's western Long Island Sound shoreline. Limited public land along and extensive development of Connecticut's Long Island Sound shoreline, and even its coves and popular 'back-water' paddling area such as those on the Connecticut, Quinnipiac and Thames Rivers, make it difficult to acquire land and develop new car-top launch facilities. Competition between paddle craft and motorized boats for parking and launch ramps at some State boat launches create user conflicts and facilities management problems. Other obstacles to car-top boating access is the lack of neighborhood support new launch facilities and the policy of some towns to limit use of their boat launches to town residents only or making access to town launches prohibitively expensive to non-residents.

##### *B.2.2.3.2 Access for trailered boats and parking*

Because launching trailered-boats requires sufficient water depths and space for trailer parking there are even more limited opportunities to acquire new sites well-suited to providing new trailered boat launch facilities. Neighborhood opposition to developing new or expanding existing boating facilities also contribute to preventing DEEP from providing new boating access

facilities. This situation is even further exacerbated by the closing or conversion to residential uses of small-craft marinas that previously offered boat launching services to the public.

#### *B.2.2.3.3 Shore-based fishing/crabbing/shell-fishing areas*

A 2004 DEEP survey of shore-based marine anglers indicated that 36 percent of surveyed respondents cross private lands to access shore-based fishing areas. These informal fishing and crabbing access areas, used by the public through custom and the goodwill of the landowners, are being lost as coastal waterfront property is developed or sold to owners who prohibit public use of their shoreline property. Similarly, recreational shellfishing is threatened by shoreline access restrictions and shellfish bed closures due to water quality impairments. Such impairments are caused in part by polluted storm water runoff discharged into recreational shellfish areas from upland development with inadequate storm water quality management controls.

Further, many recreational saltwater anglers and shell-fishers access waters by walking along the public trust area of the shore to reach a preferred fishing spot from an available public access point, such as a public road end. However as shorelines erode and sea level rises, the public's ability to pass within the public trust area waterward of the mean high water will be lost, particularly in regions of the coast where inland migration of the mean high water is restricted by shoreline flood and erosion control structures such as groins and seawalls.

#### *B.2.2.3.4 Coastal greenways/trails*

Due in large part to the highly developed nature of Connecticut's shoreline and the predominance of relatively small sized parcels (e.g., less than 10 acres), Connecticut has few long (e.g., over 1 mile) continuous public access trails near coastal waters. Within 1,000 feet of coastal waters, especially land fronting directly on Long Island Sound, assembling large numbers of small parcels to create continuous public trails is extremely challenging. The few remaining larger undeveloped parcels with potential to provide new or expand existing recreation trails, such as those along Niantic River in East Lyme, are often valued well beyond the budgets of local land conservation organizations to acquire these lands. However some communities within highly developed shoreline areas, such as the Mill River in Stamford, are gradually creating shoreline trails or greenways along coastal waters by acquiring land with assistance from State and federal agencies, as it becomes available, or are requiring private dedications of public land to fill gaps within planned trail systems through the municipal coastal site plan review process.

### **C. CELCP Project Area and Focus Area Conservation Targets**

In order to better identify potential coastal land acquisition opportunities that address Connecticut's coastal conservation goals, a more focused geographic analysis is needed than that which can be practically accomplished using Connecticut's Coastal and Estuarine Planning Area (Figure 1). Therefore, two more planning sub-areas are proposed to help identify future CELCP acquisition projects. The first, referred to as Connecticut's *CELCP Project Area*, is defined as the area within the 42 municipalities identified in Figure 6 not already developed (as defined in Figure 3 and shown in Figures 4a and 4b) or held as 'protected open space' (as defined in

footnote 1 in Table 3 on page 16.)<sup>28</sup> The CELCP Project Area is most likely to include Connecticut's priority coastal conservation values and areas (described in Section II.B).

The CELCP Project Area was then further distilled to identify unprotected coastal area land with attributes indicative of Connecticut's targeted priority coastal land conservation values. The goal was to identify and map focus areas within the broader CELCP Project Area that represent areas of ecological significance that can be used to help guide potential future coastal land acquisitions. The purpose of further refining the CELCP Project Area to *focus areas* is to concentrate limited analytical resources to areas most likely to contain high-priority land acquisition opportunities that can successfully compete in the highly selective national CELCP funding process. The methodology and resulting focus area maps are presented in greater detail in Appendix 19, and summarized below.

### C.1 Process for Identifying Focus Areas

Because national CELCP competition guidelines assign priority to acquisition projects with significant *ecological value*, ecological-based evaluation criteria were used to identify 'focus areas.' The focus areas were identified using weighted evaluation criteria (shown in Table 6) to identify areas based on: the size of un-fragmented forest blocks, proximity to existing protected open space, potential marsh migration zones, habitat for threatened and endangered species, species of global conservation need, and/or concentrations of migratory waterfowl.

Based on this assessment, coastal focus areas were identified and assigned a value ranging from high to low based on the weighted criteria, as shown in Figure 7, below. More detailed regional maps of these areas can be found in Appendix 19.

This emphasis on using the ecologically-based project selection criteria described in Table 6 is not intended to discount the importance of acquiring coastal land that can support other land conservation objectives, such as natural resource based outdoor recreation. Rather, these criteria were selected because they reflect national CELCP program conservation priorities and because they are supported by relatively strong available geo-spatial data sets. As new state compatible geospatial data sets (e.g., shorebird breeding areas) become available, the criteria used to identify CELCP focus areas can be modified. Future updates likely include results of updated assessments of areas suitable for marsh migration using the sea-level-rise affecting marsh model (SLAMM), and other information that may help Connecticut's coast adapt to changing conditions.

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<sup>28</sup> Three datasets were used to identify Connecticut's CELCP project area's 42 coastal municipalities. They include: (1.) The boundaries of Connecticut's 36 statutorily-defined coastal municipalities (defined in Connecticut General Statutes Section 22a-94); (2.) the boundaries of the 6 lower Connecticut River Valley municipalities that contain 'Ramsar wetland' core sites designated "wetlands of international importance" pursuant to Ramsar Convention on Wetlands (see Section II.D.7. for a description of the Ramsar Convention and the Connecticut River Estuary and Tidal Wetlands Complex Ramsar Convention nomination and Appendix 13-Connecticut River Ramsar Core Sites); and (3.) Connecticut's coastal eco-regions, as defined in the publication *Rare and Endangered Species of Connecticut and Their Habitats*, (shown in Figure 6 and further described in Appendix 5- *Rare and Endangered Species of Connecticut and their Habitats*, CT DEEP, 1976). Collectively, the 42 municipalities depicted in Figure 5 encompass 1,145 square miles, comprising 55 percent of Connecticut's Coastal and Estuarine Area (2,073 square miles) and 25 percent of Connecticut's coastal watershed (4,600 square miles).

Ten ecological-based criteria were used to develop a ‘weighted-sum’ scoring mechanism to refine the CELCP Project Area to identify more discrete coastal acquisition ‘focus areas’ still in non-protective forms of ownership. Using a spatial statistics algorithm, a clustering analysis was conducted to identify ‘hot-spots’ representing concentrations of high ecological value warranting additional investigation as potential conservation acquisition targets. Each criterion was assigned a weighting-factor to reflect its perceived value relative to other criteria. As indicated in the following table, Connecticut places significant value on conserving large blocks of unfragmented coastal forest blocks and marsh advancement zones, particularly those proximate to areas of existing protected open space (POS). Note however, that other criteria not used to help identify focus areas (e.g. shorebird foraging areas) were excluded from the analysis not because they are unimportant, but because insufficient geospatial data exist to use the criteria. As additional geo-spatial data for important ecological evaluation criteria not included in this analysis become available, the focus areas identified here will be modified.

Table 6  
Evaluation Criteria Used to Identify  
‘Focus Areas’

Criteria	Weight
Forest Blocks <100 acres	<b>4</b>
Forest Blocks 100-250 acres	<b>8</b>
Forest Blocks 250-500 acres	<b>12</b>
Forest Blocks >500 acres	<b>20</b>
Proximity to POS Property	<b>15</b>
Marsh Advancement Zones	<b>14</b>
Natural Diversity Database Areas (e.g., CT endangered or threatened species areas)	<b>10</b>
Migratory Waterfowl Concentration Areas	<b>6</b>
Critical GCN* Species Habitat	<b>10</b>
Land Use/Land Cover	<b>1</b>
<b>Total</b>	<b>100</b>

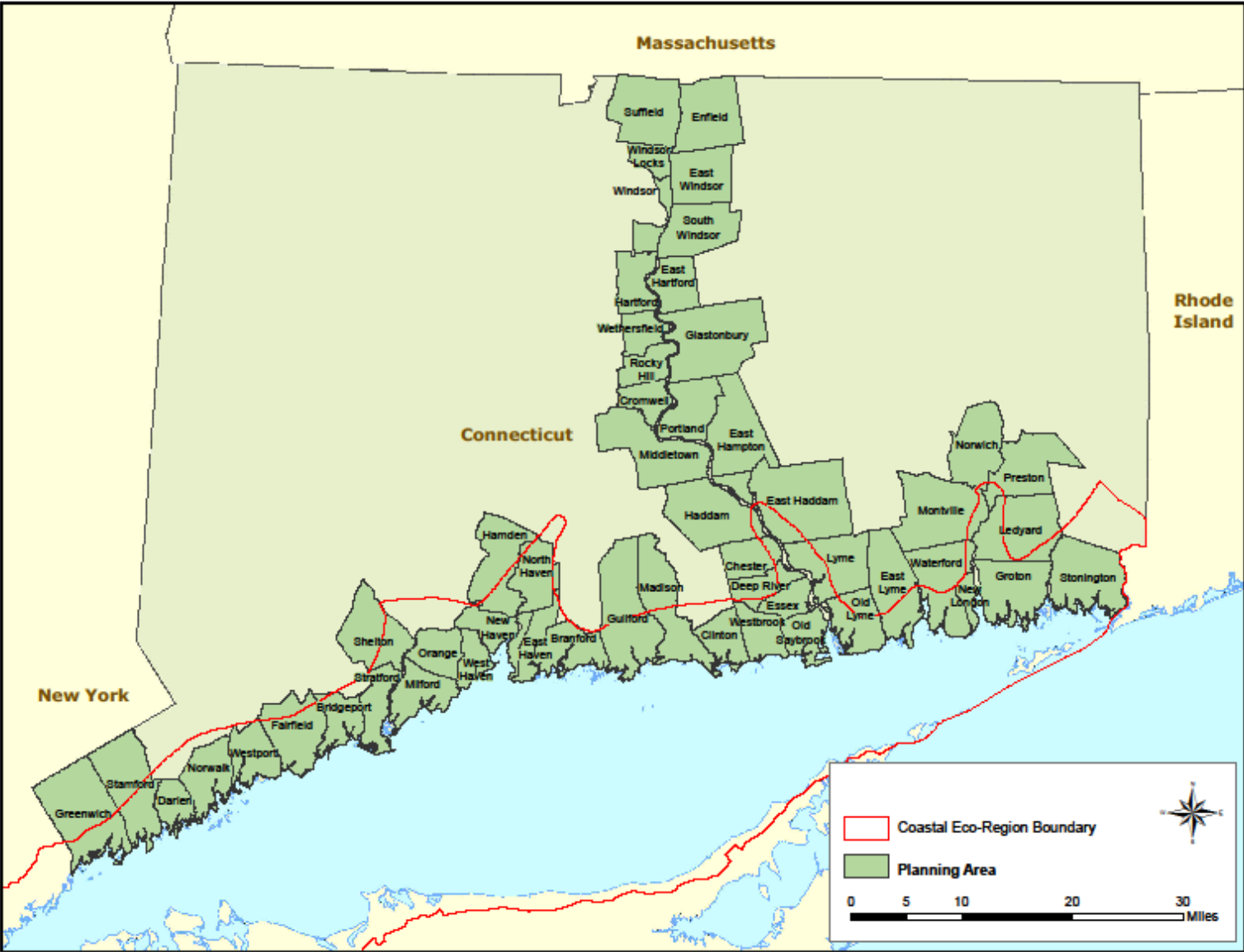
\* Species of Greatest Conservation Need are identified in *Connecticut’s Comprehensive Wildlife Conservation Strategy (Appendix 15)*

In order to help score the relative ecological value of potential focus areas, a grid dividing the Project Area into 500 foot by 500 foot cells was applied to the area. This grid size was selected to balance the size of the input data with the data processing capacity of the GIS tool used to conduct the analysis. Raw score values were determined for each cell within the CELCP Project Area based upon whether the area of the cell contained the ecological value described by each criterion listed in Table 6. These raw scores were used to develop a composite scoring index derived using a geo-processing model to aggregate area scores. The resulting scores represent the potential relative ecological value of specific locations within the CELCP Project Area using a spatial statistics algorithm. Each location within the Project Area was evaluated by applying the algorithm within each grid cell. By aggregating neighboring individual grid cell values with similar characteristics, the resulting data could more readily be interpreted at an appropriate

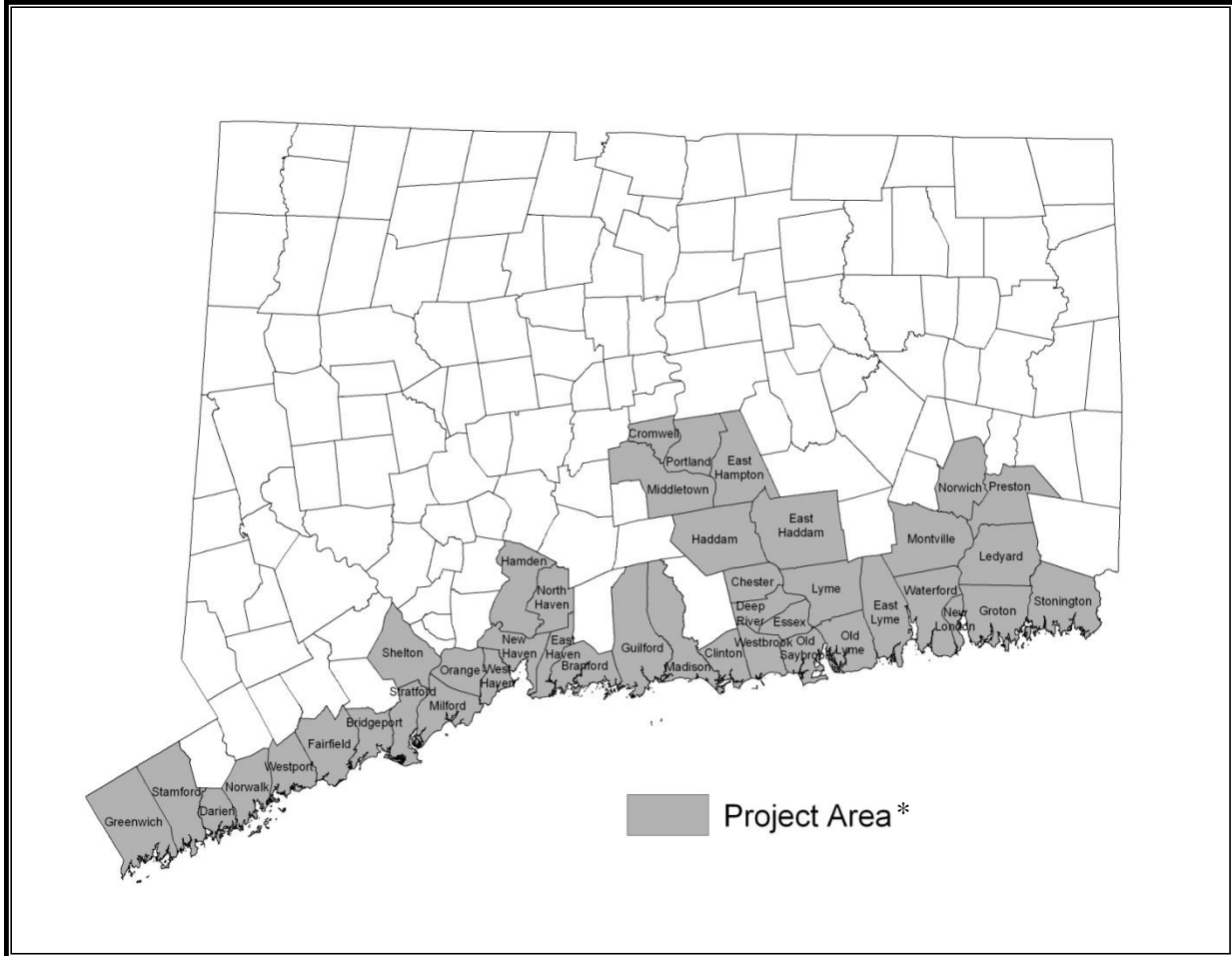
scale. In other words, the individual grid cell aggregation process identified ‘hot-spots’ representing areas of potentially significant conservation value. These areas are shown in the ‘hotter’ colors red, orange, yellow in Figure 7 below. Conversely, areas less likely to contain lands with high priority coastal conservation value are shown in the ‘cooler’ colors royal blue, aqua blue, green. We expect that additional investigation of coastal land conservation opportunities will be focused within areas identified as potential conservation ‘hot spots.’



**Figure 5.** Connecticut Coastal Eco-regions Relationship to the Coastal and Estuarine Planning Area



**Figure 6. CELCP Project Area Municipalities**

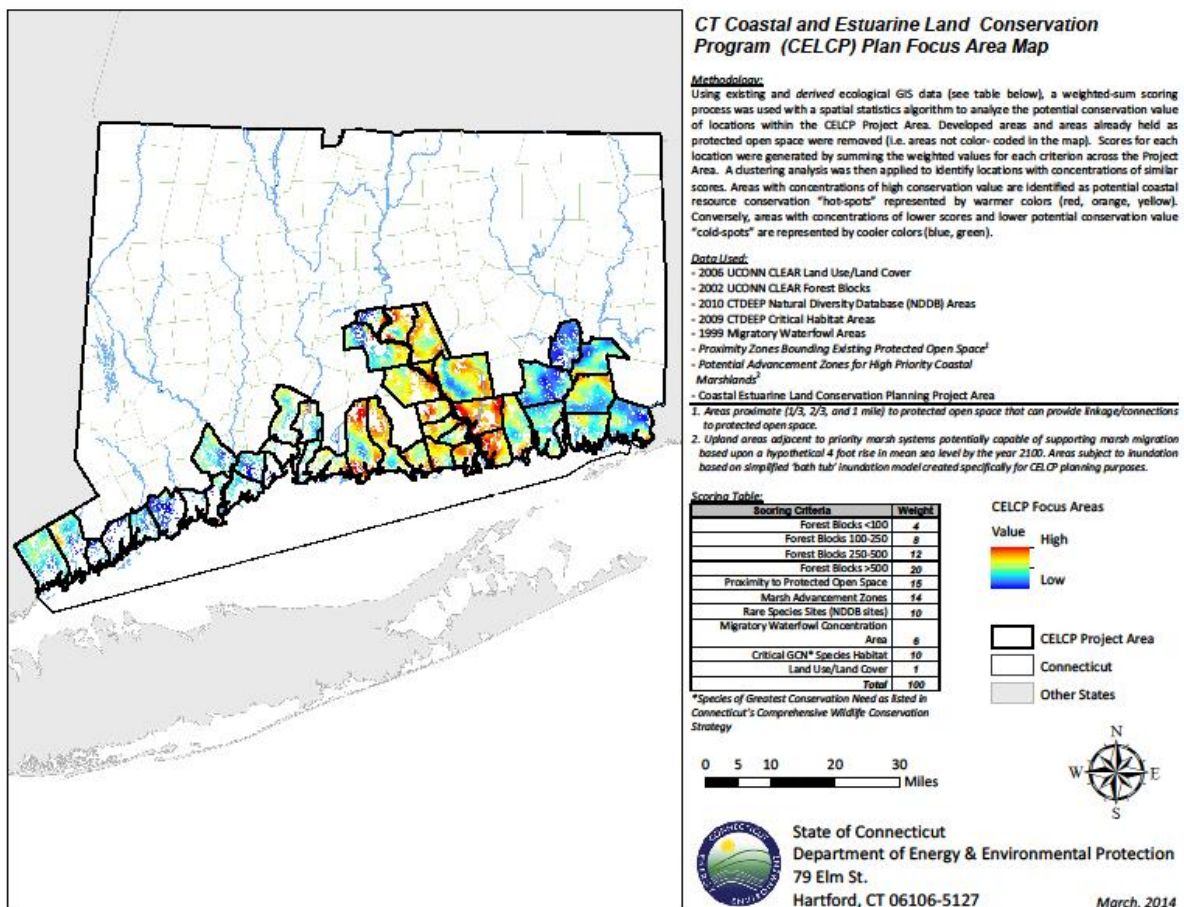


\* See description in Section II.C. (on pg. 26) of the CELCP Project Area within these municipalities. See Appendix 4 for a list of the CELCP Project Area Municipalities.

## C.2 Identification of Connecticut's Focus Areas

Figure 7 shows the locations of Connecticut's focus areas identified using the process described in section II C.1. As noted above, the areas shown in the 'hotter' colors of red, orange, yellow ('hot-spots') represent areas of potentially significant conservation value. The areas shown in the 'cooler' colors of royal blue, aqua blue, and green are less likely to contain lands with high priority coastal conservation value. Although these maps are intended to help guide the identification of potential priority coastal land acquisition opportunities that can successfully compete in national CELCP funding competition, they do not restrict areas where acquisition projects can be proposed, nor will acquisition candidate sites within these areas necessarily be given priority according to the project scoring criteria listed in Table 7.

Figure 7. CELCP Focus Areas



For a larger scale views of CELCP focus areas go to <http://arcg.is/1MvQfTg>

## **D. Description of Existing Plans and Studies Incorporated into the CELCP Plan**

The following resource conservation and management plans, surveys and studies were consulted when drafting Connecticut's CELCP Plan. The first set of documents (Section D.1) provided spatial information used to help define Connecticut's CELCP Project Area and may be used by project applicants and reviewers to determine the location of priority land conservation values. The second set of documents (Section D.2) more generally describe agency-wide conservation values relevant to this plan and can be consulted by CELCP conservation project proponents and reviewers to better understand Connecticut's priority land conservation values. All the plans, surveys and studies referred to are incorporated into this CELCP Plan by reference and will be consulted to identify potential land acquisition projects to the national CELCP project selection process.

### ***D.1 Plans, Surveys, and Studies Containing Geographic Information within the Project Areas***

#### ***D.1.1 Coastal Land Assessment Methodology (CLAM)***

DEEP's Office of Long Island Sound Programs (OLISP) developed a coastal land acquisition planning tool called *Coastal Land Assessment Methodology* (CLAM) to identify priority coastal land acquisition opportunities. CLAM is a municipal tax parcel based computer model that uses a geographic information systems (GIS) application to perform simple spatial analyses. The model queries tax parcel and natural resource information to identify potential coastal land conservation opportunities based upon a parcel's size, land cover, presence of significant natural resources, and proximity to existing protected land. This land acquisition-planning tool is being used to identify coastal land acquisition opportunities (Appendix 3 provides a summary of the CLAM project's findings and how project data can be accessed).

#### ***D.1.2 Long Island Sound Stewardship Initiative***

The LIS Stewardship Initiative (LISSI) is a program of the EPA's Long Island Sound Study office developed in coordination with the updated 2015 LIS Comprehensive Conservation and Management Plan (LIS CCMP) goal to conserve the Sound's most significant ecological areas and increase public access to the Sound. The goals of the Long Island Sound Stewardship Initiative are to:

- Identify sites or site complexes with exceptional recreational and ecological value;
- Facilitate funding for permanent protection and stewardship of identified sites or complexes of sites;
- Provide site managers or owners with access to technical support and assistance for improved resource stewardship;
- Link related sites to promote landscape-scale planning for long-term ecological health and public enjoyment of the Sound;
- Collaborate with related public and private entities to protect open space, improve the ecological health of the Sound, and increase public access and recreational opportunities around the Sound; and

- Foster voluntary partnerships to leverage limited public funds available for open space protection, public access, management, and activities designed to maintain and enhance the ecological health of the Sound.

LISSI's Stewardship Work Group is coordinating efforts to identify areas with outstanding ecological and recreational resource value and to develop a strategy to protect and enhance them. The Work Group outlined a two-phase strategy to accomplish this objective. The first planning phase is an inventory of ecological and recreational resources of Sound-wide importance, the most significant of which are designated as Stewardship areas that include specific sites or properties. As funding allows, more detailed resource inventories, management plans that identify resource threats and conservation opportunities are completed. The second phase focuses on implementation of on-the-ground stewardship actions to protect or enhance the public resource values these sites provide. Both phases of the process will be iterative requiring additional planning and implementation phases. An in-depth description of the Stewardship Initiative can be accessed using the [EPA Long Island Sound Study Web site's Stewardship pages](http://longislandsoundstudy.net/issues-actions/stewardship/background/) <http://longislandsoundstudy.net/issues-actions/stewardship/background/> Enhancing and expanding conservation land within LIS Stewardship areas continues to be an objective of the 2015 update to LIS CCMP, more about which can be accessed by searching [the EPA LIS Web page](http://longislandsoundstudy.net/) <http://longislandsoundstudy.net/>. The current CCMP is available at <http://longislandsoundstudy.net/about/our-mission/management-plan/>.

#### ***D.1.3 Connecticut Coastal Recreation Access Survey***

In 2004, DEEP's OLISP conducted a series of coastal recreation access and facilities needs surveys, the results of which are incorporated into the needs assessment section B.2 of this plan. The surveys gauged the public's coastal recreation needs and illuminated the public's coastal recreation habits and preferences and our understanding of the most popular types of coastal recreation activities. The recreational activities assessed by the access surveys included: (1) saltwater angling and waterfowl hunting; (2) wildlife observation; and (3) marine boating. Approximately 1,000 surveys were distributed to targeted recreational user groups or individuals with special knowledge or interest in these coastal recreation activities (the survey response rate was 39%). Geographic data compiled as part of the survey can be used to identify and prioritize coastal land acquisition opportunities and target coastal recreation facilities improvement funds. A summary of the survey results is included in Appendix 9.

#### ***D.1.4 Northeast Coastal Areas Study: Significant Coastal Habitats of Southern New England and Portions of Long Island, New York (NECAS)***

*Northeast Coastal Areas Study: Significant Coastal Habitats of Southern New England and Portions of Long Island, New York* (Appendix 10) evaluated the quality of and threats to regionally significant fish and wildlife habitat in coastal and estuarine areas of southern New England and northern and eastern Long Island. The study contains an analysis of regionally significant habitat most in need of protection to preserve natural diversity in the coastal southern New England-New York bight eco-region. The study can be accessed at <http://library.fws.gov/pubs5/necas/begin.htm> .

### ***D.1.5 RAMSAR Nomination: Connecticut River Estuary and Tidal Wetlands Complex***

In 1994, the Connecticut River Estuary and Tidal River Wetlands Complex was designated “wetlands of international importance” pursuant to the Ramsar Convention on Wetlands (see Appendix 11 for a map describing the complex). The Convention on Wetlands, signed in Ramsar, Iran in 1971, is an intergovernmental treaty that provides a framework for national action and international cooperation for the conservation and wise use of wetlands. Consistent with the Ramsar Convention, primary emphasis is placed upon wetlands but in several instances sites include subtidal areas, upland riparian areas and coastal zones adjacent to the wetlands. These areas represent the complex of wetlands and tidal waters that meet the criteria for designation as “wetlands of international importance” pursuant to the Ramsar Convention (see Appendix 12 Ramsar Criteria for Inclusion). Within the Connecticut River Estuary and Tidal River Wetlands Complex Ramsar designation area, there are 20 discrete major wetland complexes, or core sites, listed in the Ramsar nomination report (see Appendix 13 Ramsar Core Sites). These Ramsar-designated core sites will be used to help identify high priority coastal land acquisition opportunities for possible nomination to the national CELCP project selection review process. A list of the Ramsar-designated core sites can be accessed at: [http://library.fws.gov/pubs5/ramsar/web\\_link/sites.htm#Listpercent20ofpercent20Corepercent20Sites](http://library.fws.gov/pubs5/ramsar/web_link/sites.htm#Listpercent20ofpercent20Corepercent20Sites) and a map of the site locations at: [http://library.fws.gov/pubs5/ramsar/web\\_link/images/map.htm](http://library.fws.gov/pubs5/ramsar/web_link/images/map.htm)

### ***D.1.6 Long Island Sound Study Habitat Restoration Initiative***

The Long Island Sound Study Habitat Restoration Initiative’s list of potential habitat restoration sites is incorporated into this Plan (see Appendix 14 - Long Island Sound Habitat Restoration Sites) as a guide for identifying potential CELCP land acquisition sites. The Long Island Sound Study Habitat Restoration Initiative is a partnership of state, federal and non-governmental organizations working to restore habitats that support the Sound’s living resources. The goals of the Initiative are to restore an additional 532 acres of tidal wetlands and 200 miles of fish riverine migratory corridors between 2015-2035.

A list of restoration sites in Connecticut can be obtained by reviewing the Habitat Restoration Database on the EPA Long Island Sound Study’s Habitat Restoration web page at: <http://lisshabitatrestoration.com/search.aspx> and contacting the coastal resource restoration specialist at CT DEEP’s Office of Long Island Sound Programs.

### ***D.1.7 Connecticut’s Comprehensive Wildlife Conservation Strategy***

*Connecticut’s 2005 Comprehensive Wildlife Conservation Strategy* (CCWCS) (Appendix 15) describes the State’s 12 key habitat types, identifies species of “greatest conservation need” (GCN species), threats to these species, potential conservation actions to address identified threats and a plan implementation monitoring program to evaluate the effectiveness of conservation strategies. The most significant threats to Connecticut’s GCN species habitats include: degradation, and fragmentation from development; changes in land use; and competition from non-native, invasive species. Other threats include insufficient scientific knowledge regarding wildlife and their habitats (distribution, abundance and condition); lack of landscape-level conservation plans; insufficient resources to maintain or enhance wildlife habitat; and

public indifference toward conservation. Connecticut's CELCP Plan can contribute to the implementation of the CCWCS through acquisition of lands or interest in lands that provide key habitat for GCN species. Acquisition projects nominated for CELCP funding assistance should, if possible, describe how the acquisition will benefit GCN species and their key habitats described in Chapter 4 of the CCWCS. The CCWCS is currently (January 2015) being updated, and is now referred to as Connecticut Wildlife Action Plan. For more on this effort see [http://www.ct.gov/deep/cwp/view.asp?a=2723&q=329520&deepNav\\_GID=1719](http://www.ct.gov/deep/cwp/view.asp?a=2723&q=329520&deepNav_GID=1719)

## ***D.2 Plans, Surveys, and Studies That Support CELCP Priority Lands and Values***

### ***D.2.1 Connecticut Statewide Comprehensive Outdoor Recreation Plan (SCORP) (2005-2010)***

Connecticut's *Statewide Comprehensive Outdoor Recreation Plan*, or SCORP, (Appendix 6) identifies Connecticut's natural resource-based outdoor recreation needs and provides a blueprint for prioritizing federal and state resources to address the Plan's goals. Through the SCORP planning process, a survey of Connecticut residents was conducted to identify the most popular outdoor recreation activities. Among the top ten outdoor recreation activities that Connecticut households participated in during 2004, "beach activities" (2<sup>nd</sup>) and "saltwater swimming" (4<sup>th</sup>) ranked among the most popular. The most commonly cited priority action suggested by survey respondents was to acquire additional open space. Properties that can accommodate water-based recreation such as swimming, boating and fishing, as well as trail-based activities, are identified as among the highest land acquisitions priorities. Other specific acquisition priorities include: private in-holdings within DEEP-owned lands, properties capable of supporting multiple recreational uses, and properties with joint ownership and management cost-sharing potential.

### ***D.2.2 The Green Plan: Guiding Land Acquisition and Protection in Connecticut 2007-2012***

*The Green Plan: Guiding Land Acquisition and Protection in Connecticut 2007-2012* (see Appendix 7), is Connecticut's principal strategic plan for land acquisition and protection. The Plan is currently (Fall 2015) in the process of being comprehensively revised and updated. The Plan provides general guidance for State land acquisition program managers and is a tool for organizations that wish to cooperate with the State to address statewide land acquisition priorities. *The Green Plan* identifies multiple land conservation criteria to consider when prioritizing potential land conservation opportunities. These criteria are classified into the following four categories: (1) ecological values; (2) use needs; (3) location concerns and (4) general evaluation considerations. Individual criteria within these four categories are presented on pages 6-9 of the Plan.

One of the principal goals in the Green Plan is to conserve 21 percent of Connecticut's land area. This include 10 percent held as State-owned land with the balance held by municipalities, nonprofit land conservation organizations and water company lands held as Class I and Class II watershed lands. The State's two principal land conservation funding programs through which to accomplish the goals of the Green Plan are the Recreation and Natural Heritage Trust Program (RNHTP) and the Open Space and Watershed Land Acquisition Grant Program (Open Space Grant Program). The RNHTP is DEEP's primary program for acquiring land to expand the State's system of parks, forests, wildlife, and other DEEP managed lands and funds land

acquisitions of statewide natural, recreational and cultural significance. Of special conservation interest are lands with unique landscape features such as rivers, ridgelines, rare natural communities, scenic qualities, historic significance, water access and connections to existing conservation land. The Open Space Grant Program provides financial assistance to municipalities, nonprofit land conservation organizations and water companies to acquire land for many of the same purposes and to protect lands critical to protecting public water supplies but to be managed by the grantees.

The Green Plan includes in its list of acquisition and protection priorities several CELCP objectives including: protecting sensitive coastal resources; preserving exemplary coastal ecosystems, habitats or landscape; and enhancing coastal public access and other coastal recreational opportunities.

### **D.2.3 Connecticut Forest Resource Assessment and Strategy**

The Connecticut Forest Resource Assessment and Strategy <[http://www.ct.gov/deep/cwp/view.asp?a=2697&q=454164&deepNav\\_GID=1631](http://www.ct.gov/deep/cwp/view.asp?a=2697&q=454164&deepNav_GID=1631)> identifies the principal issues facing the long-term viability and health of Connecticut's forestlands and strategies actions needed to address these issues over the ten-year period (2010-2015). Many of the proposed principles and actions listed in the Strategy section of the document are consistent with and could be furthered by the CELCP Plan. They include: creating partnerships to accomplish planning objectives, improving long-term conservation planning, encouraging well-managed forests that provide important public benefits including abundant high quality water resources, and protecting core forest areas from conversion to non-forest uses.

## **III. Implementation**

### **A. Identification of State Lead Agency**

The DEEP's Office of Long Island Sound Programs (OLISP) is the lead state agency responsible for preparing and overseeing implementation of Connecticut's CELCP plan in coordination with DEEP's Land Acquisition and Management (LAM) Division. DEEP-OLISP administers Connecticut's federally approved coastal management program and is responsible for ensuring that state agency actions are consistent with the program. DEEP-OLISP works in close coordination with DEEP divisions that manage coastal property to promote management activities that protect and restore coastal resources, and where appropriate, provide public recreation opportunities. DEEP-LAM is the agency's lead division for acquiring lands to be held under DEEP's custody and control. DEEP-LAM also assigns management responsibility to the appropriate DEEP division primarily responsible for managing newly acquired conservation land.



## **B. Agencies Eligible to Hold Title to Property**

*CELCP Final Guidelines* require that title to property or other property interests acquired using CELCP funds be held by an eligible state agency or local government and that a permanent conservation restriction be placed on the property. Eligible agencies include DEEP and municipalities within Connecticut's Coastal and Estuarine Area (see Figure 1). CELCP grant awards are typically awarded to DEEP although DEEP may sub-award CELCP grant funds to an eligible municipality if it is more appropriate for a municipality to hold title to property acquired through CELCP. NOAA may also make awards directly to the sub-recipient, with concurrence from DEEP, in order to expedite completion of projects awarded funding.

Other land conservation organizations such as land trusts ineligible to receive CELCP funding may serve as 'project cooperators' by committing the value of lands they own through a conservation easement if such land contributes to a proposed CELCP acquisition project's conservation value. By contributing the value of such lands, cooperating entities can assist eligible entities meet substantial CELCP matching funds requirements. Such organizations can also play a significant role in implementing Connecticut's CELCP Plan by identifying potential coastal land acquisition projects for nomination to the national project selection process. Upon acquisition of coastal land by an eligible entity, land trusts and other land ineligible organizations can continue to participate in the property's stewardship by managing lands acquired by others through CELCP. Locally-focused land acquisition identification and management roles may be particularly appropriate for land trusts or other land conservation organizations since they are often most aware of local land acquisition opportunities and best positioned to manage conservation lands.

## **C. Land Acquisition Project Nomination Process**

### ***C.1 Identifying Coastal Land Acquisition Projects***

In order to generate potential acquisition projects that can successfully compete for land acquisition funding assistance through the national CELCP competition, CT DEEP will solicit project proposals using a two-phase solicitation process. Phase 1 will use CT DEEP's electronic newsletter *Sound Outlook* and other public outreach methods to describe national CELCP project evaluation criteria, Connecticut's priority conservation values and focus areas. The purpose of this informal 'notice' is to create a 'pool' of potential land conservation projects for nomination to the highly competitive national CELCP grant program competition. Following this notice, upon official announcement of a NOAA-sponsored national CELCP funding opportunity, CT DEEP will issue a more detailed request for proposals (RFP) for CELCP project nominations. This two-phase project solicitation process should help develop proposals geared to state and national project selection criteria well in advance of formal notification of a CELCP funding opportunity announcement. Municipalities within Connecticut's CELCP Project Area, regional planning agencies serving those municipalities and land conservation organizations registered with the Connecticut Land Conservation Council serving eligible municipalities will be notified of CELCP federal funding opportunities.

In the second phase, project proponents will be encouraged to provide a brief summary of project proposals to CT DEEP so that it can provide guidance on how to develop a complete and competitive CELCP project nomination. Responses to CELCP funding opportunity notices require detailed information describing a proposed project's consistency with Connecticut's CELCP Plan and national project evaluation review criteria.

## ***C.2 Request for Proposal Response Review and Prioritization***

### ***C.2.1 Proposal Acceptance***

Responses to CT DEEP's RFP project nominations will be screened to determine if proposals are complete and eligible. Applicants submitting incomplete proposals will be provided a time-limited opportunity to provide all required information. For instance, projects that propose to vest title to property with an eligible municipality must include documentation demonstrating that the municipality or other participating organizations can provide required non-federal acquisition matching funds. Matching funds provided in part by DEEP's Open Space and Watershed Protection Grant Program must include a grant award letter documenting that awarded funds are being held in reserve as part of the required non-federal match. A demonstration of municipal sources of matching funds should include documentation that such funds have been encumbered by a municipal finance committee. Other sources of required match should provide a letter from the organization's governing body verifying that the funds have been encumbered and are being held in reserve for the acquisition.

### ***C.2.2 Project Proposal Review and Ranking***

Complete project proposals will be reviewed and ranked by Connecticut's CELCP Project Review Committee. The Committee will consist of representatives from the land trust community, municipal conservation commissions and CT DEEP. The committee will review proposals for consistency with the Plan according to a scoring system to be developed using the Connecticut Project Nomination Criteria in Table 7 as a guide. These criteria may be modified from year to year to reflect the current funding priorities of the CT DEEP and NOAA which will be provided as part of the RFP solicitation process. The Committee's interpretation of the criteria and their application to score project nominations will be guided by this Plan. The Project Review Committee will accept and review proposals outside the CELCP Project Area that are within the Coastal and Estuarine Area only if the Committee determines that the project directly responds to a priority coastal land conservation value described in Section II. B. of the Plan and that the project would be a competitive proposal according to the state and national CELCP project scoring process. For projects selected by the Committee for referral to the national CELCP competition, completed Project Nomination Forms will be reviewed according to the project selection criteria that states are required to consider when nominating project proposals (Table 8.). More about the national CELCP competition can be found at <http://coast.noaa.gov/czm/landconservation/applying/> .

Table 7  
Draft Connecticut Project Nomination Evaluation Criteria<sup>29</sup>

Criteria	Maximum Potential Score
<b><i>(1.) General Conservation Value/Project Readiness</i></b>	
Size (10-50 acres; 50 -100 acres; 100-200 acres; >200 acres)	4
Leverages conservation of related parcel(s) of conservation value	2
Contains frontage on tidal waters or tidal marsh	3
Property can be readily managed/has a dedicated management funding source	2
Abuts existing protected open space/eliminates an ‘in-holding’	4
Proximate to existing protected open space (proximity based on principal purpose of acquisition)	2
Reduces potential boundary management problems of abutting protected open space	1
Property does not require contaminant remediation per phase 1 environ. assessment	1
Project sponsor can provide required non-federal funding match	5
Advances a priority goal of a local watershed or area management plan	1
Demonstrated commitment of landowner to complete conservation sale	5
Significantly reduces potential to degrade an aquatic resource or habitat type dependent on high water quality (e.g., shellfish and eel grass beds)	2
Significantly contributes to the conservation of a landscape feature of statewide conservation significance (e.g., traprock ridges) as described in the CT Green Plan	2
Clearly describes how acquisition protects a CT CELCP Plan priority conservation value or area	3
<b>Subtotal</b>	<b>35</b>
<b><i>(2.) Ecological Value</i></b>	
Significantly contribute to the health/viability of a rare biological community (e.g., freshwater tidal marsh free of invasive plants, Atlantic white cedar swamp, etc.)	4
Includes exemplary LIS habitat/ecosystem type (e.g., barrier beach/dune) especially those under-represented in the State’s existing system of protected open space	4
Includes outstanding LIS habitat/ecosystem type (e.g., unditched salt marsh)	5
Protects one or more of 12 key habitats described in <i>CT’s Comprehensive Wildlife Conservation Strategy</i> ( <a href="ftp://ftp.state.ct.us/pub/dep/wildlife/cwcs/CWCSC4.pdf">ftp://ftp.state.ct.us/pub/dep/wildlife/cwcs/CWCSC4.pdf</a> )	3
Provides rare species habitat	4
Provides habitat for GCN species described in <i>CT’s Comprehensive Wildlife Conservation Strategy</i>	4
Provides area capable accommodating upland migration of an exemplary tidal wetland system	4
Provides habitat for species identified on the IUCN’s “Red List” with a “threatened” ranking of near-threatened or greater <sup>30</sup>	3
Links wildlife travel or seed dispersal corridor between critical habitats	3

<sup>29</sup> Criteria weighting subject to change by Connecticut DEEP CELCP Project Nomination Committee

<sup>30</sup> See International Union for the Conservation of Nature and Natural Resources (IUCN) Red-List at <http://www.iucnredlist.org/search/search-basic>

Enhances an ecological value in at a LIS Stewardship site (see <a href="http://longislandsoundstudy.net/issues-actions/stewardship/stewardship-areas-atlas/">http://longislandsoundstudy.net/issues-actions/stewardship/stewardship-areas-atlas/</a> )	2
Within/adjacent to adopted or identified National Audubon Society Important Bird Area (IBA) or other important bird habitat	2
Protects large (>200 acres) unfragmented block of coastal forest	3
Protects upland adjacent to Ramsar-designated Wetlands of International Importance “core” sites (see <a href="http://nctc.fws.gov/resources/knowledge-resources/pubs5/ramsar/web_link/intro.htm">http://nctc.fws.gov/resources/knowledge-resources/pubs5/ramsar/web_link/intro.htm</a> )	4
<i>Subtotal</i>	<i>45</i>
<b>(3.) Recreational Value<sup>31</sup></b>	
Provides public access to coastal waters in a distressed municipality (as referenced in current list at <a href="http://www.ct.gov/ece/cwp/view.asp?a=1105&amp;q=251248">http://www.ct.gov/ece/cwp/view.asp?a=1105&amp;q=251248</a> )	2
Provides public access to coastal waters for boating, swimming, fishing, shellfishing or wildlife observation in an area underserved by existing public access	4
Enhances recreational use/enjoyment of a designated EPA LIS Stewardship site	3
Part of an existing or planned recreation trail or greenway near coastal waters	4
Demonstrated commitment of funds to improve or prepare the site for public use	2
<i>Subtotal</i>	<i>15</i>
<b>(4.) Other Exceptional Site/Unique Area Value</b>	
Facilitates restoration of a LIS Study Habitat Restoration Initiative site (see <a href="http://longislandsoundstudy.net/wp-content/uploads/2010/03/LISSHabMap021.pdf">http://longislandsoundstudy.net/wp-content/uploads/2010/03/LISSHabMap021.pdf</a> )	1
Preserves a State-recognized historic/cultural value	1
Preserves a unique geological feature	1
Protects an exceptional public scenic value (e.g., ridgeline, )	1
Other factors	1
<i>Subtotal</i>	<i>5</i>
<b>Total score</b>	<b>100</b>

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<sup>31</sup>Acquisition nominations proposed to provide recreational access opportunities must demonstrate that access will be available to the general public, consistent with ecological values being protected, without regard to municipal residency requirements and include a commitment of funds to improve the site to support public use (e.g., parking, trails, etc.).

Table 8  
National CELCP Project Selection Criteria

Criteria
(1) Protects important areas with significant ecological, recreation, historical, or aesthetic values and/or lands threatened by conversion from their natural or recreational state to other uses. Priority is given to those lands that have significant ecological value in need of protection
(2) Advances the goals, objectives, or implementation of Connecticut’s CELCP Plan and regional or state watershed protection plans and is consistent with the Connecticut’s Coastal Management Program
(3) Can be effectively managed for long-term conservation
(4) Can be successfully completed by the applicant during the performance period
(5) Successfully leverages funds among participating entities to match Federal funds in the form of cash or in-kind contributions

**IV. Inter-agency Coordination and Public Involvement**

Connecticut’s CELCP plan was developed in coordination with federal, state and municipal public agency officials and non-governmental organizations with expertise or special knowledge of coastal resource management issues. Members of the general public with an interest in coastal land conservation were also provided opportunities to offer their opinions on Connecticut’s coastal land values and coastal land acquisition priorities. Public comment on the proposed Connecticut CELCP Plan was collected through a series of public meetings, interviews and surveys. Two public information meetings were held to review the proposed content of the Plan and to solicit public input on the coastal land conservation issues and priorities in Connecticut. In addition, opinion surveys were sent to 66 state and municipal agencies or non-governmental organizations with an interest in coastal land conservation issues. Seventeen governmental and non-governmental organizations responded with information on Connecticut’s most significant land conservation needs. Survey responses are summarized in Appendix 16. The need for public access to Connecticut’s shoreline for coastal recreation was also separately assessed through a series of public access surveys described in Section II. D. above.

Connecticut’s draft CELCP Plan was posted on the CT DEEP Web site for public review and comment after OLISP issued a press release announcing its availability and participated in a radio interview describing the Plan on Connecticut Public Radio. Notice of the draft Plan’s availability was sent via e-mail to approximately 75 individuals who expressed interested in reviewing it and twelve individuals or representatives of interested organizations provided written comments. All written comments were considered and, where appropriate, incorporated into the final Plan.

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## Appendix 1

### Coastal and Estuarine Planning Area Municipalities

Connecticut's Coastal and Estuarine Planning Area includes the following municipalities and their political subdivisions (or portions thereof shown in Figure 1) authorized to own land. Municipalities in **bold font** are 'coastal municipalities' defined by the Connecticut Coastal Management Act and highlighted here to indicate that the Coastal and Estuarine Planning Area is significantly larger than the area defined by the boundaries of Connecticut's 36 coastal cities and towns.

**Branford**

**Bridgeport**

**Chester**

**Clinton**

Cromwell

**Darien**

**Deep River**

East Haddam

East Hampton

East Hartford

**East Haven**

**East Lyme**

East Windsor

Enfield

**Essex**

**Fairfield**

Glastonbury

**Greenwich**

**Groton**

**Guilford**

Haddam

**Hamden**

Hartford

**Ledyard**

**Lyme**

**Madison**

Middletown

**Milford**

**Montville**

**New Haven**

**New London**

**North Haven**

North Stonington

**Norwalk**

**Norwich**

**Old Lyme**

**Old Saybrook**

**Orange**

Portland

**Preston**

Rocky Hill

**Shelton**

South Windsor

**Stamford**

**Stonington**

**Stratford**

Suffield

**Waterford**

**Westbrook**

**West Haven**

**Westport**

Wethersfield

Windsor

Windsor Locks

## **Appendix 2**

Connecticut's Coastal Resources  
as defined in the Connecticut Coastal Management Act-  
Connecticut General Statutes (CGS) Section 22a-93(7)

### **BEACHES AND DUNES**

"Beaches and Dunes" means beach systems including barrier beach spits and tombolos, barrier beaches, pocket beaches, land contact beaches and related dunes and sandflats. CGS section 22a-93(7)(C)

### **BLUFFS AND ESCARPMENTS**

"Coastal Bluffs and Escarpments" means naturally eroding shorelands marked by dynamic escarpments or sea cliffs which have slope angles that constitute an intricate adjustment between erosion, substrate, drainage and degree of plant cover. CGS section 22a-93(7)(A)

### **COASTAL HAZARD AREAS**

"Coastal Hazard Areas" means those land areas inundated during coastal storm events or subject to erosion induced by such events, including flood hazard areas as defined and determined by the National Flood Insurance Act, as amended (U.S.C. 42 Section 4101, P.L. 93-234) and all erosion hazard areas as determined by the commissioner. CGS section 22a-93(7)(H)

### **COASTAL WATERS AND ESTUARINE EMBAYMENTS**

"Coastal Waters" means those waters of Long Island Sound and its harbors, embayments, tidal rivers, streams and creeks, which contain a salinity concentration of at least five hundred parts per million under the low flow stream conditions as established by the commissioner. CGS section 22a-93(5)

"Nearshore Waters" means the area comprised those waters and their substrates lying between mean high water and a depth approximated by the ten meter contour. CGS section 22a-93(7)(K)

"Offshore Waters" means the area comprised of those waters and their substrates lying seaward of a depth approximated by the ten meter contour. CGS section 22a-93(7)(L)

"Estuarine Embayments" means a protected coastal body of water with an open connection to the sea in which saline sea water is measurably diluted by fresh water including tidal rivers, bays, lagoons and coves. CGS section 22a-93(7)(G)



## **DEVELOPED SHOREFRONT**

"Developed Shorefront" means those harbor areas which have been highly engineered and developed resulting in the functional impairment or substantial alteration of their natural physiographic features or systems. CGS section 22a-93(7)(I)

## **FRESHWATER WETLANDS AND WATERCOURSES**

"Freshwater Wetlands and Watercourses" means "wetlands" and "watercourses" as defined by CGS section 22a-38 and CGS section 22a-93(7)(F).

"Wetlands" means land, including submerged land, not regulated pursuant to sections 22a-28 to 22a-35, inclusive, which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial, and flood plain by the National Cooperative Soil Survey, as may be amended from time to time, of the Soil Conservation Service of the United States Department of Agriculture. CGS section 22a-38(15)

"Watercourses" means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, public or private, which are contained within, flow through or border upon this state or any portion thereof, not regulated pursuant to sections 22a-28 to 22a-35, inclusive. CGS section 22a-38(16)

## **GENERAL RESOURCE**

"Coastal Resources" means the coastal waters of the state, their natural resources, related marine and wildlife habitat and adjacent shorelands, both developed and undeveloped, that together form an integrated terrestrial and estuarine ecosystem. CGS section 22a-93(7)

## **INTERTIDAL FLATS**

"Intertidal Flats" means 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. CGS section 22a-93(7)(D)

## **ISLANDS**

"Island" means land surrounded on all sides by water. CGS section 22a-93(7)(J)

## **ROCKY SHOREFRONT**

"Rocky Shorefront" means shorefront composed of bedrock, boulders and cobbles that are highly erosion-resistant and are an insignificant source of sediments for other coastal landforms. CGS section 22a-93(7)(B)

## **SHELLFISH CONCENTRATION AREAS**

"Shellfish Concentration Areas" means actual, potential or historic areas in coastal

waters, in which one or more species of shellfish aggregate. CGS section 22a-93(7)(N)

### **SHORELANDS**

"Shorelands" means those land areas within the coastal boundary exclusive of coastal hazard areas, which are not subject to dynamic coastal processes and which are comprised of typical upland features such as bedrock hills, till hills and drumlins. CGS section 22a-93(7)(M)

### **TIDAL WETLANDS**

"Tidal Wetlands" means "wetland" as defined by CGS Section 22a-29. CGS section 22a-93(7)(E)

"Wetland" means those areas which border on or lie beneath tidal waters, such as, but not limited to banks, bogs, salt marsh, swamps, meadows, flats, or other low lands subject to tidal action, including those areas now or formerly connected to tidal waters, and whose surface is at or below an elevation of one foot above local extreme high water; and upon which may grow or be capable of growing some but not necessarily all, of the following: (wetland vegetation - see CGS section 22a-29(2) for complete list of species).

### Appendix 3

#### Coastal Land Assessment Methodology (CLAM) Results Summary

Coastal Land Assessment Methodology, or CLAM, is a computer assisted coastal land conservation planning tool developed to assist in identifying coastal Connecticut's larger remaining unprotected parcels with potentially significant conservation value. Approximately 28,000 tax parcels within a 105 square-mile study area, generally defined by a line 1,000 feet inland of coastal waters, were evaluated to identify significant parcels warranting further investigation (see Table 1 below for parcel evaluation criteria).

Table 1.  
CLAM Parcel Evaluation Criteria

Criteria	Score
Waterfront (all water within coastal boundary)	1
Adjacent to Protected Open Space (POS)	1
<25% Developed	1
Adjacent to LIS Stewardship Inventory Area	1
Contains Sandy Beach	1
Adjacent to Tidal Wetland	1
Adjacent to Inland Wetland	1
Within NDDB (rare species) Area	1
Outstanding Natural Feature (e.g., gorge)	-
<i>Total</i>	8

The conservation value of parcels greater than 25 acres and less than 25 percent developed were initially classified using these criteria. Subsequently, the parcel's development potential and the opinions of DEP resource management specialists were used to further evaluate each parcel's conservation priority. Each parcel's conservation value has been preliminarily classified into one of three "tiers" as summarized in Table 2. As additional parcel information becomes available through consultation with municipal agencies, land trusts and others, a parcel's conservation value is reassessed.

Table 2.  
Preliminary Assessment of CLAM Parcels' Conservation Value

*Higher Conservation Value ----> Lower Conservation Value*

Conservation Priority	Tier I	Tier II	Tier III	Total
# parcels	16	40	22	78

To date, 78 parcels greater than 25 acres have been identified as having conservation value of potential *statewide* significance. Only 25 parcels greater than 50 acres exist. Detailed tax parcel scale information is being collected to further assess these parcels' resource value, ownership, potential threats, and conservation priority. The CLAM project database also contains limited information for an additional 60 parcels identified as having *local* conservation value. Further investigation of these parcels' conservation value may be warranted at the local level.

Data collected through CLAM can be used to develop strategies to conserve the most significant remaining unprotected areas along Connecticut's coast. Developing a successful conservation strategy will require that state and federal natural resource management agencies partner with municipal conservation commissions, land trusts and other interested local conservation organizations. CT DEEP worked with land trusts and municipal commissions to learn more about parcels identified through CLAM and to develop partnerships to conserve the most significant remaining unprotected coastal areas in Connecticut. Project partners will develop conservation acquisition strategies only in cooperation with willing sellers. Other conservation strategies may be developed consistent with the objectives of municipal land use and conservation commissions.

## Appendix 4

### CELCP Project Area Municipalities\*

Branford	Middletown
Bridgeport	Milford
Chester	Montville
Clinton	New Haven
Cromwell	New London
Darien	North Haven
Deep River	Norwalk
East Haddam	Norwich
East Hampton	Old Lyme
East Haven	Old Saybrook
East Lyme	Orange
Essex	Portland
Fairfield	Preston
Greenwich	Shelton
Groton City	Stamford
Groton Town	Stonington
Guilford	Stratford
Haddam	Waterford
Hamden	West Haven
Ledyard	Westbrook
Lyme	Westport
Madison	

\* Includes municipal subdivisions authorized to hold title to land

## Appendix 5

Excerpt from  
*Rare and Endangered Species of Connecticut and Their Habitats*  
By Joseph J. Dowhan and Robert J. Craig

State Geological and Natural History Survey of Connecticut

The Natural Resources Center  
Department of Environmental Protection

1976

Report of Investigations No. 6

Eco-regions offer a useful means of describing and understanding the distribution and relationships of the biota and physical landscapes of Connecticut, especially so with regard to rare species. This publication defines an “eco-region” as *an area characterized by a distinctive pattern of landscapes and regional climate as expressed by the vegetation composition pattern and the presence or absence of certain indicator species and species groups*. Connecticut’s eastern and western coastal eco-regions are principally defined by a vegetation composition pattern dominated by coastal hardwoods including red, white and black oak, hickories, tulip poplar, black cherry and sassafras. Several species of vines, including green brier, poison ivy, Virginia creeper, and the non-native Asiatic bittersweet and Japanese honeysuckle, form dense tangles in these coastal forests. (For purposes of Connecticut’s CELCP Plan, Connecticut’s eastern and western coastal eco-regions were combined and shown as a single coastal eco-region in Figure 6.)

This publication is available in hard copy only. To order a copy of *Rare and Endangered Species of Connecticut and Their Habitats* see:

[http://www.ct.gov/dep/cwp/view.asp?a=2701&q=323434&depNav\\_GID=1641](http://www.ct.gov/dep/cwp/view.asp?a=2701&q=323434&depNav_GID=1641)

## Appendix 6

### Connecticut Statewide Comprehensive Outdoor Recreation Plan (SCORP)

The Connecticut Department of Energy and Environmental Protection's federally-approved Statewide Comprehensive Outdoor Recreation Plan (SCORP) 2011-2016 assesses the demand for and the supply of natural resource-based outdoor recreational facilities in Connecticut. Using the recommendations and data obtained through the preparation of the SCORP, CT DEEP and cooperating municipalities are able to more effectively plan for meeting the State's outdoor recreational needs. Connecticut's approved SCORP enables the State of Connecticut to participate in federal Land and Water Conservation financial assistance programs offered through the National Park Service to acquire, develop and improve outdoor recreational facilities that meet the outdoor needs described in Connecticut's SCORP.

Connecticut's 2011-2016 SCORP can be accessed at:

[http://www.ct.gov/deep/lib/deep/outdoor\\_recreation/scorp/scorp\\_2011\\_webversion.pdf](http://www.ct.gov/deep/lib/deep/outdoor_recreation/scorp/scorp_2011_webversion.pdf)

Additional background data not included in the current Connecticut SCORP that still applies to Connecticut's natural resource-based outdoor recreation needs is available through Connecticut's 2005-2010 SCORP that can be accessed at:

[http://www.ct.gov/deep/lib/deep/outdoor\\_recreation/scorp/scorp\\_2005\\_webversion.pdf](http://www.ct.gov/deep/lib/deep/outdoor_recreation/scorp/scorp_2005_webversion.pdf)

Questions regarding Connecticut's SCORP should be directed to Douglas Jann of CT DEEP's Division of State Parks at [douglas.jann@ct.gov](mailto:douglas.jann@ct.gov) or (860) 424-3471.

# **The Green Plan**\*

## **Guiding Land Acquisition and Protection in Connecticut 2007-2012**



Connecticut Department of Environmental Protection  
Gina McCarthy, Commissioner  
[www.ct.gov/dep](http://www.ct.gov/dep)  
September 2007

\* As of February 2015, *The Green Plan* is being revised. See the [Plan's revision web site](#) for updates



## CT DEP ADA Publication Statement

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These requests may be made directly to Marcia Z. Bonitto, ADA Coordinator, via e-mail: [Marcia.Bonitto@po.state.ct.us](mailto:Marcia.Bonitto@po.state.ct.us)

**The Green Plan**  
Guiding Land Acquisition and Protection in Connecticut  
2007-2012

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# The Green Plan:

## Guiding Land Acquisition and Protection in Connecticut 2007-2012

### **BACKGROUND/OVERVIEW**

Historically, undeveloped open space was common in Connecticut and its preservation was not a public priority. As time passed, Connecticut, like the rest of the country, grew economically and its population increased. The development that had been concentrated in key areas, generally along waterways, spread out as roads were built and cars became the preferred mode of transportation. Suburban development replaced rural lands and today all of Connecticut is under increasing development pressure. Poorly controlled growth (also known as sprawl) has become a significant threat to open space as areas that used to be open, undeveloped or part of our agricultural heritage are being converted to other uses, primarily residential development. With careful planning, it is possible to have economic and population growth while protecting valuable open spaces. Connecticut's citizens have both an opportunity and responsibility to decide the future of the State's landscape by permanently protecting certain undeveloped areas as open space. This plan sets forth a strategy for approaching such significant decisions.

#### Why Protect Open Space?

Although each protected parcel has its own unique value, open space as a whole provides a wealth of valuable "services" to Connecticut's citizens. While the full list of benefits is too extensive to include here, these services include options for outdoor play, activity, and environmental education. Forested areas are especially adept at removing carbon from the atmosphere, which helps to minimize global climate change, and floodplains, coastal waterfront and adjacent uplands provide opportunities to respond to the anticipated effects of climate change. Other valuable open space services are the provision and preservation of scenic beauty, contributions to local sustainable economy from wood, food and fiber production, and maintenance of the diversity of Connecticut's landscape. Open space also can provide a variety of specific ecological functions such as preserving biodiversity, habitat for rare species, streamflow and water supply protection, and flood control. Open space protection will play an expanding role in Connecticut's economic future as businesses increasingly consider quality of life in making decisions on where to locate and expand.

*"The Green Plan: Guiding Land Acquisition and Protection in Connecticut 2007-2012"* is an update of the original *Green Plan* (2001). The updated plan: 1) identifies the State's future open space goals; 2) summarizes land acquisition and protection efforts to date; 3) discusses threats and challenges to open space protection; 4) identifies priorities for acquisition and protection; 5) describes the programs and funding available; and 6) outlines the process. This document is a strategic plan for land acquisition and protection for the State of Connecticut through 2012. As such, it provides general guidance for program managers, is a tool for those who want to work with the State in preserving land, and offers a basic overview for the public of the State's land acquisition and protection program.

#### The Vision

A diverse landscape of protected open space that offers outdoor recreation to Connecticut's citizens, protects water supplies, preserves natural communities and habitats for plants and animals, offers green spaces accessible to all residents, whether residing in urban, suburban or rural communities, and provides a working natural landscape for the harvest of farm and forest products.

### The Goal

To acquire or otherwise permanently protect land to meet the diverse needs expressed in Connecticut General Statutes (CGS) section 23-8(b) and in various plans regarding open space protection prepared by the State of Connecticut and our open space partners at a rate consistent with achieving the overall statutory goal of protecting 21% of Connecticut's land area by 2023.

In 1997, the general assembly set a goal of preserving 21 percent of the land area of Connecticut for open space for public recreation and natural resource conservation and preservation. With a total of 3,205,760 acres in Connecticut, 673,210 acres must be preserved to meet the goal. In addition to the overall goal, CGS section 23-8 sets targets for both the State and its land protection partners (municipalities, private non-profit land conservation organizations, and water utilities, whose Class I and II watershed lands count towards this goal). This statutory goal is:

- 10 percent (or 320,576 acres) be acquired and held by the State of Connecticut, and
- 11 percent (or 352,634 acres) be acquired and held by our partners.

At the time, it was recognized that the threat of loss of open space to development was substantial and that preservation activities had to be pursued while there was still appropriate land available for open space so a time line was set with an end date of 2023.

The authority, requirements and procedures for open space land acquisition is set forth in several sections of the Connecticut General Statutes (CGS). Open space acquisition by the State is governed by CGS sections 23-8 and 23-73 through 23-99 which places that authority with the DEP. State supported acquisition by municipalities, private non-profit land conservation organizations, and water utilities is governed by CGS sections 7-131d et. seq.

In addition to the statutory goals, the specific characteristics of individual parcels of protected land can contribute to the implementation of a variety of other State and local plans. The list of State plans that require land protection to achieve open space and/or environmental objects is lengthy, starting with the *Conservation and Development Policies Plan of Connecticut 2005–2010* (State C&D Plan) which contains six growth principles including:

- Conserve and restore the natural environment, cultural and historical resources, and traditional rural lands
- Protect and ensure the integrity of environmental assets critical to public health and safety.

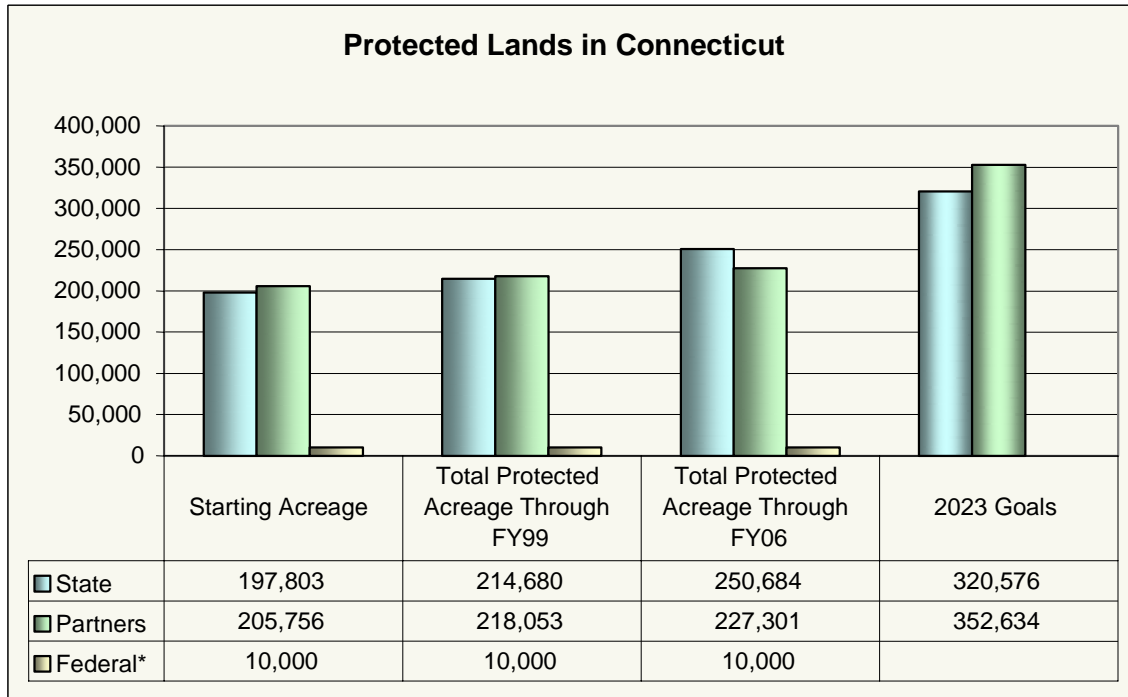
The DEP also has several plans that support the intent of increasing both outdoor public recreation and the preservation and conservation of natural resources. These plans require or would benefit from land protection for implementation; a list of these plans and a description of their relationship to land protection can be found in Appendix I. Land protection efforts are also an essential component to implementing local plans for open space preservation.

### Open Space Status

Fortunately, the State and its partners were not starting from square one. The State has been working since 1901 to acquire open space. Our partners have also been protecting land for a long time. As of January 1, 2007, the State has acquired a total of 251,001 acres for its system of parks, forests, and wildlife, fishery and natural resource management areas. This is 78 percent of the 320,576 acres of open space land targeted for State acquisition.

With 169 cities and towns, approximately 116 land conservation organizations, and 85 water companies serving 1,000 people or more, as well as numerous smaller ones, the State of Connecticut is fortunate to have a wealth of open space partners. Exact acreage of open space protected by DEP's partners has not yet been compiled. The statistics presented below include the estimate made in the original Green Plan updated only by the acreage that DEP assisted in protecting through the Open Space and Watershed Grant Program. It is assumed that our partners actually hold significantly more acreage than reported below.

To gain a better understanding of how much land is actually protected, the DEP is currently undertaking a research project to inventory all open space parcels in the State. Once this Protected Open Space Mapping (POSM) Project is complete, DEP will revisit this section of the plan and make changes as warranted. Until then, it is our best estimate that municipalities own  $\pm 74,971$  acres of land; nonprofit land conservation organizations own  $\pm 57,327$  acres; and water companies own  $\pm 97,500$  acres Class I and Class II lands. Together, open space acreage held by these partners is 229,798 acres, which is 65 percent of their statutory open space goal. There is no requirement that non-State partners report their land protection efforts and, as explained above, these numbers may underestimate the actual holdings of our partners.

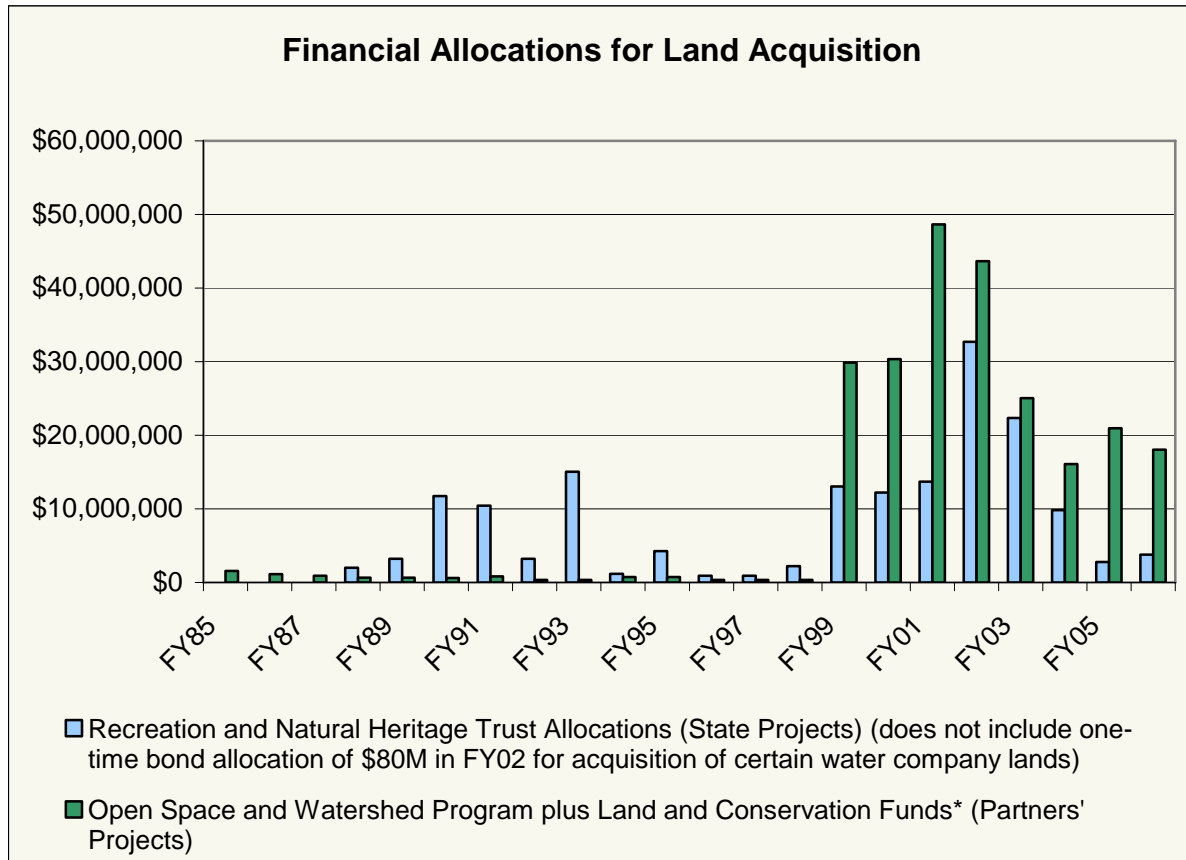


\* The acreage of Federal protected lands estimated here includes hiking trails, wildlife preserves, flood control projects and a national historic park. While these amenities are appreciated and enjoyed by the citizens of Connecticut, by statute the federally-held acreage does not count towards the land protection goal. A more accurate accounting of this acreage will be determined through the POSM project explained above.

Due to variations in funding and resources, land offerings and opportunities, and other factors, new land acquisition and protection does not occur at a steady pace. To achieve the statutory goal for open space acquisition, on average from the beginning of the program in 1999 until 2023, every five years the State needs to acquire 21,600 acres and to encourage our non-State partners to acquire nearly 25,000 acres. From FY00 through FY06, the State acquired 34,001 acres, including some Class I and Class II watershed lands that were at risk, thus permanently preserving their protected status. During that same period, our municipal partners protected approximately 17,600 acres through the Open Space and Watershed Lands Grant Program. To meet the goals set forth in statute and this report, the State of Connecticut must acquire nearly 70,000 additional acres by the end of 2023 and encourage the acquisition of approximately 125,000 additional acres by municipalities, private nonprofit land conservation organizations and water companies (the actual number of acres necessary to protect to meet the statutory requirement may be less than this number; however, this is our best estimate to date pending completion of the POSM project). This plan continues to set a strategic course to meet these acquisition goals.

**Challenges and Threats**

There are several challenges to meeting the statutory goals. There also are threats to open space, even when it has been acquired. Perhaps the greatest challenge is posed by development and economic pressures which are pushing many landowners to convert their open lands to uses such as housing, commercial, office space or other uses incompatible with open space. This pressure places an urgency on all aspects of land protection, from securing funding, to surveying and appraising potential parcels, to the negotiating and closing of transactions to ensure that the long-term protection goals are met before desirable properties are converted to other uses. The challenge posed by development pressures is compounded by issues related to future funding and other resources for open space protection.



\* The lands protected through the Land and Conservation Funds program have not been separated into State and Partners' lands. They are listed here under Partners as the vast majority of this funding has been expended on local non-State protection efforts.

Securing continual funding to achieve the acreage goals by acquiring the most appropriate lands is also a challenge. Per acre costs for land protection (fee simple and easement acquisition) vary significantly based on a number of variables including: landowner's financial flexibility, location; character and size of parcel; current property values at the time of the sale/donation. Some property transfers can be accomplished with minimal per acre cost, while other are much more expensive. In general, per acre costs paid over recent years have ranged between \$4,500 and \$7,000. Using an average per acre cost of \$6,000 which is slightly more than the average of the range, and given the ±295,000 acres needed to meet the overall statutory goal (see above), the total funding needs would equate to \$420 million for the Recreation and Natural Heritage (State acquisition) Program and \$736.6 million for the Open Space and Watershed (partner's) Program between now and 2023 (both numbers are in 2006 dollars unadjusted for inflation/land price escalation). Again, acreage to be acquired under the Open Space and Watershed

Program will be re-evaluated upon completion of the POSM project which will provide us with significantly more accurate land protection statistics.

Another challenge is planning and providing for long term stewardship or management of protected lands. As part of this Green Plan update, the Department is adopting a new policy requiring funds be set aside for maintenance of protected lands acquired by DEP<sup>1</sup>, especially when the land is intended for habitat protection.

For our partners, amendments to CGS section 7-131e made in 2007, allow for using up to five percent of Open Space and Watershed Grant Program funds for administrative expenses of the program; however these funds are limited to pre-acquisition/protection expenses such as evaluation of grant proposal, appraisals and appraisal reviews and the preparation of legal and other documents. These funds cannot be used for staff salaries, nor for open space planning or management. There is currently no specific funding source identified that we can offer to our partners for open space planning, management and long-term stewardship.

In addition to the challenges described above, development pressures are threatening open space already acquired or otherwise protected. Increasingly there is pressure to convert certain existing protected open spaces to other uses. While initially pressure for conversion was primarily an urban issue, there have been recent efforts to convert other areas of open space to commercial use. The second significant threat is the prevalence of encroachments into protected open space. Recent legislation<sup>2</sup> defines open space encroachment and sets civil penalties for unauthorized encroachment on open space land or land held under a conservation easement. The penalties for encroachment are substantial; up to five times the cost of restoration. This new legislation provides a more effective tool for the Department in pursuing encroachment situations and is expected to become a deterrent to future encroachment.

#### Executive Order 15 Regarding Responsible Growth

On October 6, 2006, Governor M. Jodi Rell issued Executive Order 15 creating an Office of Responsible Growth “to coordinate state initiatives to control rampant, ill-conceived development that threatens Connecticut’s special character.” The Executive Order required that the “Green Plan” for Connecticut be updated “to better identify sensitive ecological areas and unique features, guide acquisition and preservation efforts, support local build-out maps and assessments, and make these and other maps accessible to state agencies, regional planning agencies, local communities and nongovernmental organizations through geographic information systems (GIS).”

This plan identifies sensitive ecological areas and unique features that merit protection. These are discussed in the section below on “Protection Considerations.” To guide acquisition and preservation efforts, the categories of acquisition and protection considerations will be weighted and the individual considerations will be ranked based on the needs expressed in this and other plans as discussed above as well as changes in the protected status of individual ecological types or uses. Examples of such changes include recent land acquisitions or other protection activities, and legislative changes that affect the status (e. g., provide additional protection) of specific ecological types or uses. The weighting and ranking will be reviewed annually and will be included in the Commissioner’s annual report to the legislature (see below).

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<sup>1</sup> In accordance with CGS section 23-79, an amount not to exceed 20 percent of the fair market value of a property to be protected can be set aside for long-term management; however, discussions with the State Treasurer’s Office have revealed that no more than 5 percent of such funds can be set aside for this purpose.

<sup>2</sup> PA 06-89, codified at CGS section 52-560a, (effective October 1, 2006).



A geographic information system (GIS), as mentioned in Executive Order 15, is a powerful tool to aid in identifying and visualizing existing and proposed conditions. It can be used in the planning process to determine where development would have the least adverse environmental impacts and most beneficial social impacts, and what areas should be preserved for their ecological and cultural values. The Department of Environmental Protection is currently active in supporting the use of GIS in several ways including participating in the Geospatial Information Systems (GIS) Council established by Public Act 05-03, and by providing data layers that are used to develop maps. In addition to continuing to participate in the GIS Council and providing new and updated data layers, the DEP will explore means to improve regional and local capacity for GIS utilization. An example of an on-going GIS effort is the multi-year Protected Open Space Mapping (POSM) project which is mapping, town-by-town, all existing protected open space. Finalizing the POSM project and making the data available to municipalities, land trusts and other non-governmental land preservation organizations and individuals will aid in future land protection efforts at all levels.

## ACQUISITION AND PROTECTION CONSIDERATIONS

### Important Conservation Areas

Three categories of land qualities should be considered when evaluating potential land protection projects. These are the ecological values of the property, the uses that the property can provide or protect, and the location of the site. Each of these is briefly discussed and an unranked list of protection considerations is provided below. These considerations will be used to prioritize the properties that come to the State's attention for potential protection. The existing list of properties approved for acquisition or protection will also be evaluated based on these priorities and properties and re-ranked as appropriate.

#### *Ecological Values*

The ecological values provided by an individual site are a major consideration for the Department when evaluating a proposal for land acquisition or protection. Properties containing sensitive ecological communities, outstanding or representational examples of ecological communities or certain water resources, as listed below, will receive higher scores during evaluation. These are the ecological communities most valuable for maintaining biological integrity and diversity in Connecticut. While some of these independently provide wildlife habitat for certain species, viable habitat for other species may include a complex of more than one of these ecological types. Also of particular interest is select farmland, particularly non-active farmland that can be managed for early successional habitat or blocks of farmland abutting existing protected open space property. Large blocks of unfragmented forest or forest blocks abutting existing protected unfragmented forestland are similarly desirable. The following lists are unranked.



Specific ecological communities (parcels containing, abutting or providing buffers to)

- Coastal communities
  - Beaches
  - Dunes
  - Bluffs or escarpments
  - Coastal plain ponds
  - Offshore islands
- Sand plain grasslands
- Pitch pine/scrub oak barrens

- Calcareous (limestone-based) uplands
- Calcareous (limestone-based) fens and associated wetlands
- Grassy glades and balds
- Traprock ridges and associated communities
- Atlantic white cedar swamps
- Bogs
- Riverine islands
- Colonial waterbird complexes
- High-yielding, stratified drift aquifers that contribute high quality water for base stream flow
- Reference sites for scientific monitoring
- Landscape sensitive to disturbance (e.g., steep slopes, erodible soils, shallow depth to bedrock, with sparse groundcover)

Water Resources (parcels containing, abutting or providing buffers to)

- Large rivers and associated riparian communities
- Free-flowing (undammed) streams and rivers
- Natural lake shoreline habitat
- Predominantly undeveloped coastal coves and embayments
- Upland buffers around high quality wetlands
- Tidal wetlands (includes saline, brackish and freshwater tidal wetlands)
- Relatively undeveloped coves or embayments on Long Island Sound or Connecticut's rivers
- Estuarine embayments with extraordinary aquatic habitat value (e.g., shellfish beds, areas of submerged aquatic vegetation)
- Vernal pools
- Headwater streams
- Surface springs, cold headwater springs and seeps
- Wild trout or cold water streams
- Significant diadromous fish runs

Long Island Sound coastal systems

- Outstanding examples of coastal systems, habitats or landscapes
- Typical or representative coastal ecological areas

*Use Needs*

In addition to protecting the ecological types listed above, the DEP will work to protect properties that can provide certain uses that benefit the public. These public uses, which on an individual basis may or may not include public access, are presented, but not ranked, here.



Wildlife habitat as identified by the above list of ecological types especially

- Habitat that supports one or more species of greatest conservation need as identified in the *Connecticut Wildlife Conservation Strategies*
- Habitat that supports, enhances or protects biodiversity

Riparian and littoral buffers (see list of water resource types above)

Floodplain protection

- As habitat
- To protect or improve water quality
- To preserve natural flood storage or function (to the 500 year flood level)

#### Streamflow protection

- Properties that can have a notable augmentation of flow based on basin size or other factors
- Protection of groundwater recharge areas and headwater streams

#### Protection of large areas of unfragmented forest

- Large parcels of unfragmented forest
- Key parcels whose protection would prevent fragmentation of a large protected forest tract

#### Recreation

- Coastal or inland properties that provide water-based recreational opportunities including swimming, fishing, boating, hunting, or other water-access
- Coastal or inland properties that offer significant cultural heritage value
- Trail-based activities. These include:
  - Multi-use trail development (provision of new or enhancement of existing) as part of an existing or planned greenway, trail or linear park, particularly in areas of significant or unique geologic or biologic interest;
  - Elimination of gaps in individual trails or within the state's trail network;
  - Connectivity of trail systems; and
  - Trailhead facilities including sufficient parking, restroom facilities
- Recreational areas capable of providing wildlife observation-especially birding sites
- Sites that have historically been used for recreation with existing recreational and/or supporting infrastructure (e.g., swimming beach, hiking trails, established camping sites and/or established parking)
- Other recreational areas capable of providing opportunities for underserved recreational demands.

#### *Location Concerns*

In addition to the ecological types and use priorities identified above, the relative location of a property to be acquired or protected is also important. Also, there are certain site-specific conditions that can enhance the value of a potential acquisition or protection opportunity.

- Parcels proximate to existing protected open space if capable of being used for: expansion of recreation opportunities, buffering for sensitive resources; and/or corridors for wildlife and/or seed dispersal
- Parcels providing protected corridors that link critical protected open space hubs
- Additions to existing DEP holdings that will create greenways or improved access to state parks, forests, or wildlife management areas
- Parcels proximate to urban areas or public transportation that will further environmental justice/environmental equity goals
- In-holdings within DEP properties if it will increase the efficiency of management by DEP and/or eliminate potential conflicts between user groups and in-holding owners
- Parcels under threat of development that meet one or more identified needs
- Lands containing significant archeological, cultural or historic resources
- Property adjacent to greenways or other transportation opportunities that may be of particular interest for its recreation and transportation values.

#### General Evaluation Considerations

In addition to the land qualities discussed above, several general evaluation considerations are important in any land protection decision by the Department on where best to spend state land acquisition and protection dollars. These include:

- The size and functionality of a parcel under consideration
- Whether the property contains significant amounts of contaminants, widespread invasive species, or other impediments to providing or maintaining optimum ecological value
- The degree to which a property can accommodate multiple uses with minimal conflict and optimize the extent to which recreational demands can be met
- Whether the property can advance other DEP plans and protection efforts
- The threat of development to areas specifically identified as important for their ecological characteristics or use values, or both.

## **THE ACQUISITION AND PROTECTION PROCESS**

### Partners

The ambitious target for land acquisition and protection established by the legislature requires the cooperation of many partners including municipalities, private nonprofit land conservation organizations, water companies, the State of the Connecticut and interested private property owners.

The **Commissioner of Environmental Protection** is charged with developing the strategy for achieving the open space acquisition goal. The Commissioner is responsible for acquiring State lands for open space purposes and submits a report annually to the General Assembly's Environmental Committee regarding the strategy and progress being made toward achieving the State's open space land acquisition goals. The Commissioner also provides technical assistance and grants to facilitate the acquisition of open space lands by municipalities, private nonprofit land conservation organizations and water companies.

**The Natural Heritage, Open Space and Watershed Land Acquisition Review Board**, established by statute<sup>3</sup>, assists and advises the Commissioner. The Board provides comments on the selection criteria, policies and procedures, and on applications for funding. It also provides general guidance and reviews land protection strategies. The Board also plays a major role in promoting public participation in the acquisition program and submits an annual report on the acquisition program. The Board makes recommendations to the Commissioner on funding specific grant projects. Please see Appendix II for a description of the Board's make-up.

**Municipalities, private nonprofit land conservation organizations and water companies** are encouraged to cooperatively pursue the acquisition of land to meet the open space goal set forth in the statutes. The State seeks out and works with partners to help in acquisition of state-owned open space land. Land trusts in particular have been key allies in land protection efforts in Connecticut. They have not only directly acquired land and easements, but have also assisted the State in protecting properties. Municipalities, private nonprofit land conservation organizations, and water companies are eligible to receive funds through the Open Space and Watershed Land grant program for the acquisition of open space lands.

The **individual landowners** interested in protecting their land are perhaps the most critical partners in this effort. Often, these individuals have exhibited careful stewardship of their land and have demonstrated a concern for the Connecticut landscape or are otherwise interested in transferring their property for protection purposes. Without them, the Department would be unable to meet the land protection goals set by the legislature.

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<sup>3</sup> Connecticut General Statutes 7-131e, see Appendix II

## Methods

The land protection process can occur through donation or purchase in several ways including fee simple, easements for access, use and/or conservation, or acquisition of development rights. While there are other land protection methods available, including purchase options, the right of first refusal, and the transfer of development rights, these are less frequently used by the Department.

## Tools

The DEP has two programs available to assist in realizing the vision and achieving the goal: the Recreation and Natural Heritage Trust Program and the Open Space and Watershed Land Acquisition Grant Program

### *The Recreation and Natural Heritage Trust Program*

This program acquires lands to add to the State's system of parks, forests, and wildlife, fishery and natural resource management areas for the beneficial use and enjoyment of the public. The purpose of the program is to acquire land that represents the ecological diversity of Connecticut, including natural features such as rivers, mountains, coastal systems, and other natural areas, in order to ensure the preservation and conservation of such land for recreational, scientific, educational, cultural and aesthetic purposes.

An innovative, though rarely used, provision of the program allows partners, usually municipalities or private, nonprofit organizations, to assist the State in the purchase of properties. Where the DEP and an outside group identify mutual interest in the protection of a piece of land, but neither group can commit to the whole purchase price, cost sharing allows each party to leverage available funding to meet a common goal. The responsibility for managing properties acquired in this manner is negotiated between the Department and the partner/s involved in the transaction; however, the property is owned by the Department.

### *The Open Space and Watershed Land Acquisition Grant Program*

This program provides financial assistance to municipalities and nonprofit land conservation organizations to acquire land for open space and to water companies to acquire land to be classified as Class I or Class II water supply property. In accordance with CGS section 7-131d(b), grants under this program are for land purchases that meet one or more of the following criteria:

- (1) Protects land identified as being especially valuable for recreation, forestry, fishing, conservation of wildlife or natural resources;
- (2) Protects land which includes or contributes to a prime natural feature of the state's landscape, including, but not limited to, a shoreline, a river, its tributaries and watershed, an aquifer, mountainous territory, ridgelines, an inland or coastal wetland, a significant littoral or estuarine or aquatic site or other important geological feature;
- (3) Protects habitat for native plant or animal species listed as threatened or endangered or of special concern, as defined in section 26-304;
- (4) Protects a relatively undisturbed outstanding example of a native ecological community which is now uncommon;
- (5) Enhances and conserves water quality of the state's lakes, rivers and coastal water;
- (6) Preserves local agricultural heritage; or
- (7) In the case of grants to water companies, protects land which is eligible to be classified as Class I land or Class II land after acquisition.

Conditions that apply to these grants include:


- o The acquired land must be protected by a permanent conservation easement requiring that the property remain forever predominately in its natural and open condition;

- Any improvements or change to the property must support the purpose for which the land was acquired; and
- The easement includes a provision that the property be made available to the general public for recreational purposes<sup>4</sup>.

In all cases, the grant applicants must provide a substantial match for the grant funds requested. Maximum DEP contributions are set by statute and summarized here.

In addition to land acquisition or protection, distressed municipalities or targeted investment communities, as defined in CGS section 32-9p, have other opportunities under the Open Space And Watershed Land Acquisition Grant Program. Qualified municipalities can use grant monies for restoration or protection of natural features or habitats on open space already owned by the municipality. Such restoration can, include, but is not limited to, wetland, wildlife, or plant habitat restoration, restoration of other sites to a more natural condition, or replacement of vegetation. However, the DEP cannot commit more than twenty percent of the total amount of grants made in any fiscal year to these purposes.

**Required Matches**



The Connecticut General Statutes set forth the potential grant matches for land acquisition or protection. As of July 1, 2007, the DEP contributions for land acquisition, based on fair market value, are as follows:

Municipalities	Up to 65%
Nonprofit Land Conservation Organizations	Up to 65%
Water Companies	Up to 65%
Distressed Communities or Target Investment Communities	Up to 75%

Other tools used by our partners in land acquisition and protection include purchase options, the right-of-first-refusal and the regulatory authority of local land use agencies who can establish open space set asides and open space zoning districts.

Funding

The Recreation and Natural Heritage Trust Program is funded through State bonds. Funding for the Open Space and Watershed Land Acquisition Grant Program predominantly comes through a combination of State bonds and monies collected under the Community Investment Act (CIA).<sup>5</sup> Corporate and private donations for this program are also accepted. There are several additional sources of funding utilized by DEP’s land acquisition and protection efforts. These include: Land & Water Conservation Fund from the U.S. Department of the Interior, used for both state and municipal open space development and acquisition projects; the George Dudley Seymour Trust Fund, which provides approximately \$250,000 annually that is used to supplement the Recreation and Natural Heritage Trust Program; and the Forest Legacy Program from the U.S. Department of Agriculture Forest Service, used to purchase conservation

<sup>4</sup> CGS section 7-131d provides that an exception to the public access provision may be made at the discretion of the Commissioner of Environmental Protection when provision for public access would be unreasonably detrimental to the wildlife or plant habitat or other natural features of the property. Exceptions may also be made where development rights have been purchased for agricultural purposes or for land acquired for watershed protection which will be classified as Class I or Class II watershed land if access is inconsistent with farming or the provision of pure drinking water, respectively.

<sup>5</sup> The Community Investment Act (CIA) requires a \$30 fee for the recording of all documents on the municipal land records. This fee is distributed as follows: \$1 to the municipal clerk for management and related costs; \$3 to the municipality for local capital improvement projects fund; and the remaining \$26 is distributed among four state agencies for specific purposes. In addition to the DEP, these agencies are: the Department of Agriculture, the Connecticut Commission on Culture and Tourism, and the Housing Finance Authority. The DEP’s portion of this funding goes to the Open Space and Watershed Land Acquisition Grant Program.

easements. Finally, for the first time the Department anticipates receiving funding through the Highlands Conservation Act, which is administered by the US Fish and Wildlife Service.

### Process

The DEP purchases lands from willing landowners. In many cases, these owners contact the Department. In other instances, the DEP or conservation organizations initiate contact. Typically there are more properties offered for protection than there are financial resources and so the Department has to evaluate and rank the offerings. The process for selection is described in Appendix III. Currently there are multiple scoring sheets used in the evaluation and ranking process. Each scoring sheet was developed by experts in and tailored to the individual focus areas identified in the previous Green Plan (e.g., forest lands, ecological habitats, urban green spaces). This allows the individual programs to evaluate a potential protection site based on their specific responsibilities. The rating system will be reviewed and modified and streamlined as part of the implementation of this plan update.

Various tools, in addition to statutory criteria, are used for evaluating properties and their attributes. These tools include documented site characteristics including information regarding history, geology, soils, ecology, water quality and other environmental concerns and landownership supplemented by individual staff knowledge. Currently, some of this data is available in an in-house GIS toolkit, which aids in the evaluation of potential protection sites by providing the available data on a site-by-site basis in both visual and verbal formats. However, there is a substantial amount of information that has yet to be integrated into this system, which has resulted in a pressing need to improve the DEP's GIS capabilities.

To address this, the Department is working on several new projects. The first, as previously discussed, is a statewide map of all protected open-space, including holdings by municipalities, land trusts and water companies. The second is a new GIS project to provide additional data regarding ecosystems. The DEP is also exploring ways to support enhanced GIS capabilities by our land protection partners.

#### **An Example of an Innovative Land Protection Approach**

DEP has encouraged cooperating on projects with municipalities and nonprofit land organizations.

Most recently, DEP entered into an agreement with the Town of Oxford to preserve an approximate 45 acre parcel of land located adjacent to Southford Falls State Park in the Town of Oxford.

The Town of Oxford will contribute \$100,000 towards the \$500,000 purchase price for the property. In addition, the Town of Oxford will construct an entry road and parking lot for improved access to the park by the General Public.

#### A New Approach

DEP land acquisition and protection efforts have been primarily reactive, i.e., the Department has generally relied on landowners, land conservation groups and municipalities to identify land protection opportunities. As development pressures have continued, the importance of proactively identifying properties that provide exceptional value for habitat or public use is becoming critical. As part of the implementation of the Green Plan update, the Department will evaluate how best to develop a more proactive approach to land protection.

This new proactive approach would rely heavily on developing additional data and tools to support appropriate outreach to our land protection partners. The additional data and tools necessary to support this effort include the completion of the Protected Open Space Mapping Project, described above, continued support of enhanced GIS capabilities available to both DEP and our partners, and the inventorying and mapping of significant ecological areas. Improved outreach includes enhancing efforts to provide information on innovative land protection techniques to DEP's land acquisition and protection partners, and engaging the partners in both identifying potential acquisition or protection sites, and in initiating discussions with owners of high priority lands.

## AGRICULTURAL LAND AND OPEN SPACE

Agricultural lands are integral to the quality of Connecticut's landscape and essential to the character of many towns. Working farms, pasture, tilled acreage, and associated forest are critical complements to the open space protection efforts outlined in this plan. While the Department of Agriculture has the primary role in preserving farmland (see box), the DEP has a role in protecting certain agricultural lands, generally either through out-right acquisition or the purchase of conservation easements. For lands so protected, it is not uncommon for arrangements to be made so that the farmer can continue to work the land. In some instances, modification of existing farm practices can both provide important habitat and produce marketable crops. For example, altering the schedule for mowing hay fields can preserve grassland habitat during the bird nesting season and still provide a hay crop. Future efforts by DEP will include the development of lease language to encourage farmers to maintain portions of their properties in a manner that provides wildlife habitat.

The DEP recognizes that certain farm practices can enhance the quality of habitat and provide ecological protection. Farmers are encouraged to utilize farming methods that protect the environment and provide quality habitat wherever practical. Additional outreach by the DEP to provide farmers the information necessary to consider such farm practices would be beneficial. Despite having to exclude preserved agricultural land from the total open space tally, one focus of the grant programs discussed in this document is the preservation of local agricultural heritage for scenic and open space amenities. Protected agricultural land preserves a "sense of place" in our more rural towns and, in many ways, the State's open space and farmland preservation programs complement each other.

## GOING FORWARD

It will take time and adequate funding to meet the statutorily-required land acquisition and protection goals. The DEP is committed to a long-term effort to reach the goals identified in statute and to encourage and provide assistance to cities and towns, non-governmental organizations and other entities to succeed with acquiring and protecting open space that satisfies the various needs of Connecticut. Although there is overlap, these actions generally fall into five categories: operations, data and tools, criteria and standards, outreach, and project evaluation and update. What follows are the steps DEP will take.

### *Operations*

- Fill vacancies and reinvigorate the Review Board
- Implement other DEP plans as they relate to land protection, including moving forward aggressively with the Grassland Habitat Initiative



### Farmland for Food Production

Securing farmland land to maintain food production capability is done by the Connecticut Department of Agriculture (DOAG) through their Purchase of Development Rights Program. Because the primary purpose of the program is to maintain food production capability, eligible properties must be at least 30 acres in size.

Lands where the DOAG has acquired development rights remain in private ownership and these lands are not generally available to the public for use without further agreement from the individual farm owner. Without a specific public access/recreation or wildlife habitat component, these lands cannot counted towards the 21 percent open space goal.

However, these efforts fulfill an important role by protecting food and fiber producing land resources. In addition to providing fresh, locally grown foods, farmland can also offer important environmental benefits including providing wildlife habitat and flood control.



- Improve coordination with other State agencies, especially with the Department of Agriculture, the Connecticut Commission on Culture and Tourism, and the Housing Finance Authority which receive funding through the Community Investment Act, to integrate land protection actions, where practical, for maximum overall benefit
- Increase use of techniques other than fee simple purchase, such as purchase or transfer of development rights and acquisition of access, use or conservation easements
- Develop and implement a more proactive approach to land acquisition and protection. This would include engaging land trust, towns, and others in identifying potential acquisition or protection sites and approaching landowners. It would also include providing information on innovative land protection techniques to DEP's land acquisition and protection partners

#### *Data and Tools*

- Complete the Protected Open Space Mapping (POSM) project
- Inventory and map significant ecological areas and provide that information as GIS data layers available both internally and to our land protection partners
- Continue to provide data for GIS users and explore means to improve regional and local capacity for GIS utilization
- Develop lease language to manage agricultural land for habitat purposes

#### *Criteria and Standards*

- Assess the criteria used to review potential land acquisition and protection projects and amend these criteria as necessary to reflect this update of The Green Plan
- Develop a system to better weight the identified priorities to focus acquisition and protection activities

#### *Outreach*

- Enhance outreach to municipalities, land trusts and water companies regarding land protection. Specifically, the outreach should include the value of open space acquisition and land preservation and management techniques to enhance efforts to meet the State's goals
- Enhance outreach to private owners of priority lands to educate them about the opportunities for and benefits of permanently protecting their land from development
- Enhance and deliver outreach to the agricultural community on farming practices that protect the environment and provide wildlife habitat

#### *Project Evaluation and Update*

- Provide an annual statement of implementation priorities
- Review and update the Green Plan on a regular basis.

FOR MORE INFORMATION...

...about the Department of Environmental Protection's land acquisition and protection efforts,  
see web page: [www.ct.gov/dep/openspace](http://www.ct.gov/dep/openspace)  
or contact:

Land Acquisition and Management  
Department of Environmental protection  
79 Elm Street  
Hartford, CT 06106-5127  
Phone: 860-424-3016

...about the Department of Agriculture's Farmland Preservation program,  
see web page: [www.ct.gov/doag](http://www.ct.gov/doag)  
or contact:

Farmland Preservation Program  
Connecticut Department of Agriculture  
165 Capitol Avenue  
Hartford, CT 06106  
Phone: 860-713-2511

...about efforts of our non-State partners, contact:  
your municipal officials including conservation commissions, inland wetlands commissions,  
recreation departments and chief elected officials;  
your local land trust;  
your local watershed association, or  
your local water company.

APPENDIX I  
DEP PLANS RELATED TO OPEN SPACE

The DEP has a variety of plans, developed by a wide range of programs, that have some relationship to open space. They are identified and their relationship to open space is described below.

- The Connecticut Statewide Forest Resource Plan (CSFRP) is clearly linked to the Green Plan. Historically, a majority of the land acquisition and protection efforts undertaken by the State have affected forest lands. The CSFRP includes general recommendations on forest land protection and management. The protection of key forested parcels and improved management of all publicly owned parcels (State and municipal) will be consistent with both the CSFRP and the Green Plan update.
- The Connecticut Climate Change Action Plan (CCAP) includes recommended actions to reduce greenhouse gas emissions which cause global climate change, which, in turn, if left unchecked will alter the ecosystems in Connecticut and perhaps replace the environment that we currently enjoy with one more representative of areas significantly south of here. The preservation of forested lands will aid in the sequestration of carbon, which is a recommendation of this plan. Also, and the preservation and expansion of recreational trails may support travel choices and reduce vehicle miles traveled, another recommendation of the CCAP.
- The Connecticut Comprehensive Wildlife Conservation Strategies identifies species of greatest conservation need and their affiliated habitats as well as priority research needs and conservation actions necessary to address problems facing these species and habitats. Protection of lands containing the identified habitats will aid in ensuring long-term protection of these species.
- The Connecticut Recreational Trails Plan contains the DEP's policy for the development and use of statewide recreational trails and helps guide decisions made regarding grant awards for trail projects. Protection of lands upon which the trails lie or that can provide connections between trails, extensions of trails or support facilities (especially parking) will advance this plan.
- The Natural Hazard Mitigation Plan identifies long-term measures to reduce losses from future natural disasters. The protection of floodplain areas, including areas within the 500-year and the 100-year flood boundaries, as well as within stream channel encroachment lines, will help mitigate future flood damage. The protection of lands prone to coastal erosion will mitigate future erosion damage and provide opportunities to respond to the anticipated effects of climate change.
- The Statewide Comprehensive Outdoor Recreation Plan (SCORP) will guide state investments and resource allocations for meeting the outdoor recreational needs of Connecticut and it is a requirement for participation on the Federal Land and Water Conservation Fund program. Because the SCORP focus is on outdoor recreation, there is significant overlap between meeting its needs and meeting the statutory requirements for the Green Plan which includes public access/recreation as a significant component.
- The Coastal and Estuarine Land Conservation Program Plan (CELCP) is required to be eligible for federal Coastal and Estuarine Land Conservation Program competitive grant funds. Such funds can be used to acquire or otherwise protect priority coastal land conservation needs as identified in the plan. In general, the acquisition and protection of coastal lands is more costly than inland properties. These funds will provide a significant boost to the State's ability to protect environmentally sensitive coastal areas and properties that can provide public access to coastal waters. All priority acquisitions identified in the Draft CELCP are included, some in more general form, in the Green Plan update.

APPENDIX II  
NATURAL HERITAGE, OPEN SPACE AND WATERSHED LAND ACQUISITION  
REVIEW BOARD MAKE-UP\*

APPOINTEE	APPOINTED BY	LENGTH OF TERM
(2 total) Chair Bonding Subcommittee	By Statute	Standing appointment
(2 total) Ranking Member Bonding Subcommittee	By Statute	Standing appointment
Member Environment Committee	Speaker House of Representatives	Standing appointment
Member Planning & Development Committee	President Pro Tempore of Senate	Standing appointment
Secretary, Office of Policy and Management	By Statute	Standing appointment
Business Community Representative	Governor	3 year
Representative of Persons with Disabilities	Governor	3 year
Representative of Investor-owned Water Utility	Minority Leader of Senate	3 year
Representative of Municipal Water Utility	Minority Leader of House	3 year
Representative of Regional Water Authority	Minority Leader of Senate	3 year
Realtor or Attorney	Speaker of the House	3 year
Construction Industry or Land Development	President Pro Tempore of Senate	3 year
(2 total) Conservation of River Watershed Regional Interest Group	(1) Majority Leader of House (1) Majority Leader of Senate	3 year 3 year
(3 total) Nonprofit Environmental Protection or Natural Resources Conservation Organization	(1) Governor (1) Speaker of House (1) President Pro Tempore of Senate	3 year 3 year 3 year
Chief Elected Official of Town (less than 20,000 population)	Governor	3 year
Chief Elected Official of Town (greater than 20,000 population)	Governor	3 year

\* Review Board make-up is dictated by CGS section 7-131e

APPENDIX III  
STATE AND GRANT PROPERTY SELECTION PROCESS

The review procedure and decision process for the rating system consists of the following steps.

1. Identification. Submissions must include preliminary information and a map of the parcel.
2. Data distributed to DEP evaluation team. Information on each potential open space project is collected and distributed to the relevant DEP resource experts (forestry, wildlife, fisheries, botany, endangered species, geology, parks, boating, water resources, air resources, and landscape stewardship). The open space lands grant applications may receive additional review from the departments of agriculture or public health depending on whether agricultural or watershed land is involved.
3. Evaluation team ratings and comments. Resource experts evaluate the properties using criteria established for each of focus areas identified in the Green Plan (e.g., forest lands, ecological habitats, urban green spaces). Each resource expert may assign a numerical point rating based on critical factors or characteristics of a property.
4. Evaluation results compiled. A summary report is generated for each property. Based on the summary report, the Division of Land Acquisition and Management makes a recommendation to the DEP Commissioner regarding acquisition or protection of each property. Proposals received for consideration through the grant program are presented to the Natural Heritage, Open Space and Watershed Land Acquisition Review Board, which makes funding recommendations to the Commissioner.

Decisions to pursue acquisition or protection are based on the scores and comments received, as well as other considerations which in the past have included such things as: cost; fulfillment of resource need; geographic distribution; availability of partners to assist in protection; proximity to urban areas or areas with a deficiency of protected public open space; statewide interest relative to DEP programs; availability of a gift or bargain sale; stewardship needs and management constraints; proximity to other preserved open space; compatibility with the Conservation and Develop Policies Plan for Connecticut and other state environmental plans, policies, goals and objectives; compatibility with local and regional plans; identification by DEP as having multiple resource values under the Connecticut Resource Protection project; and fiscal benefits and burdens. Once this plan is finalized, this list will be reviewed and modified as warranted during the review of the selection criteria.

5. Properties selected for acquisition. Each property selected for acquisition or protection is assigned to a property agent. The DEP encourages and works cooperatively with private nonprofit land conservation organizations, municipalities, and water companies to promote land protection. In complex real estate negotiations, the Department may seek assistance from private nonprofit organizations such as the Nature Conservancy and the Trust for Public Land to help expedite the transaction.

Grant recipients are responsible for implementing approved grant projects. This includes negotiating price, survey, title search, preparation of documents, and recording of transfer documents.

6. Review by The Natural Heritage, Open Space and Watershed Land Acquisition Review Board. The Review Board reviews selection criteria, policies, and procedures and provides guidance and review of land protection strategies. Specific comments and recommendations are presented in an annual report. The Board also reviews and makes recommendations to the Commissioner on funding grant proposals.





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# Long Island Sound Stewardship Initiative

## INTRODUCTION

The Long Island Sound Stewardship Initiative is a public/private partnership created by the Long Island Sound Study to identify, protect, and enhance places along the Sound of greatest ecological value. The goals of the Stewardship Initiative are to:

- Preserve representative examples of native plant and animal communities;
- Protect threatened and endangered plants and animals and their natural habitats;
- Preserve the Sound's unique habitats;
- Preserve sites that are important for long-term scientific research and education;
- Improve coastal resource-based recreation and public access opportunities;
- Enhance public awareness, visibility, and support for the Sound resources; and
- Strengthen citizens' personal connections to and identification with the Sound.

For the purposes of this Initiative, “stewardship” means land acquisition, land conservation agreements, site planning, plan implementation, land and habitat management, public access improvements, site monitoring, and other activities designed to enhance and preserve the Sound's ecological health, functions and sustainable public use. The Long Island Sound Stewardship Initiative is designed to accomplish this by:

- Identifying sites or site complexes with significant recreational and/or ecological values;
- Facilitating funding for protection and stewardship of these sites or site complexes;
- Providing a link to technical support and assistance for improved resource stewardship;
- Linking together sites that are important for the long-term ecological health and public enjoyment;
- Collaborating with related public and private entities
- Fostering voluntary partnerships to leverage limited public funds available for land conservation, public access, management, and other activities designed to maintain and enhance the ecological health of the Sound.

## 1. BACKGROUND

The Long Island Sound Study's Comprehensive Conservation and Management Plan (CCMP) calls for the conservation of natural resources and increased public access around the Sound. The Long Island Sound Study (LISS) began implementing the CCMP in 1994, and has since made significant improvements to the Sound's water quality.



However, critical elements of the Long Island Sound CCMP, including open space and natural resource protection still require significant attention.

To bring attention to these needs, in 2000, Audubon, the Regional Plan Association (RPA), and Save the Sound (STS) organized the *Listen to the Sound* Campaign. The Campaign was an initiative to gain citizen input on strategies to advance the ecological resource and land-use goals outlined in the CCMP. There was strong public sentiment regarding the urgent need to focus on restoring and protecting the Sound's coastal habitats that sustain its fisheries and other wildlife, and preserving the few unprotected significant natural areas remaining along the shore that are under intense development pressure. The public supported the development of a strategy connecting people to the Sound while protecting the remaining outstanding unprotected areas. Development of this strategy was adopted as a commitment of the LISS in the 2003 Long Island Sound Agreement that builds upon the goals of the CCMP.

With this mandate in hand, the LISS formed the Stewardship Work Group to coordinate efforts to identify sites with ecological and/or recreational resources and to develop a strategy to protect and enhance these important areas. The Stewardship Work Group is a collaborative effort including a broad range of agencies and organizations interested in protecting the Sound. Work Group members.

## **2. A USEFUL MODEL**

The Stewardship Initiative is modeled on the successful approach used by the LISS Habitat Restoration Initiative to identify degraded habitats where restoration is critical to support the living resources of the Long Island Sound ecosystem. The LISS Habitat Restoration Initiative, launched in 1996, is a bi-state, multi-organization effort to restore and enhance degraded coastal habitats in Connecticut and New York.

Led by a work group comprised of agency officials and nonprofit organizations, the goals of the LISS Habitat Restoration Initiative are to restore the ecological functions of degraded and converted habitats; to restore at least 2,000 acres of habitat and 100 miles of riverine migratory corridors by 2008; and to use partnerships to accomplish the restoration objectives and leverage limited state, local, and federal funds. To accomplish these goals, the LISS Habitat Restoration Team identified potential restoration sites, solicited additional site nominations from the public, compiled a list of potential restoration sites using Geographic Information Systems (GIS) technology, and then ranked them according to a set of criteria in three major categories: ecological value; technical viability; and public benefit. Additional factors such as the presence of a local sponsor, an existing design plan, or available funding were also considered.

While the LISS Habitat Restoration Initiative focuses on restoring altered or degraded sites, the LIS Stewardship Initiative focuses on preserving and enhancing sites still in good condition that are critical to supporting the Sound's ecological and recreational resources.

### 3. STEWARDSHIP INITIATIVE STRATEGY

The strategy for developing the Stewardship Initiative requires work in two distinct phases. The first phase is a planning phase to inventory the ecological and recreational resources located throughout the Sound, identify the inaugural priority sites or site complexes, and document the threats and opportunities at these special places. The second phase focuses on implementation of on-the-ground stewardship actions. Implementation will be coordinated by a Stewardship Coordinating Committee (formed by expanding the current work group), and progress will be evaluated against goals and measures of success. A feedback loop will take new information gained from the process to review and update the list of priority sites. The flow chart shown in Figure 1 illustrates the proposed strategy for the LIS Stewardship Initiative and identifies the section of this document that provides the details on each step.

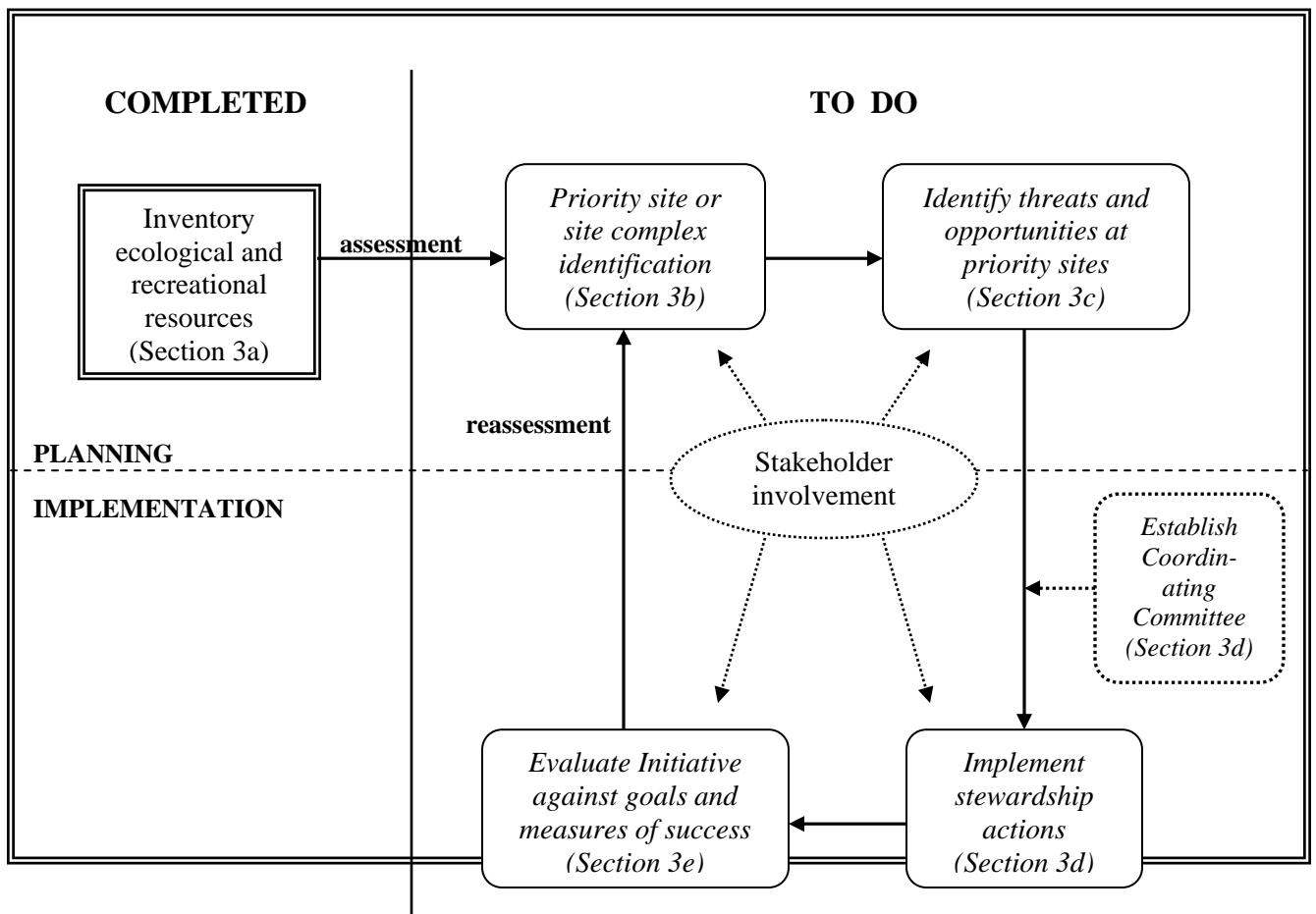
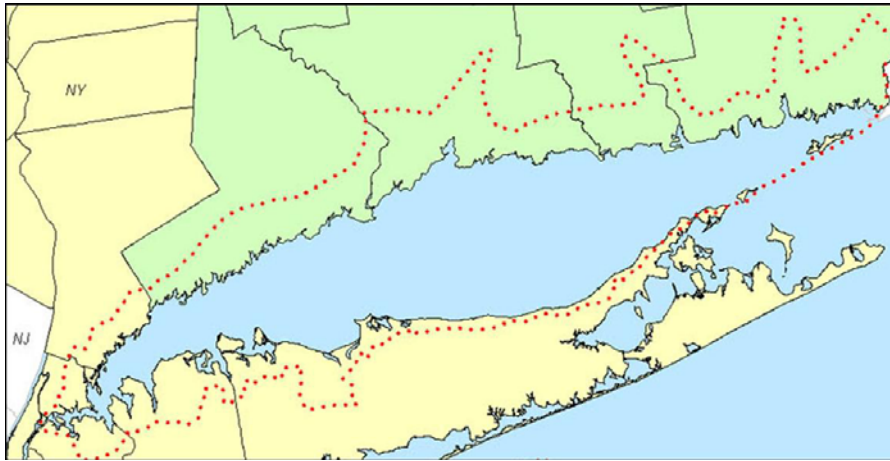


Figure 1: Proposed strategy for the planning and implementation phases of the LIS Stewardship Initiative.

**3a. Inventory of Key Recreational and Ecological Resources**

Following the LISS Habitat Restoration model, the first step of the LIS Stewardship Initiative was to establish a boundary defining the area within which a detailed inventory



**Figure 2: The Stewardship Initiative boundary, shown as a dotted line, encompasses the immediate coastal areas of the Sound.**

and analysis would be conducted. Figure 2 illustrates the boundary used for the Stewardship Initiative, which is similar to the one used for the Habitat Restoration Initiative.

As a basis for identifying the high value areas throughout the Sound, a comprehensive inventory of the Sound’s coastal resources was conducted within the boundary area. These early inventories of coastal recreational resources important ecological areas are currently being updated. Key criteria for these earlier inventories are listed in Table 1.

**Table 1: Key Criteria for the Comprehensive Inventory of the Sound’s Coastal Resources**

Criteria for Recreational Resources	Criteria for Ecological Resources
Public access to the water Water resource protection High recreational need Social equity Environmental justice Special needs groups (children/elderly) Open space resources Connectivity/adjacency to protected areas Scenic views Cultural/historical areas Educational opportunities	Ecological uniqueness Species viability Habitat diversity Size Quality Connectivity to existing protected areas or open space Land cover Scientific research or educational value

The inventory data and the preliminary areas identified by the work groups as having significant value were illustrated on maps and displayed at a series of public meetings in early 2004. Eight public meetings were held around the Sound to solicit input regarding the accuracy and completeness of the recreational and ecological resource inventories, as well as to identify a preferred approach for the protection and enhancement of these special places. This summary, which is available to the public on the LISS website, includes a list of the groups that attended each meeting, questions that were asked, and the results of the survey distributed at the meetings. Overall, there was strong support for the goals of the Stewardship Initiative. The public expressed great concern over the speed with which these special places throughout Long Island Sound are disappearing or becoming degraded, and stressed the need for the LISS to act quickly in implementing a strategy to improve the stewardship of the Sound's resources.

Comments on the maps and site suggestions received during the meetings were incorporated to ensure the completeness and accuracy of the inventories. A database of sites of exemplary ecological significance and maps of the showing the general locations of these sites is in production.

This resource inventory focused on the coastal and intertidal areas of Long Island Sound. While there are also significant resources in the Sound's underwater areas, data limitations for these subtidal areas has precluded production of a comprehensive inventory of such areas. As a result, mapping the Sound's benthic environment and bringing key stakeholders together to discuss stewardship of the Sound's underwater resources are long-term needs, and this strategy considers only nearshore and coastal sites.

### **3b. Identification of Priority Sites**

With the forthcoming completion of terrestrial and intertidal resource inventories, the next step for the Stewardship Initiative is to develop a list of priority sites or site complexes throughout the Sound. The site identification process will use a systematic approach to develop a priority list that highlights the most valuable ecological areas throughout the Sound. The current existing list of Stewardship sites/site complexes focuses on existing publicly owned facilities and other existing protected open space. A description of the Stewardship sites is available at the U.S. EPA's Long Island Sound Study's stewardship web pages: <http://longislandsoundstudy.net/issues-actions/stewardship/stewardship-areas-atlas/>

The ecological inventory and site identification process employs existing resource information and professional resource expertise. The USFWS Coastal Program collected available species and habitat use data layers using GIS. The USFWS then met with work groups of Connecticut and New York specialists to agree on significant resource categories (listed in Table 1) and definitions and review the maps of existing data. These technical work groups outlined polygons on the maps and developed notes that explained which category(ies) a site fit best. The inventory of sites is being evaluated by the work groups to develop a list of the priority ecological sites in New York and Connecticut.

Once the ecological priority site lists have been developed, the Stewardship Initiative Work Group will evaluate a draft list of sites to determine if and how an integrated list of high priority places around the Sound can be developed. The Stewardship Work Group will also evaluate whether identifying individual sites or grouping sites together as complexes best captures the Sound's ecological resources.

The resulting list of priority sites will highlight places that are important for wildlife, the last large areas of natural habitat around the Sound, and sites that provide recreational and access opportunities for people to enjoy and learn about Long Island Sound. The priority sites are not intended to become preserves set aside from economic activity. While some areas may warrant such protection, many others will accommodate multiple uses as determined by landowners, local communities, and appropriate agencies.

Owners and managers of the potential priority sites will be notified about the identification of their property and given the option to accept or decline inclusion on the site list. Identification of a site as a priority site will not override any existing management requirements or statutory or regulatory dictates. Ownership, as well as use and access decisions, will remain in the hands of the property owners or resource managers. Sites that are not included on the priority list may be considered for stewardship efforts or partnerships, provided that the site has significant ecological or recreational value and is located within the Stewardship Initiative boundary.

The Stewardship Work Group will hold a series of public meetings to solicit feedback on the draft list of priority areas and input on the issues affecting these special places. After incorporating these comments, the Stewardship Work Group will present the list of priority sites to the LISS Management Committee and Policy Committee for approval. Upon approval by the LISS, the site list will be made available to the public, along with documentation on the values of and threats to these sites or site complexes.

### **3c. Identification of Threats and Opportunities**

Along with the site identification process, the ecological values of the initial Stewardship sites and threats to those sites will be evaluated. Public input on the issues affecting these special places will be solicited at the public meetings. Additional information regarding the threats and conservation opportunities at these sites will be identified.

### **3d. Implementation**

The Stewardship Initiative will be implemented as a program of the LISS. However, as with the LISS Habitat Restoration Initiative, a variety of organizations and agencies are expected to provide funding and partnership opportunities for implementation. Upon completion of the initial site identification process, the existing work group will be expanded and formally constituted as the Long Island Sound Stewardship Coordinating Committee. The Committee will be comprised of agency staff and stakeholder organizations representing diverse environmental and economic interests, and will include representatives from New York and Connecticut. The EPA Long Island Sound Office (EPA LISO), in coordination with the LISS Management Committee, will make appointments to the Committee. The Coordinating Committee's responsibilities will include the following:

- 1. *Facilitate Funding for Stewardship Projects:*** Evaluate proposals requesting funding for stewardship actions and recommend projects for funding to the LISS Management Committee. Identify and secure additional resources to accomplish Initiative goals.
- 2. *Develop Measurable Goals for the Stewardship Initiative:*** Define key indicators of success for this Initiative, establish a timeline for meeting these goals, evaluate ongoing activities, and provide annual reports on progress toward meeting established goals. Amend process based on results if necessary. Preliminary example indicators include the following:
  - Improve and enhance access at XX sites throughout Long Island Sound.
  - Protect XX acres of coastal habitat and open space. (Protect = improve management, acquire, easement)
  - Guide and assist XX number of sites with funding for stewardship activities.
- 3. *Communicate the Goals of the Stewardship Initiative:*** Develop and distribute materials to describe the Initiative and highlight its importance. Continue the dialogue with interested organizations around the Sound. Communicate and collaborate with other agencies and organizations working on stewardship issues to avoid duplication of efforts and build partnerships.

The Stewardship Work Group has recommended that the LISS provide funding for a Stewardship Initiative Coordinator, as the LISS has done with the Habitat Restoration Initiative. The Stewardship Initiative Coordinator will act as the liaison between the Coordinating Committee and the property owners or resource managers involved with the

Initiative, and will assist the Coordinating Committee with the tasks detailed above. In addition, the Stewardship Initiative Coordinator will be responsible for organizing Committee meetings and producing reports and other deliverables for the LISS Management Committee, EPA and others. The Stewardship Initiative Coordinator will be housed in the EPA LISO and will report to the Director of the EPA LISO.

**3e. Evaluation of the Stewardship Initiative**

In order to evaluate the effectiveness of the Stewardship Initiative, the Initiative Coordinator will work with the Coordinating Committee to develop a set of measurable goals, as described in Section 3d. Periodic evaluation of the Initiative will help ensure that stewardship goals are being realized and will provide an opportunity to review and update, if necessary, the list of priority sites. The Coordinating Committee will establish a process by which to update the list of priority sites. This process will include criteria for evaluating information on potential additions to the list and methodology for soliciting and incorporating feedback from the public.

#### **4. BENEFITS**

The LIS Stewardship Initiative is envisioned as a collaborative effort among a wide range of public and private partners. These voluntary partnerships will help protect and improve stewardship at sites important for maintaining the long-term ecological health and public enjoyment of the Sound, while building public visibility and support for the Sound. Another benefit of the LIS Stewardship Initiative is that the data gathered through the comprehensive inventory are an information resource for landowners, government agencies, land trusts, and others interested in restoring and protecting the Sound. This information, coupled with the list of priority sites, can help focus agencies and groups on where to direct limited resources and can assist in the establishment of stewardship priorities.

Upon completion of the priority site list, identification as a stewardship site will enhance an application's ranking for possible funding through the LIS Futures Fund – a joint program of the LISS and the National Fish and Wildlife Foundation – to assist with acquisition, planning, management, or public access improvements consistent with the goals and principles of the Stewardship Initiative. Participating landowners and managers will also have access to technical support to assist with stewardship efforts. The Stewardship Coordinator will work with these landowners and managers to identify and secure funding to develop and implement stewardship actions, by facilitating partnerships and assisting with grant applications. If desired, participants may display a logo designating their site as a LIS Stewardship Area on signage at the site, as well as on printed materials and on their web sites. Further information about the logo concept will be developed.

#### **5. FUNDING**

Significant financial resources will be necessary to initiate and sustain the Stewardship Initiative. Funding will be needed for the acquisition and protection of lands, to facilitate effective site planning, management, enhancement, and public access improvements, and to allow the Stewardship Coordinating Committee to effectively carry out its duties. The preliminary list of potential sources of funding for the LIS Stewardship Initiative includes:

##### ***Identifying New Funding Sources***

- Proposed Federal Legislation establishing a Long Island Sound Stewardship Act would authorize \$40 million per year in funding for the Stewardship Initiative
- Potential sources of new state and local funding to assist with stewardship
- Potential new sources of Foundation and other private support
- Proposed federal legislation such as the American Outdoors Act and extension and enhancement of the Land and Water Conservation Fund
- NOAA's Coastal and Estuarine Land Conservation Program

##### ***Leveraging Existing Funding Sources***

- Federal Land and Water Conservation Fund
- Other Federal sources, such as North American Wetlands Conservation grants
- LIS Futures Fund, a joint program of the LISS and the National Fish & Wildlife Foundation (NFWF)



- State open space programs (CT Recreation and Natural Heritage Trust Program; CT Municipal Open Space and Watershed Grants Program; CT Farmland Preservation Program; the New York Open Space Program)
- Municipal sources, such as the New Drinking Water Protection Program of Suffolk County, New York and the New York Community Preservation Act

Appendix 9  
**Connecticut Coastal Access Survey Results**

**Connecticut Department of Environmental Protection  
Office of Long Island Sound Programs**

**November 2004**

From February 2004 to July 2004 Connecticut DEP's Office of Long Island Sound Programs distributed three coastal recreation access surveys to better understand the public's coastal recreation habits and to assess public demand for access to Connecticut's coast for the following popular coastal recreation activities: (1) Saltwater Fishing and Waterfowl Hunting; (2) Coastal Boating; and (3) Wildlife Observation. The data obtained from the three surveys are summarized here.

**Survey Distribution and Response**

**Total surveys distributed: 1,069**  
**Total surveys returned: 419**  
**Response Rate: 39%**

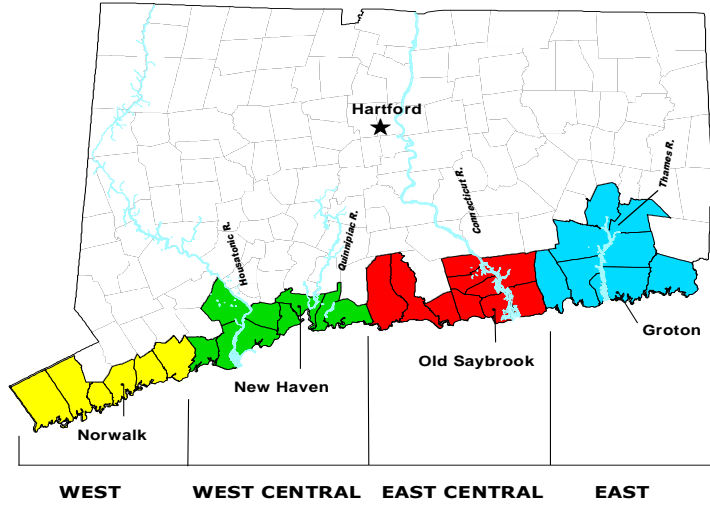
Total # of Wildlife surveys distributed: **356**  
Total # of Wildlife surveys returned: **166**  
Response Rate: **47 %**

Total # of Saltwater Fishing and Waterfowl Hunting surveys distributed: **368**  
Total # of Saltwater Fishing and Waterfowl Hunting surveys returned: **141**  
Response Rate: **38%**

Total # of Boating surveys distributed: **345**  
Total # of Boating surveys returned: **112**  
Response Rate: **32%**

# Demographics of Survey Respondents

## Connecticut's Coastal Regions



### Respondents were from the following regions:

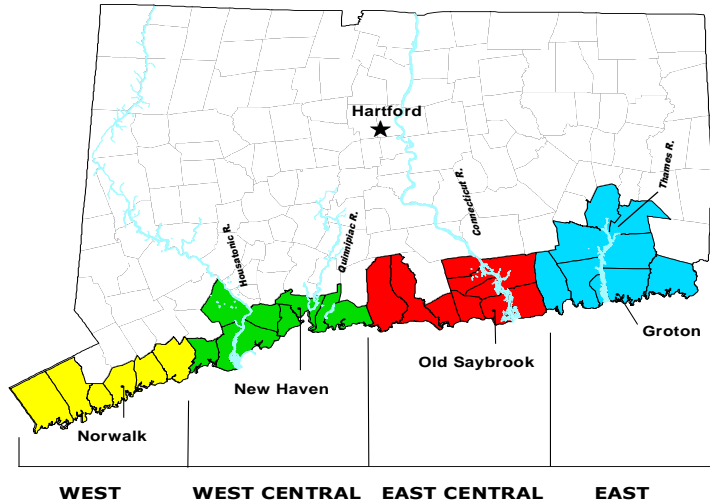
Percent for regions (coastal regions outlined in the above map)

Other-	<b>46%</b>
East Central	<b>15%</b>
Eastern	<b>16%</b>
West Central	<b>13%</b>
Western	<b>7%</b>
Did not respond	<b>4%</b>

# BOATING ACCESS SURVEY RESULTS

## Demographics of Survey Respondents

### Connecticut's Coastal Regions



### **Respondents were from the following regions:**

Percent for regions (coastal regions outlined in the above map)

Other-	<b>47%</b>
East Central	<b>16%</b>
Eastern	<b>16%</b>
West Central	<b>11%</b>
Western	<b>5%</b>
Did not respond	<b>5%</b>

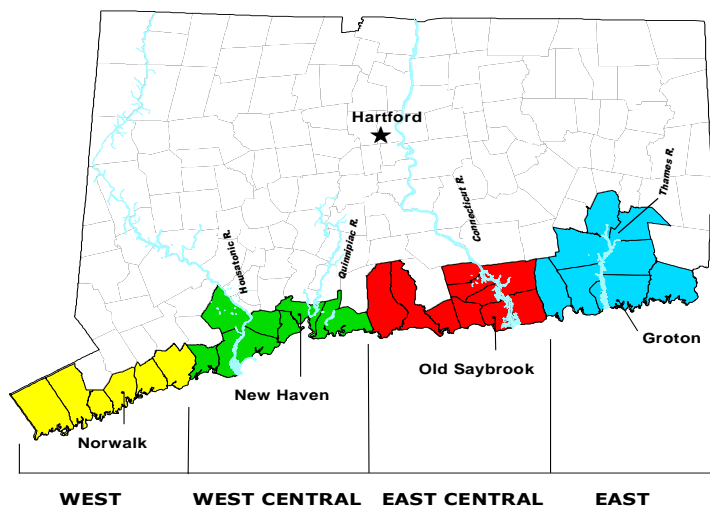
### Percent of respondents that use the following vessels:

Powerboat over 26 feet long	6%	Canoe	18%
Powerboat under 26 feet long	35%	Kayak	27%
Personal Watercraft	3%	Rowing Skull/Shell	2%
Registered Sailboat	3%	Windsurfer	0%
Unregistered Sailboat	4%	Other	2%
		(specify)_____	

1. Are boaters coastal waters access needs being met at public access facilities?

- 83% - believe additional public boating sites are needed
- 6% - believe no additional public boating sites are needed
- 8% - had no opinion
- 3% - did not respond

2. Where are **additional** public boating access facilities most needed?



Region	New car-top launch	New trailered launch
<b>East Central Coastal Region (RED)</b>	31%	36%
<b>Eastern Coastal Region (BLUE)</b>	26%	30%
<b>Western Coastal Region (YELLOW)</b>	24%	20%
<b>West Central Coastal Region (GREEN)</b>	19%	14%

2b. Towns where **new** boating access sites are most needed:

New car-top launches

- 1. Stonington 9%
- 2. Branford and Madison 6%
- 3. Guilford and Greenwich 5%

New trailered launches

- 1. Stonington 7%
- 2. Clinton and Westbrook 6%
- 3. Greenwich, Madison, East Lyme, New London 5%

3. Facilities requested at **new** boat launches:

Facilities requested at **new carry-in** boat launches:

soft bottom ramp	<b>39%</b>
toilet	<b>33%</b>
public dock at boat launch	<b>8%</b>
hard-bottom ramp	<b>2%</b>
parking	<b>2%</b>
other	<b>1%</b>

Facilities requested at **new trailered** boat launches:

hard-bottom ramp	<b>33%</b>
public dock at boat launch	<b>27%</b>
toilet	<b>29%</b>
other	<b>8%</b>
parking	<b>3%</b>

4. How should **existing** public boat access facilities be improved or managed to better meet the public's boating access needs?

The following **additional** facilities should be provided at **existing** boating access sites:

additional parking	<b>24%</b>
ramp	<b>20%</b>
improved water depths	<b>15%</b>
other	<b>10 %</b>
public dock	<b>9%</b>
permanent toilets	<b>8%</b>
portable toilets	<b>7%</b>
lighting	<b>3%</b>
improved services for the mobility impaired	<b>3%</b>
did not respond	<b>1%</b>

The following facilities should be **improved** at **existing** boating access sites:

public dock	<b>20%</b>
portable toilets	<b>17%</b>
additional parking	<b>15%</b>
improved water depths	<b>11%</b>
permanent toilets	<b>10%</b>
did not respond	<b>8%</b>
other	<b>7%</b>
lighting	<b>6%</b>
improved services for the mobility impaired	<b>2%</b>
fresh water hose	<b>2%</b>
trash cans	<b>2%</b>

5. Facilities improvements at specific boating access sites:

What **existing** public boating access sites are most in need of **additional** facilities?

- East River State Boat Launch                   **6%**
- Great Island State Boat Launch               **5%**
- Barn Island State Boat Launch               **5%**  
(major facility improvements completed at Barn Island State Boat Launch post survey)
- Saugatuck River State Boat Launch           **4%**

**What were the facilities requested at these sites?**

Site# 149 East River State Boat Launch - additional parking, improved water depths, lighting, portable toilets and a public dock.

Site# 186 Great Island State Boat Launch - additional parking, carry-in access improved water depths permanent toilets and a public dock.

Site# 258 Barn Island State Boat Launch - a fresh water hose, improved water depths, lighting, permanent toilets and a public dock.

Site# 53 Saugatuck River State Boat Launch - additional parking, improved water depths, permanent toilets, portable toilets, a public dock and separate carry-in access point for manually-propelled vessels.

What sites had the highest percentage of requests for facility **improvements**?

- Barn Island State Boat Launch               **9%**  
(major facility improvements completed at Barn Island State Boat Launch post survey)
- Niantic River State Boat Launch           **7%**
- Branford River State Boat Launch       **7%**
- Bayberry Lane State Boat Launch       **7%**

**What were the facility improvements requested at these sites?**

Site# 258 Barn Island State Boat Launch - additional parking, improved water depths, permanent toilets, a public dock, rock removal, improve bottom for small boat landing, smooth access road and a soft-bottom ramp (sand).

Site# 197 Niantic River State Boat Launch - additional parking, improved water depths, more frequent cleaning of portable toilets, permanent toilets and a ramp.

Site# 140 Branford River State Boat Launch - additional parking, improved services for mobility impaired, lighting, a public dock and a ramp.

Site# 226 Bayberry Lane State Boat Launch - additional parking, improved water depths, permanent toilets, public dock and a ramp.

6. a. Should boat launch ramps be managed to allow uses **other than boating access** (e.g., bird watching, fishing, etc.)?

Yes **47%**

No **53%**

b. If other non-boating uses are permitted at boat launches, what types of uses should be permitted?

fishing **34%**

wildlife observation platforms **34%**

picnicking **29%**

other- all others no more than **1%**

7. New boating access design considerations:

How far from a parking area are car-top boaters willing to carry their vessels (eg. canoes/kayaks) to a launch site?

0 feet - 50 ft **20%**

50 ft - 100 ft **34%**

100 ft -150 ft **9%**

More than 150 ft **17%**

Did not respond **21%**



8. What types of coastal environments would boaters visit more often if they could land their vessels nearby? Beaches and Islands for all four coastal regions.

**Percent respondents that would visit certain coastal environments more often if they could land their boat there:**

Rank	Coastal Environments	Coastal Region			
		West	West Central	East Central	East
1	islands	24%	27%	26%	24%
2	beaches	20%	22%	21%	23%
3	marsh (carry-in vessels only)	13%	15%	16%	15%
4	parks	14%	11%	14%	15%
5	historic sites	11%	13%	8%	10%
6	downtown areas (town centers)	9%	9%	9%	8%
7	shopping (service areas)	4%	2%	4%	3%
8	other	5%	1%	2%	2%

**other (specify)**

**East-** tackle shops, rivers, camping area and coves

**East Central-** dredging, rivers and tackle shops

**West Central-** restaurants

**West-** rivers for rowing and restaurants

9. Temporary vessel “tie-up” facilities:

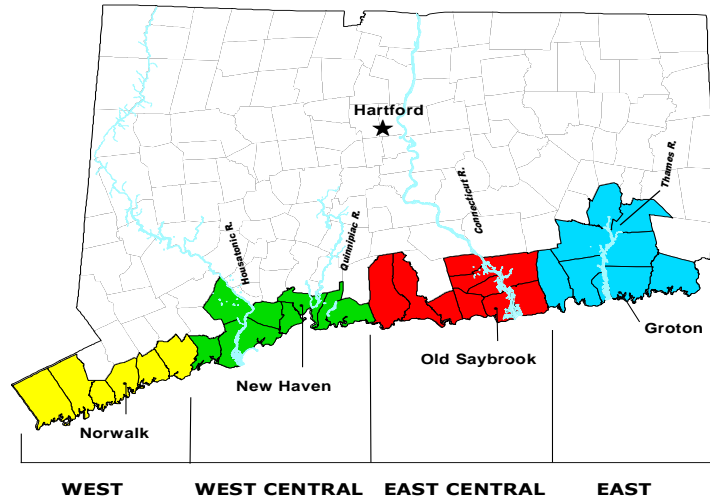
*Temporary tie-up facilities allow short term boater access to the land from the water.*

a. 47% of respondents use temporary tie-ups

Preferred method (or facility) for temporarily securing boats:

- transient/temporary dock space      **55%**
- informal haul-out area                **21%**
- dinghy dock                                **13%**
- mooring                                      **11%**

b. Where are temporary tie-ups most needed (percentage of responses for each region)?



Region	New temporary tie-ups
East Central Coastal Region (RED)	37%
Eastern Coastal Region (BLUE)	28%
Western Coastal Region (YELLOW)	28%
West Central Coastal Region (GREEN)	7%

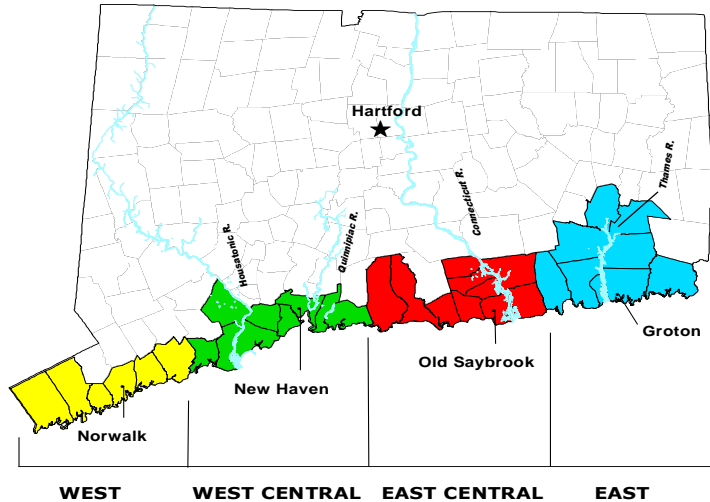
Towns where **new** temporary tie-ups are most needed:

1. Greenwich and Clinton -- all with 8%
2. Madison - 7%
2. Darien, Waterford, Stonington -- all with 6%

# SALTWATER FISHING AND WATERFOWL HUNTING RESULTS

## Demographics of Survey Respondents

### Connecticut's Coastal Regions



### **Respondents were from the following regions:**

Percent for regions (coastal regions outlined in the above map)

Other-	<b>43%</b>
Eastern	<b>19%</b>
East Central	<b>16%</b>
West Central	<b>11%</b>
Western	<b>6%</b>
did not respond	<b>6%</b>

Percentage of respondents that participate in saltwater shore fishing: **45%**

Percentage of respondents that participate in saltwater boat fishing: **45%**

Percentage of respondents that participate in waterfowl hunting: **10%**

### **Fishing:**

How far are fishermen willing to travel to use a fishing site?

Less than 10 miles- **7%**

Greater than 10 but less than 50 miles- **55%**

Greater than 50 miles- **35%**

Popularity of CT's Coastal regions for shore-based fishing:

<b>East Central-</b>	<b>39%</b>
<b>Eastern-</b>	<b>38%</b>
<b>Western-</b>	<b>11%</b>
<b>West Central-</b>	<b>9%</b>

1. The role of private lands in providing shore-based fishing access:

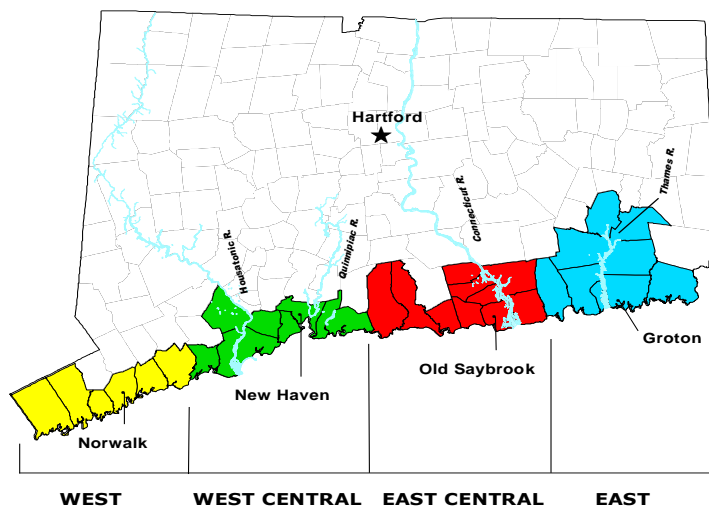
**36%** Percent of respondents had to cross private land to access a fishing site:

Of those indicating a need to cross private land, **76%** felt the DEP should acquire the land

Specific sites that are providing a significant shore-based fishing opportunity where the public has to cross private land:

- Cornfield Point, Old Saybrook **6%**
- Griswold Point, Old Lyme **3%**
- Seaside Point, Waterford **2%**
- Norwich State Hospital, Preston **2%**

2. Where are additional fishing access opportunities most needed along CT's coast?



a. Additional public **shore-based fishing access** opportunities are most needed:

Region	Shore Fishing Access
East Central Coastal Region (RED)	38%
Eastern Coastal Region (BLUE)	26%
Western Coastal Region (YELLOW)	21%
West Central Coastal Region (GREEN)	15%

b. Additional public **boat fishing access** opportunities are most needed:

Region	Boat Fishing Access
East Central Coastal Region (RED)	35%
Eastern Coastal Region (BLUE)	33%
Western Coastal Region (YELLOW)	14%
West Central Coastal Region (GREEN)	18%

**Hunting:**

Popularity of CT’s Coastal regions for waterfowl hunting:

<b>Eastern-</b>	<b>34%</b>
<b>East Central-</b>	<b>31%</b>
<b>West Central-</b>	<b>17%</b>
<b>Western-</b>	<b>17%</b>

\*note: only 21% of the Saltwater Fishing and Waterfowl Hunting survey respondents answered this question

1. The role of private lands in providing waterfowl hunting access:

a. **4%** Percent of respondents had to cross private land to access waterfowl hunting sites.

Of those who need to cross private lands, **33%** felt the DEP should acquire the land

b. Specific sites that are providing a significant waterfowl hunting opportunity where the public has to cross private land:

- Greenwich
- Manersa Power Plant Land and Salt Marsh, Norwalk
- Darien

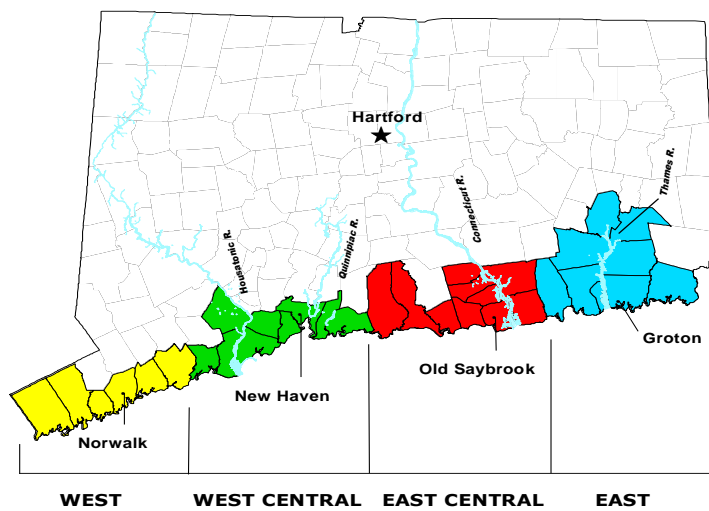
2. Facilities that are most needed at **existing** waterfowl hunting access sites:

- Most frequently requested facility: Toilets

Toilets	<b>20%</b>
Trailer Ramp	<b>18%</b>
Carry-In Boat Launch	<b>17%</b>
Access Pier	<b>17%</b>
Parking area improvements	<b>17%</b>
Other	<b>9%</b>

- Most frequently mentioned access site: Four Mile River State Boat Launch, Old Lyme
- Public access site that needed the most new facilities: Four Mile River State Boat Launch, Old Lyme

3. Where are additional waterfowl hunting opportunities most needed along CT's coast?

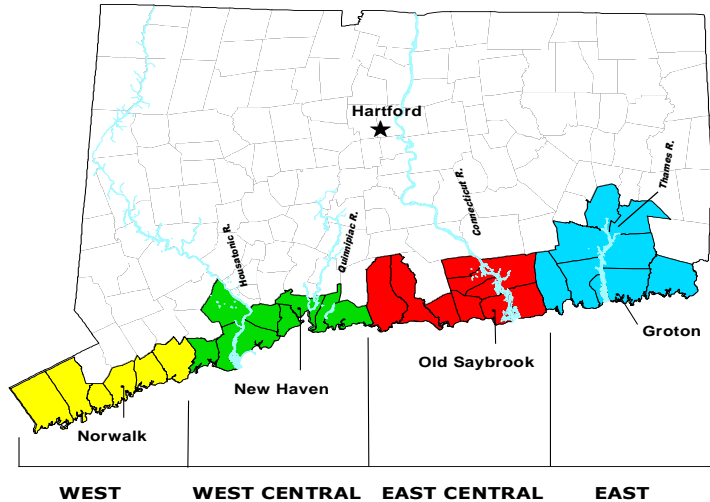


Region	Waterfowl Hunting Access
<b>East Central Coastal Region (RED)</b>	28%
<b>Eastern Coastal Region (BLUE)</b>	36%
<b>Western Coastal Region (YELLOW)</b>	21%
<b>West Central Coastal Region (GREEN)</b>	15%

# WILDLIFE ACCESS SURVEY RESULTS

## Demographics of Survey Respondents

### Connecticut's Coastal Regions



#### **Respondents were from the following regions:**

Percent for regions (coastal regions outlined in the above map)

Other-	47%
West Central	17%
Eastern	13%
East Central	12%
Western	8%
Did not respond	3%

1. a. Are wildlife observation public access needs being met? No

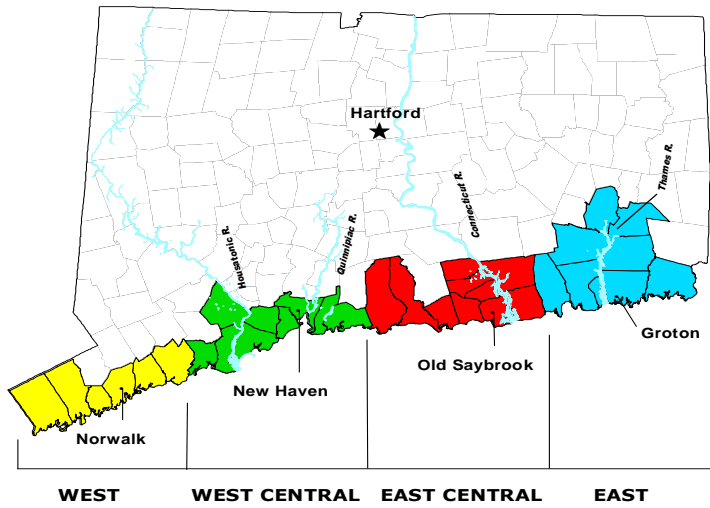
**81%** believe additional wildlife observation areas are needed

**10%** had no opinion

**6%** did not respond

**3%** believe no additional wildlife observation areas are needed

b. Where are additional wildlife observation opportunities most needed along CT's coast?



Region	Wildlife Observation Access
<b>East Central Coastal Region (RED)</b>	36%
<b>Eastern Coastal Region (BLUE)</b>	16%
<b>Western Coastal Region (YELLOW)</b>	21%
<b>West Central Coastal Region (GREEN)</b>	27%

2. Are there specific sites that DEP should investigate acquiring to meet the needs of the wildlife observation public?

Areas with the highest percentage of responses:

- Area on the Quinnipiac River in New Haven, North Haven and Hamden
- Area in and around Great Meadows, Stratford
- Griswold Point, Old Lyme
- Oswegatchie Hills, East Lyme
- Area adjacent to Hammonasset State Park, Madison
- Quaker Hill, Waterford

3. Are additional facilities needed at existing wildlife observation areas?

- 54%** believe additional types of facilities are needed at existing sites
- 25%** believe no additional types of facilities are needed at existing sites
- 21%** had no opinion



4. a. Facilities that need to be added to **existing** wildlife observation areas to make them more useful:

Observation platform	<b>21%</b>
Observation blind	<b>14%</b>
Toilets	<b>30%</b>
Parking area improvements	<b>19%</b>
Other (boat kayak launch 2%, Osprey nest platforms 2%)	<b>16%</b>

b. Most frequently mentioned sites requiring facilities improvements (highest percentage of responses):

Sandy Point Bird Sanctuary, West Haven	<b>6%</b>
Sandy Point, West Haven	<b>4 %</b>
Barn Island Wildlife Management Area, Stonington	<b>4%</b>

Facilities most frequently requested at the above sites:

Sandy Point Bird Sanctuary, West Haven - observation blind, observation platform, parking improvements (also in the summer months) and toilets.

Sandy Point, West Haven - observation blind, observation platform, parking improvements and toilets.

Barn Island Wildlife Management Area, Stonington - observation blind, observation platform, toilets and trail maps – area info.

5. a. Is DEP adequately operating coastal access sites to meet the needs of the wildlife observation public?

**41%** believe existing DEP coastal access properties are operated to meet their needs:

**45%** believe existing DEP coastal access properties are not operated to meet their needs:

**14%** had no opinion

b. The most significant operational obstacles to meeting the needs of the wildlife observation public at existing DEP coastal access areas:

Increased hours of access	<b>50%</b>
Improve maintenance/trash pick-up	<b>19%</b>
Improve parking facilities	<b>17%</b>
Other- (dogs on leash 2%, dog feces 2%)	<b>14%</b>

c. Most frequently mentioned sites (highest percentage of responses):

- Hammonasset Beach State Park, Madison **28%**
- Silver Sands State Park, Milford **9%**
- Sherwood Island State Park, Westport **4%**

Facilities most frequently requested at the above sites:

- Hammonasset Beach State Park, Madison - increase hours of access
- Silver Sands State Park, Milford - increase hours of access
- Sherwood Island State Park, Westport - increase hours of access

6. Conflicting uses at wildlife observation sites:

**52%** have encountered conflicting recreational uses at access sites

**36%** have not encountered conflicting recreational uses at access sites

**11%** had no opinion

a. The most common types of conflicting uses at wildlife observation sites:

Unleashed dogs disturbing nesting birds

Walkers disturbing nesting birds

Motor powered vehicles (including ATV's, jet-skis, boats) disturbing nesting birds

b. The three sites where conflicts most often occurred (percentages):

Hammonasset Beach State Park, Madison **15%**

Sandy Point, West Haven **9%**

Stewart B. McKinney National Wildlife Refuge-Milford Point Unit **6%**

**Appendix 10**



go to: <http://nctc.fws.gov/resources/knowledge-resources/pubs5/necas/begin.htm>

for

**FINAL REPORT**

**NORTHEAST COASTAL AREAS STUDY:  
SIGNIFICANT COASTAL HABITATS  
OF SOUTHERN NEW ENGLAND  
AND PORTIONS OF LONG ISLAND, NEW YORK**

**Submitted to**

**U.S. HOUSE OF REPRESENTATIVES  
COMMITTEE ON APPROPRIATIONS  
AND  
U.S. SENATE  
COMMITTEE ON APPROPRIATIONS**

**August 1991**

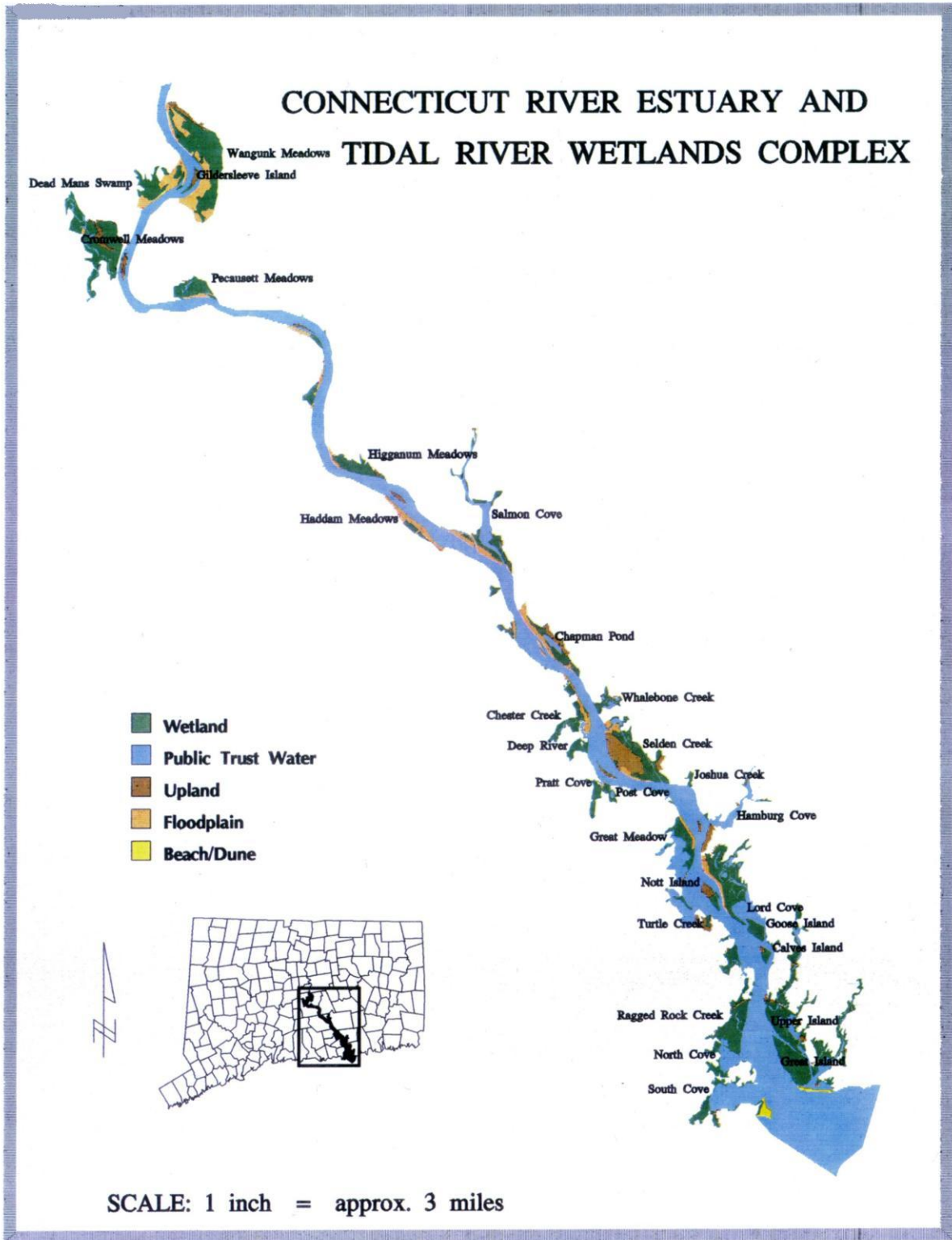
**PREPARED BY:**

**U.S. FISH AND WILDLIFE SERVICE**

**Southern New England - Long Island Sound Coastal and Estuary Office**

**Box 307**

**Charlestown, Rhode Island 02813**



## **Appendix 12**

### **Criteria for Inclusion - Ramsar Wetlands of International Importance**

Article 2(2) of the Ramsar Convention specifies that the selection of wetlands for the List of Wetlands of International Importance (List) should be based on their international significance in terms of ecology, botany, zoology, limnology, or hydrology. Member countries to the Ramsar Convention adopted general criteria and expanded guidelines at the Conferences of the Parties at Heiligenhafen (1974), Regina (1987), and Montreux (1990) for nominating wetland sites for the Ramsar List. The three categories for selecting internationally significant wetlands are: 1) representative or unique wetlands in a region; 2) wetlands using plants and animals as indicators of importance, especially rare and endangered species; and 3) wetlands of particular value to waterfowl. According to the Convention, a wetland is considered suitable for inclusion on the List if it meets any of the established criteria.

## Appendix 13

### Connecticut River Estuary and Tidal Wetlands Complex Core Sites

- (1) Connecticut River Mainstem - All tidal waters and submerged lands below mean high water of the mainstem of the Connecticut River.
- (2) Great and Upper Island Complex (Old Lyme) - An extensive system of salt and brackish meadow marshes, including Griswold Point, an important barrier beach and dune complex at the mouth of the river.
- (3) Ragged Rock Creek and South Cove Complex (Old Saybrook) - Brackish marsh system including Lynde Point, a coastal barrier with one of the most extensive sandflat communities in Connecticut.
- (4) Turtle Creek (Essex, Old Saybrook) - Brackish reed marsh with some wild rice.
- (5) Lord Cove Complex (Lyme) - An extensive area of brackish reed marsh and floodplain forest. Includes Nott, Goose, and Calves Islands.
- (6) Great Meadows (Essex) - A brackish reed marsh.
- (7) Hamburg Cove (Lyme) - A tidally-influenced freshwater cove noted for its ecologically important intertidal flats and diversity of submerged aquatic vegetation.
- (8) Pratt and Post Coves (Deep River) - Well-developed freshwater tidal marshes dominated by dense stands of wild rice on low marsh and diverse forb communities on the high marsh.
- (9) Selden Creek and Joshua Creek (Lyme) - Area consists of Selden Neck (bedrock island), Selden Cove, and Selden Creek, extensive freshwater tidal marshes and alluvial wetlands, and a narrow upland slope. Numerous creeks flow into the cove from the surrounding uplands.
- (10) Chester Creek and Deep River Complex (Chester, Deep River) - Extensive freshwater tidal wild rice marsh.
- (11) Whalebone Creek and Cove (Lyme) - One of the most extensive freshwater tidal wild rice marshes in the state, surrounded by forested uplands.
- (12) Chapman Pond (East Haddam) - A 24-hectare (60 acre) tidal freshwater pond connected to the Connecticut River by two narrow inlets.
- (13) Salmon Cove and River (East Haddam) - A complex of high-quality freshwater tidal marshes, intertidal flats, floodplain forest, and alluvial swamp bounded by forested uplands.
- (14) Haddam Meadows State Park (Haddam) - Alluvial wetlands and floodplain
- (15) Higganum Meadows (Haddam) - Freshwater tidal marshes, alluvial wetlands and floodplain
- (16) Pecauset Meadows (Portland) - High quality freshwater tidal marsh.
- (17) Cromwell Meadows (Cromwell, Middletown) - Freshwater tidal and alluvial marsh.
- (18) Dead Mans Swamp (Cromwell) - An alluvial floodplain, swamp, and marsh system with well-developed vegetation characteristic of the upper tidal Connecticut River.
- (19) Gildersleeve Island (Cromwell) - Sandy island and sand bar system and floodplain forest on west side of upper tidal Connecticut River.
- (20) Wangunk Meadows (Portland, Glastonbury) - A large complex of floodplain forest and alluvial marsh east of Gildersleeve Island.

# Restoring Long Island Sound's Habitats

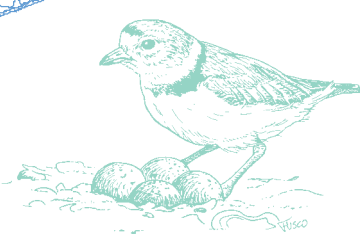
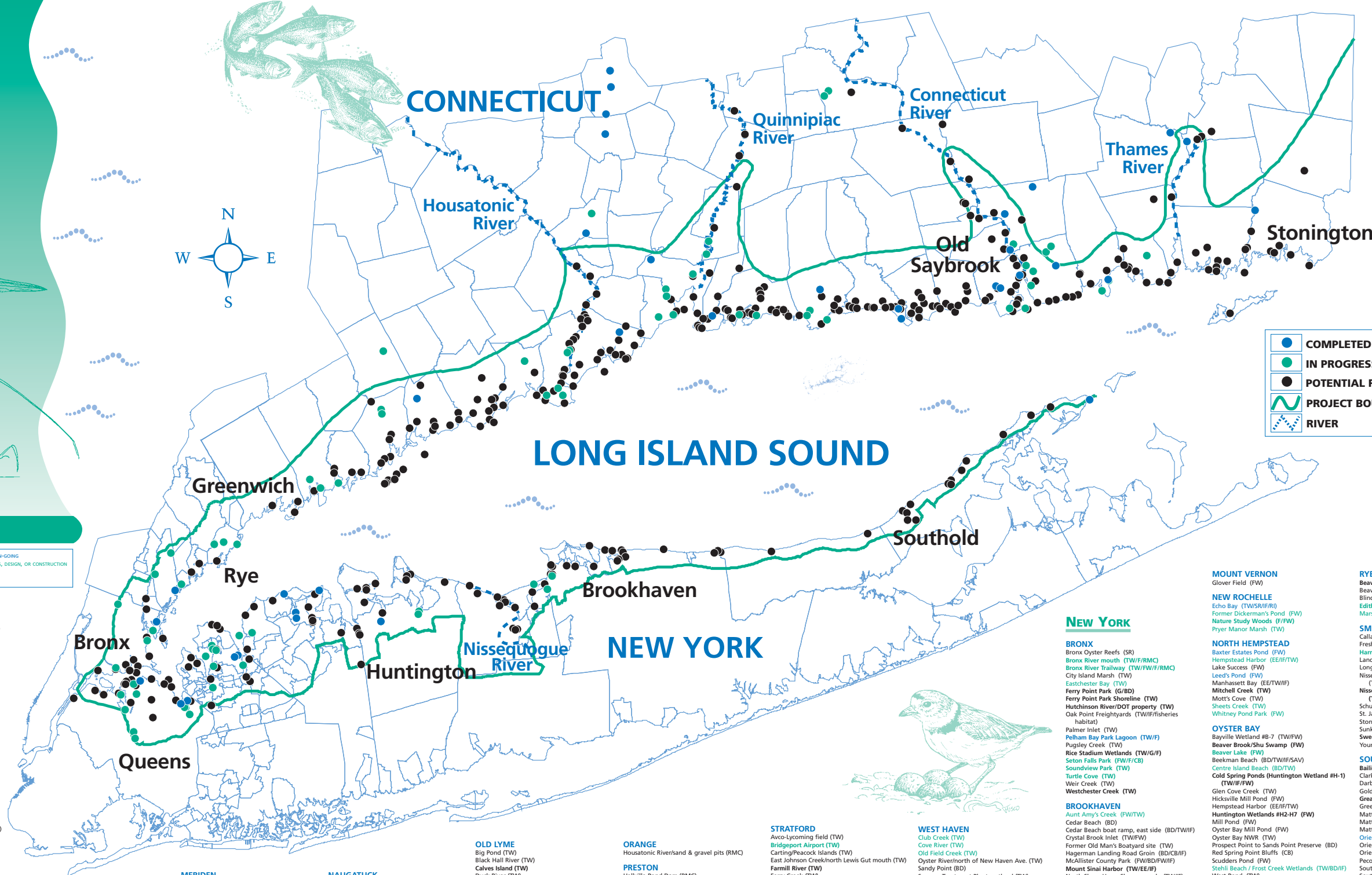
2002

## RESTORATION SITES

BLUE INDICATES COMPLETED SITE - CONSTRUCTION ON THE PROJECT IS FINISHED, BUT MONITORING MAY BE ON-GOING  
 GREEN INDICATES IN PROGRESS SITE - SOME PHASE OF THE PROJECT IS UNDERWAY, E.G. APPLYING FOR FUNDING, DESIGN, OR CONSTRUCTION  
 BLACK INDICATES POTENTIAL SITE - A RESTORATION PROJECT HAS BEEN IDENTIFIED, NO ACTION TAKEN YET  
 BOLDFACE IN ALL COLORS INDICATES HIGH-RANKED SITES

### CONNECTICUT

- BRANFORD**  
 Branford River STP (TW)  
 Branford R./Christopher Rd. (TW)  
 Branford R./St. Agnes Cemetery (TW)  
 Branford R./Hickory Rd. (TW)  
 Branford R. tributary/Mill Creek (TW)  
 Farm River (TW)  
 Farm R. tributary/Pent Rd. (TW)  
 Farm R. tributary/Cynthia Ct. (TW)  
 Flying Point/Prospect Hill Rd. (TW)  
 Juniper Point (TW)  
 Lindsey Cove east (TW)  
 Lindsey Cove west/Castle Rock (TW)  
 Pages Cove north (Short Beach) (TW)  
 Pages Cove (Kilian's Point) (TW)  
 Pine Orchard golf course (TW)  
 Sybil Creek (TW)  
 Tabor Drive Marsh (TW)  
 Three Elms Rd. (TW)  
 Ticon Wetland (TW)  
 Ward's Millpond/Branford River W.M.A. (RMC/FW)  
 West Point Road (TW)
- BRIDGEPORT**  
 Ash Creek/Rooster River (TW)  
 Bunnells Pond (RMC)  
 Grover Hill (TW)  
 Pleasure Beach (BD)  
 Yellow Mill Channel to Stillman Pond (RMC)
- CHESTER**  
 Carini Preserve (RMC)
- CLINTON**  
 Chapman's Pond Dam (RMC)  
 Clinton Harbor (SAV/SR/TW)  
 Hammock River (TW)  
 Hammonasset River tributary (TW)  
 Indian River (TW)  
 Indian River south of RR track (TW)  
 Upper Mill Pond Dam (RMC)
- CROMWELL**  
 Cromwell Meadows (RMC)
- DARIEN**  
 Five Mile River Marsh (TW)  
 Goshams Pond (EE/RMC)  
 Holly Pond (RMC/EE)  
 Noroton River at I-95 (RMC)  
 North Scott Cove-Arrowhead Way (TW/EE)
- DEEP RIVER**  
 Plano Works Dams (RMC)  
 Pratt Cove (TW)
- EAST HADDAM**  
 Chapman Pond (TW)  
 Salmon River (RMC)
- EAST HAVEN**  
 Caroline Creek between Minor and Stanton Rds. (TW)  
 Caroline Creek/Cossey Beach (TW)
- FARM RIVER (TW)**  
 Farm River tributary/Edgemere Rd. (TW)  
 Morris Creek/Sibley Lane (TW)  
 New Haven Airport (TW)
- EAST LYME**  
 Brides Brook Culvert (RMC/TW)  
 Crescent Park/Manwaring Rd. (TW)  
 Fourmile River Dam (RMC)  
 Indian Pond (EE)  
 National Guard camp (TW)  
 Old Black Point Spit (BD/F)  
 Upper Pattaquansett River (TW)  
 Niantic River (SAV)
- EAST WINDSOR/ENFIELD**  
 Scatict River (RMC)
- ESSEX**  
 Denison Pond Dam (RMC)  
 Great Meadows (TW)  
 Thatchbed Island (TW)
- FAIRFIELD**  
 Ash Creek, Rooster River (TW)  
 Lower Ash Creek/Kenard St. (TW)  
 Fairfield Creek/Grassme (TW)  
 Mill River/Samp Mortar Lake Dam (RMC)  
 Mill River/Tide Mill Dam (RMC)  
 Penfield and Beach Roads (FW)  
 Penfield Reef (SR)  
 Perrys Millpond (TW)  
 Pine Creek East (TW)  
 Sasco Brook Dam (RMC)  
 South Pine Creek/Par 3 golf course (TW)  
 West of marina/Turney Road (TW)
- HADDAM**  
 Higgamum Creek (RMC)  
 Ruddy Creek (TW)  
 Salmon River (RMC)
- HAMDEN**  
 Quinipiac River marshes (TW)  
 West bank of Mill River (RMC/FW)
- GROTON**  
 Birch Plain Creek (TW)  
 Bluff Point Natural Area Preserve (F)  
 Bluff Point Coastal Reserve (TW)  
 Bluff/Bushy Point Beach (BD)  
 Haley Farm (G)  
 Hyde Pond Dam (RMC)  
 Mumford Cove (BD)  
 Mystic River (SAV)  
 Noyes Property (TW)  
 Spencer Point (TW)  
 Willow Point (TW)
- GUILFORD**  
 East River (TW)  
 Grass Island (TW)  
 Landon Dam (RMC)  
 Leetes Island (TW)  
 Lost Lake (TW)  
 Hammonasset S.P./Filled wetland (TW)  
 Kesley Place (TW)  
 Neck River/Garnet Park Rd. (TW)  
 Neck R. tributary (TW)  
 Vinyard Haven (TW)  
 Windy Brook Lane (TW)  
 Upper West River (TW)
- MADISON**  
 Bailey Creek (TW)  
 Fence Creek (TW)  
 Seaview Beach (TW/BD)  
 Hammonasset River north (TW)  
 Hammonasset S.P./Tom's Creek (TW)  
 Wheeler Marsh (TW)  
 Kesley Place (TW)  
 Neck River/Garnet Park Rd. (TW)  
 Neck R. tributary (TW)  
 Seiden Neck (TW)  
 Windy Brook Lane (TW)  
 Windy Brook Lane/east of golf course (TW)
- MERIDEN**  
 Hanover Pond Dam (RMC)
- MIDDLETOWN**  
 Lower Mill Pond Dam (RMC)  
 Savage Mill Dam (RMC)  
 Starr Millpond/Coginchaug River (RMC)
- MILFORD**  
 Beaver Brook (TW/FW)  
 Calf Pen Meadow Creek (TW)  
 Charles Island (F)  
 Clark Pond Dam (RMC)  
 Dredge mining sites (RMC)  
 Fowler Island (TW)  
 Great Creek Marsh (TW)  
 Great Flat (TW)  
 Hilldale Road area (TW)  
 Howard Ct./Morehouse Ave. (TW)  
 Indian River between I-95 and railroad track (TW)  
 Milford Pond (BD)  
 Oyster River (TW)  
 Rogers Ave./Milford Harbor tributary (TW)  
 Seabreeze Ave./Merwin Ave. (TW)  
 Turkey Hill Brook (TW)  
 Welches Pond Rd. (TW)  
 Wheeler Marsh (TW)  
 West of sand and gravel company (TW)  
 West side of Gulf Pond (TW)
- MONTVILLE**  
 Trading Cove Brook (RMC)
- NAUGATUCK**  
 Union City Dam (RMC)
- NEW HAVEN**  
 Hemingway Creek (TW)  
 Long Wharf Flats (F)  
 Mill River east bank/south of RR tracks (TW)  
 Mill River, north of I-91 (RMC/EE/TW)  
 Morris Creek/Lighthouse Pt. (TW)  
 Nathan Hale Park/Forbes Bluff (CB)  
 New Haven Airport (TW)  
 Pond Lily Dam (RMC)  
 Quinipiac River Marsh (TW)  
 West River Salt Marsh (TW)
- NEW LONDON**  
 Mitchell College (BD)
- NORTH HAVEN**  
 Quinipiac River north (TW)  
 Quinipiac River south (TW)
- NORWALK**  
 Chimon Island (F)  
 Flock Process Dam (RMC)  
 Harborview (TW)  
 Indian River (RMC)  
 NE Wilson Cove (TW)  
 Norwalk River/Perry Ave. flood gate (RMC)  
 Oyster Creek (TW)  
 Sheffield Island (BD)  
 Sheffield/Plains/Shea Island Complex (F)  
 Silvermine/Perry & Timber ponds (RMC)  
 Village Creek (RMC/TW)
- OLD LYME**  
 Big Pond (TW)  
 Black Hall River (TW)  
 Calves Island (TW)  
 Duck River (TW)  
 Finnegan Farm Lane (TW)  
 Fourmile River Dam (RMC)  
 Goose Island (TW)  
 Great & Upper Islands (TW)  
 Griswold Point (BD)  
 Lieutenant River (TW)  
 Lord Cove (TW)  
 Lower McGillicham Dam (RMC)  
 Pond Road/Soundview (TW)  
 Rogers Lake (RMC)  
 Saltworks Point (TW)  
 Upper Mill Pond Dam (RMC)  
 White Sands Beach, west (TW)
- ORANGE**  
 Housatonic River/sand & gravel pits (RMC)
- PRESTON**  
 Hallville Pond Dam (RMC)  
 Poquetanuck Cove (F/TW)  
 Route 2A bridge (TW)
- SEYMOUR**  
 Kinnetown Dam (RMC)  
 Tingle Dam (RMC)
- SHELTON**  
 Derby Dam (RMC)  
 Housatonic River/sand & gravel pits (RMC)  
 Farmli River (RMC)
- SPRAGUE**  
 Versailles Pond Dam (RMC)
- STAMFORD**  
 Holly Pond (RMC/EE)  
 Kosciuszko Park (TW/F)  
 Main Street Dam (RMC)  
 Noroton River at I-95 (RMC)  
 Stamford Marine Center/Magee Ave (TW)
- STONINGTON**  
 Collins Rd. Marsh (TW)  
 Little Narragansett Bay (SAV)  
 Lords Point (TW)  
 Mystic River (SAV)  
 Quimbog Cove (TW)  
 Ram Island (TW)  
 Velvet Mills (TW)
- STRATFORD**  
 Avco-Lycoming field (TW)  
 Bridgeport Airport (TW)  
 Carting/Peacock Islands (TW)  
 East Johnson Creek/north Lewis Gut mouth (TW)  
 Farmli River (TW)  
 Ferry Creek (TW)  
 Fresh Pond (EE)  
 Great Meadows/south of Lordship Blvd.(TW)  
 Great Meadows/north of Lordship Blvd.(TW)  
 Russian/Lordship Island (TW/G/F)  
 Sandy Point (BD)  
 Mount Sinal Harbor (TW/EE/F)  
 Sewage Treatment Plant wetland (TW)  
 West River (TW/RMC)
- WEST HAVEN**  
 Club Creek (TW)  
 Cove River (TW)  
 Old Field Creek (TW)  
 Oyster River/north of New Haven Ave. (TW)  
 McAllister County Park (FW/BD/FW/F)  
 Mount Sinal Harbor (TW/EE/F)  
 North Shore Horse Showgrounds (TW/F)  
 Pipe Steve Hollow/Chandler Estate Swale (TW/FW/CB/F/F)  
 Port Jefferson Village Beaches (BD)  
 Satterly Landing (TW)  
 Setauket Mill Pond (FW/F/F/TW)  
 Shoreham Plant Wetlands (TW/BD)  
 Shoreham Point (TW)  
 Stony Brook Creek & Pond (TW/FW)  
 Stony Brook Harbor (TW)  
 Unnamed Creek & Pond (FW)  
 Wading River (TW/FW/BD/F)  
 Wading River Wetland #W7 (FW)  
 Wading River Wetland #W9 (FW)  
 West Meadow Beach (BD)  
 West Meadow Creek (TW/F/EE)
- WESTBROOK**  
 Chapmans Pond Dam (RMC)  
 Hammock River (TW)  
 McVeagh Dam (RMC)  
 Menunketesuck Island (BD)  
 Menunketesuck River (TW)  
 Patchogue River (TW)  
 Quotsonet Beach (TW)  
 Westbrook Town Beach (BD)
- WESTPORT**  
 Cocksnoe Island (F)  
 Greens Farm Brook (TW)  
 Grove Point/Sherwood Millpond (TW)  
 Lees Pond (RMC)  
 North of Sherwood Millpond and I-95 (TW)  
 Sasco Brook (TW)  
 Sasco Brook Dam (RMC)  
 Saugatuck River Dam (RMC)  
 Saugatuck River north of Route 1 (TW)  
 Sherwood Millpond (EE/TW)
- WALLINGFORD**  
 Upper Quinipiac River Dam (RMC)  
 Wallace Dam/Community Lake Dam (RMC)  
 Wharton Brook State Park (F/G)
- WATERBURY**  
 Anaconda Dam (RMC)  
 Freight Street Dam (RMC)
- WATERFORD**  
 Alewife Cove (EE/SAV)  
 Gardner Pond north (TW)  
 Goshen Cove (EE)  
 Harkness Memorial State Park (TW)  
 Jordan Millpond Dam (RMC)  
 Millers Pond Dam (RMC)  
 Niantic Bay Barrier (BD)  
 Niantic Bay northeast (TW)  
 Niantic River (SAV)  
 Quaker Hill north (TW)  
 River Street (TW)  
 White Point (TW)
- WESTPORT**  
 Cocksnoe Island (F)  
 Greens Farm Brook (TW)  
 Grove Point/Sherwood Millpond (TW)  
 Lees Pond (RMC)  
 North of Sherwood Millpond and I-95 (TW)  
 Sasco Brook (TW)  
 Sasco Brook Dam (RMC)  
 Saugatuck River Dam (RMC)  
 Saugatuck River north of Route 1 (TW)  
 Sherwood Millpond (EE/TW)
- WILTON**  
 Cannondale Dam (RMC)  
 Merwin Meadows (RMC)
- WINDSOR**  
 Rainbow Dam (RMC)
- MOUNT VERNON**  
 Glover Field (FW)
- NEW ROCHELLE**  
 Echo Bay (TWSR/F/R)  
 Former Dickerman's Pond (FW)  
 Nature Study Woods (F/FW)  
 Pryer Manor Marsh (TW)
- NORTH HEMPSTEAD**  
 Baxter Estates Pond (FW)  
 Hempstead Harbor (EE/F/TW)  
 Lake Success (FW)  
 Lead's Pond (FW)  
 Manhasset Bay (EE/TW/F)  
 Mitchell Creek (TW)  
 Mott's Cove (TW)  
 Sheets Creek (TW)  
 Whitney Pond Park (FW)
- OYSTER BAY**  
 Bayville Wetland #B-7 (TW/FW)  
 Beaver Brook/Sau Swamp (FW)  
 Beaver Lake (FW)  
 Beekman Beach (BD/TW/SAV)  
 Centre Island Beach (BD/TW)  
 Cold Spring Ponds (Huntington Wetland #H-1) (TW/FW/FW)  
 Darby Cove (TW)  
 Glen Cove Creek (TW)  
 Hicksville Mill Pond (FW)  
 Hempstead Harbor (EE/F/TW)  
 Huntington Wetlands #H2-H7 (FW)  
 Mill Pond (FW)  
 Oyster Bay Mill Pond (FW)  
 Oyster Bay NWR (TW)  
 Prospect Point to Sands Point Preserve (BD)  
 Red Spring Point Bluffs (CB)  
 Scudders Pond (FW)  
 Stehli Beach / Frost Creek Wetlands (TW/BD/F)  
 West Pond (TW)
- PELHAM**  
 Glover Field (TW)
- QUEENS**  
 Alley Pond Park (FW/TW)  
 Aurora Pond (FW/F)  
 Bowery Bay (TW)  
 College Point Creek (TW)  
 College Point tidal creek (TW)  
 Crocheron Park (G)  
 Flushing Airport (FW/G/F)  
 Flushing Bay Timber Structures (fisheries habitat)  
 Flushing Bay/Flushing Creek (TW)  
 Flushing Meadow-Corona Park-Willow Lake (TW/FW/CB)  
 Forest Park Shrub Swamp (FW)  
 Fort Totten (TW/FW/BD/F)  
 Halletts Cove (TW)  
 Kissena Park (G)  
 Powell's Cove Shoreline (TW/BD)  
 Steinway Creek Enhancement (TW)  
 Tallman Island (TW)  
 The Alley@Alley Pond Park (FW/F/TW/CB/F)  
 Western College Point creeks (TW)
- RIVERHEAD**  
 Balting Hollow (TW/FW/RMC)  
 Mattituck Wetland #MT-1 (FW)  
 Shoreham Point (TW)  
 Wading River (TW/RMC/FW/F)  
 Wading River Wetland #W7 (FW)
- MAMARONECK**  
 Green Point (TW/F)  
 Hommock Marsh (TW)
- RYE**  
 Beaver Swamp Brook (FW)  
 Beaver Swamp Brook/Cowperwood site (FW)  
 Blind Brook (FW)  
 Edith G. Read Wildlife Sanctuary (TW/F/EE/FW)  
 Marshlands Conservancy (TW/F/F)
- SMITHTOWN**  
 Callahan's Beach (CB)  
 Fresh Pond (FW/BD)  
 Harrison Pond Town Park (FW/RMC/TW/F)  
 Landing Avenue Town Park (TW)  
 Long Beach (BD)  
 Nissequogue River/Rivera Dr., Kings Park (TW/FW/RMC)  
 Nissequogue River/Village of Nissequogue (TW/FW/RMC)  
 Schubert Beach (BD)  
 St. James Wetland #S116 (FW)  
 Stony Brook Harbor (TW/F)  
 Sunken Meadow Creek (TW/BD/F)  
 Sweetbriar Nature Center (G/TW/FW)  
 Young's Island (TW/F)
- SOUTHOLD**  
 Baillie's Beach (BD/TW)  
 Clark's Beach/Inlet Pond (BD/CB)  
 Darby Cove (TW)  
 Goldsmith Inlet Beach (BD/TW/F/F)  
 Great Pond (FW)  
 Greenport Wetland #GP11 (FW)  
 Mattituck Creek (TW/F)  
 Mattituck Hills Wetlands #MH1 & MH2 (FW)  
 Mattituck Wetland #MT20 (FW)  
 Orient Point Park (G/F/CB/R)  
 Orient Wetland #O1 (FW)  
 Orient Wetland #O14 (FW)  
 Peconic Dunes Wetland Complex (FW)  
 Southold Wetland #S028 (FW/F)  
 West Pond (TW)  
 Wolf Pit Lake (FW)



- ### TYPES OF HABITATS
- BD** Beaches and Dunes
  - CB** Cliffs and Bluffs
  - EE** Estuarine Embayments
  - F** Coastal and Island Forests
  - FW** Freshwater Wetlands
  - G** Coastal Grasslands
  - IF** Intertidal Flats
  - RI** Rocky Intertidal
  - RMC** Riverine Migratory Corridors
  - SAV** Submerged Aquatic Vegetation
  - SR** Shellfish Reefs
  - TW** Tidal Wetlands

# Restoring Long Island Sound's Habitats

## WHO ARE THE PARTNERS INVOLVED?

- US Environmental Protection Agency
- US Fish and Wildlife Service
- US Army Corps of Engineers
- NOAA National Marine Fisheries Service
- USDA Natural Resources Conservation Service
- Connecticut Department of Environmental Protection
- Connecticut Sea Grant
- New York State Department of Environmental Conservation
- New York Department of State
- New York Sea Grant
- New York City Department of Environmental Protection
- New York City Department of Parks and Recreation
- Audubon New York
- Save the Sound, Inc.

A partnership of concerned agencies and organizations working together to improve the Sound for the living resources that depend on it.

## WHY ARE WE CONCERNED ABOUT LONG ISLAND SOUND'S HABITATS?

The coastal habitats of Long Island Sound form a unique and highly productive ecosystem that supports a diverse array of living resources. These living resources range from microscopic plants and animals that drift with the currents to economically important finfish, shellfish, and crustaceans. Other animals such as birds, sea turtles, and marine mammals spend all or part of their lives in the Sound, on its shores, or in its watershed. While there is still healthy habitat in and around Long Island Sound, there is little doubt that the overall abundance and diversity of habitats have been diminished by incompatible human uses of the Sound and its resources.



Present-day habitat conditions are very different from those observed by the first colonists. One third of all tidal wetlands in the Sound have been lost since the 1700s. Most of the remaining tidal wetlands have been altered by mosquito ditching. Once plentiful, eelgrass beds disappeared from the western and central portions of the Sound in the 1930s. Terrestrial habitats have been lost by clearing and filling for development. For example, 70 percent of Connecticut's original forested area was clear cut by the late 1800s. In the nearly 400 years since European settlers arrived, the radical alteration of the landscape has played a role in the decline of the Sound.

In the latter half of the twentieth century, scientists began to study the link between healthy habitat and healthy populations of fish and wildlife. Not only do we need adequate acreage of habitats, but those habitats must be healthy and functioning properly to support a diverse and resilient population of the Sound's living resources. To address these concerns, the Long Island Sound Study Habitat Restoration Initiative was created.

## HOW DOES THE LONG ISLAND SOUND STUDY HABITAT RESTORATION INITIATIVE WORK?

As recommended in the Long Island Sound Study's Comprehensive Conservation and Management Plan, habitat restoration is being coordinated through the Long Island Sound Study Habitat Restoration Initiative, a partnership of concerned agencies and organizations working together to improve the Sound for the living resources that depend on it. With funding from the EPA Long Island Sound Office, the Connecticut Department of Environmental Protection and the New York State Department of Environmental Conservation are taking lead responsibility for implementing the Initiative.

The work of the Initiative is implemented by the Habitat Restoration Workgroup, a group of technical staff with expertise in habitat restoration from all of the agencies and organizations listed to the left. The following goals for habitat restoration were developed by the Habitat Restoration Workgroup and adopted by the Policy Committee of the Long Island Sound Study:

- Restore the ecological functions of degraded and lost habitats
- Restore at least 2000 acres and 100 river miles of habitats between 1998 and 2008
- Use partnerships to accomplish the restoration objectives and to leverage limited state, local, and federal funds

Workgroup partners meet several times a year to set priorities, discuss technical issues, and review work products. Each state has a habitat restoration coordinator who is funded by EPA and coordinates the activities of the Habitat Restoration Workgroup. The coordinators are also responsible for assisting partner agencies, local government and other groups with habitat restoration issues relevant to the Sound.

The Habitat Restoration Workgroup, in cooperation with the public and staff of concerned agencies, developed a database of potential restoration sites, then ranked them in order to set restoration priorities for the partners in seeking funds and undertaking projects. A map listing the potential restoration projects and their current status appears on the reverse side of this page. The projects are ranked based on ecological value, public benefit, and technical viability. The site ranking is used to help Habitat Restoration Workgroup members set funding and staffing priorities for restoration projects within the partner agencies. However, the Workgroup will assist any concerned group or local government with a restoration project, regardless of its rank.



## WHAT TYPES OF HABITAT ARE BEING RESTORED?

The Initiative has targeted twelve important habitat types in the Sound for their support of living resources and water quality. Descriptions of the habitat types are found below. The abbreviations found after the names of the habitat types are used to denote which habitat types are found at the potential restoration sites listed on the other side of this page. The abbreviations are also used in the charts that track our progress.

**BEACHES AND DUNES (BD)** are the transitional sandy or cobble shoreline area between the land and the Sound. These dynamic systems are in a constant state of erosion and deposition due to tidal action, currents, and wind. Dunes can protect adjacent low-lying properties from flooding. Many rare plants and animals, such as prickly-pear cactus, golden-aster, beach heather, piping plover, and horned lark occur on this habitat complex.

**CLIFFS AND BLUFFS (CB)** are steep coastal slopes of glacial sands and till that are created through long-term wave erosion and sea-level rise. Rare plant communities, such as New York's dwarf beech forest, may be found here.

**COASTAL AND ISLAND FORESTS (F)** located in the project area may be dominated by species such as maple, oak, cedar, pine, and beech. No virgin tracts of old growth forest remain. Animals that may use this habitat include owls, bald eagles, and osprey. Forest stands on islands are of particular importance to nesting colonial water birds, such as egrets and herons, because they are relatively free of predators. Forests provide shade and oxygen, and help influence the local climate.

**COASTAL GRASSLANDS (G)** are open glacial outwash plains dominated by tall grasses, such as little bluestem and switchgrass. They often have diverse wildflower communities as well. These areas are critical habitat for many rare and endangered species, such as the grasshopper sparrow and regal fritillary butterfly. Grasslands are also important to birds of prey like the short-eared owl.

**FRESHWATER WETLANDS (FW)** are the transitional zone between the land and fresh water. These are areas where the water table is at, or near, the surface of the soil and there is no tidal influence. They are very diverse and may be dominated by trees, such as red maple, and shrubs, such as swamp azalea, or herbs such as cattail. These wetlands aid in groundwater recharge and store flood waters. They are also critical habitat to many rare plant and animal species.

**ESTUARINE EMBAYMENTS (EE)** are confined areas of the Sound that have narrow inlets and significant freshwater inflow. They are generally more shallow than the open Sound, and the restricted flow causes greater sedimentation. These areas are important nurseries for finfish and are concentration sites for wildlife. The best bay scallop production occurs in estuarine embayments.

**INTERTIDAL FLATS (IF)** are shallow areas of bays and harbors that lay between the spring high- and low-tide marks. These flats contain no rooted vegetation. The sediments may be muddy to sandy and support important species, such as juvenile flounder, clams, and crabs.

**RIVERINE MIGRATORY CORRIDORS (RMC)** are river systems that drain to the Sound. They are often bordered by flood plain trees and wetlands. Migratory species, such as Atlantic salmon, shad, and herring use these rivers to travel to fresh waters miles away from Long Island Sound to spawn. Recreational and commercial fisheries benefit when river corridors remain healthy and passable to migratory fish.

**ROCKY INTERTIDAL ZONES (RI)** are areas of exposed bedrock characterized by attached species such as barnacles, algae, and mussels. These zones fall between extreme high- and low-tides, which results in frequent exposure of the plant and animal residents to the air. The species which attach themselves to this habitat help filter nutrients from the water, and are a food source for other marine species.

**SHELLFISH REEFS (SR)** are formed by clusters of oysters and blue mussels. The reef structure sits on top of soft sediments and provides habitat and shelter for a variety of other finfish and invertebrate species. The shellfish are able to filter algae and particulate matter in the water column thereby improving water clarity.

**SUBMERGED AQUATIC VEGETATION (SAV)** beds are comprised of rooted plants, such as eelgrass and widgeon grass, which grow on shallow bay bottoms below the spring low-tide mark. These grassy beds provide vital refuge for juvenile fish and lobsters. The plants also trap sediments and use nitrogen from the water column, thereby improving water quality.

**TIDAL WETLANDS (TW)** are the transitional zone between the land and submerged systems. These areas are dominated by rooted plants that are flooded by the tide. Healthy wetlands help trap sediments, store flood waters, and reduce wave energy during storms. In addition, two thirds of all marine species depend on tidal wetlands for a portion of their life cycle.

## HOW ARE SITES PRIORITIZED?

The Initiative partners developed ranking criteria based primarily on the potential ecological value of the degraded sites. Other factors, such as likelihood of success and public benefits of the project, are taken into consideration as well. The site ranking list is not the only criterion that determines the order in which projects are completed. Factors like available funding, local sponsors, and advanced project planning can make it much easier to complete a project, regardless of its rank. However, it is the site ranking list which helps direct the Initiative partners' efforts from year to year. The ranking criteria are listed below.

### ECOLOGICAL CRITERIA:

- Size of the site to be restored
- Benefits of the restoration to trust species
- Potential to restore ecological functions at the site
- Potential to restore a diverse plant and animal community at the site

### OTHER CRITERIA CONSIDERED INCLUDE:

- Probability of success
- Community support for project
- Cost per acre of project
- Public access opportunity and open space value of site
- Potential surface and groundwater improvements associated with project

**TRUST SPECIES** are those species that are protected or managed by law, such as endangered and threatened species, managed fisheries, and game mammals.

## HOW ARE PROJECTS FUNDED?

Project funding comes from several sources. The Initiative partners use the prioritized list of candidate restoration sites to match projects to existing grant programs. Examples of federal grant programs include the US Environmental Protection Agency's 5-Star Challenge Grant Program, the US Fish and Wildlife Service's Partners for Wildlife Program, Natural Resource Conservation Service's Wildlife Habitat Improvement Program, and National Marine Fisheries Service's Community Based Habitat Restoration Grants. Examples of state-funded programs include Connecticut's Coves and Embayments Restoration Program and the Long Island Sound License Plate Fund, and New York's Clean Water, Clean Air Bond Act and Environmental Protection Fund. Private grants from charitable institutions and the Connecticut Corporate Wetland Partnership may also be used to complete projects. In some cases, agency staff may be able to simply add the needed work to their annual schedule of activities and complete the project with little or no additional cash funds. There are nearly as many funding scenarios as there are projects to be done. It is the job of the State Habitat Restoration Coordinators and the rest of the Habitat Restoration Workgroup to help get all the projects planned and funded, and they are available to answer questions about funding.



### PROGRESS TO DATE:

A great deal of progress has been made toward the habitat restoration goals since they were adopted in 1998. In May of 2000, the Initiative partner agencies signed a Memorandum of Understanding (MOU) which states that they all agree to work toward the goals of the Initiative and share the responsibility for reaching those goals. A copy of the MOU can be found on the Long Island Sound Study web site at: <http://www.epa.gov/region01/eco/lis>

## HOW DO PROJECTS GET DONE?

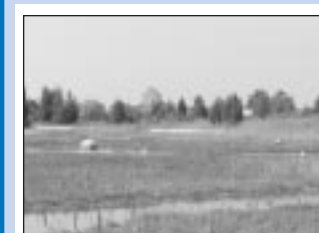
Each potential restoration project listed on the reverse side of this sheet represents a discrete location around Long Island Sound's shore or in the Sound's watershed. The sites represent a variety of habitat types, landowners, and varying levels of complexity. High priority projects are targeted by the state and federal agencies in the annual work planning process. The descriptions of a few projects which have been completed are summarized below. Each description will show the steps involved in restoration projects.



### GRASSLAND RESTORATION SOUTHDOLD, N.Y.

**Project Description:** Orient Point County Park is owned by the Suffolk County Department of Parks and Recreation. The park displayed favorable soil conditions to restore the old agricultural fields on site to a coastal grassland community. Work on the 50-acre parcel was divided into 3 phases of about 17 acres each. During each phase, U.S. Fish and Wildlife Service staff used chainsaws and brush mowers to remove woody vegetation in the spring, then plowed and disked the soil using standard farm tractors. Once the soil was properly prepared, a specialized seed drill was used to plant a warm season grass mix. The principle species planted were little bluestem, big bluestem, indian grass, and switchgrass. Restoration work on the site was completed in 2000, but annual mowing is anticipated to continue indefinitely. The project is expected to benefit grassland nesting birds like the eastern meadowlark, raptors like the short-eared owl, and small mammals like the eastern cottontail rabbit. Migrating monarch butterflies were observed using the site in the fall of 2001.

**Partners:** US Fish and Wildlife Service (lead), Town of Southold, Suffolk County Department of Parks and Recreation, US Environmental Protection Agency (grant award), New York State Department of Environmental Conservation



### TIDAL WETLAND RESTORATION MADISON, CT

**Project Description:** During the late 1950s, a portion of the wetlands at Hammonasset State Park was used as a disposal area for sandy sediment that was dredged from nearby Clinton Harbor. Some of the filled wetland was converted to upland supporting grasses and red cedar, while part became degraded salt marsh. More recently, the invasive non-native genotype of the plant common reed (*Phragmites australis*) colonized most of the degraded wetland portions.

Restoration of approximately 5 acres of tidal wetland was accomplished through the removal of 1 to 3 feet of sandy dredged sediment. Four ponds were constructed and a network of meandering creeks was installed to provide adequate tidal flushing. A portion of the excavated sands was placed and graded on the adjacent upland and then planted with warm season grasses, such as little bluestem. The restoration work was completed in 2000. The site now supports marsh vegetation, and numerous egrets, shorebirds, and ducks are using the ponds.

**Partners:** US Fish & Wildlife Service, CT DEP Wetland Habitat and Mosquito Management, CT DEP Office of Long Island Sound Programs, EPA Long Island Sound Study and 319 Program, Ducks Unlimited, and Connecticut Waterfowlers Association.

### FRESHWATER WETLAND RESTORATION QUEENS, NY

**Project Description:** A natural glacial depression wetland in Forest Park was filled in 1966 to create two ball playing fields. The site hydrology made the ball fields prone to persistent flooding. In 2001, restoration of 6 acres of the site to freshwater wetland, and stabilization of the surrounding hillsides with native vegetation was completed.



**Partners:** New York City Department of Parks and Recreation (lead), New York State Department of Environmental Conservation (grant)

Table 1: ACRES OF HABITAT RESTORED, 1998 - 2001

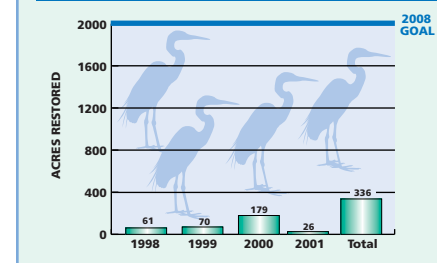
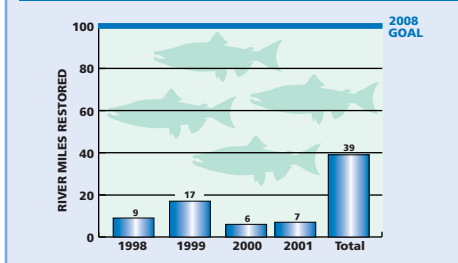


Table 2: MILES OF RIVERINE HABITAT RESTORED, 1998 - 2001



**ANADROMOUS FISH** are those that spend the adult phase of their lives in salt water, but move up streams and rivers to spawn in freshwater. Barriers on coastal streams and rivers prevent these fish species from reaching their natural spawning habitat and reduces their reproductive success.



### TIDAL WETLAND RESTORATION OLD SAYBROOK, CT

**Project Description:** This 17-acre restoration site was first identified through a Coastal America partnership project with CT DEP and CT DOT. The investigation determined that the culvert connecting this wetland to the Oyster River was undersized and was causing a depression of the high water elevation by over one foot. CT DEP applied for Intermodal Surface Transportation Efficiency Act funds through CT DOT for design and construction. The project consisted of the installation of a second culvert (30" diameter) to complement the flows through the existing (24" diameter) culvert. A new concrete vault chamber was built to house an adjustable slide/flap gate. The gate can be manually lowered in advance of a forecast coastal flood to minimize tidal flooding of low-lying properties.

**Partners:** Funding for the project was provided by CT DOT's ISTEPA Enhancement Funds (80%) and CT DEP's Long Island Sound Cleanup Account. Partners include the Town of Old Saybrook, CT DOT, EPA Long Island Sound Study, CT DEP OLISP and Inland Water Resources Management Division, and Coastal America. The project had the support of all adjacent property owners.

### DUNE RESTORATION RYE, NY

**Project Description:** A flood protection berm created in Edith Read Sanctuary following the December 1992 nor'easter had become dominated by *Phragmites australis*. The berm was converted to a coastal dune system by the addition of clean sand and planted *Ammophila breviligulata*, and serves to enhance the educational opportunities at the site as well as to protect a newly restored adjacent marsh from wave action.

**Partners:** Westchester County Department of Planning, Westchester County Department of Parks, Recreation, and Conservation, and USDA Natural Resources Conservation Service

## WHAT CAN I DO TO HELP RESTORE LONG ISLAND SOUND'S HABITATS?

- Sponsor or support local restoration projects
- Volunteer for citizen monitoring efforts
- Sponsor or participate in clean-up projects on vacant lots, public beaches, and roadsides
- Adopt "Sound Gardening" practices - Contact New York Sea Grant at 631-727-3910 or Connecticut Sea Grant at 203-432-5188 for more information
- Support habitat restoration and protection funding through license plate funds, federal and state duck stamp programs, and tax form check-offs
- Take photos of restoration sites near you to document site conditions over time
- Talk to your neighbors about the importance of habitat restoration

## WHERE CAN I LEARN MORE ABOUT HABITAT RESTORATION AND LONG ISLAND SOUND?

Please visit these web sites:

Society for Ecological Restoration [www.ser.org/definitions.htm](http://www.ser.org/definitions.htm)

Association of State Wetland Managers [www.aswm.org/wetlinks.htm](http://www.aswm.org/wetlinks.htm)

Restore America's Estuaries [www.estuaries.org](http://www.estuaries.org)

National Marine Fisheries Service [www.nmfs.gov/habit/restoration/nspage.html](http://www.nmfs.gov/habit/restoration/nspage.html)

USDA Stream Corridor Restoration Page [www.usda.gov/stream\\_restoration/newgra.html](http://www.usda.gov/stream_restoration/newgra.html)

Save the Sound, Inc. [www.savethesound.org/mb\\_habitat.htm](http://www.savethesound.org/mb_habitat.htm)

Or contact the offices listed below:

EPA Long Island Sound Office  
Stamford Government Center  
888 Washington Blvd.  
Stamford, CT 06904-2152  
203-977-1541 in Connecticut  
631-632-9216 in New York  
[www.epa.gov/region01/eco/lis](http://www.epa.gov/region01/eco/lis)

New York State Department of Environmental Conservation  
Bureau of Marine Resources  
205 North Belle Meade Road;  
Suite 1  
East Setauket, NY 11733  
631-444-0469  
[www.dec.state.ny.us](http://www.dec.state.ny.us)

Connecticut Department of Environmental Protection  
Office of Long Island Sound Programs  
79 Elm Street  
Hartford, CT 06106-5127  
860-424-3034  
[www.dep.state.ct.us](http://www.dep.state.ct.us)





## **Appendix 15**

### **Connecticut's Comprehensive Wildlife Conservation Strategy\***

Connecticut's Comprehensive Wildlife Conservation Strategy (CWCS) has been completed and was approved by the U.S. Fish & Wildlife Service in January 2006. The CWCS is available for download in two ways. You may download the entire [CWCS in one large zip file](#) (8,286k 11 files) or you may download individual sections. If you choose to download and save the CWCS files on your computer, you should save all of the files in the same folder. By saving all of the files in the same folder, the bookmarks in each file are preserved and you will be able to easily navigate among the different sections.

[Introduction](#) (PDF 253k 25pp): Contains the the Title Page, Table of Contents, Acknowledgements, an Executive Summary, a Guide to the Elements used in developing the CWCS and the Introduction.

[Chapter 1](#) (PDF 1,120k 26pp): Information on the distribution and abundance of Connecticut's wildlife and the process used to select species of greatest conservation need (GCN species).

[Chapter 2](#) (PDF 1,582k 18pp): An overview of Connecticut's landscapes and waterscapes and the process used to select 12 key habitats of greatest conservation need.

[Chapter 3](#) (PDF 254k 6pp): Describes threats affecting GCN species or their habitats.

[Chapter 4](#) (PDF 2,283k 89pp): Describes the status of the 12 key habitats, the GCN species that use these habitats, threats, conservation actions and research needs.

[Chapter 5](#) (PDF 39k 4pp): Describes the biological monitoring efforts for GCN species and key habitats, how the effectiveness of conservation actions will be measured, and how the strategy will incorporate adaptive management.

[Chapter 6](#) (PDF 22k 1p): Describes the process that Connecticut will use to revise and update the CWCS.

[Chapter 7](#) (PDF 31k 3pp): Describes how DEP coordinated the development of the CWCS with federal, state, local, and tribal partners.

[Chapter 8](#) (PDF 37k 4pp): Describes efforts to seek stakeholder and public participation in the development of the CWCS.

[Literature Cited](#) (PDF 183k 32pp): List of publications and references used in the development of the CWCS.

[Appendices](#) (PDF 3,078k 473pp): Appendices for each chapter (except chapters 5 and 6) that provide supporting and supplemental information regarding each of the required elements.

\* As of February 2015, Connecticut's Comprehensive Wildlife Conservation Strategy, now referred to as *Connecticut's Wildlife Action Plan*, is being revised. Consult the [Plan update website](#) for current status of the revised Plan.

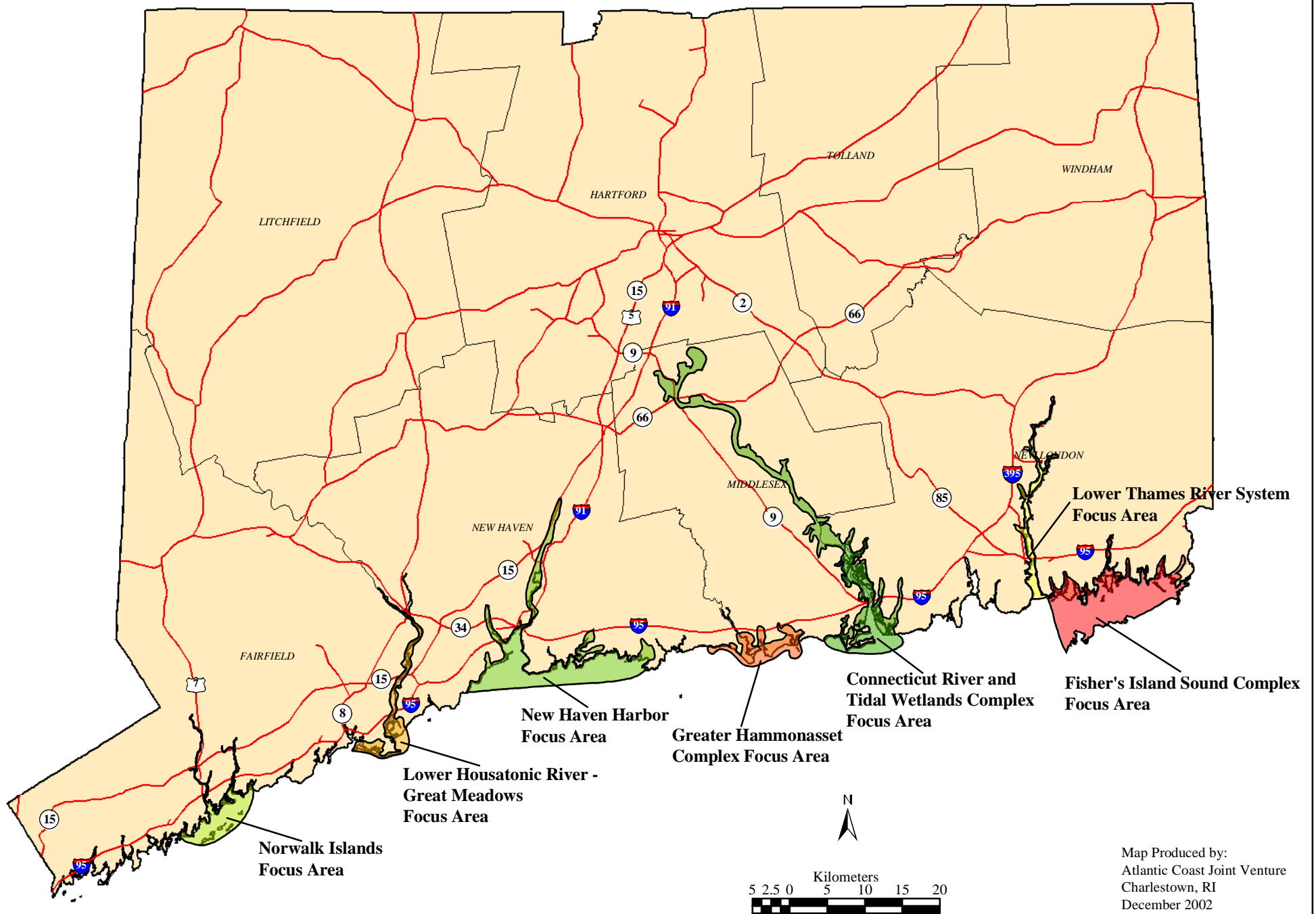
**Appendix 16**  
**Responses to CELCP Conservation Needs Survey**

<b>Coastal Conservation Need</b>	<b>Threat Sought to be Addressed</b>	<b>Number of Responses for this Need</b>
<b>PUBLIC ACCESS</b>		
1. Greenways along rivers and LIS	Diminished public access do to development; Development of river shorelines	2
2. Protect views to and from CT River estuary	Degraded and diminished views of river due to development	1
3. Trailered boat launch access to LIS and parking for cars/ trailers	Limited open space for launch development. Increased opposition from local residents to boat launch development; The continuing loss of coastal property and subsequent public access has constrained the ability for projects of this nature to develop.	2
4. Car-top boat launch access	Paddlesport boating on the rise, few sites available; development of remaining open spaces along estuaries; 1) Lack of public access to LIS west of Milford, Connecticut for small boat operators. Increased access to accommodate the burgeoning paddle sports in the area.	3
5. Shore based boating access for car-top vessels	Privatization of the shoreline makes it difficult for boaters to get to shore; access points are limited, especially in backwaters; urbanization	3
6. Walking trails	development of remaining open spaces along estuaries	1
7. Protect local shellfishing (including commercial oyster fishery)	Siltation and non-point source pollution	1
8. More beach access (for swimming, etc.)	Development of beach front parcels for private use; need for public access to LIS	2
9. Public crabbing opportunities	Loss of habitat & public access for fishing	1
10. Kayaking access to rivers and estuaries	Development along shorelines of rivers and estuaries in Connecticut.	1
11. Shore-based access for marine anglers	Loss of coastal property and public access due to urbanization and private ownership	1
12. Shore-based fishing platforms (e.g. piers) with adequate parking space for marine recreational anglers of all ages and abilities to safely fish.	The continuing loss of coastal property and subsequent public access has constrained the ability for projects of this nature to develop.	1
13. Public access to Connecticut River (for recreational opportunities)	Need for public access to CT river	1

<b>RESOURCE PROTECTION</b>		
14. Foraging habitat for waterbirds, shorebirds, and waterfowl	Areas free of human disturbance and pollution; development of remaining open spaces along estuaries; coastal and upstream development	3
15. Brackish and tidal freshwater wetlands (including buffers to the riparian areas)	Unique habitats suffer from being desirable for human recreation and adjacent habitation	1
16. High salt marsh	Disappearing, encroached by sea level rise and erosion, and from upland development	1
17. <i>Native grasslands and sand plains</i>	Loss of habitat due to development and suppression of natural disturbance regimes	1
18. Shorebird foraging and nesting habitat	Degradation and development of vital shorebird nesting habitat (in some cases for species of global and continental conservation concern); areas free of mammalian and human disturbance that can cause abandonment or limit productivity; development of remaining open spaces along estuaries; coastal and upstream development; urbanization	7
19. Protection/acquisition of undeveloped coastal islands	Development and degradation of vital wildlife habitat; Loss and/or degradation of nesting habitat for state-listed species; Importance of creating public access to remaining offshore islands to create increased tourism; urbanization	5
20. Tidal marsh habitat and surrounding buffer area	Development and degradation of vital wildlife habitat (in some cases for species of global and continental conservation concern); development of coastline, privately held habitat/buffers continue to decline	3
21. Undeveloped coastal forest or shrubland habitat (capable of supporting migratory landbirds)	Development and degradation of vital wildlife habitat (in some cases for species of regional conservation concern); coastal and upstream development	3
22. Waterways capable of supporting anadromous/catadromous fish runs	Degradation of water quality, existing obstructions of migratory fish.	2
23. Tidal flats (sand, mud)	Degradation from shoreline development and dredging related to cross-Sound energy cables and pipelines	1
24. <i>Protection of inland coves, freshwater lakes in the Birch Plain Creek area of Southeast CT</i>	Residential waterfront development	1
25. CT River Estuary habitat protection	Loss of estuarine wetlands, important for wildlife and water quality.	1
26. Wading bird nesting habitat	Development and human-use of off-shore islands and coastal mudflats.	1
27. Wetland bird nesting habitat	Development and degradation of habitats.	1

28. Salt marsh sharp tailed sparrow habitat	Development and degradation of marsh habitat	1
29. Protection of buffers around critical nesting areas		1
30. Protection of riverine sandy beaches		1
<b>OTHER</b>		
-streamside buffer regulation	Nonpoint source pollution to streams, marshes and LIS	
-correct unprotected channelized streams next to roads	Road pollutants, sand, nutrients, go to LIS	
-minimize steep slope development impacts upstream	Clearing of slopes up to 25% grade, poor maintenance of detention basins, purchase uplands	
-acquire riparian lands, conservation easements along riparian corridors	Protect LIS water quality, shellfishing, wildlife habitat, etc.	
-reduce human disturbance during critical breeding season		
-continued restoration of saltmarsh habitat-both low and high.		
-maintenance and enhancement of existing submerged aquatic vegetation		
-control of exotic, invasive species		

Appendix 17. Atlantic Coast Joint Venture Connecticut Waterfowl Focus Areas



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**Connecticut River, Connecticut**

**Sub-Focus Areas: None**

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*Area Description:*

This wetlands and river focus area consists of over 20 individual tidal wetland units and river islands of various sizes occurring along a 40-mile (64 km) stretch of the lower Connecticut River from Old Saybrook to Cromwell. Taken as a whole, this focus area represents a gradation of tidal wetlands from a very narrow zone of relatively high salinity marshes at the mouth of the Connecticut River where it enters Long Island Sound, through an intermediate zone of brackish, lower salinity wetlands, to extensive freshwater tidal marshes and floodplain forests beginning at Deep River and extending upriver to Cromwell.

*Ownership/Protection:*

Of the 23 wetland/island units comprising this focus area, at least 14 (61%) are in need of protection and/or management, either wholly or in part. While some are entirely privately owned, many have some form of protective ownership. Several of these areas contain individual parcels owned and managed by the Connecticut Department of Environmental Protection or by conservation groups such as The Nature Conservancy, Connecticut River Gateway Commission and various Town conservation and land trusts.

*Acreage to Conserve:*

Approximately 468 ha (1,157 acres) of tidal wetlands within the focus area require acquisition and/or enhancement. Of this figure, approximately 364 ha (900 acres) are privately owned and could be considered in jeopardy and in need of acquisition. New programs in place, such as the Landowner Incentive Plan, could allow for the restoration and enhancement of many of these privately owned wetlands. Statewide, no estimate of wetlands in need of acquisition and/or enhancement is available.

Since 1988, approximately 193 ha (479 acres) of wetland habitat within the focus area have been enhanced. Enhancement has been achieved through the use of open marsh water management techniques. An additional 191 ha (474 acres) have undergone intensive vegetation control (Phragmites control). Statewide, in areas outside of ACJV focus areas, approximately 187 ha (463 acres) of inland wetlands have undergone either enhancement or restoration activities. An additional 182 ha (452 acres) have been controlled for exotic vegetation.

*Special Recognition:*

From a regional standpoint, there are no areas in the Northeast that support such extensive or high quality fresh and brackish tidal wetland systems as those in the Connecticut River estuary. The lower Connecticut River is a RAMSAR designated site. In addition, 4 areas within the focus area (Pratt/Post, Seldon Island, Whalebone Creek, and Chapman's Pond) are designated as Important Bird Areas (IBA) by the National Audubon Society.

*Waterfowl:*

The freshwater coves and tidal saltmarshes at the mouth of the river contain some of the most important areas for migrating and wintering waterfowl in the state. The remaining wild rice marshes within the focus area provide excellent food sources for breeding, staging, and wintering

waterfowl. In addition, large concentrations of American Black Ducks, Green-winged Teal, Mallard, and American Wigeon utilize the Great Island complex at the mouth of the river. Significant numbers of Greater Scaup, Canvasback, Ruddy Duck, and Atlantic Brant winter within the focus area.

Table 1. Waterfowl species identified in the Connecticut River Focus Area.

<u>Species</u>	<u>Breeding</u>	<u>Migration</u>	<u>Wintering</u>
American Black Duck	X	X	X
Green-winged Teal	X	X	X
Mallard	X	X	X
American Wigeon		X	X
Greater Scaup		X	X
Canvasback		X	X
Ruddy Duck		X	X
Atlantic Brant		X	X

*Other Migratory Birds:*

The lower Connecticut River constitutes the core of breeding Osprey in the state. In addition, the mudflats of the river and Great Island provide foraging habitat for a myriad of shorebirds, including; Willets, Red Knots, various species of sandpiper, Ruddy Turnstones, and Whimbrels. Griswold Point at the mouth of the river hosts nesting populations of the federally threatened Piping Plover as well as Least Tern. The tidal marshes in the lower river support globally significant populations of nesting Saltmarsh Sharp-tailed Sparrow, listed as ‘near threatened’ by BirdLife International, and historic populations of nesting Black Rails. The lower river also supports nesting and wintering concentrations of Bald Eagles.

*Threats:*

Although wetlands in Connecticut are regulated by State and Federal laws, such areas and the species which depend upon them continue to be adversely impacted by various types of human disturbances and activities (e.g. burning, mowing, mosquito ditching) and habitat alteration of upland borders and tributaries. In addition, illegal fills and activities occur over the area. The threat of oil spills and toxic contamination of the river are constant. Dredging, dredge spoil disposal, land fills, marina development, stormwater discharges, non-point source pollution and increased sediment loads pose significant problems for living resources in and along the river. There have also been various proposals to impound certain marshes, to locate a sewage treatment plant at the mouth of the river and to divert water from the river to supply water to Boston. Invasive species such as Mute Swan, common reed (*Phragmites australis*) and purple loosestrife (*Lythrum salicaria*) threaten the typical marsh vegetation of numerous wetlands in the complex.

*Conservation Recommendations:*

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A substantial portion of this nationally significant tidal marsh complex remains unprotected and/or is not being effectively managed so as to maintain its high species and habitat diversity and to optimize fish and wildlife productivity. The current complicated ownership pattern necessitates establishment of cooperative management and conservation agreements among all parties in order to protect this valuable ecosystem in its entirety rather than by any piecemeal approach. Such an arrangement could include zoning ordinances and other restrictions to maintain or enhance existing land uses. Aggressive management of invasive species such as the Mute Swan and common reed need to be pursued. Habitat degradation of protected areas is occurring due to lack of aggressive management. Acquisition of adjacent upland habitats should be actively pursued to provide buffers to existing wetlands.



## **Fishers Island Sound, Connecticut**

**Sub-Focus Areas: None**

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### *Area Description:*

This major estuary complex encompasses all of Fishers Island Sound and Little Narragansett Bay, including the coastline of southeastern Connecticut from the mouth of the Thames River to Watch Hill, Rhode Island, and the north shore of Fishers Island, NY. This large, estuary-dominated complex includes all of the waters and adjacent shorelines of Fishers Island Sound, or that body of water lying between Fishers Island (New York) and the southeastern coast of Connecticut, and enclosed within the area east of a boundary line drawn from the mouth of the Thames River at Avery Point (Groton) to the western end of Fishers Island, and north of a line drawn from the eastern end of Fishers Island to and including Napatree Point (Rhode Island) and Little Narragansett Bay. This area is approximately 13 miles (21 km) long in a southwest-northeast direction, and from 2 to 5 miles (3-8 km) in width in a north-south direction between the mainland and Fishers Island.

### *Ownership/Protection:*

This complex has a mixed ownership pattern of Public Trust waters, several State-owned areas, Town parks and extensive private residential lands. State of Connecticut-owned areas include Bluff Point Coastal Preserve and State Park, Haley Farm State Park, Sixpenny Island Wildlife Area and Barn Island Wildlife Management Area. The Town of Westerly, Rhode Island, owns Napatree Point.

### *Acreage to Conserve:*

Approximately 103 ha (256 acres) of tidal wetlands within the focus area need acquisition and/or enhancement. Of this figure, approximately 80 ha (200 acres) are privately owned and could be considered in need of acquisition. New programs in place, such as the Landowner Incentive Plan, could allow for the restoration and enhancement of many of these privately owned wetlands. Statewide, no estimate of wetlands in need of acquisition and/or enhancement is available.

Since 1988, approximately 19 ha (47 acres) of wetland habitat within the focus area have been enhanced. Enhancement has been achieved through the use of open marsh water management techniques. An additional 3.6 ha (9 acres) have undergone intensive vegetation control (Phragmites control). Statewide, in areas outside of ACJV focus areas, approximately 187 ha (463 acres) of inland wetlands have undergone either enhancement or restoration activities. An additional 182 ha (452 acres) have been controlled for exotic vegetation.

### *Waterfowl:*

Fishers Island Sound is a high quality, shallow estuarine environment with extensive eelgrass beds, supporting regionally significant seasonal concentrations and populations of waterfowl and shorebirds, important finfish nursery and spawning areas and substantial commercial and recreational shellfish beds. Over-wintering and migrating flocks of waterfowl of special emphasis occurring in significant numbers in the coves and open water environments here include Atlantic Brant, American Black Duck, Canada Goose, Common Goldeneye, Bufflehead and Hooded, Common, and Red-breasted Mergansers. This area is especially

important as a breeding area for American Black Duck, with lesser numbers of Mallard and Canada Goose.

Table 1. Waterfowl species identified in the Fisher’s Island Sound Focus Area.

<u>Species</u>	<u>Breeding</u>	<u>Migration</u>	<u>Wintering</u>
American Black Duck	X	X	X
Atlantic Brant		X	X
Canada Goose	X	X	X
Common Goldeneye		X	X
Bufflehead		X	X
Hooded Merganser	X	X	X
Common Merganser		X	X
Red-breasted Merganser		X	X
Mallard	X	X	X

*Other Migratory Birds:*

Ospreys nest in several places along the Connecticut shoreline and on Fishers Island, and appear to be increasing in this area, as is also American Oystercatcher which breeds on several offshore island beaches. Ram Island is an important rookery for several species of colonial wading birds, including Black-crowned Night-Heron, Snowy Egret, Glossy Ibis, Great Egret, and Little Blue Heron, as well as such problem species as Double-crested Cormorant, Great Black-backed Gull and Herring Gull. These last three species seem to be increasing their numbers and populations everywhere along the coast, often displacing nesting terns and Piping Plovers. Common, Least and Roseate terns and Piping Plovers commonly nested on several area beaches in the recent past, but in the past several years essentially only the Least and Common Tern still breed, and even then only at a very few localities, such as small offshore islets and on Fishers Island. Roseate Tern and Piping Plover, U.S. Endangered and Threatened species, respectively, have not nested on area beaches in the Connecticut portion of this complex in several years (although Piping Plovers still nest on Napatree Beach, Rhode Island) even though suitable habitat appears available. Human-related disturbances and perhaps displacement by gulls are likely responsible for the abandonment of these sites. Marshes in this complex, particularly those at Barn Island, provide nesting habitat for American Bittern, Least Bittern, Black Rail and Seaside Sparrow, all regional species of special emphasis.

*Threats:*

Increased residential and marina development in the area, with consequent runoff of chemicals and fertilizers, increased turbidity and sedimentation, and discharges of sewage, stormwaters, and wastes, potentially threatens water quality throughout the rivers, coves and waters of Fishers Island Sound, to the detriment of habitat quality for the area's significant fish and wildlife resources. This area also receives heavy recreational use, especially boating and

beach activities, which can adversely impact wildlife populations during certain times of the year. Of particular concern are human-related disturbances to colonial nesting waterbirds. Nesting populations of terns and Piping Plovers are highly vulnerable to human intrusions into nesting areas during the critical nesting season (mid-April to August), and stray pets can pose serious hazards to eggs and young birds. In several areas within this complex there are considerable problems with invasive species such as common reed, Japanese honeysuckle (*Lonicera japonica*), Asiatic bittersweet (*Celastrus orbiculatus*) and Mute Swans, and also with dense concentrations of white-tailed deer (*Odocoileus virginianus*).

*Conservation Recommendations:*

The apparent abandonment of several area nesting beaches of terns and Piping Plovers as a result of human disturbances is of particular concern, and requires intensive efforts to protect both currently-occupied sites as well as recent historical localities by all available means, including beach closures, fencing, predator/pet removal, posting, beach warden patrols and public education. Habitat improvement and restoration of degraded or abandoned nesting beaches using dredging spoils should be considered. Efforts should be made to identify and implement those tasks and objectives of the piping plover and roseate tern recovery plans that may be applicable to areas within this complex. Opportunities should be sought to develop cooperative management and conservation programs between various governmental agencies, private conservation organizations and private landowners to best manage and protect for the long term the living resources of this significant estuarine complex. Protection and maintenance of water quality and wetlands throughout this complex through monitoring and regulation are necessary to ensure the continued high value of this area to fish, wildlife and plant populations dependent on them.

## **Greater Hammonasset Complex, Connecticut**

**Sub-Focus Areas: None**

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### *Area Description:*

This complex is located along the central coast of Connecticut on the north shore of Long Island Sound, between the Towns of Madison and Westbrook. The boundary of this complex extends west to east from the nearshore area of Tuxis Island and the adjacent Connecticut mainland to Menunketesuck Island, a distance of about 12 miles (19 km), and inland to the limits of anadromous fish passage up the Hammonasset, Indian, Menunketesuck and Patchogue Rivers. In addition to those areas mentioned, the following areas are also included within this complex: Tuxis Island, Hammonasset State Park and marshes, Cedar Island, Clinton Harbor, Harbor View Beach, Hammock River wetlands, Indian River wetlands and Duck Island.

### *Ownership/Protection:*

Ownership is a mixed pattern of public lands and waters and private lands, including Hammonasset State Park and Natural Area Preserve, Hammock River Marsh Wildlife Area, Black Pond Wildlife Area, Salt Meadow Unit of the Stewart B. McKinney National Wildlife Refuge and Duck Island Wildlife Area (CT DEP). Menunketesuck Island is privately owned; Tuxis Island is owned by the Town of Madison.

### *Acreage to Conserve:*

Approximately 142 ha (353 acres) of tidal wetlands within the focus area need acquisition and/or enhancement. Of this figure, approximately 121 ha (300 acres) are privately owned and could be considered in need of acquisition. New programs in place, such as the Landowner Incentive Plan, could allow for the restoration and enhancement of many of these privately owned wetlands. Statewide, no estimate of wetlands in need of acquisition and/or enhancement is available.

Since 1988, approximately 44 ha (109 acres) of wetland habitat within the focus area have been enhanced. Enhancement has been achieved through the use of open marsh water management techniques. An additional 19 ha (47 acres) have undergone intensive vegetation control (Phragmites control). Statewide, in areas outside of ACJV focus areas, approximately 187 ha (463 acres) of inland wetlands have undergone either enhancement or restoration activities. An additional 182 ha (452 acres) have been controlled for exotic vegetation.

### *Special Recognition:*

The Salt Meadow Unit of Stewart B. McKinney NWR, Hammonasset State Park, and Menunketesuck and Duck islands are recognized by the National Audubon Society as an Important Bird Areas (IBA) for migratory birds.

### *Waterfowl:*

The estuarine marshes of this complex, including Hammonasset and Menunketesuck marshes, are important areas for wintering waterfowl, especially American Black Duck, Green-winged Teal, Red-breasted Mergansers, and Bufflehead. The offshore waters are important wintering and migratory stopover areas for sea ducks and diving ducks, scoters and Oldsquaw in particular.

Table 1. Waterfowl species identified in the Hammonasset Complex Focus Area.

<u>Species</u>	<u>Breeding</u>	<u>Migration</u>	<u>Wintering</u>
American Black Duck	X	X	X
Green-winged Teal	X	X	X
Red-breasted Merganser		X	X
Bufflehead		X	X
Oldsquaw		X	X
Scoter			X

*Other Migratory Birds:*

Several of the beaches and islands (Tuxis, Menunketesuck and Duck) have nesting colonies of Piping Plover, a U.S. Threatened species, Roseate Tern, a U.S. Endangered species, Common Tern, Least Tern and American Oystercatcher. Menunketesuck Island previously contained one of the two largest nesting colonies of Least Tern in Connecticut, a species that has suffered greatly in the past from human disturbance. Only a few pairs nest now. Common Terns presently nest here. Significant intertidal mudflats adjacent to Menunketesuck Island are an important stopover area for migratory shorebirds, including, Ruddy Turnstone, Red Knot, Sanderling, Dunlin, and Purple Sandpiper. The area is perhaps the primary wintering area for shorebirds in Connecticut. The offshore waters often host significant numbers of migratory water birds, including Common and Red-throated Loons, Horned Grebe and Northern Gannet. Duck Island hosts a significant colony of long-legged wading birds and the tidal marshes in the area are key foraging areas for these birds. Globally-significant numbers of Saltmarsh Sharp-tailed Sparrow, listed as ‘near-threatened’ by BirdLife International, nest in the marshes at Hammonasset, the Hammock River Marsh, and Salt Meadow Unit of Stewart B. McKinney NWR. Hammonasset Beach State Park and the Salt Meadow Unit of Stewart B. McKinney NWR are key stopover areas for migratory songbirds in spring and particularly fall migration. Hammonasset is an important stopover and wintering area for Northern Harrier and to a lesser degree Short-eared Owls. Salt Meadow Unit has relatively unfragmented forest habitats for coastal Connecticut and hosts nesting populations of several species of concern, including Wood Thrush and Worm-eating Warbler. Significant early successional habitats also exist at Salt Meadow Unit, providing important habitat for species of conservation concern, including, American Woodcock, Blue-winged Warbler, and Eastern Towhee.

*Threats:*

Disturbances to nesting colonies of Piping Plover and terns on beaches and islands in this complex should be given high priority among resource issues. These colonies are extremely vulnerable to human-related disturbances ranging from trampling of eggs and nests by beach-walkers and picnickers and deliberate vandalism to predation by unrestrained dogs and cats and other mammalian predators. With increasing shoreline and marina development in the area, resulting in some instances in outright destruction of habitat, there are also serious potential threats to the water quality of rivers and nearshore waters from discharges of pesticides, road runoff, farmland fertilizers, and sewage discharges, which can greatly reduce habitat quality for the many significant populations and seasonal concentrations of fish and wildlife species using this area. Increased turbidity and alterations of channels and tidal currents due to dredging are also issues of concern, including deposition of spoils on inappropriate areas, although such materials can also be used for improving beach habitats of nesting birds. Erosion of sand dunes and bluffs in the Hammonasset area due to unregulated pedestrian access is a problem in this area. Development of upland edges of saltmarshes threatens the loss of important buffer zones for these fragile habitats. Forest fragmentation due to development threatens the integrity of forest habitats at Salt Meadow Unit, as well as migratory corridors leading to this important land bird stopover area. Early succession habitats at Salt Meadow Unit are in need of active management to prevent succession into mature forest habitats.

*Conservation Recommendations:*

Piping Plover and tern nesting areas need to be afforded maximum protection, employing all available means to prevent the intrusion of humans and stray animals into these areas during the critical nesting season (mid-April to August), including fenced exclosures, posting, beach warden patrols, predator removal and public education. Efforts should also be made to identify and implement those tasks and objectives of the Piping Plover and Roseate Tern recovery plans that may be applicable to nesting areas in this complex, particularly those involving habitat restoration and enhancement of degraded areas. Protection of nesting areas on private property should be accomplished to the greatest extent practicable and feasible through the use of cooperative agreements and conservation easements. There are numerous opportunities and challenges throughout this complex for various governmental agencies, private conservation organizations and private landowners to work cooperatively in conserving and protecting this valuable complex of fish, wildlife and plant habitats.

Certain privately-owned parcels in the Menunketesuck area should be considered for acquisition by the Federal government as additions to the National Wildlife Refuge System (Salt Meadow National Wildlife Refuge) so as to protect and manage them for their significant regional biological values, undeveloped upland areas adjacent to important marsh habitats should be considered for acquisition by federal or state agencies (e.g. Griswold Airport, properties adjacent and proximal to Salt Meadow Unit). Increased funding is necessary for habitat management of early successional habitats at Salt Meadow Unit.

## **Lower Housatonic River/Great Meadows, Connecticut**

**Sub-Focus Areas: None**

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### *Area Description:*

This marsh/barrier beach/river focus area is located on the southwestern Connecticut shoreline of western Long Island Sound between the mouth of the Housatonic River and Bridgeport Harbor. Portions of the lower Housatonic River are also included. The area boundary includes all of Long Beach, Pleasure Beach and Great Meadows Marsh, just east of Bridgeport Harbor, eastward to Lordship Beach, the mouth of the Housatonic River, Milford Point, Charles Island, and the Charles E. Wheeler State Wildlife Area (Nells Island marshes) and from there northward up the river to Derby Dam.

### *Ownership/Protection:*

Most of the Great Meadows marsh is in public ownership. The majority of the marsh is owned by the United States Fish and Wildlife Service (Stewart B. McKinney NWR). Long Beach is owned by the Town of Stratford. There is a colony of beach cottages at the western end of Long Beach that is leased from the Town. The Town cooperates with State personnel in managing the shorebird nesting area on Long Beach. Milford Point includes Federal (Stewart B. McKinney National Wildlife Refuge) and privately-owned (CT Audubon) parcels. The CT Audubon leases this piece of Milford Point from the CT DEP. Nells Island/Wheeler State Wildlife Management Area and several marshy islands upstream are owned and managed by the Connecticut Department of Environmental Protection.

### *Acreage to Conserve:*

Approximately 111 ha (275 acres) of tidal wetlands within the focus area need acquisition and/or enhancement. Of this figure, approximately 81 ha (200 acres) are privately owned and could be considered in need of acquisition. New programs in place, such as the Landowner Incentive Plan, could allow for the restoration and enhancement of many of these privately owned wetlands. Statewide, no estimate of wetlands in need of acquisition and/or enhancement is available.

Since 1988, approximately 16 ha (41 acres) of wetland habitat within the focus area have been enhanced. Enhancement has been achieved through the use of open marsh water management techniques. An additional 10 ha (25 acres) have undergone intensive vegetation control (Phragmites control). Statewide, in areas outside of ACJV focus areas, approximately 187 ha (463 acres) of inland wetlands have undergone either enhancement or restoration activities. An additional 182 ha (452 acres) have been controlled for exotic vegetation.

### *Special Recognition:*

Milford Point, Great Meadows, Charles Island, and Nell's Island are all designated as Important Bird Areas (IBA) by the National Audubon Society.

### *Waterfowl:*

Great Meadows is of high regional significance in that it contains the largest block of unditched high salt marsh 91 ha (225 acres) left in the State of Connecticut. The marsh provides an important wintering, nesting and migration habitat for many waterfowl species, including

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Atlantic Brant, American Black Duck, Green-winged Teal, American Wigeon, Gadwall, Canvasback, and Greater and Lesser Scaup. The near shore waters along the coast from Bridgeport to Milford often harbor large wintering flocks of scaup and scoters.

Table 1. Waterfowl species identified in the Housatonic-Great Meadows Focus Area.

<u>Species</u>	<u>Breeding</u>	<u>Migration</u>	<u>Wintering</u>
American Black Duck	X	X	X
Atlantic Brant		X	X
Green-winged Teal	X	X	X
American Wigeon		X	X
Gadwall	X	X	X
Canvasback		X	X
Greater Scaup		X	X
Lesser Scaup		X	X
Mallard	X	X	X

*Other Migratory Birds:*

The entire area is heavily used during migration by numerous species of shorebirds, especially the mud flats. Willet, Red Knot, various species of sandpiper, Ruddy Turnstone, and Whimbrel are prevalent in the area during migration. Wading birds breeding on the Norwalk Islands also utilize the mudflats around these marshes for feeding. The marsh is used as a feeding area by migrating and wintering raptors such as Northern Harrier, Osprey, Bald Eagle and Peregrine Falcon. Black-crowned Night-Heron, Green-backed Heron, American and Least Bittern and Pied-billed Grebe have been recorded as nesting in the Great Meadows marsh. Undisturbed portions of Long Beach support small nesting populations of Piping Plover, a U.S. Threatened species, American Oystercatcher, Common and Least Terns, Killdeer and Spotted Sandpiper. Roseate Tern, a U.S. Endangered species, historically nested in this area. During migration, upwards of 5000 shorebirds roost on the beaches above high tide. Some of the State's best examples of backdune sandflat communities occur on Long Beach and Pleasure Beach.

*Threats:*

Private development, storm water discharges, marine sand and gravel mining, marina construction and channel dredging are of immediate and potential threat to the habitats in this complex, particularly surrounding the Great Meadows marsh area, both in reducing available wildlife habitat area and increasing the level of human disturbance and the risk of contaminants and degraded water quality in the general area. Lead is a major contaminant in the vicinity of Lordship Point, the result of this area being a popular trap and skeet range for over 60 years.



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During this time an estimated 4.8 million pounds of lead shot may have been deposited into the sediments around Lordship Point. Current remediation of the area, however, is underway. Further studies will be conducted to determine whether lead is still a potential problem to migratory birds. Non-point source pollution from the river watershed is thought to be a significant problem to the coastal waters in this area; studies are underway to further define this problem and to seek solutions. Human-related disturbances to colonial beach-nesting terns and Piping Plovers, whether unintentionally or the result of purposeful intrusions into nesting areas and acts of vandalism, or from stray animals and unleashed cats and dogs, are of major concern at all known nesting localities in this area. Populations of Piping Plover, Common and Least Terns and other shorebirds nesting on beaches in this complex are subject to disturbance by people passing through the area or sunbathing on or near the nesting areas, and by predation from stray or unleashed pets. Disturbance of roosting migratory shorebirds and lack of high tide foraging habitat for them are also key problems. There were significant tidal and freshwater pools at Stratford GM historically, and those have either been filled in or overgrown with *Phragmites*. *Phragmites* threatens to displace cordgrass (*Spartina alterniflora*) marsh vegetation in several areas.

### *Conservation Recommendations:*

Acquisition of privately held salt marsh adjacent to publicly owned habitats should be aggressively pursued. Diverse partnerships between governmental and non-governmental groups need to be developed to pursue funding for acquisition and continued habitat restoration. It is essential that nesting beaches of piping plovers and terns in this complex be protected from human-related disturbances during the critical nesting season (mid-April to August), using all available methods to exclude people and stray animals from these areas. Fenced enclosures, posting, predator traps, beach warden patrols and public education should all be considered in a protection strategy. Efforts should be made to identify and implement those tasks and objectives of the piping plover recovery plan that may be applicable to these beaches, including opportunities to restore or enhance degraded beach habitat. State and Federal programs to protect and enhance water quality in Long Island Sound and adjacent waters should continue to focus on protecting tidal freshwater and brackish wetlands and coastal water quality through the regulatory process and in addressing the problems of hypoxia, oil spills, non-point source pollution, sewage and waste disposal and heavy metal contaminants in these waters to restore and maintain important fish and wildlife habitat.

## **New Haven Harbor, Connecticut**

**Sub-Focus Areas: None**

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### *Area Description:*

This complex is centered primarily along the central coast of Connecticut on Long Island Sound in the New Haven Harbor area and areas to the east. The outer, shoreward boundary of this largely nearshore water and tidal flat-dominated complex extends from Merwin Point, just south of Woodmont (Milford) east to Sachem Head (Guilford), a distance of approximately 14.5 miles (23 km). Enclosed within this boundary are the east and west shoreline areas around New Haven Harbor to the limit of anadromous fish passage on the West and Quinnipiac Rivers, including the Quinnipiac Meadows wetlands area and the North Haven and Wallingford sand plains north of New Haven Harbor. To the east of New Haven Harbor, the boundary incorporates the Branford River, Leetes Island and Joshua Cove marshes and tidal flats and nearshore waters of Long Island Sound for a distance averaging 1-2 miles (2-3 km) south of the shoreline. A number of important wildlife islands in the Branford-Guilford vicinity are included within this nearshore water boundary, most notably The Thimbles and Kelsey Island.

### *Ownership/Protection:*

A significant portion of this complex includes public coastal and river waters and wetlands, while the rest represents various mixtures of publicly and privately owned lands. Several of the islands are privately held, as is most of the sand plains area along the Quinnipiac River.

### *Acreage to Conserve:*

Approximately 242 ha (598 acres) of tidal wetlands within the focus area need acquisition and/or enhancement. Of this figure, approximately 210 ha (520 acres) are privately owned and could be considered in need of acquisition. New programs in place, such as the Landowner Incentive Plan, could allow for the restoration and enhancement of many of these privately owned wetlands. Statewide, no estimate of wetlands in need of acquisition and/or enhancement is available.

Since 1988, approximately 5.6 ha (14 acres) of wetland habitat within the focus area have been enhanced. Enhancement has been achieved through the use of open marsh water management techniques. An additional 43 ha (107 acres) have undergone intensive vegetation control (Phragmites control). Statewide, in areas outside of ACJV focus areas, approximately 187 ha (463 acres) of inland wetlands have undergone either enhancement or restoration activities. An additional 182 ha (452 acres) have been controlled for exotic vegetation.

### *Special Recognition:*

Sandy Point in West Haven and Lighthouse Point Park in New Haven are recognized by the National Audubon Society as an Important Bird Area (IBA) for migratory birds.

### *Waterfowl:*

The open water areas and tidal flats in New Haven Harbor and the nearshore area south of Guilford, Branford and East Haven contain some of the largest and most important concentrations of wintering and migrating waterfowl along the Connecticut coast, especially

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American Black Duck, Canvasback, American Wigeon, Greater and Lesser Scaup, Common Goldeneye and three species of scoter. The New Haven tidal flats are one of the most important wintering areas for American Black Duck in Connecticut. The Quinnipiac Marshes are extremely productive biologically, in spite of the heavy industrialization that lines its banks and its chemically polluted waters and soils, especially with heavy metals. Migratory waterfowl using these marshes for nesting include American Black Duck, Mallard and Gadwall.

Table 1. Waterfowl species identified in the New Haven Harbor Focus Area.

<u>Species</u>	<u>Breeding</u>	<u>Migration</u>	<u>Wintering</u>
American Black Duck		X	X
Canvasback		X	X
American Wigeon		X	X
Greater Scaup		X	X
Lesser Scaup		X	X
Common Goldeneye		X	X
Scoter		X	X
Gadwall		X	X

*Other Migratory Birds:*

The sand and mud flats at Long Wharf, City Point and Morse Point/Sandy Point in New Haven Harbor are regionally significant staging areas for large concentrations of migrating sandpipers, terns, including the federally endangered Roseate Tern, plovers, turnstones and other shorebirds and waterfowl that feed on these flats to sustain them on their long journeys southward or northward. Shorebird species of special note include Semi-palmated Sandpiper, Dunlin, Red Knot, Ruddy Turnstone, Least Sandpiper and Sanderling. Tidal flats in New Haven Harbor in the vicinity of Long Warf historically hosted thousands to tens of thousands of foraging migratory shorebirds, but shorebird use of this area has been much reduced since the 1970's. Jetties at the mouth of New Haven Harbor support regionally significant numbers of wintering Purple Sandpiper. Morse Point currently supports nesting populations of Piping Plover, a U.S. Threatened species, Least and Common terns and Black Skimmer. Lighthouse Point Park has been the site of a hawkwatch continuously since 1974. On average over 5000 raptors are counted from this location. Lighthouse Point Park is also an important stopover area for migratory landbirds in fall migration. The Quinnipiac River Tidal Marsh hosts nesting Saltmarsh Sharp-tailed Sparrow, which is listed as globally "near threatened" by BirdLife International, as well as nesting populations of Least Bittern, Pied-billed Grebe, Common Moorhen and Seaside Sparrow and is an important foraging area for long-legged wading birds.

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Elsewhere in the complex, Common Terns nest on a few of the islands to the east of New Haven Harbor. Wading bird rookeries are established on a few of the outer Thimbles, mostly Snowy Egret, Great Egret and Black-crowned Night-Heron. The nearshore areas also contain abundant shellfish beds, particularly for American Oystercatcher (*Crassostrea virginica*) and hard-shelled clams (*Mercenaria mercenaria*).

### *Threats:*

The large seasonal concentrations of wildlife utilizing the extensive tidal mud and sand flats and open waters of this complex are extremely vulnerable to an oil spill or hazardous chemical discharge, particularly in New Haven Harbor. Numerous other activities potentially threaten natural ecosystems and fish and wildlife populations in this industrialized zone, including waste and sewage disposal, storm water discharge, shoreline development, erosion control projects, channel dredging and wetland alterations. Heavy metal and PCB pollution of soils and waters is of special concern, as are contaminated sediments in portions of New Haven Harbor and Mill River due to storm water, sewage treatment plant and industrial discharges. Invasion of Phragmites is a serious problem in many areas of the Quinnipiac tidal marsh and in Old Field Creek marsh. In spite of it all, however, significant wildlife populations continue to persist in this area, albeit at much reduced levels from former levels of abundance. Human-related disturbances to colonial beach-nesting terns and Piping Plovers, whether unintentionally or the result of purposeful intrusions into nesting areas and acts of vandalism, or from stray animals and unleashed cats and dogs, are of major concern at all known nesting localities in this area. There are several historical, but presently unoccupied, localities for breeding birds in this area, particularly for Roseate Tern, a U.S. Endangered species. Such areas were likely abandoned due to disturbance.

### *Conservation Recommendations:*

Protection of the nearshore waters and intertidal flats from catastrophic events such as an oil spill or hazardous chemical discharge needs to be given the highest priority among resource concerns in this area. Attention needs to be focused not only on formulating oil spill contingency plans, but developing the highest degree of readiness to respond to such an event, particularly during critical times of the year when wildlife populations are at their peak and most vulnerable, such as spring and fall migrations and winter. Measures should also be sought and instituted, whether by regulation, zoning, planning, cooperative agreements or full-scale restoration programs such as the National Estuary Program, to restore, maintain, enhance and protect aquatic and terrestrial resources in this complex. Opportunities should be identified to restore or enhance degraded wetlands, including control of common reed, and other coastal habitats in this complex to increase their value to fish and wildlife. In addition to wetland habitats, the New Haven sand plains should be given high priority by the State in identifying and implementing restoration opportunities for this unique ecosystem. Studies should be conducted into the reasons for the decline in the numbers of migratory shorebirds using the mudflats in the area of Long Wharf and possible remedial action to restore the value of this area as a shorebird foraging area. The Old Field Creek area has significant potential for restoration and creation of shorebird foraging habitat.

Disturbances to colonial nesting birds, whether sand beaches or island rookeries, need to be minimized or eliminated entirely. Human and stray animal intrusions into nesting areas during

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the critical nesting season (mid-April to August) should be prevented using a variety of methods, including fenced exclosures, posting, beach warden patrols, trapping of animals and public education. Pertinent tasks and objectives of the Piping Plover recovery plan should be identified and implemented on area beaches, especially those aimed at habitat restoration, enhancement and protection. A regional or basin-wide conservation and management plan should be developed and implemented for protecting and enhancing wintering waterfowl populations in central and western Long Island Sound, in partnership with governmental agencies, private conservation groups and landowners.

## **Norwalk Islands, Connecticut**

### **Sub-Focus Areas: None**

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#### *Area Description:*

The Norwalk Islands are located in western Long Island Sound, approximately one to one-and-a-half miles (2 km) offshore (south) of the city of Norwalk, along the southwest coast of Connecticut. The mainland portion of this focus area occurs between Rowayton and Sherwood Island State Park. This focus area includes all of the Norwalk Islands (Sheffield Island, Shea Island, Copps Island, Chimon Island, Betts Island, Long Beach Island, Grassy Island, Goose Island, Cockenoe Island and several smaller islands) and the mainland tidal wetlands and mudflats at Fivemile River, Village Creek (Hoyt Island), Norwalk Harbor (Harborview and Seaview Park), Shorehaven-Canfield Island, mouth of Saugatuck River, Compo Cove and Sherwood Millpond, as well as the intervening embayed waters of Long Island Sound. The length of this focus area in a southwest-northeast direction is approximately 6 miles (16 km), and 2 to 3 miles (3-5 km) in width. Also included in this focus area are the mainstem channels of the Norwalk River up to the vicinity of the Silvermine River, and the Saugatuck River to its confluence with the Aspetuck River, near Sipperly Hill.

#### *Ownership/Protection:*

Most of the larger islands are publicly-owned (Federal National Wildlife Refuge, Town), while many of the smaller ones are in private ownership. The waters and mudflats along the mainland are in the Public Trust (below mean high water). A few of the mainland wetland areas are privately-owned. Many of the larger islands are designated under the Coastal Barriers Resource Act.

#### *Acreage to Conserve:*

Approximately 64 ha (160 acres) of tidal wetlands within the focus area need acquisition and/or enhancement. Of this figure, approximately 61 ha (150 acres) are privately owned and could be considered in need of acquisition. New programs in place, such as the Landowner Incentive Plan, could allow for the restoration and enhancement of many of these privately owned wetlands. Statewide, no estimate of wetlands in need of acquisition and/or enhancement is available.

Since 1988, approximately 24 ha (60 acres) of wetland habitat within the focus area have been enhanced. Enhancement has been achieved through the use of open marsh water management techniques. An additional 23.8 ha (59 acres) have undergone intensive vegetation control (Phragmites control). Statewide, in areas outside of ACJV focus areas, approximately 187 ha (463 acres) of inland wetlands have undergone either enhancement or restoration activities. An additional 182 ha (452 acres) have been controlled for exotic vegetation.

#### *Special Recognition:*

None at the moment.

#### *Waterfowl:*

Both the waters and tidal flats around these islands as well as the mainland marsh and cove sites, particularly Five Mile River, Village Creek, Norwalk Harbor, Canfield Island and the

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mouth of the Saugatuck River, are significant concentration areas for wintering waterfowl of special emphasis, especially American Black Duck, American Wigeon, Atlantic Brant, Greater and Lesser Scaup and Gadwall.

Table 1. Waterfowl species identified in the Norwalk Islands Focus Area.

<u>Species</u>	<u>Breeding</u>	<u>Migration</u>	<u>Wintering</u>
American Black Duck		X	X
American Wigeon		X	X
Atlantic Brant		X	X
Great Scaup		X	X
Lesser Scaup		X	X
Gadwall		X	X

*Other Migratory Birds:*

The Norwalk Islands are of high regional significance to breeding colonial wading birds. These rookeries are mostly dominated by Black-crowned Night-Heron, but also include Great Egret, Snowy Egret, Cattle Egret, Little Blue Heron, Yellow-crowned Night-Heron, Green-backed Heron and Glossy Ibis. A large colony of colonial waders is found on Cockenoe Island. These birds utilize the other islands, mainland marshes, and intertidal flats for feeding. The most important wading bird feeding areas in this focus area are the tidal flats around some of the islands and on the mainland at Village Creek-Hoyt Island, Norwalk Harbor, Shorehaven-Canfield Island, Saugatuck River mouth and Compo Cove-Sherwood Millpond. Birds from these islands also utilize the mudflats at Great Meadows (Stratford) for feeding. Small nesting colonies of herons and egrets occur on Shea and Grassy Islands and others. Also nesting on beaches on a few of the Norwalk Islands are Piping Plover, a U.S. Threatened species, Least Tern, Common Tern, and American Oystercatcher. Problem species also nesting in this area include large numbers of Great Black-backed Gulls and Herring Gulls and increasing numbers of Double-crested Cormorant. Roseate Tern, a U.S. Endangered species, historically nested on Goose Island.

*Threats:*

Although most of the Norwalk Islands are already in public ownership and are not likely to be developed, they are still subject to varying degrees of human disturbance, especially to the wading bird rookeries and nesting colonies of beach-nesting Piping Plovers and terns. Human

disturbances in the form of intrusions into nesting areas during the critical nesting and fledging season can cause colonies to be temporarily or even permanently abandoned. Predation of eggs and young birds by Norway rats (*Rattus norvegicus*), raccoons (*Procyon lotor*), and gulls are also a threat to these colonies. The heavily urbanized mainland shoreline in this area poses threats to water quality through chemical contamination, oil spills, sewage and storm water discharges, waste disposal, marina development, dredging and numerous other activities that potentially degrade both terrestrial and aquatic habitats of fish and wildlife resources. The waters of western Long Island Sound are subject to low oxygen levels (hypoxia) during the summer months, which can stress and even kill marine organisms if prolonged.

*Conservation Recommendations:*

The protection and management of colonial wading bird rookeries and colonies of beach-nesting terns and Piping Plover need to be given high priority in this area. Because these birds are very sensitive and vulnerable to human disturbances during the critical nesting season (mid-April to August), protective strategies and measures should be designed to prevent people and unleashed pets from entering these areas, using such measures as closed areas with fenced enclosures, posting, warden patrols, trapping and removal of pets or feral animals, rats, etc., and public education. Small mammal control should be pursued on these islands. Educational programs to inform the general public of the need for avoidance at certain critical time periods need to be initiated.



## **Lower Thames River System, Connecticut**

**Sub-Focus Areas: None**

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### *Area Description:*

This area encompasses the lower tidal reaches of the Thames River in southeastern Connecticut from New London and Groton at the mouth to Norwich. The boundary of this site includes the river channel, waters and shoreline wetlands of the lower tidal reaches of the Thames River from the confluence of the Shetucket and Quinebaug Rivers a few miles north of Norwich to the mouth of the river at New London and Groton where it enters into the eastern end of Long Island Sound, a river length of approximately 19 miles (31 km). Specific areas of biological significance, in addition to the river itself, include the Mamacoke Island marshes, Horton Cove, Poquetanuck Cove marshes, Smith Cove, Greens Harbor and small rocky islands at the river mouth.

### *Ownership/Protection:*

This area is primarily Public Trust waters and State and private conservation and research lands. Connecticut College owns and manages Mamacoke Island Natural Area.

### *Acreage to Conserve:*

Approximately 20 ha (50 acres) of tidal wetlands within the focus area need acquisition and/or enhancement. All of these wetlands are privately owned and could be considered in need of acquisition. New programs in place, such as the Landowner Incentive Plan, could allow for the restoration and enhancement of many of these privately owned wetlands. Statewide, no estimate of wetlands in need of acquisition and/or enhancement is available.

Since 1988, no wetland acreage has undergone restoration or enhancement. Statewide, in areas outside of ACJV focus areas, approximately 187 ha (463 acres) of inland wetlands have undergone either enhancement or restoration activities. An additional 182 ha (452 acres) have been controlled for exotic vegetation.

### *Special Recognition:*

Mamacoke Island, Smith Cove, and the adjacent coves are designated by the National Audubon Society as Important Bird Areas.

### *Waterfowl:*

Several of the shallow tidal coves and associated brackish marshes in the lower Thames River contain regionally significant concentrations of wintering and migrating waterfowl, especially of several species not commonly found elsewhere or in similar concentrations in the region. These include relatively large numbers of Canvasback, American Wigeon, American Black Duck, Gadwall, Mallard, Redhead, Common Goldeneye and Hooded Merganser. Also found here are Common and Red-breasted Merganser, and Greater and Lesser Scaup.

Table 1. Waterfowl species identified in the Thames River Focus Area.

<u>Species</u>	<u>Breeding</u>	<u>Migration</u>	<u>Wintering</u>
American Black Duck	X	X	X
American Wigeon		X	X
Atlantic Brant		X	X
Great Scaup		X	X
Lesser Scaup		X	X
Canvasback		X	X
Gadwall		X	X
Mallard	X	X	X
Redhead		X	X
Common Goldeneye		X	X
Hooded Merganser	X	X	X
Red-breasted Merganser		X	X

*Other Migratory Birds:*

Osprey breed at several places along the river. Small rocky islets in the river mouth contain nesting populations of Common and Roseate Tern, the latter a U.S. Endangered species.

*Threats:*

Industrial, commercial and residential development along the river corridor impacts fish and wildlife populations and habitats largely through direct losses of habitat and degradations in habitat quality, particularly water quality. Heavy metal contamination, sewage, stormwater and waste discharges, shoreline marina development and dredging are all of concern in the Thames River aquatic environment. The river is reported to have significant water quality problems, particularly in certain upstream areas and at the mouth of the river.

*Conservation Recommendations:*

Particular attention needs to be focused on restoring and protecting the water quality of the Thames River and its high value to fish and wildlife populations, especially anadromous fish and overwintering waterfowl. Protective measures should include stringent regulatory oversight and enforcement of existing Federal, State and local environmental regulations, as well as developing and implementing environmentally sound planning and zoning policies and restoration programs. Additionally, exotic species such as Mute Swan and Phragmites need to be aggressively managed in this focus area.

## Appendix 19 – Process and Data Used to Identify CELCP Project ‘Focus Areas’

Goal: To identify and map focus areas within Connecticut’s larger CELCP Project Area that represent zones of ecological significance that can be used to help guide potential future coastal land acquisition strategies.

### General Methodology:

After removing from further conservation consideration areas of existing protected open space and developed lands, a variety existing and derived ecological GIS data was used to first develop a weighted-sum scoring mechanism to evaluate the Project Area for zones of ecological significance. Then, using a spatial statistics algorithm, perform a clustering analysis to identify “hot-spots” representing concentrations of areas of high ecological value.

#### 1. *Data Used:*

- 2006 UCONN CLEAR Land Use/Land Cover:
  - Depicts land cover classification for CT as of 2006.
- 2002 UCONN CLEAR Forest Blocks;
  - Depicts large blocks of unfragmented forest in Connecticut
- 2010 CTDEEP Natural Diversity Database (NDDDB) Areas:
  - Represents known locations, both historic and extant, of state listed species and significant natural communities. State listed species are those listed as Endangered, Threatened or Special Concern under the Connecticut Endangered Species Act (Connecticut General Statutes, Section 26-303)
- 2009 CTDEEP Critical Habitat Areas:
  - provides the identification and distribution of a subset of important wildlife habitats identified in the Connecticut Comprehensive Wildlife Conservation Strategy
- 1999 Migratory Waterfowl Areas;
  - depicts the concentration areas of migratory waterfowl.
- *Proximity Zones Bounding Existing Protected Open Space and CT DEEP Property: \**
  - Depicts areas in proximity to Protected Open Space or DEEP property at 1/3, 2/3, and 1 mile to provide a means for establishing linkages/connections to already protected property
- *Potential Advancement Zones for High Priority Coastal Marshlands:\**
  - Identifies, based on simplified “bath-tub” inundation modeling, areas of upland that might support marsh migration based on a hypothetical 4 ft rise in sea-level (approximating a worst case scenario by 2100.) Created specifically for this effort.
- Coastal Estuarine Land Conservation Planning Project Area:
  - Political boundaries of 42 coastal/Riverine CT municipalities that define the extent of CELCP activities.

\* Derived specifically for this effort

2. Creation of Derived Data Sets:

*Potential Advancement Zones for High Priority Coastal Marshlands*

CT DEEP OLISP staff identified salt and estuarine marsh complexes exceeding 100 acres (see Table 1 above) and ‘buffered’ their upland boundary to extract elevation data from LiDAR data (circa 2000). Upland boundary elevation data for each marsh were averaged and a value of the average plus one standard deviation was used as a proxy for the system. A worst case scenario for sea level rise (Rahmstoff, 2007) was then added to the boundary proxy to arrive at a hypothetical elevation for a potential advancement zone. Once the hypothetical elevation was derived, a simple least-cost based inundation model was run for each system to determine the new marsh extent. The new extents were merged together and the original marsh extent was then subtracted creating a layer identifying just the potential advancement zone. Resulting data was converted to 500ft x500 ft raster grid covering the extent of the CELCP Project Boundary. Grid cells corresponding to advancement zones were coded as “1”; all other cells were coded as “0”. No “No Data” were used. (Although more rigorously defined data for this topic exists, CT DEEP was unable to acquire it in time to use for this analysis.)

Table 1 -Salt and Estuarine Marsh Complexes Exceeding 100 Acres

Marsh Complex Name	Min_elev	Max_elev	Avg_elev	Std_Dev.elev	Bndry_val	SLR_factor	SLRbnd_val
<b>(Elevation values in ft NAVD88)</b>							
Barn Island	1	15	3.70	2.02	5.72	4	10.0
Black Hall River	1	16	3.77	2.15	5.92	4	10.0
Cromwell Meadows	2	16	5.17	1.90	7.07	4	11.0
East River	1	17	4.17	2.25	6.41	4	10.0
Essex Great Meadows	2	10	4.07	1.81	5.88	4	10.0
Ferry Point	1	10	3.07	1.47	4.54	4	9.0
Great Harbor	1	17	2.91	2.15	5.06	4	9.0
Great Island	1	9	3.68	1.42	5.10	4	9.0
Great Meadows Stratford	1	13	4.60	2.14	6.74	4	11.0
Gulf Pond/Indian River	1	11	4.59	1.63	6.23	4	10.0
Hammock River	1	9	2.55	1.28	3.84	4	8.0
Hammonasset Park/River	1	17	4.36	1.67	6.02	4	10.0
Hoadley Neck/Stony Creek	1	18	4.22	2.54	6.75	4	11.0
Lord Cove	1	17	3.77	1.97	5.74	4	10.0
Menunketesuck River	1	18	4.29	1.74	6.02	4	10.0
Nells Island	1	17	6.43	2.70	9.13	4	13.0
Pattangansett River	1	13	4.21	2.36	6.56	4	11.0
Plum Bank/Oyster River	1	11	3.28	1.72	5.01	4	9.0
Quinnipiac River	1	18	5.03	3.09	8.12	4	12.0
Ragged Rock Creek	1	13	4.02	2.18	6.21	4	10.0
Selden Creek	1	19	4.25	2.72	6.97	4	11.0
West River	1	19	4.81	2.28	7.09	4	11.0

### *Proximity Zones Bounding Existing Protected Open Space and CT DEEP Property*

Protected Open Space (POS) including lands subject to conservation easements and lands held by U.S. Fish and Wildlife Service, land trust, and water companies were extracted from a master layer of POS lands and subsequently merged with an inventory of Connecticut Department of Energy and Environmental Protection land to create an integrated set of POS lands. These lands were then buffered with successive zones of 0 to 1/3 of a mile, 1/3 to 2/3 of a mile, and 2/3 to 1 mile to create a datalayer to score lands adjacent or proximate to existing protected property. Scores are weighted based on proximity to the existing POS with areas adjacent POS more favorable than land 1 mile away from POS areas. The 1-mile upper limit proximity threshold was selected based on best professional judgment. Resulting data was converted to 500 foot x 500 foot raster grid covering the extent of the CELCP Project Area boundary. Grid density was selected to balance integrity of resource data with processing speed based on best professional judgment. Grid cells corresponding to the proximity zones reflected the weighted scores; all other cells were coded as 0. No "No Data" were used.

### *3. GIS Data Layer Processing/Preparation:*

#### *2006 UCONN CLEAR Land Cover:*

This data set corresponds to the following UCONN CLEAR *Connecticut's Changing Landscape Project* land cover classes: Other Grasses, Agriculture, Deciduous Forest, Coniferous Forest, Non-forest wetlands, Forested wetland, Tidal wetland. This data excludes Developed & Turf Grasses land cover classes. The data was used in combination with the previously described POS data to define the area within the general CELCP Project Area boundary that represents the maximum extent of the Project Area available for potential acquisitions through CELCP. Resulting data was clipped to CELCP project area and re-gridded to a 500 ft x 500 ft cell size. Grid density was selected to balance integrity of resource data with processing speed based on best professional judgment. Grid cells corresponding to the viable areas of land cover were coded as "1"; all other cells were coded as 0. No "No Data" were used.

#### *2002 UCONN CLEAR Forest Blocks:*

This data depicts areas of large (greater than 25 acres) blocks of unfragmented forest in CT. Data was extracted from original raster sources and provided to CT DEEP as polygon data. Data was further subset into distinct size categories:

- 25 to 100 acres
- 100 to 250 acres
- 250 to 500 acres
- Greater than 500 acres

Resulting data was clipped to CELCP Project Area and re-gridded to a 500ft x 500 ft cell size. Grid density was selected to balance integrity of resource data with processing speed based on best professional judgment. Grid cells corresponding to each of the forest block categories were coded as "1"; all other cells were coded as 0. No "No Data" were used.

*2010 CTDEEP Natural Diversity Database (NDDB) Areas:*

Represents known locations, both historic and extant, of state listed species and significant natural communities. State listed species are those listed as Endangered, Threatened or Special Concern under the Connecticut Endangered Species Act. Data was clipped to CELCP project area and regrided to a 500ft x 500 ft cell size. Grid density was selected to balance integrity of resource data with processing speed based on best professional judgment. Grid cells corresponding to NDDB areas were coded as “1”; all other cells were coded as 0. No “No Data” were used.

*2009 CTDEEP Critical Habitat Areas:*

These data identify and show the distribution of a subset of important wildlife habitats identified in the Connecticut Comprehensive Wildlife Conservation Strategy for which data was available. Data was clipped to CELCP project area and re-gridded to a 500 foot x 500 foot cell size. Grid density was selected to balance integrity of resource data with processing speed based on best professional judgment. Grid cells corresponding to Critical Habitat areas were coded as “1”; all other cells were coded as 0. No “No Data” were used.

*1999 Migratory Waterfowl Areas:*

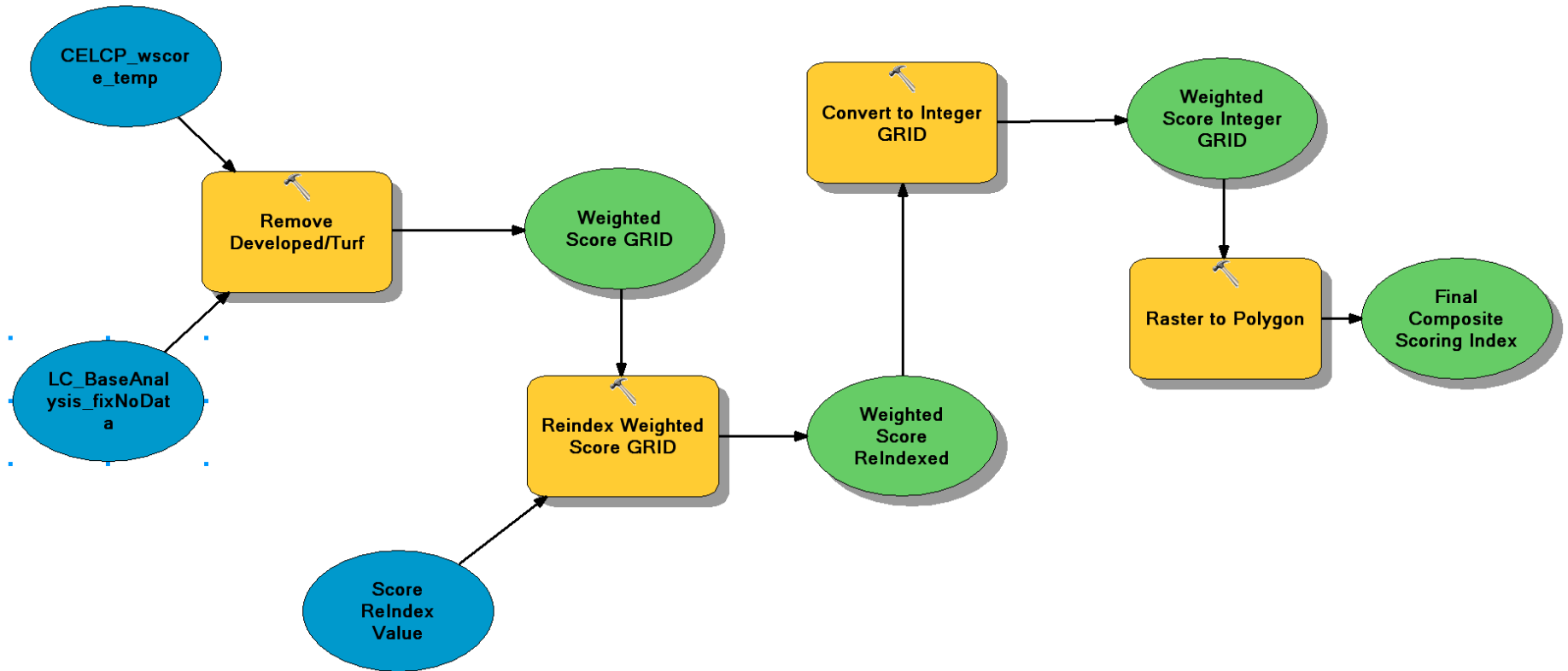
Depicts the concentration areas of migratory waterfowl. Data was clipped to CELCP project area and re-gridded to a 500ft x 500 ft cell size. Grid density was selected to balance integrity of resource data with processing speed based on best professional judgment. Grid cells corresponding to Migratory Waterfowl areas were coded as “1”; all other cells were coded as 0. No “NoData” were used.

**4. Weighted Scoring**

Each datalayer used to evaluate an area’s ecological significance was assigned a weighting-factor that reflects its perceived value relative to other datalayers. Datalayers with higher weighting factors represent ecological value of greater significance for conservation acquisition purposes. These weighted values were employed in a geo-processing model that created a composite scoring index used to perform a clustering analysis explained in Section 6 that follows. Scores were iterated through several versions before settling on the following weighting-factors:

<b>Layer</b>	<b>Weight</b>
Forest Blocks <100	<b>4</b>
Forest Blocks 100-250	<b>8</b>
Forest Blocks 250-500	<b>12</b>
Forest Blocks >500	<b>20</b>
Proximity to POS Property	<b>15</b>
Marsh Advancement Zones	<b>14</b>
NDDB	<b>10</b>
Migratory Waterfowl	<b>6</b>
Critical Habitat	<b>10</b>
Land Use/Land Cover	<b>1</b>
<b>Total</b>	<b>100</b>

5. Creating Composite Scoring Index:



The above Geoprocessing model outlines the process to arrive at a final composite scoring index. It involves several intermediate steps to account for

- Removal of non-viable land areas (existing property, already developed lands/grasses.)
- Retention of scoring values when converting from floating point to integer grids. (Integer format is required to convert GRID to polygons for subsequent clustering analysis.)

## 6. Clustering Analysis:

The raw score values from the composite scoring index were derived using a process shown in the geo-processing model schematic on the preceding page. The resulting scores represent the potential relative ecological value of specific locations within the CELCP Project Area determined by a spatial statistics algorithm. Each location within the Project Area was evaluated by applying the algorithm within 500 feet x 500 feet grid cells distributed across the entire Project Area. This grid size was selected to balance the size of the input data with ease of processing. By aggregating neighboring individual grid cell values with similar characteristics, the resulting data could more readily be interpreted at the Project Area scale. That is, the individual grid cell aggregation process attempted to identify 'hot-spots' that represent areas of potentially significant conservation value. These areas are shown in 'hotter' colors (e.g., red, orange, yellow) in Figure 2 below. Conversely, areas of 'cold-spots' (depicted in royal blue, aqua blue, green in Figure 2) represent areas that are likely to be of less significant conservation value. To address questions associated with this type of processing, a geo-statistical pattern analysis was employed.

Most statistical tests begin by identifying a null hypothesis. The null hypothesis for the pattern analysis tools is Complete Spatial Randomness (CSR). The Z-scores and P-values returned by these tools tell you whether or not to accept or reject the null hypothesis. Z-scores are simply standard deviations; the P-value is the probability that the observed spatial pattern was created by some random process. When a feature pattern analysis tool yields small P-values and either a very high or a very low Z-score, this indicates it is unlikely that the observed spatial pattern reflects the theoretical random pattern represented by the null hypothesis (CSR). In other words, the results are not random – there is some underlying structure involved.

The ArcGIS Hot Spot Analysis tool calculates the Getis-Ord  $G_i^*$  (pronounced G-i-star) pattern analysis statistic for each feature in the dataset based on its composite scoring value. (NOTE: any scoring values of zero - i.e., areas where no ecological data values were recorded - were eliminated from the subsequent analyses.) The resultant Z-scores (standard deviations) and P-values (probability of random chance) identify where features with either high or low values cluster spatially. The tool works by looking at each feature within the context of neighboring features. To be a statistically significant hot spot, a feature will have a high value and be surrounded by other features with high values as well. For statistically significant positive Z-scores, the larger the Z-score is, the more intense the clustering of high values (hot spots). For statistically significant negative Z-scores, the smaller the Z-score is, the more intense the clustering of low values (cold spots).

There are several ways to assess the neighboring features in the context of the tool. For simplicity, we use the default option, a fixed band distance. This approach uses a moving 'window-of-influence' based on a fixed distance. We began by using the default value (here ~5000 feet), the minimum distance to ensure all values had at least one neighboring feature) and evaluated successively larger values. Larger values were rejected based on the degree of clustering (i.e. larger values accounted for larger areas of clustering which failed to provide the level of granularity project managers required), which was adequately provided by the default.

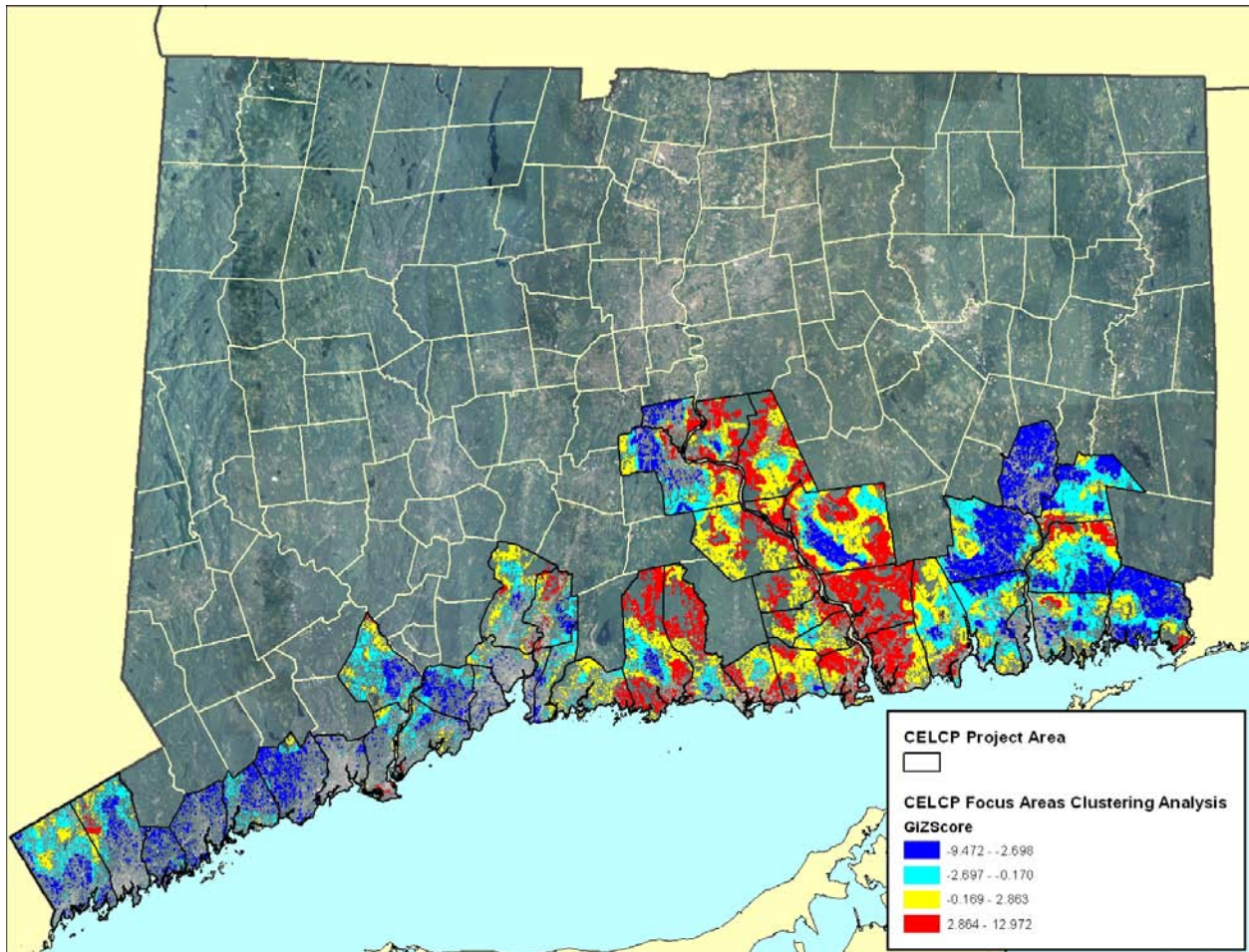
While it is helpful to consider the clustering analysis as a whole, it is more useful to classify the results into discreet 'bins' based on some useful criteria. The ways to classify are often based on subjective values such as "how many bins are useful to my goals" and "is an automated or manual process to set



the bin limits preferred.” In this case it is most useful to describe the focus areas within a 4-bin context; thus representing areas of “High”, “Medium-high” “Medium-low” and “Low” ecological value. Further, using a quartile approach to define the bin levels proved optimal as this process groups the same number of results into each bin. The net effect provides a scheme that breaks the project area into units of equal area (i.e., the items in the each bin represent the value of a grid cell) if all grid cells are distributed in equal number among the bins, thereby effectively segmenting the project area into 25% segments of successively increasing significance.

The clustering analysis provides a base level of data that identifies areas based on their ecological value that can be used to identify areas for targeted land acquisition. It is important to note that while the results of the analysis identify areas of “high” or “low” relative value these data should not be used in isolation make final acquisition decisions. For instance, if a parcel of land is within a “low” zone, it should not be construed to have little or no conservation value. While it may be of less comparative ecological value than other areas, if no alternative acquisition opportunity exists, then the parcel could still represent a viable acquisition opportunity and should be evaluated on its merits. The value of the analysis is that it provides a means to focus limited resources initially in high-value (Gi Z score) areas and to assist in comparative evaluations of multiple properties being evaluated for acquisition.

Figure 1. Clustered Composite Index Scoring Prior to Cluster Smoothing



## 7. Cartographic Output – Smoothed Clustering

While the composite scoring index and clustering analysis results are the most useful tools to evaluate specific areas conservation value, a more cartographically pleasing output was required to help convey the relative high/low ecological values for Connecticut's CELCP Plan. To address this, the clustering output was run through an interpolation algorithm to smooth out the hard breaks between each 'scoring zone' to produce a map that more clearly describes transitions from higher to lower zones of potential conservation interest. An Inverse Distance Weighted (IDW) approach was used on the Gi Z-score values and the resulting grid size was increased to 1000ft x 1000ft. The results were clipped to the CELCP Project Area and areas representing non-viable areas (existing property, already developed lands/grasses) were removed as shown in Figure 3. In order to show each focus areas at a scale that would be more useful from a regional perspective. Focus areas were segmented into four regions as shown in Figure 4 through Figure 7.

## 8. Caveats

The selected 'hot-spot' approach to identifying potential priority conservation zones or 'focus areas' is susceptible to 'edge effects' along on the Project Area boundary where no surrounding data outside the project area exist. Further, results are scale-dependent, based on the size of the grid cell. Smaller or larger cells may have modified results slightly.

Figure 2. Clustered Composite Index Scoring Post Cluster Smoothing

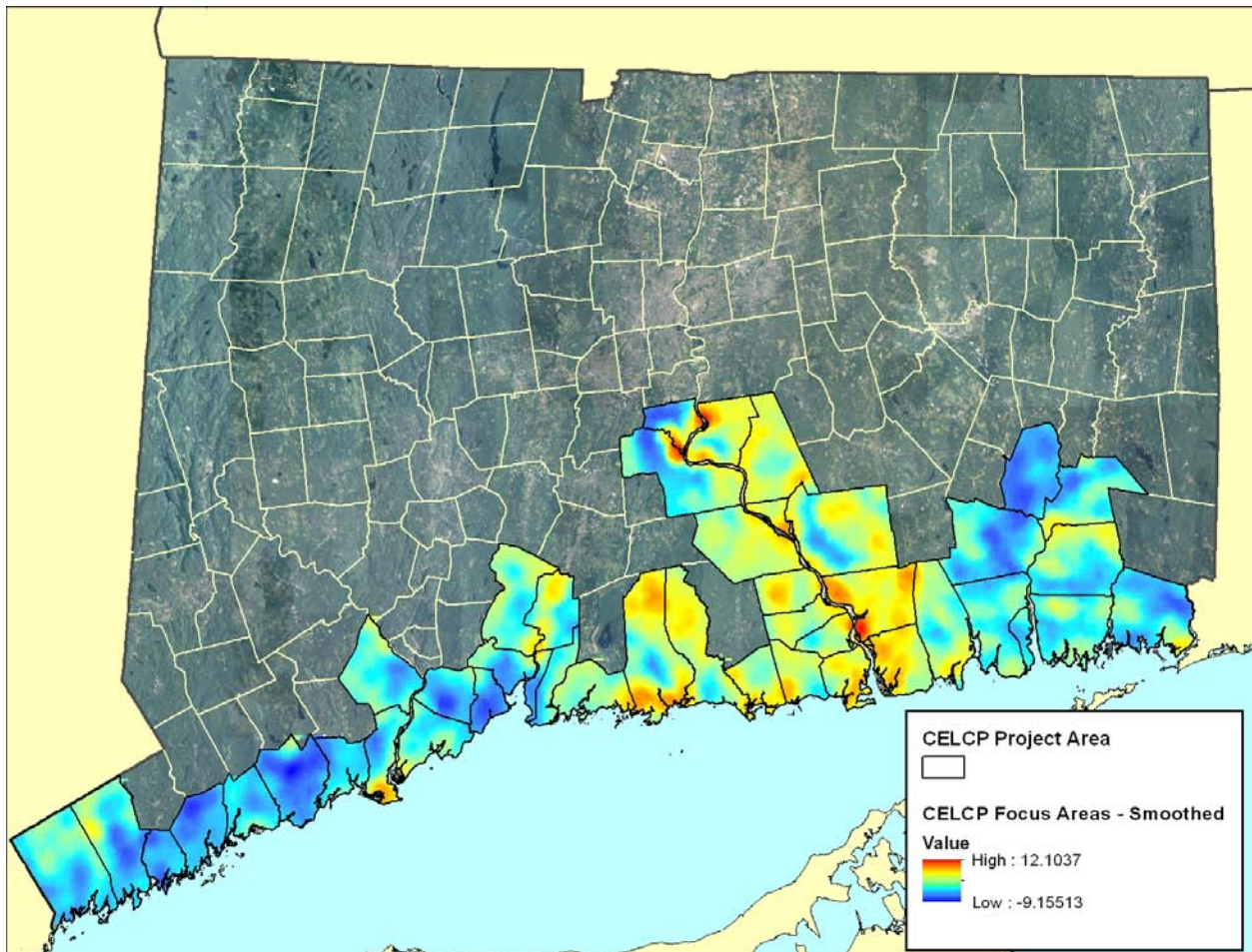


Figure 3. Clustered Composite Index Scoring Post Cluster Smoothing Excluding Developed and Protected Open Space Areas

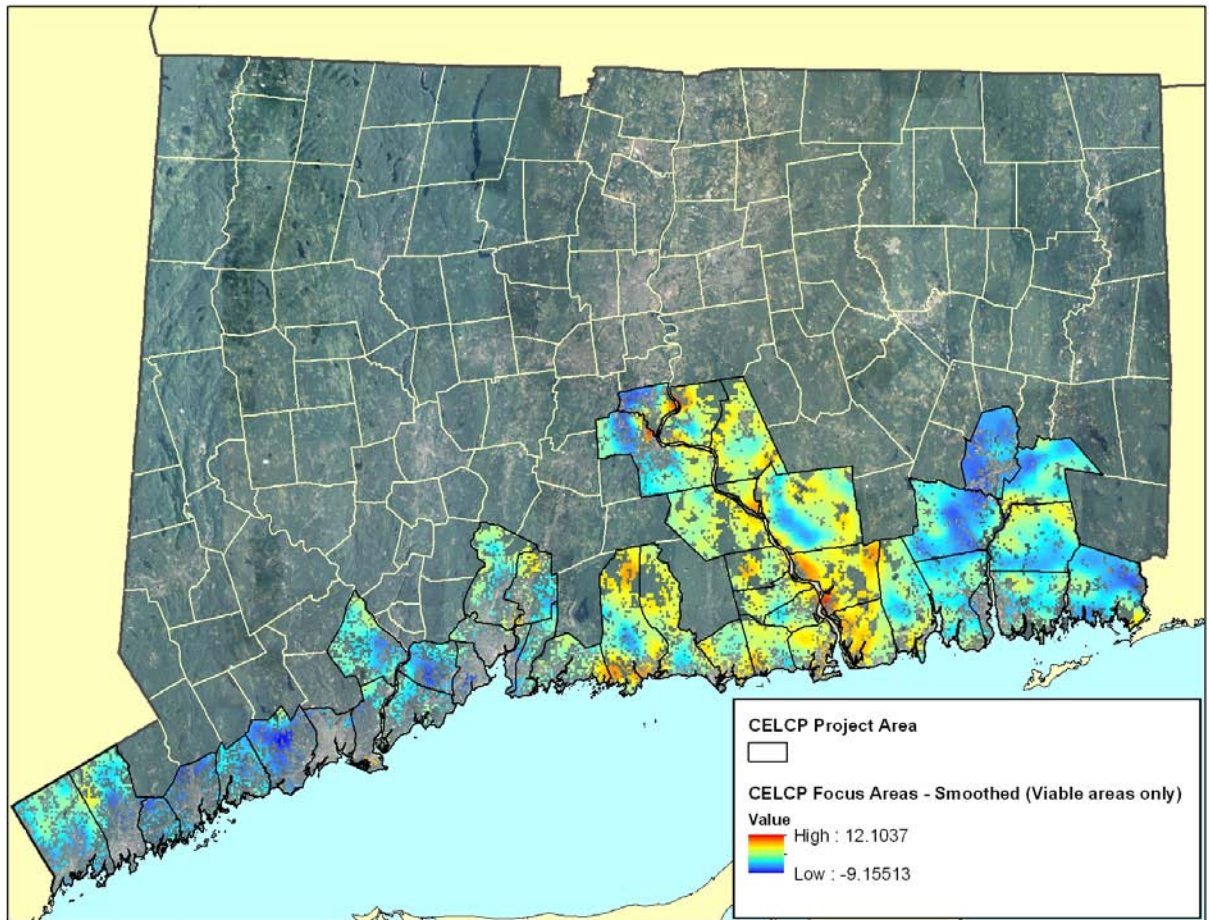


Figure 4. Western Coastal Focus Area

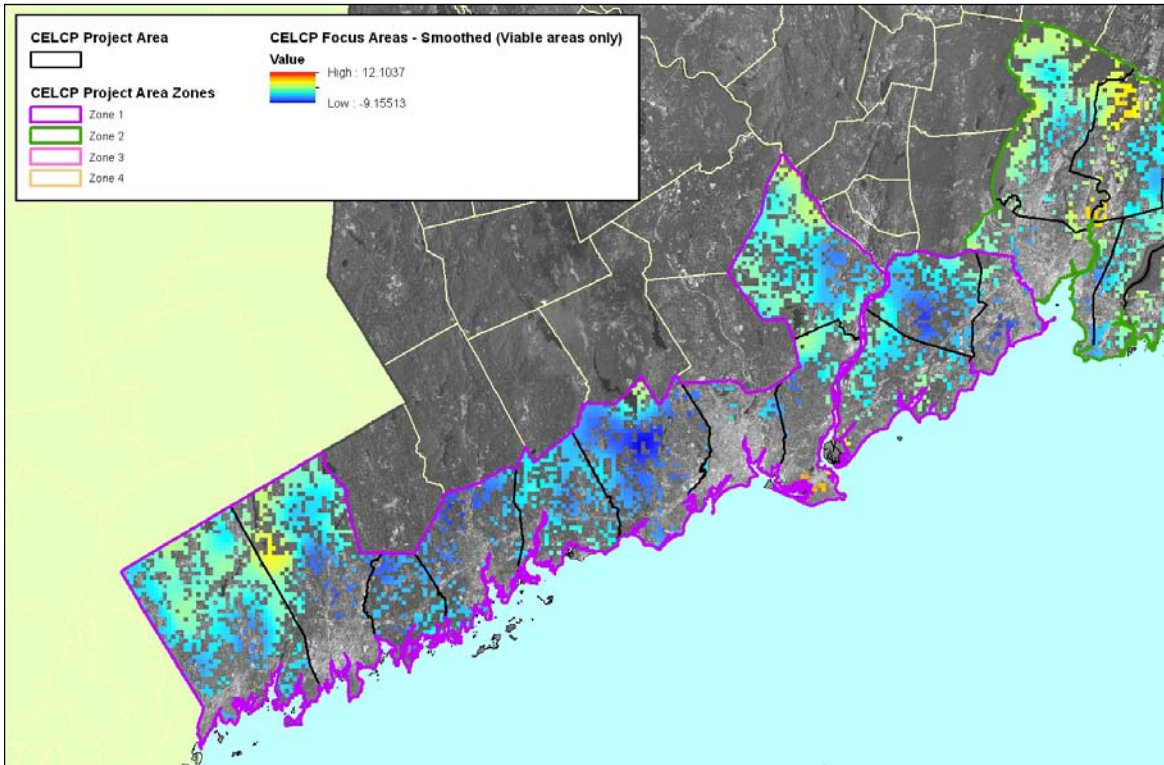


Figure 5. West Central Coastal Focus

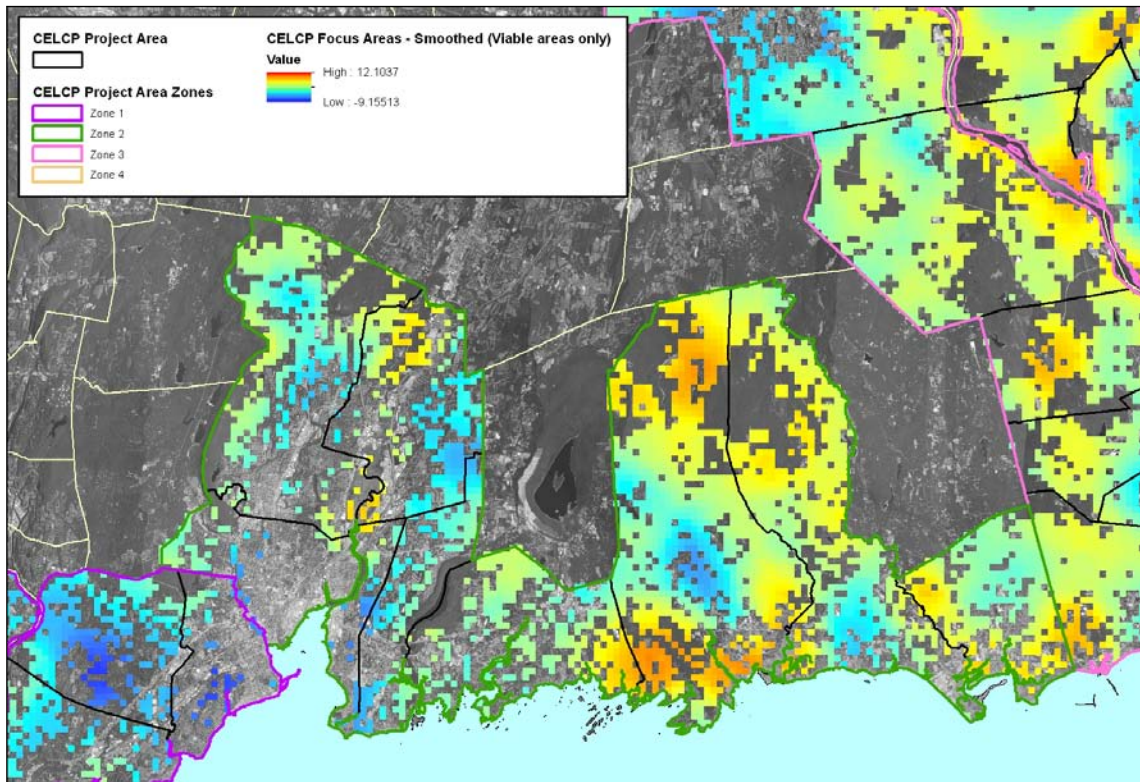


Figure 6. East Central Coastal Focus Area

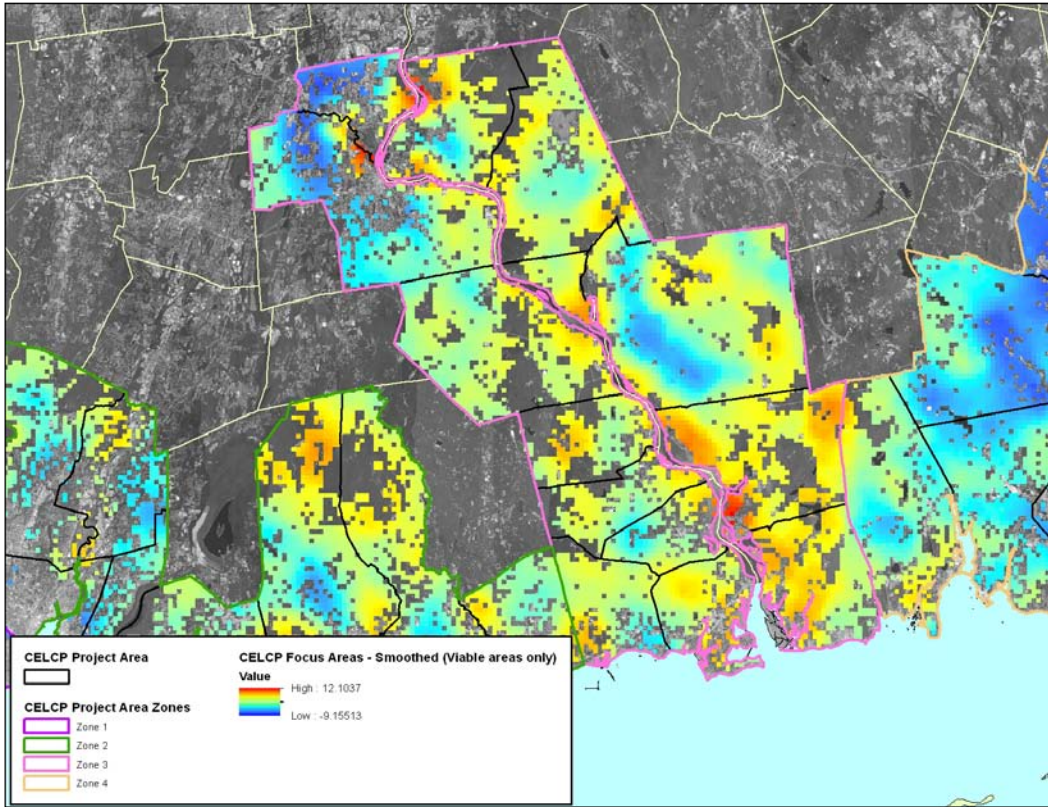


Figure 7. Eastern Coastal Focus Area

