

# Important Bird Area Conservation Plan Greenwich Point Park Greenwich, Connecticut



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## **1.0 INTRODUCTION**

This Important Bird Area Conservation Plan (IBA Plan hereinafter) was developed for Greenwich Point Park (GPP hereinafter) by Eric Davison on behalf of Audubon Connecticut (the state office of the National Audubon Society), the Town of Greenwich, and the Friends of Greenwich Point. The plan was developed in 2013-2014 after a series of field investigations were conducted by the author, and project stakeholders were engaged in a number of informal work sessions to gather information on the park's avian resources and management goals. Conservation planning is a critical component of the Important Bird Area (IBA) program, providing Audubon, landowners, land managers and other stakeholders with a strategic, science-based approach for future conservation and habitat management activities. This plan is not intended to be a comprehensive habitat or recreational management document, but is designed to identify avian resources present on the property, summarize strategies to protect and enhance those resources and outline opportunities to engage the town of Greenwich Conservation Commission and other interested parties in conservation, monitoring and outreach activities. This document can be used to supplement and guide a detailed habitat management plan should one be developed, or, in the case of a recreational management plan, can serve to identify critical avian habitats that might be negatively affected by recreational activities and identify opportunities to enhance bird-associated recreational activities.

## **2.0 IMPORTANT BIRD AREA DESIGNATION**

The National Audubon Society's Important Bird Area Program began in 1995 and is a partnership between Audubon and BirdLife International. The program is part of a global effort to identify sites that are most important for maintaining populations of birds and to focus conservation efforts toward protecting these sites. Important Bird Areas are sites that provide essential habitat for one or more species of birds. IBA's may include public or private lands, and may or may not include areas currently designated as protected land. To qualify as an IBA in Connecticut, sites must satisfy at least one of the following criteria:

- Sites important to species of global concern
- Sites important to species of continental or regional concern
- Sites important to endangered or threatened species in Connecticut
- Sites that contain rare or unique habitat within the state/region or an exceptional representative of a natural habitat, and that hold important species or species assemblages largely restricted to a distinctive habitat type
- Sites where significant numbers of birds concentrate for breeding, during migration, or in winter
- Sites important for long-term research and/or monitoring projects that contribute substantially to ornithology, bird conservation, and/or education

GPP was identified as an IBA due to the following factors:

1. Presence of high concentrations of winter waterfowl;
2. Presence of high concentrations of migratory birds including 500+ waterfowl, 100+ terns, and 500+ shorebirds as well as raptors and neo-tropical songbirds;
3. Presence of significant coastal habitats including tidal wetlands, coastal forest, beaches, dunes and tidal ponds;
4. The site is used as a feeding site for wading birds breeding at nearby Great Captains Island;
5. The site supports state-listed species including wintering owls (Long-eared Owl, Northern Saw-whet Owl), Great Egret, Snowy Egret, American Oystercatcher, Purple Martin, Common Tern and Least Tern, and Brown Thrasher.

### 3.0 PROPERTY STAKEHOLDERS

Table 1 lists the organizations and individuals identified as stakeholders. Greenwich Point Park is owned by the Town of Greenwich and operated by Greenwich's Parks and Recreation Department in coordination with the Conservation Commission. . The Friends of Greenwich Point (FoGP hereinafter) is a not-for-profit stewardship organization that serves in a support capacity to the town providing funding, running educational programs, and carrying out various projects in support of their mission.

*Table 1: Greenwich Point Park stakeholders*

#### Organizations

Town of Greenwich – Conservation Commission  
Town of Greenwich – Department of Parks and Recreation  
Friends of Greenwich Point  
Audubon Connecticut  
CT DEEP Wildlife Division  
Audubon Greenwich  
Connecticut Audubon Society  
Connecticut Ornithological Association  
Greenwich Shellfish Commission  
Bruce Museum

#### Individuals

Joe Zeranski, Jeanne Pici, Pat Roger,  
Shaun Martin, Stefan Martin, Meredith  
Sampson,, Mike Aurelia, Merideth  
Sampson, Cynthia Ehlinger

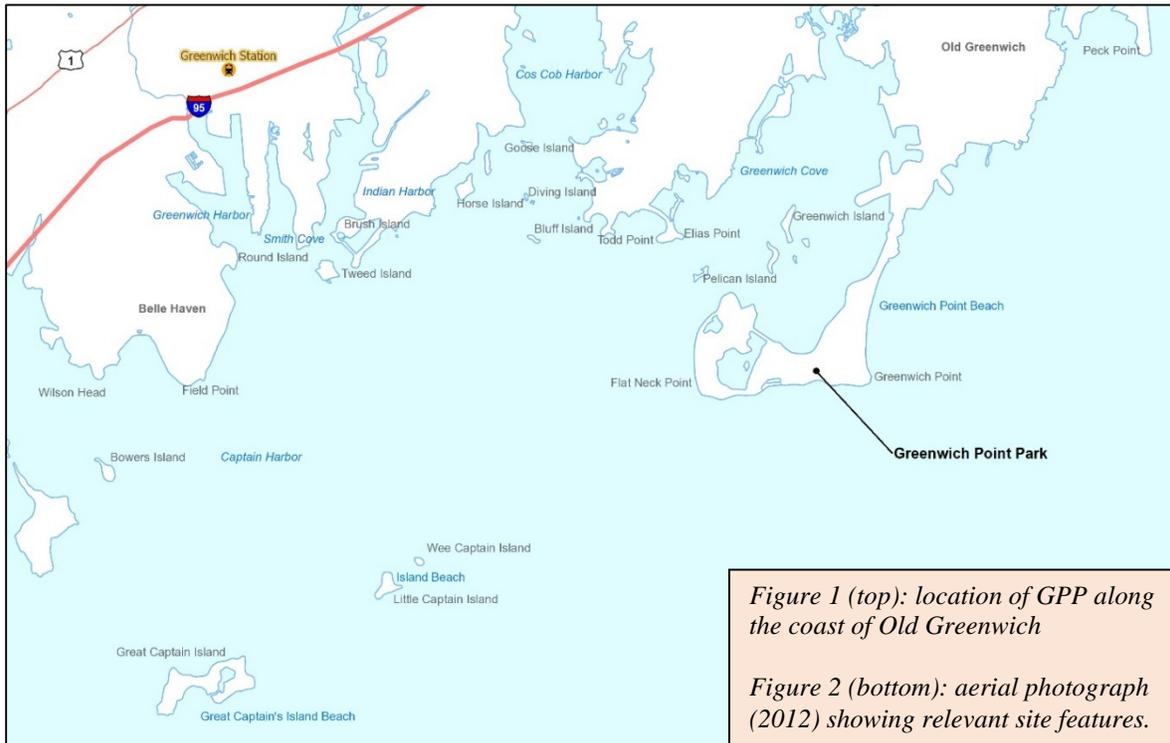


Figure 1 (top): location of GPP along the coast of Old Greenwich

Figure 2 (bottom): aerial photograph (2012) showing relevant site features.



## **4.0 SITE CHARACTERISTICS**

GPP consists of  $\pm$  147 acres of land situated on the southerly side of Greenwich Cove. Greenwich Cove is located between Cos Cob Harbor and Stamford Harbor in the “Old Greenwich” section of town. The park is essentially an island, connected to the mainland by a causeway which supports the park access road known as Tod’s Driftway.

GPP was formerly an estate built in 1884 by J. Kennedy Tod. Mr. Tod built a large estate, multiple accessory buildings, the access road, a private golf course and constructed Eagle Pond from former tidal marsh. The town purchased the property in 1945 and converted it to a municipal park.

### **4.1 COASTAL DYNAMICS**

GPP is a low-lying coastal site subject to dynamic ecosystem processes. Coastal storms bring wind and water onto the shores of GPP, periodically reshaping its shoreline environs. Approximately 76% of the park (112 of the 147 acres) lies within the Federal Emergency Management Agency’s (FEMA) 100-year or AE-floodzone. Only the higher elevations which include the forested knoll northeast of Eagle Pond, the central clambake area and the eastern highlands (around the picnic grounds and parking lot) lie beyond any FEMA-designated floodzone. The outer margins of the park (e.g., beaches, tidal flats) are located within the VE-zone, a portion of the 100-year floodzone that is subject to “additional hazards due to storm-induced velocity wave action” (FEMA, 2014). It is reasonable to assume that in the future coastal flooding will become more severe as a result of sea level rise. Sea level rise is predicted to have negative effects on transitional coastal ecosystems (e.g., tidal marsh, rocky intertidal zone) and the species that rely on such habitats for survival. Recognizing how coastal dynamics affect the park’s ecosystem is critical to the management of the site for the benefit of wildlife.

### **Superstorm Sandy**

Superstorm Sandy struck Connecticut in October of 2012 and was the deadliest and most destructive storm of the 2012 Atlantic hurricane season, as well as the second-costliest storm in United States history. In Greenwich, the high water elevation reached just over 10 feet NAVD88 despite the fact that the highest surge came during low tide. Wave action at Greenwich Point is estimated to have been 2-3 feet higher than this. Storm damage resulting from strong winds, coastal flooding and wave action was significant, resulting in dune blowouts, salt spray induced plant mortality and significant erosion of upland embankments and tidal marshes located along the southern shore. GPP’s infrastructure, including roads, walkways, docks and building also suffered significant damage as detailed in a report prepared by Roberge Associates Coastal Engineers, with the estimated total cost to repair storm damage at \$844,750 for basic infrastructure. Cost of repair to natural areas including dune restoration work and reforestation is not accounted for in this cost estimate. The Town is in the process of developing a coastal resiliency plan for Greenwich Point and its other coastal properties.

### **4.2 EXISTING LAND USE**

Three land use categories are present within the park: (1) Developed (impervious) Areas; (2) Designated Recreation Areas; and (3) Natural Areas. The characteristics of these various land use types are described in the following sections.

## Developed Areas

Developed areas include buildings, roads, parking lots, and maintenance areas including outdoor equipment storage areas. There are currently 25 buildings on the property. There are two road systems present, one paved and one unpaved. The paved road is a loop road that carries patrons from the entrance of the park westerly around Eagle Pond and back to the park entrance. The main thoroughfare is known as Tod's Driftway. The paved road system includes several roads not open to the public. The second road system is unpaved and consists of two service roads. These roadways are open to the public only by foot.

There are seven parking lots in the park, five of which are paved. There are two "service areas" dedicated to maintenance activities. One is located southwest of the southern concession stand and the second is located adjacent to the caretaker's cottage at the west end of the point.

## Designated Recreation Areas

These include areas that support activities such as fishing, hiking, dog walking, swimming, boating, picnicking, and day camp and educational activities. Recreation areas are heavy use areas and include the beaches, clambake area, marina and mooring field, and picnic areas. While some of the areas utilized for recreation (beaches, for example) also provide valuable bird habitat, the habitat value is generally low due to intensive use and the need for manicured vegetation and lawn.

## Natural Areas (a.k.a. Important Bird Habitats)

The term "natural areas" is used here to describe areas of the park that are left predominately in a natural state. Natural areas include areas of native vegetation, whether planted or natural, that are most important to birds and are therefore the focus of this conservation plan. These areas have been categorized as "Important Bird Habitats" and include all of the habitats critical to the park's avian biodiversity (see Figure 3-*Important Bird Habitats* and Table 2). GPP's "Important Bird Habitats" were determined based data provided by stakeholders. Important Bird Habitats include the following types:

1. Non-forested habitats
  - a. Beaches and dunes
  - b. Shrubland
2. Forested Habitats
  - a. Coastal forest (oak-mixed hardwoods)
  - b. Woodlands (immature forest)
  - c. Holly Grove
3. Tidal areas
  - a. Marshes
  - b. Ponds
  - c. Intertidal zone
4. Greenwich Cove
  - a. Offshore islands (Pelican Island and Greenwich Island)
  - b. Nearshore Waters (shallows and exposed tidal flats)

## **Non-Forested Habitats**

Non-forested upland habitats include beaches, dunes, woodland and shrubland. Also included within these areas are planted and naturalized areas including the Holly Grove as well as ecotone or “edge” habitats.

### **Beaches**

Beaches are located predominately along the eastern shore stretching from just north of the entrance booth south to Greenwich Point. There is a second small pocket of beach located at the marina, but this area is currently used for seasonal boat storage.

### **Dunes**

There are four dune areas; three are located along the eastern shore and the fourth is located along the southern shore. The typical dune geomorphology, which includes a dynamic foredune-backdune topology, has been altered at the park as a result of development of the backdune for roads and trails, as well as sand accretion control along the beaches and foredune (Sloss, et. al., 2012).

Restoration efforts have been undertaken on the three dunes along the eastern shore that suffered storm damage (see Figure 3, habitat units 5, 6 and 9). In 2012 dune 9 was re-graded, an artificial geotextile core tube was installed, and the foredune was planted with American beachgrass (*Ammophila breviligulata*).

At dune habitats 5 and 6, the foredune was also planted with American beachgrass to repair damage from Storm Sandy. The work was funded by the Town of Greenwich and the FoGP.

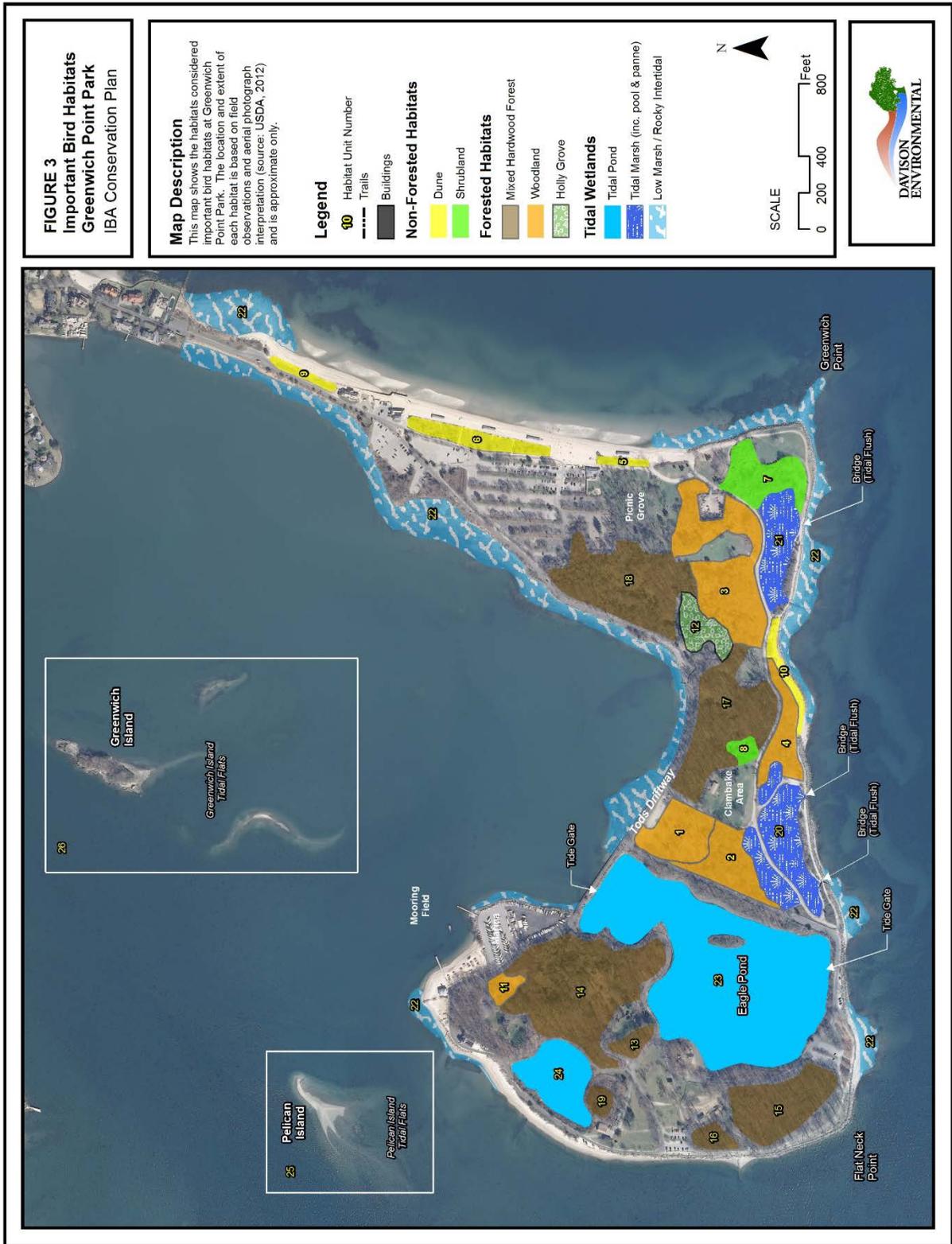
Dune habitat 10, located along the south shore, sustained significant damage during Storm Sandy. The storm surge caused a saucer-type blowout, resulting in a depositional lobe forming in the adjacent tidal marsh system.

### **Shrublands**

Shrublands are habitats that are comprised of shrubs that are generally 1.5 feet or taller, with individuals or clumps overlapping to not touching, and a canopy cover of 25% or less. If trees are present they comprise less than 25% of the canopy cover. Habitat units 7 and 8 are shrublands, both of which are heavily infested with the non-native, invasive porcelain berry (*Ampelopsis brevipedunculata*) and morrow’s honeysuckle (*Lonicera morrowii*). Shrublands at the park provide habitat for nesting Brown Thrasher as well as migrating passerines and raptors.



Photo 1: restored dune planted with American beachgrass.



<b>TABLE 2: Important Bird Habitats (as illustrated on Figure 3)</b>				
Unit	Acres	Habitat Type	Primary Avian Groups Supported	Description
<b>Non-Forested Habitats</b>				
5	0.27	Dune	Migrating and wintering landbirds	Backdune is shrub-small tree dominated. Foredune was planted with beachgrass in 2014
6	1.45	Dune	Migrating and wintering landbirds	Backdune is shrub-small tree dominated. Foredune was planted with beachgrass in 2014
9	0.42	Dune	Migrating and wintering landbirds	Dune was restored (i.e., re-shaped and re-planted) in 2012. Foredune was planted with beachgrass
10	0.65	Dune	Migrating and wintering landbirds	Highly degraded due to blowout during Hurricane Sandy
7	2.41	Shrubland	Migrating and wintering landbirds and raptors	Dense bush honeysuckle-dominated with areas of dense mugwort
8	0.41	Shrubland	Migrating and wintering landbirds and raptors	Dense growth of porcelainberry and bush honeysuckle
<b>Forested Habitats</b>				
1-4	2.33, 2.28, 5.89, 1.73	Woodland	Migrating and wintering landbirds and raptors	Hardwood woodland (oaks, cherry) , recently cleared of invasive undergrowth
11	0.53	Woodland	Migrating and wintering landbirds	Forest edge habitat adjacent to overflow parking
13	0.51	Coastal hardwood forest	Migrating and wintering landbirds and raptors	Coastal forest consisting of mixed hardwoods, dominated by oaks. Tree species include red oak, white oak, black oak, sassafras, black cherry. Forest is uneven-aged with many large sawtimber sized trees.
14	8.27	Coastal hardwood forest	Migrating and wintering landbirds and raptors	
15	3.58	Coastal hardwood forest	Migrating and wintering landbirds and raptors	
16	0.43	Coastal hardwood forest	Migrating and wintering landbirds and raptors	
17	5.23	Coastal hardwood forest	Migrating and wintering landbirds and raptors	
18	5.88	Coastal hardwood forest	Migrating and wintering landbirds and raptors	
19	0.44	Coastal hardwood forest	Migrating and wintering landbirds and raptors	
12	1.33	Holly Grove	Roosting Owls; migrating and wintering landbirds	Mature ornamental American holly grove
<b>Tidal Areas – Marshes, Ponds and Intertidal Zones (habitat units 20-24)</b>				
20	3.99	Tidal marsh	Shorebirds, wading birds, waterfowl	Typical marsh plant community zonation with embedded pools and pannes
21	2.23	Tidal marsh	Shorebirds, wading birds, waterfowl	Typical marsh plant community zonation with embedded pools and pannes
22	18.58	Tidal marsh and rocky intertidal zone	Shorebirds, wading birds, waterfowl	Matrix of predominately low marsh and rocky intertidal areas and mud flats
23	2.85	Eagle Pond and island	Wading birds, waterfowl, winter waterfowl	Tidal pond controlled by two tide gates
24	19.47	Unnamed Pond	Wading birds, waterfowl, winter waterfowl	Tidal pond controlled by single tide gate
<b>Islands - Greenwich Cove (habitat units 25-26)</b>				
25	N/A	Pelican Island	Shorebirds and wading birds; irregular nesting by oystercatcher and terns	Sand dominated island with bordering flats. Former tern and oystercatcher nesting area
26	N/A	Greenwich Island	Shorebirds and wading birds; irregular nesting by oystercatcher and terns	Bedrock island with hardwood trees, bordering beach and tidal flats

### Woodlands

“Woodlands” are defined as open stands of trees with crowns that generally do not touch, forming a canopy cover of 25-60%. Woodland habitats occupy habitat units 1, 2, 3, 4 and 11. Due to the open canopy, these areas often have a dense shrubby understory unless the understory growth is controlled, as is the case in habitat unit 1 and 2. In many areas, the dominant understory is the invasive bush honeysuckle. Woodlands provide habitat for the nesting Brown Thrasher as well as migratory passerines and raptors.

### Gardens and Groves

Gardens and groves are areas designated for cultivated plants and specimen trees. Their purpose is aesthetic rather than habitat for native species, although these areas do support native flora and fauna. Existing areas include the Seaside Garden, Butterfly Garden, Friends of Greenwich Point Garden and Holly Grove. While the garden areas can be expected to support some migratory bird use, only the Holly Grove was mapped as an important bird habitat due its frequent use by wintering owls.

### Coastal Forest

Coastal forests are those forests that border on salt marshes or intertidal zones. They are dominated by deciduous trees, predominately white oak (*Quercus alba*), red oak (*Quercus rubra*), black oak (*Quercus velutina*), sassafras (*Sassafras albidum*) and black cherry (*Prunus serotina*). Greenbriar (*Smilax rotundifolia*) is common, and the invasive non-native Morrow’s honeysuckle (*Lonicera morrowii*) and burning bush (*Euonymus alatus*) dominates the understory at the sunnier forest edge and at tree throws, clearings or other canopy openings. Coastal forests are subject to impacts from wind and salt spray associated with coastal storms. Rising sea levels are resulting in soil erosion and the gradual loss of the seaward edge of coastal forests (Hammerson, 2004). Coastal forests provide important migratory habitat for songbirds, particularly a large diversity and density of spring warblers.



Photo 2: coastal forest bordering western shorelands.

### Tidal Areas – Marshes, Ponds and Rocky Intertidal Flats

Tidally influenced habitats include tidal marshes, two tidal ponds, and the intertidal zone situated between mean high water (MHW) and mean low water (MLW). From a regulatory perspective, tidal wetlands are those wetland areas that lie at or below elevation 5.5 feet Above Sea Level (ASL)<sup>1</sup>.

<sup>1</sup> Coastal Jurisdictional Line Elevations, CT DEEP, Office of Long Island Sound Programs

Habitat units 20 and 21 constitute tidal marsh habitats. These habitats include high marsh and low marsh plant communities interspersed with open water pools and pannes. High marsh areas are dominated by saltmeadow cordgrass (*Spartina patens*). Low marsh areas are dominated by smooth cordgrass (*Spartina alterniflora*). Both habitat units 20 and 21 lie landward of the southern shoreline but are connected to Long Island Sound via a narrow channel that breaks the armored shoreline.

Tidal ponds include Eagle Pond and a second unnamed pond in the northwest corner of the park. The hydrology of Eagle Pond is controlled via two tide gates, one at the northern end of the pond and one at the southern end. The gates are set at an elevation that allows for full water volume turnover in three to four tidal cycles. The gates remain partially open even at low tide. As a result, estuarine species such as striped bass (*Morone saxatilis*) are often found in Eagle Pond.

Intertidal zones not dominated by salt marsh are comprised of un-vegetated rocky and sandy flats. These habitats are critical to shorebirds such as sandpipers and other probing shorebirds that feed on invertebrates during low tide.



Photo 3: tidal marsh area with tidal creek, low/high marsh, and upland border dominated by high-tide bush (*Iva frutescens*).

### **Offshore Islands – Greenwich Cove**

Greenwich Cove is a navigable and NOAA charted harbor (nautical chart #12367) that is heavily used by day boaters as well as those seeking an overnight anchorage while traveling through Long Island Sound. The harbor contains two islands, Greenwich Island and Pelican Island (a.k.a. Sand Island). The harbor contains a mooring field managed by the Town at the Old Greenwich Yacht Club located at the northeastern point of GPP.

The entirety of Greenwich Cove is a Managed Recreational Shellfish Bed (known as the “Cos Cob and Greenwich Cove Shellfish Bed”), managed for oysters and hard clams, administered by the State Department of Agriculture, Bureau of Aquaculture.

Pelican Island and Greenwich Island are bordered by broad tidal flats. Pelican Island is un-vegetated and composed primarily of shifting sands with a small bedrock outcropping anchoring the southern end of the island. The geographic extend of the island shifts as a result of erosion and accretion. Greenwich Island is more substantial and includes a pronounced wooded bedrock outcropping. The Cove and islands support American Oystercatcher during the breeding season; a Least Tern colony nested historically on Pelican Island. The shallows around the islands provide a foraging site for wading birds while the tree canopy of Greenwich Island offers roosting habitat.

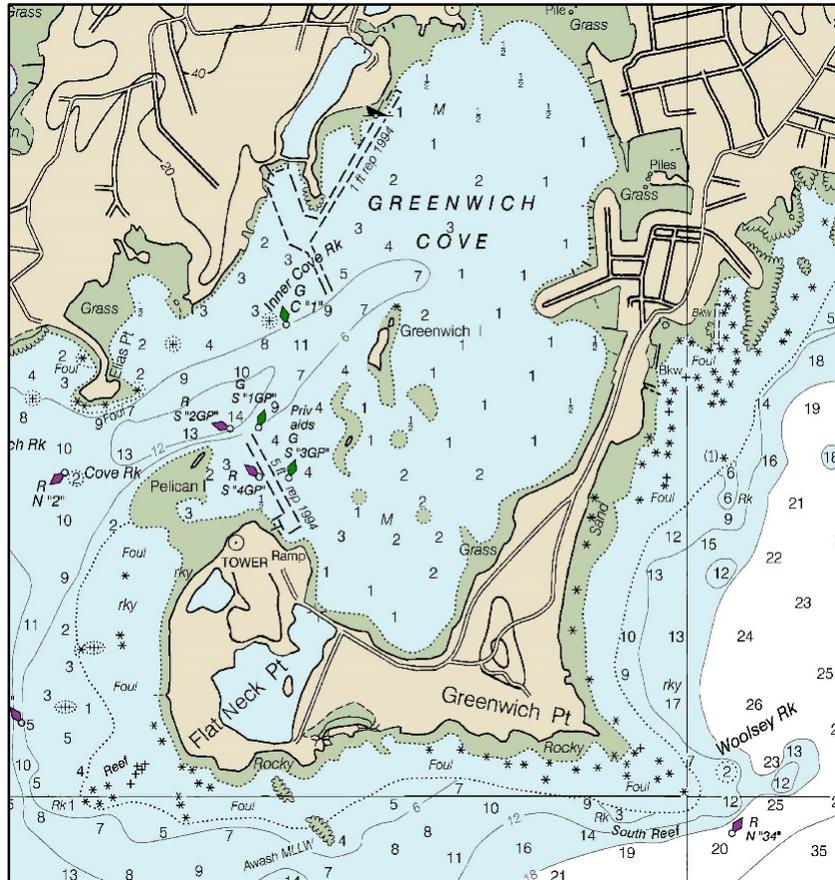


Figure 4: NOAA Nautical Chart for Greenwich Cove, showing the location of Pelican and Greenwich Islands as well as water depths and tidal flats.

### 4.3 ABIOTIC FEATURES

#### Topography

Topography ranges from sea level to a maximum elevation of  $\pm 40$  feet Above Sea Level (ASL). The majority of the park lies within 10-20 foot ASL, with three pronounced knolls rising above the surrounding landscape, in the western, central and eastern portions of the park.

#### Geology and Soils

Surficial material consists of Glacial Moraine deposits of sandy till, sand and gravel and dense surface boulders. Bedrock material consists of gneiss, a metamorphic rock consisting mainly of feldspar, quartz and mica. Soils consist of glacial till (unstratified sand, silt and rock) derived soils of the Canton and Charlton complex and glaciofluvial (stratified sand and gravel) derived soils of the Ninigret and Tisbury

complex, the Hinckley series, the Agawam series and beaches-Udipsammets. Anthropogenic (disturbed or altered) soils are common throughout the park; these soils are classified as Udorthents. Wetland soil types consist of the Westbrook series, a peat soil (organic) that develops in tidal wetlands.

## 5.0 AVIAN SPECIES INFORMATION

A significant diversity of birds have been recorded at the park totaling 295 species to date, 29 of which are accidental or historic species. A comprehensive species list has been developed and maintained by Joe Zeranski, a long time birder at GPP (see Figure 5). Bird diversity and abundance is most notable during spring and fall migration. During the summer months the diversity of nesting birds is relatively low due to limited habitat as well as disturbance from intensive recreation.

The park's coastal locale makes it prime habitat for waterbirds. The varied aquatic habitats, from tidal ponds to tidal marshes and a broad intertidal zone attract a variety of long-legged waders, shorebirds, waterfowl and other waterbirds. Wading birds including Great and Snowy Egret, Green Heron, Black-crowned Night-heron and Great Blue Heron forage at GPP and roost at Eagle Pond. The heron and egret rookeries at nearby Great Captain's Island use GPP as a feeding site. Eagle Pond Island is a nesting site for Osprey and the pond's shallows attract a variety of waterfowl during migration and in winter including rarities such as Lesser Scaup, Ruddy Duck and Northern Pintail (Devine and Smith, 1996).

The park's peninsular geography juts out into Long Island Sound around Greenwich Cove, making it an ideal stopover habitat for migrating birds. Migratory songbirds favor the mature coastal oak forest and protected shrublands in spring and fall. The coastal forest and thickets along the park's western shore near Seaside Garden and the cow barn are a noted migratory songbird fallout point. Shorebirds including sandpipers, turnstones, plovers, yellowlegs and others can be found feeding in the intertidal zones around the point as well as the flats surrounding Greenwich Island and Pelican Island. Fall hawk watch surveys regularly record Osprey, buteos, American Kestrel, Sharp-shinned Hawk, Merlin, Peregrine Falcon, Cooper's Hawk and occasionally Bald Eagle (Devine and Smith, 1996).

During the winter, rarities are often observed. Waterfowl utilize the protected tidal ponds that often remain ice-free, and wintering owls are often found in the Holly Grove.



*Photo 4: Winter roosting Long-eared Owl in the Holly Grove.*



## 5.1 State-listed Bird Species

A number of state-listed species can be found at GPP, particularly during migration and winter. During the fall migration state-listed raptors commonly observed include the endangered Sharp-shinned Hawk and threatened American Kestrel, Peregrine Falcon and Bald Eagle. Foraging wading birds commonly found in the nearshore waters, tidal ponds and marshes of GPP include the threatened Great Egret and Snowy Egret and occasionally the special concern Glossy Ibis in spring. State-listed grassland birds considered uncommon or rare during spring and fall include Savannah Sparrow, Grasshopper Sparrow and Eastern Meadowlark. Waterfowl include the special concern Common Loon considered fairly common in spring and fall and the Pied-billed Grebe considered rare during spring and fall (see Figure 5).

State-listed owl species recorded include the endangered Long-eared Owl and the special concern Northern Saw-whet Owl which are occasional in spring, fall and winter and the Short-eared Owl which is rare in the spring, fall and winter.

State-listed species that nest (now or in the recent past) within or immediately adjacent to GPP include the Common Tern, Least Tern, American Oystercatcher, Purple Martin and Brown Thrasher. The State Department of Energy and Environmental Protection (CT DEEP) monitors Pelican Island and Greenwich Island for nesting by the special concern Common Tern (*Sterna hirundo*), the threatened Least Tern (*Sternula antillarum*) and the threatened American Oystercatcher (*Haematopus palliatus*). Nesting surveys are conducted every three years. Available nesting survey records were provided by CT DEEP from 1989 to 2007 and are summarized in Table 3. Results show a precipitous decline and subsequent loss of the Least Tern nesting colony following erosion caused by the nor'easter in December of 1992. Records for American Oystercatcher and Common Tern show infrequent nesting by a small number of birds throughout the survey period.

### Common Tern (*Sterna hirundo*)

The common tern is a migratory species, wintering in the southern U.S. and South America. Large groups gather in the late summer, staging for migration. The common tern is a colonial nester. Nesting occurs on offshore islands or mainland beaches. Nests are placed on the ground in sandy, gravelly, rocky or sparsely vegetated habitats. Nesting occurred historically in coastal salt marshes.

### Least Tern (*Sternula antillarum*)

The least tern is a migratory species present from mid-spring through summer. Least tern flock during the late summer, staging for migration. Nesting occurs on open sandy portions of upper beaches. The least tern is strictly a coastal bird; never found far from salt water. Unlike other tern species in Connecticut, the least tern tends to select mainland nesting sites as opposed to offshore islands. The least tern tends to nest in small colonies. Least tern typically use beaches that are washed over by winter storms, which maintain open sandy conditions. Adults forage primarily in nearshore waters of Long Island Sound.

### American Oystercatcher (*Haematopus palliatus*)

The American oystercatcher nests on the sandy-gravelly portions of upper beaches where vegetation is sparse. Some nests have been recorded in salt marshes. The oystercatcher forages on shellfish and other marine invertebrates in nearshore waters.

Table 3: Adult / Nest Survey Results, GPP Offshore Islands, 1989-2007 (CT DEEP Wildlife Division)

Year	Common Tern		Least Tern		American Oystercatcher	
	Adults	Total Nest	Adults	Total Nest	Adults	Total Nest
1989	0	0	200	87	0	0
1992	20	10	120	60	0	0
1995	1	0	36	18	0	0
2001	0	0	2	1	2	1
2004	0	0	0	0	0	0
2007	0	0	0	0	0	0
<i>No recent survey data from the CT DEEP is available, so present nesting activity is not known</i>						

### Purple Martin (*Progne subis*)

The Purple Martin is a state threatened species that regularly nests at GPP’s two managed nesting stations located at the Gate House and the Clambake Area. Nests are monitored weekly during the breeding season. During 2014, a total of 36 nesting gourds (24 at the Gate House and 12 at the Clambake Area) resulted in 14 fledglings, all of which were banded.

### Brown Thrasher (*Toxostoma rufum*)

The Brown Thrasher is a state-listed species of special concern that inhabits thickets, shrublands and old fields. A small population (n = <5) of nesting Brown Thrasher has been present in recent years (nests confirmed in 2012, 2013 and 2014) in both the northwest corner of the park (vicinity of the Cow Barn and Chimes Building) and in the eastern portion of the park (west and south of the main concession building).

## 6.0 NON-AVIAN SPECIES

Two notable non-avian species were identified as inhabitants of GPP, the Northern Diamondback Terrapin (*Malaclemys t. terrapin*) and the Horseshoe Crab (*Limulus polyphemus*). The Terrapin is a denizen of tidal creeks and estuaries, nesting on nearby beaches just above the high tide line. The species is known to occur in the Town of Greenwich (Klemens, 1993). There have been recent sightings of Terrapin at the point, although no confirmed records (i.e., photograph or shell).

Horseshoe Crab spawn on sandy or gravelly beaches in May and June, often during a spring tide (Hammerson 2004). The eggs of horseshoe crab are highly prized by birds and are an important food source for spring migrating shorebirds. Irregular surveys of Horseshoe Crab breeding have been conducted since 2000, initially in conjunction with surveys by the Connecticut Department of Environmental Protection (now CT DEEP) and subsequently with Sacred Hart University as part of Project Limulus. Of regional concern is the harvesting of crabs for use as bait in commercial fisheries. Harvesting has been observed at GPP and the Town has raised their concerns of overharvesting to the CT DEEP.

Other notable non-avian wildlife are the various shellfish that inhabit the nearshore waters around GPP. Active shellfish harvesting beds controlled by the Greenwich Shellfish Commission support hard clams, soft clams and oysters. Greenwich Cove contains recreational beds open on a seasonal basis. The nearshore waters along the southern shore are open year round for harvesting.

## 7.0 CONSERVATION THREATS

Miradi software (version 4.1.3) was used as an organizational tool to identify conservation targets, conservation threats, and strategies to minimize threats to conservation targets. Miradi is a project management program designed for conservation planning. It allows the user to better understand whether strategies identified would be effective based on whether they are ethically or technically feasible.

Three primary threats to birds and habitats that are critical to birds have been identified, these are:

1. Human disturbance (resulting in habitat avoidance);
2. Loss or degradation of coastal habitat
3. Invasive species infestation and loss of native plant diversity

These three primary threats (and contributing “sub-threats”) are discussed in detail in the following sections and illustrated in Figure 6:

### 7.1 *Human Disturbance*

Everyday seemingly benign recreational activities such as hiking, biking, sun-bathing or dog-walking, when they occur in areas of high biodiversity, can disturb wildlife and negatively affect their health and behavior. Human activities can alter a bird’s ability to exploit important resources such as food, cover, nesting or roosting sites. Humans can also unintentionally attract and support species which prey on birds, their eggs or their young. Human activities can affect bird distributions by altering short-term movements or in areas of intensive human activity, the result is often avoidance of the habitat entirely. Human activity has also been shown to alter bird behavior by triggering the flight response (frequent flushing), altering incubation patterns and disrupting feeding patterns.

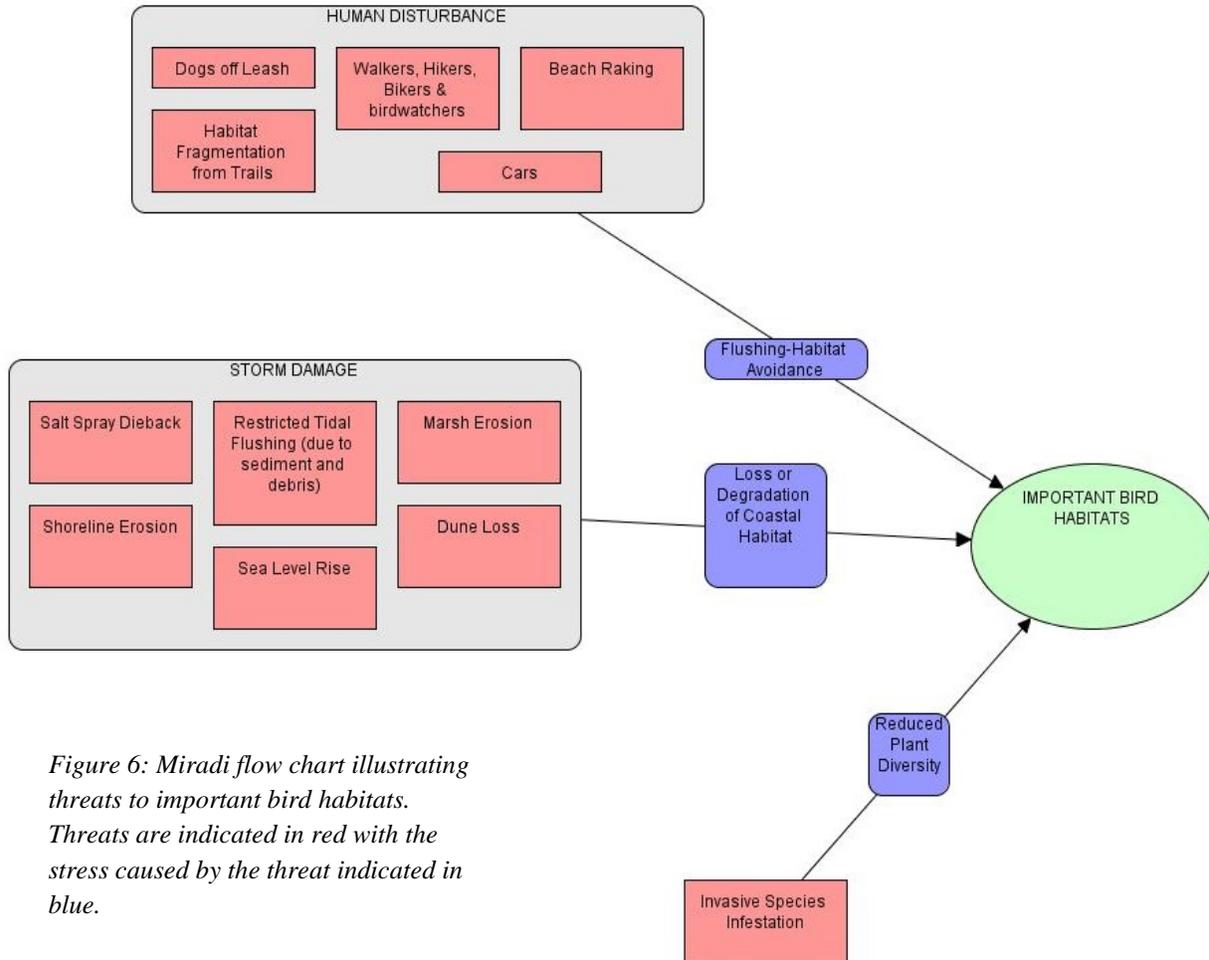


Figure 6: Miradi flow chart illustrating threats to important bird habitats. Threats are indicated in red with the stress caused by the threat indicated in blue.

Human disturbance to birds is a significant concern at GPP due to high-intensity recreational use. The park receives a high volume of visitors in nearly every season in cars, on bikes and on foot, and many with dogs. Park visitors have access to nearly every portion of the park, and no bird habitat is more than 200 feet from a road, trail or picnic area. In the summer, beachgoers reduce available habitat for shorebirds and wading birds on beaches and in nearshore waters. Frequent beach raking during the summer months reduces feeding opportunities for shorebirds. Hikers and dog-walkers (leashed dogs are allowed into parks from December 1st through March 31st) penetrate into sensitive habitats, flushing roosting and feeding birds. In winter, roosting owls are often flushed from protective cover in habitats like the Holly Grove. Such stressors, during the winter when energy stores are low, can have a significant negative impact on a bird’s health.

## 7.2 Loss or Degradation of Coastal Habitat

Loss and degradation of unique coastal habitats, including coastal forest and tidal marshes, is ongoing at GPP. Habitat damage from storms is an unavoidable impact at GPP due to its coastal exposure. In a natural coastal ecosystem, flooding, wind and wave action maintain a highly dynamic environment in which sand erodes and accretes, beaches and dunes shift, and coastal vegetation zonation develops in response to these

dynamic conditions. However at GPP, these natural ecosystem processes need to be controlled due to the presence of significant infrastructure (roads, buildings) within storm damage prone areas. Storm damage generally results in three deleterious effects to coastal forest and tidal wetlands:

1. Erosion of shoreline and marshes;
2. Sand deposition and accretion in tidal marshes and
3. Vegetation dieback from salt spray.

Erosion from wave action and flooding during coastal storms is prevalent at GPP, and it is reasonable to assume that such impact will be exacerbated in the future as a result of sea level rise. Erosion is most severe along the highly exposed southern shoreline between Flat Neck Point and Greenwich Point. Storms have caused dune blowout (habitat unit 10) and deposition of sand into sensitive tidal marshes (habitat units 20 & 21), bank erosion (shearing and down-cutting, see photo 5), and erosion and fragmentation of tidal marsh (see photos 6-7) along GPP's southern shore. Stone armoring has been installed along much of the southern shoreline to prevent additional erosion (see photos 8). The use of structural armoring converts vegetated or natural substrates to hardscaping and alters the natural shoreline topography, ultimately degrading the habitat. Tidal marshes (habitat units 20 & 21) now lie along the north side of this embankment, connected to the Sound only by a narrow constricted channel. This results in significant deposition of sand and a periodic constriction in tidal flushing when storm deposited debris accumulates.

The impact of salt spray on plant health is a major driving force in the zonation of salt tolerant plants in salt spray-prone areas. Salt spray from high winds results in foliar accumulations of salt on coastal plants. Sub-lethal effects of salt spray include a reduction in photosynthesis and reduced leaf growth and necrosis, and high levels of salts are lethal to plants (Griffiths and Orians, 2003). Major coastal storms such as Hurricane Sandy, have resulted in significant dieback of vegetation, in some cases well above the typical salt spray zone. The development of the park and control of natural ecosystem processes that determine coastal plant community zonation has exacerbated the problem, resulting in salt-intolerant plants becoming established or planted in the salt-spray zone.

### **7.3 Invasive Species Infestation & Loss of Native Plant Diversity**

Non-native invasive species are widespread at GPP. This is not atypical, as coastal and urban habitat islands in Fairfield County are generally heavily infested with invasive plants. The mere presence of invasive plants does not negatively impact wildlife habitat. While they usurp native species, they can often serve as a food source for native birds and from a structural perspective, they can offer cover and nesting habitat comparable to native plants. However, there is a tipping point wherein an overabundance of invasives reduces plant diversity to the point that monocultures develop, resulting in a reduction in total food sources and decreased vegetative structural diversity, ultimately resulting in reduced habitat quality. Furthermore, research has documented that species of *Lepidoptera* (i.e., butterflies and moths) are less common in invasive-rich habitats (due to the presence of limited host plants), and butterfly and moth larvae are a significant food source for birds. Complete control of invasives at GPP would be both unproductive and financial non-viable. However, control of invasive plants in order to avoid the development of monocultures and maintain overall plant diversity is warranted.

Invasive plants present include porcelainberry (*Ampelopsis brevipedunculata*), morrow's honeysuckle (*Lonicera morrowii*), autumn olive (*Elaeagnus umbellata*), tree-of-heaven (*Ailanthus altissima*), Asiatic bittersweet (*Celastrus orbiculatus*), common reed (*Phragmites australis*), garlic mustard (*Alliaria petiolata*), mugwort (*Artemisia vulgaris*), rugosa rose (*Rosa rugosa*) and mile-a-minute vine (*Polygonum perfoliatum*). Three of the most prevalent and impactful invasive species are porcelainberry, morrow's honeysuckle and mugwort. Porcelainberry is a vine that forms dense tangles that can smother shrubs and trees, and can ultimately establish a monoculture thicket, as is the case in habitat unit 8 (see photo 9).



Photos 5-8 (clockwise from top left) illustrate storm damage along GPP's southern shore: (5) bank erosion at edge of coastal forest habitat; (6-7) erosion and die-back of tidal marsh along the southern shore showing exposed Westbrook peat dislodged from the substrate; (8) bank armoring to prevent erosion along the southern shore looking east at Greenwich Point.

Bush honeysuckle is a shrub plant that also forms dense monocultures in un-forested habitats, resulting in low structural diversity. This has occurred in habitat unit 7 (see photo 10). Mugwort is an herbaceous species that grows in early-successional meadows and old fields, and often replaces native goldenrods. This species is also prevalent in habitat unit 7 (see photo 11).

Invasive species are most prevalent in the early-successional habitats. These include the woodland and shrubland habitat units 1, 2, 3, 4, 7, 8 and 11 illustrated in green and orange on Figure 3. The Parks Department, in coordination with the Conservation Commission, has been conducting ongoing invasive species control at GPP. Recent work has focused on the woodlands adjacent to the clambake area (habitat units 1 and 2) where a dense understory comprised predominately of bush honeysuckle is present. Measures employed include removal of the invasive understory while leaving the native tree canopy that includes black cherry and sassafras, intact. Following invasive removal, the area beneath the existing overstory is re-planted, and the area is mowed until canopy closure occurs in order to prevent re-establishment of invasives. This process is being conducted in phases to limit disruptions to native wildlife.



*Photos 9-11 (clockwise from top left) illustrate early-successional habitats heavily infested with non-native invasive plant species: (9) porcelainberry smothering shrubs and trees in habitat unit 8; (10) Morrow's honeysuckle dominates the understory in many areas of woodland; (11) mugwort forms a dense monoculture within the herbaceous layer of habitat unit 7.*



## 8.0 CONSERVATION GOALS and ACTION PLAN

The following vision statement was developed to summarize the park’s value for birds and the principal conservation goals:

*VISION STATEMENT*

*“Greenwich Point Park offers a diversity of habitats that are important to a variety of bird species throughout the year. Migrating songbirds have opportunities to forage and rest within coastal forests, shrublands, and woodlands, while long-legged waders and shorebirds take advantage of tidal marshes, beaches and ponds. Raptors pass through GPP in fall, and waterfowl concentrate in winter. To ensure Greenwich Point Park continues to be valuable to birds into the future, maintaining high quality habitat and reducing disturbance particularly to roosting and foraging birds needs to be an important component of park management.*

Conservation goals for GPP are aimed at mitigating threats to birds and important bird habitats outlined in Section 7.0. Goals fall into two categories:

1. Reduce bird disturbance in sensitive habitats;
2. Enhance habitat diversity and quality.

Table 4 summarizes these conservation goals and identifies actions necessary to achieve these goals. Appendix Figure 1 shows the Miradi flow chart illustrating the threats conceptual model from Figure 6 with the contributing factors and mitigation strategies also shown.

*Table 4: Conservation goals and actions necessary to achieve those goals*

<b>GOAL</b>	<b>ACTION - MEASURES NECESSARY TO MITIGATE IMPACT</b>
<b>REDUCE BIRD DISTURBANCE IN SENSITIVE HABITATS</b>	Designate portions of GPP as a “Wildlife Conservation Area”. The use and management of these areas should be dedicated to wildlife with recreational uses limited to passive activities that do not disrupt wildlife.
	Consider using permanent or temporary (seasonal) fencing to restrict access to sensitive habitats.
	Educate the public as to how common recreational activities might disrupt wildlife. Guidance should be provided on the appropriate encroachment distance to feeding or nesting birds.
	Determine whether off-leash dogs are significantly impacting habitat use. If so, work with law enforcement to enforce local leash laws and develop educational signage and brochures for park visitors.
	Reduce the frequency of beach raking to improve feeding opportunities for shorebirds. This is particularly important during the peak of fall migration in August-September.
	Close redundant trails or redirect trails to reduce fragmentation and increase the size of core habitats.

GOAL	ACTION - MEASURES NECESSARY TO MITIGATE IMPACT
ENHANCE HABITAT DIVERSITY AND QUALITY	Develop a detailed habitat management plan for the Important Bird Habitats identified on Figure 3.
	Map and monitor the full extent of invasive species.
	Control invasive species within important bird habitats. Focus control efforts on eliminating invasive monocultures. Pre-control assessments should be conducted to insure work will not impact species such as nesting Brown Thrasher or winter roosting owls.
	Form a volunteer invasive species management labor force to assist the Parks Department in control efforts.
	Adjust the tide gates at Eagle Pond to allow for a lower flow condition during the spring and fall migration period. This will create shallows and exposed flats that will increase feeding opportunities for shorebirds and wading birds.
	Improve coastal resiliency by restoring and maintaining storm damaged areas: <ul style="list-style-type: none"> <li>• Continue to employ previously successful dune restoration measures;</li> <li>• Restore degraded salt marsh along the southern shore;</li> <li>• Control erosion using “green” infrastructure (plantings vs. stone armoring);</li> <li>• Utilize shoreline armoring only when velocity necessitates;</li> <li>• Develop artificial reefs in nearshore waters to reduce erosion from wave action</li> <li>• Identify a salt-spray impact zone with any new plantings in this zone required to be salt-tolerant.</li> </ul>
	Establish new “Bird and insect Gardens” or enhance existing gardens to increase bird feeding opportunities
	Identify funding sources for habitat restoration and management

## 8.1 Reducing Bird Disturbance in Important Bird Habitats

1. Designate portions of the park as a Wildlife Conservation Area: Protection of GPP’s important bird habitats would be aided by designating some of these habitats as a Wildlife Conservation Area. Designating areas specifically for wildlife will: (1) focus the outcome of management and policy decisions on what is best for wildlife rather than recreation; (2) improve public education of the significance of these areas for birds and other wildlife; (3) improve grant funding opportunities by demonstrating a focus on wildlife conservation and management. Designated areas could be mapped on park guides and demarcated in the field using placards on trees or posts. Recreational use in these areas should be limited to passive activities that do not disrupt wildlife. Three potential Wildlife Conservation Areas (WCA’s) are illustrated on Figure 7 and are described below. It is recommended that a committee be formed to determine the final location, extent, management and allowable uses of the Wildlife Conservation Areas:

WCA 1 – this area encompasses the northwest corner of the park including woodland coastal forest (habitat units 11 and 14). Designating this area would protect and allow management of an area that is a significant fallout site for spring warblers and potential breeding habitat for Brown Thrasher.

WCA 2 – this area encompasses the eastern shoreline of Eagle Pond. Designating this area and limiting access to the pond would provide a disturbance buffer for waterfowl that congregate in the eastern shallows of the pond.

WCA 3 – this area consists of a significant complex of habitat types including coastal forest, the Holly Grove, woodland, shrubland, tidal marsh, dune and intertidal zone. Designating this area would protect a large block of diverse habitat that can support essentially all of the various avian species that utilize the park.

2. Consider the use of fencing to restrict access to sensitive habitats: consider the seasonal or permanent use of fencing to restrict human access to sensitive bird habitats. Examples could include fencing of winter owl roosting habitat or beaches during horseshoe crab breeding season.
3. Public education and outreach: increase public awareness of the presence of sensitive habitats through the development of informational brochures and signage discussing the importance of these habitats for birds and other wildlife. Distribute information at kiosks and the entrance booth and add signage at critical points along trails, fisherman access points, and overlooks.
4. Dog control: monitoring should be conducted around sensitive habitats to determine if off-leash dogs are entering habitats and flushing birds. If it is determined that sensitive habitats are negatively impacted, efforts should be made to raise awareness amongst the public about the impacts of dogs on birds. Signage that includes the phone number for animal control should be installed throughout the park reminding visitors that dogs need to be leashed. A brochure could be developed that could be distributed with dog licenses. For those dog owners that continue to ignore the leash laws, increased enforcement by Greenwich Animal Control officers and Greenwich Police may be necessary to discourage these individuals.
5. Reduce beach raking: natural shoreline wrack includes seaweed, shellfish and invertebrates that provide an important feeding habitat for shorebirds, gulls and wading birds, and is part of the dynamic beach ecosystem. Some studies have suggested that regular removal of natural wrack can impact beach biodiversity. The Town of Greenwich currently rakes the beach once per day from Memorial Day to Labor Day. The Town should consider reducing the frequency of beach raking to minimize damage to beach ecosystems and improve feeding opportunities for shorebirds on low beaches and intertidal zones. Other coastal towns, South Padre Island, Florida for example, have adopted policies that reduce or eliminate beach raking solely for the purpose of improvement of ecosystem health. Reduction or elimination of beach raking during the peak fall shorebird migration (August – September) should be considered.
6. Realign or close redundant trails: GPP’s main trail network is known as the “Beach Loop”. The official beach loop trail now has many spur and arterial trails, resulting in an extensive trail system exceeding what is necessary for efficient pedestrian flow through the park. Several of these trails are redundant as they parallel and lie close to another trail with a similar origin and terminus. Figure 8 illustrates three trail segments that could be closed without impacting pedestrian flow. The two trail segments south of the clambake area lie within salt marsh wetlands, a highly sensitive and regionally rare habitat type. The third segment is a small spur trail that provides a shortcut to the boulder meadow from the main trail. Funding could be sought to restore the trails that now lie in tidal wetlands, including excavating fill material and re-planting with native vegetation.

**FIGURE 7**  
**Wildlife Conservation Areas**  
**and Important Bird Habitats**  
**Greenwich Point Park**  
**Greenwich Point Park**  
**IBA Conservation Plan**

**Map Description**

This map shows potential Wildlife Conservation Areas in conjunction with important bird habitats at Greenwich Point Park. The location and extent of each habitat is based on field observations and aerial photograph interpretation (source: USDA, 2012) and is approximate only.

**Legend**

- Potential Wildlife Conservation Areas **WCA**
- Habitat Unit Number
- Trails
- Buildings
- Non-Forested Habitats**
- Dune
- Shrubland
- Forested Habitats**
- Mixed Hardwood Forest
- Woodland
- Holly Grove
- Tidal Wetlands**
- Tidal Pond
- Tidal Marsh (inc. pool & panne)
- Low Marsh / Rocky Intertidal



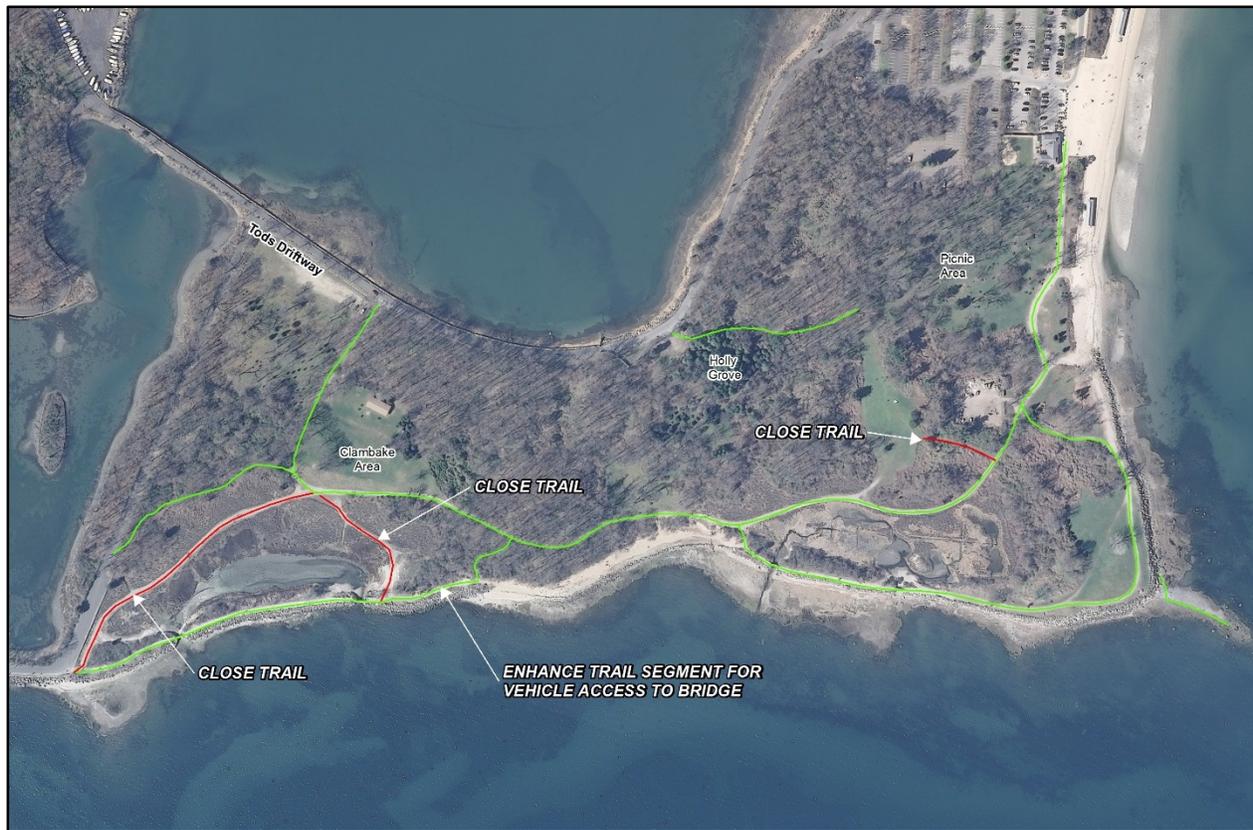


Figure 8: Map showing trail system in green with proposed trail closures shown in red. Trail closures include three redundant trail segments, two of which lie within sensitive tidal wetlands.

## 8.2 Enhance Habitat Diversity and Quality

7. Develop a habitat management plan for Wildlife Conservation Areas: This conservation plan should serve as a guide to the development of detailed habitat management plan. The plan should focus on the designated Wildlife Conservation Areas but should take a comprehensive approach that considers all activities proposed within Important Bird Habitats discussed in this plan. The plan should include recommendations for maintaining a variety of upland habitats, including coastal hardwood forest, evergreens, shrublands, and meadows, as well as tidally influence habitats, that together are valuable to a wide variety of landbirds. The plan should detail the desired habitat types (i.e., plant types, successional stage) and target species, provide a schedule for seasonal maintenance (i.e., mowing, pruning) and detail invasive species monitoring and management measures.
8. Control invasive species within important bird habitats: Control of non-native species should focus on areas where invasive plants have formed monocultures and significantly reduced plant diversity. Best invasive plant species control practices should be determined and implemented based on current review of the growing body of scientific literature on management of invasives, such as those prescribed by The Nature Conservancy or the Connecticut Invasive Plant Working Group

(<http://cipwg.uconn.edu/control-information/>). These methods may include physical, chemical and biological controls. Invasive plant species subject to control shall include but not be limited to the most current Connecticut Invasive Plant List. The list includes Invasive and Potentially Invasive Plants as determined by the Connecticut Invasive Plants Council in accordance with Connecticut General Statutes 22a-381a through 22a- 381d.

Consider encouraging the formation of a volunteer invasive species removal crew to work alongside park staff. Large scale removal of invasive plants in a manner that alters the structural diversity of a habitat (e.g., removes the herb or shrub layer) should be done judiciously so as to not impact birds. Control measures done in stages and performed during the non-critical season (i.e., summer for breeding habitat, winter for winter roost habitat) will help to reduce impact. It may be worthwhile on large-scale removal projects to conduct some pre-control surveys to better understand the potential impact (whether positive or negative) on birds.

9. **Improve Coastal Resiliency:** Coastal storms result in shoreline erosion and impacts to coastal forest, tidal marshes and dunes. These impacts can be expected to increase in severity in the future as a result of sea level rise. Coastal resiliency is a land-use approach aimed at reducing the ecological and socioeconomic risks of coastal hazards. The following habitat restoration and maintenance strategies utilizing “green infrastructure” are recommend for consideration in habitats prone to storm damage:
  - a. **Salt-spray dieback:** A salt spray impact zone should be identified based on observations from previous storms such as Hurricane Sandy. Within this zone, any new plants or trees established should be restricted to those native species considered to have moderate to high salt tolerance such as those listed in Table 5. Other introduced and non-invasive cultivars could be considered. An excellent resource is the UCONN’s Center for Land Use and Education and Research’s (CLEAR) [Coastal Riparian Landscaping Guide](http://clear.uconn.edu/crlg/) available at: <http://clear.uconn.edu/crlg/>

Table 5: Native plant species with moderate to high salt tolerance

Trees	Shrubs	Herbaceous Plants
E. Red Cedar ( <i>Juniperus virginiana</i> )	High-Tide Bush ( <i>Iva frutescens</i> )	Virginia Rose ( <i>Rosa virginiana</i> )
River Birch ( <i>Betula nigra</i> )	Groundseltree ( <i>Baccharis halimifolia</i> )	Chairmaker’s Bulrush ( <i>Schoenoplectus americanus</i> )
Black Gum ( <i>Nyssa sylvatica</i> )	Beach Plum ( <i>Prunus maritima</i> )	Seaside Goldenrod ( <i>Solidago sempervirens</i> )
	Bayberry ( <i>Myrica pensylvanica</i> )	American Beachgrass ( <i>Ammophila breviligulata</i> )
	Sweet Pepperbush ( <i>Clethra alnifolia</i> )	Switchgrass ( <i>Panicum virgatum</i> )
	Inkberry Holly ( <i>Ilex glabra</i> )	Sand Lovegrass ( <i>Eragrostis trichodes</i> )
		Indian Grass ( <i>Sorghastrum nutans</i> )
		Side Oats Grama ( <i>Bouteloua curtipendula</i> )
		Bib Bluestem ( <i>Andropogon gerardii</i> )
		Little Bluestem ( <i>Schizachyrium scoparium</i> )



- d. Conifers that supply dense protective cover such as white pine, pitch pine, hemlock, red cedar, mountain laurel, holly, spruce or fir. Trees should be densely planted and be suitable for winter owl cover. Owl roosting areas should be located away from active recreation areas
- e. Wildflowers that attract Lepidoptera and provide seed for food



Figure 9: aerial map showing potential locations (outlined in green) to create bird gardens. Gardens located in these areas would serve to “soften” ecotones and break up expanses of lawn and other low value habitats.

11. Strengthen communication between stakeholders: Park staff should be advised of the locations of native salt tolerant and “Bird Gardens” plantings to avoid accidental damage during maintenance activities. To keep Parks Department and Conservation Commission staff advised of issues at the park, the Town of Greenwich might consider initiating a SeeClickFix program which allows residents to upload pictures or notes about issues within their neighborhoods which are directed to the appropriate City department. This was done in the City of New Haven (<http://www.cityofnewhaven.com/Ask/index2.asp>).

12. Identify funding sources for habitat restoration and management:

Funding can be sought for projects including bird gardens, storm damage repair, dune restoration, habitat management and invasive species control. The Important Bird Area Program's [Small Matching Grants Program](#) awards funds to Audubon Chapters, landowners, universities, and members of IBA Stakeholder Groups for projects at Important Bird Areas in order to implement conservation strategies put forth in IBA Conservation Plans. Individual projects are generally eligible for up to approximately \$2,000 each and a minimum of 1:1 match of funds, goods or services is required.

The Connecticut Ornithological Association's [Mini-grant committee](#) was established to support initiatives that specifically benefit birds. All Mini-grant proposals need to demonstrate some benefit to birds and/or birding in Connecticut. Grants may be in any amount up to a maximum award of \$2,500. Match is not required but may increase the likelihood of project being funded.

The Quebec-Labrador Foundation/Atlantic Center for the Environment is a non-profit organization dedicated to conservation and education activities in Eastern Canada and the New England maritime region. This organization created the [Sounds Conservancy Grant Program](#), which supports conservation and education projects that benefit the six sounds of southern New England. Grants average \$1000 with a \$2500 maximum.

The [Long Island Sound Futures Fund](#) supports projects in local communities that aim to protect and restore Long Island Sound. The fund is managed by The National Fish and Wildlife Foundation (NFWF) in partnership with the Long Island Sound Study (LISS) through U.S. EPA's Long Island Sound Office. The grantee must demonstrate a real, on-the-ground commitment to promoting the overall health of Long Island Sound. Grants are awarded in two categories: Large grants between \$20,000 and \$150,000 and mini-grants between \$3,000 and \$10,000 and span one year to 15 months.

### **8.3 Evaluation (Measures of Success)**

Within the next five years, it should be possible to achieving the conservation goals outlined in this plan. Table 6 provides some recommended metrics to measure the success of strategies implemented. The metrics provided here should continue to grow and evolve as threat mitigation strategies are implemented.

*Table 6: Metrics to measure threat reduction strategies*

Threat	Metrics
Human Disturbance	<ol style="list-style-type: none"> <li>1. Wildlife Conservation Area(s) has been designated and demarcated in the field</li> <li>2. A management plan has been developed for the Wildlife Conservation Area(s)</li> <li>3. Areas of trails realigned.</li> <li>4. An assessment of the impact of dogs on birds was conducted</li> <li>5. Beach raking frequency has been reduced</li> </ol>
Storm-Induced Habitat Degradation	<ol style="list-style-type: none"> <li>1. Square feet of storm-damaged habitat restored</li> <li>2. Linear feet of eroded shoreline restored (bioengineering vs. structural methods)</li> <li>3. Number of American beachgrass plants installed in dunes</li> <li>4. A salt-spray planting zone has been designated and mapped</li> <li>5. Number of salt tolerant plants installed in salt-spray zone</li> <li>6. Restoration of degraded marshes has been investigated</li> <li>7. Creation of a nearshore breakwater has been investigated</li> </ol>
Degraded Habitat/Low Habitat Diversity	<ol style="list-style-type: none"> <li>1. Invasive species have been mapped</li> <li>2. An invasive species management plan has been developed</li> <li>3. Acres of invasive control measures conducted</li> <li>4. Annual monitoring of invasives being conducted</li> <li>5. Number of native plants planted.</li> <li>6. Square feet of tidal wetlands restored at former trail location</li> </ol>

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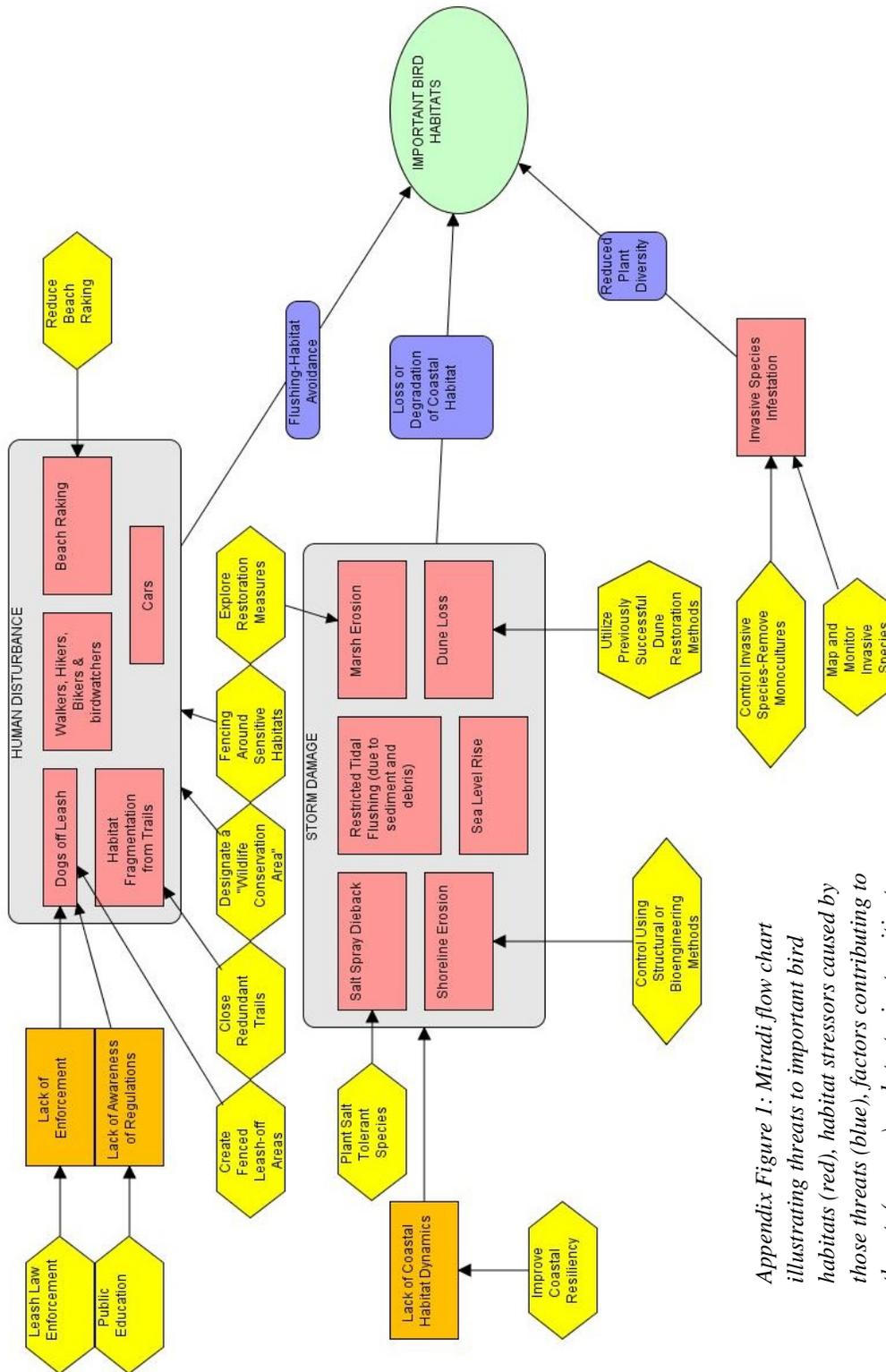
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## **APPENDICES**

### **Appendix Figure 1 – Miradi flow chart**



Appendix Figure 1: Miradi flow chart illustrating threats to important bird habitats (red), habitat stressors caused by those threats (orange), factors contributing to threats (yellow), and strategies to mitigate threats (yellow).