Robinia hispida	Locust, Clammy
Decodon verticillatus	Loosestrife, Swamp
Lyonia ligustrina	Maleberry
Iva frutescens	Marsh Elder
Phoradendron flavescens	Mistletoe R
Quercus prinoides	Oak, Dwarf Chustnut*
Quercus ilicifolia	Oak, Scrub*
Mitchella repens	Partridge-berry*
Prunus maritima	Plum, Beach*
Rhus toxicodendron	Poison Oak
Chimaphila umbellata	Pipsissewa
Pyxidanthera barbulata	Pyxie Moss
Ascyrum hypericoides	St. Andrew's Cross
Hypericum densiflorum	St. John's Wort*
Ascyrum stans	St. Peter's Wort
Leiophyllum buxifolium	Sand Myrtle R
Smilax glauca	Sawbrier*
Amelanchier obovalis	Shad-bush, Low
Amelanchier canadensis	Shad-bush, Swamp
Pyrola secunda	Shinleaf
Lyonia mariana	Stagger-bush
Spirea tomentosa	Steeple-bush
Rhus copallina	Sumac, Dwarf
Rhus vernix	Sumac, Poison
Rhus glabra	Sumac, Smooth
Comptonia peregrina	Sweet-fern*
Clethra alnifolia	Sweet-Pepperbush
Epigaea repens	Trailing Arbutus
Parthenoicissus quinquefolia	Virginia Creeper
Itea virginica	Virginia Willow
Ilex verticillata	Winterberry
Gaultheria procumbens	Wintergreen, Teaberry*
Chimaphila maculata	Wintergreen, Spotted
Viburnum cassinoides	Withe-rod
Yucca filamentosa	Yucca*
Flowering Plants – Trees	
Populus grandidentata	Aspen
Pyrus malus	Apple*
Betula populifolia	Birch, Gray*
Plantanus occidentalis	Buttonwood

Catalpa bignoniodes	Catalpa, Southern
Prunus serotina	Cherry, Wild*
Juniperus virginiana	Cedar, Eastern Red*
Chamaecyparis thyoides	Cedar, Southern White*
Thuja occidentalis	Cedar, Arbor Vitae*
Cornus florida	Dogwood
Nyssa sylvatica	Gum, Sour
Liquidambar styraciflua	Gum, Sweet
Carya tomentosa	Hickory, Mockernut
Ilex opaca	Holly, American
Robinia pseudo-acacia	Locust, Black
Magnolia virginiana	Magnolia, Swamp*
Acer rubrum	Maple, Red*
Morus alba	Mulberry, White*
Quercus velutina	Oak, Black*
Quercus marilandica	Oak, Blackjack*
Quercus prinus	Oak, Chestnut*
Quercus palustris	Oak, Pin*
Quercus stellata	Oak, Post*
Quercus rubra	Oak, Red*
Quercus coccinea	Oak, Scarlet*
Quercus falcata	Oak, Spanish*
Quercus alba	Oak, White*
Quercus phellos	Oak, Willow*
Pyrus communis	Pear, Choke*
Diospyros virginiana	Persimmon
Pinus rigida	Pine, Pitch*
Pinus echinata	Pine, Short leaf
Pinus strobus	Pine, White*
Populus alba	Popular, White*
Sassafras albidum	Sassafras*
Platanus occidentalis	Sycamore
Larix laricina	Tamarack, Larch
Liriodendron tulipifera	Tulip Tree
Juglans nigra	Walnut, Black*
Salix nigra	Willow, Black
Salix babylonica	Willow, Weeping

Non-Flowering Plants – Ferns, Lichens, Mosses

Lycopodium carolinianum	Club-Moss. Carolina
Lycopodium alopecuroides	Club-Moss, fox Tail

Lycopodium complanatum	Club-Moss, Ground Cedar
Lycorpodium obscurum	Clob-Moss, Ground Pine
Ophioglossum vulgatum	Fern, Adder's-Tongue
Dryopteris simulata	Fern, Bog
Pteridium aquilinum	Fern, Bracken*
Osmunda cinnamonea	Fern, Cinnamon
Schizaea pusilla	Fern, Curly-grass R
Asplenium platyneuron	Fern, Ebony Spleenwort
Dryopteris thelypteris	Fern, Marsh
Osmunda regalis	Fern, Royal
Woodwardia virginica	Fern, Virginia Chain
Equisetum arvense	Horsetail, Common
Parmelia spp.	Lichen, Thallose
Cladonia cristatella	Lichen, British Soldier
Cladonia rangiferina	Lichen, Reindeer Moss
Usnea barbata	Lichen, Old Man's Beard
Pallavicinia lyelli	Liverwort, Long
Cephalosia spp.	Liverwort, Cephalosia
Odontoschisma spp.	Liverworst, Odontoschisma
Polytrichum juniperum	Moss, Haircap
Polytrichum commune	Moss, Pigeon Wheat
Leucobryum glaucum	Moss, Pin Cushion
Sphagnum spp.	Moss, Sphagnum
Dicranum spp.	Moss, Broom

Unique Plant Species of the Barnegat Township Area

Phoradendron flavescens*	American Mistletoe
*Quercus michauxii**	Basket or Swamp Chestnut Oak
Aster nemoralis	Bog Aster
Narthecium americanum	Bog Asphodel
*Viola brittoniana**	Britton's Violet
*Corema conradii***	Broom Crowberry
Lycopodiurn carolinianum	Carolina Clubmoss
*Habenaria cristata***	Crested Yellow Orchis
*Schizaea pusilla****	Curly-grass Fern
Lophiola americana	Golden Crest
*Spiranthus praecox**	Grass-Leaved Ladies Tresses
Habenaria clavellata	Green Woodland Orchid
Liatris graminfolia	Hairy Blazing-star
Hudsonia ericoides	Hudsonia (Pine Barrens Heather)
*Carex kobomugi***	Japanese Sedge

*Listera australis**	Longlipped Twayblade
*Polygala mariana**	Milkwort
*Gentian autumnalis***	Pine Barrens Gentian
Solidago fistulosa	Pine Barrens Goldenrod
*Prenanthes automnalis***	Pine Barrens or Slender Rattlesnake Root
*Utricularia purpurea**	Purple Bladderwort
Pyxianthera barbulata	Pyxie Moss
Habenaria lacera	Ragged-Fringed Orchid
Leiophyllum buxifolium	Sand Myrtle
*Arenaria peploides***	Sea Beach Sandwort
*Triglochin maritime***	Seaside Arrow Grass
*Eurphorbia polygonifolia**	Seaside Spurge
*Chrysopsis falcate**	Sickle-leaved Golden Aster
*Vaccinium oxycoccos**	Small Cranberry
Helonias bullata	Swamp Pink
Eryngium yuccifolium	Tall Rattlesnake Master
Eriocaulon decangulare	Ten Angled Pipewort
Xerophyllum asphodeloides	Turkey Beard
Artemisia caudata	Wild Wormwood, or Mugwort
*Habenaria ciliaris***	Yellow Fringed orchid

Source: Environmental Resource Inventory of the Township of Barnegat Ocean County, New Jersey; September 1978

A vast majority of Barnegat Township is wooded and can be described by two (2) portions of the Pine Barrens: lowland and upland. These two (2) categories are then further broken down to include specific habitats and dominate species within the upland and lowland.

Wetlands

Wetlands are a critical ecological resource that supports terrestrial and aquatic animals. These areas can play a vital role in maintaining water quality by purifying surface and ground waters. The ecological importance of wetlands has been ignored for years. For example, people have drained, dredged, filled and leveled wetland areas for future development and agricultural activities. The pace of wetland destruction has decreased in the past three (3) decades. Human activities have destroyed approximately 115 million of the original 221 million acres of wetlands in the United States since the beginning of the European settlement time period.

Wetlands in Barnegat are protected by the New Jersey Freshwater Wetlands Protection Act of 1987 (NJSA 13.9B-1 et req). NJAC 7:7A of the Freshwater Wetlands Protection Act rules defines a wetland as follows:

"A wetland is an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adopted for life in saturated soil conditions, commonly known as hydrophytic vegetation; provided, however, that the (NJDEP), in designating a wetland, shall use the three-parameter approach (hydrology, soils and vegetation) enumerated in the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands; and any subsequent amendments thereto, incorporated herein by reference. These include tidally influenced wetlands which have not been included on a promulgated map pursuant to the Wetlands Act".

In addition to the Freshwater Protection Act of 1987 regulations, wetlands within Barnegat Township are also protected by the Pinelands Comprehensive Management Plan. All lands within Barnegat Township, and located west of the Garden State Parkway are under the jurisdiction of the New Jersey Pinelands Commission.

The following definition (NJAC 7:50-6.3) is used by the Pinelands Commission in administering the provisions of the Pinelands Comprehensive Management Plan: "wetlands are those lands which are inundated or saturated by water at a magnitude, duration and frequency sufficient to support the growth of hydrophytes. Wetlands include lands with poorly drained soils as designated by the National Cooperative Soils Survey of the Soil Conservation Service of the United States Department of Agriculture. Wetlands include coastal wetlands and inland wetlands, including submerged lands". A literal interpretation of the Pinelands commission definition indicates that a site may be considered a wetland if either poorly drained or very poorly drained soil or vegetation is present. The presence of wetland species is the primary indicator and soils are used to confirm problem area wetlands within the pinelands jurisdiction.

Nearly all wetlands in Barnegat Township are associated with major streams and their tributaries. Wetlands are dominant along the principal surface waters within the borders of Barnegat Township and include, but not limited to, Oswego River, Mill Creek, Gunning River, and several smaller streams that drain into the Barnegat Bay. As previously mentioned, some of the Township is located within the Pinelands and low land wetland vegetation can be found at the previously discussed locations. Typical lowland area vegetation complexes are broken up into four (4) subsections and includes, but not limited to, a Tidal Marsh, Cedar Swamp, Hardwood Swamp and a Pitch Pine low land. Typical wetland complexes that are located outside of the pinelands include, but are not limited to mixed forested wetlands (deciduous), tidal water, mixed forested wetlands (coniferous).

Typical wetland vegetation along a coastal area of Barnegat Township.

Typical upland pitch pine and oak forested area.

Lowland Vegetation- The lowland vegetation phase is further subdivided according to the following vegetation species:

1. *Tidal Marsh*- This vegetation found on the portion of the Township that is in contact with Barnegat Bay. It is directly affected by tidal flow and brackish water. Part of this region has been dredged and filled to form lagoons for residential communities. The most dominant native plants here include Spartina patens and Spartina alterniflora with red cedar, bayberry, marsh elder, and groundsel growing in the slightly higher land on the outskirts of the marsh. These shrubs can be found on mounds of dredged soil. Mosquitoes have been known to cause an issue in this area and a portion of tidal marsh near Double Creek has been impounded by the County Mosquito Commission for mosquito control.

2. *Cedar Swamp*- Atlantic White Cedar can be found along stream corridors, most notably along the Oswego River. White Cedar has a long history of being harvested within the Township. Since colonial times these stands have been used extensively for building boats, buildings, shingles, bulkheads, and furniture. Some of the most heavily harvested areas were never re-established because it created a new niche, first deer grazed on the cedar saplings and eventually hardwoods took their place completely. Also found in cedar swamps are some rare plants such as Curly Grass Fern, Pitcher Plants, and Sundew.

3. *Hardwood Swamp*- Red maple is the dominant species of hardwood swamps in the Pinelands. Other common hardwoods include Sweet Gum, Gray Birch, and to a lesser extent Pitch Pine and Atlantic White Cedar. Old cranberry bogs and blueberry fields have succeeded where hardwood swamps have failed. In Barnegat Township hardwood swamps are found along Mill Creek, Gunning River, and several small streams east of US Rt. 9.

4. *Pitch Pine Lowland*- This habitat is a mixture of many types of plant life and considered to be a transitional area. The pitch pine lowlands connect the upland with the swamps. While the understory of this lowland is very diverse including a variety of shrubs and woody vines such as Sand Myrtle, Pyxie Moss, and Turkey Beard, the canopy includes three major species. The pitch pine is most prevalent everywhere except when it becomes very wet, this is where the red maple and black gum dominate. There is only one substantial Pitch Pine Lowland forest in Barnegat Township and it is located along the upper Yellow Dam Branch of the Oswego River.

Upland Vegetation- The following plant communities can be identified in the upland region:

1. *Pine Oak*- Within the pine oak forest oak species such as black, post, white, chestnut, and blackjack are present, however, the dominant tree is the pitch pine. Barnegat Township contains a dwarfed pine oak forest and is located in the section of the Township known as West Plains. Several other pine oak forests can be found in the vicinity of the Garden State Parkway.

2. *Oak-Pine*- Oak-dominated forests are found in areas that are not prone to fires. A majority of the canopy is made up of chestnut, black and white oaks and some pitch pine. Well- drained, oak-pine forests with little understory are made up of mostly low shrubs, mosses, and lichens and can be found in Barnegat Township along Route 534, west of the Parkway to NJ 72, and between the Garden State Parkway and US 9. Oak-pine forests represent areas that are suitable for well-planned development. Wide buffer zones of vegetation, retention of runoff, and proper sewage disposal can help keep erodibility, ground water pollution, and runoff problems to a minimum.

Landscape Project

Endangered/Threatened Flora Species

Barnegat Township is located partially in the State-designated Pinelands area and partially in the Pinelands National Reserve. Throughout the Pinelands there are many endangered/threatened plant species and habitats, many of which are protected under the Pinelands Comprehensive Management Plan. The plan prohibits development where there may be a potential for adverse affects on any habitats.

Along with the Pinelands Comprehensive Management Plan the NJ Division of Fish and Wildlife's Endangered Species and Nongame Species Program (ENSP) created the Landscape Project. The stated goal was to protect New Jersey's biological diversity by maintaining and enhancing imperiled wildlife populations within healthy, functioning ecosystems. This program began to map critical wildlife habitats for threatened and endangered species throughout the State. The results of this mapping was released to the public in 2001 in Version 1.0, revised in 2004 to create Version 2.0 and revised in 2007 to create version 2.1. This mapping was divided into the following habitat types: forest, grassland, forested wetland, emergent wetland, beach/dune, bald eagle foraging habitat, urban peregrine, and wood turtle habitats. The Landscape Project further ranks each of these habitat types depending on the conservation status of the species present. A rank of 1 shows that a specific area meets the minimum size requirement for a specific habitat although there are no species associated with this area. A rank of 2 shows that there is potential habitat for non-listed state species of special concern. A rank of 3 maps habitat for state threatened species. State endangered species are represented by rank 4 and federally listed species are shown as a rank 5. Only species and associated habitats with a rank of 3 or greater are currently regulated.

According to the Landscape Project Mapping, Version 2.1 (Figure 13), grassland, forest, forested wetland, and emergent wetlands areas where endangered or threatened flora species are present in Barnegat Township. The following list of endangered or threatened plants species are found in the Pinelands Area and, therefore, may be located in Barnegat Township:

Common Name	**Scientific Name**
Sensitive-joint Vetch	*Aeschynomene virginica*
Red Milkweed	*Asclepias rubra*
Silvery Aster	*Symphyotrichum concolor*
Pickering's Morning glory	*Stylisma pickeringii var. pickeringii*
Pine Barrens Reedgrass	*Calamovilfa brevipilis*
Barratt's Sedge	*Carex barratti*
Sickle-leaved Golden aster	*Pityopsis falcata*
Spreading Pogonia	*Cleistes divaricata*
Broom Crowberry	*Corema conradii*
Rose-colored Tickseed	*Coreopsis rosea*
Rushfoil	*Croton willdenowii*
Stiff Tick Trefoil	*Desmodium strictum*
Knotted spike rush	*Eleocharis equisetoides*
Resinous Boneset	*Eupatorium resinosum*
Pine Barrens Gentian	*Gentiana autumnalis*
Yellow-fringed Orchid	*Platanthera ciliaris*
Crested Yellow Orchid	*Platanthera cristata*
Southern Yellow Orchid	*Platanthera integra*
Swamp Pink	*Helonias bullata*
New Jersey Rush	*Juncus caesariensis*
Lily-leaved Twayblade	*Liparis liliifolia*
Loesel's Twayblade	*Liparis loeselii*
Southern Twayblade	*Listera australis*
Boykin's Lobelia	*Lobelia boykinii*
Canby's Lobelia	*Lobelia canbyi*
Hairy Ludwigia	*Ludwigia hirtella*
Linear-leaved Ludwigia	*Ludwigia linearis*
Climbing Fern	*Lygodium palmatum*

Torrey's Muhly	*Muhlenbergia torreyana*
Yellow Asphodel	*Narthecium americanum*
Floating Heart	*Nymphoides cordata*
Narrow Panic-grass	*Panicum hemitomon*
Hirst's Panic-grass	*Dichanthelium hirstii*
American Mistletoe	*Phoradendron leucarpum*
Maryland Milkwort	*Polygala mariana*
Slender Rattlesnake Root	*Prenanthes autumnalis*
Awned Meadow Beauty	*Rhexia aristosa*
Capitate Beaked Rush	*Rhynchospora cephalantha*
Slender Beaked Rush	*Rhynchospora inundata*
Knieskern's Beaked Rush	*Rhynchospora knieskernii*
Curly Grass Fern	*Schizaea pusilla*
Chaffseed	*Schwalbea americana*
Long's bulrush	*Scirpus longii*
Slender Nut-rush	*Scleria minor*
Reticulated Nut-rush	*Scleria reticularis*
Sclerolepis	*Sclerolepis uniflora*
Wand-like Goldenrod	*Solidago stricta*
Little Ladies'-tresses	*Spiranthes tuberosa*
False Asphodel	*Tofieldia racemosa*
Humped Bladderwort	*Utricularia gibba*
White-flowered Bladderwort	*Utricularia olivacea*
Purple Bladderwort	*Utricularia purpurea*
Reclined Bladderwort	*Utricularia resupinata*
Yellow-eyed Grass	*Xyris caroliniana*

WILDLIFE

GENERAL / NATIVE SPECIES

The extensive network of salt marsh, forest, Atlantic white cedar swamps, coastal wetlands, and surface waters make Barnegat a melting pot for both permanent and transient wildlife populations. Please note that there was no species survey conducted for this inventory so the following list may not be comprehensive.

Fish Species in Barnegat Township Waters

Alosa poendoharengus	Alewife
Anguilla rostrata	American Eel
Alosa sapidissima	American Shad
Clupea harengus	Atlantic Herring
Strongylura marina	Atlantic Needlefish
Brevortia tyrannus	Atlantic Round Herring
Mendidia spp.	Atlantic Silversides
Fundulus diaphanus	Banded Killifish
Enneacanthus abesus	Banded Sunfish
Anchova mitchilli	Bay Anchovy
Enneacanthus chaetodon	Blackbanded Sunfish
Pogonias cromis	Black Drum
Alosa aestivalis	Blueback Herring
Pomotomus saltatrix	Bluefish
Enneacanthus gloriosus	Bluespotted Sunfish
Ictalus nebulosus	Brown Bull head
Poronotus triacanthus	Butterfish
Esox niger	Chain Pickerel
Erimyzon oblongus	Chub sucker
Caranx hippos	Crevalle Jack
Tautogolabrus adspersus	Cunner
Umbra pygmaea	Eastern Mudminnow
Apeltes gnadracus	Fourspine Stickleback
Dorosoma cepedianum	Gizzard Shad
Notemigonun crysoleucas	Golden Shiner
Myoxocephalus aenaeus	Grubby
Trinectes maculatus	Hogchoker
Notropis chalybaeus	Ironclad Shiner
Etheostoma oemstedi	Johnny Darter
Selene vomer	Lookdown
Acantharchus pornatis	Mud Sunfish
Fundulus heteroclitus	Mummichog
Gobiosoma fosci	Naked Goby
Menticirrhus saxatilis	Norhtern Kingfish
Prionotus spp.	Northern Searobin
Micropterus punctulatus	Orangespotted Sunfish
Opsanus tarr	Oyster Toadfish
Ophredoderus sayanus	Pirate Perch
Pollachius virens	Pollock
Fundulus spp.	Rainwater Killfish
Lepomis gibbosus	Red-breasted Sunfish
Esox americanus	Redfin Pickerel
Epinephelus morio	Red Grouper
Gymnura micrura	Roughtail Stingray
Cyprionodon variegatus	Sheepshead Minnow

Myoxecephalus octodecemspinosus	Shorthorn Sculpin
Bairdiella chrysura	Silver Perch
Micropterus dolimicui	Smallmouth Bass
Etropus microtomus	Smallmouth Flounder
Leiostomus xanthurus	Spot
Chilomycterus schoepfi	Spotted Burrfish
Hippocampus hudsonius	Spotted Seahorse
Urophycis chuos	Squirrel Hake
Morone saxatilis	Striped Bass
Chasmodes bosquianus	Striped Blenny
Chilomycterus spp.	Striped Burrfish
Fundulus mejolis	Striped Killfish
Mugil cephalus	Striped Mullet
Paralichthys dentatus	Summer Flounder
Etheostoma fusiforma	Swamp Darter
Noturus gyrinus	Tadpole, Madtom
Tautoga onitis	Tautog
Gasterosteus aculeatus	Threespine Stickleback
Menidia beryllina	Tidewater Silversides
Cynoscion regalis	Weakfish
Mugil curema	White Mullet
Morone americanus	White Perch
Scophthalmus aguosus	Window Pane
Catastomus commersoni	White Sucker
Pseudopleuronectes americanus	Winter Flounder
Ictalus natalis	Yellow Bullhead
Perca flavescens	Yellow Perch

Bird Species in Ocean Township

Gavia immer	Common Loon
Gavia stellata	Red-Throated Loon
Podiceps auritus	Horned Grebe
Podilymbus podiceps	Pied-Billed Grebe
Phalacrocorax auritus	Double Crested Cormorant
Ardea herodias	Great Blue Heron
Casmerodius albus	Common Egret
Leucophoyx thula	Snowy Egret
Bubuleus ibis	Cattle Egret
Hydranassa tricolor	Louisiana Heron
Florida caerulea	Little Blue Heron
Butorides virenscens	Green Heron
Nycticorax nicticorax	Black-Crowned Night Heron
Nyctanassa violacea	Yellow-Crowned Night Heron
Botaurus lentigineous	American Bittern
Lxobrychus exitis	Least Bittern
Plegadis falcinellus	Glossy Ibis
Cygnus olor	Mute Swan

Olor columfianus	Whistling Swan
Branta canadensis	Canada Goose
Branta bernicla	Brant
Chen hyperborea	Snow Goose
Chen caerulescens	Blue Goose
Anas platyrhynchos	Mallard
Anas rubripes	Black Duck
Anas strepera	Gadwall
Mareca americana	Bald Pate
Anas acuta	Pintail
Anas carolinensis	Green-Winged Teal
Anas discolor	Blue-Winged Teal
Spatula clypeata	Shoveler
Aix sponsa	Wood Duck
Aythya americana	Redhead
Aythya collaris	Red-Necked Duck
Aythya valisineria	Canvas Back
Marila marila	Greater Scaup Luck
Marila affinis	Lesser Scaup Duck
Bucephala clangula	American Golden-Eye
Bucephala albeola	Bufflehead
Harelda hyemalis	Old Squaw
Histrionicus histrionicus	Harlequin Duck
Somateria dresseri	Common Eider
Somateria spectabilis	King Eider
Oidemia deglandi	White-Winged Scoter
Oidemia perspiculata	Surf Scoter
Oidemia americana	Common Scoter
Erismatura jamaicensis	Ruddy Duck
Lophodytes cucullatus	Hooded Merganser
Mergus americanus	Common Merganser
Mergus serrator	Red-Breasted Merganser
Cathartes aura	Turkey Vulture
Accipiter striatus	Sharp-Shinned Hawk
Accipiter Cooperii	Cooper's Hawk
Buteo jamaicensis	Red-Tailed Hawk
Buteo lineatus	Red-Shouldered Hawk
Buteo platypterus	Broad-Winged Hawk
Buteo lagopus	Rough-Legged Hawk
Aguila chrysaetos	Golden Eagle
Haliaetus leucocephalus	Bald Eagle
Circus cyaneus	Marsh Hawk
Pandion haliaetus	Osprey
Falco peregrinus	Peregrine Falcon
Falco columbarius	Pigeon Hawk
Falco sparverius	Sparrow Hawk

Bonasa umbellus	Ruffled Grouse
Colinus virginianus	Bobwhite
Phasianus colchicus	Ring-Necked Pheasant
Rallus elegans	King Rail
Rallus longirostris	Clapper Rail
Rallus limicola	Virginia Rail
Porzona carolina	Sora Rail
Fulica americana	American Coot
Haemotopus palliatus	Oyster Catcher
Charadrius vociferus	Piping Plover
Aegialitis semipalmata	Semipalmated Plover
Oxyechus vociferus	Killdeer
Phivivialis dominica	Golden Plover
Spuqtarola aquatarola	Black-Bellied Plover
Arenaria interpres	Ruddy Turnstone
Philohela minor	American Woodcock
Capella gallinago	Common Snipe
Numenius americanus	Whimbrel
Actitus macularia	Spotted Sandpiper
Tringa solitaria	Solitary Sandpiper
Catoptrophorus semipalmatus	Willet
Totanus melonoleucus	Greater Yellowlegs
Totanus flavipes	Lesser Yellowlegs
Calidris canutus	Knot
Pisobia maculata	Pectoral Sandpiper
Pisobia fuscicollis	White-Rumped Sandpiper
Erolia minutilla	Least Sandpiper
Erolia alpina	Dunlin
Limnodronius griseus	Short-Billed Dowitcher
Limnodronius scalopaceus	Long-Billed Dowitcher
Micropalama himantopus	Stilt Sandpiper
Ereunetis pusillus	Semipalmated Sandpiper
Limosa fedoa	Marbled Godwit
Limosa haemastica	Hudsonian Godwit
Crocethis alba	Sanderling
Recurvirostra americana	American Avocet
Steganopus tricolor	Wilson's Phalarope
Larus hyperboreus	Glacous Gull
Larus marinus	Great Black-Backed Gull
Larus argentatus	Herring Gull
Larus delenarensis	Ring-Billed Gull
Larus atricilla	Laughing Gull
Larus philadelphia	Bonaparte's Gull
Gelochelidon nilotica	Gull-Billed Tern
Sterna Fosteri	Foster's Tern
Sterna hirundo	Common Tern

Sterna dougalli	Roseate Tern
Sterna albifrons	Least Tern
Sterna maxima	Royal Tern
Sterna caspia	Caspian Tern
Hydrochelidon nigra	Black Tern
Rynchops nigra	Black Skimmer
Alle alle	Dovekie
Zenaidura macroura	Mourning Dove
Coccyzus americanus	Yellow-Billed Cuckoo
Coccyzus erythopthalmus	Black-Billed Cuckoo
Tyto alba	Barn Owl***
Otus asio	Screech Owl
Bubo virginianus	Great Horned Owl
Nyctea nyctea	Snowy Owl
Asio Wilsonianus	Long Eared Owl
Asio flammeus	Short-Eared Owl
Aegolius acadicus	Saw-Whet Owl
Caprimulgus vociferus	Whip-poor-will
Chordeiles minor	Nighthawk
Chaetura pelagica	Chimney Swift
Archilochus colubris	Ruby-Throated Hummingbird
Megaceryle alcyon	Belted Kingfisher
Colaptes auratus	Yellow-Shafted Flicker
Centurus carolinus	Red-Bellied Woodpecker
Melanerpes erythrocephalus	Red-Headed Woodpecker
Sphyrapicus varius	Yellow-Bellied Sapsucker
Dendrocopos villosus	Hairy Woodpecker
Dendrocopos pubescens	Downy Woodpecker
Tyrannus tyrannus	Eastern Kingbird
Tyrannus verticalis	Western Kingbird
Myriarchus crinitus	Great Crested Flycatcher
Sayornis phoebe	Eastern Phoebe
Empidonax flaviventris	Yellow-Bellied Flycatcher
Empidonax vireacens	Acadian Flycatcher
Empidonax trailli	Traill's Flycatcher
Empidonax minimus	Least Flycatcher
Eremophila alpestris	Horned Lark
Hirundo rustica	Barn Swallow
Petrochelidon pyrrhonota	Cliff Swallow
Lridoprocne bicolor	Tree Swallow
Riparia riparia	Bank Swallow
Stelgidopteryx ruficollis	Rough-Winged Swallow
Progne subis	Purple Martin
Cyanocitta cristata	Blue Jay
Corvus brachyrhynchos	Common Crow
Corvus assifragus	Fish Crow

Parus atricapillus	Black-Capped Chickadee
Parus carolinensis	Carolina Chickadee
Parus bicolor	Tufted Titmouse
Strix varia	Barred Owl
Sitta carolinensis	White-Breasted Nuthatch
Sitta canadensis	Red-Breasted Nuthatch
Certhia familiaris	Brown Creeper
Troglodytes aedon	House Wren
Troglodytes troglodytes	Winter Wren
Thryothorus ludovicianus	Carolina Wren
Telatodytes palustris	Long-Billed Marsh Wren
Cistothorus platensis	Short-Billed Marsh Wren
Mimus polyglottos	Mockingbird
Dumetella carolinensis	Catbird
Toxostoma rufum	Brown Thrasher
Turdus migratorius	Robin
Hylocichla mustelina	Wood Thrush
Hylocichla guttala	Hermit Thrush
Hylocichla ustulata	Swainson's Thrush
Hylocichla minima	Gray-Cheeked Thrush
Hylocichla fuscescens	Veery
Sialia sialis sialis	Eastern Bluebird
Polioptila caerulea	Bluegray Gratcatcher
Regulus satrapa	Golden-Crowned Kinglet
Regulus calendula	Ruby-Crowned Kinglet
Bombycilla cedorum	Cedar Waxwing
Lanius borealis	Northern Shrike
Lanius ludovicianus	Loggerhead Shrike
Sturnus vulgaris	Starling
Vireo griseus	White-Eyed Vireo
Vireo flavifrons	Yellow-Throated Vireo
Vireo solitarius	Solitary Vireo
Vireo olivaceus	Red-Eyed Vireo
Vireo philadelphicus	Philadelphia Vireo
Vireo gilva	Warbling Vireo
Mniotilta varia	Black & White Warbler
Protonolaria citrea	Prothonotary Warbler
Vermivora chrysoptera	Golden-Winged Warbler
Vermivora pinus	Blue-Winged Warbler
Vermivora peregrina	Tennessee Warbler
Vermivora celata	Orange-Crowned Warbler
Vermivora suficappila	Nashville Warbler
Parula americana	Parula Warbler
Dendroica petechia	Yellow Warbler
Dendroica magnolia	Magnolia Warbler
Dendroica tigrine	Cape May Warbler

Dendroica coronata	Myrtle Warbler
Dendroica virens	Black-Throated Green Warbler
Dendroica caerulescens	Black-Throated Blue Warbler
Dendroica dominica	Yellow-Throated Warbler
Dendroica fusca	Blackburnian Warbler
Dendroica pennsylvanica	Chestnut-Sided Warbler
Dendroica castanea	Bay-Breasted Warbler
Dendroica striata	Blackpoll Warbler
Dendroica pinus	Pine Warbler
Dendroica discolor	Prairie Warbler
Dendroica palmarum	Palm Warbler
Seiurus aurocapillus	Ovenbird
Seiurus noveboracensis	Northern Waterthrush
Seiurus motocolla	Louisiana Waterthrush
Geothlypis trichas	Yellowthroat
Icteria virens	Yellow-Breasted Chat
Oporonis formosus	Kentucky Warbler
Oporonis philadelphia	Mourning Warbler
Oporonis agilis	Connecticut Warbler
Wilsonia citrina	Hooded Warbler
Wilsonia pusilla	Wilson's Warbler
Wilsonia canadensis	Canada Warbler
Setophaga ruticilla	American Redstart
Passer domesticus	House Sparrow
Dolichoryx oryzivorus	Bobolink
Sturnella magna	Eastern Meadowlark
Agelaius phoeniceus	Red Winged Blackbird
Euphagus carolinus	Rusty Blackbird
Quiscalus quiscula	Common Grackle
Molothrus ater	Brown-Headed Cowbird
Icterus spurius	Orchard Oriole
Icterus galbula	Baltimore Oriole
Piranga erythromelas	Scarlet Tanager
Piranga rubra	Summer Tanager
Richmondena cardinalis	Cardinal
Pheucticus ludovicianus	Rose-Breasted Grosbeak
Hesperiphona vespertina	Evening Grosbeak
Guiraca caerulea	Blue Grosbeak
Passerina cyanea	Indigo Bunting
Carpodacus purpureus	Purple Finch
Acanthis flammea	Common Redpoll
Spinus pinus	Pine Siskin
Spinus tristis	American Goldfinch
Loxia curvirostra	Red Crossbill
Loxia leucoptera	White-Wined Crossbill
Pipilo erythrophthalmus	Rufous-Sided Towhee

Passerculus sandwichensis	Savannah Sparrow
Passerculus princeps	Ipswich Sparrow
Ammodramus savannarum	Grosshopper Sparrow
Passerherbulus henslowii	Henslow's Sparrow
Ammospiza caudacuta	Sharp-Tailed Sparrow
Ammospiza maritima	Seaside Sparrow
Povecetes gramineus	Vesper Sparrow
Chondestes grammacus	Lark Sparrow
Junco hyemalis	Slate-Colored Junco
Spizella arborea	Tree Sparrow
Spizella passerina	Chipping Sparrow
Spizella pallida	Clay-Colored Sparrow
Spizella pusilla	Field Sparrow
Zonotrichia atricopilla	White-Crowed Sparrow
Zonotrichia albicollis	White-Throated Sparrow
Passerella iliaca	Fox Sparrow
Melospiza lincolnii	Lincoln's Sparrow
Melospiza georgiana	Swamp Sparrow
Melospiza melodia	Song Sparrow
Calcarius lapponicus	Lapland Longspur
Plectrophenax nivalis	Snow Bunting

Amphibians in Barnegat Township

Salamanders

Desmognathus f. fuscus	Dusky Salamander
Desmognathus v. viridescenes	Eastern Newt
Hemidaclylium scatatum	Four-toed Salamander
Ambystoma jeffersonianium	Jefferson's Salamander
Ambystoma opacum	Marbled Salamander
Pseudotriton r. ruber	Red Salamander
Plethodon c. cinereus	Red-backed Salamander
Ambystoma maculatum	Spotted Salamander
Ambystoma tigrinum	Tiger Salamander
Eurycea bislineatus	Two-lined Salamander

Frogs and Toads

Rana catesbeiana	Bull Frog
Rana virgatipes	Carpenter Frog
Acris c. crepitans	Cricket Frog
Hyla v. versicolor	Eastern Gray Tree Frog
Rana clamatans	Green Frog
Rana palustris	Pickerel Frog
Hyla andersonii	Pine Barrens Tree Frog
Rana pipiens sphenocephala	Southern Leopard Frog
Scaphiopus holbrookee	Spade Foot Toad
Hyla crucifer	Spring Peeper
Pseudacris triseriata kalmi	New Jersey Chorus Frog
Rana sylvatica	Wood Frog

Bufo woodhousei Fowleri	Fowler's Toad
Reptiles in Barnegat Township	
Snakes	
Coluber c. constrictor	Black Racer
Storeria dekayi	Brown Snake
Helerodon platyrhinos	Common Hognosed Snake
Elaphe gluttata	Corn Snake
Haldea v. valeriae	Eastern Earth Snake
Thamnophis s. sirtalis	Garter Snake
Lampropeltis g. getulus	King Snake
Lampropeltis t. triangulum	Milk Snake
Elaphe o. obsoleta	Pilot Black Snake
Pituophis m. melanoleucus	Pine Snake
Storeria o. occupitomaculata	Red-Bellied Snake
Thamnophis s. sauritus	Ribbon Snake
Diadophis p. punctatus	Ringneck Snake
Opheodrys aestivus	Rough Green Snake
Cemophora coccinea	Scarlet Snake
Crotalus h. horridus	Timber Rattlesnake
Natrix s. sipedon	Water Snake
Corphophis a. amoena	Worm Snake
Turtles	
Clemmys muhlenbergi	Bog Turtle
Malaclemys t. terrapin	Diamond Back Terrapin
Terrapene c. carolina	Eastern Box Turtle
Kinosternon s. subrubrum	Eastern Mud Turtle
Chrysemys p. picta	Eastern Painted Turtle
Chelydra serpentina	Snapping Turtle
Clemmys guttata	Spotted Turtle
Sterothaerus ocoratus	Stinkpot Turtle
Clemmys insculpta	Wood Turtle
Lizards	
Sceloporus undulatus hyacinthus	Northern Fence Lizard
Eumeces fasciatus	Five-Line Skink
Lygosoma laterale	Ground Skink
Mammals in Barnegat Township	
Estesicus fuscus	Bat, Big Brown
Myotis lucifugus	Bat, Little Brown
Lasiurus cinereus	Bat, Hoary
Myotis keenil septentrionalis	Bat, Keen's
Lasiurus borealis	Bat, Red
Lasionycteris noctivagans	Bat, Silver Haired
Castor canadensis	Beaver
Tamias striatus	Chipmunk, Eastern
Silvilagus floridanus	Cottontail, Eastern
Canis latrans	Coyote

Odocoileus virginianus	Deer, White Tailed
Urocyon cinereoargentus	Fox, Gray
Vulpes fulva	Fox, Red
Lepus europaeus	Hare, European
Synaptomys cooperi	Lemming, Southern Bog
Mustela vison	Mink
Scalopus aquaticus	Mole, Eastern
Parascalops breweri	Mole, Hairy Tailed
Condylura cristata	Mole, Star Nosed
Peromyscus maniculatus	Mouse, Deer
Mus musculus	Mouse, House
Zapus hudsonius	Mouse, Meadow Jumping
Clethrionomys gapperi	Mouse, Redbacked
Peromyscus leucopus	Mouse, Whitefooted
Ondatra zibethica	Muskrat
Didelphis marsupialis	Opossum
Lutra canadensis	Otter, River
Pipistrellus subflavus	Pipistrelle, Eastern
Lepus californicus	Rabbit, Jack
Procyon lotor	Raccoon
Rattus rattus	Rat, Black
Rattus norvegicus	Rat, Norway
Oryzonys palustrus	Rat, Rice
Sorex cinereus	Shrew, Masked
Cryptotis parva	Shrew, Least
Blarina brevicauda	Shrew, Short-Tailed
Sorex fumeus	Shrew, Smokey
Mephitis mephitis	Skunk, Striped
Glaucomys volans	Squirrel, Flying
Sciurus carolinensis	Squirrel, Gray
Tamiasciurus hudsonicus	Squirrel, Red
Microtus pennsylvanicus	Vole, Meadow
Pitymys pinetorum	Vole, Pine
Mustela frenata	Weasel, Longtail
Marmota monax	Woodchuck

Endangered/Threatened Fauna Species

As discussed in the Endangered/Threatened Flora Species section above, according to the Landscape Project, Version 2.1 (Figure 13) there are threatened or endangered species located in grassland, forest, forested wetland, and emergent wetland habitats. There is also a bald eagle foraging habitat located in Barnegat Township. The forest habitat includes rank 3 areas, areas listed as state threatened species, for the following species: red shouldered hawk and timber rattlesnake, barred owl, northern pine snake and pine barrens tree frog. The emergent wetlands habitat includes rank 3 and 4 areas, areas listed as state and federal endangered species, for the following species: osprey, which is listed

as a state endangered species; black skimmer, black crowned night heron; and, colonial water bird and tern species foraging. The forested wetlands habitat includes ranks 3 areas for the following species: Pine Barrens tree frog, which is listed as a state threatened species.

Red Shouldered Hawk (Buteo lineatus)– The red shouldered hawk is listed as a state endangered species and occurs throughout the state. Red shouldered hawk use lowland hardwood, mixed and conifer forests (i.e. Atlantic white cedar stands) near swamps, rivers and ponds for breeding.

Timber Rattlesnake (Crotalus horridus) – Timber rattlesnakes, listed as a state endangered species, requires both upland and forested wetland habitats for hibernation. In southern New Jersey, timber rattlesnakes are mostly found in the Pine Barrens and fringe areas within Monmouth, Cumberland, Ocean and Burlington Counties. Timber rattlesnakes are more commonly associated with the Lakehurst soils located within the northeastern portion of the Borough.

Barred Owl (Strix varia) - Barred owls are listed as state threatened species and are found throughout the state. Barred owls use both uplands and wetland habitats. In southern New Jersey barred owls are typically found among Atlantic white cedar swamp, pitch pine lowland habitats and hardwood swamps.

Northern Pine Snake (Pituophis melanoleucus) – The northern pine snake is listed as a threatened species in New Jersey and is found in areas of sandy soils and upland forests mostly within the Pinelands. Northern pine snakes are more commonly associated with the Lakehurst soils located within the northeastern portion of the Borough.

Pine Barrens Treefrog (Hyla andersonii) – The Pine Barrens treefrog requires both upland and forested wetland habitats and are found throughout the Pine Barrens. Pine Barrens treefrogs breed in seepage bogs, cranberry bogs, small ponds and streams, Atlantic white cedar swamps, and pitch pine lowlands.

Osprey (Pandion haliaetus) – The osprey is a state threatened species that is concentrated along the Atlantic coast and Back Bay areas. Ospreys are located in areas of high fish populations such as rivers, lakes, and/or coastal waterbodies.

Black Skimmer (Rynchops niger) – The black skimmer is listed as a state endangered species and is typically found on open sandy beach areas. Black skimmers use shallow water tidal creeks and inlets for foraging.

Black Crowned Night Heron (Nycticorax nycticorax) – The black crowned night heron is listed as a state threatened species and uses forests, marshes, ponds and scrub/shrub areas for nesting and foraging. They prefer areas with dense cover such as phragmites stands and wooded swamps and forage along salt marshes and shallow tide pools.

Cooper's Hawk (Accipiter cooperii) – The Cooper's Hawk is listed as a state threatened species that uses red maple or black gum swamps and some Atlantic white cedar swamps for breeding. Other threatened and/or endangered species not located on the Landscape Project Mapping and possibly present within Barnegat Township include:

Bald Eagle (Haliaeetus leucocephalus) - The bald eagle is listed as a state endangered species. In June of 2007, the bald eagle was removed from the Federal List of Endangered and Threatened Wildlife and Plants; however, the bald eagle is still protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Bald eagles mostly occur in the drainage system of the Delaware Bay. However, Bald Eagle sightings have become increasingly common within the Township.

Peregrine Falcon (Falco peregrinus) – The peregrine falcon is listed endangered in the state of New Jersey. Peregrine falcons are usually found where foraging is best along open areas such as lakes, rivers, and marshes.

Roseate Tern (Sterna dougalii) – The roseate tern is listed as endangered at both the state and federal levels. This species nests on barrier islands and salt marshes and above the high tide line within vegetated dunes. This species prefers dense concentrations of beachgrass and seaside goldenrod for cover.

Piping Plover (Charadrius melodus) – The piping plover is listed as endangered in the state of New Jersey and threatened at the federal level. Piping plovers nest on sandy beaches between the dune and high tide line.

Least Tern (Sterna antillarum) – The least tern is listed as state endangered. The smallest of the tern species in North America, the least tern nests along beaches with sparse vegetation. Terns forage in bays, lagoons, rivers and lakes along the coast.

Northern Harrier (Circus cyaneus) – The northern harrier is listed as endangered in the state. This bird, formally known as the marsh hawk, is found in tidal marshes, emergent wetlands, grasslands, meadows and agricultural areas.

ENVIRONMENTAL ISSUES

CONTAMINATED SITES

According to the Known Contaminated Sites GIS data there are seven contaminated sites that are documented within Barnegat Township. These include two (2) marinas, Bob's Bay Marina and Sun Harbor Marina, the Edwin B. Forsythe NWR (Barnegat Refuge), Plaza Dry Cleaners, and three private homes. There are also 18 known contaminated sites with active remediation and are shown below in Table 7.

Table 7: Active Sites with Confirmed Contamination

Site ID (Master File)	PI Number	PI Name	Line Address
368935	456409	112 Winward Drive	112 Winward Dr.
371796	460125	12 Maple Avenue	12 Maple Ave.
224231	292684	12 Spar Court	12 Spar Ct.
369612	457360	139 Barnegat Boulevard	139 Barnegat Blvd.
365435	451712	14 Midway Court	14 Midway Ct.
364100	449921	151 Windward Drive	151 Windward Dr.
222140	290118	175 Village Drive	175 Village Dr.
221851	289750	38 Schooner Avenue	38 Schooner Ave.
352176	434658	4 Bilge Avenue	4 Bilge Ave.
363876	449648	4 Ensign Avenue	4 Ensign Ave.
358004	442667	56 Georgetown Boulevard	56 Georgetown Blvd.
364558	450507	6 9th Street	6 9th St.
357718	441747	69 Windward Drive	69 Windward Dr.
362353	447523	972 West Bay Avenue	972 W Bay Ave.
15692	012028	Bobs Bay Marina	459 E Bay Ave.
15149	006729	Cumberland Gulf 126433	334 S Main St.
15157	G000037604	Plaza Dry Cleaners	580 N Main St.
15158	026923	Sun Harbor Marina	451 E Bay Ave.

Source: NJDEP Site Remediation Program Active Sites With Contaminated Contamination, prepared 5/9/2008

The NJDEP Site Remediation Program also has pending sites with confirmed contamination. There are five pending sites in Barnegat Township with contamination and are shown below in Table 8.

Table 8: Pending Sites with Confirmed Contamination			
Site ID (Master File)	**PI Number**	**PI Name**	**Line Address**
195597	256834	1092 West Bay Avenue	1092 W. Bay Ave.
375642	465563	23 Village Drive	23 Village Dr.
178018	233278	44 Bowline Street	44 Bowline St.
200667	263987	92 Barnegat Boulevard	92 Barnegat Blvd.
65994	G000000007	Edwin B. Forsythe NWR (Barnegat Refuge)	700 W. Bay Ave.
Source: NJDEP Site Remediation Program Pending Sites With Contaminated Contamination, prepared 5/9/2008			

The NJDEP Site Remediation Program also includes sites where remediation has been completed. Barnegat Township has 154 sites that have been remediated

The Environmental Protection Agency's Permit Compliance System (PCS) is a database of all water pollution permits. There are six of these permit holders in Barnegat including Bob's Bay Marina, Indianola Sewage Company, Mariner's Marina Inc, Sherers Boat Basin, Sun Harbor Marina, and Total Marina (Right To Know).

All known contaminated sites within the Township are shown on Figure 14, known as "Contaminated Sites".

Influence of Fire

Although Barnegat Township receives plenty of rainfall, the sandy soil is very porous and therefore does not retain water for long. This creates a very dry, fire-prone environment and the vegetation had to evolve to accommodate this. With a majority of forests dominated by pitch pine and oaks, and shrub understory throughout the lowland habitats as well as the upland habitats, the Pine Barrens are highly flammable. Available fire frequency data and other fire characteristics are listed below in Table 9.

Above all, forest fire frequency is responsible for the composition of upland forests. Because of a higher fire frequency, pitch pine dominates lowland areas. Oak is most prevalent in the upland areas with a lower fire frequency. Fire is suspected to be a major causative factor in the development of the unique dwarf pine-oak forests in the East and West Plains, which is located in Barnegat Township.

The presence of fire in these habitats is very important to the continuation of many rare and unique floral species that depend upon fires to establish open areas for seed germination and to prevent over-competition from other common species. Some of these unusual species which favor recent burned areas are: Blazing Star, Broom Crowberry,

Turkey Beard, Sand Myrtle, Pine Barrens Heather, Bearberry, Pyxie Moss, and Pine Barrens Gentian.

Table No. 9
Forest Fire Fuel Key

Species	Rate of Spread	Resistance To Control	Crowning Potential
Lowland Forest Association			
Atlantic White Cedars	Low	Medium	High
Hardwood Swamp	Low	Low	None
Pitch Pine Lowland	Extreme	Extreme	Extreme
Lowland Non-forest	Extreme	Low/Extreme	None
Upland Forest			
Pine-dense and large	Medium	Low	High
Pine and Oak/Pine, open and large	High	Medium	Medium
Pine and Oak/Pine, small and variable heights (Includes scrub oak)	Extreme	Medium	Extreme
Upland Non-Forest	Extreme	Low	None

Source: NJ Bureau of Forestry, Environmental Resource Inventory of the Township of Barnegat Ocean County, New Jersey; September 1978

The High, Moderate, and Low ratings are explained as follows:

1. High Fire Frequency is found in the forests of the Plains, where forest fires occur most frequently. Due to their great resistance to fire, the dominant species of this area include Blackjack oak and pitch pine. These dwarf forests have been shown to have a fire frequency up to three (3) times greater than the other areas of the pinelands. It has been estimated that fires occur on an average of every 6-8 years on the Plains.

   The dwarf forest area is equivalent to the category of a "Pine and Oak/Pine, small or variable heights" in Table 3. Their rate of spread is very fast, due to the dryness of the soil and vegetation. The chances of the fire reaching the crowns of the trees are also very high. These types of trees have a relatively small stature, ranging from 3-5 feet in height, and fire can quickly reach the treetops.

   This type of forest is rated high for forest fire danger due to the fire frequency and its efficient performance as fuel for fire. Together, they place a high constraint on the developablity of a dwarf-forested area.

2. Moderate Fire Frequency is found in the upland forest, upland non-forest, and lowland non-forest. These forested areas are dominated by pine or oak. Fires occur an average of every 16-25 years. There is a medium to high rate of spread, with a slow to medium resistance of control in these forest types, depending on the density. The denser the stand of trees, the higher potential is present for crowning fires, while more open stands have a medium potential. The upland forests have a lower frequency and rate of fire than forests that are located in the Plains. There is a moderate chance of a fire for developments that are located in these areas.

   The upland non-forests are also rated as Moderate, with an extremely high rate of spread, and a low resistance to control.

   Like the upland non-forests, the lowland non-forest also contains an extremely high rate of spread. The lowland non-forest has a highly variable resistance to control, ranging from low to extreme. The frequency data was not available for the lowland non-forest. It appears the wet soils reduce the frequency of fire in this area; however, the rating has been set to Moderate due to other dangers of spread and resistance to control.

3. Low Fire Frequency is found in the lowland forests. Although frequency figures were not available, wet soils play a large role in fire activity. Within the years between 1967 and 1977 it is estimated that about 20% of forest fires occurred in the lowland, while the other 80% occurred in the upland forests. It seems reasonable to assume that this forest type has the lowest frequency. On rare occasions when fires do occur, the damage can be very substantial due to a thick understory. When there are no severe conditions, such as strong winds or dry weather, lowland forests can be helpful during a fire. The lowland forests with favorable conditions can be used as a firebreak.

   There is a low rate of fire spread associated with the swamp forest species, particularly cedar swamp species. Cedar swamps have a medium resistance to control and a high crowning potential, due to their density. Hardwood swamps offer a low resistance to control, a low rate of spread and a lack of crowning potential.

   There is one exception within the lowland forest. The pitch pine lowland forest has an extreme rate of spread, resistance to control, and a high crowning potential. The frequency of fires in a pitch pine lowland forest is lower than the upland pitch pine forests, particularly due to present wet soil conditions.

   The lowland forest has a low fire danger and is rated as containing slight development constraints. Information on fire danger was not available for a Tidal Wetland forested area.

According to the Land Use Ordinance of Barnegat Township, Section 55-294 Fire Protection and shown below in Table 10, the current Fire Hazard Classification are as follows:

Table 10: Fire Hazard Classification	
Hazard	**VEGETATION TYPE**
Low	Atlantic white cedar hardwood swamps
Moderate	Non-pine barrens forest, Prescribed burned areas
High	Pine barrens forest including mature forms of pine, pine-oak or oak-pine
Extreme	Immature or dwarf forms of pine-oak or oak-pine; all classes of pine-scrub oak and pine-lowland
Source: Ordinance.com	

As per the ordinance, no applications requesting development in fire hazard areas moderate through extreme are accepted without fulfilling multiple criteria depending on the number of units proposed. Any development with 25 or more units must have at least two access ways to accommodate fire-fighting equipment. Dead-end roads must also be able to accommodate fire equipment. A fuel break must be maintained along rights-of-way as well as surrounding uses specific for people. More specifically, a fuel break of 75 feet is necessary in areas of high fire hazard and 100 feet in extreme high hazard areas.

The ordinance also contains specific structural guidelines for any development within a fire hazard zone. The roofs and outside of the buildings much be constructed of fire resistant materials, all additions such as decks or balconies, must also be constructed of fire resistant materials, openings to the outside, such as chimneys, must be covered with screens over the outlet, and anywhere that vegetation may be higher than the roof line, flat roofs are prohibited.

In addition to the ordinance requirements, the Township is taking other steps towards fire safety and prevention. Currently, the Township is working with Stafford Township, Ocean County, and the New Jersey Forest Fire Service to create a fire control plan. They have recognized the importance of fire to the Pinelands ecosystems and that people who own property in the highly fire prone areas must find ways to maintain and protect their land from the spread of fire. Also, according to a discussion regarding the forest fire control program the Pinelands will conduct a study of all the high hazard fire-prone areas that exist to this date. (Pinelands Commission Meeting March 14, 2008 Minutes).

THE BUILT ENVIRONMENT

EXISTING LAND USES

Barnegat Township is located in the southern portion of Ocean County, New Jersey. The west most boundary of the township borders Burlington County, while the east portion meets the Barnegat Bay. Lacey Township and Ocean Township border Barnegat on the north and Stafford Township borders it on the south. Barnegat Township covers 34.9 square miles, or 22,336 acres, of land.

Route 72 bisects the northwestern portion of the Township, and splits to the southeast, while Route 554 continues through the Township and crosses the Garden State Parkway and U.S. Route 9, both of which run north and south through the southeast portion of the Township.

The Township has many recreation areas and parks. Many of the parks have basketball courts and playground equipment including Bowline/Bilge, Village Drive, Beverly Drive, Georgetown Boulevard, First Street, Lower Shore Road, and Koridago Cove at Rosehill RD. There is Skateboard and Bike Park at the Municipal Complex. Other parks include Meadowedge Park and Cloverdale Farm County Park in Barnegat.

Specific land uses within the Township are listed below. The land-uses were based on the NJDEP GIS database information. In addition, a map depicting generalized land-uses can be found in Figure 15.

- Residential
- Commercial
- Artificial Lake
- Barren Lands
- Recreational
- Agricultural
- Tidal Water
- Saline Marsh

- Atlantic White Cedar Wetlands
- Transportation & Utilities
- Cemetery
- Coniferous Scrub/Shrub
- Coniferous Forest
- Deciduous Scrub/Shrub
- Deciduous Forest
- Dredged Lagoon
- Industrial
- Mixed Forest
- Mixed Scrub/Shrub
- Old Field

The current zoning for Barnegat Township is split between two regions, East of the Parkway (Municipal Zone Districts) and West of the Parkway (Pinelands Zone Districts). The Zoning Districts east of the Parkway include the following zones:

PW - Preserved Waterfront Zone

This zone district permits single-family homes, cluster development, civic buildings, schools, children nurseries, open space, golf courses, country clubs, and other recreational facilities, horticulture, campgrounds, raising farm animals, commercial farming and forest harvesting, as well as other farming operations, riding stables, and bed and breakfast businesses.

R-40 Residential Zone

This zone district permits single-family homes, civic buildings, schools and nurseries, open space, hospitals and other care facilities, places of worship, golf courses and other recreational facilities, campgrounds, horticulture, farming and road side stands for produce retail.

R-15 and R-20 Residential Zone

These zone districts include, but are not limited to, single-family homes, civic buildings, schools and nurseries, open space, places of worship, and horticulture.

R-10 Residential Zone

This zone district permits single-family homes, civic buildings, schools, open space, places of worship, and public utilities.

R-7.5, RC-7.5, R-6 Residential Zone

The permitted uses for the R-7.5, RC-7.5, and R-6 Residential Zones are the same as the R-10 Residential Zone with the exception of schools.

R-MF Residential Multifamily

Permitted uses for the R-MF Residential Multifamily Zone include two-family homes, attached single-family homes (also known as townhouses), along with accessories, adult communities, open space, necessary public utilities, detached single-family homes, and civic buildings.

C-M Marine Commercial

Permitted uses in the C-M Marine Commercial Zone include retail, business and professional offices, restaurants, marinas, civic buildings, open space, public utilities, detached single-family homes, bed and breakfast inns, and flea markets.

C-N Neighborhood Commercial

Permitted uses in C-N Neighborhood Commercial Zone include retail, business and professional offices, gas stations, children nurseries, open space, public utilities, restaurants, bed and breakfast inns, ambulance dispatch services, flea markets, funeral homes, car wash, civic building, and detached single-family homes.

C-PHD Commercial Planned Highway Development

Permitted uses for the C-PHD Commercial Planned Highway Development Zone include hotels, retail, business and professional offices, funeral homes, restaurants and fast food restaurants, gas stations, vehicle, boat, and other equipment sales, building material sales, animal hospitals, vehicle repair shops, civic buildings, schools and nurseries, open space, hospitals and other care facilities, places of worship, public utilities, warehousing, distribution centers, product packaging and assembly, commercial recreation, flea markets, light manufacturing and machinery service.

C-V Village Commercial Zone

The permitted uses of the C-V Village Commercial Zone include detached single-family homes, bed and breakfast inns, retail, business and professional offices, funeral homes,

restaurants, animals hospitals, civic buildings, schools, day nurseries, open space, places of worship, public utilities, roadside produce sales, flea markets, and nursing homes.

ML-1 Residential Zone

The permitted uses in the ML-1 Residential Zone include detached single-family homes, civic building, open space, places of worship, public utilities, and garden apartments.

ML-2 and ML-3 Residential Zone

The permitted uses in the ML-2 and ML-3 Residential Zone include detached single-family homes, civic buildings, open space, places of worship, and public utilities.

ML-4 and ML-5 Multifamily Residential Zone

The permitted uses for the ML-4 and ML-5 Multifamily Residential Zone include garden apartments, open space, public utilities, and civic buildings.

Barnegat Historic District

The Barnegat Historic District is located within the R-7.5 Zone and C-V Zone. No buildings or structures may be built, reconstructed, demolished, altered or restored without the consent of the Planning Board and the Historic Preservation Commission.

Pinelands Zone District

The Zoning Districts west of the Parkway into the following zones:

PA Presentation Area Zone

Permitted uses in this zone district include detached single-family dwellings, raising farm animals, berry agriculture, forestry, fish and wildlife management, beekeeping, and Pinelands development credits.

PF Preserved Forest Pinelands

Permitted uses of the Preserved Forest Pinelands Zone include detached single-family homes, horticulture, farming, and forestry, raising farm animals, and riding stables.

PI Planned Industrial

Permitted uses include all permitted or conditional uses in the PF Zone except for the residential and institutional uses.

C-PHD Commercial-Planned Highway Development

C-PHD Commercial-Planned Highway Development permits the same uses as the PF Zone. However, residential development is prohibited in this zone district.

CN Neighborhood Commercial

Permitted uses for the CN Neighborhood Commercial Zone include retail, business and professional offices, gas stations, children nurseries, open space, public utilities, funeral homes, restaurants, car wash, animal hospital, civic buildings, hospitals and nursing homes, places of worship, and recreation facilities.

RC- Residential Conservation

Permitted uses for the RC- Residential Conservation zone include fish and wildlife management, low intensity recreation, public utilities, and detached single-family homes.

RL Residential Low /AC Residential Low/Adult Community

Permitted uses in the RL Residential Low/AC Residential Low/Adult Community zone include single-family homes, adult community homes, cluster development, civic buildings, schools and nurseries, open space, hospitals, places of worship, recreation areas, campgrounds, public utilities, horticulture, animal and plant farming, and forestry, as well as roadside produce retail.

RM Residential Medium

The permitted uses in the RM Residential Medium include single-family homes, open space, public utilities, horticulture and farming.

RH Residential High

The permitted uses in the RH Residential High include single-family homes, open space, public utilities, and pump stations.

RC Residential Conservation

Permitted uses in the RC Residential Conservation zone include fish and wildlife management, low intensity recreation areas, public utilities, pump stations, and single-family homes.

MH Mobile Home Residential Zone

MH Mobile Homes Residential zone permit detached mobile home, civic buildings, open space, and public service infrastructure.

ML #5 Multi-Family Residential

The permitted uses for the ML-5 Multifamily Residential Zone include garden apartments, open space, public utilities, and civic buildings.

A copy of the zoning map for Barnegat Township can be found in Figure 19.

THE NEW JERSEY STATE DEVELOPMENT AND REDEVELOPMENT PLAN

The New Jersey State Development and Redevelopment Plan (SDRP) was first adopted in 1992 and later updated and revised in March 2001. The SDRP sets forth a vision and a plan for the future of New Jersey. To help realize this vision, the SDRP sets forth a vision and a plan for the future of New Jersey. To help realize this vision, the SDRP identifies goals and strategies that are intended to guide public policy decisions. The SDRP continues to strongly support the preservation of agriculture in the State. In fact, the promotion and preservation of agriculture in the State is a major goal of the SDRP and is supplemented by 23 separate statewide agricultural policies to be used by state, county and local agencies in their planning and decision-making processes.

The SDRP designates land areas within New Jersey into one of five Planning areas. Within the SDRP, Planning Areas serve a pivotal role by setting forth Policy Objectives that guide the application of the State Plan's Statewide Policies within each area and serve to achieve the goals of the State Planning Act. A Planning Area is a large mass of land with tracts that share certain characteristics, such as population density or natural features.

In addition, Planning Areas guide local planning and decisions on the location and size of Centers and Cores within Planning Areas and protect or enhance the Environs of these Centers, primarily in Planning Areas 3 through 5. The Planning Areas are listed below.

- PA 1 Metropolitan Planning Area
- PA 2 Suburban Planning Area
- PA 3 Fringe Planning Area
- PA 4 Rural Planning Area and
- PA 4B Rural/Environmentally Sensitive Planning Area
- PA 5 Environmentally Sensitive Planning Area and
- PA 5 Environmentally Sensitive/Barrier Islands Planning Area

Characteristics that define Planning Areas include population density, infrastructure, road systems, land area, adjacent land areas, soils and natural environmental features.

Barnegat Township contains four (4) State Planning Areas and include, but not limited to, Suburban Planning Area (PA2), Environmentally Sensitive Planning Area (PA5), Pinelands and Federal Parks.

The Pinelands State Planning Area is located west of the Garden State Parkway.

The Suburban State Planning Area (PA2) is located between the Garden State Parkway and US Rt. 9. A pinelands designation can be found west of the Garden State Parkway.

Environmentally Sensitive Planning Area (PA5) can be found east of US Route 9. Federal Park designations can be found along the coastal/shoreline of Barnegat Township.

The State Development and Redevelopment Plan for Barnegat Township is shown below in Figure 16.

Historic, Recreational, and Economic Value

Humans have exploited the natural environments of Barnegat Township since the time of the Indians. Historically, fines were created in the Pine Barrens to clear area for travel and to encourage wildlife habitats.

Along with the Indians, colonial settlers used the Pinelands resources extensively. Logging was the primary resource that was used. The lumber was utilized for firewood, homes and boats, shingles, and turpentine. The Pinelands ecosystem was also utilized for farming, especially blueberry fields in the uplands and cranberry bogs along waterways, and soil and gravel were excavated to create sand roads. Local communities also used the plant resources, such as sphagnum moss, pitch pine cones, gray birch twigs, and mountain laurel greens, for florist shops.

These disturbances of the original habitats gave way to unusual and non-native species, such as Curly Grass Fern, Sundews, Pitcher Plants, and the rare Pine Barrens Tree Frog.

As stated in the Townships 1978 Natural Resource Inventory, "Man has influenced all areas of Barnegat Township and because of this it appears as though wise management of open spaces within the Township should take place to ensure the continuance of the unique species that rely on natural and/or man-caused disturbances for their future existence".

Figure 18 depicts Barnegat Township's historic district, which is located within the vicinity of the Rt. 9 and Bay Avenue intersection.

Environmental Resource Inventory of the Township of Barnegat Ocean County, New Jersey; September 1978

TOWNSHIP UTILITIES AND SERVICES

Drinking Water

The majority of Barnegat Township is serviced by the Barnegat Township Water and Sewer Department. The Township water and sewer department complies with the Safe Water Drinking and Water Allocation requirements of the NJDEP.

The Township acquires its drinking water supply from seven (7) public supply wells. The groundwater for Barnegat is sourced from the Atlantic City 800-foot sand aquifer. The public supply wells for Barnegat Township are listed in table 5 (page 27) of this report and a map depicting the public supply wells can be found in Figure 10 of this report. Barnegat Township's 2008 approved diversion is defined in Water Allocation Permit No. 5301 and is allowed 154 MGY and 1,162 MGY per year. The 2008 Water Utilization Report for 2008 indicated that July had a peak of 94.886 MGM. The report also indicated that a total of 661.254 MGY was pumped for 2008 and below its water allocation amount.

During current groundwater withdrawl, there are no adverse impacts on residents. In addition, it appears there are no known impacts on the environment other than the obvious pumping of groundwater out of the aquifer, which eventually ends up in the Atlantic Ocean.

BEI reviewed the USGS report entitled "Simulation of proposed increases in ground-water withdrawals from the Atlantic City 800-foot sand, New Jersey Coastal Plain". Based on review of the report, it appears groundwater within the Township of Barnegat could be considered a finite resource.

The report had indicated that the deeper aquifers and the Atlantic City 800-foot sand aquifer groundwater amounts are declining. In addition, the report indicates that water from the updip area of the Pinelands reportidly had been intruding into the 800-foot sand aquifer. Approximately sixty-three percent (63%) of the groundwater that infiltrates into the Township of Barnegat's wells originate from the Pinelands aquifer and twenty-seven percent (27%) from the Kirkwood-Cohansey Aquifer.

NJDEP has assessed Ocean County as having adequate water supplies. Even during a period of severe drought in 2002, Ocean County's watersheds were adequate. As a preventive measure the Township contains water restriction requirements within its Township ordinance and are listed below.

Code Section 74-21.1 for wasting water prohibits a person from flowing water unnecessarily from any part of a private pipe or fixture, even to prevent freezing, or shall permit any waste of water on his premises or the premises occupied by him, either within a building or upon any yard, street or alley. In addition, the correction of leaks should be maintained by the responsible property owner.

Code Section 74-21.2 for outdoor water use states, that the right to use Township supplied water through a hose or sprinkler for the watering of lawns, gardens or shrubbery is expressly held subject to the right of the Township to revoke that right at any time, when in the opinion of the Township and the Director of Public Works determines that the supply of water is to low. The use of any hose or sprinkler shall be restricted to use on the premises of the taker and shall be used during the following days and hours only: From May 15th to September 15th of the calendar year, from 6:00 p.m. to 10:00 a.m. From September 16th to May 14, without limitation.

Code Section 74-21.3 for outdoor water use/irrigation restrictions requires residences, houses or other structures with even number street numbers to irrigate their property on Sunday, Wednesday and Friday. Likewise odd number residences are permitted to irrigate on Tuesday, Thursday and Saturday.

Based on review of Barnegat's well data, it appears the Township has ample capacity for peak usage and for committed peak (projects not built to date) usage.

Sewer

Public sewer service is provided by the Barnegat Township Water and Sewer Department. All developed areas and a majority of the Township is provided with sewer service, with the remainder being served by individual septic systems. As of January 1, 2009, the municipal sewer system in Barnegat Township had 6,654 connections (customer households); 77 miles of sewer mains, 43,824 feet of force mains and 15 pump stations in addition to any privately owned and operated sewage pumping stations.

The Township does not contain a sewage treatment plant. All sewage is sent to the Ocean County Utilities Authority (OCUA) for treatment prior to discharge into the Atlantic Ocean. The OCUA central treatment plant is located in Bayville, New Jersey and is permitted for a flow of 32 MGD. Some of the sewage is also sent to the OCUA's southern treatment plant that is located in Stafford Township, New Jersey and is permitted for a flow of 20MGD. Barnegat Township sent a total of 430.264 MG of treatment in 2008.

To date, the Township does not have an approved sewer service area map. It is important to note that the Ocean County Planning Board submitted an updated Wastewater Management Plan to the NJDEP for review and comment. Through discussions with NJDEP and county planning staff, the existing county sewer service area will change. The NJDEP recommended the removal of certain areas throughout the County, including Barnegat Township. However, the Township has not prepared a sewer service area map at this time and awaiting for the County's map to be approved by the NJDEP.

CRITICAL AREAS

The Barnegat Township Environmental Commission has indicated that there are five (5) locations within the Township that should be considered as critical areas and should be protected from any future development. The five (5) locations include: The Pan Coast Road Corridor, Gunning River Headwaters (east), Lochiel Creek Headwater, Gunning River Headwaters (west) and Ridge Way West. These areas are shown on Figure 17 Critical Areas Map and described briefly below:

Pan Coast Road Corridor

This area is located along the northerly township line between Ocean Township and Barnegat Township and west of the Garden State Parkway. The Pan Coast Road Corridor encompasses 3.5 square miles. Based on review of the NJDEP Landscape Project 2.1, it appears that the Pan Coast Road Corridor contains a forested critical habitat for some wildlife species. The Pan Coast Road Corridor was an old stagecoach line during the late 1800's. In addition, this corridor is proposed to join the rails to trails project that is under the jurisdiction of Ocean County. The vegetation present along the corridor includes oak/pitch pine forested areas. Several residential developments are located just south of the Pan Coast Round Corridor.

Gunning River Head Waters (East)

This area is located within the southeasterly section of the Township and encompasses approximately 56.89 acres. This critical area is located east of Rt. 9 and fronts along New Road and Lower shore Road. The headwaters of Gunning River are located within this location and eventually empty into the Barnegat Bay. Gunning River and its tributaries that are located within the Edwin B. Forsythe National Wildlife Refuge are designated C-1 waterways. Based on review of the NJDEP GIS Wetland database and the Landscape Project 2.1 database, it appears wetland areas and forested critical wetland habitats are present at this location. Some commercial and residential development is located east of this critical area.

Lochiel Creek Headwater

The Lochiel Creek Headwater is located and fronts along Barnegat Bay Boulevard and encompasses approximately 18.64 acres. This critical area is characterized by steep slopes and unique topography. Based on review of the NJDEP Landscape database, this area contains a critical habitat for some wildlife species. Residential development is located to the northeast and south of Barnegat Boulevard. The enclosed photo on page 84 depicts the Lochiel Creek headwater that fronts along Barnegat Bay Boulevard.

Gunning River

The Gunning River Headwaters is located just west of US Rt. 9 and encompasses approximately 53.86 acres. This site was the location of the former Barnegat Township water treatment plant. Based on review of the NJDEP GIS database for wetland and Landscape Project 2.1, it appears wetland areas; critical forested habitat and forested critical habitat for some wildlife species are present within this critical area. Residential development is located to the north and west of this location. The enclosed photo below depicts an area at the Gunning River headwater.

Ridgeway West

The Ridgeway West critical area is located east of US Rt. 9 and fronts on the north and south side of Bay View Boulevard. This critical area encompasses 117.28 acres. Based on the NJDEP GIS database layer, this location contains wetland areas and forested wetland suitable habitat for some wildlife species. Some sporadic residential development is located to the south and vacant land is located to the north. Enclosed below is a photograph that was taken from the Ridgeway Street R.O.W. and looking in an easterly direction towards the Barnegat Bay.

A more detailed description of environmentally sensitive areas within the Township was prepared by Dr. V. Eugene Vivian and can be found in Appendix A of this report.

There are several State agencies that have regulations in place to protect the above mentioned critical areas and other environmentally sensitive areas that are located within the Township and include, but are not limited to, the Flood Hazard Area Control Act, Pinelands Comprehensive Management Plan, Coastal Area Facilities Review Act (CAFRA), Tidal Wetlands Act, Waterfront Development Act and the Freshwater Wetlands Protection Act.

Flood Hazard Area Control Act

There are two (2) areas protected under this Act and include the flood hazard area and the riparian zone.

A flood hazard area exists along every regulated waterway that contains a drainage area of 50 acres or more. If a waterway has a drainage area of less than 50 acres, the waterway does not have a flood hazard area and is not regulated under the Flood Hazard Area Control Act. As previously discussed in the Water Resources section of this report, a flood hazard area is comprised of a flood fringe and a floodway. The Atlantic Ocean and other non-linear tidal waters such as bays and inlets do not have a floodway. Flood hazard areas along tidal waters are considered to be a flood fringe for the propose of the Flood Hazard Area Control Act Rules. The methods for determining the limits of the flood fringe and floodway can be found in N.J.A.C. 7:13-3 of the Flood Hazard Area Control Act Rules.

The other area protected under the Flood Hazard Area Control Act is the riparian zone. This zone exists along every regulated waterway, except there are no riparian zones along the Atlantic Ocean, man-made lagoons, stormwater management basins, oceanfront barrier islands or a peninsula. The regulated water is part of the riparian zone. Methods for determining the limits of the riparian zone can be found in N.J.A.C. 7:13-4.1 of the Flood Hazard Area Control Act Rules.

All stream corridors within Barnegat Township are protected by this regulation.

Coast Area Facilities Review Act

CAFRA regulates development in certain coastal areas of Atlantic, Burlington, Cape May, Cumberland, Middlesex, Monmouth, Ocean and Salem Counties. The regulations divide CAFRA areas into pieces and zones, and regulates different types of development in each zone. Generally, the closer you are to the water, the more likely that development will be regulated. Development in a CAFRA zone can be regulated from the mean high water line to a point 500 feet landward of the mean high-water line. If a municipality meets the criteria of a "qualifying municipality", CAFRA can regulate development beyond 500 feet landward of the mean high water line of any tidal waters or the landward limit of a beach or dune.

Tidelands Act

This is a coastal program that is related to, but is not part of CAFRA, is the Wetlands Act of 1970. The Tidelands Act is designed to protect the ecological balance and unique habitat of the inter tidal estuarine zone. State tidal wetlands maps depict the area of each coastal county that is regulated. The significant difference between this act and other coastal and wetland regulations is the fact that the maps promulgate the regulations. The coastal areas of Barnegat Township are protected by this regulation.

Water Front Development Act

This regulation is focused on the preservation and enhancement of navigable waterways for purposes of marine, commerce through the regulation of waterfront development. The Waterfront Development Act regulations apply to all waterfronts of all coastal waterways in the state, with the exception of upland areas that are under CAFRA jurisdiction.

The act delineates three (3) types of waterfronts:

- Hackensack Meadowlands area, which includes all waterways below the mean high-waterline.
- CAFRA, which includes the coastal area inter tidal waterways below the mean high-water line.
- Other areas, which include all inter tidal lands below the mean high-water line and upland areas to the first paved road, railroad or surveyable property line, and containing an area not less than 100 feet nor more than 500 feet deep.

The coastal/shore areas of Barnegat Township are protected by this regulation.

Freshwater Wetlands Act

Under this act, wetlands are categorized as either Exceptional, Intermediate or Ordinary. A more detailed description of the Freshwater Wetlands Protection Act can be found in the Natural Resources and Biological Resources wetland section of this report.

There are several wetland areas within the Township that are protected by this regulation.

Pinelands Comprehensive Management Plan

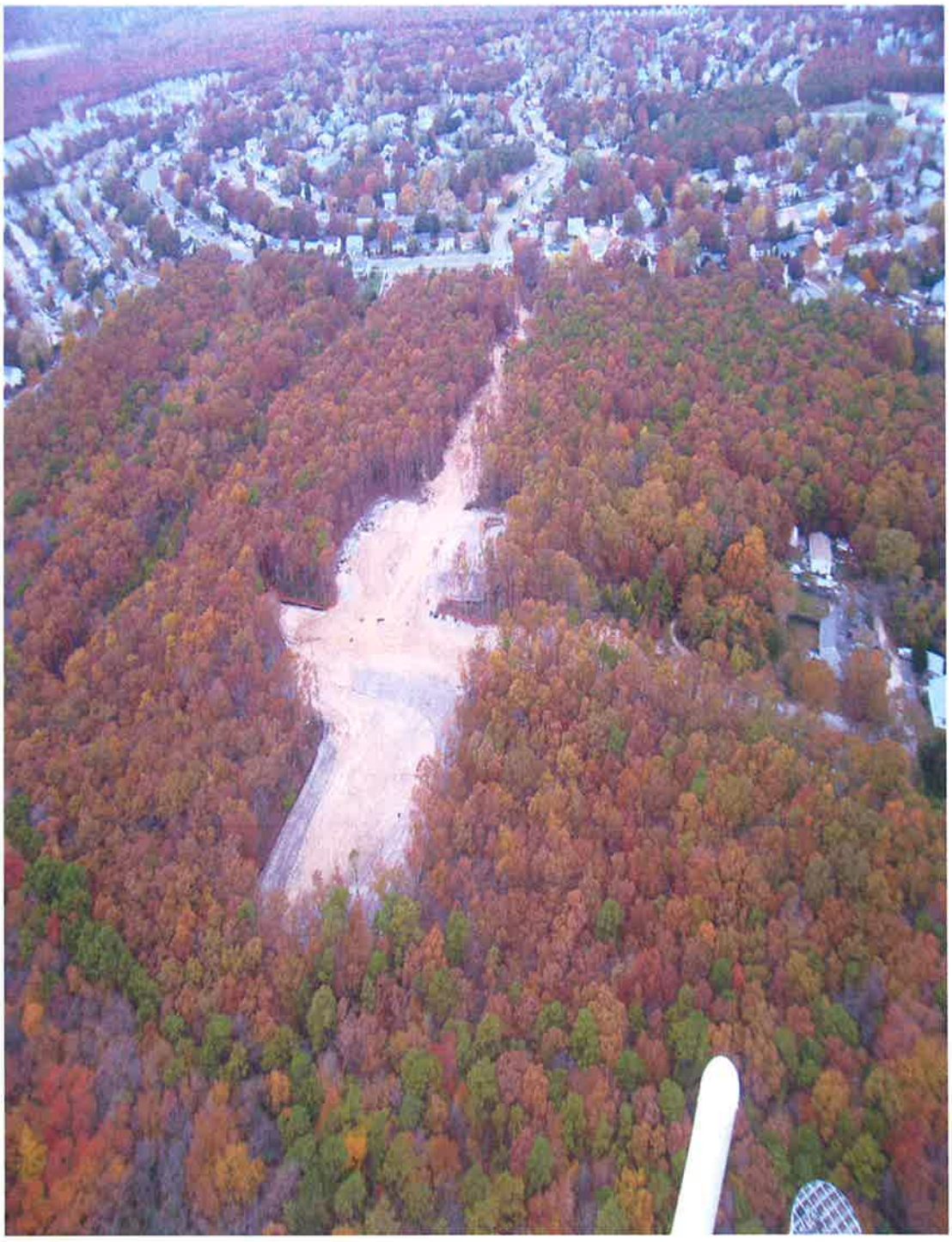
This plan was developed in consultation with federal and state jurisdictional agencies and local governments. No permit for development may be issued unless in conformance with the plan and implementing regulations, except that the commission may grant waivers of strict compliance in cases of extraordinary hardship or to satisfy a compelling public need consistent with the purposes and provisions of the act and the federal act.

Some goals of the plan include the following:

- Protect, preserve and enhance the significant values of the resources in a manner consistent with the purposes and provisions of the Pinelands Protection Act.
- Area of protection.
- Protect and maintain the essential character of the existing pinelands environment, including indigenous plant and animal species.
- Promote and maintain the quality of surface and ground waters.
- Promote the continuation and expansion of agricultural and horticultural uses.
- Discourage piecemeal and scattered development.
- Encourage appropriate patterns of compatible residential, commercial and industrial development, in or adjacent to areas already used for such purposes.

The Pinelands jurisdiction within Barnegat Township includes all land that is located west of the Garden State Parkway.

Aerial view of the Pan Coast Road Corridor.



Aerial view of the Gunning River West Critical Area (former water plant location)

Aerial view of the Gunning River East Critical Area.

Aerial view of the Ridgeway West Critical Area.

Aerial view of the Lochiel Corridor.

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To learn more about a contaminated site, contact one of the lead agencies overseeing the case or visit the web site: http://www.state.nj.us/dep/srp/. Site Remediation and Waste Management, formerly known as the Site Remediation Program, is a program unit within NJDEP that provides financial aid and technical guidance in cleaning up the state's more serious contaminated sites that pose a danger to human health and the environment. SRWM maintains an inventory of 38,000 sites, of which 25,000 require no further remediation action. The bureaus within SRWM are listed below for easy reference:

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[1] Annual Population Estimates by Municipality. Ocean County Department of Planning website at http://www.planning.co.ocean.nj.us/databook/03popest.xls. Accessed on August 13, 2007.

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APPENDIX A
ENVIRONMENTALLY SENSITIVE AREAS DATA

SECTION III. ENVIRONMENTALLY SENSITIVE AREAS

A. DOUBLE CREEK WATERSHED

The Double Creek Watershed is located chiefly east of US Route 9 in the northeastern sector of Barnegat Township. The wetlands adjacent to the south of the lagoons at Pebble Beach are connected to the estuarine waters of Double Creek.

Many small fresh water tributaries empty into Double Creek and its counterpart to the south, the Gunning River fresh water wetland and estuary. These tributaries are noteworthy in having a vegetative cover of wetland forest (PF401). This deciduous wetland forest is several thousand acres in area extending southward beyond Taylor Lane into Stafford Township.

Some remnants of the originally more extensive fresh water Atlantic White cedar wetland forests (PFO4) are also present in these two watersheds. One of the more conspicuous Atlantic white cedar wetlands is in a northern tributary of Double Creek. It is located at US Route 9 about 0.15 miles north of Rose Hill Road.

Vegetation, Flora and Fauna of The Watershed

Vegetation of Deciduous Wetland Forests and Associated Areas

Wetlands

This deciduous wetland forest is dominated by trident red maple (**Acer rubrum**). Relatively few of the other tree species commonly associated with deciduous wetland forest are present. These are black gums (**Nyssa sylvatica**, American holly (**Ilex opaca**) and swamp magnolia (**Magnolia virginiana**). Where land disturbance has occurred, and on upland edges, black cherry (**Prunus serotina**), sassafras (**Sassafras albidum**) and gray birch (**Betula populifolia**) are usually found.

In the understory shrubs and vines, the most frequent species encountered are high blueberry (**Vaccinium corymbosum**), arrowwood (**Viburnum dentatum**), Japanese honeysuckle (**Lonicera japonica**) and grape (**Vitis labrusca**). Much of the wetlands, especially at the edges, is unfavorably impacted by the ground-covering Japanese honeysuckle, a pervasive vine which strongly inhibits the growth of native herbs.

Vegetation of the Atlantic White Cedar Wetland Forest

This area is dominated by Atlantic White Cedar (**Chamaecyparis thyoides**) along with occasional Pitch Pine (**Pinus rigida**) and red maple (**Acer rubrum**).

An inspection of this area provides evidence of adverse environmental impact by the considerable amounts of deposited soil materials as sediment along with much accumulated trash from Route 9. Many young trees (5 - 10 years of age), mostly white cedars, have been killed either from pollution or from frost.

This smaller tributary is notable in that there is a population of nearly one hundred plants of the endangered plant species known as swamp pink (**Helonias bullata**). This tributary must be protected from continuing pollution from storm water runoff. The presence of the swamp pink makes imperative the designation of this wetland an **environmentally sensitive** area requiring special protection measures.

Uplands

The open uplands, apparently succeeding from open field areas following former agricultural activity, are dominated by redcedars (**Juniperus virginiana**) and the black cherry, while oak species have matured to form a considerable canopy in smaller sections. The oaks include willow oak (**Quercus phellos**) with post oak (**Q. stellata**), white oak (**Q. alba**) and southern red oak (**Q. falcata**). Most frequently occurring shrubs are the upland sumac (**Rhus copallinum**) along with scrub oak (**Quercus ilicifolia**).

Fauna of the Watershed

The presence of common herptiles, birds and mammals is documented in the species lists shown in the original inventory. The Atlantic white cedar wetland forest and the large deciduous wetland forest area contiguous to the east and to the south are known to be the breeding and foraging area for two threatened species, the great blue heron (**Ardea herodias**) and the barred owl, (**Strix varia**).

The barn owl (**Tyto alba**), has been reported from the wetland forests and their upland borders. It is likely that the red-tailed hawk (**Buteo jamaicensis**) and the great horned owl, (**Bubo virgianus**) are also breeding and foraging in these extensive wetlands. Some of this area is already part of the Forsythe Natural Wildlife Refuge. Preservation of these valuable coastal wetland forests is greatly to be desired. They should be designated as an **environmentally sensitive area**.

B. GUNNING RIVER WATERSHED

The Gunning River system has three upland tributaries and an extensive estuarine complex lying south of the Double Creek system. The extensive freshwater forests and the estuary are known to be foraging and perhaps nesting places for the bird species described for the Double Creek watershed. The presence of the barred owl was confirmed along Taylor Lane by the antiphonal responses of male and female to broadcast recordings of the call of that species.

No additional plant species have been detected here.

C. LOCHIEL BROOK (CREEK) WATERSHED

This extensive system drains most of the northern sector of the Township between the Garden State Parkway and US Route 9. It originates in two steep-sided drainage valleys, one "arm" rising near Barnegat Boulevard and the other in the Lincoln Heights sector near Hamilton Road, an unimproved earthen road. They flow northeasterly toward an abandoned cranberry bog whose northern edge is close to the township's northern boundary. Here an all-weather stream drains to a more extensive wetland in which the Barnegat-Ocean Townships' boundary is located. The Lochiel Creek ultimately enters Barnegat Bay at Pebble Beach.

VEGETATION OF THE WETLAND SYSTEM

The upper drainage wetlands in both "arms" are tree covered and classed as **deciduous wetlands forests** (specified as **PFO1** and **PFO1/4** in the National Wetlands Inventory Classification system). Principal tree species are sour gum (**Nyssa sylvatica**) and red maple (**Acer rubrum**); pitch pines (**Pinus rigida**) are present mostly at the edges of these wetlands. Understory shrubs are chiefly high blueberry (**Vaccinium corymbosum**) and sweet pepperbush (**Clethra alnifolia**). The ground cover is dominated by cinnamon fern (**Osmunda cinnamomum**) and (**Sphagnum spp.**) peat mosses.

The soils underlying these wetlands is the hydric series known as **Atsion** which gives way to **Manahawkin Muck** downstream.

Approximately 0.3 miles north of Rose Hill Road the wetland zone increases in width from 200 feet to 400 feet or more while the vegetation changes from forest cover to a scrub shrub and herbal wetlands in which the shrubs and herbs emerge from what is usually standing water. This vegetation complex, known as **PSS1/EM**, is not distinguished on the National Wetlands Inventory

map, but this classification is shown further downstream. Map # 1 shows these wetland classiflications.

Inasmuch as one proposed alignment of Barnegat Boulevard extension crosses and bisects this open wetland area at a place which seems to be a former dike, the dike and surrounding wetlands were investigated. The open upstream area of wetland is inferred to have been a former cranberry bog reservoir; the wetlands downstream portion to a second dike and road crossing are obviously abandoned cranberry bogs.

In the standing water of the reservoir are numerous herbs, some of them growing on tussocks formed by sedges such as Howe's sedge (**Carex howei**) and coast sedge (**Carex exilis**). Shrubs such as the red chokeberry (**Aronia arbutifolia**) and lambkill (**Kalmia angustifolia**) also find a supporting habitat on the tussocks. In the standing water the dominant herbs are water willow (**Decodon verticillata**) and blunt manna grass (**Glyceria obtusa**). The presence of dead sour gum and red maple trees suggests the rise of water levels in this "reservoir" in the relatively recent past.

North and downstream from the "reservoir" area, the stream channel and wetland are again forested with a dominantly deciduous species complex (PFO1). Several small streams, either spring or seep fed, flow into the broader wetland corridor, which is at least 800 feet in width; it also receives water from a smaller northwestern wetland tributary which merges with the main stream in the cranberry bog.

Downstream, in the former cranberry bog, the Atlantic white cedar (**Chamaeccyparis thyoides**) is dominant, with older trees at the edges and younger trees and saplings centrally located. Some of the central open "old bog" is covered by standing water and two dominant "colonial" sedge species,Walter's sedge (**Carex walteriana**) and button sedge (C. **bullata**). This shallow open water with its herbaceous cover and young cedar trees makes the presence of the pine barrens treefrog (**Hyla andersoni**) likely. A rich diversity of **Sphagnum** (bog or peat moss species) is here also.

Downstream from a road-covered dam which forms the northern terminus of the cranberry bog, the Lochiel Creek corridor is heavily forested with a mixture of evergreen and deciduous species. As it flows eastward,toward US Route 9, the Lochiel Creek forest is predominantly evergreen (Atlantic white cedar) close to the abandoned Tuckerton Railroad right of way. East of Route 9, some of the wetland has been filled and developed. The remainder is a deciduous forest to the Pebble Beach residential lagoon area.

D. MILL CREEK DRAINAGE SYSTEM

FOUR MILE BRANCH

The headwaters of this stream are located south of Bay Avenue and west of the Garden State Parkway. A smaller eastern branch rises west of Lighthouse Drive, while the larger western branch rises a mile or more west of Nautilus Drive.

Both branches have relatively narrow (150 to 300 foot) channel widths with relatively steep banks apparently produced by the eroding effect of the streams on the gravelly Downer and Woodmansie soils. A series of operating cranberry bogs has been developed in the westernmost portion of the larger branch.

VEGETATION OF THE FOUR MILE BRANCH

Atlantic white cedar (**Chamaecyparis thyoides**) is dominant in many sectors of the stream both upstream and downstream from the cranberry bogs. Where the cedar has not recovered from lumbering, black gum (**Nyssa sylvatica**) and trident red maple (**Acer rubrum**) are found in larger or smaller populations. These forests provide dense shade reducing the likelihood of the occurrence of endangered or threatened plant species.

Numerous roadways and cul-de-sacs, chiefly unpaved and without residential development have provided some disturbance and soil deposition in the streamway. Some of the roadways have been paved and have a scattered residential component. At some of the stream crossings, some clearing of the stream channel has occurred. These openings raise the possibility for endangered plant species to be present now or in the future.

THREATENED AND ENDANGERED SPECIES

The occurrence of the barred owl, the great blue heron and the pine snake, each with a threatened status, is likely in one or more locations in this extensive wetland system. No verification has yet been made. The same is true for endangered or threatened plant species.

EIGHT MILE BRANCH

A tiny portion of the Eight Mile Branch of Mill Creek rises at the southern Township boundary with Stafford Township. This stream flows through the Fawn Lakes community and thence eastward on the south side of Route 72. No threatened or endangered species are known in this small stream area.

MILL CREEK MAINSTEM

This stream also rises in south central Barnegat Township just north of the Brighton at Barnegat settlement. It has a small area within the Township; its main drainage area is within the Township of Stafford. No threatened or endangered species are known from these headwaters, although many are known downstream in Stafford Township.

E. OYSTER CREEK DRAINAGE

Just west of the Four Mile Branch headwaters, some of the drainage of Oyster Creek rises near the Lacey Township boundary. It is not significant in areal extent in Barnegat; no threatened or endangered species have been recorded from this area, although the probability for the presence of the pine snake is high.

F. OSWEGO (WADING) RIVER DRAINAGE

Headwaters of this system rise in Barnegat or Lacey Townships and thence through Little Egg Harbor and Bass River Townships to the Mullica River estuary and Great Bay. Nearly twenty square miles of Pine Barrens are drained by the several branches of this system which include the Yellow Dam Branch, the Sykes Branch and two branches of the East Branch of the Oswego River. The water quality in this system has remained acceptable and typical of Pine Barrens streams over a fifteen year testing interval between 1977 and 1992. See Table I, page 3.

In the Sykes Branch sector, which is distinguished by the presence of a large area of dwarfed trees known as the West Plains or pygmy forest, an upland rare plant species known as the broom crowberry (**Corema conradii**) is located. It has been classed as a State of New Jersey endangered species (S-2) by the NJDEPE Office of Natural Heritage.

On the Yellow Dam Branch near County Route 539 the rare plant species, Pine Barrens Gentian (**Gentiana autumnalis**) has been located. There is potential for the endangered plant species Knieskern's Beaked Rush, (**Rhyncospora knieskernii**) and the Pine Barrens Reedgrass, (**Calamovilfa brevipilis**), but their presence has yet to be verified.

Similarly, this watercourse and its associated wetlands have the potential (still unverified) for the pine snake and the barred owl. In 1989, the pine barrens trefrog (**Hyla andersoni**) was noted in this watershed close to the intersection of County 539 and State Road 72.

Much of the Yellow Dam Branch northwest of County Route 539 has been acquired as public land by the Division of Fish & Game of the NJ DEPE and incorporated as part of the Greenwood Forest Wildlife Management Area. It is desirable that all of this ecologically unique area be preserved as a valuable habitat for both plants and animals.

TABLE II

RARE, THREATENED OR ENDANGERED SPECIES IN BARNEGAT TOWNSHIP

COMMON OR COLLOQUIAL NAME	SCIENTIFIC NAME	THREATENED OR ENDANGERED STATUS *
	Plants	
Swamp Pink	**Helonias bullata**	G2, S2
Pine Barrens Gentian	**Gentiana autumnalis**	G3, S3
Broom Crowberry	**Corema conradii**	G3? S2
Pine Barrens Reedgrass ?	**Calamovilfa brevipilis**	G3 S3

* Key -- Plants
S--State Status G-- Global or World Ranking **
Animals
T -- Threatened E-- Endangered ?--Strong possibility, but still some uncertainty about status or occurrence in Barnegat Township

	Animals	
Barred Owl	**Strix varia**	T
Great Blue Heron	**Ardea herodias**	T
Pine Barrens Treefrog	**Hyla andersoni**	E
Northern Pine Snake	**Pituophis m. melanoleucus**	T

** a "2" status means 6 - 20 known occurrences
a "3" status means 21 - 100 known occurrences

Threatened means species which may become endangered if conditions around them begin to or continue to deteriorate.

Endangered means species whose prospects for survival are in immediate danger because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. Assistance is needed to prevent future extinction in New Jersey.