

## **Freshwater Wetlands Health and Biodiversity Monitoring**

### **Summary**

The health of freshwater wetlands is critical to the Central Pine Barrens, as they ensure the continued health of the underlying sole source aquifer that provides Long Island's drinking water and the continued viability of the biotic communities they support. The wetlands are also home to various threatened or endangered species of plants, fish, wildlife and insects. Despite their importance, little monitoring or research has been done to learn how to best manage these vital habitats. Comprehensive monitoring of these wetlands is needed in order to provide natural resource management agencies with the information they require to preserve, protect and restore these unique environments.

### **Program History**

Many organizations, such as The Nature Conservancy, have identified Freshwater Wetlands as being a targeted habitat for conservation efforts. In stakeholder meetings FERN has hosted or attended, there has been much concern about the overall health of the freshwater wetlands on Long Island. Also important is the race to preserve enough acreage of each habitat to keep that habitat viable and healthy. Long Island is approaching total build out and it is estimated that by 2015 all land will be built on, slated for building or preserved. Wetlands are an important part of the Long Island ecosystem for water, flood control and biological diversity. We need to know if enough has been preserved and how to properly manage what has been preserved.

In 2007 The Foundation for Ecological Research in the Northeast (FERN) received funding from the Central Pine Barrens Joint Planning and Policy Commission to develop protocols specifically for the needs of the land managers of wetlands in Long Island Central Pine Barrens. Using protocols from other areas of the United States, the methods were evaluated for use on Long Island and tested to ensure the protocols contained the most effective and efficient methods available.

### **Program Overview**

The Foundation for Ecological Research in the Northeast (FERN) proposes to establish and test monitoring protocols developed in 2007 and begin monitoring 60 – 90 of the 400+ freshwater wetlands located within the Long Island Central Pine Barrens (CPB) over the following three years. Comprehensive monitoring of these wetlands will provide natural resource management agencies with the information necessary to preserve, protect and restore these vital environments and gain critical information on species of greatest conservation need (SGCN) within the Central Pine Barrens.

A comprehensive set of protocols is currently being developed using existing protocols for wetland habitats and information from stakeholder meetings. The draft document is being presented at stakeholder meetings for review and comments to ensure it includes all of the required information and will contain information that stakeholders need to manage their properties. The protocols are in progress now and will come as close as possible to filling the needs of each stakeholder.

Frog call surveys will be the first step in fulfilling the protocols. Long Island is home to many amphibians, some of which are experiencing severe declines. This survey will begin to answer the questions of where and which frogs are currently here and their relative abundance. FERN has done some work on this already in the Search for the Southern Leopard Frog project, which was one of the most abundant frogs on the island only twenty years ago, but seems to have all but disappeared. Frogs of special interest to this project would be the NYS endangered cricket frog and the NYS species of special concern: southern leopard frog and eastern spadefoot toad.

This summer, two interns taught portions of the protocols in order to assist the biologist with field testing the protocols, including taking water samples, mapping vegetation, noting the presence or absence of plants, animals, fish or insects and similar tasks to finalize the protocols. They also began testing the data entry forms that will be used in the field and from which a comprehensive database will be created.

Establishing a priority for work will be important. FERN is already working with the New York State Natural Heritage program to determine the extent of heritage elements located throughout the Central Pine Barrens. The distribution of heritage elements will be utilized to identify areas likely to contain other SGCN and thus focus FERN's efforts in these areas. As FERN gathers data on SGCN in year one a better understanding of habitat is expected to evolve allowing a more refined approach to the monitoring program including the potential for a more refined GIS approach.

Special attention will be paid to the presence or absence of the following species or signs of these species (list is not all inclusive):

Birds - Black-crowned night heron (*Nycticorax nycticorax*), Great egret (*Ardea alba*), Little blue heron (*Egretta caerulea*), Snowy egret (*Egretta thula*), Least bittern (*Ixobrychus exilis*), Pied-billed grebe (*Podilymbus podiceps*), Yellow rail (*Coturnicops noveboracensis*), Semipalmated sandpiper (*Calidris pusilla*)

Herptofauna - Eastern tiger salamander (*Ambystoma tigrinum tigrinum*), Marbled salamander (*Ambystoma opacum*), Four-toed salamander (*Hemidactylium scutatum*), Fowler's toad (*Bufo fowleri*), Eastern spadefoot toad (*Scaphiopus holbrookii*), Southern leopard frog (*Rana sphenoccephala*), Northern cricket frog (*Acris crepitans*), Eastern mud turtle (*Kinosternum subrubrum*), Eastern box turtle (*Terrapene Carolina*), Spotted turtle (*Clemmys guttata*), Snapping turtle (*Chelydra serpentina*), Northern black racer (*Coluber constrictor*), Hognose snake (*Heterodon platirhinos*), Eastern ribbon snake (*Thamnophis sauritus sauritus*), Worm snake (*Carphophis amoenus*)

Fish - Banded sunfish (*Enneacanthus obesus*), Swamp darter (*Etheostoma fusiforme*)

Insects - Tiger beetles, genus *Cicindela* spp., (3 pine barren species); Yellow-sided skimmer (*Libellula flavida*), Needham's skimmer (*Libellula needhami*), Comet darner (*Anax longipes*), Mantled baskettail (*Tetragoneuria semiaquea*), Common sanddragon (*Progomphus obscurus*), Russet-tipped clubtail (*Stylurus plagiatus*), Pine Barrens blueth (*Enallagma recurvatum*), Scarlet blueth (*Enallagma pictum*), Rambur's forktail (*Ischnura*)

*ramburii*), Little Bluet (*Enallagma minusculum*), New England bluet (*Enallagma laterale*), Southern sprite (*Nehalennia integricollis*)

When SGCN are documented additional habitat documentation may be warranted. For example should banded sunfish or swamp darters be identified in wetland areas an assessment of the population will be made and additional documentation of vegetation within the wetland will be made to begin building habitat requirements for this species. Similar efforts may be conducted for other species as well. For example, if pine barrens tiger beetles are observed during approach and departure from wetlands the area would be denoted via GPS, mapped and a return visit scheduled to assess the population.

At the end of the first season, the available data will be analyzed and interim reports will be generated and made publicly available. A review of the first year's effort will be done and any changes to the protocols based on this review will be made and documented. Monitoring will continue in seasons two and three, until all wetlands identified for analysis have been completed.

### **Program relationship to FERN's Mission**

FERN's mission is to conserve, protect, and enhance the habitats for plants, fish, and wildlife for the continuing benefit of the people of Long Island, New York, and the Northeast through research, education, and dissemination of information. As a research and monitoring project to educate land managers as to the requirements of a healthy freshwater wetland ecosystem, the Freshwater Wetlands project fits very well with FERN's mission. Using the information FERN provides, land managers will be able to take steps to conserve, protect, and enhance wetland habitats.

### **Goals and Objectives**

This project specifically looks to fulfill, at least in part, the following objectives and recommendations of the NY State Comprehensive Wildlife Conservation Strategies (NYSDEC 2006) within the Lower Hudson/Long Island watershed:

- Improve the health of remaining habitats for SGCN by reducing their limiting factors;
- Vernal pool and upland buffer habitats are critical habitats for several species of amphibians. Mapping of vernal pools and upland buffer;
- Freshwater marshes are critical for many species of freshwater marsh nesting birds, Eastern box turtle and other herpetofauna, and odonates. Monitoring of these habitats should be conducted;
- The Central Pine Barrens Complex supports a large number of SGCN, including several most critical species such as tiger salamander, marbled salamander, blue-spotted salamander, pine barrens bluet, and eastern hognose snake. Pine barrens are also historic habitat for American burying beetle and the coastal barrens buck moth. The full range of habitats found in association with the pine barrens, including coastal plain ponds and grassy openings should be monitored for use by SGCN.

- Monitor waters in Rockland and Suffolk Counties that are suited to banded sunfish and mud sunfish to better understand their population dynamics and their habitat needs. Note: This should also include the swamp darter as well.

Additionally, this project would answer questions that land managers and conservationists are currently asking such as:

- ❑ Do we have 'sustainable' populations of species within the preserved lands?
- ❑ How will we manage these lands for sustainability?
- ❑ Will the land support endangered/threatened species or SGCN?

The need for these answers is critical. On Long Island, all land that is to be protected will likely be purchased by 2010 and much of it is within the Pine Barrens. We need to understand the systems to determine if we have preserved enough. There is a pressing need for land managers to know the sustainability of various ecosystems in order to protect them and the wildlife they support, as well as to properly manage the land they have in their control.

Though the wetlands are one of the most ecologically sensitive areas, little research and monitoring has been done to assess their health or to be able to answer the questions posed by land managers. Questions about habitat loss, species loss, pesticide use, mercury and metals levels in wetlands and fish remain unanswered and the time is long overdue to get the current health status of the wetlands of Long Island. In addition, there has been a dramatic, continuing decline in amphibian populations in this and other similar habitats; this research will address these losses. Long Island has the highest number of NY State threatened and endangered species and many of these rare species use freshwater wetland habitats, this research and monitoring program will also assess their relative numbers. As the most sensitive ecological area in the Pine Barrens, the health of the wetlands must be determined and addressed to ensure long-term sustainability of this habitat type and the species it supports.

### **Vision for the Future**

Upon conclusion of the project FERN expects to make available significant information on the status of approximately 39 species of greatest conservation need, the current health of a representative group of the 400+ wetlands within the Central Pine Barrens, and recommendations for management activities to ensure the long term health of the wetlands within the Central Pine Barrens. Types of information to be made available include vegetation make-up of the wetlands and surrounding buffers; presence of both rare and common species through inventory of aquatic species like fish, reptiles, amphibians, and invertebrates; assessment of wetland buffers (100 meter buffers) through GIS analysis; and physical/chemical assessment through field measurements and laboratory analysis of water and sediments for potential contaminants.

At the completion of this multi-year monitoring effort we will have the following:

- A comprehensive inventory of all of the freshwater wetlands of the Pine Barrens of Long Island.
- An inventory of the flora and fauna present in each wetland assessed.

- Baseline data for comparability.
- Overall assessment of wetland health.
- Identification of contaminants for mitigation efforts.
- Document the affects of fragmentation and edge effects.
- Status of invasive species in the wetlands.
- An estimate of how much land needs to be preserved (if any) to save this habitat.
- Centralized database readily available to other agencies and researchers.

### **Literature Cited**

New York State Department of Environmental Conservation. (2006). New York State Comprehensive Wildlife Conservation Strategy. Albany, NY: New York State Department of Environmental Conservation.