Testing Vegetation Sampling Methods of Central Pine Barren Freshwater Wetlands in Preparation of the Wetland Protocol

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ABSTRACT

The current health of the freshwater wetlands of the Long Island Central Pine Barrens is unknown. In order to determine the health of the wetlands, a protocol must be established to determine a baseline. The baseline will then aid in monitoring future wetland conditions. Several bioassemblages of the wetland community will be examined because each element has an affect on the overall health of the wetland. Vegetation is an element that plays a major role in determining the health of the wetlands. It is the primary source of energy flow in the wetland ecosystem and forms the foundation of the wetland food chain. No other life forms are able to exist without the presence of vegetation. Plants, both dead and alive, form a structural habitat for many species to live and thrive in. Not only does vegetation affect taxonomic groups, but it also has a major impact on the wetland's water and soil quality. Therefore, vegetation is very important for the survival of the entire wetland community and must be closely monitored. By reading bioassessment case studies of Florida, Michigan, Minnesota, North Dakota, Oregon, Wisconsin and Maryland, different methods for analyzing wetland vegetation were collected and examined. Information on how to carry out various analytical techniques of vegetation was gathered and organized. The techniques that best suited our purpose, along with the necessary equipment, were taken into the Pine Barren Wetlands to be tested. Many different methods for analyzing the wetland vegetation was carried out in and around the wetland ponds of Long Island. The procedures that were the most practical and informative for the wetlands being assessed were noted. Many methods that were tested did not apply to the Pine Barren wetlands being examined because many of the case studies established permanent plots. Since the wetlands being studied will be on public lands, permanent plots were not a viable option. Upon investigating different methods of vegetative analysis, it was found that the case studies were very helpful, but many of the procedures were altered in order to accommodate the ponds being studied. Further investigation must be conducted in order to determine the precise vegetative methods that will be used to examine plants of the freshwater wetlands in the Long Island Pine Barrens.

INTRODUCTION

The current state of the freshwater wetlands of the Long Island Pine Barrens is unknown because there is not a wetlands protocol established in the state of New York to address this issue. The health of the freshwater wetlands is critical because it has an affect on the health of the aquifer of Long Island. This aquifer provides most of Suffolk County Long Island with drinking water [1]. Therefore, unhealthy freshwater wetlands could possibly have a bad affect on the quality of Long Island's drinking water.

Another factor that must be considered is that fact that Long Island is home to many threatened and endangered species. All animals rely on water as a source of nutrients and some of these endangered animals, such as the Tiger Salamander, live in and near the water. Fish as well as many amphibians and reptiles rely on water to reproduce and raise their offspring. An unhealthy freshwater wetland could not only affect the human population, but it could be devastating to threatened or endangered native species.

An organization that has realized this problem and is putting an effort forth to construct a freshwater wetlands protocol is the Foundation of Ecological Research in the Northeast (FERN). One of the main purposes of FERN is to establish a step-by-step freshwater wetland protocol in order to monitor the health of the wetlands on Long Island [1]. This protocol will be composed of many parts, all of which have an affect on the overall health of the wetland. Some of the wetland assessment will be based strictly on observations, but there will be aspects that yield empirical data. Analyzing water quality, soil quality and macroinvertebrates will yield quantitative data while the vegetation, reptile, amphibian, bird and mammal sections will consist of observations.

There are seven different freshwater wetland community types on Long Island that will be studied. These wetland types are the Coastal Plain Ponds/Pondshores, Coastal Plain Poor Fen, Highbush Blueberry/Bog Thicket, Pine Barrens Shrub Swamp, Coastal Plain Atlantic White Cedar Swamp, Emergent Marsh and Red Maple-Black Gum Swamp.

MATERIALS AND METHODS

The first step was to take photographs of the wetland using a waterproof camera and a compass. Photo points were set up and panoramic shots of the wetland were taken from that location. The points were marked by GPS to make them easy to find again. Panoramic pictures were taken from spots that best represented the overall wetland community. The file number of the photograph was noted for future observation and comparison. The bearing at which the picture was taken was also observed.

The next step was to note emergent vegetation, estimated surface area and the dominant species on a data entry form. Vegetation included both aquatic and terrestrial species.

A thorough sketch of the wetland was then drawn. Distinct features of the wetland and surrounding area, different vegetative communities, photograph points and water/soil sample points were noted on the sketch.

Finally, other information that was gathered when researching vegetation in the area was a comprehensive species list, cover estimate of each species, cover class, relative cover of each plant species, relative density of the species, stems per unit area, basal area, importance values, standing biomass, DBH of living plants, dead plants and shrubs, length and state of downed logs, abundance of a species and dominant species present in the wetland. The DBH of the plants was determined by using DBH measuring tape and the length of the downed logs was measured with a tape measure. Most other information was determined by estimations done by two or more crewmembers. All information collected was noted on data sheets.

Emily Efstration studying a red maple tree

RESULTS [2]

State	Plot Size/ Description	Comprehensive Species List	Cover estimate	Cover Class	Relative Cover	Relative Density	Stems per Unit Area
Ohio	transects	X	X	X	X	X	X
Oregon	quadrats						
Minnesota	releve plots	X		X			
Michigan	2 transects per bird census plot	X					
Maryland	transects	X					
Florida	4 cardinal transects	X					

State	Basal Area	Standing Biomass	DBH	Downed Logs	Abundance	Dominance
Ohio	X	X				
Oregon						X
Minnesota						
Michigan			living, dead, shrub	length, state of decomposition		
Maryland					X	X
Florida					X	X

DISCUSSION AND CONCLUSION

Although many procedures and methods were tested out in the field, it was found that most of the procedures were hard to conduct in all seven Long Island Central Pine Barren freshwater wetland community types. Line transects, quadrats and permanent plots were all tested in the wetlands, but none of the methods worked well in all communities. A major concern was the fact that a large percentage of the freshwater wetlands is made up of ponds, many of which are too big and deep to cross in waders. Since multiple species of vegetation are in and on the water, the vegetation in the water must be analyzed in some manner. If a permanent plot were established on the shores of the wetland community, an overall representation of the wetland would not be met because some species of vegetation could be present outside of the plot [3].

The idea of setting up a series of quadrats was also discussed, but the idea was dismissed because it would not represent the wetland community as a whole.

Certain plant species are hard to identify when they are not flowering while others are quite easy. Since it was decided that an overall observational analysis of the wetland community type was going to be performed, vegetative analysis would be conducted seasonally. An estimated percent cover of each species present in the wetland would be determined by multiple crewmembers.

Another concern was the issue of time. Multiple components of the wetlands are going to be analyzed including the water, soil, macroinvertebrates, amphibians, reptiles, birds, mammals, the area around the wetland and also the vegetation. To analyze all aspects of a wetland will be very time consuming so it was decided that an overall estimation of the vegetation would be ideal. This form of vegetative analysis was not decided before testing out other analytical methods in the field, which were presented in different state case studies.

Panoramic pictures of the wetland location will be taken each time it is visited. The location and bearings of where the pictures were taken will be recorded. This is so that the pictures can be retaken from the same angles and at the same point in the wetland.

The sketch of the wetland is one of the most important factors when visiting the wetland. The sketch will document where roads and paths are, where the photo points and water sample points are located, any defining features of the wetland as well as other characteristics that must be documented.

Emily Efstration and Sarah Miloski identifying vegetation

REFERENCES

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