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PENNSYLVANIA COASTAL ZONE MANAGEMENT PROGRAM

PRESQUE ISLE STATE PARK ENVIRONMENTALLY SENSITIVE AREA STUDY DESIGN FINAL REPORT

PRESQUE ISLE STATE PARK
ERIE COUNTY, PENNSYLVANIA

Prepared by:

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for
Department of Environmental Resources
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Scope of Work
Presque Isle State Park
Environmentally Sensitive Area Study Design

Introduction

Landuse planning deals with the allocation of land resources. In Pennsylvania, parkland is normally set aside for both the protection of significant natural communities and for the recreational use of the park visitors. The activities of outdoor recreation have the **potential** of degrading the environmental quality of the sites on which they take place. Each of these activities have different levels of potential and actual impact on the significant ecological features of a park. Park managers require the knowledge of the location and characteristics of the significant features so that better landuse allocation decisions can be made. The proper determination of levels of acceptable use is dependent upon the careful delineation of those areas of significance that are particularly susceptible to impact.

Environmentally Sensitive Areas are natural landscapes containing ecosystems whose biological and physical integrity as well their ecological processes that should be maintained and protected. Within a park, they are the most significant and sensitive natural sites. They require special consideration in the determination of management actions because of the sensitive features that they contain.

Work Objectives of the Project

The work objectives of the project include:

1) Collect the relevant, existing data on the natural environmental features of Presque Isle State Park.

2) Apply the criteria that have been developed for the establishment of Environmentally Sensitive Areas of Presque Isle State Park.

3) Identify the Environmentally Sensitive Areas of Presque Isle State Park using the criteria as applied to the existing information.

4) Map each of the Environmentally Sensitive Areas.

5) Use the accepted ranking system to produce a ranking of the Environmentally Sensitive Areas within the park.

6) Prepare a final report that maps each of the ESAs and provides a written account of the reasons for the determination of each site as an ESA.

7) Provide for the close coordination of all of the identified parties.

Criteria for the Designation of Environmentally Sensitive Areas

Environmentally Sensitive Areas are delineated by the application of a set of standardized criteria to an adequate set of knowledge of the resources of a park.

Criteria for the selection of significant sites within municipalities have been developed and refined over time (Eagles, 1980 and 1981). The application of these criteria within a planning context has been extensively documented in the text - The Planning and Management of Environmentally Sensitive Areas (Eagles, 1984). Evaluation of criteria from a number of different examples has been undertaken by Smith and Theberge (1986). The warden service in Banff National Park in Alberta have undertaken one of the first large scale determinations of sites of significance within a park (Auchuff et. al. 1986).

In order to use the ESA concept within a park the standardized municipal criteria have been modified with knowledge gained in the Banff example.

The criteria for the determination of the Environmentally Sensitive Areas within a park take into consideration the special circumstances of the resources in a large natural area. Most state and national parks have extensive blocks of natural habitat. The challenge of the resource managers is to locate and outline the most significant features within the context of a relatively natural landscape.

The criteria for selection of the Environmentally Sensitive Areas of Presque Isle State Park are outlined below.

1) The area contains rare or endangered indigenous species that are rare or endangered within the park, the state or the country.

2) The area has an unusual and/or high quality community with limited representation within the park, the state or the country.

3) The area has an unusually high diversity of species.

4) The ecological function of the area is vital to the healthy maintenance of a natural system beyond its boundaries.

5) The area is large and provides habitat for species that require extensive blocks of suitable habitat.

6) The area is a distinctive and unusual landform.

7) The area is significant for scientific research.

8) The combination of landforms and natural biological communities is of high aesthetic value.

Application of the Criteria

The use of each of the park ESA criteria requires the careful identification, description, analysis and classification of the natural values of an area. It is important to recognize that most parks can be considered to be significant in their totality when mapped at a small scale. However, when mapped at a large scale it is possible to recognize features of local significance within the park. In this study, the large scale type of mapping is the preferred technique.

The interpretation of each of the criteria is outlined below.

Criterion 1 (rare or endangered species)

This criterion discusses three levels of rarity: within the park (such as Prairie Deer Mouse), within the state (such as Blanding's Turtle) and within the country (such as Piping Plover).

The status of the species within a park is determined by field work over a period of years. Within Presque Isle, such work has been done both by park officials and by outside researchers. Lists of species are available and the assignment of status to each species is possible.

The status of the birds, the mammals, the woody plants, the herbaceous plants, the reptiles, the amphibians, and the fish are reasonably well known at Presque Isle State Park. The invertebrates and nonvascular plants are more poorly known but the information is available from the relevant researchers. This criterion is usually applied to breeding locales of highly mobile organisms.

It is not necessary to have complete and total information on all life forms before status determination can be made. First, comprehensive information is almost never available and second, it is prohibitively expensive to collect.

It should be recognized that the presence of one or several rare or endangered species in a locality is usually indicative of the presence of an unusual or rare community type. Therefore, the known rare or endangered species are often indicators of the presence of other species that have yet to be discovered. It is for this reason that an incomplete data base is sufficient.

A rare species within a park is defined as one that is found in 5 or fewer localities. An endangered species is one that is found in 2 of fewer localities. A locality is defined as the location of the species as well as its immediate habitat.

At a state or national level species rarity is usually determined by the use of standard published references. These come from a variety of sources, such as fish and game departments, atlas projects, and museums or professional associations. In some cases the assessment of certain groups, such as some invertebrate groups, has not been made and, therefore, the application of the park level information to the determination of state or national significance is not possible.

The Pennsylvania Natural Diversity Inventory has been working for some time to determine the status of each of the indigenous species that occurs in the state.

A special case should be made for the habitat of endangered species that appear to have been extirpated from the park. The Piping Plover is an example. This shorebird no longer breeds in the park but as with all migratory species it is possible that it could return in the future if the appropriate habitat is available. In such a case, designation of appropriate habitat is possible under this criteria as long as there is a reasonable amount of knowledge on the location of the previous breeding sites, the appropriate habitat is still available and the designation can serve a useful conservation purpose.

Criterion 2 (Unusual and/or high quality community)

The comparison of the conditions of the various habitats and communities within the park to the similar habitats and communities outside the park is necessary for the determination of status.

The knowledge of the historic conditions present before European settlement is useful but is usually not available in comprehensive detail.

This criterion is most often used to highlight the presence of communities that are highly natural (i.e. with little human-caused degradation). It is also used to highlight communities that are scarce (i.e. those at the edge of a climatic region, such as the habitat of Prickly Pear Cactus or those that were once more common but have been considerably reduced due to disturbance, such as the Cranberry).

Criterion 3 (High diversity)

High diversity of species in an area is indicative of significant ecological conditions.

The presence of a large number of species in an area must be done with a good knowledge of the species numbers that are normally found in other similar habitats in that part of the country.

This criterion is applied by reference to all of the species in a community.

This criterion can be applied with specific groups of organisms as indicators. For example, a wetland with a high number of species of fish or a woods with a high number of species of breeding wood warblers can be used to satisfy the criterion.

The use of this criterion can normally not be done with mathematical precision. The knowledge of community composition is usually not to a sufficient level for precise numerical

application. However, some populations, such as those of breeding birds and fish are well enough known that quantitative comparative assessments are possible. In other groups only qualitative judgments can be made.

It most cases this criterion is acceptably applied by the use of the knowledge and experience of a group of well-informed individuals. This is known as the best-professional knowledge method of determination.

Criterion 4 (Ecological Function)

The determination of sites of vital ecological function is best done by reference to specific ecological functions. These will vary greatly in different climatic regions. The ones discussed here are most important in inland sites in northeastern North America.

Groundwater and surface water are critical components of all ecosystems. The presence of areas of groundwater recharge and groundwater discharge are particularly important. However, in some parks that are naturally very wet due to their presence in or on a lake, the important hydrological functions are influenced by features outside the park. In these cases the determination of the location of specific, significant hydrological sites is very difficult and usually not possible.

The presence of significant migratory or wintering stop-over points can be used to fulfill this criterion. However, most migratory species use broad areas of habitat for their migration stop-over points. As a result, it is important to select significant locations of importance, as opposed to general areas. An example of such an application might be a significant resting and feeding area for migratory terns, where such areas are scarce.

The biological linkage of habitats by a section of similar, but often less natural or valuable, habitat is important for the movement of individuals and species. An example here might be a break in a shore sand bar that allows access for lake fish into important inland spawning areas.

Some species of organisms have developed breeding strategies that require them to group together during the breeding season. Colonial water birds are a good example. In most of these species the nesting area is in a well-defined, relatively small area. However, the birds forage over a much larger area. This criterion can be used to designate such colonial nesting areas because the functioning of this site is vital to the healthy maintenance of the natural system well beyond the immediate boundaries.

Other significant ecological functions may be used to fulfill this criterion in specific areas.

Criterion 5 (Large areas)

This criterion is used to delineate areas that provide habitat for species that require extensive blocks of natural area to survive. Upper trophic level predators are examples. These animals have demanding habitat needs that are only fulfilled by very large blocks, in the scale of hundreds of hectares, of habitat. They usually cannot survive with significant amounts of human disturbance in their range. This criterion is used to delineate habitat of this type.

Some species that require large amounts of habitat do not need all of the habitat to be natural. An example of this is the Osprey that can tolerate large amounts of human activity in its feeding area. This criterion is not used to designate the entire home range of species such as this. However, it can be used to designate smaller areas that are critical to certain parts of the life cycle, such as the area of an Osprey nest.

Criterion 6 (Landform)

Distinctive and unusual landform designation is done with the knowledge of the general geomorphological and geological characteristics of a park and their significance. Features to be considered for application would include those that have a significance because of their unusual characteristics. Examples of the potential use of this criterion could be: rare glacial land forms, type sites of stratigraphic exposure, significant erosional or depositional features, and unusual land shapes. An example in Presque Isle might be the highest sand ridges.

In keeping with the use of the criterion for designation at three levels of significance, in park, in the state, and in the country, it is important to attempt to rank the landform feature to its level of importance.

Criterion 7 (Scientific Research)

Since virtually all aspects of the environment are potential grist for the scientific mill only those sites that have a history of scientific research are considered. As the knowledge gained at a site develops, it becomes quite important that non-planned and unnatural perturbations not disturb the environment. Such a happening could potentially endanger the long term conclusions that might be drawn from the studies. For example, studies of the predator-prey relationships of a population of unhunted animals would be endangered by the introduction of a new predator or of hunting.

This criterion can be used for a wide variety of scientific research. Examples might include: the typing of past climates through the investigation of lake sediments, processes of fire succession, long term water monitoring, herbivore and food plant relationships over time, and habitat requirements of certain sensitive species. Within Presque Isle, there is a long term study that looking at the relationship between the White-tailed Deer and the rare Hairy Puccoon.

Criterion 8 (Aesthetic Area)

Aesthetic appreciation of an environment is one of strongest public reactions to some sensitive environments. In the context of the designation of ESAs aesthetic appreciation is defined by the inherent beauty of a site as related to its natural value.

Specific features such as scenic views over water, overlooks, stretches of wild river, pristine forests, undisturbed natural areas and impressive stands of wildflowers are all examples of the use of this criterion. Examples in Presque Isle are the scenic area around Gull Point and the views of the lagoons from the Ridge Trail.

This criterion is only to be used in concert with at least one of the others. The site must have some scientific, ecological or geological significance in addition to its aesthetic appeal. It is possible to have man-made sites that are quite aesthetically pleasing but are of minimal ecological significance.

Boundary Delineation

The delineation of boundaries around ESAs involves the interpretation of site-specific natural resource data. The boundaries should contain the characteristics that fulfill the criteria. The boundaries are drawn using information from field surveys, aerial photographs, ecosystem mapping and personal observation.

The determination of boundaries is very important. Some of the more important factors to be taken into consideration are listed below.

1) The visibility of the ESA boundaries on the ground.

2) The potential impact of adjacent or nearby land uses.

3) The territory, range, and habitat of species of special consideration.

4) The natural boundaries of changing environmental features such as tides, flood lines, erosion areas, depositional areas, shorelines and river edges.

5) The ecological integrity of nearby communities.

6) The need for linkages between ecosystems.

7) The existing land use.

8) Ecosystem changes underway.

Land use planning requires the outlining of features in such a way that they can be found on the ground and, thereby, potentially treated differentially. The use of aerial photographs will enable the determination of visible changes in habitats. It is best to draw boundaries based on an abrupt change in habitat. It must always be kept in mind that the purpose of designation of ESAs is to give land managers guidance. Therefore, field people must be able to find such sites by the observation of relatively distinct features on the ground.

Late in 1987 the mapping of the natural communities of Presque Isle was completed. Generally, the boundaries of the natural communities will be used to outline the ESAs within the park. In addition, roads, trails, rights-of-way and other well defined manmade features can serve as useful boundaries. The natural communities will serve as the basic ESA units. It is to be expected that the ESAs will be: part of a natural community area, an entire such community, or portions of more than one community.

Ranking ESAs

Decisions must be made constantly in a park. New trails are required, shoreline erosion requires the movement of facilities, and old facilities need to be restored. It is of use to the park manager to the have the ESAs in the park both delineated and ranked. The delineation acts as a simple red flag method of highlighting importance to a manager. Ranking assists in the determination of alternatives when management cannot avoid making some level of impact on an ESA.

This method of ranking has components; the number of criteria that they satisfy and the strength that they fulfill each criteria. The methods for assigning relative strength are outlined below.

Criterion 1 (Rare and Endangered Species)

Each species of park level significance is given a mark of 1.

Each species of state level significance is given a mark of 5.

Each species of national level of significance is given a mark of 10.

Criterion 2 (Unusual Community)

Each community of park level of significance is given a mark of 1.

Each community of state level of significance is given a mark of 5.

Each community of national level of significance is given a mark of 10.

Criterion 3 (High Diversity)

Each ESA that is seen to be of unusually high diversity is given a mark of 5.

Criterion 4 (Ecological Function)

Each ecological function that a site fulfills in an unusual and critical fashion is given mark of 5.

Criterion 5 (Large Area)

Each area defined as large is given a mark of 10. This criterion may not be applicable in Presque Isle because of the park's relatively small size. However, some Presque Isle habitats may be part of a much larger habitat unit that extends beyond the park's boundaries. In such a case this criterion may be used.

Criterion 6 (Unusual Landform)

Each landform of park level of significance is given a mark of 1.

Each landform of state level of significance is given a mark of 5.

Each landform of national level of significance is given a mark of 10.

Criterion 7 (Scientific Research)

This involves an assessment of the value of the research. Give between 1 to a maximum of 10 points for the level of significance, in a scientific sense, of the research.

Criterion 8 (Aesthetic Value)

The aesthetic value of all sites designated under this criterion is assigned comparatively. The site within the park with the highest value is given a 10, while all other are ranked below this between 9 and 1.

Discussion of Ranking

If a feature is of a high level of significance, such as a nationally endangered species, it gets points at the highest level but does not receive points for fulfilling the state or park level of significance.

The system of ranking gives higher levels of significance to the sites with important populations of rare species and their habitats (Criteria 1 and 2) because the number that can be assigned is open ended.

It must always be remembered that the assigning of numbers for the purpose of ranking is only for general guidance purposes. By definition, many subjective decisions must be made and the numbers should not be allowed to hide the fact that the base for ranking is subjective.

Therefore, it is suggested that after numbers have been assigned to each of the ESAs that a series of categories of significance be developed. The ESAs should be listed and sorted according to their significance number. They can then be grouped into 5 categories. Each category will contain 20% of the ESAs. The 20% with the top numbers will be given category 1 and the bottom 20% will be given category 5.

The Application of the Criteria

The application of the criteria is a 3-step process.

1) Data collection and compilation

In this stage the existing data on the resource features of the park is collected. The information can be obtained from sources such as: herbarium records, published literature, field notes of staff and visitors, unpublished scientific data, museum collections and the memories of interested individuals.

In some cases original data collection in the field may be required if some necessary information is not available.

2) Data interpretation

In this stage the resource data is sifted through the criteria in order to reveal the ESAs. This interpretation is best done by an interdisciplinary advisory committee. The members of this group should represent a wide range of the biological and resource management professions and knowledge groupings. This method of decision making is known as that of the best professional judgment.

At Presque Isle the consultant will initially collect and prepare the information. The consultant will then interpret the data in the light of the criteria. Boundary delineation will be done at the next stage. After that, a report will be written.

3) Report Preparation

A report should be prepared that outlines the ESAs. The contents of the descriptions for each ESA are outlined below.

Description of ESAs

The description of each ESA should follow a general format as described below.

NAME

Each ESA should have a unique name. The name should describe some important feature of the ESA, for example Orchid Woods or Tern Flats.

LOCATION

A short description of the location of the ESA within the park is necessary.

SIZE

The size of the ESA can be estimated from maps and aerial photographs.

GENERAL DESCRIPTION

Each ESA should have a short introduction that serves as a general description of its features. The major ecosystem type, the important features and the general landscape form should be components of this description.

CRITERIA FULFILLED

This is a listing of the numbers, with a short descriptor, of the criteria fulfilled by the ESA. For example this summary of the criteria fulfilled should look like this:

Criteria 1 (rare species), criteria 2 (unusual community), etc.

DESCRIPTION OF CRITERIA

Under the heading of the criteria number and the short descriptor an outline of the reasons for the fulfillment of this criterion is given. In some cases the description may be quite short, for example, in simply outlining the fact that a natural feature is the only one of its type in the park. In other cases this description may be quite long, for example a listing of each of the rare species found in an important site.

SENSITIVITY

This is a general discussion of the sensitivity of this ESA. It will highlight certain features or processes that must be given special consideration and will provide an interpretation of the facts listed under each of the criteria listed above. This section is important because the implications of the occurrence of a particular species, community or process are not always readily apparent to the park manager.

Management recommendations and any foreseeable factors which could jeopardize the existence of the ESA will be given.

MAPPING

Each ESA should be delineated on a map at a scale of 1" = 400'. Each map will outline the boundaries of the ESA with a clear, solid line and the inside of the area will be covered with a fine shading. The community boundaries and the location of specific features will be shown. Distinctive features will be shown by name. Some features that are susceptible to vandalism, such as rare plants, should not be shown on the maps that are distributed to the general public. However, this information must be readily available to the park managers and to the scientific community.

Other Components of the Report

The report should contain a table that displays the number and the strength of fulfillment of each of the criteria for each ESA.

In addition, information on the species, habitats and landforms of significance should be summarized in appendices.

An overall map at a scale of 1" = 2000' should be included that shows all of the ESAs within the park.

Application of ESAs to Park Plans

The primary reason for the delineation of the ESAs within a park is to highlight certain areas for higher levels of protection. With this concept in mind, it is worthwhile to outline general principles that should guide the development of policy within the park.

1) As a general rule, no development is permitted in sensitive areas due to the detrimental impact.

2) The boundaries of the ESAs should be shown on all park plans and maps.

3) If impact is anticipated on an ESA, say in the form of a new trail, an environmental impact statement should be prepared.

4) The collection of information on the features of the ESAs should be ongoing.

5) The park should continue the development of a data base on the natural resources of the park. All new data that is collected should be added to the data base.

6) Both the general public and the park officials must have regard for the sensitivity of the ESA features. Appropriate enforcement procedures must be put in place.

7) Procedures should be put in place for the updating of the ESA boundaries at 10 year intervals.

Summary

The delineation of the ESAs within a park is an important step in the management of the natural resources. The site monitoring and the plan administration functions are critical to the long-term success of the program - the plan is only as good as the implementation.

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Appendix 1

This alternative for ranking of the ESAs was considered and rejected during the preparation of the ESA criteria and delineation methodology.

Ranking Alternative 1

The simplest method of ranking of alternatives uses the addition of the number of criteria that each site fulfills. For example, a site that fulfills 8 criteria is ranked higher than one that fulfills 2.

This method has the advantage of simplicity. It is easy to administer and understand.

It has the disadvantage of ignoring the relative strength of the fulfillment of any one criterion. For example, one site might fulfill criterion 1 (rare or endangered species) with the presence of 2 significant species while another site contains 15 significant species. Both sites, however, would be ranked equally.

Appendix 2

Appendix 2 contains lists of references to the flora and fauna of Presque Isle State Park. There are reference lists for the reptiles and amphibians, vegetation, water quality, geomorphology, and birds. The Resource Management Plan contains additional information.

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BIRDS OF PRESQUE ISLE STATE PARK
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Pennsylvania Natural Diversity Inventory (PNDI) lists were provided by Calvin DuBrock, Pennsylvania Game Commission, and Charles Bier, Western Pennsylvania Conservancy. Lists of endangered and threatened species were provided by Clark Schiffer, Pennsylvania Fish Commission, and Charles J. Kulp, U.S. Fish & Wildlife Service, Region 5.

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