

VI. NATURAL AND CULTURAL RESOURCE MANAGEMENT

NATURAL RESOURCE MANAGEMENT POLICY

The Division of Parks and Recreation' s approach to natural resource management is directed by the North Carolina Constitution and the State Parks Act, both of which require the prudent management of natural resources. The constitution sets the overall policy by broadly defining the conservation and protection of natural resources and the acquisition of such resources as a proper function of government. The State Parks Act states that unique archaeological, geological, biological, scenic and recreational resources are a part of the heritage of the people that “...*should be preserved and managed by those people for their use and for the use of their visitors and descendants.*”

The North Carolina state parks system plays an important role in maintaining, rehabilitating and perpetuating the state' s natural heritage. The natural resources of the state parks system include: high quality, rare or representative examples of natural communities; native plants and animals; geological features and land forms; water resources; and the natural processes that affect these resources. The primary objective in natural resource management will be the protection of natural resources for their inherent integrity and for appropriate types of enjoyment while ensuring their availability for future generations.

It is the Division' s policy that natural resources will be managed by allowing natural environments to evolve through natural processes with minimal human influence. Natural resource management will not attempt solely to preserve individual species or processes; rather, it will attempt to maintain all the components and processes of a park' s naturally evolving ecosystems. When intervention is necessary, direct or secondary effects on park resources will be minimized to the greatest extent possible. Intervention of natural processes may occur:

To correct or compensate for the previous human disruption of natural processes;

To protect, restore or enhance rare species and natural communities;

To protect, restore or enhance significant archaeological resources;

To construct, maintain, improve or protect park facilities; and,

To prevent danger to human health or safety around park facilities.

All park facilities will be designed, constructed and maintained to avoid adverse impacts to high quality natural communities, rare plant and animal species, major archaeological sites and other significant natural and cultural resources.

ENO RIVER NATURAL COMMUNITIES

Community descriptions follow the *Classification of the Natural Communities of North Carolina: Third Approximation* (Mike Schafale and Alan Weakley, 1990).

Dry Oak-Hickory Forest

This forest type, which typically occurs on ridge tops, steep south-facing slopes, and other dry upland areas, was once one of the most predominant natural communities in the Piedmont. Much of the historical range has been cleared for agriculture or urban development; those areas that were not cleared were subjected to long-term selective cutting and livestock foraging. Examples of significant size and quality are rare.

An extensive example of this community occurs on the broad ridge tops and upland slopes in the area around Few's Ford. The canopy is closed and is dominated by white oak (*Quercus alba*), southern red oak (*Q. falcata*), scarlet oak (*Q. coccinea*), and post oak (*Q. stellata*). The dominant hickory species are mockernut (*Carya tomentosa*) and pignut (*C. glabra*).

Dry-Mesic Oak-Hickory Forest

This forest type occurs on low and middle slopes, upland flats, and other dry-mesic upland areas. Like the Dry Oak-Hickory Forest, this was once one of the most extensive and well developed community types in the Piedmont prior to widespread clearing for development and agriculture.

Two examples of this community occur in the park. The first is on the middle and upper slopes of the extensively forested uplands south of the river around the Few's Ford area. The canopy is dominated by white oak, northern red oak (*Q. rubra*), black oak (*Q. velutina*), and scarlet oak. The dominant hickory species are mockernut and pignut. The second example occurs south of the river on the upland slopes and ridges in the Cabe Lands section of the park. Canopy species are the same as above, with the addition of yellow poplar (*Liriodendron tulipifera*), black walnut (*Juglans nigra*), shortleaf pine (*Pinus echinata*), and Virginia pine (*P. virginiana*).

Piedmont/Coastal Plain Acidic Cliff

This community type occurs on very steep to vertical slopes that are rocky or dry enough to prevent the formation of a closed tree or shrub canopy. Hard rock is the most typical substrate; however, this community is also associated with softer material that has been undercut and exposed by a stream. The vegetation is usually heterogeneous and scattered; trees and shrubs are limited to crevices or other areas of deeper soil.

Three examples of this community occur in the park. An unusually xeric example occurs on a steep, rocky, south-facing bluff north of the river in the Few's Ford area. The dominant tree and

shrub species are post oak, mountain laurel (*Kalmia latifolia*), and stunted Virginia red cedar (*Juniperus virginiana*). Herbaceous species include woolly lipfern (*Cheilanthes tomentosa*), and goat's rue (*Tephrosia virginiana*). A second example occurs on a rugged, nearly vertical outcrop that runs for approximately 1,000 feet along the east side of the river in the Cabe Lands section. Woody vegetation at this site is very limited and is dominated by dry site species such as Virginia pine, post oak, and blackjack oak (*Q. marilandica*). The best example of this community is the Garrard Slopes in Durham County, located on the south bank about one-half mile west of Guess Road. These cliffs rise approximately 70 feet and are about 700 feet long.

Mesic Mixed Hardwood Forest (Piedmont Subtype)

This community generally develops on low slopes, steep north-facing slopes, and ravines. These forests remain common across the region, and their occurrence on steep sites has spared many of them the extensive disturbance that has occurred in other upland natural communities.

Three examples of this natural community occur in the park. The first is in moist, north-facing ravines along the south side of the river in the Cabe Lands section. This is an old forest, with tree ages in some areas estimated to exceed 150 years. Dominant species include beech (*Fagus grandifolia*), bitternut hickory (*C. cordiformis*), northern red oak, and yellow poplar. The second example occurs on steep north-facing slopes and ravines south of the river in the Pump Station section. This is a younger community than the one at the Cabe Lands and it supports a diverse flora. Dominant canopy species include northern red oak, beech, and red maple (*Acer rubrum*). The average diameter-at-breast-height (dbh) is 10-12". Trees up to 30" dbh are also present. The herb layer is rich and diverse and includes yellow ladyslipper (*Cypripedium pubescens*), and doll's-eyes (*Actaea pachypoda*). The third example occurs in the Few's Ford section along north and east-facing slopes. Vegetation is similar to that found at the Cabe Lands.

Piedmont/Low Mountain Alluvial Forest

This community occurs in river and stream flood plains that are seasonally or intermittently flooded. Flood-borne sediments provide nutrients to these communities, which typically have a closed canopy. Structure and diversity of the subcanopy and herbaceous layers are highly variable and may be affected by the severity of flooding.

An example of this community occurs in the area around the Few's Ford Access. Dominant species include river birch (*Betula nigra*), sycamore (*Platanus occidentalis*), box-elder (*Acer negundo*), and white ash (*Fraxinus americana*).

Rocky Bar and Shore

This community occurs as outcrops and gravel bars in or adjacent to rivers and streams. These sites are typically too rocky or wet to support trees. Frequent disturbance results in vegetation patterns that are highly variable and dependent on flooding and sediment loads.

An example of this community type occurs in the area around the Few's Ford Access. The site features well developed gravel shoals and riffles in the riverbed; since these shoals are frequently reworked by the river, woody vegetation is essentially absent. The dominant plant species is common water-willow (*Justicia americana*). The site also supports mussel beds.

Piedmont/Coastal Plain Heath Bluff

This community occurs on steep, north-facing slopes and bluffs that generally border a flood plain forest or stream channel. Although usually found in areas underlain by hard rock, these communities may also develop on sites with softer material that has been undercut by a stream.

An extensive example of this community type occurs along a series of three steep, rocky bluffs along the south side of the river in the Cabe Lands section of the park. The vegetation at these bluffs is dominated by mountain laurel. Two of the bluffs support Catawba rhododendron (*Rhododendron catawbiense*). The tree canopy is open and is dominated by white oak, chestnut oak (*Q. montana*), beech, Virginia pine, and gum species (*Nyssa* spp.). The western bluff is the state's easternmost location for mountain spleenwort (*Asplenium montanum*).

RARE SPECIES AT ENO RIVER

Plants

Ginseng (*Panax quinquefolius*)

Ginseng is on the North Carolina watch list. This designation means that ginseng is believed to be rare and of conservation concern in the state, but it does not warrant active monitoring at this time. Populations have been previously documented in the vicinity of Cox Mountain at Few's Ford. Park staff, however, believe that the range of ginseng is diminishing since known populations of this plant are no longer extant in the park.

Amphibians

Neuse River Waterdog (*Necturus lewisi*)

This large salamander is a state-listed species of Special Concern. This listing means that the North Carolina Wildlife Resources Commission (WRC) has determined that this species is sufficiently rare to warrant monitoring. A 2000-2001 study indicates that the waterdog is not at imminent risk of disappearing from the Piedmont portion of the Neuse River basin, and that populations in the Eno River appear healthy. The low level of capture success, however, suggests at least an uncommon species. Evidence suggests that this animal is at some level of risk from impacted water quality. Continued monitoring is needed to ensure its future.

Mollusks

Eastern Lampmussel (*Lampsilis radiata*)

The eastern lampmussel is a state-listed species of Special Concern. This listing means that the WRC has determined that this species is sufficiently rare to warrant monitoring. During a survey in 1992, this mussel was found at a number of locations at Few's Ford, Pleasant Green, and the Pump Station.

Green Floater (*Lasmigona subviridis*)

The green floater is a state-listed endangered species, which means the Wildlife Resources Commission has determined that this mussel's continued existence as a viable component of the fauna in North Carolina is in jeopardy. The green floater is also a federal species of concern, which means that although it may be appropriate to list the species as endangered or threatened, the Fish and Wildlife Service does not currently have conclusive data on vulnerability or threats.

Yellow Lampmussel (*Lampsilis coriosa*) and **Atlantic Pigtoe** (*Fusconaia masoni*)

Both of these mussels are state-listed as Threatened by the WRC. This listing means that they are likely to become endangered species within the foreseeable future throughout all or a significant portion of their ranges. They are also federal-listed as Species of Concern, meaning that it may be appropriate to list these species as endangered or threatened, but currently the FWS does not have conclusive data on vulnerability or threats to warrant such a listing. Both species of mussels were sampled in 1995. The Atlantic pigtoe was found at a number of locations at the Pump Station, and the yellow lampmussel was found throughout the park.

Panhandle Pebblesnail (*Somatogyrus virginicus*)

The panhandle pebblesnail is a federal-listed Species of Concern and is designated by the Natural Heritage Program (NHP) as Significantly Rare. The federal listing means that it may be appropriate to list the species as endangered or threatened, but currently the FWS does not have conclusive data on vulnerability and threats to warrant such a listing. Although significantly rare species exist in small numbers, they have not been listed by the WRC as endangered, threatened, or special concern. The NHP monitors the status of significantly rare species. In 1993, this mussel was found at the Pump Station near Guess Road. While working on her thesis in the summer of 1997, a Duke University masters student found the pebble snail in over 30 locations in the park.

Squawfoot (*Strophitus undulatus*) and **Triangle Floater** (*Alasmidonta undulata*)

These rare mussels are state-listed as Threatened species and are, therefore, recognized by the WRC as ones that are likely to become endangered species within the foreseeable future throughout all or a significant portion of their range. Both of these species were sampled in 1992. A number of squawfoot mussels were found at the Pump Station. One triangle floater was found

at Few's Ford.

Notched Rainbow (*Villosa constricta*)

This mussel species is designated as Significantly Rare by the NHP. Significantly rare species exist in small numbers but have not been formally listed by the WRC as endangered, threatened, or special concern. The NHP monitors the status of Significantly Rare species. In 1995, the notched rainbow was found at a number of locations throughout the park.

Fish

Roanoke Bass (*Ambloplites cavifrons*)

The Roanoke bass is designated as Significantly Rare by the NHP. Significantly Rare species exist in small numbers but have not been formally listed by the WRC as endangered, threatened, or special concern. The NHP monitors the status of Significantly Rare species.

Carolina Darter (*Etheostoma collis*)

The Carolina darter is a state-listed species of Special Concern. This designation means that the WRC has determined that this fish is sufficiently rare to warrant monitoring.

Birds

Cooper's Hawk (*Accipiter cooperii*)

The Cooper's hawk is a state-listed species of Special Concern. This designation means that the Wildlife Resources Commission has determined that this bird is sufficiently rare to warrant monitoring.

Black Vulture (*Coragyps atratus*)

This species has been designated by the Wildlife Resources Commission as a Special Concern species. These birds prefer forested areas for nesting and forests or open areas for foraging.

Insects

Gray Petaltail (*Tachopteryx thoreyi*)

This dragonfly is designated as Significantly Rare by the NHP. Significantly Rare species exist in small numbers but have not been formally listed by the WRC as endangered, threatened, or special concern. The NHP monitors the status of Significantly Rare species.

DEDICATED NATURE PRESERVE

In January 1995, 1,150 acres of Eno River State Park, including the entire reach of the river that is included in the park's boundaries, were approved by the Governor and Council of State for designation as a Dedicated Nature Preserve. This designation supersedes any areas previously designated as Registered Natural Heritage Areas and provides more stringent rules for use and protection of the dedicated area.

The dedicated lands along the river include high quality examples of both rare and common natural community types. The rare community types are most notable for their small size and scarcity across the landscape; the larger, more common community types are most notable for the presence of mature, well developed vegetation patterns that resemble the historical landscape. These large tracts also provide habitat for animals that require large home ranges. The aquatic habitat is most notable for its role in supporting the park's numerous rare aquatic species, many of which serve as indicators of water quality.

Potential Additions to the Dedicated Nature Preserve

Additional lands that are acquired will need site inspections and inventories in order to determine their eligibility for inclusion in the Dedicated Nature Preserve.

NATURAL AND CULTURAL RESOURCE MANAGEMENT ISSUES

Natural Resource Inventories

Although the park has been the subject of a number of scientific research projects, including an aquatic survey in 1996, a comprehensive, updated natural heritage survey is needed. These inventories would provide important baseline data for monitoring and managing ecologically sensitive natural resources and would also help identify additional high quality areas for designation as Dedicated Nature Preserves. These data would also allow for expanded interpretation and education programs. Emphasis should be placed on developing and maintaining an updated database for the park's rare species. Efforts should also be made to determine the presence and status of rare species known only from isolated or historical records. Particular attention should be placed on the status of rare aquatic species, the presence of which frequently serve as indicators of water quality.

Cultural Resource Inventories

The area in and around the state park is known to have been long inhabited by the Eno, Occaneechee, and Shakori Indian tribes, who apparently shared the river valley with little animosity. These tribes dispersed soon after the arrival of European settlers around 1750, and little work has been done to document the location and extent of cultural resources associated with American Indian habitation and use of the river valley.

The same is generally true of the area's cultural resources associated with European settlement. Although much is known of the numerous grist mills that were built along the river in the eighteenth and nineteenth centuries, a comprehensive study of these sites has never occurred. The only site that has received any preliminary investigation is the Few's Ford community, which the North Carolina Department of Cultural Resources added to the study list of potential nominations to the National Register of Historic Places in April 1994.

In order to address issues regarding environmental compliance for capital improvements, the Resource Management Program has recommended that a system wide archaeological survey be conducted to determine what, if any, mitigation will be required for sites that support significant cultural resources. Funding has been approved by the Parks and Recreation Trust Fund, and surveys for all projects in the park's master plan are being coordinated with the Office of State Archaeology. In addition to these surveys, the division needs to develop a comprehensive database regarding the role and extent of both American Indian and European inhabitants in the Eno River Valley. Such studies could be of great benefit for the park's interpretation and education programs.

Water Quantity

Concerns over low flows in the Eno River prompted the Town of Hillsborough, the Orange-Alamance Water System, Inc., Orange County, and Piedmont Minerals, Inc. to develop a voluntary capacity use agreement in February 1989. This agreement restricts the amount of water each user can withdraw based on the actual flows measured in the river. Water users who withdraw more than 100,000 gallons per day are subject to the management controls stated in the agreement. The area covered by this agreement covers 150 square miles and encompasses the Eno River watershed upstream from the confluence of the Eno River with the Little River. As long as this agreement continues to function satisfactorily, it will continue to be administered on a voluntary basis.

Water Quality

The North Carolina Division of Water Quality regularly monitors the water chemistry and biology of the Eno River. Ambient water chemistry is sampled monthly at two sites and aquatic insects are sampled every five years at an additional two sites within the park. Considering the urban character of the areas surrounding the Eno River, the park lands provide an excellent buffer for the maintenance of high water quality in this river. Rapid growth, however, will continue to put pressure on the watershed, underscoring the need for long-term monitoring of water quality.

Southern Pine Beetle Management

Sections of the park have been affected by outbreaks of the southern pine beetle (*Dendroctonus frontalis*). Southern pine beetles (SPB) are a naturally occurring component of southeastern forests and are, therefore, always present at some level. However, their effects are rarely uniform and tend to be more adverse when combined with the physiological distress that trees experience when exposed to prolonged hot, dry weather, disease, or other stress causing agents.

Although the SPB is a significant and widespread native forest pest whose effects have been documented since the 1750s, an effective method to control its periodic outbreaks has not yet been developed. The division's policy on SPB outbreaks is to remove affected trees whenever they present a threat to visitor safety or to a neighboring landowner. In response to such outbreaks, control efforts at Eno River have focused primarily on the removal of affected trees to create buffers around active beetle sites. Small, isolated outbreaks that affect few trees or that are sufficiently removed from higher risk areas are generally left alone, since the impacts of getting to such sites generally outweigh the benefits gained from treating the spot. Pheromone treatments were employed in 1994 and 1995 by the U.S. Department of Agriculture as part of a scientific research project on SPB control. The results of these treatments have been mixed.

Durham Northwest and Northeast Loop (Eno Drive)

The division has reviewed and provided comments to the NC Department of Transportation on their Draft Environmental Impact Statement (DEIS) for the Durham Northwest and Northeast Loop. The division's major objection focuses on the proximity to the park of the segment from Roxboro Road westward to Interstate 85. The division believes that potential impacts, both short and long term, to the river and the park were not adequately addressed by the DEIS.

Potential noise impacts on the state park from the construction of this road were not addressed in the DEIS. The proposed road would be very close to the park or would adjoin the park boundary in several locations. Hiking, bird watching, environmental education, and other park activities would be adversely affected by noise generated by this project. The construction of a major road along the park boundary could also affect the wildlife living along the river corridor. Long term impacts could include wildlife killed by traffic, loss or alterations of habitat, and alterations in movement patterns. This type of development may also disrupt the breeding and foraging behavior of wary species.

Although the road would not cross the river, the location of the road so close to the river and the crossing of several major tributaries are likely to result in the degradation of the water quality of the river. The Eno River supports numerous rare aquatic species whose presence is largely a consequence of good water quality and relatively undisturbed habitat. It is reasonable to expect that the construction of this road will cause a significant amount of sedimentation, which could adversely affect the rare mussels and other aquatic species as well as degrade the aesthetic appeal of the river. Secondary impacts associated with this road project could include more urban development along the construction corridor.

As of December 2002, the Northwest Loop (Eno Drive west Roxboro Road) has been eliminated from the Metropolitan Planning Organization Long Range Transportation Plan. Should the Northwest Loop be re-inserted into transportation planning it will loom in the forefront of management concerns at Eno River State Park.

Invasive Exotic Plant Species

In 1999, Invasive Plant Control, Inc. was contracted by the Division of Parks and Recreation to conduct a park-by-park inventory of invasive exotic plant species. These inventories were

conducted with an emphasis on roads, trails, waterways, and high use visitor areas and were intended to serve as the primary source for information regarding species identification, location, degree of infestation, and difficulty of control. Information from these inventories is to be used in conjunction with the division's *Exotic Plant Guidelines*, which provide step-by-step protocols for the development of control plans. Copies of this inventory and guideline are on file with the park and the Resource Management Program.

The inventory at ENRI was divided into four sections: Few's Ford; Pleasant Green/Cabe Lands; Cole Mill/Pump Station; and OCMO. In all, 14 invasive exotic plant species were identified; twelve of these species occurred on ENRI sites, and nine occurred at OCMO. The following species were identified:

Species	ENRI	OCMO
Lespedeza (Lespedeza cuneata)	X	X
Japanese honeysuckle (Lonicera japonica)	X	X
Japanese grass (Microstegium viminium)	X	X
Periwinkle (Vinca minor)	X	
Multiflora Rose (Rosa multiflora)	X	X
Chinese privet (Ligustrum sinense)	X	X
Tree of Heaven (Ailanthus altissima)	X	X
Autumn olive (Elaeagnus umbellata)	X	
Chinese wisteria (Wisteria sinensis)	X	
Mimosa (Albizia julibrissin)	X	
English ivy (Hedera helix)	X	X
Kudzu (Pueraria lobata)	X	
Large periwinkle (Vinca major)		X
Princess tree (Paulownia tomentosa)		X

It is recommended that park staff continue to search for exotic species and to update the 1999 inventory, as it is likely that additional exotic species occur at both ENRI and OCMO that were not previously documented. It is also recommended that park staff apply the protocols contained in the division's *Exotic Species Guidelines* to identify and prioritize the most critical species for control and/or eradication. Of particular concern are well-established populations of aggressive species, including tree of heaven, multiflora rose, Japanese honeysuckle, and Chinese privet. All of these are common at old home sites, which are numerous throughout the park. The control of these species will likely be a long term project, as most of the non-native species that have been

found are aggressive and are well established. Control plans should, whenever possible, make the best possible use of volunteers and should include the use of appropriate herbicides that are applied according to the manufacturer's suggestions and under the supervision of a state-licensed applicator. Park staff can be licensed and can find information on this process by contacting the NC State Department of Agriculture.

Resource Management Plan

A comprehensive, park-specific resource management plan addressing these and future issues needs to be developed for Eno River State Park and Occoneechee Mountain. This plan should include detailed actions, the implementation of which will prevent or correct threats or damage to the natural resources of the park. The addition of a district resource management specialist would facilitate the development and implementation of this plan.

OCCONEECHEE MOUNTAIN NATURAL COMMUNITIES

The community descriptions follow the *Classification of the Natural Communities of North Carolina: Third Approximation* (Mike Schafale and Alan Weakley, 1990).

Dry Oak–Hickory Forest

Mature Dry Oak–Hickory Forests are found on the mid-slopes of Occoneechee Mountain. A typical assemblage of oaks, including white oak (*Quercus alba*), post oak (*Q. stellata*), and southern red oak (*Q. falcata*), along with a variety of hickory species (*Carya spp.*) forms the overstory. The understory is dominated by sourwood (*Oxydendrum arboreum*) and black gum (*Nyssa sylvatica*).

Piedmont Acidic Cliff

An example of this community occurs at the site known as Panther's Den, which is characterized by north-facing vertical cliffs and a steep, rocky ravine. Catawba rhododendron (*Rhododendron catawbiense*) and chestnut oak (*Q. montana*) dominate this site. The site is significant because it contains several montane disjuncts at their eastern limit, including sarsaparilla (*Aralia nudicaulis*) and mountain spleenwort (*Asplenium montanum*).

Piedmont Monadnock Forest

One of the largest and most mature examples of a Piedmont Monadnock Forest in the eastern piedmont occurs at the summit of Occoneechee Mountain. Dominated by chestnut oak and scarlet oak (*Q. coccinea*), this community occurs on rocky, well-drained, and generally very acidic soils. The understory contains an abundance of sourwood and red maple (*Acer rubrum*). Blueberries (*Vaccinium spp.*) and huckleberry (*Gaylussacia baccata*) dominate the sparse shrub layer.

Pine–Oak Heath

The Pine–Oak Heath at Occoneechee Mountain is the easternmost occurrence of this community in the state. It is located on the northern edge of the ridge and is dominated by Virginia pine (*Pinus virginiana*) and a dense shrub layer containing blueberries, huckleberry, and mountain laurel (*Kalmia latifolia*). Bracken fern (*Pteridium aquilinum*) is found in abundance.

OCCONEECHEE MOUNTAIN RARE SPECIES

Plants

Plants Brown Elfin (*Incisalia augustinus*)

This butterfly has been placed on the Natural Heritage Program's (NHP) Watch List. Such species are believed to be of conservation value because of scarcity, declining populations, threats to populations, or their scarcity cannot be determined due to inadequate information. This species occurs in heath vegetation at the summit.

Large Witch-alder (*Fothergilla major*)

This species has been designated by the Plant Conservation Program (PCP) as a Candidate Species. Such species are considered to be quite rare. If present land use trends continue, the species may be listed as either Threatened or Endangered on the state level. At least two populations have been documented growing among heath-dominated communities on dry mid and upper slopes at Occoneechee Mountain.

Sweet Pinesap (*Monotropis odorata*)

This species has been designated by the PCP as a Candidate Species. Information on the species' presence at Occoneechee Mountain is very sketchy and needs to be confirmed.

Purple Fringeless Orchid (*Platanthera peramoena*)

This species has been designated by the PCP as a Candidate Species. Information on the species' presence at Occoneechee Mountain is very sketchy and needs to be confirmed. The most recent record dates from 1977.

Bradley's Spleenwort (*Asplenium bradleyi*)

This species has been listed by the NHP as a Candidate Species. NHP records indicate that Occoneechee Mountain supports what may be the state's largest population of this species. It occurs on the lower part of the mountain's north-facing slopes on rocks in a chestnut oak forest.

Insects

Gray Petaltail (*Tachopteryx thoreyi*)

This dragonfly is designated as Significantly Rare by the NHP. Significantly Rare species exist in small numbers but have not been formally listed by the WRC as endangered, threatened, or special concern. The NHP monitors the status of Significantly Rare species.

POTENTIAL DEDICATED NATURE PRESERVE

The inclusion of Occoneechee Mountain in the state parks system as a State Natural Area is based on Natural Heritage Program inventory data. Much of the mountain is included in the significant Natural Heritage Area identified for the site. Additional inventory work is needed to determine the boundaries of a Dedicated Nature Preserve under the Nature Preserves Act for Occoneechee Mountain State Natural Area.

OCCONEECHEE MOUNTAIN NATURAL AND CULTURAL RESOURCE MANAGEMENT ISSUES

Cultural Resources

Occoneechee Mountain has a diverse array of cultural resources. The ruins of an old mill village can be found on the northern slope of the mountain. The western slope has been scarred by an old quarry site. There is also evidence of American Indian habitation in the area. The development of trails and facilities must occur with these cultural resources in mind.

In order to address issues regarding environmental compliance for capital improvements, the Resource Management Program has recommended that a system wide archaeological survey be conducted to determine what, if any, mitigation will be required for sites that support significant cultural resources. Funding has been approved by the Parks and Recreation Trust Fund, and surveys for all projects in the park's master plan are being coordinated with the Office of State Archaeology. In addition to these surveys, the division needs to develop a comprehensive database regarding the role and extent of both American Indian and European inhabitants at Occoneechee Mountain. Such studies could be of great benefit to the park's interpretation and education (I&E) programs.

Natural Resources Inventories

Comprehensive natural heritage surveys are needed. These inventories would provide baseline data for monitoring and managing ecologically sensitive resources and would also help identify additional high quality areas for designation as Registered Natural Heritage Areas. These data would also allow for expanded interpretation and education programs. Emphasis should be placed on developing and maintaining an updated database for the park's rare species. Efforts

should also be made to determine the presence and status of rare species known only from isolated or historical records. Vegetation monitoring plots should be established in the park's various natural communities in order to track changes in community structure and status.

Invasive Exotic Plant Species

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Carrying Capacity of the Site

The area has had uncontrolled public use, and the natural resources are showing signs of wear. This site supports ecologically sensitive natural resources of statewide significance; some locations can only handle low levels of use. Research is needed to determine the level of use that the resources of the area can withstand.

Development of Trails and Facilities

Since much of the mountain supports rare plant and animal species and high quality natural communities, the development of trails and facilities will require coordination with the Resource Management Program. All capital improvements must be planned and constructed with resource protection in mind.