APPENDIX H

BIOLOGICAL ASSESSMENT

Biological Assessment of the Environmental Impact Statement for the Revision of the Chattahoochee-Oconee National Forest Land and Resource Management Plan

Prepared by: Cindy Wentworth – Botanist and Ecologist
Jim Wentworth – Wildlife Biologist
Jeff McDonald – Planning Biologist
Mitzi Cole – Aquatic Biologist

Lead Contact: Jeff McDonald
Chattahoochee-Oconee National Forest
1755 Cleveland Highway
Gainesville, Georgia 30501
706 297-3007
jmcdonald@fs.fed.us

DESCRIPTION OF PLANNING AREA

The planning area for this analysis consists of the 749,755 acre Chattahoochee National Forest and the 115,210 acre Oconee National Forest. The Chattahoochee NF is located across the northern portion of the state with lands in 18 counties. The Oconee NF is located in the central portion with lands in eight counties. The two National Forests in Georgia are administered by one Forest Supervisor, headquartered in Gainesville, GA.

KEY FINDINGS

Twenty-four species were evaluated (Table 1). The determination of effect for twenty-three of the twenty-four T&E species was "**not likely to adversely affect.**" A "**no effect**" determination was made for the Relict Trillium (*Trillium reliquum)*.

INTRODUCTION

The Chattahoochee NF comprises approximately 750,000 acres in north Georgia. It is generally characterized by Appalachian oak forest typical of the southernmost reaches of the Appalachian Mountains. The westernmost portion of the forest is somewhat different. It is located in the Ridge and Valley ecological section, and consists of an oak-hickory-pine forest type. The southeastern corner of the forest is also distinctive. Upper Piedmont topography and an oak-hickory-pine forest type characterize this area. Features of notable significance on the Chattahoochee NF include Brasstown Bald (the highest point in Georgia), the crest of the Blue Ridge Mountains, the majority of cold-water trout fisheries, and over 150,000 acres of Congressionally designated areas. The Chattahoochee NF is contained in the headwaters of four major river basins that begin in Georgia; the Tennessee, Chattahoochee, Coosa, and Savannah Rivers. Water from each of these basins provides essential domestic and industrial water supplies for numerous cities and towns downstream of National Forest lands.

The lands on the Chattahoochee NF are usually found in large blocks on the mountainsides and ridges, with private lands in the valleys. There are occasional, usually small, private parcels that are partly or completely surrounded by national forest land. Similarly, there are forest parcels that are isolated from the larger blocks and are partially or completely surrounded by private lands.

The Oconee NF consists of approximately 115,000 acres south of Athens and east of Atlanta, Georgia. The lands are generally in large blocks, but with a generous interspersing of private lands. The private lands are sometimes in fairly large blocks of farmland or lands owned or managed by large timber companies. This forest occurs as two separate sections; a northern section near Madison and Greensboro, and a southern section near Monticello and Eatonton. Interstate Highway 20 creates an east-west boundary between the two sections of National Forest. The Oconee is a Piedmont forest with predominantly pine vegetation on the uplands and wide hardwood bottomlands. Features of notable significance on the Oconee NF include Murder Creek Research Natural Area (RNA), Scull Shoals Historic Area, Scull Shoals Archeological Area, and an endangered species, the red-cockaded woodpecker. Two major river basins flow through the Oconee National Forest, the Ocmulgee and the Oconee. These two basins include reservoirs managed for hydroelectric power production, recreation and water supply. Much of the private lands surrounding the lakes have experienced increasing development for residential and recreational uses. The two basins flow together south of the Forest to form the Altamaha River, which flows to the Atlantic Ocean between Savannah and Brunswick, GA.

PROPOSED MANAGEMENT ACTIONS

As required by the National Forest Management Act of 1976 (NFMA), the Chattahoochee-Oconee National Forest proposes to revise the 1985 Land and Resource Management Plan (LRMP) for all of the land resources. The existing LRMP

was approved April 1, 1985, and there are currently 20 amendments to the 1985 LRMP. The Code of Federal Regulations (36 CFR 219.10[g]) implementing NFMA instructs the Regional Forester to make periodic revisions to the plan and to provide the basis for any revision. The Southern Appalachian Assessment (SAMAB 1996) supports the revision of forest plans by describing how the lands, resources, people, and management of the national forests interrelate within the larger context of the Southern Appalachian area. The revised LRMP guides all natural resource management activities to meet the objectives of federal law, regulations, and policy. The revision updates the management goals, objectives, standards, and monitoring requirements for the ten- year planning period, which begins when the plan is approved. Objectives in the LRMP are geared toward restoring major forest communities and are designed to begin to restore habitat structure, composition, and distribution to a desired condition needed to maintain viability of associated species. It is recognized that compensation for significant ecological changes (loss of American chestnut, lack of large tree structure, presence of invasive species, etc.) cannot be expected in the short term.

This Biological Assessment (BA) evaluates the potential effects on threatened and endangered species, of implementing the revised LRMP. The objectives of this BA are: 1) to discuss objectives and strategies to effect recovery of threatened and endangered species; 2) to provide a process by which threatened and endangered species receive full consideration in the decision-making process; 3) to ensure Forest Service actions do not adversely affect any threatened or endangered plant or animal species; and 4) to comply with the requirements of the Endangered Species Act that actions by federal agencies not jeopardize or adversely modify critical habitat of federally-listed species.

SPECIES EVALUATED

The following species are evaluated in this BA:

Table 1. Species Known or with Potential to Occur on the Chattahoochee-Oconee National Forest:

A. Species known to occur on the Chattahoochee-Oconee:		
Species	**Common Name**	**Federal Status**
Plants:		
Echinacea laevigata	Smooth coneflower	Endangered
Gymnoderma lineare	Rock gnome lichen	Endangered
**Helonias bullata*	Swamp pink	Threatened
Isotria medeoloides	Small whorled pogonia	Threatened
**Sarracenia oreophila*	Green pitcher plant	Endangered
Scutellaria montana	Large flowered skullcap	Threatened
Trillium persistens	Persistent trillium	Endangered
Vertebrates:		
Picoides borealis	Red-cockaded woodpecker	Endangered
Mycteria americana	Woodstork (foraging only)	Endangered
Myotis grisescens	Gray bat (foraging only)	Endangered
Cyprinella caerulea	Blue shiner	Threatened
Etheostoma etowahae	Etowah darter	Endangered
Percina jenkinsi	Conasauga logperch	Endangered
Molluscs:		
Lampsilis altilis	Fine-lined pocketbook	Threatened
Pleurobema georgianum	Southern pigtoe	Endangered

* = these species are not naturally occurring on FS land, but were planted to FS land from local genetic stock to aid in recovery of the species.

B. The following species have NOT been found on the Chattahoochee-Oconee National Forest despite inventories for these species. However, they are known to occur in Georgia or have historical records and could have potential to occur on the Forest where habitat is present.

Species	Common Name	Federal Status
Plants:		
Trillium reliquum	Relict trillium	Endangered
Vertebrates:		
Haliaeetus leucocephalus	Bald eagle (nests)	Threatened
Percina antesella	Amber darter	Endangered
Percina aurolineata	Goldline darter	Threatened
Molluscs:		
Medionidus acutissimus	Alabama moccasinshell	Threatened
Medionidus parvulus	Coosa moccasinshell	Endangered
Pleurobema decisum	Southern clubshell	Endangered
Pleurobema perovatum	Ovate Clubshell	Endangered
Ptychobranchus greeni	Triangular kidneyshell	Endangered

INFORMAL CONSULTATION HISTORY

Jimmy Rickard, USFWS endangered species biologist, attended several Forest Service IDT and FWRBE meetings from 2001-2002 to discuss the planning process and the way the Chattahoochee-Oconee is addressing issues regarding federally-listed species. In addition, numerous phone calls to discuss the Biological Assessment took place between USFWS and USFS biologists in the years 2002-2003.

The following is a list of dates and locations for additional meetings between USFS and USFWS:
October 8, 2002 - Gainesville, GA
November 5, 2002 – Gainesville, GA
April 30, 2003 – Athens, GA

May 22, 2003 –Athens, GA
June 18, 2003 –Athens, GA
August 1, 2003 – Gainesville, GA
August 15, 2003 – Athens, GA

PROTECTION OF FEDERALLY-LISTED SPECIES

The revised Plan contains forest-wide standards that either directly or indirectly provide protection for all federally-listed species. These are:

- Sites supporting federally-listed threatened and endangered species or individuals needed to maintain viability or species of viability concern are protected from detrimental effects caused by management actions. Site-specific analysis of proposed management actions will identify any protective measures needed in addition to Forest Plan standards, including the width of protective buffers where needed. Management activities occur within these sites only where compatible with recovery of federally-listed species, or maintenance of individuals needed to maintain species viability on the national forest.

- Exotic species are controlled where they are causing adverse effects to federally-listed species, or individuals of other species needed to maintain their population viability on the national forest. Non-native species are not intentionally introduced near these species or individuals, nor will management actions facilitate their inadvertent introduction. (This would include exotic plants such as kudzu and animals such as feral hogs).

- Intentional establishment of invasive non-native plant species is prohibited. Prohibited species are defined by the Regional Forester's Invasive Species List.

- During project level inventories, document the presence of species listed on the Regional Forester's Invasive Species List.

- Where recreational uses are negatively affecting federally-listed species or individuals of other species that are needed to maintain their population viability on the national forest, uses and/or sites are modified to eliminate negative effects.

- Where recreational uses are negatively affecting rare communities, uses and/or sites are modified to eliminate negative effects. New recreational developments are designed to avoid adverse effects to rare communities.

- Do not encourage recreational use of rare communities.

- Project areas are surveyed for rare communities prior to implementing projects that have potential to adversely affect them. A database of rare community locations and conditions across the forest is maintained, and is referenced during project planning.

- The conservation of rare communities identified in this Forest plan takes precedence over achieving old growth management direction.

- Do not release specific locations of rare communities to the general public.

- Prohibit rock climbing at federally-listed and sensitive plant locations through coordination with recreation and natural resources staff. Divert new and existing hiking trails away from these sites and use barriers to close access if needed.

- Mitigate impacts on known Heritage resources, federally-listed or sensitive species when constructing fire lines for wildfire control. Document rationale for line location if impacts to any area are safety related.

First priority for land acquisition will be given to lands needed for the protection of federally-listed endangered or threatened wildlife, fish, or plant species and their habitat.

Additional objectives and standards applicable to federally-listed species are discussed below under the individual species discussions.

The direction in the revised Forest Plan is general and does not preclude or replace the requirement for specific, project-level consideration of threatened, endangered, or proposed species or their critical habitat and further consultation, if necessary, with the U.S. Fish and Wildlife Service. Project areas will be inventoried for these species in accordance with procedures outlined in the Region 8 supplement to the Forest Service Manual §2672, which will provide another facet of protection.

BIOLOGICAL ASSESSMENT FOR THREATENED AND ENDANGERED PLANT SPECIES

Green Pitcher Plant (Sarracenia oreophila)

Environmental Baseline

The U. S. Fish and Wildlife Service (USFWS) listed the green pitcher plant (*Sarracenia oreophila*) as an endangered species on September 21, 1979. Much of the following is taken from the 1994 revision of the Recovery Plan (U.S. Fish and Wildlife Service 1994) written for the species.

The green pitcher plant is restricted to sites in the Cumberland Plateau and Ridge and Valley Provinces in northeast Alabama, and to the Blue Ridge Province in Georgia and North Carolina. Only 35 natural populations of this species are known to be extant in Alabama (32), Georgia (1), and southwest North Carolina (2). Habitat for the plant is variable, and consists of both moist upland areas, many of which are described as seepage bogs, as well as boggy, sandy stream edges (U.S. Fish and Wildlife Service 1994).

Historical *Sarracenia oreophila* populations have been destroyed by residential development and clearing and disruption of the hydrological regimes for agriculture, silviculture and industrial use. Flooding of sites through construction of reservoirs, collection of plants, and cattle grazing are also cited as reasons sites have been destroyed. All of these activities continue to be threats to extant populations of the green pitcher plant. Plant succession and woody encroachment in green pitcher plant bogs also threaten the bog habitat where this species occurs (U.S. Fish and Wildlife Service 1994).

This pitcher plant is not known to naturally occur on National Forest lands in the analysis area. However, the Chattahoochee National Forest has established 1 non-experimental population with the help of the Georgia Natural Heritage Program and the Atlanta Botanical Gardens, using propagated material from plants occurring only a few miles away on Nature Conservancy property.

Potential Effects

Recovery opportunities on National Forest lands consist of continuing to survey for additional populations, protecting and managing populations if they are found, and protecting and managing the transplanted population. Management actions are primarily those of controlling vegetative competition through pruning and prescribed burning, increasing light levels in the sites, and restoring the natural hydrological regime where necessary (U.S. Fish and Wildlife Service 1994). Effects to the green pitcher plant could occur through habitat manipulation, but should be beneficial to the plants.

It is likely that fire is needed to maintain suitable pitcher plant habitat (NatureServe 2001, USFWS 1994). Myers (1997) noted in his paper on management of a green

pitcher plant bog in North Carolina, that without fire the site would eventually become a shrub-dominated bog. Sutter et al. (1994) reported positive effects to green pitcher plants following prescribed burning in the spring. This would correspond to the period of greatest likelihood (April and May) of lightning fires in the Southern Appalachians (Bratton and Meier 1996). Sutter recommends, however, that fire be used as a management tool only when *Sarracenia oreophila* is beginning to decline and the site is dense with woody vegetation. Therefore, the revised Forest Plan contains a standard that states the 2-acre site on the Chattahoochee is burned only in the early spring and only as needed to control woody vegetation.

The transplanted site probably does not provide ideal soil conditions for the pitcher plants. There is an ongoing problem with lush growth of herbaceous competition. Current information indicates that naturally occurring green pitcher plant sites may contain an impermeable clay layer, or fragipan, limiting growth of competing herbaceous vegetation (R. Determann, pers. comm). However, the established plants are robust and many bloom annually, despite the limitations of the site. The Forest has been looking for additional introduction sites for establishment of green pitcher plants, but to date, no sites have been found with the appropriate habitat conditions. The Chattahoochee will continue to search for appropriate sites for establishment and maintenance of this species, and will notify USFWS is a site is found.

The green pitcher plant often occurs in riparian corridors, and the riparian prescription (# 11) will provide protection for any pitcher plants located in the corridors. In addition to the Forest-wide and green pitcher plant standards already discussed, standards in the Chattahoochee National Forest Plan that will provide additional protection to the green pitcher plant are those in the 9F prescription that protect wetland rare communities. The pertinent standards are:

Management actions that may negatively alter the hydrologic conditions of wetland rare communities are prohibited. Such actions may include livestock grazing and construction of roads, plowed or bladed fire lines, and impoundments in or near these communities. Exceptions may be made for actions designed to control impacts caused by beavers, or where needed to provide for public and employee safety and to protect private land resources.

Beaver ponds and associated wetlands are normally protected as rare communities; however, beaver populations and dams may be managed to prevent negative effects to public safety, facilities, private land resources, and other rare communities. Where beaver wetlands and other rare communities are in conflict, decisions are based on the relative rarity of the communities and associated species involved, with the rarest elements receiving priority.

Of the 35 natural green pitcher plant populations in Alabama, Georgia and North Carolina, the 1994 Recovery Plan revision (U.S. Fish and Wildlife Service) states that 6 sites are protected and considered secure in the long-term. In addition, The Nature Conservancy recently acquired the only naturally occurring population in Georgia, previously located on private land, thereby assuring its protection. There are 12

green pitcher plant populations protected on private land through Conservation Agreements with US Fish and Wildlife Service. Thus a total of 19 natural populations are currently protected (6+1+12). However, the 12 populations under Conservation Agreements are on privately owned land and are protected only as long as the landowner agrees to do so (U.S. Fish and Wildlife Service 1994). Continued protection and management of the transplanted population on the Chattahoochee NF as described above, and protection and management of the natural population on the newly acquired Nature Conservancy site, will prevent any cumulative effects to the species in Georgia.

The transplanted site of *Sarracenia oreophila* on the Chattahoochee NF is protected under the revised Forest Plan for the reasons listed above. Site manipulation for improvement of green pitcher plant populations and habitat will be conducted only in consultation with USFWS.

Determination of Effect

Because of the forest-wide protective measures for wetland rare communities, for individuals and sites of federally-listed species, control of exotic species threatening federally-listed species and the additional standards discussed above, implementation of the revised Forest Plan is not likely to adversely affect the green pitcher plant.

Large-flowered skullcap (Scutellaria montana)

Environmental Baseline

The large-flowered skullcap was listed as federally endangered in 1986, when only 10 populations were known. It was reclassified as federally threatened effective February 13, 2002 based on an additional 74 occurrences (Federal Register 2002). This member of the mint family is only known to occur in the Ridge and Valley and Cumberland Plateau physiographic provinces in Tennessee, and the Ridge and Valley in Georgia (U.S. Fish and Wildlife Service 1996, Federal Register 2002). Habitat tends to be rocky, submesic to xeric, dominated by oak and hickory with some pine present, in mid to late successional forests (NatureServe 2001).

A population of small flowered skullcap is considered to be self-sustaining (viable) if it has a minimum of 100 individuals (Federal Register 2002). According to the Federal Register (2002), Tennessee has 19 total populations, 9 of which are viable and 10 nonviable. Georgia has a total of 29 naturally occurring populations. Eight of the 29 populations are self-sustaining, and 21 are nonviable.

Two of the 29 Georgia populations are located on Forest Service land. Both are considered nonviable and consist of only 3 individuals in one of the populations, and 10 in the other. There are 2 additional, introduced populations located on the Chattahoochee National Forest. The plants were rescued from areas slated for development, propagated in the Atlanta Botanical Gardens, and then planted in appropriate habitat on the National Forest.

The skullcap is threatened primarily by habitat destruction from activities such as residential development, grazing, logging, and trampling along hiking trails. The presence of invasive species such as Japanese honeysuckle (*Lonicera japonica*) is a problem where disturbance allows the exotic species to become established (U.S. Fish and Wildlife Service 1996, Federal Register 2002). Currently, none of these threats appear to be a problem with any of the Chattahoochee populations.

Potential Effects

At this time there are no habitat management activities recommended for large - flowered skullcap. Several recovery tasks are discussed in the Recovery Plan for the skullcap (U.S. Fish and Wildlife Service 1996). They include the need to search for additional populations and the protection of existing sites through existing laws and regulations. The Chattahoochee is implementing both tasks.

Forest-wide standards in the Chattahoochee National Forest Plan that would provide protection to the skullcap are those standards that would protect individuals and sites of federally-listed species from adverse effects of management activities, those that would control exotic species where they are adversely affecting federally-listed species, and the other standards discussed in the introduction.

In summary, 2 natural and 2 introduced populations of skullcap are present on the Chattahoochee National Forest where they are protected. These populations are currently considered nonviable. Management conditions necessary for long-term maintenance and vigor are not currently known. However, if information for management of the species does become available, it will be implemented where appropriate with the concurrence of USFWS.

Determination of Effect

Because of the protective measures for individuals and sites of federally-listed species, control of exotic species threatening federally-listed species and the additional standards discussed above, implementation of the Plan is not likely to adversely affect the large flowered skullcap.

Persistent Trillium (Trillium persistens)

Environmental Baseline

The persistent trillium (*Trillium persistens)* was listed as federally endangered in 1978. Known populations are restricted to the Tallulah-Tugaloo River system in Rabun, Habersham, and Stephens Counties, Georgia, and Oconee County, South Carolina. The trillium appears to be restricted to gorges and steep ravines (U.S. Fish and Wildlife Service 1984). Habitat is variable, with plants occurring primarily in mixed pine-hemlock forests where they are often associated with *Rhododendron maximum*, or in mixed oak-beech forests (Patrick et al 1995). The persistent trillium population in South Carolina is located on private land (U.S. Fish and Wildlife Service 1984). One of the Georgia populations is located on the Chattahoochee National

Forest. The Chattahoochee site is mesic with the presence of rhododendron (*Rhododendron maximum*) and dog-hobble (*Leucothoe axillaris*). Prior to the construction of dams and reservoirs that would have flooded former habitat, the population may have been more extensive along the riverbanks (NatureServe 2001).

Threats to the species include recreation use in the form of trails and camping (T. Patrick, pers. comm., U.S. Fish and Wildlife Service 1984), illegal collection pressure, wildfire, and residential development (U.S. Fish and Wildlife Service 1984). The species cannot withstand disturbance, and populations on state land near abandoned or closed trails appear to be flourishing now that the trails are no longer used. (T. Patrick, pers. comm.). These threats do not appear to be pertinent to the Chattahoochee population, which is not located in an area of heavy recreation use.

Potential Effects

At this time there are no habitat management activities recommended for persistent trillium. The Recovery Plan (U.S. Fish and Wildlife Service 1984) mentions the need for research into light regime and soil moisture requirements to determine appropriate habitat management techniques. Kral (1983) believes prescribed fire will damage *T. persistens*, and the Chattahoochee site of the trillium does not appear to be a fire maintained community. Kral (1983) estimates that thinning and/or removing the overstory will damage or destroy the trillium plants. Should habitat manipulation appear to be necessary for the well being of the population on the Chattahoochee NF, management will be conducted only with informal or formal consultation with USFWS.

Several recovery tasks are discussed in the Recovery Plan for persistent trillium (U.S. Fish and Wildlife Service 1984). Among these are the need to search for additional populations and protection of existing sites through existing laws and regulations. The Chattahoochee is implementing both tasks. To date, no new populations have been found on Forest Service land.

Forestwide standards in the revised Forest Plan that provide additional protection to the persistent trillium are those standards that protect individuals and sites of federally-listed species and those that control exotic species where they are adversely affecting federally-listed species, as well as the additional standards already discussed.

As mentioned previously, one site of persistent trillium in Georgia occurs on the Chattahoochee National Forest. The majority of persistent trillium sites in Georgia are located on Georgia Power Company land within Federal Energy Regulatory Commission project boundaries, and are therefore subject to ESA consultation requirements (U.S. Fish and Wildlife Service 1984). A few sites in Georgia are located on state land and 2 are reported to occur on private land (T. Patrick pers. comm.). Therefore, most of the sites are protected through federal and state laws. This protection will prevent any cumulative effects to the species in Georgia.

Determination of Effect

Because of the protective measures for individuals and sites of federally-listed species, control of exotic species threatening federally-listed species as well as the additional standards discussed in the introduction, implementation of the revised Plan is not likely to adversely affect the persistent trillium.

Relict Trillium (Trillium reliquum)

Environmental Baseline

Relict trillium is a federally endangered species of basic mesic hardwood forests occurring on soils that contain a high level of organic matter and medium-to-high levels of calcium. The largest and most vigorous populations are located in the lower piedmont/fall line sandhills province, in drainages of both the Savannah and Chattahoochee Rivers of Georgia and South Carolina. Relict trillium is known to occur from 21 populations (U.S. Fish and Wildlife Service, 1990) in Alabama, Georgia, and South Carolina, but none of the populations occur on National Forest land. Primary threats to the species are loss of habitat resulting from urban development, and in some cases, competition with invasive exotic species, logging, species conversion, or fire (TNC, 1990)

Potential Effects

Under the revised Plan, all high quality basic mesic forest communities, habitat for relict trillium, will be managed under the 9F (rare community) prescription. These rare communities will be protected from detrimental effects caused by management actions. There is a forest wide standard that generally will exclude prescribed burning in basic mesic forests. Any prescribed fires occurring in that habitat will be low intensity.

Forest-wide standards in the revised Forest Plan that provide additional protection to the relict trillium, should the species be found, are those standards that protect individuals and sites of federally-listed species, those that control exotic species where they are adversely affecting federally-listed species, and the additional standards discussed in the introduction. With no populations known to occur on National Forest land, the direct and cumulative effects of the revised Forest Plan on this plant are likely to be negligible.

Determination of Effect

Due to the fact relict trillium populations have not been found on National Forest land and because habitat for the species will be protected through the rare community prescription (9F), as well as standards in place to protect the trillium should it be found in the future, there will be no effect to the species through implementation of the revised Plan.

Rock Gnome Lichen (Gymnoderma lineare)

Environmental Baseline

Rock gnome lichen (*Gymnoderma lineare*) is a rare, squamulose lichen that is endemic to the southern Appalachian mountains of North Carolina, Tennessee, South Carolina, and Georgia. This species is the only member of its genus that occurs in North America and is similar in appearance to the more common genus *Cladonia*. Rock gnome lichen was listed as endangered by the US Fish and Wildlife Service on January 18, 1995 (Federal Register 1995) and a Recovery Plan (U.S. Fish and Wildlife Service 1997) was developed for this species in 1997 that includes a range wide summary of existing population information and a comprehensive literature review. Much of the information provided below is taken from that document.

Gymnoderma lineare (Evans) Yoshimura and Sharp, is currently known from a total of 35 extant locations within four states (North Carolina, Tennessee, South Carolina, and Georgia) and has been extirpated from at least five sites where it was historically known to occur. Thirty of the remaining thirty-five sites are located on public lands where long-term protection may be afforded, yet many of these sites have experienced recent declines (U.S. Fish and Wildlife Service 1997).

Gymnoderma lineare populations are restricted to high elevation sites that are often bathed in fog, or steep humid gorges at lower elevations. High humidity seems to be an important habitat factor and the dense colonies are usually limited to near vertical, moist rock faces. Very little information exists regarding the life history or population biology of the species including dispersal mechanisms, and consequently populations are rather arbitrarily defined based on spatial separation (U.S. Fish and Wildlife Service 1997).

Gymnoderma lineare populations are threatened by recreational impacts associated with hikers, climbers, and sightseers, collectors, and the indirect effects of habitat modifications associated with logging and other disturbances. Air pollution and exotic pests also may be contributing to habitat declines through their effect to high elevation spruce/fir forests. No cause has been documented for the extirpation of the five historic sites, though one was suspected to have been impacted by highway construction and the other four sites currently are subject to heavy recreational use. Most populations occupy an area less than one square meter and only eight of the remaining thirty-five populations cover greater than two square meters (U.S. Fish and Wildlife Service 1997) leaving all sites vulnerable to impact despite their occurrence on public (protected) land. The combined factors of small populations and habitat declines related to factors that cannot be controlled by Forest Service management (air pollution and exotic pests) heighten the importance of maintaining existing populations and quality habitat.

Gymnoderma lineare is known from one location on the Chattahoochee National Forest on the Tallulah Ranger District. The lichen has not been found elsewhere on the Forest, despite searches for the species on other rock outcrops.

Potential Effects

A Recovery Plan (U.S. Fish and Wildlife Service 1997) was completed for *Gymnoderma lineare* in 1997. The plan emphasizes the protection and monitoring of existing populations and inventory of suitable habitats to locate new populations. Major threats to populations include the singular or cumulative effects of habitat loss caused by recreational trampling (scraping), collection, air pollution, and declining forest canopies in adjacent high elevation forests. The Chattahoochee population is located on an exposed, steep, fairly inaccessible rock outcrop, and recreational trampling and declining forest canopies do not appear to be threats to this population (Wentworth, pers. obs).

The Rare Community (9F) prescription and associated standards would provide adequate protection for *Gymnoderma lineare* from potential negative effects of management activities on the Chattahoochee National Forest. The standard written specifically for rock outcrops and cliffs states:

Mature forest cover is maintained within 100 feet slope distance from the top of cliffs and 200 feet slope distance from the base of cliffs to provide habitat for cliff-associated species. Within this zone, activities are limited to those needed to ensure public safety or to maintain or improve habitat for federally-listed species or other species whose viability is at risk.

The Chattahoochee National Forest Plan includes forest-wide standards that would protect individuals and locations of federally-listed threatened or endangered species, and where possible, control exotic species when they are causing adverse effects to federally-listed threatened or endangered species. Additional pertinent standards are listed in the introduction.

Determination of Effect

Because of the protective measures for individuals and sites of federally-listed species, control of exotic species threatening federally-listed species, standards to protect the rock outcrop and cliff habitats, as well as the additional standards discussed in the introduction, implementation of the revised Plan is not likely to adversely affect the rock gnome lichen.

Small Whorled Pogonia (Isotria medeoloides)

Environmental Baseline

The small whorled pogonia (*Isotria medeoloides*) was listed by the U. S. Fish and Wildlife Service (USFWS) as endangered in 1982 and revised to threatened status in 1992 based on discovery of new sites, achievement of protection for many of the sites, and additional life history and population information. This information and much of the following is taken from the Revised Recovery Plan (U.S. Fish and Wildlife Service 1992) written for the species.

Isotria medeoloides (Pursh.) Raf. is a federally-listed orchid known from 16 states, including Virginia, West Virginia, North and South Carolina, Georgia and Tennessee (NatureServe 2001). This species occurs in three primary population centers, consisting of New England, the southern extreme of the Appalachian Blue Ridge at the juncture of North and South Carolina, Georgia, and Tennessee, and the coastal plain and piedmont region of Virginia, with outliers in Delaware and New Jersey. Disjunct populations occur in six sites in Pennsylvania, Ohio, Michigan, Illinois, and Ontario (U.S. Fish and Wildlife Service 1992). A number of the small whorled pogonia sites occur on state and Federal lands, affording the species protection from development. According to the Recovery Plan (U.S. Fish and Wildlife Service 1992), 47 percent of known sites have some level of habitat protection. Private land sites in other states are being protected through agreements and conservation easements between the landowner and the state (U.S. Fish and Wildlife Service 1992). In the Southern Appalachian planning region, the only small whorled pogonia sites occurring on National Forest lands are located on the Chattahoochee and Sumter National Forests in Georgia and South Carolina, respectively. The locations on these National Forests are especially important because they are the only sites of the orchid known in the two states.

The Chattahoochee National Forest has 16 known sites with 33 colonies of the small whorled pogonia (using the definition of sites and colonies in the 1992 USFWS Recovery Plan). Numbers of individuals in each colony ranged from 1 to 50 according to Forest monitoring data from 2003. Colony sizes and stem counts of the species fluctuate widely year to-year, a fact that is noted in the 1992 Recovery Plan, and one that makes viability assessment difficult.

This species is found primarily in second and third-growth deciduous and mixed-deciduous/coniferous forests. Ages of the older trees on the sites vary from as young as 30 years old in South Carolina to 80 years old in Virginia. The forest habitat in which this orchid is found is not rare, yet only a small percentage of the habitat has colonies of small whorled pogonia. Site characteristics are highly variable, but are usually mesic, with sparse to moderate ground cover and a relatively open understory canopy. Old logging roads or streams are often nearby. Many sites show signs of past agricultural use (USFWS 1992, Wentworth pers. obs).

Most small whorled pogonia sites on the Chattahoochee National Forest in Georgia are near a stream and have sparse ground cover. Two sites have a dense coverage of New York fern (*Thelypteris noveboracensis*). Habitat varies from mixed hardwoods to hardwoods mixed with white pine and hemlock. Several colonies of the orchid are growing in former pastureland with the presence of old house sites nearby, and one site appears to be in an old wagon road.

The primary threat to the small whorled pogonia throughout its range is habitat destruction by residential and commercial development. Collection of plants, recreational use, herbivory, and inadvertent damage from research activities are also cited as harming populations. Whereas heavy timbering and clear-cutting are

considered threats, selective timbering may not be harmful to a population (U.S. Fish and Wildlife Service 1992).

Potential Effects

The Recovery Plan for small whorled pogonia (U.S. Fish and Wildlife Service 1992) lists several implementation tasks for recovery of the species. Those listed for federal agencies consist primarily of protection through existing laws and coordination with other governmental agencies and conservation organizations. The Forests in Georgia, South Carolina and Virginia have been implementing these tasks as well as conducting inventories for new locations of the orchid.

In South Carolina and Georgia, there is a concern that under-and midstory vegetation may be shading plants and possibly causing a decline in individual colonies. Vegetative removal studies have been conducted in Maine in 1993 and 1996, with possible positive response of the *Isotria* to the increased light at the forest floor (Dibble et al 1997). Vegetative removal studies began in New Hampshire in 1998, but will take at least 5 years to determine any effects of the removal (Sperduto, pers. comm). The Recovery Plan identifies the need for further research into effects of vegetation removal in small whorled pogonia sites, and thus there is an opportunity for the National Forests to experiment with such removal. Any risks of habitat manipulation through vegetation manipulation will likely be outweighed by potential benefits to the species (D. Harris, pers. comm.) Because the orchid is protected under the Endangered Species Act, no activities with potential to affect the plants either adversely or beneficially can take place in the sites without concurrence from, or consultation with, USFWS. Forest-wide standards in the Forest Plan that provide additional protection to the small whorled pogonia are those standards that protect individuals and sites of federally-listed species, those that control exotic species where they are adversely affecting federally-listed species, and other standards listed in the introduction.

According to the Recovery Plan, monitoring results of protected populations followed for years have shown declines, and many extant populations may not be self-sustaining. Causes for the declines are not known, but the loss of habitat functionality may be a factor. Meanwhile, populations of *Isotria medeoloides* will be protected through enforcement of the Endangered Species Act and efforts made to strengthen protective regulations at the state and local levels (U.S. Fish and Wildlife Service 1992).

Determination of Effect

Because of the protective measures for individuals and sites of federally-listed species and control of exotic species threatening federally-listed species, in addition to the other standards discussed in the introduction, implementation of the revised Plan is not likely to adversely affect the small whorled pogonia.

Smooth Coneflower – Echinacea laevigata

Environmental Baseline

Smooth coneflower, a federally endangered species, is a plant of roadsides, open woods, barrens and glades, utility rights-of-way, or other sunny situations, usually in association with calcium- or magnesium-rich soils underlain by mafic rock (Gaddy 1991). Smooth coneflower is known to occur in Georgia, South Carolina, North Carolina, and Virginia, but has been reported historically from Pennsylvania, Maryland, Alabama, and Arkansas as well. Based on information of 24 surviving populations summarized in the Recovery Plan (April 1995), 7 populations occur on National Forest land (South Carolina, Georgia, Virginia), 9 occur on private land, and the remaining 8 occur under various federal or state ownerships (US Fish and Wildlife Service 1995). The recovery objective for classification from endangered to threatened is 12 geographically distinct, self-sustaining (stable or increasing for 10 years or more) populations.

On the Chattahoochee National Forest, smooth coneflower is known to occur only on the Chattooga Ranger District in Habersham and Stephens Counties. There are 25 known sites on national forest land in Georgia, ranging in size from 1 individual to approximately 1000 plants. On the Chattahoochee, sites for smooth coneflower occur predominantly along roadsides and in power line rights-of-way.

Historically, much of the species' habitat was xeric woodlands, savannas, or grasslands that were maintained in an open condition by fires caused by lightning or Native American burning (Davis et al. 2002). Optimal sites for smooth coneflower have little herbaceous competition and an abundance of sunlight (Gaddy 1991). Habitat management, including removal of encroaching woody vegetation and prescribed burning, has been ongoing on the Chattahoochee sites for several years to provide these open conditions for the plants.

Potential Effects

A population size of at least 250 plants may be required to ensure maintenance of genetic diversity, protect against random events that may lead to local extinctions, and facilitate attraction of pollinators (Kindscher pers.comm.with R. Roecker). In order to meet this objective, active management will be required. Management tools needed to achieve this condition will primarily be prescribed fire, mid-story or overstory removal, and mowing between November and early March (US Fish and Wildlife Service 1995). Site-specific, project-level planning of these activities will be used to ensure there will be no adverse effects to individuals. Concurrence from U.S. Fish and Wildlife Service will occur prior to implementation of any management in the coneflower locations. The revised Forest Plan includes an objective for the development of a management plan for the coneflower over the next 3 years. The smooth coneflower management plan will address the number of acres to be managed for the coneflower; boundaries of a Habitat Management Unit for the coneflower and the associated Georgia aster; number of populations to be managed

within the HMU; methods of habitat management for the species, including appropriate burn interval; road maintenance adjacent to roadside populations; establishment of coneflowers (local genetic stock) into appropriate, protected (i.e. not along road banks) habitat; and any additional information appropriate for the management plan.

Forest-wide standards in the Chattahoochee National Forest Draft Plan that will provide protection to the smooth coneflower are those standards that will protect individuals and sites of federally-listed species and those that will control exotic species where they are adversely affecting federally-listed species. Additional objectives included in the Revised Forest Plan will increase abundance of optimal habitat for this species and create opportunity for establishment of new populations. Objectives call for restoration and maintenance of 10,000 acres of open woodland, savanna, and grassland habitats within the first 10 years of Plan implementation. Some of these acres will be primarily for coneflower management and will occur on the Chattooga Ranger District. The number of acres will be determined from on-the-ground reconnaissance, and will be stated in the management plan discussed in the above paragraph. Glades and barrens rare communities, with which this species is sometimes associated, will be restored or maintained where they occur on the Forest, and will be managed under the Rare Community Prescription (9F) and associated standards.

Federally-listed plants receive little or no protection on private land. Therefore, public land plays a critical role in their conservation. The occurrence of the smooth coneflower primarily along roadsides and utility rights-of-way, along with the necessity of active management such as prescribed fire, suggest that in the future this species will continue to be extremely vulnerable to extirpation on private land. Cumulatively, therefore, persistence of the species in the area of the national forest, as well as across its range, will be greatly enhanced through efforts on the national forest to maintain and expand populations.

Determination of Effect

Because of provisions for protecting and maintaining existing sites of smooth coneflower populations, activities that will maintain and restore quality habitats, and the standards discussed in the introduction, implementation of the revised Forest Plan is not likely to adversely affect *Echinacea laevigata*, and is expected to have beneficial effects on the species.

Swamp pink (Helonias bullata)

Environmental Baseline

The swamp pink (*Helonias bullata*) was designated as federally threatened in 1988. It is currently known from 7 states; New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, and Georgia (U.S. Fish and Wildlife Service 1991). A population reported from an eighth state, New York, is believed extirpated. The majority of the populations are found on private lands. Naturally occurring

populations on national forest lands in the Southern Appalachians occur only in North Carolina and Virginia. Coastal Plain populations are known only from New Jersey to Virginia, and none of these occur on national forest lands.

Habitat for the swamp pink consists of a variety of wetland types, including bogs, spring seeps, wet meadows, and swampy forests that border small streams (U.S. Fish and Wildlife Service 1991). Habitat loss through draining and filling of wetlands, development, and timbering, as well as collection, trampling, and biological factors are all cited as threats to the swamp pink. The species is also highly vulnerable to habitat siltation resulting from run-off from adjacent development (NatureServe 2001).

Helonias is not known to naturally occur on the Chattahoochee National Forest. However, the Forest has 1 non-experimental population that was established by the Georgia Plant Conservation Alliance, using propagated material from plants occurring several miles away on private land.

Potential Effects

Recovery opportunities for swamp pink on the Chattahoochee consist primarily of continuing to survey for populations, protecting and managing populations if they are found, and protecting and managing the transplanted population (U.S. Fish and Wildlife Service 1991). Private landowners are not required to protect federally-listed plants, and thus public land is critical in protecting and aiding in the recovery of *Helonias bullata*. The established site of *Helonias bullata* would be protected on the Chattahoochee under the revised Forest Plan. On the Chattahoochee National Forest, the wetland habitats necessary for the swamp pink would be protected through the Rare Community (9F) and Riparian prescriptions (11). Additionally, the revised Plan includes forest-wide standards that would protect individuals and sites of federally-listed species, and standards that would control exotic species where they are adversely affecting federally-listed species.

Determination of Effect

Because of the protective measures for wetland rare communities through the riparian and rare community prescriptions, protection for individuals and sites of federally-listed species, control of exotic species threatening federally-listed species, and additional standards discussed in the introduction, implementation of the revised Forest Plan is not likely to adversely affect the swamp pink.

BIOLOGICAL ASSESSMENT FOR THREATENED AND ENDANGERED TERRESTRIAL VERTEBRATE SPECIES

Bald Eagle (Haliaeetus leucocephalus)

Environmental Baseline

The bald eagle ranges over most of the North American continent, from as far north as Alaska and Canada, down to Mexico. Experts believe that in 1782 when the bald eagle was adopted as our national bird, their numbers may have ranged from 25,000 to 75,000 nesting pairs in the lower 48 states. Since that time the species has suffered from habitat destruction and degradation, illegal shooting, and most notably from contamination of its food source by the pesticide DDT. In the early 1960's, only 417 nesting pairs were found in the lower 48 states. In 1999, more than 5,748 nesting pairs of bald eagles were recorded for the same area, resulting primarily from the banning of DDT in the United States in 1972 aided by additional protection afforded under the Endangered Species Act (U.S. Fish & Wildlife Service 1999). Bald eagles have few natural enemies, but usually prefer an environment of quiet isolation from areas of human activity (i.e. boat traffic, pedestrians, or buildings), especially for nesting. Their breeding areas are generally close to (within 4 km) coastal areas, bays, rivers, lakes, or other bodies of water that reflect general availability of primary food sources including fish, waterfowl, rodents, reptiles, amphibians, seabirds, and carrion (Andrew and Mosher 1982, Green 1985, Campbell et al. 1990). Although nesting territory size is variable, it typically may encompass about 2.59 square kilometers (Abbott, 1978). Most nest sites are found in the midst of large wooded areas adjacent to marshes, on farmland, or in logged-over areas where scattered seed trees remain (Andrew and Mosher, 1982). The same nest may be used year after year, or the birds may alternate between two nest sites in successive years. Bald eagles mate for life and are believed to live 30 years or more in the wild. Although bald eagles may range over great distances, they usually return to nest within 100 miles of where they were raised (U.S. Fish & Wildlife Service 1995).

Winter home ranges for eagles can be very large, especially for non-breeding birds. They generally winter throughout the breeding range but are more frequent along the coast. These birds commonly roost communally.

The primary threats to the bald eagle include loss of nesting, foraging, and roosting habitat especially along shorelines, disturbance by humans, biocide contamination, decreasing food supply, and illegal shooting (Byrd and Johnstone 1991, Buehler et al 1991). Bald eagles also have died from lead poisoning as a result of feeding on waterfowl that had inadvertently ingested lead shot. In 1991, the U.S. Fish and Wildlife Service completed a program to phase out lead shot for waterfowl hunting.

Bald eagles have been seen foraging on Lakes Notley, Chatuge and Blue Ridge on the Chattahoochee. They are seen more frequently foraging on the Oconee National Forest on Lake Oconee, Lake Sinclair, and the Oconee River. There have also been reports of eagles foraging on the Ocmulgee River. Eagle nests are present below

Wallace Dam on Lake Sinclair, on Lake Jackson north of the Oconee National Forest, and on Lake Juliette approximately 10 miles from the Oconee National Forest. Nesting and winter roosting habitat does occur on the Chattahoochee-Oconee National Forest, but no active nests have been found on the Forest during recent aerial surveys for the species (Ozier, pers.comm.), and no winter roosts have been found. Known nesting activity is concentrated along the coast and in the central and southern portions of Georgia (Ozier 1999).

Potential Effects

Timber harvesting or road building activities have the potential to impact the bald eagle or its habitat should it occur near streams, lakes, or other wetlands. Human disturbance from roads, trails, and campgrounds can also adversely affect the use of an area for nesting or roosting by eagles.

The Forest Plan includes a standard establishing 1500-foot protection zones around bald eagle nests and communal roost sites. Vegetation management that would affect forest canopy within these zones is prohibited, and other activities that may disturb eagles are prohibited within these zones during periods of use by eagles. The Riparian Prescription (prescription 11), with its emphasis on low levels of disturbance and maintenance of mature forest, provides direction for management of shorelines where bald eagles may forage.

Currently no nests have been found on National Forest (Ozier pers. comm.). However, if nests are found protective measures will be implemented immediately. Standards for bald eagle and riparian habitat will protect nesting, roosting and foraging habitat for the species. These protective measures will also prevent adverse cumulative effects to bald eagle nesting, roosting or foraging habitat.

Determination of Effect

Through management direction and standards that address protection of habitat, roosts and nests from human disturbance, the Forest Plan and alternatives are not likely to adversely affect the bald eagle, and should provide conditions beneficial to this species.

Red-cockaded woodpecker (*Picoides borealis*)

Environmental Baseline

The red-cockaded woodpecker (RCW), *Picoides borealis,* is a federally-listed endangered species endemic to open, mature and old–growth pine ecosystems in the southeastern United States. Currently, there are an estimated 14,000 RCWs living in roughly 5,600 active clusters across eleven states. This is less than three percent of estimated abundance at the time of European settlement (U.S. Fish and Wildlife Service 2003). The RCW was listed as endangered in 1970 and received federal protection under the Endangered Species Act of 1973. The precipitous decline in population size that led to the species' listing was caused by an almost

complete loss of habitat. Fire-maintained old-growth pine savannas and woodlands that once dominated the southeast, no longer exist except in a few, isolated, small patches. Longleaf pine (*Pinus palustris*) ecosystems, of primary importance to RCWs, are now among the most endangered ecosystems on earth. Shortleaf (*P. echinata*), loblolly (*P. taeda*), and slash pine (*P. elliottii*) ecosystems, important to RCWs outside the range of longleaf, also have suffered severe declines (U.S. Fish and Wildlife Service 2003).

The red-cockaded woodpecker occurs on the Oconee and Hitchiti portions of the Oconee National Forest (ONF) south of Interstate 20 in Jasper, Jones, Putnam and Baldwin counties. The area is located in the Piedmont physiographic province in central Georgia. It consists of 51,746 acres of predominantly loblolly and shortleaf pines in the overstory, with a dense mid-story of regenerating sweetgum, pine and oak species. A majority of the area consists of old pine plantations located on lands that were previously used as agricultural fields. In the revised LRMP, this portion of the ONF is allocated to Management Prescriptions 3.B (Hitchiti Experimental Forest), 8.D (RCW HMA) and 8.D.1 (RCW sub-HMA).

The Oconee, along with the Piedmont National Wildlife Refuge (PNWR), is designated in the Recovery Plan for the Red-cockaded Woodpecker Second Revision, as the Oconee/Piedmont secondary core population and together they comprise the Piedmont Recovery Unit. According to the RCW Recovery Plan, the ONF and PNWR together are responsible for providing 250 potential breeding groups of the bird. Currently, there are 15 active clusters on the Hitchiti Experimental Forest and two active clusters on the sub-HMA, for a total of 17 active clusters on the ONF. The number of active clusters generally is equal to 1.1 to 1.4 times the number of potential breeding groups (USFWS 2003).

Current threats to RCW recovery on National Forest lands are: the loss of roosting and nesting substrate through past over-harvest or die-off of mature pines; the loss of foraging habitat and proper stand structure through encroachment of woody vegetation into preferred herbaceous ground-covers due to the absence of dormant- and, especially, growing-season fires; and the loss of suitable habitat through unimpeded succession of pine and pine-hardwood stands toward hardwood-dominated conditions. Red-cockaded woodpeckers' naturally low fecundity and the potential effects of isolation, habitat fragmentation, and cavity competition exacerbate these habitat limitations (U.S. Fish and Wildlife Service).

Potential Effects

The Forest will utilize several management actions to alleviate these threats and to restore habitat for the species. These actions will follow the direction in the RCW Recovery Plan, and include: the production and retention of pine trees 100+ to 120+ years old, depending on tree species (not less than 120 years for shortleaf, and 100 years for loblolly pines); retention of potential roost trees; the installation of artificial roosting and nesting cavities; the protection of artificial and natural cavities from competitors through the installation of excluder devices; the restoration and maintenance of low (50-80 sq. ft per acre) basal areas of trees in upland pine and

pine hardwood forest stands; the restoration of native pine species on altered, off-site plantations and other appropriate upland sites; thinning of mid-successional and mature pine and pine-hardwood stands; and control of hardwood midstory encroachment through the use of mechanical, chemical, and prescribed burning methods. Chemical and mechanical treatment of midstory hardwoods will be used where fire is not a viable management tool.

Both dormant season and growing season prescribed burns will be utilized to maintain RCW habitats. Growing season burns are more efficacious in killing encroaching hardwoods, restoring habitat structure, and favoring the development of native, pyrophytic grasses and forbs. There will be approximately 16,000 total acres per year burned in the RCW HMA, the sub-HMA, and Hitchiti Experimental Forest. During the prescribed burning, active and inactive cavity trees within burn units will be protected using the guidelines in the second revision of the RCW Recovery Plan.

Additional methods used to aid in the recovery of the RCW are capture, banding and monitoring of individual birds, the translocation of birds from donor populations to recipient populations, and inter-population (as well as intra-population if approved by USFWS) translocations as necessary to optimize annual reproduction. These techniques will follow RCW Recovery Plan (Second Revision) requirements for permits, training of personnel, and other guidelines for translocation. Translocation to the HMA will occur when habitat has been established and within 5 to 7 years of Plan implementation. Because there are risks in translocating RCW's, including mortality of individual birds related to capture and handling, translocation will be implemented only through consultation with USFWS.

Table 1 identifies red-cockaded woodpecker population objectives on the Oconee portion of the Oconee/Piedmont secondary core population. Long -term population goals were determined in cooperation with the U.S. Fish and Wildlife Service as part of the Revised Recovery Plan. Short- term population goals are defined as population increase objectives over the next ten years. These objectives are for minimum population growth as directed in the Revised Recovery Plan. Greater population growth during the planning period is desirable and encouraged.

Table 1: Red-cockaded Woodpecker Population Objectives for the Oconee NF Portion of the Oconee/Piedmont Secondary Core Population

	2002 Active Clusters	Long-Term Population Goal	Short Term Population Goal	Recovery Designation
Oconee	17	176	25	Secondary Core

Management direction has been incorporated into the revised Forest Plan through the allocation of acres to the RCW HMA Area Prescription (RX-8.D.) and the RCW sub-HMA Prescription (RX-8.D.1). These prescriptions and their associated standards will

aid in the protection and recovery of the species. Management direction to benefit the RCW also has been incorporated into the Hitchiti Experimental Forest Management Prescription (RX 3. B). Additional benefits to the RCW will be derived from objectives and standards in the Rare Communities Prescriptions for woodlands, savannas and grasslands, and the prescription for Restoration of Shortleaf Ecosystems.

The actions discussed above will reduce habitat isolation and fragmentation, thus encouraging RCW population expansion as suitable habitat is increased across the Habitat Management Areas. Adherence to the RCW Recovery Plan, the revised Land and Resource Management Plan (LRMP), and the "FEIS for the Management of the Red-cockaded woodpecker and its Habitat on National Forests in the Southern Region" (U.S. Forest Service 1995) will avoid any adverse cumulative effects to the RCW.

Determination of Effect

Compliance with the Recovery Plan for the Red-cockaded Woodpecker, Second Revision, along with management actions discussed in the above sections, will ensure that implementation of the Revised Land and Resource Management Plan for the Chattahoochee-Oconee National Forest is not likely to adversely affect the red-cockaded woodpecker.

Wood Stork (Mycteria americana)

Environmental Baseline

The United States breeding population of wood storks is listed as an endangered species. This species may have formerly bred in all the coastal southeastern United States from Texas to South Carolina. Currently, they breed throughout Florida, Georgia, and coastal South Carolina. Post-breeding storks from Florida, Georgia, and South Carolina occasionally disperse as far north as North Carolina and as far west as Mississippi and Alabama. Storks sighted in Arkansas, Louisiana, Texas, and points farther west may have dispersed from colonies in Mexico. The amount of overlap and/or population interchange is unknown (U. S. Fish and Wildlife Service 1996).

The estimated total population of nesting storks throughout the southeastern United States declined from 15,000 to 20,000 pairs during the 1930's to a low of between 4,500 and 5,700 pairs for most years between 1977 and 1980. Since 1983, the U.S. population has ranged between 5,500 and 6,500 pairs. Factors contributing to the decline include loss of feeding habitat, water level manipulations affecting drainage, predation and/or lack of nest tree regeneration, and human disturbance (U. S. Fish and Wildlife Service 1996).

Wood storks use a variety of freshwater and estuarine wetlands for nesting, feeding, and roosting. Freshwater colony sites must remain inundated throughout the nesting cycle to protect against predation and abandonment. Foraging sites occur in shallow,

open water where prey concentrations are high enough to ensure successful feeding. Good feeding conditions usually occur where the water column is uncluttered by dense patches of aquatic vegetation. Typical foraging sites throughout the species range include freshwater marshes and stock ponds, shallow, seasonally flooded roadside or agricultural ditches, narrow tidal creeks or shallow tidal pools, managed impoundments and depressions in cypress heads and swamp sloughs. Almost any shallow wetland depression where fish become concentrated, either through local reproduction or the consequences of area drying may be used as feeding habitat (U. S. Fish and Wildlife Service 1996).

Portions of the Oconee National Forest are used as late summer foraging areas by post-breeding storks that disperse from the nesting areas (E. Caldwell, USFS; N. Nicholson, GA DNR, pers. comm.). There are no known nesting or roost sites on the Oconee National Forest. The closest nesting colony is in Burke County, Georgia, approximately 100 miles to the southeast. On the Oconee, wood storks forage in wetlands, beaver swamps and the Dyar Pasture waterfowl impoundment. Use of most feeding areas is short-term and the use of any individual area varies from year-to-year depending on water levels and the availability of forage fish. During the recent drought years, wood storks have consistently used Dyar Pasture between late June and August. As many as 40-50 birds have been present at once for short periods of time (3-4 weeks). In addition to Dyar Pasture, occasional foraging use by wood storks has been observed at two wetland/beaver swamp sites near Falling Creek in the Scull Shoals Experimental Forest. The use of these sites as foraging areas is dependent on having appropriate water levels during late summer, which to a great degree is dictated by weather conditions. Even at Dyar Pasture where there is some ability to control water levels, the timing and duration of use by wood storks is influenced by rainfall patterns. Alterations to the water control structure at Dyar Pasture to permit further drawdown are needed to optimize use by foraging wood storks (N. Nicholson, pers. comm.). Georgia DNR and the U. S. Forest Service have periodically stocked Dyar Pasture with prey fish to enhance foraging conditions for wood storks (E. Caldwell, pers. comm.).

Wood storks are not known to use the Chattahoochee NF.

Potential Effects

Factors contributing to the decline of wood storks include loss of feeding habitat, water level manipulations affecting drainage, predation and/or lack of nest tree regeneration, and human disturbance (U. S. Fish and Wildlife Service 1996).

Under the revised forest plan, the wood stork foraging areas at Dyar Pasture and the Falling Creek sites would be managed under the Riparian corridor prescription (11). The riparian corridor standards ensure that these sites would be managed to retain, restore, and/or enhance the inherent ecological processes and function of the associated aquatic, riparian, and upland components within the corridor. The appropriate Wetland Rare Community (9F) standards also would be applied to natural wetland sites currently used for foraging (such as the Falling Creek sites) as

well as other wetland sites that may be used in the future. The wetland rare communities would be managed for protection, maintenance, and where possible, restoration. The Dyar Pasture and Falling Creek sites also fall within the Oconee River corridor, which would be managed under the Outstandingly Remarkable Rivers prescription (4.H). The primary emphasis for management of this river corridor is to protect and enhance its unique values.

The revised forest plan also contains several specific standards designed to enhance foraging conditions for wood stork on the Oconee National Forest. This includes a standard that will ensure that water levels in artificial impoundments (such as Dyar Pasture) used by foraging wood storks would be managed to provide favorable water levels for this species, and a standard that encourages the stocking of artificial impoundments used by wood storks with preferred prey fish such as sunfish, bullhead and catfish. These standards, along with the riparian corridor and rare community standards discussed above would ensure that vegetative and hydrologic conditions of existing and potential wood stork foraging areas would be protected and foraging conditions enhanced.

Human disturbance also can negatively impact wood stork populations. This is primarily an issue with nesting areas, but to a lesser degree, also is a concern for foraging areas. At Dyar Pasture there is a public boat ramp approximately 200 yards away from the area used by storks. The sites are separated by a row of willows that provides a vegetative screen (E. Caldwell, pers. comm.). The peak time of boater use of the ramp is in the early spring. During late summer when the storks are present the lake is drawn down so there is limited use of the ramp and therefore human disturbance does not appear to be a problem at this site (N. Nicholson, pers. comm.). For other existing and potential foraging areas, the riparian corridor and wetland rare community standards will protect the vegetation around these sites and provide a vegetative screen from human activity.

No wood stork nesting colonies are present on the Oconee National Forest. However, several sites on the forest are used as late summer foraging areas. Since loss of foraging habitat is considered one of the causes for the decline of this species, protection of foraging habitat can contribute to the recovery of this species. The riparian corridor and wetland rare community standards and foraging area standards described above all will contribute to the protection of wood stork foraging habitat. Therefore, there will be no adverse cumulative effects to these wetland communities or to the wood stork and other associated species.

Determination of Effect

Through the implementation of riparian corridor and wetland rare community standards, and foraging areas standards discussed above, the vegetative and hydrologic conditions of existing and potential wood stork foraging areas would be protected and foraging conditions enhanced. Therefore, the implementation of the revised forest plan is not likely to adversely affect the wood stork.

Gray bat (Myotis grisescens)

Environmental Baseline

The gray bat occupies a limited geographic range in limestone karst areas of the southeastern U.S. (U.S. Fish and Wildlife Service 1982). The bat is more narrowly restricted to cave habitats than any other mammal occurring in the U.S., and occupies caves year-round. Most individuals migrate seasonally between maternity and hibernating caves. About 95% of the known populations inhabit nine winter caves. None of these are located on the Chattahoochee-Oconee National Forest.

Limiting factors for the gray bat may include warm caves in the northern portion of its range, and cold caves in the southern portion. A key cause of decline appears to be human disturbance and loss of cave habitat quality. The recovery plan (U.S. Fish and Wildlife Service 1982) recommends actions focused on cave acquisition and gating.

Deforestation of areas around occupied cave entrances and in between caves and large water sources (feeding corridors) may have a detrimental effect. Forest cover provides protection from predators, especially for young bats. Retention of forested corridors around cave entrances, along river and perennial stream edges, and along reservoir shorelines within 25 km of known gray bat maternity caves is important (U.S. Fish and Wildlife Service 1982, LaVal et al. 1977, Best et al. 1995).

Although the gray bat is currently listed as endangered, some bat researchers have endorsed a proposed status change to threatened due to population increases and successful protection of many inhabited caves (Currie and Harvey 2002). Gray bats are now estimated to number over 2.6 million individuals.

Because of the land ownership patterns, the Chattahoochee-Oconee does not have the limestone karst areas that could provide potential cave habitat for the gray bat, and no hibernacula or maternity caves have been found on the National Forest. During 88 total net nights of forest-wide sampling in 2001 and 2002, there were 5 confirmed captures of male gray bats along Armuchee Creek (Loeb 2001, 2002), approximately 9 miles from a known bachelor cave present on private land.

Potential Effects

Based on Dr. Loeb's inventories, the Forest provides riparian foraging habitat for nearby gray bat colonies. This foraging habitat will be managed through the Riparian prescription (11) objectives and standards, as well as other standards discussed below.

Riparian corridors will be managed and protected under standards discussed in the Riparian Corridor prescription (11) to retain, restore or enhance ecological processes and functions of these systems. The prescription will not only provide forest cover for foraging and protection from predation, but will also ensure high water quality to support the aquatic insect prey base. Further, if maternity sites are found in Georgia, site-specific consultation with U.S. Fish and Wildlife Service will be required for

projects within 20 miles of known maternity sites, if those projects were to affect canopy cover along perennial streams or forested lake shorelines. Because of these standards, there are expected to be no effects to foraging habitat as a result of implementation of the Revised Plan.

Within the Rare Community Prescription (9F), there are several standards for caves and mines that protect bats from adverse impacts. These are:

Accessible caves and mines will be surveyed to determine use by bats as soon as possible following discovery.

For all caves and mines suitable for supporting cave-associated species, a minimum buffer of 200 feet is maintained around portals, and any associated sinkholes and cave collapse areas. Prohibited activities within this buffer include use of wheeled or tractor vehicles (except on existing roads or as needed for cave protection and maintenance activities), mechanical site preparation, vegetation cutting, recreation site construction, tractor-constructed fire lines, livestock grazing, herbicide application, and construction of new roads (including temporary roads), skid trails, and log landings. Wider buffers are identified through site-specific analysis when necessary to protect cave and mines from subterranean and surface impacts, such as recreational disturbance, sedimentation and other adverse effects to water quality, and changes in air temperature and flow.

Use of caves for disposal sites or alteration of cave entrances is prohibited, except for construction of appropriate cave gates or closures. Where previously modified entrances are causing adverse impacts to cave fauna, entrances are restored to eliminate impacts.

To protect rare species, including bats, occurring in cliff communities, there is a standard in the 9F prescription that states:

Mature forest cover is maintained within 100 feet slope distance from the top of cliffs and 200 feet slope distance from the base of cliffs to provide habitat for cliff-associated species. Within this zone, activities are limited to those needed to ensure public safety or to maintain or improve habitat for federally-listed species or other species whose viability is at risk.

Under the revised Plan, standards will protect all hibernacula and maternity colony sites that are discovered or purchased. Although no hibernacula or maternity caves have been found on the Chattahoochee-Oconee National Forest, if they are found forest -wide standards will require installation of gates or other protective structures at entrances of all caves and mines occupied by significant populations of bats (i.e. not restricted to T&E bats). Public access routes will be closed within 0.25 miles of these sites when bats are present, and camping and fire building at the entrance to these caves and mines will be prohibited. Standards also will require development of prescribed burning plans that identify caves and mines occupied by bats as smoke-sensitive targets and plans that avoid smoke entering cave or mine openings when

bats are present. In addition, an objective of all prescribed fire burn plans will be to protect snags and cavity trees.

Determination of Effect

Implementation of the Revised Forest Plan is not likely to adversely affect this species because management direction as discussed above, addresses the critical needs for habitat and protection of the gray bat and should improve or maintain foraging, roosting, and if found, maternity/hibernacula habitat conditions for the species.

BIOLOGICAL ASSESSMENT FOR THREATENED AND ENDANGERED AQUATIC SPECIES

INTRODUCTION

Federally-listed aquatic threatened and endangered species have been documented as occurring only within two 5th level Hydrologic Units (HUCs) on the Chattahoochee National Forest. These occurrences are within the Upper Conasauga and the Upper Etowah 5th level HUCs. In addition, federally-listed species have been documented to occur within one stream mile of the proclamation boundary in the Holly Creek watershed. These three watersheds are all sub-basins of the Coosa River basin. The Coosa River basin has been widely noted for its uniqueness of endemism and of the high number of federally-listed mussels and fish, therefore all three watersheds will be addressed in this Biological Assessment. There are no occurrences of federally-listed species on or within close proximity to the Oconee NF.

IMPACTS

Direct impacts such as mechanical disturbance or alteration of slopes, soils and vegetation can cause erosion and may result in increased sediment delivery to streams. Indirect impacts may include degraded riparian and aquatic habitat, reduced channel stability and diminished water quality. The maintenance and enhancement of aquatic habitats are also necessary to maintain healthy populations of fish, mussels, and other aquatic biota. Forest Plan direction will protect waters occupied by federally-listed aquatic species, as well as those with federally-listed species in close proximity to federal lands, from the sediment generated during authorized ground disturbing activities.

Habitat will be maintained or enhanced for federally-listed species that occur on or within close proximity to Forest Service lands. This habitat maintenance or enhancement will be through concerted efforts to reduce known and potential impacts of sedimentation to these aquatic systems. Streams on public lands should provide optimum habitat for federally-listed species, and waters flowing off federal lands should be clean for the benefit of federally-listed species occurring within close proximity to these lands.

Protection of the Aquatic Biota

The goal of the Forest Service is to maintain or enhance watershed conditions within public ownership. However, in most cases, habitat for these federally-listed species is off or downstream of Forest Service lands. Most federally-listed species are associated with larger order streams and rivers occurring in the broad floodplains and valleys beyond the National Forest boundaries.

National Forest ownership on the Chattahoochee generally occurs in the headwater streams of the river basins. Viability for these federally-listed species is dependent on adequate habitat throughout the 5th level watersheds where they occur. However,

with only short distances of ownership of larger streams and rivers within public boundaries, the influence of the agency on the survival of these species is limited to actions on the National Forest.

The Federal Water Pollution Control Act, commonly known as the Clean Water Act directed all states to develop strategies and guidance to reduce non-point source pollution for all land disturbing activities (Section 208 and Section 319). To better protect Georgia's streams from forestry non-point source pollution, Best Management Practices (BMPs) were developed, and implemented on a voluntary basis, by the forestry community in 1981. Georgia Forestry Commission is the lead agency for forest water quality in the state of Georgia, as directed by the Environmental Protection Division of the Department of Natural Resources. The application of BMPs is primarily to attain compliance with state water quality standards. Standards addressed include turbidity, biota, temperature, and habitat.

Clean Water Act regulations (Section 313) require federal agencies to comply with state and local water quality regulations. This regulation directs mandatory compliance with the Best Management Practices on National Forest lands.

To determine the effectiveness of the BMPs in addressing control of non-point source pollution the Georgia Forestry Commission began random biannual surveys of forestry operations in 1991. These surveys are conducted to determine if BMPs are properly installed and maintained, and their effectiveness in addressing non-point source pollution.

The initial studies in 1992 by the GFC concluded that benefits to water quality, including aquatic habitat were achieved when BMPs were correctly applied.

In 1998 and 2002, two additional, more rigorous state-wide studies were conducted to determine the rates of BMP implementation; units of measure (acres, miles of road and stream) in BMP compliance; effectiveness of BMPs and any needed modifications; and comparability of stream habitats above and below stream crossings when using BMPs. These surveys used a protocol recommended by Southern Group of State Foresters (SGSF) Task Force. This group was comprised of hydrologists and water specialists from state forestry agencies, US Forest Service, and forest and paper industry, in consultation with the Environmental Protection Agency (EPA). In the 1998 study, 386 sites (approximately 43,906 acres) were selected across the state of Georgia. Of these acres, 98% were in compliance and no water quality risks or impairments were identified when BMPs were applied (Georgia Forestry Commission 1998**).** In 2002, 420 sites (approximately 40,159 acres) were selected and 99.1% were in compliance with BMPs. This study determined that BMPs are effective in protecting water quality (Georgia Forestry Commission 2002).

In addition to implementing Georgia's Best Management Practices for Forestry, and the forest-wide standards for federally-listed species identified in the BA introduction, protection of the aquatic biota will be achieved by the following direction in the Forest Plan: 1) Riparian Corridor Management Prescription, and 2) additional forest-wide

objectives and standards for aquatic species including those with specific emphasis on watersheds with listed species.

RIPARIAN CORRIDOR MANAGEMENT PRESCRIPTION

The riparian corridor prescription (Management Prescription 11) is not a mapped, stand-alone prescription. It is embedded within each of the other management prescriptions described in Chapter Three of the Forest Plan. The riparian corridor prescription must be identified during project implementation of any of the other management prescriptions at the project/site-specific level.

Several methods of delineation of riparian areas were considered during the development of the Forest Plan. A "fixed-width" approach was selected as the preferred method for the Chattahoochee National Forest. A fixed width approach facilitates the planning process in estimating riparian extent, and provides a common and consistent approach for identifying riparian corridors. An additional benefit during project implementation is a certain level of protection is assured and delineation does not require a great deal of knowledge or expertise related to riparian characteristics.

The Forest Service is required to meet or exceed State Best Management Practices. It should be recognized that BMPs for forestry were created to minimize nonpoint source pollution and protect water quality. These BMPs are mainly designed to address impacts within specified distances to a stream, and to minimize the impact from upland activities outside the streamside management zone. They are not designed for other functions and values of riparian corridors nor are they necessarily designed for other management activities that may typically occur on National Forest land, such as recreation impacts.

Most of the streams on the Chattahoochee are designated as cool or cold water, and are further identified as trout watersheds by the Georgia Department of Natural Resources. All of the streams in the three watersheds of concern are designated as trout waters. These streams require protection of streams and associated riparian areas to provide optimum cool and cold-water habitat. Protective buffer widths for the Chattahoochee National Forest were determined using results of research studies examining potential forestry impacts on water quality, conducted in the Appalachian Mountains at Coweeta Research Station since 1933. In the technical report "Effects of management practices on water quality and quantity: Coweeta Hydrological Laboratory, North Carolina", 40 years of watershed experiments were summarized. Conclusions included no increases in stream temperatures by forest cutting if buffer strips are retained to provide shade to the stream (Douglass and Swank, 1975). The publication "Filter strip widths for forest roads in the Southern Appalachians" (Swift 1986) measured the distance sediment moved down slope from newly constructed roads. Filter strips ensured protection of streams from. sedimentation of these newly constructed roads. Minimum filter strip widths for the Southern Appalachians were given for management consideration. Field reviews over the past 30 years on the Chattahoochee National Forest as well as research at

Coweeta Hydrologic Station have shown that BMPs are effective in protecting water quality and aquatic habitat.

Protective buffers (streamside management zones) of 100 feet on either side of perennial and intermittent streams of designated trout waters are required (Georgia Forestry Commission 1999). For all streams designated as trout waters, including all streams in the three watersheds of concern, riparian corridor widths will be between 100 feet to 150 feet on either side of the stream. Increased distances is a function of the slope of the land; 0-10% slope requires a 100 foot buffer; 11-45% slope requires a 125 foot buffer; and a 150 foot buffer is required on slopes greater than 45%. It is recognized that the actual riparian ecosystem extent may vary with the site-specific conditions and the riparian boundary may be expanded through field investigation.

The riparian prescription contains standards for activities designated as either "major" or "minor" activities. These are defined as follows:

Major actions or activities that create long-term impacts or permanent changes to water drainage, soil exposure and productivity, create impervious surfaces, or permanent removal of vegetation cover are **prohibited** within the Riparian Corridor. Examples of major actions and activities include road and trail travelways (except for designated crossings), recreation sites and facilities, log landings, permanent wildlife openings, and range allotments.

Minor actions or activities that create short-term impacts or temporary changes to water drainage, soil exposure and productivity, or vegetation cover are **permitted** within the Riparian Corridor with appropriate mitigation and monitoring of impacts. Examples of minor activities include silvicultural activities needed to meet resource objectives of riparian associated species. Examples are timber removal, site preparation, reforestation, and prescribed burning, bank stabilization, and stream crossings associated with these activities. All silvicultural activities must be in compliance with Georgia Best Management Practices for Forestry.

The riparian prescription also contains standards that address mitigation of resource damages caused by activities such as recreational use, vegetation management, insect and disease control, fireline construction, and road construction and management. These include:

Recreation: Existing OHV trails within the riparian corridor causing unacceptable resource impacts will be identified for appropriate mitigation measures (including OHV trail closure). No new OHV trails will be constructed within the riparian corridor except at designated crossings.

Camping trailers and vehicles will be restricted within 100 feet of streams, except at designated areas. Overnight tethering and/or corralling horses will be outside of the 100 foot buffer except in existing corral sites. When existing recreational trails or off-trail use are creating significant impacts to streams resulting in water quality

parameters below Georgia water quality standards, these impacts will be corrected by closure or other corrective measures. Forest Supervisor closure orders for existing trails or use areas will be used when necessary to manage adverse environmental impacts.

Recreational gold panning is the only allowed method of gold collecting on the Chattahoochee National Forest.

Vegetation management: Lands in the riparian corridor are classified as not suitable for timber production. However, vegetation management may be implemented to accomplish resource objectives. These objectives are to enhance the diversity and complexity of vegetation, rehabilitate both natural and human-caused disturbances, provide habitat improvements for TES or riparian-associated species or to reduce fuel buildup. Stability of perennial and intermittent streams is protected by retaining all woody understory vegetation within at least 5 feet from the edge for the first terrace or water's edge as well as retaining all stream bank trees unless removal is part of a watershed improvement project.

Insect and disease control and salvage: Cut and leave will be the preferred method for control and suppression of insects and disease in the riparian corridor.

Fire management: To minimize soil disturbance, hand lines are used to create firelines near streams. Except for wildfire or escaped prescribed fire, construction of firelines with heavy mechanized equipment (e.g. bulldozers) in wetlands or riparian corridors is prohibited.

Roads and stream crossings: Where risks of resource damage are high, each road segment will be constructed and stabilized prior to starting another segment. High-risk streams are those with any federally-listed species. All new stream crossings will be constructed so that they do not adversely impact the passage of aquatic organisms. Exceptions may be allowed in order to prevent the upstream migration of undesired species. Use road closure or decommissioning projects as opportunities to enhance other resources; for example, wildlife, recreation, or fisheries. Hydrologists, fishery biologists, or soil scientists will be consulted prior to replacing culverts, in order to address proper culvert sizing and fish passage concerns.

FORESTWIDE OBJECTIVES AND STANDARDS PROTECTING AQUATIC T&ES

In addition to more general forest-wide standards and objectives related to water quality, there are a number of additional objectives and standards that specifically emphasize the protection of federally-listed aquatic species. These include:

Complete an annual average of ten watershed assessments below the 5th level HUC scale on a priority basis. Priority will be given to watersheds where federally-listed aquatic species occur within Forest Service lands or are within one stream mile of the furthest-downstream Forest Service ownership.

By 2008, complete a watershed assessment on each stream or stream segment within the Forest planning area that is listed by the Georgia Environmental Protection Division (EPD) as sediment-impaired in the 305(b) reports.

Conduct condition surveys of open roads within riparian corridors of order 3 and greater streams. Prioritize those that are adversely affecting soil and water resources and correct those situations by 2010. Priority will be given to watersheds where federally-listed aquatic species occur within Forest Service lands or are within one stream mile of the furthest-downstream Forest Service ownership.

Watersheds (5th level HUCS) where federally-listed aquatic species occur on federal lands or within one stream mile from the furthest downstream Forest Service ownership will have priority for mitigating major sediment sources such as roads, trails (including illegal OHV trails), culvert replacements, etc. Those causing unacceptable resource damage will be closed and/or rehabilitated.

Prioritize and implement watershed improvement needs based on watershed assessments and stream condition inventories. Highest priority is given to locations with known occurrences of federally-listed aquatic species (or occurrences within one stream mile of the Forest Service boundary.

Unless necessary to correct existing water quality impacts, there will be no net increase in open system roads and system (OHV, horse, bike) trails within watersheds (5th level HUC) where federally-listed aquatic species occur within Forest Service lands or are within one stream mile of the furthest downstream Forest Service ownership.

In watersheds (5th level HUCS) where federally-listed aquatic species occur on federal lands or within one stream mile of the furthest downstream Forest Service ownership, limit OHV motorized recreation use to trails or other routes designated for such use regardless of any direction within management prescriptions to the contrary.

In watersheds (5th level HUCS) where federally-listed aquatic species occur within Forest Service lands or are within one stream mile of the furthest downstream Forest Service ownership, restrict horse and bike use to designated trails only.

Aquatic habitat improvements, such as the addition of large woody debris, rock or other native materials in waters occupied by aquatic Federally-listed aquatic species on Forest Service lands will be for the primary benefit of those listed species.

Complete necessary studies with other agencies, scientists, and educational institutions by 2006, to determine potential impacts of stocking trout in waters occupied by federally-listed species on Forest Service lands.

MONITORING

Annually, all federally-listed aquatic species occurring on the forest and their habitat will be monitored. Monitoring on the National Forest will include searching specifically for federally-listed species in areas with suitable habitat. Annual surveys will be conducted with catch per unit effort, to provide trends over time of federally-listed species. Surveys will provide information on age class structure (recruitment) and abundance and distribution. At least once every five years, a professional malacologist will survey suitable mussel habitat on the Chattahoochee National Forest to evaluate the expansion or contraction of habitat being used by listed mussels. Monitoring will also occur to determine the distribution of exotics, such as the red shiner, which have the potential to negatively impact federally-listed aquatic species.

Within 2 years of Plan implementation, monitoring protocols will be developed with the cooperation of USFWS to assess effectiveness of mitigation measures and standards for aquatic resources, in watersheds with federally-listed species. This monitoring to detect changes in water quality is addressed in Chapter 5 of the revised Plan, and the specific protocols will be described on monitoring task sheets developed for that purpose. In addition, the Plan contains a standard to collect water quality data on a sample basis when a ground disturbing activity is proposed on 5 acres or more in watersheds with federally-listed aquatic species, or where such species occur within 1 stream mile of the furthest downstream Forest Service ownership.

SPECIAL CONCERNS

STOCKING IN THE THREE 5TH LEVEL WATERSHEDS OF CONCERN

Federally-listed species in the Upper Conasauga River Watershed occur within the main stem of the Conasauga River. Currently there is no stocking of trout within the main stem of the Conasauga River. No trout stocking of the main stem has occurred post designation of the Cohutta Wilderness in 1975. Prior to that time, rainbow, brown and brook trout were stocked in the main stem of the Jack's River and Conasauga River, both now a part of the Cohutta Wilderness.

Six federally-listed species (five mussels and one fish) occur within Holly Creek, and the blue shiner occurs within one mile downstream of the forest boundary. In Holly Creek Watershed, rainbow trout stocking occurs on federal lands from the furthest downstream boundary, upstream for approximately 2.5 miles. Trout stocking in Holly Creek has been occurring since 1961, and there are 4-5 stocking points along this stretch. During trout season (March through Labor Day), this stream is heavily stocked (GA DNR 1999) two times per month. Georgia DNR tagged trout over a three-year period (1992, 1993 and 1994) to evaluate fishing pressure by number of tags returned by fishermen (GA DNR 1996). Trout from 98 streams and lakes were tagged and Holly Creek had the highest return (49%), indicating that trout fishing pressure in the creek is high. Downstream of Forest Service lands, where the federally-listed species occur, waters are too warm for trout. In addition, there are no wild trout populations in Holly Creek (Biesser pers. comm.). Wild trout are more aggressive in their feeding and territorial behavior than stocked trout.

The only stream where trout are stocked directly in waters with federally-listed species on Forest Service lands is in the Etowah River. One federally-listed aquatic species occurs in the Etowah River watershed, the Etowah darter (*Etheostoma etowahae*). This fish occurs on the forest in the main stem of the Etowah and in Jones Creek, a tributary of the Etowah. The distribution of the Etowah darter in Jones Creek occurs from the confluence with the Etowah River upstream to the first waterfall of Jones Creek approximately 2 miles. On the Forest, distribution of the Etowah darter in the Etowah River is from the most upstream site immediately below Black Falls to the lower most forest boundary, approximately 8 miles. Rainbow, brook and brown trout stocking has occurred from 1961 to 1999 in these stretches of the Etowah River. Stocking probably occurred prior to this time, but records are not available. From 1999 to the present, only rainbow trout have been stocked. Rainbow trout stocking occurs twice a month during trout season in four sections throughout the main stem of the Etowah River on Forest Service lands. Trout fishing pressure is high in the Etowah River, and the stream is heavily stocked (GA DNR 1999). There is no stocking of trout in Jones Creek.

The literature is unclear as to any direct negative effects of stocking of trout on native fishes. Previous research demonstrates that stocked or introduced trout may negatively affect native fishes (McIntosh et al. 1992). Potential negative effects from stocked trout include predation, interspecific competition and the introduction of

disease. A study in Virginia of the candy darter (*Etheostoma osburni*) was conducted to examine predation by trout, and the darter's habitat distribution and habitat relationships (Leftwich et. al 1996). No predation of candy darters was found. However, it is thought that although 421 trout stomachs were examined and no candy darters were found, that predation may still occur. Jenkins and Burkhead (1994) reported that the Roanoke darter (*Percina roanoka*) was eaten by stocked rainbow trout. LaRoche (1979) observed limited feeding activity in rainbow trout stocked in two central Virginia streams.

The impact of stocking trout on native non-game fishes in Georgia is a current research study funded by the Georgia Department of Natural Resources. Research will be conducted by the University of Georgia, beginning summer of 2003 and continuing through 2005. Study sites will include streams in the Etowah and Tennessee watersheds in Georgia. Results of this study will be used for making management decisions and adjusting management if needed, to minimize adverse effects to listed species.

NON-NATIVE, INVASIVE SPECIES

The red shiner (*Cyprinella lutrens*) is a minnow native to river systems that drain into the Gulf of Mexico west of and including the Mississippi River to the Rio Grande. Red shiners are preferred baitfish, often transported between watersheds by anglers. They have become established in drainages where they did not historically occur.

Red shiners are characterized as being aggressive, especially during spawning where the males may cooperate to secure favorable spawning sites. The males defend the spawning sites and spawn with their species as well as other *Cyprinella* females. The results are a hybrid of *Cyprinella.*

In the Conasauga River, the federally-listed blue shiner, *Cyprinella caerulea,* occurs on Forest Service lands in the Upper Conasuga River watershed (5th level HUC), within 5 miles of federal lands in the Middle Conasauga and within one mile of federal lands in the Holly Creek watershed (5th level HUCs). There are five extant populations of blue shiners. The Conasauga River population is the most prolific and was thought to be the most secure. The other four populations are located in Alabama and are subject to the same invasive threat. They are less secure because their habitat is more degraded than the Conasauga River. All five populations are functionally isolated and no natural genetic interchange can occur.

In the summer of 2000 red shiners were detected in the Conasauga River marking the upper extent of dispersion from a population that had become established in the Coosa River system in about 1993. In 2002, red shiners were as far upstream in the Conasauga River as Dalton, Georgia. Red shiners were abundant near Dalton and hybrids were collected of red shiner and blacktail shiner (*Cyprinella venusta*) (pers. comm. Dr. Walters, June 2002). Hybridization has been observed between red shiners and blue shiners in aquaria.

There does not appear to be any action that may be taken to stem the progression of red shiners into blue shiner habitat. The best hope for blue shiners and the other *Cyprinella* native to the Conasauga River is that the water may be "too" clean for red shiners to effectively compete. Red shiners tend to proliferate in degraded systems. The USGS and USFWS will continue to monitor the red shiner in the Conasauga River system and will provide us with any management recommendations.

BIOLOGICAL ASSESSMENT ANALYSIS

Amber Darter (Percina antesella)

Environmental Baseline

The amber darter was federally-listed as endangered in 1985 (U.S. Fish and Wildlife Service 1985). The species is endemic to the upper Coosa River system and occurs in the Consauga River, Etowah River, and Shoal Creek (a tributary to the Etowah River in Cherokee County, Georgia). When the amber darter was originally listed, 33.5 miles of the Conasauga River were designated as critical habitat. The population in the Conasauga River has been documented 0.7 miles down stream of the Cherokee National Forest in Polk County, but has not been collected in the upper Conasauga River or Jacks River on the Chattahoochee National Forest. Populations of amber darters do occur in the mainstem of the Conasauga River in Georgia within 5 miles of the Chattahoochee Forest. Tributaries that flow from the Chattahoochee National Forest and flow into the Conasauga River in the critical habitat area are Sumac Creek and Mill Creek (Murray County, Georgia). The uppermost known populations in the Etowah River are found in Dawson County, approximately 1 mile upstream of the confluence with the Amicalola River. These populations are more than 5 miles downstream of Forest Service lands.

The amber darter is typically found in riffle and run habitat in the mainstem Conasauga and Etowah rivers. Amber darters are microhabitat specialists and prefer areas of swift current over loose, shifty gravel and cobble substrate. Amber darters deposit their eggs directly in gravel on the stream bed and provide no parental care for their offspring (Freeman 1996). Primary food items include snails, limpets, and immature aquatic insects.

The loss of occupied habitat for amber darters may be attributed to siltation from agriculture, logging, and the associated road building. Amber darters are considered sensitive to sedimentation because they require clean gravel for spawning and they rely heavily on aquatic macroinvertebrates for food.

Potential Effects

The activities responsible for the decline of the amber darter relate to habitat destruction primarily through siltation. On the Chattahoochee National Forest, permitted ground disturbing activities have the greatest potential to affect individual fish. The Conasauga and Etowah will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for

forestry, and the Riparian Prescription applicable forest-wide standards. Other sources of pollutants are generally not permitted on this National Forest, with the exception of herbicide applications which are governed by forest-wide standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

The population of amber darter near the Chattahoochee National Forests may be unstable due to activities on private lands. Monitoring of potential populations will be our primary recovery objective. Forest biologists and technicians will conduct and/or assist with annual monitoring of the species and its habitat. Suitable habitat will be sampled for the species. The results will be reported in the annual Monitoring and Evaluation Reports.

Determination of Effect

Based on analysis above, the amber darter will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis on watersheds with listed species, and 3) Georgia BMP's for forestry. Implementation of the Chattahoochee National Forest Plan Revision is not likely to adversely affect the amber darter.

Goldline darter (*Percina aurolineata*)

Environmental Baseline

The goldline darter is a Federally threatened species endemic to the Alabama River drainage (U.S. Fish and Wildlife Service 2000). Two disjunct populations are extant, one in the Cahaba River system in Alabama and one in the Coosawattee River system in Georgia. Goldline darters have been collected near the Chattahoochee National Forest lands in the Ellijay, Cartecay, and Coosawattee rivers as well as Mountaintown, Boardtown, and Kells creeks. In addition, one specimen was collected in 1998 in the Coosawattee River downstream of Carters Lake and near Sugar Creek, a tributary that drains Chattahoochee National Forest lands. All known populations are from 2 to 8 miles downstream of the forest.

Goldline darters are found in medium sized streams and small rivers. They are typically associated with cobble, small boulder and bedrock substrates in riffle and run habitats with, moderate to swift current. Presumably, they feed primarily on aquatic macroinvertebrates and spawn in gravel habitats like other members of the genus *Percina*. Water quality degradation, particularly due to sedimentation, is considered the primary threat to the species (U.S. Fish and Wildlife Service 2000). Populations outside of the Chattahoochee National Forest are increasingly threatened by sedimentation from road construction and second home/rental cabin development.

Potential Effects

The activities responsible for the decline of the goldline darter relate to habitat destruction primarily through siltation. For populations of goldline darters downstream of the Chattahoochee National Forests, permitted ground disturbing activities have the greatest potential to affect individual fish. The streams will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for forestry, the Riparian Prescription, and applicable forest-wide standards. Other sources of pollutants are generally not permitted on this National Forest with the exception of herbicide applications, which are governed by forest-wide standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

The population of goldline darter downstream of the Chattahoochee National Forests may be unstable due to activities on private lands. Monitoring of potential populations will be our primary recovery objective. Forest biologists and technicians will conduct and/or assist with annually monitoring the habitat, and suitable habitat will be sampled for the species. The results will be reported in the annual Monitoring and Evaluation Reports.

Determination of Effect

Based on analysis above, the goldline darter will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis on watersheds with listed species, and 3) Georgia BMP's for forestry. Implementation of the Chattahoochee National Forest Plan Revision is not likely to adversely affect the goldline darter.

Etowah darter (Etheostoma etowahae)

Environmental Baseline

The Etowah darter is endemic to the upper Etowah River system and is federally-listed as endangered (U.S. Fish and Wildlife Service 2000). The Etowah darter is found in the Etowah River and its tributaries upstream of Allatoona Reservoir in Cherokee, Dawson, and Lumpkin counties. The Etowah darter has been documented on Chattahoochee National Forest lands in the Etowah River, and Jones Creek. Populations in the Etowah River extend as far upstream as Black Falls at the Frank D. Merrill Army Training Camp. Etowah darters have not been collected in Ward and Nimblewill creeks, two streams draining National Forest lands that are of suitable size to support Etowah darters.

The Etowah darter is found in small rivers and medium-sized creeks and is typically associated with gravel and cobble riffles and runs with moderate to swift current. Little is known about Etowah darter life history but it is assumed that they feed primarily on aquatic macroinvertebrates, as does the closely related greenbreast darter, *Etheostoma jordani*. Etowah darters belong to the subgenus *Nothonotus*,

which are known to bury themselves in gravel during spawning. Eggs are laid directly in the gravel and no parental care is provided.

The loss of occupied habitat for Etowah darter may be attributed to siltation from agriculture, logging, and the associated road building. In addition, populations outside of the Chattahoochee National Forest are increasingly threatened by urbanization. Dawson and Cherokee counties have consistently ranked among the nations fastest growing counties over the past decade.

Potential Effects

The activities responsible for the decline of the Etowah darter relate to habitat destruction primarily through siltation. For populations of Etowah darters on or near the Chattahoochee National Forest, permitted ground disturbing activities have the greatest potential to affect individual fish. The streams will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for forestry; the Riparian Prescription and applicable forest-wide standards. Other sources of pollutants are generally not permitted on this National Forest with the exception of herbicide applications, which are governed, by forest-wide standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

The population of Etowah darter on and near the Chattahoochee National Forests may be unstable due to activities on private lands. Forest biologists and technicians will conduct and/or assist with annually monitoring the species and its habitat. Suitable habitat will be sampled for the species. The results will be reported in the annual Monitoring and Evaluation Reports.

Determination of Effect

Based on analysis above, the Etowah darter will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis on watersheds with listed species, and 3) Georgia BMP's for forestry. Implementation of the Chattahoochee National Forest Plan Revision is not likely to adversely affect the Etowah darter

Blue shiner (Cyprinella caerulea)

Environmental Baseline

The blue shiner was federally-listed as threatened in 1992. The species is endemic to the Cahaba and Coosa River systems (U.S. Fish and Wildlife Service 1995). The population in Turniptown Creek on the Chattahoochee National Forest was last sampled in 1957, and the blue shiner is considered as extirpated from the entire Coosawattee River Basin. Five extant populations persist:

1) Weogufka Creek (Coosa County, AL);

2) Choccolocco Creek and its tributary Shoal Creek (on the Talladega National Forest in Calhoun County, AL);

3) Little River (Cherokee county, AL);

4) Cahaba Rivera (Jefferson, Shelby and Bibb Counties, AL; part of the Bibb County stretch includes the Talladega National Forest);

5) Conasauga River (Polk and Bradley Counties, TN; part of the Polk County stretch is on the Cherokee National Forest; Murray and Whitfield Counties, GA on the Chattahoochee National Forest); and Holly and Perry Creeks (Murray County, GA down stream of the Chattahoochee National Forest) and Rock Creek (Murray County, GA);

The blue shiner is found in small rivers and large streams with moderate gradients over a sand or sand and gravel substrate. Water willow beds are often present. Spawning occurs in the crevices of rocks or logs with no parental protection provided after spawning is completed. Food items are dominated by terrestrial insects. Silt free water and a substrate free of fine sediments that could fill in spawning crevices are extremely important.

The loss of occupied habitat for blue shiners may be attributed to siltation from agriculture, logging, and the associated road building; nutrient enrichment and water withdrawal for home site development; and inundation from dam construction. Dam construction has also resulted in the isolation of some blue shiner populations.

Potential Effects

The activities responsible for the decline of the blue shiner relate to habitat destruction primarily through siltation. For the populations of blue shiners on or near the Chattahoochee National Forest, permitted ground disturbing activities have the greatest potential to affect individual fish. The streams will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for forestry; the Riparian Prescription and applicable forest-wide standards. Other sources of pollutants are generally not permitted on this National Forest with the exception of herbicide applications, which are governed by forest-wide standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

The population of blue shiners in the Conasauga River on the Cherokee and Chattahoochee National Forests appears to be stable. The population of blue shiner downstream of the Chattahoochee National Forests may be unstable due to activities on private land. Forest biologists and technicians will conduct and/or assist with annually monitoring the species and its habitat and suitable habitat will be sampled for the species. An index using the numbers of blue shiners per hour of survey, has been developed and is being used to assess the status (age distribution) and trend for the Conasauga River population. Results will be reported in the annual Monitoring and Evaluation Reports.

Determination of Effect

Based on analysis above, the blue shiner will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis on watersheds with listed species, and 3) Georgia BMP's for forestry. Implementation of the Chattahoochee National Forest Plan Revision is not likely to adversely affect the blue shiner.

Conasauga logperch (*Percina jenkinsi*)

Environmental Baseline

The Conasauga logperch was federally-listed as endangered in 1985(U.S. Fish and Wildlife Service 1985). The species is endemic to the Conasauga River. Concurrent with the listing was the designation of 11 miles of critical habitat. The Conasauga logperch has been documented upstream of the critical habitat on the Cherokee National Forest and the Chattahoochee National Forest of Georgia (Murray County) in both the Conasauga and Jacks Rivers.

The Conasauga logperch is found in flowing pools of this small river over a gravel to cobble substrate. Spawning behavior is unknown but other member of this genus deposit their eggs in gravel substrate with no nest building or parental care. Food items consist of invertebrates, which are obtained by flipping rocks with their noses and grabbing the dislodged organisms. Silt free water and a substrate free of fine sediments are extremely important habitat elements for the logperch. The loss of occupied habitat for Conasauga logperch may be attributed to siltation from agriculture, logging, and the associated road building.

Potential Effects

The activities responsible for the decline of the Conasauga logperch relate to habitat destruction primarily through siltation. For the Chattahoochee National Forest, permitted ground disturbing activities have the greatest potential to affect individual fish. The Conasauga River will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for forestry; the Riparian Prescription and applicable forest-wide Standards. Other sources of pollutants are generally not permitted on this National Forest with the exception of herbicide applications, which are governed by forest-wide Standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

The population of Conasauga logperch in the Conasauga River on the Cherokee and Chattahoochee National Forests appears to be stable. Forest biologists and technicians will conduct and/or assist with annually monitoring the species and its habitat. Suitable habitat will be sampled for the species. An index using numbers of Conasauga logperch per hour of survey has been developed and is being used to assess the status (age distribution) and trend for the Conasauga River population. These results will also be reported in the annual Monitoring and Evaluation Reports.

Determination of Effect

Based on analysis above, the Conasauga logperch will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis on watersheds with listed species, and 3) Georgia BMPs for forestry. Implementation of the Chattahoochee National Forest Plan Revision is not likely to adversely affect the Conasauga logperch.

Alabama moccasinshell (*Medionidus acutissimus)*

Environmental Baseline

The Alabama moccasinshell was federally-listed as endangered in 1993 (U.S. Fish and Wildlife Service 1993). It is a small freshwater mussel or bivalve mollusk that attains an average adult size of 30mm (1.2 in.) in length. It was historically widespread throughout the Mobile basin, but now occurs sporadically in low numbers, with the best populations occurring in the Sipsey Fork drainage in Alabama, where they appear stable. Elsewhere, the status is uncertain and is believed to be declining.

The current range of the species includes the Luxapalila Creek, Buttahatchie and Sipsey Rivers in the Tombigbee River drainage; the headwaters of the Sipsey Fork (Brushy Creek) in the Black Warrior River drainage; and the Conasauga River (U. S. Fish and Wildlife Service, 1993). In Georgia, the moccasinshell is currently found in the upper Conasauga and Holly Creek watersheds, off the Chattahoochee National Forest.

This species is usually found in sand on the margins of streams with a typical sand and gravel substrate in clear water of moderate flow (Doug Shelton, pers. obs. 1995). Freshwater mussel larvae (glochidia) are brooded in the gills of the female and when mature are released into the water where they spend a brief period as obligate parasites on the gills, fins, or other external parts of fish until they drop off to the benthos. In the laboratory, Haag and Warren (1997) identified the following fish hosts: Fundulus olivaceus, Etheostoma douglasi, Etheostoma whipplei, Percina nigrofasciata and Percina sp.cf. caprodes. Females were found gravid with mature glochidia from late February to mid March in water temperatures of 8-13 degrees C (Haag and Warren, 1997).

Habitat modification, sedimentation, water quality degradation and eutrophication are the primary reasons for decline of this species. Runoff and discharge from urban and agricultural practices, surface mines and sewage treatment plants, as well as small stream impoundments, also threaten the mussel (U.S. Fish and Wildlife Service, 2000).

Potential Effects

No populations of the Alabama moccasinshell are known to occur on the Chattahoochee National Forest. Permitted ground disturbing activities have the

greatest potential to affect individual mussels. The Conasauga River will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for forestry; the Riparian Prescription and applicable forest-wide standards. Other sources of pollutants are generally not permitted on this National Forest with the exception of herbicide applications, which are governed by forest-wide standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

Annually, surveys will be conducted to search for the Alabama moccasinshell on the Chattahoochee National Forest. The results will be reported in the Forest Monitoring and Evaluation Report. At least once every five years, a professional malacologist will survey the entire suitable habitat managed by the Chattahoochee National Forest to evaluate the expansion or contraction in habitat being utilized.

Determination of Effect

Based on analysis above, the Alabama moccasinshell will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis on watersheds with listed species, and 3) Georgia BMPs for forestry. Implementation of the Chattahoochee National Forest Plan Revision is not likely to adversely affect the Alabama moccasinshell mussel.

Coosa moccasinshell (*Medionidus parvulus)*

Environmental Baseline

The Coosa moccasinshell was federally-listed as endangered in 1993 (U.S. Fish and Wildlife Service 1993). The type locality for Coosa moccasinshell is listed as the Coosa River, Alabama and the Chatooga River in northwest Georgia. Additional records include the Cahaba River, the Sipsey Fork of the Black Warrior River, and the Coosa River and its tributaries (Choccolocco Creek, Chatooga, Conasauga and Little Rivers). Recent records include a single specimen in the headwaters of the Sipsey Fork in 1985; a single specimen taken by Hanley from the Little River in 1981; and the Conasauga River. Recent surveys did not find the species in the Cahaba River (U. S. Fish and Wildlife Service, 1993). This moccasinshell is currently known only in the upper and middle Conasauga River and in the Holly Creek watershed, all of which are off the Chattahoochee National Forest.

Habitat is sand and gravel in highly oxygenated, clear streams with moderate flow (Doug Shelton, pers. obs. 1997). The fish host for the glochidia is unknown.

Habitat modification, sedimentation, water quality degradation and eutrophication are the primary reasons for decline of this species. Runoff and discharge from urban and agricultural practices, surface mines and sewage treatment plants, as well as small stream impoundments, also threaten the mussel (U. S. Fish and Wildlife Service, 2000). Unrestricted cattle access is a direct threat in portions on the Conasauga River in Bradley and Polk Counties, Tennessee. During recent surveys a

gravid female was found crushed, in the center of the stream. This site was in an area bordered by grazing land and unrestricted cattle access (Doug Shelton, pers. obs. 1997).

Potential Effects

No populations of the Coosa moccasinshell are known to occur on the Chattahoochee National Forest. Permitted ground disturbing activities have the greatest potential to affect individual mussels. The Conasauga River and Holly Creek watersheds will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for forestry; the Riparian Prescription and applicable forest-wide standards. Other sources of pollutants are generally not permitted on this National Forest with the exception of herbicide applications, which are governed by forest-wide standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

Annually, surveys will be conducted to search for the Coosa moccasinshell on the Chattahoochee National Forest. The results will be reported in the Forest Monitoring and Evaluation Report. At least once every five years, a professional malacologist will survey the entire suitable habitat managed by the Chattahoochee National Forest to evaluate the expansion or contraction in habitat being utilized.

Determination of Effect

Based on analysis above, the Coosa moccasinshell will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis on watersheds with listed species, and 3) Georgia BMP's for forestry. Implementation of the Chattahoochee National Forest Plan Revision is not likely to adversely affect the Coosa moccasinshell mussel.

Fine-lined pocketbook (*Lampsilis altilis*)

Environmental Baseline

The fine-lined pocketbook was federally-listed as threatened in 1993 (U.S. Fish and Wildlife Service 1993). The species occurred in the Alabama, Tombigbee, Black Warrior, Cahaba, Tallapoosa, Coosa River systems, and their tributaries. Extant populations on or near National Forests in Georgia and Tennessee are the Conasauga River (Polk and Bradley Counties, TN; Murray and Whitfield, Counties, GA) on the Cherokee and Chattahoochee National Forests; and Holly Creek (Murray County, GA) down stream of the Chattahoochee National Forest.

This species is found in moderate to swift currents over stable sand, gravel, and cobble substrates in large rivers to small creeks. The largemouth, redeye, and spotted bass may serve as the fish host for the glochidia.

The decline and extirpation of most populations of fine-lined pocketbook mussels may be attributed to habitat modification, sedimentation, eutrophication, and other forms of water quality degradation (U. S. Fish and Wildlife Service, 2000).

Potential Effects

For the populations of fine-lined pocketbook mussels on or near the Chattahoochee National Forest, permitted ground disturbing activities have the greatest potential to affect individual mussels. The Conasauga River and Holly Creek watersheds will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for forestry; the Riparian Prescription and applicable forest-wide standards. Other sources of pollutants are generally not permitted on this National Forest with the exception of herbicide applications, which are governed by forest-wide standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

The population of fine-lined pocketbook mussels in the Conasauga River is located in the only suitable habitat for this species on the Chattahoochee National Forest. Protection, monitoring, and augmentation will be the primary recovery objectives. Annually, this population will be monitored by Forest biologists and technicians. An index of mussels per hour of survey will be developed to document the status (age distribution) and trend of the population. The results will be reported in the Monitoring and Evaluation Reports. At least once every five years, a professional malacologist will survey all suitable habitat managed by the Chattahoochee National Forest to evaluate the expansion or contraction in habitat being utilized.

Determination of Effect

Based on analysis above, the fine-lined pocketbook will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis on watersheds with listed species, and 3) Georgia BMP's for forestry. Implementation of the Chattahoochee National Forest Plan Revision is not likely to adversely affect the fine-lined pocketbook mussel.

Southern pigtoe (Pleurobema georgianum)

Environmental Baseline

The southern pigtoe was federally-listed as endangered in 1993 (U.S. Fish and Wildlife Service 1993). This is a medium sized freshwater mussel with a yellow to yellow-brown shell. It is presumably a Coosa River system endemic found in Alabama, Georgia, and Tennessee. Museum records indicate its presence in the Coosa River, Shoal Creek, and the Chattooga and Conasauga rivers. Recently (1987-1991) known from just a handful of records (U.S. Fish and Wildlife Service 1993). The only known location on the Chattahoochee National Forest is in the upper Conasauga watershed. It is downstream of the forest boundary in the middle Conasauga and Holly Creek watersheds.

This species is found in sand, gravel, and cobble shoals and runs in small rivers and large streams. The fish host for the glochidia is unknown. The decline and extirpation of most populations of southern pigtoe mussels may be attributed to habitat modification, sedimentation, eutrophication, and other forms of water quality degradation (U. S. Fish and Wildlife Service, 2000).

Potential Effects

For the populations of southern pigtoe mussels on or near the Chattahoochee National Forest, permitted ground disturbing activities have the greatest potential to affect individual mussels. The Conasauga River and its tributaries will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for forestry; the Riparian Prescription and applicable forest-wide standards. Other sources of pollutants are generally not permitted on this National Forest with the exception of herbicide applications, which are governed by forest-wide standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

The population of southern pigtoe mussels in the Conasauga River is located in the only suitable habitat for this species on the Chattahoochee National Forest. Protection, monitoring, and augmentation will be the primary recovery objectives. Annually, this population will be monitored by Forest Biologists and Technicians. An index of mussels per hour of survey will be developed to document the status (age distribution) and trend. The results will be reported in the Monitoring and Evaluation Report. At least once every five years, a professional malacologist will survey all of the suitable habitat managed by the Chattahoochee National Forest to evaluate the expansion or contraction in habitat being utilized.

Determination of Effect

Based on analysis above, the southern pigtoe will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis on watersheds with listed species, and 3) Georgia BMPs for forestry. Implementation of

Southern clubshell (*Pleurobema decisum)*

Environmental Baseline

The southern clubshell was federally-listed as endangered in 1993 (U. S. Fish and Wildlife Service 1993). Formerly widespread throughout the Mobile River basin, southern clubshell was known historically from the Alabama River and Bogue Chitto Creek; Tombigbee River and tributaries (Buttahatchie, East Fork Tombigbee, and Sipsey Rivers and Bull Mountain, Luxapalila, and Lubbub Creeks); Black Warrior River; Cahaba and Little Cahaba Rivers; two Tallapoosa tributaries, Uphapee and Chewacla Creeks; and the Coosa River and tributaries (Oostanaula, Conasauga, Etowah, Chatooga, and Coosawattee Rivers and Kelly, Talladega and Shoal Creeks). Currently, the species is known from Bogue Chitto Creek in the Alabama River drainage; Buttahatchie, East Fork Tombigbee and Sipsey Rivers in the Tombigbee

River drainage; and Chewacla Creek in the Tallapoosa River drainage (U. S. Fish and Wildlife Service 1993, McGregor et. al. 1999). It is thought to be extirpated from the Conasauga River watershed (U.S. Fish and Wildlife Service 1998).

This mussel is usually found in highly oxygenated streams with sand and gravel substrate; it may be found in sand and gravel in the center of the stream or in sand along the margins of the stream (Doug Shelton, pers. obs. 1995). Habitat modification, sedimentation, water quality degradation and eutrophication are the primary reasons for decline of this species. Runoff and discharge from urban and agricultural practices, surface mines and sewage treatment plants, as well as small stream impoundments, also threaten the mussel (U. S. Fish and Wildlife Service, 2000).

Potential Effects

There are no known populations of southern clubshell mussels on the Chattahoochee National Forest. Permitted ground-disturbing activities have the greatest potential to affect individual mussels. The Conasauga and Etowah Rivers will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for forestry; the Riparian Prescription and applicable forest-wide standards. Other sources of pollutants are generally not permitted on this National Forest with the exception of herbicide applications. These are governed by forest-wide standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

No populations of southern clubshell mussels are known to occur on the Chattahoochee National Forest. Annually, surveys to search for the southern clubshell will be conducted. The results will be reported in the Monitoring and Evaluation Report. At least once every five years, a professional malacologist will survey all of the suitable habitat managed by the Chattahoochee National Forest to evaluate the expansion or contraction in habitat being utilized.

Determination of Effect

Based on analysis above, the southern clubshell will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis on watersheds with listed species, and 3) Georgia BMP's for forestry. Implementation of the Chattahoochee National Forest Plan Revision is <u>not likely to adversely affect</u> the southern clubshell mussel.

Ovate clubshell (Pleurobema perovatum)

Environmental Baseline

The ovate clubshell was federally-listed as endangered in 1993 (U. S. Fish and Wildlife Service 1993). A small freshwater mussel or bivalve mollusk which attains a maximum adult size of 50 mm (2.0 in.) in length. The outer shell varies from yellow to dark brown. Occasionally, broad green rays may cover most of the umbo and posterior ridge. The type locality for the ovate clubshell is in Greene County, Alabama. Historical records include the Tombigbee River and tributaries (Buttahatchee and Sipsey Rivers; Luxapalila, Coalfire and Lubbub Creeks); Black Warrior River and tributaries (Locust Fork; Village, Prairie, Big Prairie, Brushy and Blackwater Creeks); Alabama River; Cahaba River and the tributary Buck Creek; Chewacla, Uphapee and Opintlocco Creeks in the Tallapoosa drainage; and the Coosa River and tributaries (Conasauga and Etowah Rivers, and Holly Creek).

The current known populations occur in the Buttahatchee River and Luxapilla Creek in Mississippi and the Sipsey River, Sucarnoochee River, Coalfire Creek, Chewacla Creek and Coosa River, all in Alabama (U.S. Fish and Wildlife Service 2000).

This species is found in sand and fine gravel with moderate current at depths less than 3 feet. The fish host for the glochidia is unknown. Habitat modification, sedimentation, and water quality degradation are the major reasons for the current status of the ovate clubshell. Channelization and runoff from agriculture and household activities also threaten the species (U.S. Fish and Wildlife Service 2000).

Potential Effects

There are no known populations of ovate clubshell mussels on the Chattahoochee National Forest, but there are historical records in the Conasauga, Etowah and Holly Creek watersheds. These watersheds will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for forestry; the Riparian Prescription and applicable forest-wide standards. Other sources of pollutants are generally not permitted on this National Forest with the exception of herbicide applications, which are governed by forest-wide standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

Annually, surveys will be conducted to search for the ovate clubshell. The results will be reported in the Monitoring and Evaluation Report. At least once every five years, a professional malacologist will survey all of the suitable habitat managed by the Chattahoochee National Forest for the ovate clubshell and other rare mussels.

Determination of Effect

Based on analysis above, the ovate clubshell habitat will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis

on watersheds with listed species, and 3) Georgia BMP's for forestry. For these reasons and the fact the ovate clubshell is not known to occur on the Forest, implementation of the Chattahoochee National Forest Plan Revision is not likely to adversely affect the ovate clubshell mussel.

Triangular kidneyshell (Ptychobranchus greeni)

Environmental Baseline

The triangular kidneyshell was federally-listed as endangered in 1993 (U. S. Fish and Wildlife Service 1993). A freshwater mussel or bivalve mollusk which attains a maximum adult size of about 100 mm (4.0 in.) in length. The outer shell is straw yellow in young specimens becoming yellow- brown in older specimens. Occasionally, it may have fine and wavy or wide and broken green rays anterior to the posterior ridge. The type locality for the triangular kidneyshell is the headwaters of the Black Warrior River, Alabama. Additional records include the Black Warrior River and tributaries (Mulberry Fork, Locust Fork, North and Little Warrior Rivers, Brushy Creek, Sipsey Fork); Cahaba River; and the Coosa River and tributaries (Choccolocco Creek; Chatooga, Conasauga, and Etowah Rivers). The current range includes the Sipsey Fork and Little Warrior River in the Black Warrior River drainage; and the Conasauga River in the Coosa River drainage (U. S. Fish and Wildlife Service, 1993).

This species is found in coarse gravel and sand. The fish host for the glochidia is unknown. Freshwater mussels are filter feeders taking organic detritus, diatoms, phytoplankton, and zooplankton from the water column.

Loss of habitat due to impoundments is the primary reason for the decline of the species. It may also be threatened by overutilization for commercial, recreational, scientific and educational purposes (U. S. Fish and Wildlife Service, 1993).

Potential Effects

The populations of triangular kidneyshell mussels are off the Chattahoochee National Forest. Permitted ground disturbing activities have the greatest potential to affect individual mussels. The Conasauga River will be protected from the sediment generated during authorized ground disturbing activities by Best Management Practices for foresty; the Riparian Prescription and applicable forest-wide standards. Other sources of pollutants are, generally not permitted on this National Forest with the exception of herbicide applications, which are governed, by forest-wide standards to protect rivers from accidental spills of pesticides. Implementation of these standards will be monitored and corrected as needed.

The population of triangular kidneyshell mussels in the Conasauga River is located in the only suitable habitat for this species. Annually, surveys to search for the triangular kidneyshell will be conducted. The results will be reported in the Monitoring and Evaluation Report. At least once every five years, a professional malacologist will survey all of the suitable habitat managed by the Chattahoochee National Forest to evaluate the expansion or contraction in habitat being utilized.

Determination of Effect

Based on analysis above, the triangular kidneyshell will be protected by the following: 1) the Riparian Corridor Management Prescription; 2) additional forest-wide objectives and standards for aquatic species, including those with specific emphasis on watersheds with listed species, and 3) Georgia BMP's for forestry. Implementation of the Chattahoochee National Forest Plan Revision is not likely to adversely affect the triangular kidneyshell.

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Signatures of Preparers:

Mitzi Cole, Fisheries Biologist /s/ Mitzi Cole

Jeff McDonald, Planning Biologist /s/ Jeff McDonald

Cindy Wentworth, Ecologist/Botanist /s/Cindy Wentworth

Jim Wentworth, Wildlife Biologist /s/ Jim Wentworth

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