2015 Monitoring and Evaluation Annual Report

Revised Land and Resource Management Plan

Sumter National Forest

August 31, 2016

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Forest Supervisor's Certification

I have evaluated the monitoring results and recommendations in this report. I have directed that the action plan developed to respond to these recommendations be implemented according to the periods indicated, unless new information or changed resource conditions warrant otherwise. I have considered funding requirements in the budget necessary to implement these actions.

With these completed changes, the *Revised Land and Resource Management Plan, Sumter National Forest* is sufficient to guide management activities unless ongoing monitoring and evaluation identify further need for change.

Any amendments or revisions to the forest plan will be made using the appropriate National Environmental Policy Act procedures.

/s/ John Richard Lint
John Richard Lint
Forest Supervisor
Francis Marion and Sumter National Forests

August 31, 2016
Date

Executive Summary – 2015 Monitoring and Evaluation Annual Report Findings

Ecosystem Condition, Health and Sustainability

- On the Enoree Ranger District, three rare communities were identified within the Hills Creek Watershed area: two occurrences of "Dome Woodlands" and one occurrence of "Pine Savannah." A "Granitic Flatrock Community" was also documented on the district.

- Canebrake restoration work was conducted on the Enoree and the Andrew Pickens Ranger Districts. On the Enoree, 660 acres of non-native invasive plants were controlled to improve canebrake habitat. In addition, 8,500 sprigs of river cane were planted.

- Activities to increase oak types on the Long Cane and Enoree Ranger Districts included 3,550 acres of commercial thinning and 742 acres released by herbicide applied with a directed foliar spray. Vegetation treatments usually retain existing desirable oaks and other native hardwoods on timber sale harvest units.

- The objective of restoring shortleaf pine communities in the piedmont is unlikely to be achieved during the planning period because few areas with adequate soil conditions are being found. To stay relatively free from littleleaf disease, shortleaf has to be planted on well-drained moderately-eroded soils. Both piedmont districts have strived to restore shortleaf where suitable conditions exist.

- A decision is in place to add large wood to Howard Creek (a trout stream on the Andrew Pickens Ranger District).

- Habitat improvement activities and/or monitoring were done for the following species:

  Federally Listed Species

  Smooth Coneflower (*Echinacea laevigata*) – Endangered (USFWS)

  Monitoring and vegetation management (hand pruning and/or chainsaw felling) on the Andrew Pickens district was conducted during FY 2014-2016 for the 2014, 2015 and 2016 growing seasons. Overall trends indicate an increase in most populations. Manual vegetation removal, even on sites that are burned, is very important to continued recovery, and, it is a necessity on sites that are not burned. Prescribed fires were conducted in the Rich Mountain and Longnose Burn units in FY 2015. Observations suggest that plants would benefit from increases in fire frequency and possibly from occasional hotter fires or occasional growing season fires.

  Small Whorled Pogonia (*Isotria medeoloides)* – Threatened (USFWS)

  All five historically or currently known occurrences of this species were monitored on the Andrew Pickens district in the spring of 2016. Plants were found at only one occurrence along King Creek. Thirty seven plants, 24 of which were flowering, were found at this site. Competing woody vegetation was removed in and around the site.

Miccosukee Gooseberry (*Ribes echinellum*) – Threatened (USFWS)

On the Long Cane, 17 colonies of Miccosukee Gooseberry were monitored in FY 2015. Compared to 2011/2012 measurements, there was a very slight increase in total number of plants and a 20% increase in number of clumps counted. Longer-term trends suggest a decrease over time.

During 2015, the Long Cane district partnered with USDA APHIS (Animal and Plant Health Inspection Service) to monitor feral hog activity in compartment 314 (Florida Gooseberry and Georgia Aster habitat). A total of 159 hogs were removed from these areas.

Georgia Aster (*Symphyotrichum georgianum*) – Sensitive/Candidate Species (USFWS)

Monitoring for Georgia aster, a candidate for federal listing, occurred on the Piedmont districts of the Sumter in 2015. On the Long Cane, 2012 out-plantings of Georgia aster (C 352 and 358) were monitored. Most plantings have survived with some increasing and others decreasing. During 2015, the Long Cane district partnered with USDA APHIS (Animal and Plant Health Inspection Service) to monitor feral hog activity in compartment 314 (Florida Gooseberry and Georgia Aster habitat

On the Enoree, monitoring has been completed and a new population of Georgia aster has been documented in compartment 52. The Georgia aster population located next to Bethesda church has been masticated and planted with natives.

Carolina Heelsplitter (*Lasmigona decorata*) and Brook Floater *(Alasmidonta varicosa)*

Two freshwater muscle surveys were conducted on the Long Cane in 2015 by the Catena group. They found the federally endangered Carolina heelsplitter and the sensitive species, brook floater (petitioned for federal listing) in Beaverdam Creek but not in Cuffytown Creek or Little River.

Sensitive Plants - (Forest Service species list)

Piedmont aster (*Eurybia mirabilis*) was monitored and additional patches of plants were documented in the Lick Fork Lake area of the Long Cane district. The total number of flowering stems was 195 with 137 of these from the newly found patches.

Nine occurrences of Southern Adder's tongue (*Ophioglossum vulgatum)* and two occurrences of James' sedge *(Carex jamesii)* were documented on the Enoree district within the Hills Creek Watershed.

Four active Bald Eagle (*Haliaeetus leucocephalus)* nests were monitored on the Enoree district in 2015.

Bachman's Sparrow *(Peucaea aestivalis)* was detected during bird point surveys on the Long Cane district in the RENEW woodland /Lick Fork Lake area.

Game Species and Wildlife Management Areas (WMAs)

- Statewide, the 2014-2015 Northern bobwhite quail survey shows that hunters flushed an average of 0.65 coveys per hour, a slight increase from the 2013-2014 season (0.48 coveys per hour). From 1988 to present, there has been a steady decline in coveys flushed per hour across the state.

- Breeding Bird Survey data from 1966-2012 indicate that the Northern bobwhite quail population in South Carolina has declined 6.4% annually (Sauer et al. 2014). Despite the state-wide downward population trend, bobwhite quail numbers appear to be stable or increasing on portions of the Enoree and Long Cane Ranger Districts, particularly in areas that are managed as fire-dependent woodlands (e.g., the Indian Creek Project on the Enoree Ranger District and the RENEW Project on the Long Cane District).

- SCDNR white-tailed deer estimates indicate that a total of 111,035 bucks and 83,995 does were harvested for a statewide total of 195,030 deer during the 2015 season. Although the buck harvest was up slightly from 2014, the overall harvest represents a four percent decrease from 2014 totals (202,952).

- During the 2015 spring turkey season, SCDNR estimates that a total of 12,741 adult gobblers and 2,496 jakes were harvested for a statewide total of 15,237 turkeys. This figure represents a six percent decrease in harvest from 2014 (16,248).

- SCDNR turkey brood surveys indicate that statewide turkey recruitment decreased slightly in 2015. The recruitment ratio is a measure of young entering the population based on the number of hens in the population. The average brood size of 3.6 poults in 2015 remained good, but the total recruitment ratio of 1.5 was low. This low figure was driven by a high percentage of hens (59%) that had no poults at all by late summer. The state-wide recruitment ratio has averaged 1.7 over the last five years.

- During the 2015 black bear season, 92 bears were harvested (Mountain harvest only), an increase from the 63 bears harvested during 2014. The 2015 harvest represents the second greatest harvest on record dating back to 1970.

- In South Carolina, there are two resident populations of black bears, one in the mountains and upper piedmont and one in the coastal plain. Bear populations are increasing and their range is expanding in South Carolina. Based on a 2003 bear population study, SCDNR estimates the upstate bear population to be over 1,000 bears.

- Funds generated from the sale of wildlife management area (WMA) permits enable the South Carolina Department of Natural Resources to lease approximately 1.1 million acres of land for wildlife conservation and management. With nearly 300,000 acres enrolled in the WMA program, the US Forest Service is the largest landowner in the program. In 2015, there were 44,394 WMA permits sold. The number of WMA permits sold in 2014 was 58,227.

- Population monitoring and water chemistry were assessed in ponds in 2015. Habitat improvement with the addition of trees and brush occurred in 147 acres in district ponds and Strom Thurmond Reservoir on the Long Cane Ranger District in 2015.

Forest Fuels, Prescribed Burning

- Hazardous fuels treatments conducted on the Sumter National Forest amounted to 27,116 acres during FY 2015. The use of prescribed fire was significantly reduced from the previous fiscal year due to an increase in precipitation during the burning season. FY 2015 accomplishments decreased by 13,481 acres as compared to FY 2014.

- A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human intervention. Fire Regime Condition Classes (FRCC) are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the natural or historical fire regime typical of the Sumter National Forest and the geographic and ecological zones that it encompasses. It is desirable to have as many acres in the low to moderate categories as possible. Periodic treatments are needed to keep hazardous fuels at manageable levels. Maintenance of low to moderate fuel conditions is mostly done through periodic use of prescribed fire. In 2015, FRCC 1, FRCC 2 and FRCC 3 were 82,066 acres, 112,017 acres and 163,102 acres, respectively for the Sumter National Forest.

- Returning and maintaining fire in fire-adapted communities is a critical component of maintaining a healthy forest. Habitats on the Sumter vary from two to three-year fire return intervals. Two-year fire return interval habitats consists of the Long Cane District's Lick Fork Lake woodland area and the Enoree District's Indian Creek woodland area.

- Three-year return intervals are desired to maintain the fire adapted pine and pine-hardwood habitats throughout the Sumter.

Air Quality

- Particles in the air less than 2.5 micrometers in diameter (PM2.5) pose the greatest health risks to people, reduces visibility and causes the air to appear hazy when levels are elevated.

- Ozone is a pollutant formed by emissions of nitrogen oxides and volatile organic compounds in the presence of sunlight. Nitrogen oxides (NOx) are released when any fuel is combusted at very high temperatures. When ozone is formed, it causes human health concerns as well as negative impacts to vegetation.

- All air quality monitoring sites near the Sumter National Forest show that ozone and fine particulate matter concentrations (PM2.5) meet National Ambient Air Quality standards. The Clean Air Act, which was last amended in 1990, requires the Environmental Protection Agency to set standards (40 CFR part 50) for pollutants considered harmful to public health and the environment.

- Local and regional fine particulate matter concentrations do not appear to be correlated with PM2.5 emissions from prescribed fires on the Sumter National Forest.

- Acidic deposition of sulfates and nitrogen compounds from anthropogenic sources can negatively impact sensitive ecosystems. Trends in sulfate and total nitrogen deposition for Ellicott Rock Wilderness have decline since 1990.

Timber Harvest, Forest Health and Restoration

- Approximately, 36,422 acres of commercial thinning have been accomplished on the Sumter National Forest (mostly on the Enoree and Long Cane districts) since the plan was signed in 2004. Approximately 3,550 acres of thinning were accomplished in FY 2015.

- Emphasis on the Andrew Pickens district has been on removal of non-native loblolly pine and restoring native species. Almost 1,790 acres have been treated to date. The most recent restoration sale was the Seven Roads Timber Sale (307 acres/ 6,907 CCF) sold in FY 2015. The Forest Plan has an objective (8.01) to restore 2,000 to 6,000 acres of native communities. That objective will be met at the minimum level in the next year or so. Plans are to treat all remaining stands stocked with loblolly pine over the next five years.

- All management prescriptions across the Sumter National Forest have an abundance of middle and late-aged forests in comparison to desired conditions in the forest plan. Early successional forests are still quite limiting on all three districts.

- In FY 2015, 8.9 million cubic feet (MMCF) of wood volume was sold on the Sumter National Forest.

Non-native Invasive Plant and Animal (NNIS) Treatments

- In FY 2015, 1,097 acres were treated with herbicide to control invasive plants on the Long Cane (RENEW Roadsides), 93 acres on the Russell/Ridley fields project on the Andrew Pickens and over 1,000 acres on the Enoree district.

- Feral hogs were trapped on 5,606 acres of the Long Cane and 618 acres of the Andrew Pickens. One hundred fifty-nine hogs were trapped on the Long Cane and five were trapped on the Andrew Pickens.

- NNIS on the forest continue to increase and threaten forest health, biodiversity and ecosystem function. While current treatment levels in some areas of the Sumter have increased from FY 2014 levels, they are not nearly enough to offset NNIS infestation rates.

Best Management Practices (BMPs) Monitoring and Evaluation

- In 2015, national BMP monitoring protocols were conducted on the Sumter for timber sale units, herbicide treatment areas and prescribed fire units.

- A total of three timber sales were reviewed across the forest in 2015. There was little, if any, timber sale activity that affected riparian areas. In the past, there were some issues with sale layout. Training and layout inspection are resolving most of these issues prior to harvesting and sale completion.

- Approximately one mile of fireline was reviewed in FY 2015. It was noted that some firelines are not being rehabilitated appropriately. However, no significant issues were found and BMPs were met. Maintenance of firelines will be needed in the future to reduce entrenchment of the fireline from repeated use. Due to dry conditions, small areas of prescribed burns had burned too hot, consuming organics, exposing soils and causing some local mortality. We continue to address these issues as we find them and mitigate as needed.

Soil and Water Improvements

- Since 2012, the Sumter National Forest has been restoring riparian and isolated upland wetland areas that were converted to agriculture over 100 years ago and then abandoned prior to inclusion into the national forest system. Decades of impacts to soil and water have been reversed and the rapid response of vegetation and return of native wildlife species has been remarkable.

- Several wetland restoration projects were implemented during 2015 on the Enoree and Long Cane Ranger Districts. Projects included the plugging of historic drainage ditches to restore wetland hydrology and the creation of ephemeral wetlands on upland sites.

- As a result, restored wetlands are providing habitat to waterfowl, the federally endangered wood stork and tri-colored bat, along with native amphibian and reptile species not seen in the areas since they were drained.

- To date, there has been over two miles of ditches obliterated and over 100 wetland pools restored that range from 0.1 to 20 acres. Wetlands have been returned in four counties within the Broad River, Enoree River, Tyger River, Turkey Creek, and Stevens Creek watersheds. The restoration work has restored or led to vegetation recovery and benefited wildlife well beyond the restored wetlands.

- In 2015, a total of 127 acres were treated to improve soil and water conditions. This included two acres of continuing-treatment stabilization, three acres of gully heads, 20 acres of wetland restoration through ditch obliteration and two acres of unauthorized OHV trail obliteration and stabilization. Most of the soil and water improvement work continues to be on the Enoree district, in part due to the severe erosion, gullying and associated loss of productivity, stream stability and water quality issues from past land practices.

- The number of acres of soil and water improvements under Objective 1.01 were slightly below the 150-acre annual average needed to meet plan direction. The Knutson-Vandenberg (CWKV) funds have increased in importance as appropriated funding in Soil and Water Resource Management (NFVW) has declined. As far as the ten-year planning level, we are under the amounts needed to achieve the 1,500 acres over the decade. However, recent proposals in the area of compensatory mitigation have the potential to meet and exceed these objectives.

- Funds from 2014 were used to develop an aerial fertilization contract, to purchase fertilizer, and to pay for contractor flight time. Approximately 132 acres of soil improvement through aerial fertilization was implemented in the spring of 2015. Additional funds were used to complete 100 more acres of fertilization. This amount is lower than the annual treatment amount of soil productivity improvements needed in the forest plan, but expectations of past and expected future work should keep us on track to meet the planned level of 8,000 acres over a decade.

- We have identified a substantial backlog of low-site lands; therefore, we will need to continue to obtain funding. Most of these needs are on the Enoree district, with some needs on the Long Cane district; therefore. At this time, fertilization remains the reliable method to return nutrients to severely eroded or nutrient depleted sites.

Recreation

- While the human population is increasing, the National Visitor Use Monitoring Survey conducted every five years on the Forest (NVUM) indicated a downward trend in recreation visitation to the national forests. Total site visits for the forests are down over 32% from 2008. The only increase is wilderness visits, up 48% from 2008. The total estimated site visits in 2013 for the Francis Marion and Sumter National Forests is 927,000. Of the total use, there were 250,000 day use site visits, 27,000 overnight site visits, 629,000 general forest site visits, and 21,000 designated wilderness site visits. The total estimated national forest visits were 771,000.

- Demographics of National Forest visitors indicate males account for 80 percent of the visits to the forest and the recreation market is mostly local. About three-quarters of visits are from people who live within 50 miles. Hunting (20%) and fishing (10%) are among the key primary activities for this forest. About 95% of visits indicate they are satisfied with their overall recreation experience.

- Localized impacts to riparian areas from recreation activities have been observed through field observation in FY 2015. Most of these were associated with unauthorized trails or uses.

- Motorized trail maintenance continues to be a high priority for the recreation program on the Forests. Funding comes from appropriated, recreation fee, and grant dollars (the latter is used almost exclusively for maintaining/reconstructing OHV trails to increase financial and environmental sustainability).

Chattooga Wild and Scenic River Boating Results

Summary of Findings - Results of 2015 Boating Season on Lower Chattooga River

- On Section III of the Chattooga River, the 175-person indicator for weekends and the 125-weekday indicator were not exceeded. On Section IV, the indicators are 160 persons on weekends and holidays and 75 persons on weekdays. During the 2015 calendar year, the weekends and holidays were exceeded one time and the weekday indicators were not exceeded. This does not cross the threshold for additional management actions.

Summary of Findings - Results of 2014-2015 Boating Season on Upper Segment of Chattooga River

- 60% of all boaters started their trips at Bull Pen Bridge, the other 40% started at Burrells Ford.

- The take-out used most often was Burrells Ford, with about 60% of all use and the other 40% of boaters ended their trips at Bull Pen Bridge (North Carolina).

- The total number of boaters was 32.

Heritage Resources

- Forty seven sites were reviewed. Two sites were damage by forest users.

- Four Priority Heritage Assets including the Badwell Cemetery (38MC360), Rose Cottage (38UN182), the Chattooga Town Site (38OC18) and the Russell House Site (38OC106) had condition assessments completed. Several cemeteries were photographed and records and photos posted on the *Find A Grave* website.

- Vandals and artifact collectors continue to use metal detectors to search historic sites and remove artifacts. Soapstone cobbles and possible pieces of worked soapstone have been displaced and possibly removed from prehistoric soapstone quarries on the Andrew Pickens Ranger District. Unauthorized use of woods roads, ATV, horseback riding and bike trails are causing erosion and disturbance on sites. Protection boundaries were repainted on several unevaluated archeological sites. Eight fire lookout towers are historic sites in need of repair, restoration and documentation. Buildings at the Russell House Site (38OC106) continue to deteriorate.

- Several sites are being damaged by water erosion along the shoreline of the Strom Thurmond Lake on the Long Cane Ranger District. South Carolina Electric and Gas Company submitted annual monitoring reports on significant archeological sites on the shorelines of the Stevens Creek and Neal Shoals Hydroelectric Projects impoundments. There was no active erosion reported.

Miscellaneous

- No new system roads were constructed, 13 miles were reconstructed and about ½ mile were decommissioned.

- The total system road mileage held steady at 1,085 miles.
- FY 2015 payments to the counties within the Sumter National Forest totaled $1,307,990.68.

Chapter 2 Monitoring Results and Findings

Issue 1. Ecosystem Condition, Health and Sustainability

Sub-Issue 1.1 – Biological Diversity

MQ 1: Are rare ecological communities being protected, maintained, and restored?

Information

This monitoring question is responsive to goal 12, objectives 12.01 and 12.02 and standards FW-30, FW-31 and FW-32.

Objective 12.01: Restore 500 to 2,500 acres of Table Mountain pine forest over the 10-year planning period.

Objective 12.02: Restore 1 percent to 5 percent of the riparian corridor on slopes less than 8 percent in the canebrake community over the 10-year planning period in the Piedmont.

The monitoring elements are defined as follows:

1. Baseline acreage, condition, and distribution of rare communities on the Forest.
2. Rare communities restored. Specifically, Table Mountain pine dominated communities and canebrakes.

Results

1. No new rare communities were documented on the Andrew Pickens or the Long Cane in FY2015. In 2015, Elliott Environmental Consulting (EEC) reported on their survey of the "Middle Enoree Watershed" area. Three rare communities were identified within the Hills Creek Watershed area: two occurrences of "Dome Woodlands" and one occurrence of "Pine Savannah." Also on the Enoree, a "Granitic Flatrock Community" was documented in FY16. The digital rare community layer for the Sumter is constantly being updated with new information. Currently, over 150 occurrences for rare communities are documented with about half occurring on the Andrew Pickens.

2. Canebrake restoration work was conducted on the Enoree and the Andrew Pickens ranger districts. On the Enoree, 660 acres of non-native invasive plants were controlled to improve canebrake habitat. In addition, 8,500 sprigs of river cane were planted and later monitored. Native cane restoration efforts are also underway along the Chattooga Wild and Scenic River. This ongoing project, previously initiated in conjunction with the Chattooga Conservancy, continued in 2015 with additional transplanting of river cane rhizomes and removal of competing vegetation.

   Non-native invasive species (NNIS) were treated/controlled on 88 acres (Marshfield contractor) and five acres (David White contractor) in and adjacent to Russell/Ridley Fields on the Andrew Pickens district. In this same area, 24 acres were monitored for effectiveness of FY2014

treatments. Restoration/maintenance activities for Table Mountain Pine included stands within the Boatwright prescribed burn unit that was burned during FY2016.

Findings

1. New rare communities were documented on the Enoree since the FY2014 report.
2. The condition of Table Mountain Pine on the Andrew Pickens and native canebrake communities on the Enoree and Andrew Pickens District were improved.

MQ 2: Are landscape-level and stand-level composition and structure of major forest communities within desirable ranges of variability?

This monitoring question is responsive to goal 8, objectives 8.01, 8.02, 8.03, 8.04, 8.05 and 8.06.

Objective 8.01: Restore 2,000 - 6,000 acres of native communities on sites occupied by loblolly pine on the Andrew Pickens during the ten-year planning period.

Objective 8.02: Provide 8,000 - 11,000 acres of woodlands in the piedmont and 4,000 – 5,000 acres of woodlands in the mountains on dry-xeric sites in woodland, savanna, open grassland or shrubland conditions with fire-associated rare communities preferred over the 10-year planning period.

Objective 8.03: Create conditions to restore dry-mesic oak, oak-pine, and pine-oak forest communities on 20,000 acres currently in loblolly pine forest in the piedmont over the 10-year planning period.

Objective 8.04: Increase shortleaf pine and shortleaf pine/oak communities on 2,000 - 10,000 acres in the piedmont. This will be done on sites with low risk of littleleaf disease.

Objective 8.05: Increase structural diversity by creating canopy gaps in one to five percent of closed canopy mid and late-successional mesic deciduous forest (including mixed mesophytic and mesic oak forests). Gaps are defined as small openings (smaller than 2 acres in size) and are designed to release mast-producing species, particularly hard mast (e.g., oak, hickory, walnut) and soft mast bearing trees (e.g. cherry, black gum, persimmon) over the 10-year planning period.

Objective 8.06: Restore more diverse native communities on 1,000 - 2,000 acres currently occupied by white pine stands. Prioritize xeric to intermediate sites over the 10-year planning period.

The monitoring elements are defined as follows:

1. Restore native communities on sites occupied by loblolly pine forest on the Andrew Pickens.
2. Prefer rare communities on dry-xeric sites in the piedmont and mountains.
3. Create conditions to restore dry-mesic oak, oak-pine, and pine-oak communities on the piedmont.
4. Increase shortleaf pine and shortleaf pine/oak communities on the piedmont.
5. Increase structural diversity by creating gaps in 1 to 5 percent of closed canopy mid- and late-successional mesic deciduous forests.
6. Restore sites currently occupied by white pine stands to diverse native communities.

7. What are the trends in management indicator species (MIS) population indices in relationship to major forest community/conditions? Frequency of occurrence trends for hooded warbler, scarlet tanager, pine warbler, Acadian flycatcher and brown-headed nuthatch.

Results

1. **Objective 8.01.** Loblolly pine removal harvest has already taken place on 1,790 acres on the Andrew Pickens Ranger District. However, a number of stands no longer typed as loblolly pine still have a component of loblolly pine remaining. Loblolly pine also tends to regenerate from seed in place where removed by harvest. Information from the GIS database for this district is not reliable this year due to extensive updates and some data that is temporarily unavailable. The table below shows the acreage of loblolly pine removal harvests accomplished or planned to date. This acreage has increased by 406 acres from the previous report.

Table 1. Loblolly Pine Removal on the Andrew Pickens Ranger District

Timber Sale	EA/Decision	Acres
Village Creek	Village Creek	167
Hell Hole	Chauga Loblolly	90
Chauga 1	Chauga Loblolly	134
Mt Grove Church	Chauga Loblolly	34
Hell Stone Branch	Chauga Loblolly	126
Cedar Creek	Cedar Creek	106
Tamassee Knob	Ross Mt./Tamassee	38
Cherry Grove	Ross Mt./Tamassee	85
Fine Alley	Ross Mt./Tamassee	54
Compartment 26	Ross Mt./Tamassee	119
Garland Fields	Loblolly Pine Removal	186
Turkey Ridge	Loblolly Pine Removal	149
Cut/Leave FY14	Loblolly Pine Removal	502
Seven Roads	Loblolly Pine Removal	314
Cut/Leave FY14	Loblolly Pine Removal	92
	Total	**2,196**

Objective 8.02. The following table shows existing and planned woodland habitat areas. Though this acreage is significant, it is much less than the plan objective. It is unchanged from the previous report.

Table 2. Existing and Planned Woodlands

District	Area/project	Acres
Andrew Pickens	Garland Tract	360
Andrew Pickens	Cedar Creek Project	207
Andrew Pickens	Compartment 61	144
Andrew Pickens	Loblolly Pine Removal/Restoration	784
Enoree	Lower Enoree – Indian Creek Project	447
Enoree	Indian Creek Woodlands	840

District	Area/project	Acres
Long Cane	RENEW Project	964
Long Cane	Post Oak Savanna	130
	Total	**3,800**

2. **Objective 8.03**. Activities to increase oak types on the piedmont in FY 2015 included:

   - 3,550 acres of commercial thinning
   - 742 acres released by herbicide applied with a directed foliar spray

   Silvicultural prescriptions generally emphasize release of desirable oaks and hickories where possible. This is especially significant in regenerating stands. The commercial thinning, precommercial thinning, and herbicide release treatments above favor oak species for retention and discriminate against other species.

   Approximately 364 acres of the commercial thinning above were in management prescription 9G2 – Restoration of Upland Oak-Hickory and Mixed Pine-Oak Hickory Forests. Harvest and stand improvement activities depend upon where environmental assessments are completed and are not spread evenly across management prescriptions in any given year.

   Table 3 displays the result of a GIS query relative to the number of acres in pine types and oak types on the piedmont districts and in management prescription 9G2.

Table 3. Acres in Pine Oak Types on Piedmont Districts and in Management Prescription 9G2

Area or Mgt. Prescription	Loblolly and Virginia Pine	Oak Types
Piedmont Districts	207,835	60,092
9G2 Mgt. Prescription	30,079	10,625

3. **Objective 8.04.** The GIS database currently shows 3,017 acres of shortleaf pine on the piedmont. This is 109 acres less than reported in FY 2014.

4. **Objective 8.05.** No activities were implemented to create small canopy gaps in FY 2015.

5. **Objective 8.06**. Information on white pine acreage for the Andrew Pickens Ranger District is not reliable this year due to extensive updates and some data that is temporarily unavailable. The district has a project in the planning stages to meet this objective.

6. A Management Indicator Species (MIS) is a species who's presence in a certain location or at a given population level indicates a particular environmental condition. The MIS concept is to identify a few species that are representative of many other species and to evaluate management direction by the effects of management on MIS habitats. MIS population changes are believed to indicate effects of management activities on a number of other species. MIS can be used as a tool for identifying specialized habitats and creating habitat objectives, standards, and guidelines. Both population and habitat data are used to monitor MIS on National Forests. The *Revised Land*

and Resource Management Plan, Sumter National Forest (US Forest Service 2004) lists 13 species as MIS; 12 are avian species and one is a mammal.

Vegetation manipulation changes the diversity and abundance of wildlife species in a given area. Planning regulations define diversity as "the distribution and abundance of different plant and animal communities and species within [an] area…" (36 CFR 219.3[g]). In general, forested areas that are in various stages of development and include periodic openings support a wide diversity of species and habitats. Management activities that result in different types of habitats, including prescribed burning, thinning and herbicide use, tend to increase wildlife diversity. Impacts beneficial to wildlife are typically greater with a combination of management activities versus any of the treatments separately.

In 1996, the Forest Service's Southern Region adopted "The Southern National Forest's Migrant and Resident Land Bird Conservation Strategy" (Gaines and Morris 1996) to improve monitoring, research, and management programs affecting forest birds and their habitats. A Region-wide program of monitoring avian populations based on point-counts was initiated as part of this strategy.

Bird surveys, using point-count methodology following Hamel et al. (1996), are performed annually on the Sumter National Forest. Point-counts are used to collect presence/absence and relative abundance data of bird species, as well as habitat use data, such as information on major forest communities and management conditions. Using the results of the initial survey efforts, data were analyzed at the Forest level in Population Trends and Habitat Occurrence of Forest Birds on Southern National Forests, 1992-2004 (US Forest Service 2007). Table 4 lists the population trends of hooded warbler, scarlet tanager, pine warbler, Acadian flycatcher, and brown-headed nuthatch on all National Forests within the Southern Blue Ridge and Southern Piedmont physiographic areas and on the Francis Marion & Sumter National Forests (FMS) during 1992-2004. At present, analysis can only be conducted for the entire FMS. Refinements to the Region 8 Bird Database still need to be made in order to analyze avian trends at the District level.

Table 4. Population trends of hooded warbler, scarlet tanager, pine warbler, Acadian flycatcher, and brown-headed nuthatch by physiographic region and Forest, 1992-2004.

	Percent Annual Change		
	Physiographic Area[1]		Francis Marion & Sumter National Forests
Species	Southern Blue Ridge	Southern Piedmont	
Hooded Warbler	-1.5	-11.5	-0.6
Scarlet Tanager	0.1	3.7	-1.0
Pine Warbler	-1.4	-4.2	-0.2
Acadian Flycatcher	-1.3	2.2	-1.2
Brown-headed Nuthatch	-1.5	2.7	5.4

[1]The Andrew Pickens Ranger District is in the Southern Blue Ridge physiographic area and the Enoree and Long Cane Ranger Districts are in the Southern Piedmont physiographic area.

Findings

1. Steady progress is being made toward Objective 8.01. This objective should be met within the next year or two.

2. Objective 8.02 is unlikely to be fully achieved during the planning period at current funding and staffing levels given the number of woodland, grassland, savanna, and shrubland projects being planned.

3. Thinning piedmont loblolly pine stands will allow sunlight to reach the forest floor and should help stimulate advanced regeneration of oaks and hickories (Objective 8.03). Though few loblolly pine stands are being converted to oak types, the oak component is typically increasing in regenerated stands.

4. The objective of restoring shortleaf pine communities is unlikely to be achieved during the planning period because few areas with adequate soil conditions are being found. To stay relatively free from littleleaf disease, shortleaf pine needs good soil depth (approximately 8"+ topsoil) with well drained to moderately well-drained soils. Past erosion has generally left such soils in very few places. The areas found thus far tend to be very small, isolated parts of certain ridges or flats (Objective 8.04).

5. No projects were implemented to create canopy gaps (Objective 8.05).

6. No projects were implemented in white pine stands in FY 15. However, the project in early planning stages should meet this objective (Objective 8.06).

7. Declines in MIS populations in the Southern Blue Ridge and Southern Piedmont physiographic areas and on the FMS are likely correlated with long-term changes to habitat suitability and availability range-wide as well as on national forest land.

   Hooded warblers inhabit mesic deciduous forests and are used to help indicate the effectiveness of management providing dense understory and midstory structure within these forest communities. Dense understory and midstory habitat conditions usually occur in the absence of active forest management. As such, late successional mesic forests and riparian forests provide habitat for this species. Sites with active timber management and prescribed burning, such as woodland stands within the Indian Creek project on the Enoree Ranger District and the RENEW project on the Long Cane Ranger District, are less likely to provide habitat for hooded warbler than riparian areas and mature mesic forests.

   Scarlet tanager was selected as a MIS to help indicate management for maintaining oak forests. Oak and hardwood management, including the restoration of dry-mesic oak, oak-pine, and pine-oak forest communities, is needed to provide habitat for this species. The 9.G.2 management prescription (Restoration of Upland Oak-Hickory and Mixed Pine-Oak-Hickory Forests) is well suited to provide habitat for this species.

   Pine warbler and brown-headed nuthatch were selected as MIS to help judge the effectiveness of

management in pine and pine/oak habitats. Pine woodland management, shortleaf pine restoration, and the restoration of oak-pine and pine-oak forest communities benefits these species. The Woodland and Grassland/Savanna Habitat management prescription (8.B.2) is well suited to provide habitat for these MIS.

Acadian flycatchers inhabit riparian forests. All riparian areas on the Forest are protected by the Forest Plan's Riparian Corridor management prescription (11). All riparian corridors are managed to retain, restore, and/or enhance the inherent ecological processes and functions of the associated aquatic, riparian, and upland components within the corridor. While non-native invasive species treatments are conducted within riparian corridors, timber management is uncommon.

MQ 3: Are key successional stage habitats being provided?

Information

This monitoring question responds to goals 8 and 13; desired conditions for management prescriptions 7.E.2, 8.A.1, 8.B.2, 9.A.3, 9.G.2 and 10.B; and standard FW-33. The monitoring elements are defined as:

1. Trends in early, mid and late successional habitat by management prescription group.
2. The number of acres, conditions and distribution of existing old growth.
3. Trends in MIS population indices in relationship to major forest community/conditions to help indicate the effects of management on successional habitats. Frequency of occurrence trends for prairie warbler, Swainson's warbler, field sparrow and American woodcock.

Results

1. Trends in early, mid and late successional habitat by Management Prescription have changed little in the last several reports. Early successional habitat for management prescription 9G2 is within the lower end of the desired percentage. Early successional habitat in all other management prescriptions remain well below the desired percentage. See Table 3 for early, middle and late successional habitat by management prescription.

Table 5. Amount of Early, Middle and Late Successional Habitat by Management Prescription

Management Prescriptions	Total Forested Acres	Successional Stage	AP (Acres)	EN (Acres)	LC (Acres)	Desired Percentage	Actual Percentage
7E2	48,596 (Enoree and Long Cane only	Early	Unavailable	1,117	523	4-10	3
		Mid to Late	Unavailable	23,210	22,360	50+	94
		Late	Unavailable	11,520	12,627	10+	50
8A1	36,678	Early	Unavailable	-	-	4-10	Unavailable
		Mid to Late	Unavailable	-	-	50+	Unavailable
		Late	Unavailable	-	-	10+	Unavailable
8B2	7,758	Early		8	375	10-17	5
9A3	11,221	Early		42		4-10	<1
		Mid to Late		11,132		50+	99

Management Prescriptions	Total Forested Acres	Successional Stage	AP (Acres)	EN (Acres)	LC (Acres)	Desired Percentage	Actual Percentage
		Late		4,910		10+	44
9G2	41,737	Early		662	1525	4-10	5
		Mid to Late		22,528	15513	50+	91
		Late		10,816	8326	10+	46
10B	134,982	Early		5061	3655	10-17	6
		Mid to Late		66800	54205	20+	90
		Late		36484	29904	10+	49

2. Information relative to this question was last addressed in the 2013 Sumter Monitoring Report. Table 6 was revised and acreage by physiographic type is now included.

Table 6. Old Growth Acres by Forest Community Type and Physiographic Area

	SOUTHERN BLUE RIDGE	SOUTHERN PIEDMONT	TOTAL
COMMUNITY TYPE	**ACRES**	**ACRES**	**ACRES**
Conifer-Northern Hardwood Forest	662	0	662
Dry-Mesic Oak Forest	3,462	102	3,564
Dry-Xeric Oak Forest, Woodland, Savannah	255	24	279
Dry, Dry-Mesic Oak-Pine Forest	5,928	182	6,110
Eastern Riverfront	0	947	947
Mixed Mesophytic Forest	1,063	0	1,063
River Floodplain Forest	254	6,432	6,686
Xeric Pine and Pine/Oak Forest, Woodland	2,298	0	2,298
TOTAL	13,923	7,686	21,609

3. See MIS write-up in Monitoring Question 2, Element 7. Table 7 lists the population trends of prairie warbler, Swainson's warbler, and field sparrow on all National Forests within the Southern Blue Ridge and Southern Piedmont physiographic areas and on the Francis Marion & Sumter National Forests during 1992-2004. At present, analysis can only be conducted for the entire Francis Marion & Sumter National Forests. Refinements to the Region 8 Bird Database still need to be made in order to analyze avian trends at the District level.

Table 7. Population trends of prairie warbler, Swainson's warbler, field sparrow, and American woodcock by physiographic region and Forest, 1992-2004.

	Percent Annual Change		
	Physiographic Area[1]		Francis Marion & Sumter National Forests
Species	Southern Blue Ridge	Southern Piedmont	
Prairie Warbler	-7.5	-8.9	-8.1
Swainson's Warbler	-4.3	No data	8.2
Field Sparrow	-4.5	-16.6	-19.1

[1]The Andrew Pickens Ranger District is in the Southern Blue Ridge physiographic area and the Enoree and Long Cane Ranger Districts are in the Southern Piedmont physiographic area.

Findings

1. Table 5 indicates that all management prescriptions have an abundance of mid-late successional stage acreage, and late successional stage acreage in comparison with desired conditions. In contrast, all management prescriptions are below to far below the desired condition for early successional stage forest. Many projects are in progress to address this need, and several projects have signed decisions and are waiting for implementation. However, budgets and personnel are also a limiting factor in achieving the desired conditions. NEPA process compliance and costs are also a factor.

2. The number of stands in the 100-year (+) age class has increased.

3. The presence and trends in frequency of occurrence of prairie warbler, Swainson's warbler, and field sparrow are used to help indicate the effectiveness of management in achieving early successional habitat. Early successional habitat, particularly woodland/savanna habitat, continues to be in short supply across the Sumter National Forest. The best examples of on-going management of these habitats are the Garland Tract on the Andrew Pickens Ranger District, the Indian Creek project on the Enoree Ranger District, and the RENEW project on the Long Cane Ranger District. Timber stand regeneration also provides habitat for these disturbance-dependent species; however, the effects are usually short-term (< 10 years). Prescribed burning is essential in maintaining woodland/savanna habitat. The positive population trend of Swainson's warbler is likely because this species' habitat (canebrakes and early successional riparian habitats in the piedmont and rhododendron thickets in the mountains) is largely intact.

MQ 4: How well are key terrestrial habitat attributes being provided?

Information

This monitoring question is responsive to goals 3, 4, 8 and 9, Objective 9.01 and standard FW-18. Objective 9.01 is to construct or restore wetlands on 600 acres in the riparian corridor on the piedmont over the 10-year planning period.
The monitoring elements are defined as follows:

1. Acres, conditions, and distribution of wetland habitats and ephemeral wetlands.

2. Trends in MIS population indices in relationship to major forest communities/conditions. Frequency of occurrence trends in pileated woodpecker.

3. Trends in hard mast production capability.

Results

1. Wetlands are considered one of the most endangered habitats in South Carolina and throughout the United States. It is estimated that 27 percent of the original wetlands in South Carolina have been lost (Dahl 1990), although this is likely an underestimate. Many were altered or destroyed when land was converted to cropland or pasture. As a result of these historic activities, many of

the wetlands that once existed are now gone. Despite this, wetland habitats are not uncommon on the Sumter National Forest. Many occur as seasonally wet floodplains, beaver dam impoundments, and ephemeral wet meadows and pools. Forest Service Geographic Information System (GIS) layers and aerial photography show the distribution of wetlands (mostly riparian corridors and permanently flooded habitats) across the Forest; however, the Sumter National Forest does not have an accurate record, including acres, conditions, and distribution, of all naturally occurring wetlands.

In addition to naturally occurring wetlands, there are four areas that are managed on the Enoree Ranger District as waterfowl management areas: Dunaway (8 ac), Duncan Creek (12 ac), Enoree (26 ac), and Tyger River (91 ac). All areas were flooded during 2015, except for Duncan Creek which was being repaired.

Several wetland restoration projects were implemented during 2015 on the Enoree and Long Cane Ranger Districts. Projects included the plugging of historic drainage ditches to restore wetland hydrology and the creation of ephemeral wetlands on upland sites.

2. See MIS write-up in Monitoring Question 2, Element 7. Pileated woodpeckers have experienced a 2.8% annual increase in the Southern Blue Ridge physiographic area during 1992-2004. On the other hand, they have experienced a 7.1% annual decline and a 1.2% annual decline in the Southern Piedmont physiographic area and Francis Marion & Sumter National Forests, respectively. At present, analysis can only be conducted for the entire Francis Marion & Sumter National Forests. Refinements to the Region 8 Bird Database still need to be made in order to analyze avian trends at the District level.

3. The South Carolina Department of Natural Resources conducts hard mast surveys annually between August 25 and September 15. Survey routes are a minimum of 10 miles long with stops at approximately one-mile intervals. Routes are located within black bear habitat and are established so that altitudes and aspects vary as much as possible. If available, two to four trees of each grouping are surveyed at each stop. Groupings include white oaks, red oaks, chestnut oak, and hickory. Trees are surveyed that range in size form 12-24 inches dbh. One survey route is located on national forest land on the Andrew Pickens Ranger District. See Table 8 for a comparison of 2012-2015 results.

Table 8. Hard mast crop quality, South Carolina Mountains, 2012 to 2015. (Source: South Carolina Department of Natural Resources).

Hard Mast Species	Crop Quality			
	2012	2013	2014	2015
White Oak	Poor	Poor	Good	Poor
Red Oak	Fair	Poor	Good	Poor
Chestnut Oak	Poor	Poor	Fair	Poor
Hickory	Poor	Poor	Good	Poor

Findings

1. Wetland restoration projects need to be incorporated into vegetation management projects and other activities on the Forest. Several existing restoration projects have been identified on the Enoree and Long Cane Ranger Districts; NEPA planning has been completed on several of these. Projects will be implemented in the future as funding becomes available.

2. Pileated woodpeckers are a primary indicator of large snag habitat. They are also a good indicator of older forests that have mixtures of live hollow trees and dead trees. The positive population trend of this species in the Southern Blue Ridge physiographic area suggests an adequate supply of habitat for this species. This may be a result of the lack of wide-scale timber management within this area. Apparent population declines in the Southern Piedmont physiographic area and on the Francis Marion & Sumter National Forests may be related to the amount of loblolly pine regeneration that occurs in the Piedmont and on the Sumter National Forest. According to Forest Plan standard FW-18, "Standing snags, bird peck trees, and living den trees will not be cut or bulldozed during vegetation management treatments unrelated to timber regeneration treatments, unless necessary to provide for public or employee safety." Adherence to this standard on national forest land should result in an increase in the availability of large snag habitat.

3. Hard mast production is extremely variable and unpredictable. Many climatic factors influence acorn and hickory nut development from initiation of flowers to acorn maturity. All silvicultural prescriptions, whether in the 9.G.2 management prescription (Restoration of Upland Oak-Hickory and Mixed Pine-Oak-Hickory Forests) or not, emphasize release of desirable oak and hickory species where possible.

MQ 5: What is the status and trend in aquatic habitat conditions in relationship to aquatic communities?

Information

This monitoring question is responsive to goals 3 and 4 and Objective 11-OBJ-2. Objective 11-OBJ-2 is to restore and enhance stream habitat and aquatic communities on 50 miles of streams. This includes woody debris, stream bank stabilization, brook trout restoration and in-stream habitat improvement. The monitoring elements are defined as follows:

1. Trends in the composition and abundance of macroinvertebrate communities.
2. Trends in the composition and abundance of stream fish communities.
3. Trends in aquatic habitat conditions. Perennial and intermittent streams are managed in a manner that provides a source for large wood to channels.
4. Improve, rehabilitate, or restore aquatic habitat.

Results

1. Refer to the 2013 Sumter Monitoring Report for information on the most recent macroinvertebrate surveys. Macroinvertebrate surveys are planned in FY 2016.

2. No aquatic surveys were conducted on the piedmont Districts in 2014. However, surveys are planned beginning in FY 2016. Trout streams are monitored annually on the Andrew Pickens Ranger District and results are presented in Tables 9 and 10. Three fish species found on the Andrew Pickens Ranger District (white sucker, rainbow trout and brown trout) are considered non-indigenous (Warren, et al. 2000). The remaining species captured are native to the watersheds.

Table 9. Fish Surveys Sites Sampled on the Andrew Pickens Ranger District and Species Captured

Stream	Site #	Watershed	# Species Captured					
			2010	2011	2012	2013	2014	2015
Chattooga River								
Big Bend Site		Chattooga River			13			
Ellicott Rock Site		Chattooga River		15				
Spoonauger Site			16				16	17
Pigpen Branch	1	Chattooga River					2	2
	2						3	3
Tamassee Creek	1	Chattooga River						
	2							
	3		1					
Crane Creek	1	Cheohee Creek	1	1	1		1	1
Left Trib Site	2		1	1	1	1	1	1
Jacks Creek	1	Chattooga River			1		1	1
Howard Creek		Whitewater River		5				
Lower			5					
Upper			2					
Limber Pole Creek		Whitewater River		1				
Moody Creek		Cheohee Creek				1	1	1
	3		3					
King Creek	1	Chattooga River						
Lower			1	1	1		1	1
Middle			1	1	1		1	1
Upper			1	1	1	1	1	1
Indian Camp Branch	1	East Fork Chattooga River	2					
	2							
Ira Branch		Chattooga River	1					
Corbin Creek		Whitewater River		7				
Lower			3					
Upper			3					
Laurel Fork Creek		Whitewater River	5					
Coley Creek		Whitewater River		0				
Whetstone Creek		Chattooga River		8				
Swafford Creek				1				
Long Creek				4				
Toxaway Creek				9				
Rocky Fork Creek				5				

Table 10. Species Captured in Andrew Pickens Ranger District Streams

Species		2010	2011	2012	2013	2014	2015
Catostomidae							
Catostomus commersoni	White sucker	x	x	x		x	x
Hypentelium nigricans	Northern hogsucker		x				
Moxostoma rupiscartes	Striped jumprock	x	x	x		x	x
Centrarchidae							
Lepomis auritus	Redbreast sunfish	x	x	x		x	x
Lepomis macrochirus	Bluegill					x	x
Lepomis microlophus	Redear sunfish		x				
Micropterus coosae	Redeye bass		x				
Cottidae							
Cottus bairdi	Mottled sculpin	x	x	x		x	x
Cyprinidae							
Campostoma anomalum	Central stoneroller	x	x	x		x	x
Clinostomus funduloides	Rosyside dace	x	x			x	x
Hybopsis rubrifrons	Rosyface chub		x				
Luxilus coccogenis	Warpaint shiner	x	x	x		x	x
Nocomis leptocephalus	Bluehead chub	x	x	x		x	x
Notropis lutipinnis	Yellowfin shiner	x	x	x		x	x
Notropis spectrunculus	Mirror shiner	x	x	x		x	x
Rhinichthys cataractae	Longnose dace	x	x	x		x	x
Rhinichthys atratulus	Blacknose Dace	x	x			x	x
Semotilus atromaculatus	Creek chub		x			x	x
Ictaluridae							
Noturus insignis	Margined madtom		x				
Percidae							
Etheostoma hopkinsi	Christmas darter		x				
Etheostoma inscriptum	Turquoise darter	x	x	x		x	x
Salmonidae							
Oncorhynchus mykiss	Rainbow trout	x	x	x		x	x
Salmo trutta	Brown trout	x	x	x		x	x
Salvelinus fontinalis	Brook trout	x	x	x	x	x	x

3. Aquatic habitat surveys are planned in FY 2016 and FY 2017.

4. A decision is in place to add large wood to Howard Creek (a trout stream on the Andrew Pickens Ranger District). Habitat improvement work is being planned for FY 2016 for all Districts. This work will include but is not limited to installation of aquatic passable culverts and large wood to streams.

Findings

1. Refer to the FY 2013 Monitoring report for the most current information.

2. Surveys in 2014 indicated a high number of species. Rosyside dace is a good indicator of high quality small mountain streams.

3. Refer to the FY 2013 Monitoring Report.

4. No aquatic passable culverts were installed or large wood added to streams in FY 2015.

MQ 7: What are the status and trends of federally listed species and populations or habitats for species with viability concerns on the Sumter National Forest?

Information

This monitoring question is responsive to goals 4, 10 and 12, Objectives 10.01 and 10.02, and standards 9F-1 through 9F-8 and FW-25 through FW-28.

Objective 10.01: To maintain or restore at least eight self-sustaining populations for smooth coneflower and, if possible, four populations for small whorled pogonia on the Andrew Pickens, including the habitat to support them.

Objective 10.02: To maintain or restore at least eight self-sustaining populations for Georgia aster and one population for Florida gooseberry on the piedmont districts and the habitat to support them.

The monitoring element is defined as follows:

1. Trends in recovery of threatened and endangered species (TES), and status and distribution of some viability concern species that are not specifically identified under other elements. Species targeted under this element will be determined through periodic review of each species' status and conservation priority. Priorities will likely vary through the life of the forest plan, as new information is available.

Results

Smooth Coneflower (*Echinacea laevigata*)

Monitoring and vegetation management (hand pruning and/or chainsaw felling) on the Andrew Pickens district was conducted during FY 2014-2016 for the 2014, 2015 and 2016 growing seasons. Monitoring results for over 20 years are shown in Appendix 1. Monitoring was done in late fall or early winter for the 2014 and 2015 growing seasons and was done in the spring in 2016. Excluding one element occurrence record (EO) on state land and seven EOs where plants have not been found in over 20 years, contractor David White monitored 22 sites with plants present, five of which were monitored twice during the period. Overall trends indicate an increase in most populations. Manual vegetation removal, even on sites that are burned, is very important to continued recovery, and, it is a necessity on sites that are not burned. Prescribed fires were conducted in the Rich Mountain and Longnose Burn units in FY2015. Prescribed burning history is shown for the period 1994-2016 in Appendix 2. Observations suggest that plants would benefit from increases in fire frequency and possibly from occasional hotter fires or occasional growing season fires.

Small Whorled Pogonia (*Isotria medeoloides)*

All five historically or currently known occurrences of this species were monitored on the Andrew Pickens district by contractor David White in the spring of 2016. Plants were found at only one

occurrence along King Creek. Thirty seven plants, 24 of which were flowering, were found at this site. Competing woody vegetation was removed in and around the site. The last time this site was monitored was in 2010 when 13 plants were found. Plants were also seen there in 2013 but not counted.

Miccosukee Gooseberry (*Ribes echinellum*)

On the Long Cane, 17 colonies of Miccosukee Gooseberry (SC-3050) were monitored in FY 2015. Compared to 2011/2012 measurements, there was a very slight increase in total number of plants and a 20% increase in number of clumps counted. When colonies were examined for short-term trends for numbers of clumps and stems, little or no change occurred. Longer-term trends suggest a decrease over time. During 2015, the Long Cane district partnered with USDA APHIS (Animal and Plant Health Inspection Service) to monitor feral hog activity in compartment 314 (Florida Gooseberry and Georgia Aster habitat). A total of 159 hogs were removed from these areas.

Persistent Trillium (*Trillium persistens*)

There is no new information to report since the 2013 Monitoring report.

Georgia Aster

Monitoring for Georgia aster, a candidate for federal listing, occurred on the Piedmont districts of the Sumter in 2015. On the Long Cane, 2012 out-plantings of Georgia aster (C 352 and 358) were monitored. Most plantings have survived with some increasing and others decreasing. During 2015, the Long Cane district partnered with USDA APHIS (Animal and Plant Health Inspection Service) to monitor feral hog activity in compartment 314 (Florida Gooseberry and Georgia Aster habitat). A total of 159 hogs were removed from these areas.

On the Enoree, monitoring has been completed and a new population of Georgia aster has been documented in compartment 52. The Georgia aster population located next to Bethesda church has been masticated and planted with natives.

Sensitive Plants

On the Long Cane district, the Lick Fork Lake occurrence of Piedmont Aster (*Eurybia mirabilis*) was monitored and additional patches of plants were documented at other areas around the lake. The total number of flowering stems was 195 with 137 of these from the newly found patches. On the Enoree, within the Hill Creek Watershed, the EEC contractor documented nine occurrences of Southern Adder's Tongue (*Ophioglossum vulgatum)* and two occurrences of James' Sedge *(Carex jamesii).*

Carolina Heelsplitter and Brook Floater

Two freshwater muscle surveys were conducted on the Long Cane in 2015 by the Catena group. They found the Federally Endangered Carolina Heelsplitter and the sensitive species, Brook Floater (petitioned for federal listing) in Beaverdam Creek but not in Cuffytown Creek or Little River. Hogs, an NNIS species, were trapped and removed along Turkey Creek.

Webster's Salamander

There is no new information to report since the 2013 Monitoring report.

Bald Eagle

Four nests were monitored on the Enoree in 2015, and all were active, with one nest in compartment 16 moved 100 yards up the hill.

Bachman's Sparrow

In 2015, bird monitoring points were completed: 80 points on the Long Cane; 70 points on the Enoree; and, 50 points on the Andrew Pickens. Bachman's Sparrow was only detected on the Long Cane (RENEW Project /Lick Fork Lake area).

Findings

1. There are no additional findings from previous monitoring reports.

MQ 8: What are the trends for demand species and their use?

Information

This monitoring question is responsive to goals 8, 22 and 23 and Objective 23.01. Objective 23.01 is to maintain or improve 150 acres of ponds/lake habitat for recreational fisheries.

The monitoring elements are defined as follows:

1. Trends in harvest data for bobwhite quail, white-tailed deer, eastern wild turkey, and black bear; Wildlife Management Area (WMA) permits sales, turkey tags, and bear permits issued.

2. Trends in MIS population indices in relationship to major forest community/conditions. Frequency of occurrence trends in bobwhite quail, eastern wild turkey, and black bear.

3. Maintain or improve ponds/lakes for recreational fisheries.

Results

1. Every year since 1988 the South Carolina Department of Natural Resources (SCDNR) has conducted the Bobwhite Quail Hunter Survey. The purpose of the survey is to collect quantitative information on hunter success which aids biologists in tracking quail population trends. Statewide, the 2014-2015 survey shows that hunters flushed an average of 0.65 coveys per hour, a slight increase from the 2013-2014 season (0.48 coveys per hour). From 1988 to present, there has been a steady decline in coveys found per hour across the state.

During the 2015 deer season, SCDNR estimates that 111,035 bucks and 83,995 does were harvested for a statewide total of 195,030 deer. Although the buck harvest was up slightly from 2014 the overall harvest represents a 4 percent decrease in harvest from 2014 (202,952) and is 39 percent below the record harvest established in 2002 (319,902).

During the 2015 spring season SCDNR estimates that a total of 12,741 adult gobblers and 2,496 jakes were harvested for a statewide total of 15,237 turkeys. This figure represents a six percent decrease in harvest from 2014 (16,248) and a 40 percent decrease from the record harvest established in 2002 (25,487). The overall reduction in harvest seen since 2002 can likely be attributed to one primary factor, poor reproduction. Even though all individuals receiving a set of SCDNR-issued Turkey Transportation Tags were licensed to hunt turkeys, only 54 percent actually hunted turkeys. Based on this figure, approximately 44,205 hunters participated in the 2015 spring turkey season, a 3.8 percent decrease from 2014 (45,949).

During the 2015 black bear season, 92 bears were harvested (Mountain harvest only), an increase from the 63 bears harvested during 2014. There were a total of 1,325 permits sold in 2015 (Mountain permits only), an increase from 2015 (1,195). The 2015 harvest represents the second greatest harvest on record dating back to 1970.

Funds generated from the sale of wildlife management area (WMA) permits enable the South Carolina Department of Natural Resources to lease approximately 1.1 million acres of land for wildlife conservation and management. With nearly 300,000 acres enrolled in the WMA program, the US Forest Service is the largest landowner in the program. In 2015[1], there were 44,394 WMA permits sold (including 6,122 resident WMA permits, 1,553 non-resident WMA permits, 6,092 junior licenses, and 232 one-day permits). The number of WMA permits sold in 2014 is higher compared to the same license period last year (58,227).

2. Breeding Bird Survey data from 1966-2012 indicate that the bobwhite quail population in South Carolina has declined 6.4% annually (Sauer et al. 2014). Despite the state-wide downward population trend, bobwhite quail numbers appear to be stable or increasing on portions of the Enoree and Long Cane Ranger Districts, particularly in areas that are managed as fire-dependent woodlands (e.g., the Indian Creek Project on the Enoree Ranger District and the RENEW Project on the Long Cane District).

   SCDNR turkey brood surveys indicate that statewide turkey recruitment decreased slightly in 2015. The recruitment ratio is a measure of young entering the population based on the number of hens in the population. The average brood size of 3.6 poults in 2015 remained good, but the total recruitment ratio of 1.5 was low. This low figure was driven by a high percentage of hens (59%) that had no poults at all by late summer. The state-wide recruitment ratio has averaged 1.7 over the last five years.

   In South Carolina, there are two resident populations of black bears, one in the mountains and upper piedmont and one in the coastal plain. Bear populations are increasing and their range is

[1] The figures reported here are from June 3, 2015, through March 15, 2016, which fall within South Carolina Department of Natural Resource's (SCDNR's) fiscal year. At the time of reporting, data from March 16 through the end of the fiscal year were not available.

expanding in South Carolina. Based on a 2003 bear population study, SCDNR estimates the upstate bear population to be over 1,000 bears. In 2013-2014, SCDNR and the Sumter National Forest worked on a project that will be used to produce an updated population estimate of the mountain population of black bears. Population estimates are not yet available.

3. There are twelve recreational fishing ponds totaling 94 acres on the Sumter National Forest. Largemouth bass and bream are the primary fish in the ponds. A few of the ponds have been stocked with catfish. Population monitoring and water chemistry was assessed in ponds in 2015. Habitat improvement with the addition of trees and brush occurred in 70 acres of Strom Thurmond Reservoir on the Long Cane Ranger District and in 36 acres of five fishing ponds on the Enoree Ranger District.

Findings

1. Wildlife management activities, timber management, and prescribed burning on the Sumter National Forest continue to provide high-quality habitat for bobwhite quail, white-tailed deer, eastern wild turkey, and black bear. The enrollment of National Forest land in the state WMA program provides excellent hunting opportunities to resident and nonresident hunters. Continued management on the Forest is needed to sustain populations of consumptive wildlife species and the recreational opportunities.

2. Stable to upward trends for bobwhite quail on portions of the Enoree and Long Cane Ranger Districts likely reflects an emphasis on fire-maintained forests. Early successional habitat and woodlands are being developed, but still comprise a low percentage of national forest land. Continued emphasis needs to be placed on timber stand thinning, woodland management, regeneration harvests, and use of prescribed fire.

   Lack of reproductive success among eastern wild turkey is often associated with poor weather conditions (cold and wet) during nesting and brood-rearing season. During 2015, most of the state saw significant rainfall that began late in the spring and continued throughout most of the summer. As with quail, turkeys will benefit from projects on national forest land that increase early successional habitat, such as woodland management, thinnings and prescribed burning.

   Black bears typically require large expanses of forest dominated by a diversity of mast-producing hardwoods and shrubs intermixed with early successional vegetation such as blackberries and pokeberries. However, black bears are adaptable and as long as they can find adequate food sources and have suitable den sites they can be found in a variety of habitats. The upward trend of black bears in the mountains reflects the amount of suitable habitat that is available.

4. There are twelve recreational fishing ponds totaling 96 acres on the Sumter National Forest. The Forest also owns land adjacent to 1550 acres of Strom Thurmond Reservoir (Clark Hill Reservoir) that is managed by the U.S. Army Corp of Engineers that the Forest cooperates with managing fish habitat along with the South Carolina Department of Natural Resources and the Corp of Engineers. Largemouth bass and bream are the primary fish in the ponds. A few of the ponds have been stocked with catfish. Population monitoring and water chemistry was assessed

in ponds in 2015. Habitat improvement with the addition of trees and brush occurred in 147 acres in district ponds and Strom Thurmond Reservoir on the Long Cane Ranger District in 2015.

MQ 6: What are the status and trends of forest health threats on the Sumter?

Information

This monitoring question is responsive to goals 7, 15, 16, and 20; Objectives 15.01, 17.01 and 20.01; and standards 9F-8 and FW-27.

Objective 15.01: To control non-native invasive plants on, at a minimum, 1,000 acres by the end of the 10-year planning period, emphasizing management prescriptions where biodiversity or restoration is a primary objective.

Objective 17.01: To improve forest health on 10,000 – 50,000 acres of pine forests by reducing stand density.

Objective 20.01: To maintain FRCC 1 by restoring historic fire return intervals and reducing the risk of losing ecosystem components to wildlife on approximately 250,000 acres over the 10-year planning period.

The criteria for classifying lands in FRCC 1 are:

- Fire regimes are within or near the historical range.
- The risk of losing key ecosystem components is low.
- Fire frequencies have departed from historical frequencies by no more than one return interval.
- Vegetation attributes (species composition and structure) are intact and functioning within an historical range.

Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire use.

The monitoring elements are defined as follows:

1. Condition and trends of forest fuels and acres of hazardous fuels treated through wildland fire use, prescribed fire and mechanical treatments.
2. Maintain fire regime condition class 1 by restoring historic fire return intervals and reduce the risk of losing ecosystem components to wildfire.
3. Compliance with National Ambient Air Quality Standards (NAAQS) air particulate emissions from National Forest System lands [36 CFR 219.27(a) (12)].
4. Improve forest health in pine stands by reducing stand densities.
5. Treatments to eliminate or control NNIS. Emphasize treatments for PETS or to specific areas. Baseline acres infested with non-native plants by species.

Results

1. Hazardous Fuels treatments (Table 11) conducted on the Sumter NF amounted to 27,116 acres during FY 2015. Due to an increase in precipitation, both occurrence and amount, prescribed fire implementation was significantly reduced from the previous fiscal year. FY 2015 accomplishments decreased by 13,481 acres from FY 2014.

   Wildland fire preparedness funding and staffing (equipment, personnel, and leadership) was still below an efficient level for an optimal Moderate Complexity Fire Organization. Because of organizational shortages, the Forest is unable to adequately staff their fire engine fleet, provide 7-day coverage, staff for multi-fire days, and provide an ongoing prevention program.

   Shortages of firefighting resources are also common when wildfires and prescribed fire operations occur on the same day. Recommendations have been to continue requesting wildland fire preparedness funding and at the same time pursue alternative funding sources. Alternative funding sources could include developing partnerships with cooperators to help offset funding shortfalls and to maximize benefits from appropriated funds.

   The Forest Service previously received American Recovery and Reinvestment Act of 2009 (ARRA) funding which started with FY 2010 that allowed an agreement to be formed between The Nature Conservancy (TNC) and the Forest Service. This agreement continued through FY 2012 and expired in FY 2013. After expiration of the ARRA agreement, a Title II agreement was implemented and which has allowed the continued use of TNC prescribed fire burn module. The TNC module provides leadership, firefighters, and equipment to assist Forest Service burn crews in planning and implementing prescribed fire treatments on federal lands.

Table 11. Hazardous fuels treated on the Sumter (mechanical and prescribed)

Treatment (Prescribed Fire and Mechanical)	Andrew Pickens (Acres)	Enoree (Acres)	Long Cane (Acres)	Treatment Total Acres
Primary Hazardous Fuels Benefit	1,250	10,351	8,989	20,590
Difference FY15-FY14	(-4,135)	**1,662**	(-1,796)	(-4,269)
Secondary Hazardous Fuels Benefit (Wildlife, Timber, Etc.)	876	3,018	2,632	6,526
Difference FY15-FY14	(-142)	(-2089)	(-2,862)	(-9,205)
District Total Acres	2,126	13,369	11,621	27,116
Difference FY15-FY14	(-4,277)	(-4,539)	(-4,658)	(-13,474)

Bolded black indicates an increase from FY 14 accomplishments while red in parentheses show a decrease in accomplishments.

1. The three Fire Regime Condition Classes (FRCC) are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the *central tendency* of the natural (historical) fire regime (Hann and Bunnell 2001, Hardy et al. 2001, Schmidt et al. 2002) typical of the Sumter National Forest and the geographic and ecological zones that it encompasses. The *central tendency* is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern;

and other associated natural disturbances. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside.

It is difficult to measure Condition Class 1 (CC1) using GIS data. The Forest modeled CC1 in GIS by looking at fire intervals (burn history), mechanical treatments, and stand age for some forest types. In 2004, the Sumter CC1 was 35,627 acres, in 2010, the Sumter CC1 was 67,400 acres, and in 2015, the Sumter CC1 was 82,066 acres. The processes and technologies used to calculate change in FRCC is evolving. As data collection and dissemination occurs, these processes continue to refine FRCC acreage breakdowns throughout the forest. The following table displays FRCC on the Sumter. Figures 1-3 show the distribution of FRCC across each district.

Table 12. 2015 Fire Regime Condition Class for the Sumter National Forest

District	FRCC 1	FRCC 2	FRCC 3	Total Acres
Enoree	38,851	58,027	66,888	163,766
Andrew Pickens	10,716	27,353	39,607	77,675
Long Cane	32,500	26,637	56,607	115,744
Total Acres	**82,066**	**112,017**	**163,102**	**357,185**

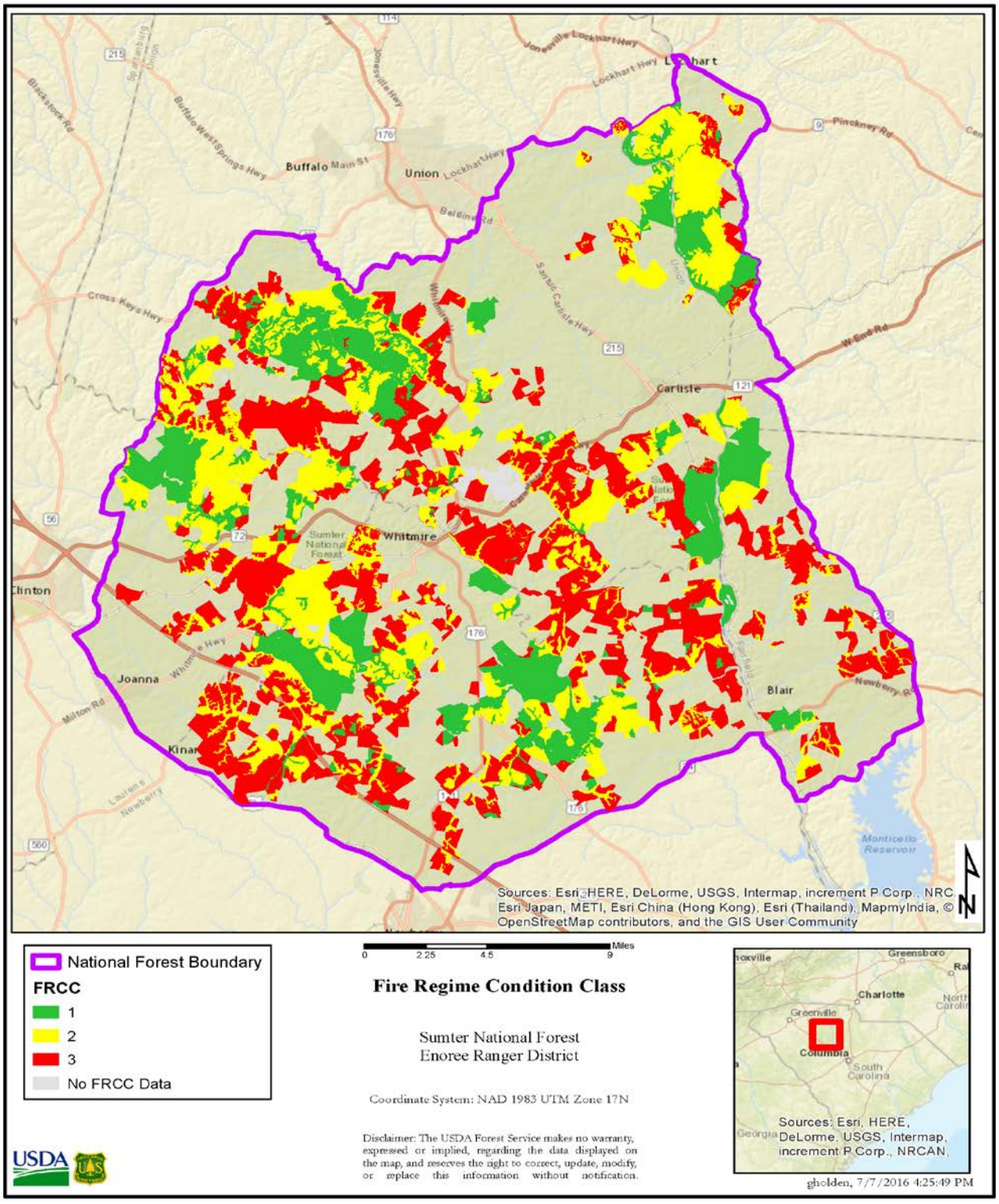


Figure 1. Enoree Ranger District Fire Regime Condition Class

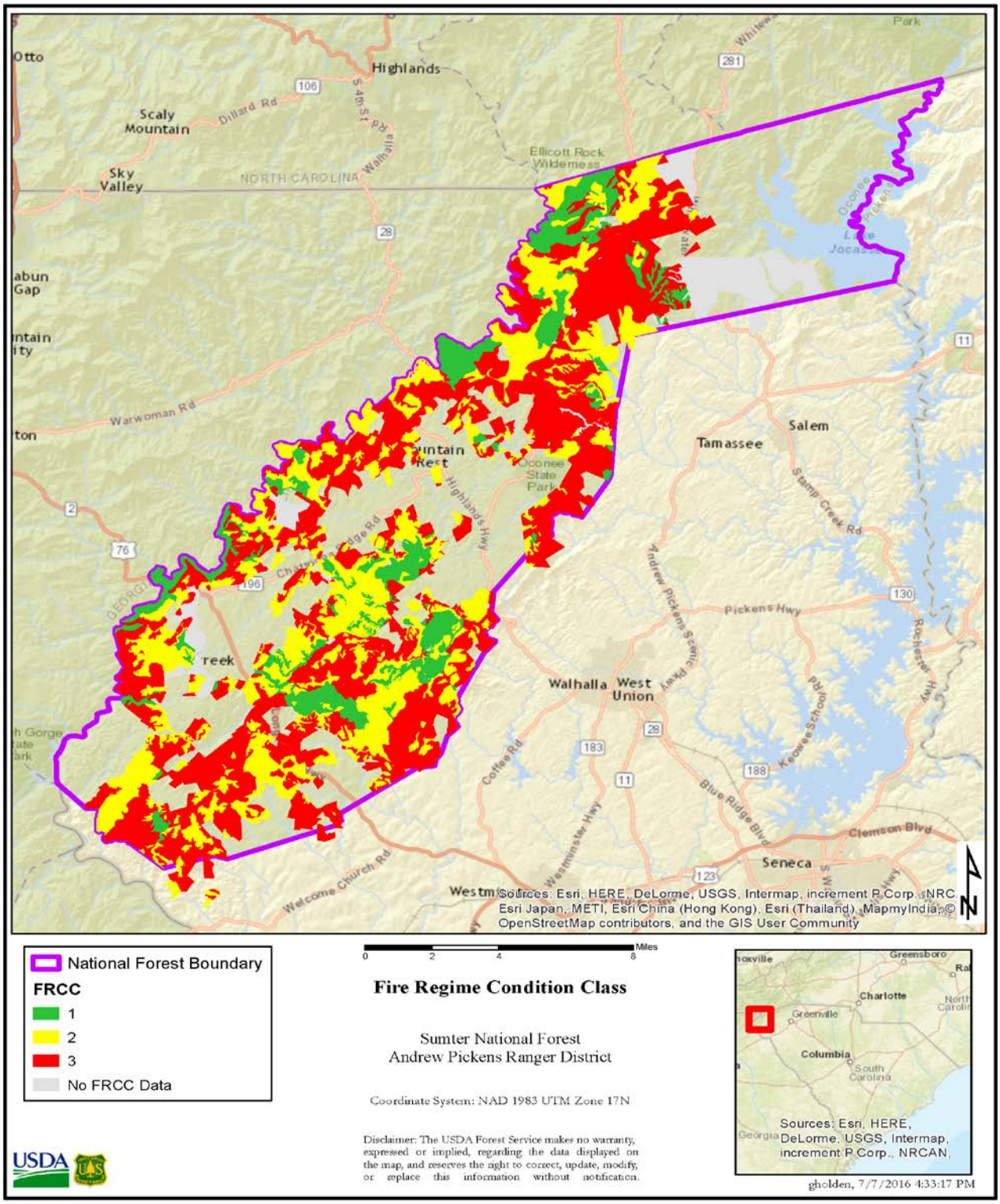


Figure 2. Andrew Pickens Ranger District Fire Regime Condition Class

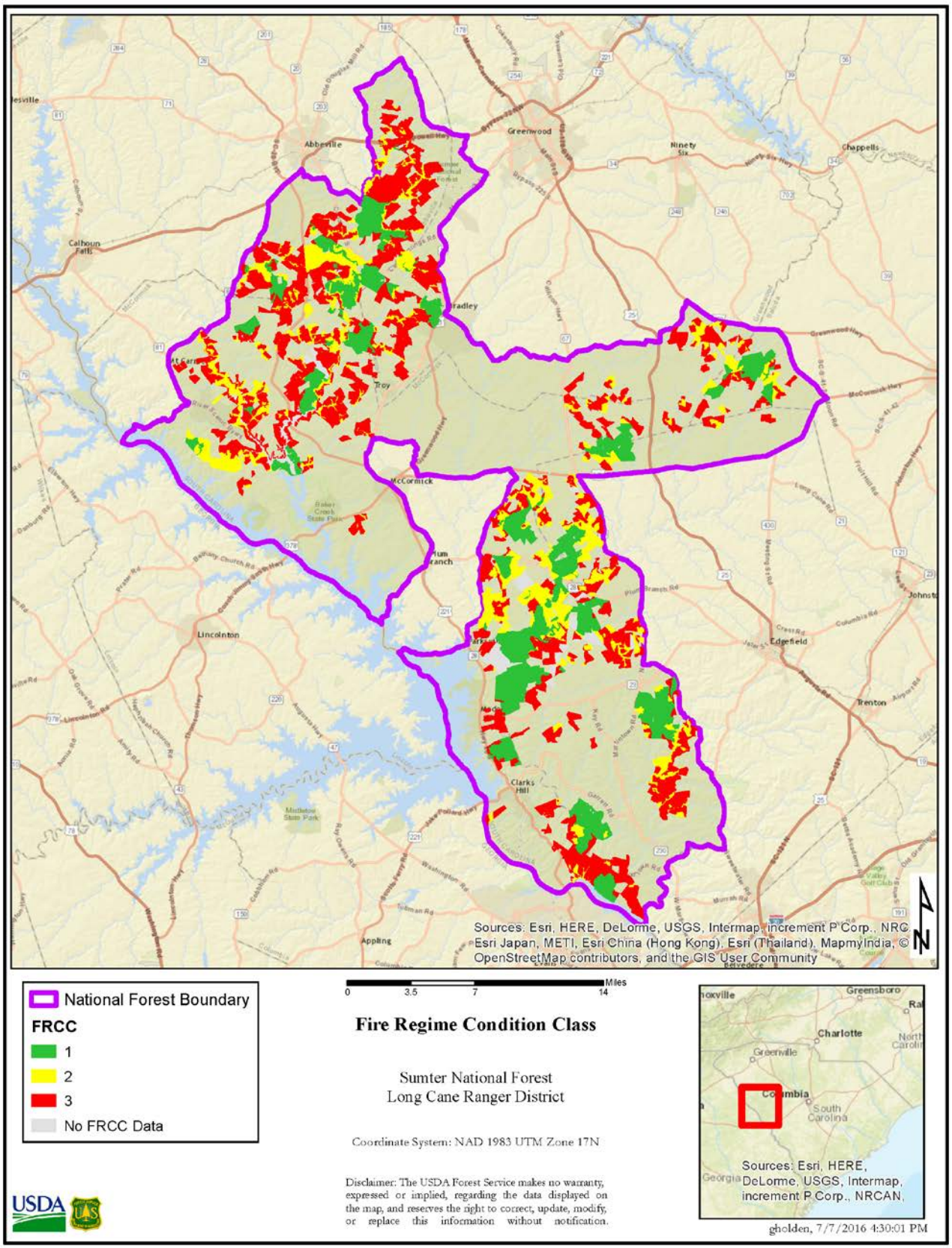


Figure 3. Long Cane Ranger District Fire Regime Condition Class

1. The best way to evaluate air quality status and trends as related to both forest health and wilderness character is to compare measured air pollutant concentrations to air quality standards. The U.S. Environmental Protection Agency (EPA) has been directed by Congress to set national ambient air quality standards (NAAQS). This standard is reviewed every few years, and revised (strengthened) if the most recent scientific research indicates that the current standard is not protective enough of sensitive populations. The criteria pollutants of most concern on the Sumter National Forest are particulate matter and ozone. Levels of these two pollutants are measured at air monitoring sites near all three districts of the National Forest. Fine particulate matter is the leading cause of regional haze (also known as visibility impairment), while ozone can harm sensitive vegetation within the forest. Additionally, at elevated concentrations these two pollutants can impair the health of both employees and visitors to the National Forest.

   Particulate Matter. Particulate matter is a mixture of extremely small particles made up of soil, dust, organic chemicals, metals, and sulfate and nitrate acids. The size of the particles is directly linked to health effects, with smaller particles causing the worst impacts to human health. As a result, EPA has set a primary NAAQS for ultra-small (less than 2.5 microns in diameter) particulate matter on both a short-term (24-hour) and annual basis. The 24-hour fine particulate matter ($PM_{2.5}$) NAAQS is currently set at 35 $\mu g/m^3$, while the annual $PM_{2.5}$ NAAQS is 12 $\mu g/m^3$. The graphics below show the measured $PM_{2.5}$ levels at the three fine particulate matter monitoring sites located near the Sumter National Forest. As shown, levels are below the 24-hour and annual air quality standards, and continue to be improving.

   The South Carolina Department of Health and Environment Control (DHEC) operates fine particulate matter monitoring sites throughout the state, including several near the three noncontiguous ranger districts of the Sumter National Forest.

   Andrew Pickens Ranger District. This portion of the Sumter National Forest is located in the northwestern corner South Carolina, in Oconee County. The only wilderness area within the Sumter National Forest is Ellicott Rock and it is located within this District. Although $PM_{2.5}$ concentrations used to be measured at a monitoring site in Oconee County, that site has not operated since 2010. Recently, during the spring of 2016 a portable $PM_{2.5}$ monitor was set up at the ranger district and recorded several weeks of ambient data. Of the 26 days of sampling, no concentrations of $PM_{2.5}$ were recorded over 11 micrograms per cubic meter (ug^3). These ambient recordings are well below the EPA National Ambient Air Quality Standards (NAAQS). Not enough data was collected to compare the annual or 24-hr average trends to the prescribed fire program on the Andrew Pickens Ranger District.

   Enoree Ranger District. The Enoree Ranger District is located in north-central South Carolina; portions of the District fall within Chester, Fairfield, Laurens, Newberry and Union Counties. A nearby monitoring station in Spartanburg County (21.7 miles northwest of the District) measures $PM_{2.5}$ concentrations in the area.

   Long Cane Ranger District. This District is located along the border between South Carolina and Georgia, with portions of the Forest falling in Abbeville, Edgefield, Greenwood, McCormick, and Saluda Counties. There are two $PM_{2.5}$ monitoring stations currently nearby: one east of the District in Edgefield County; and one south of the District in Richmond County,

Georgia. These two monitoring sites are located 6.8 miles and 8.1 miles south of the District, respectively.

The maximum measured values and trends at the above monitoring sites as compared to both the daily and annual $PM_{2.5}$ NAAQS are shown in the graphs on the next page. (Data Source: http://www.epa.gov/airdata/ad_rep_mon.html). The blue columns are measured annual averages, and the green columns are measured daily values; the annual and daily NAAQS are shown by red lines. Note that none of the fine particulate matter monitors near the National Forest are exceeding the current fine particulate matter NAAQS.

As shown, measured particulate matter pollution near the two Ranger Districts are not exceeding either the 24-hour or the annual $PM_{2.5}$ standard.

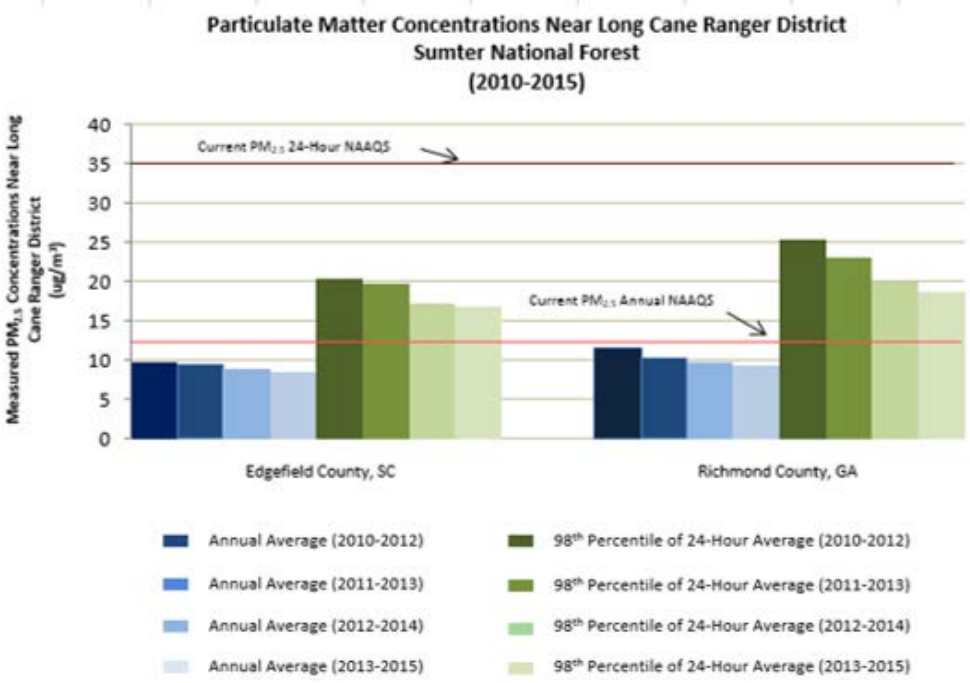


Figure 4.Long Cane Ranger District Particulate Matter Concentrations

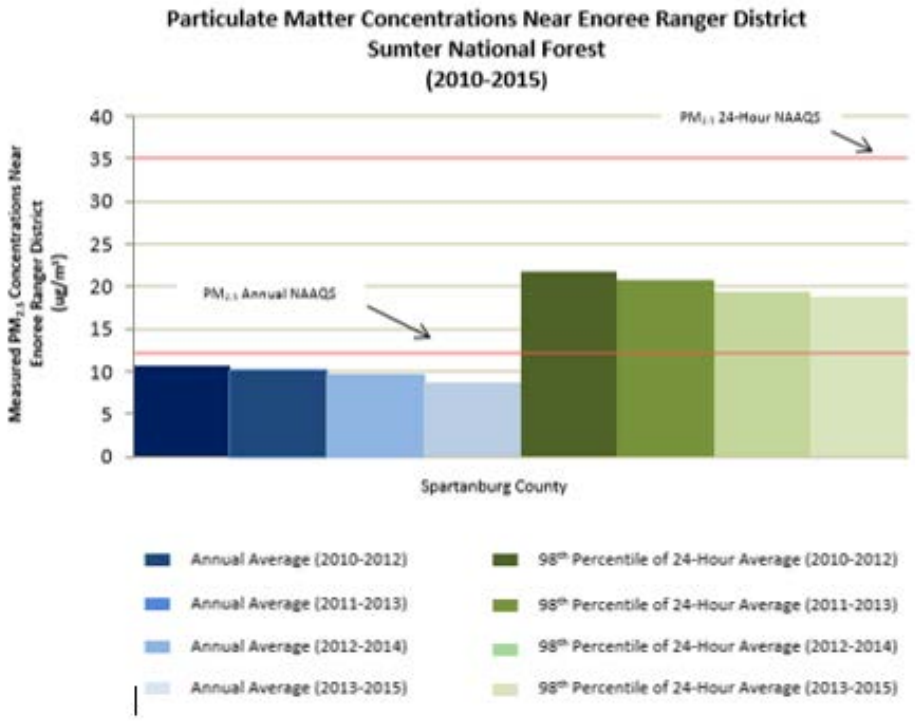


Figure 5.Enoree Ranger District Particulate Matter Concentrations

There are several monitoring sites that measure ozone near the three ranger districts of the Sumter National Forest.

- *Andrew Pickens Ranger District.* Ozone concentrations are currently measured at two monitoring sites near the District. The ozone monitor in Oconee County is adjacent to the District, while an ozone monitor in Pickens County is located 17.4 miles east of the District.
- *Enoree Ranger District.* Two air quality monitoring stations currently measure ozone near this Ranger District. One is located in Spartanburg County, 28 miles west of the District, and the other is in York County, approximately 26 miles away from the Enoree Ranger District.
- *Long Cane Ranger District.* There are four ozone monitoring stations currently operating near the Long Cane Ranger District. A monitor in Columbia County is less than 0.6 miles west of the District. There are also monitors located in Abbeville County, 6.8 miles north of the District; Edgefield County, 8.1 miles east of the District; and Aiken County, 21.1 miles south of the District

The following graphs show the ozone concentrations at the monitors near each ranger district for the years 2010-2015, calculated in the same form as the NAAQS (3 year average of the 4th highest 8-hour ozone concentration). The NAAQS is shown below as the red line. Note all of the most recent 3-year averages are below the NAAQS. (Data Source: http://www.epa.gov/airdata/ad_rep_mon.html)

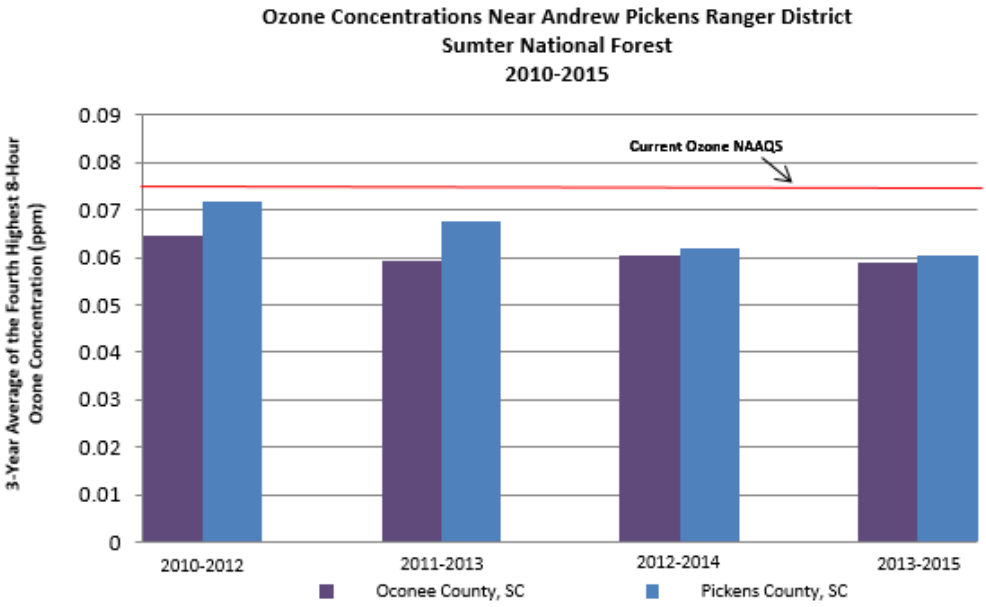


Figure 6. Andrew Pickens District Ozone Concentrations

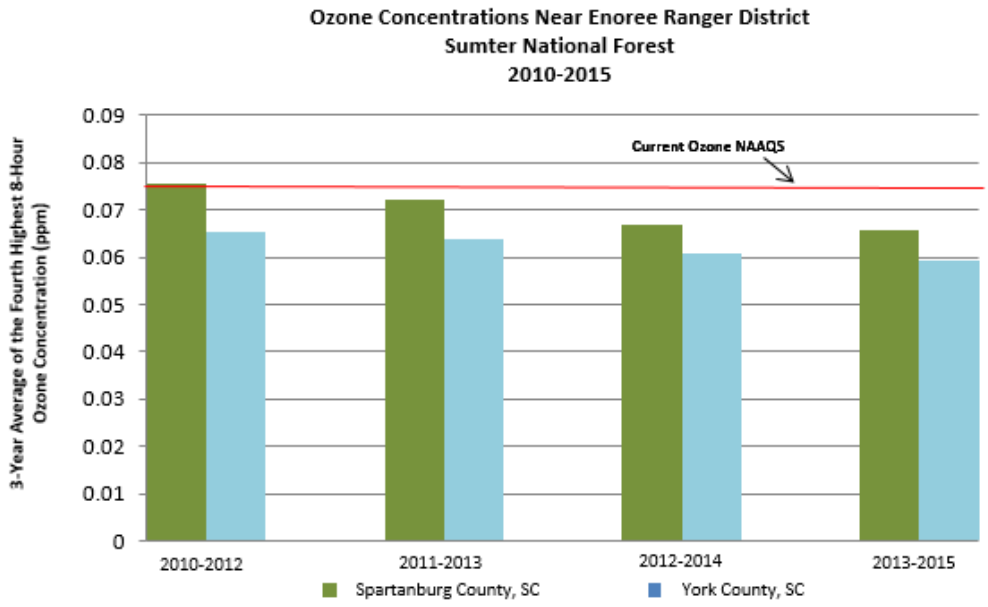


Figure 7. Enoree District Ozone Concentrations

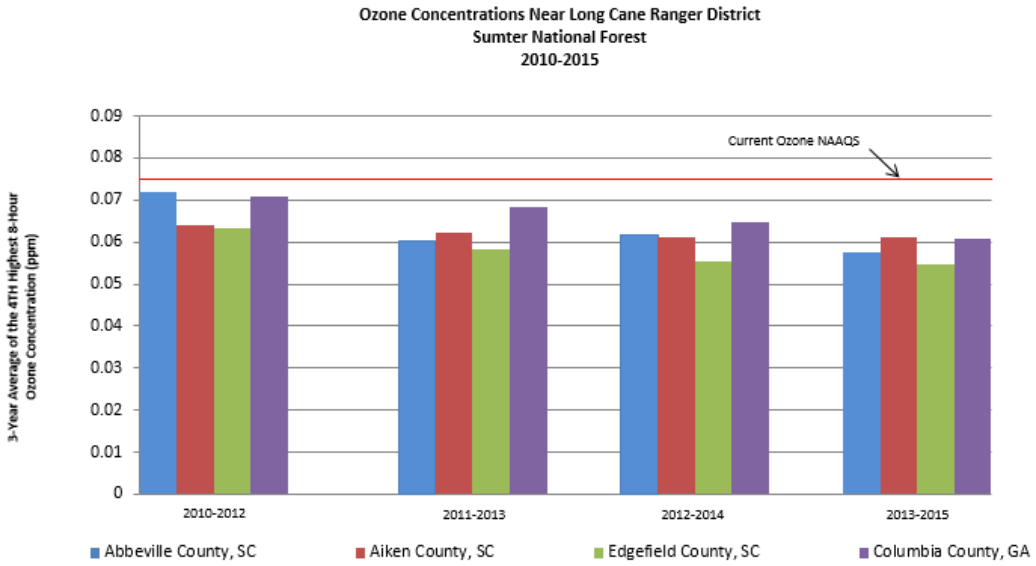


Figure 8. Long Cane District Ozone Concentrations

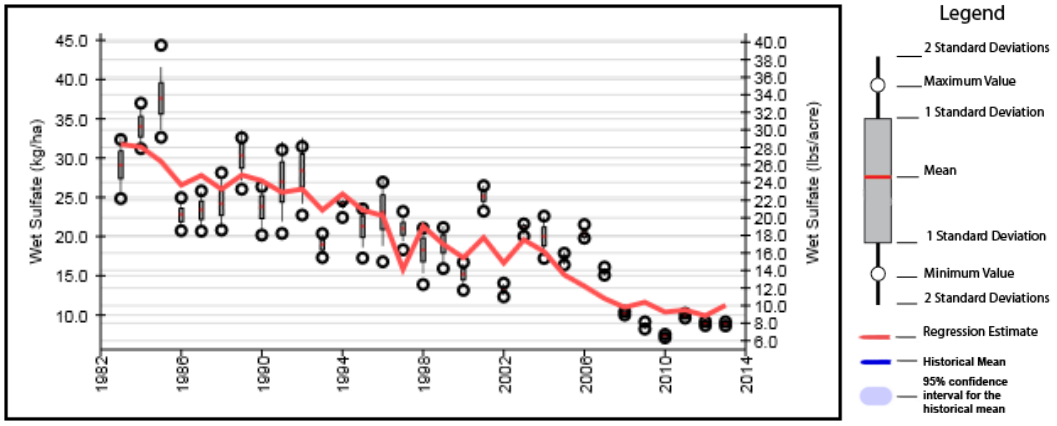
Acidic Deposition:

Acidic deposition of sulfates and nitrogen compounds from anthropogenic sources can negatively impact sensitive ecosystems. These compounds can acidify soil and surface waters, affect nutrient cycling and impact the ecosystem services provided by forests. Sulfates and nitrogen compounds are deposited in precipitation (known as wet deposition), as well as particulates and aerosols (known as dry deposition), or directly from clouds/fog vapor.

In the United States, there are many locations where measurements are taken of wet deposition, as opposed to dry or cloud deposition. However, not all National Forests or wildernesses are monitored directly. For this reason, statistical models, using monitored wet acidic deposition, precipitation amounts, and topographic data are being used to provide a spatial estimate of wet acidic deposition for the eastern United States (Grimm and Lynch, 2004). The results presented in the two graphs below show the estimated trend in wet deposition (red line) along with the distribution (box plots) in the modelled estimates for Ellicott Rock Wilderness.

Since 1983, the wet sulfate deposition has decreased on average about 0.6689 kilograms per hectare (kg/ha) each year; while the total nitrogen has decreased 0.0676 kg/ha each year. Both models are highly significant with less than 1 in 1000 cases where there is actually no relationship between the mean of the annual wet sulfate deposition as predicted by the years since 1983 and the mean of the annual precipitation. Overall, 81% of the variation in the estimated mean of the annual wet sulfate deposition and 67% of the total nitrogen can be accounted for with the two predictors.

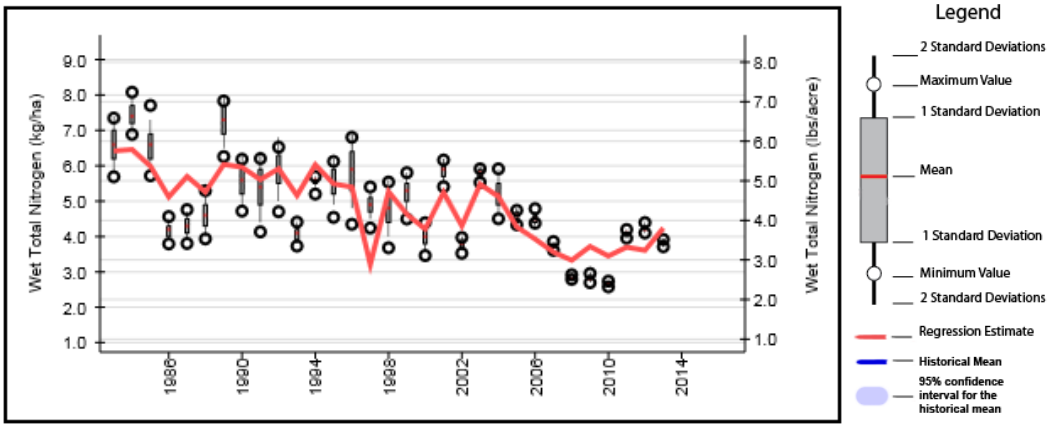
Wet Sulfate



Source: http://webcam.srs.fs.fed.us/graphs/dep/

Figure 9. Trends in Wet Sulfate deposition along with distribution in the modelled estimates for Ellicott Rock Wilderness

Wet Total Nitrogen



Source: http://webcam.srs.fs.fed.us/graphs/dep/

Figure 10. Trends in Wet Total Nitrogen deposition along with distribution in the modelled estimates for Ellicott Rock Wilderness

Goal 21: Emissions from prescribed fire will not hinder the state's progress toward attaining air quality standards and visibility goals.

Emissions from wildland fire include carbon dioxide, water, carbon monoxide, particulate matter, hydrocarbons or volatile organic compounds, and nitrogen oxides. Carbon dioxide and water generally make up over 90 percent of the total emissions. The most important pollutant from wildland fire emissions is fine particulate matter ($PM_{2.5}$) due to the amount emitted and the effects on human health and visibility.

With the current prescribed fire program, it is important to assess whether there is any indication that levels of local and regional $PM_{2.5}$ levels are mirroring that trend. The graph below shows the daily and annual fine particulate matter concentrations near the Long Cane and Enoree Ranger Districts from 2009 through 2015 compared to acres burned from prescribed fire conducted during that same time period. Since fine particulate matter is no longer measured near the

Andrew Pickens Ranger District, a comparison between prescribed fire acres burned and measured $PM_{2.5}$ could not be made for that District. As shown, local and regional $PM_{2.5}$ concentrations do not appear to be correlated with $PM_{2.5}$ emissions from prescribed fires.

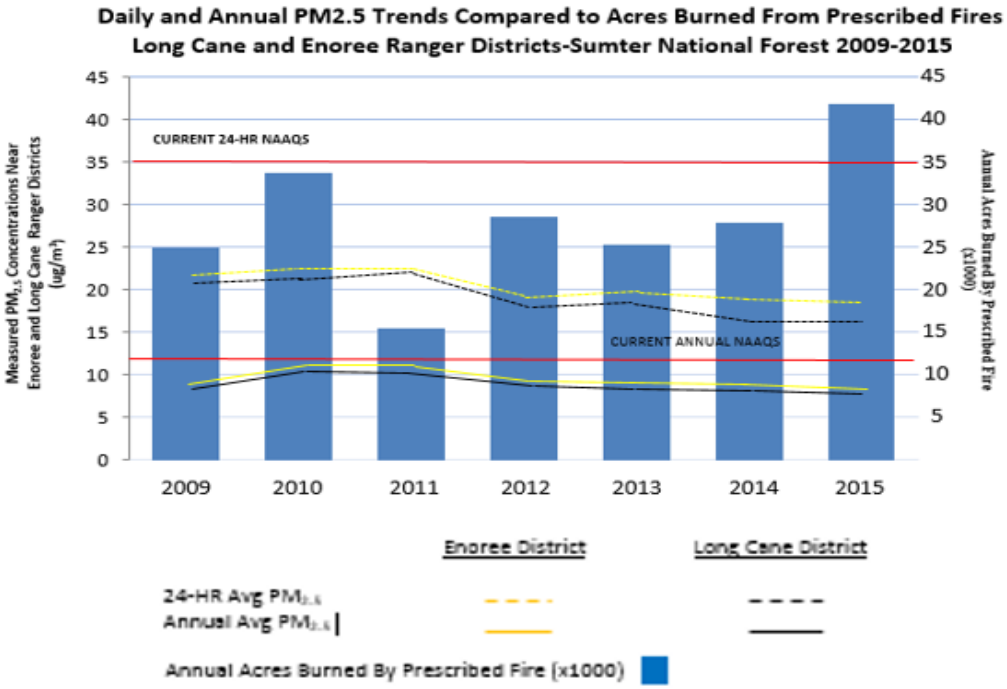


Figure 11. PM 2.5 (fine particulates) trends when compared to acres prescribed burned on the Enoree and Long Cane Districts

4. 36,422 acres of commercial thinning, which is within the range of objective 17.01.

5. One thousand ninety-seven (1,097) acres were treated (NNIS treatments) to control invasive plants on the Long Cane (RENEW Roadsides) and 93 acres on the Russell/Ridley fields project on the Andrew Pickens (88 acres by Marshfield contractor and 5.3 acres by contractor David White. Also, 50% of all FY 2014 NNIS treatments were monitored on the Long Cane (466 acres) and the Andrew Pickens (24 acres). On the Enoree, over 1,000 acres were treated in FY2015.

   Feral hogs were controlled on numerous acres across the Sumter. Trapping of hogs occurred on 5,606 acres of the Long Cane and 618 acres of the Andrew Pickens. One hundred fifty-nine hogs were trapped on the Long Cane and five were trapped on the Andrew Pickens.

Findings

1. Returning and maintaining fire in fire-adapted communities is a critical component of maintaining a healthy forest. Habitats on the Sumter vary from two to three-year fire return intervals. Two-year fire return interval habitats consists of the Long Cane District's Lick Fork Lake woodland area and the Enoree District's Indian Creek woodland area.

The table below displays fire frequency accomplishments.

Table 13. FY15 Fire Frequency Accomplishments

Fire Frequency Rotation	District	Acres	District	Acres	Total Acres
Less than 2 Years	Long Cane	1,367	Enoree	401	1,768
2-3 Years	Long Cane	14,258	Enoree	3,938	18,196
Total Acres		15,625		4,339	19,965

To maintain these areas, 1,768 acres were treated on lands having a less than two-year fire frequency rotation (2006-2015) in these fire dependent habitats. Three-year return intervals are desired to maintain the fire adapted pine and pine-hardwood habitats throughout the Sumter. 18,196 acres of these fire-adapted habitats were treated in FY 2015. A total of 32,933 acres were treated in FY 2015, above the desired 25,000 acres treated annually to meet objectives set in the Forest Plan.

Uncertain budgets, increased operational costs and a string of continuing congressional resolutions have limited the availability of resources and prescribe burning opportunities to accomplish objectives. Yet, all three districts shared personnel and equipment to help achieve over half the year's targeted treatment acres despite operating half of the normal operating period.

2. The Sumter National Forest saw a shift in Fire Regime Condition Class (FRCC) from the previous FY 2014 to FY 2015. FRCC 1 increased 60,000 acres forest wide while FRCC 2 decreased 40,000 acres forest wide. FRCC 3 decreased by 4,500 acres forest wide. Again, it is important that science and technology continue to improve FRCC calculation methods.

   FRCC 3 acres are continuing to decrease and shift into FRCC 1 due to increased prescribed fire use, non-commercial and commercial mechanical treatments of forest stands. Stewardship contracts and timber sales are providing more opportunities for treating fuels than existed a few years ago. Monitoring plots are currently being installed to track these changes empirically.

   Overall, the forest did not meet its goal of increasing FRCC 1 acres but succeeded in increasing overall forest health. There are fewer acres by overall percentage in FRCC 3 than have been recorded since monitoring FRCC began.

3. All air quality monitors near the Sumter show that ozone and fine particulate matter concentrations meet air quality standards. No negative impacts either to forest visitors or to forest vegetation are anticipated. Emissions from prescribed fire do not appear to be correlated with local and regional fine particulate matter concentrations and thus will not hinder the state's ability to attain air quality standards and visibility goals. Based on modeling results acidic deposition is improving in the Ellicott Wilderness. The threshold of ozone exposure to sensitive flora is not exceeded.

4. Intermediate and pulpwood commercial thinnings are being planned and implemented on the Long Cane and Enoree districts on a routine basis. Emphasis on the Andrew Pickens district has been on restoration of native species and not on thinning.

5. NNIS on the forest continue to increase and threaten forest health, biodiversity and ecosystem function. While current treatment levels in some areas of the Sumter have increased from FY14 levels, they are not nearly enough to offset the problem. The forest is conducting re-treatments to establish control within priority areas.

   Feral hogs by their rooting and trampling compact soils, reduce water quality and disturb plant regeneration. Hog activities directly threaten sensitive plant species and increase the spread of non-native invasive plants. Hogs threaten game and nongame wildlife by predation, competition for resources and spread disease and parasites. During 2015, the Long Cane partnered with USDA APHIS (Animal and Plant Health Inspection Service) along the Turkey Creek corridor (known habitat for Carolina Heelsplitter and Brook Floater) to trap hogs. A total of 159 hogs were removed from these areas.

Sub-Issue 1.2 – Watershed Condition and Riparian Areas

MQ 15: Are watersheds maintained (and, where necessary, restored) to provide resilient and stable conditions to support the quality and quantity of water necessary to protect ecological functions and support intended beneficial uses?

Information

This monitoring question is responsive to goals 1, 2, 3 and 5 and objectives 1.01, 2.01 and 5.01.

Objective 1.01: To improve soil and water conditions on 1,500 acres through stabilization or rehabilitation of actively eroding areas such as gullies, barren areas, abandoned roads or trails, and unstable stream banks over the 10-year planning period.

Objective 2.01: Stream flows needed to protect steam processes, aquatic and riparian habitats and communities, and recreation and aesthetic values will be determined on 50 streams.

Objective 5.01: To improve soil productivity on 8,000 acres of disturbed, low productivity, eroded soils with loblolly and shortleaf pine in the piedmont during the 10-year planning period.

The monitoring elements are defined as follows:

1. Are National and State BMPs and forest standards being implemented to protect and maintain soil and water resources?
2. Improve soil and water conditions through stabilization or rehabilitation of actively eroding areas such as gullies, barren areas, abandoned roads or trails, ditches, and unstable stream banks.
3. Improve soil productivity on disturbed, low productivity, eroded soils with loblolly and shortleaf pine in the piedmont.
4. The in-stream flows needed to protect stream processes, aquatic and riparian habitats and communities, and recreation and aesthetic values will be determined.

Results

1. In 2015 national BMPs monitoring protocols were conducted on the Sumter for timber sale units, herbicide treatment areas, and prescribed fire units. Sale administrators and inspectors monitor timber harvest activities to ensure the implementation and effectiveness of erosion control and water quality protection measures. Contract language is consistent with the intent of BMPs. Field inspections during activities, as well as a final review, are required of all measures upon sale closure. The inspection forms are included with the other sale documentation collected. Harvesting is one of several areas monitored by forest watershed specialists to help spot check quality control. The forest has maintained a strong adherence to and intends to fully implement BMPs to limit water quality and other effects on the land. This intent is also formalized in the forest plan revision in forest-wide standards FW-1, FW-2 and others that include specific measures intended to protect water quality and address associated soil and water conservation issues. An agreement with the SC Forestry Commission (SCFC) has been formalized to conduct BMP checks and determine consistency when requested. In addition, interaction and cooperation to address non-point source pollution and BMPs are part of the Memorandum of Understanding (MOU) between the SCFC, SC Department of Health and Environmental Control and the USFS. The MOU content needs to be renewed and updated. The SCFC continues to provide group training of forest and technical staff on BMPs when requested. The forest hydrologist worked with the state BMP foresters and other industry representatives to discuss the adequacy and application of BMPs on a number of projects within the state. We intend to continue to pursue both the field and office interaction between the state BMP foresters and USFS personnel on the Sumter. A district contracting officer representative insures the compliance of the herbicide application contract.

2. In 2015, a total of 127 acres were treated to improve soil and water conditions. This included 2 acres of continuing-treatment stabilization, 3 acres of gully head, 20 acres of wetland restoration through ditch obliteration, and 2 acres of unauthorized OHV trail obliteration and stabilization. Most of the soil and water improvement work continues to be on the Enoree, in part due to the severe erosion, gullying and associated loss of productivity, stream stability and water quality issues. Native grasses are used for erosion control on treated gullies, trails and other exposed areas. The acres of soil and water improvements under Objective 1.01 were slightly below the 150-acre annual average needed to meet plan direction. The Knutson-Vandenberg (CWKV) funds have increased in importance as appropriated funding in Soil and Water Resource Management (NFVW) has declined. As far as the ten-year planning level, we are under the amounts needed to achieve the 1,500 acres over the decade. However, recent proposals in the area of compensatory mitigation have the potential to meet and exceed these objectives.

3. Funds from 2014 were used to develop an aerial fertilization contract, to purchase fertilizer, and to pay for contractor flight time where 132 acres of soil improvement through fertilization was implemented in spring of 2015. Additional funds in 2015 was used to complete 100 more acres of fertilization. This amount is lower than the annual treatment amount of soil productivity improvements needed in the forest plan, but expectations of past and expected future work should keep us on track to meet the planned level of 8,000 acres over a decade.

Native grasses are used when possible for erosion control on treated gullies, unauthorized trail closures and other exposed areas. Most of the immediate needs for native grass are supplied by district plant production fields to handle the soil and water program needs on the Enoree. Maintenance and continued collection of native seed is needed to keep the production fields viable and producing. In some instances, herbicides to treat unwanted or invasive plants may be needed within production fields. Some efforts to broadcast native seeds with PAM show signs of some success, but inadequate data has been collected to verify the observations. Without regular infusion of funding, we may eventually turn to commercial sources for native grass, forb and other seed that promotes site improvement and erosion control.

4. There were no accomplishments in 2015 toward developing a protocol process to work on reaching objective 2.01 relative to determining in-stream flow needed to protect streams, habitats, recreation and aesthetic values. No funding was allocated to this task or to get started on the protocol for determining in-stream flows. However, some guidance was accomplished at the regional level. Due to the costs of these determinations, site specific determinations will probably only be done on a case-by-case basis or as specifically needed. It is doubtful that the forest would accomplish in-stream flow determinations for 50 streams over the next few years; therefore, Objective 2.01 may need to be revised.

Findings

1. In 2015 the Sumter conducted the National BMP Monitoring Protocol on one timber sale unit. This review showed that all of the sale units were in in compliance. Compliance with forestry BMPs are implemented through forest plan guidance, sale analysis and preparation, quality sale marking and sale administration which includes interaction with logging contractors who are typically BMP trained and certified by the state. Most mills are not going to accept logs from operations that do not use BMPs. Therefore, at several operational and implementation levels, BMPs are part of normal operations. In addition, BMP compliance checks with the SCFC on example areas with ground disturbance or streamside management occurs intermittently. Forest soil and water specialists and district personnel also help evaluate BMP implementation and effectiveness. Special attention is placed on ground-disturbing practices that occur in sensitive soil areas, wetlands, riparian corridors, when ground disturbing activities concentrate over substantial areas of the landscape or within specific drainages. A total of three timber sales were reviewed across the forest in 2015. There was little, if any, timber sale activity that affected riparian areas. In the past there were some issues with sale layout. Training and layout inspection are resolving most of these issues prior to harvesting and sale completion.

   Approximately one mile of fire line was reviewed in FY15. It was noted that some firelines are not being rehabbed appropriately. However, no significant issues were found and BMPs were met. Maintenance of fire lines will be needed in the future to reduce entrenchment of the fire line from repeated use. Due to dry conditions, small areas of prescribed burns had burned too hot, consuming organics, exposing soils and causing some local mortality. We continue to address these issues as we find them and mitigate as needed.

   BMPs were monitored for one transmission line and one road for road maintenance activities. No significant issues were found and BMPs were sufficient.

2. The 127 acres of soil and water improvements under Objective 1.01 was 85% of the 150-acre annual average needed to meet plan direction. In spite of this, there appear to be ample future opportunities to expand this work based on compensatory mitigation banking in the Hughes Creek- Broad River Watershed and efforts to address watershed conditions within the priority watersheds of Lower Indian Creek – Enoree River, Little Turkey-Stevens Creek, Hughes Creek-Broad River and Coxs Creek-Broad River. CWKV and other funding sources have helped us achieve plan objectives for addressing: poor soil and water conditions due to eroding gullies and barrens (galls); stream stabilization and restoration; abandoned or unclassified roads; user-created trails; and unstable streambanks.

   We have many opportunities to reduce legacy and ongoing erosion; sediment delivery; aquatic habitat; and stream and water quality impacts from private lands through authorizations under the Wyden Amendment. However these typically need funding and technical service time to develop and implement. Personnel continue to develop opportunities when possible. As appropriate, CWKV, stewardship and other funding sources for soil and water improvements are being pursued, primarily on the Enoree through the timber sale program. We are considering opportunities that address stream and wetland mitigation needs of outside developers. In addition, we are working on procedures that would allow this work with private funding sources such as compensatory mitigation and regulatory agency approval.

3. We have identified a substantial backlog of low-site lands; therefore, we will need to continue to obtain funding. Most of these needs are on the Enoree, with some needs on the Long Cane; therefore, funds from CWKV or stewardship are sound funding sources. Based on past work completed and expected future work, the forest should meet the planned level of 8,000 acres over a decade. At this time, fertilization remains the reliable method to return nutrients to severely eroded or nutrient depleted sites. We test sites that we are considering for fertilization to validate nutrient deficiencies before treatment. We continue to use native plants to provide erosion control and help rebuild soil organics. Restoring native plants is seldom an easy task with immediate results; only a few species, such as partridge pea, have some nitrogen fixing benefits that would be significant in dense stands.

4. Attention to water rights and in-stream flow methodologies and determination is needed to be consistent with plan direction in the future (Goal 2, Objective 2.01). For the last several years, developing a protocol to fit the forest needs was put on hold due to other priorities and lack of funding. Some work has been done at the regional level. There is still no overriding need to obtain this information immediately, but continuing to postpone it indefinitely will insure that the information will not be available when needed to identify and address critical water needs. Funding, increased emphasis and dedicated resources are needed if the intent has not changed; this element will probably remain tabled until the need is more pressing. Given the costs and complexity of this work under current conditions, identifying in-stream flows should probably only be done on a case-by-case, as needed basis. Less rigorous methods may be selected and used where only informed estimates of flow needs to protect resources will suffice. More detailed instream flow determinations would typically be needed for Federal Energy Regulatory Commission (FERC) or more demanding water use projects where sensitive aquatic resources exist. Most forest activities are not going to need this determination, but in mixed ownership

situations, outside influences such as irrigation, using stream water for pollution abatement, dams, etc. may influence streamflow during critical periods and necessitate in-stream determinations. If possible, outside developers and users would fund these determinations; however, in some instances, internal funding may be needed to insure our dependent aquatic resources are adequately protected. In addition, there is currently no legal mandate to force identification of in-stream flow quantities needed to protect aquatic resources.

MQ 16: What are the conditions and trends of riparian area, wetland and floodplain functions and values?

Information

This monitoring question is responsive to goals 3, 4, 8 and 9, objectives 4.01 and 11-OBJ-1 and standards 11-1 thru 11-25.

Objective 4.01: To create and maintain dense understory of native vegetation on 1 to 5 percent of the total riparian corridor during the 10-year planning period.

Objective 11-OBJ-1: To improve structural diversity and composition within the riparian corridor on 2,000 acres on the piedmont as canebrake habitat restoration.

The monitoring elements are defined as follows:

1. Are management strategies in riparian areas adhering to Forest Plan riparian guidelines? Are conditions in riparian areas or corridors providing for soil conservation, associated habitats and necessary shade and cover for aquatic habitats?
2. Create and maintain a dense understory within riparian corridors. Improve structural diversity and composition within the riparian corridor on the piedmont.
3. Acres of riparian area inventoried for condition (i.e. terrestrial habitat, vegetative composition, woody debris recruitment, and non-native invasive plants).

Results

1. Assessment of riparian condition typically occurs during project planning. Occasionally we evaluate the riparian condition and initiate action to address riparian health and function. Some of these analyses address the presence of unwanted exotic species (non-native invasive species), lack of woody debris, active erosion from slopes, gullies, unstable or eroding streambanks, excessive sediment, fecal coliform, damage from unmanaged recreational uses or a desire to restore certain types of native species, such as canebrakes. Other projects may intentionally avoid riparian corridors and thereby are not responsible for or responsive to analyzing and addressing riparian issues that may exist. When riparian corridors are involved, we design projects or use mitigation measures (as appropriate) to maintain riparian/stream vegetation and avoid activities that contribute to streambank failure or unnecessarily impact riparian or aquatic habits. We also carefully select and apply herbicides or pesticides to address exotic or invasive species (e.g., water label with cut surface treatment) and limit their effects on streams and non-target organisms. Timber harvesting, road location, prescribed fire, wildlife openings and

fertilization treatments require buffer streams consistent with the forest plan standards and BMPs.

Efforts were made to insure that streams and associated riparian areas and wetlands were protected appropriately for future activities. All projects we reviewed showed appropriate levels of compliance with standards and BMPs.

Improved signage and management of developed recreation sites within floodplains has begun and will improve public safety. These changes will inform the public of potential hazards in the area.

The Enoree Transportation Analysis Project (TAP) rated all the roads on the district for potential erosion, sediment and hydrologic risks using LiDAR, soils, slope, type of road, desired road operational level, road surfacing and proximity to the riparian corridor. Additional analysis proceeded to evaluate whether roads with limited need and high environmental risks could be adjusted in maintenance level, limited in use, closed to use or obliterated. The overall objectives were to identify road maintenance needs and find opportunities to reduce maintenance costs and environmental impacts while still providing needed access.

2. The forest planned wetland restoration projects; 20 acres were accomplished in 2015 to help create or improve/restore structural diversity and composition within riparian corridors on the Long Cane and Enoree. Although the riparian corridor seldom burns completely during prescribed burning, a mosaic of burning occurs within some riparian areas. Where burning intersects areas with openings, some temporary development of dense understories may occur.

3. We reviewed approximately 40 acres for wetland function in riparian areas on the Enoree and Long Cane. This consisted of walking through and taking quick notes about the riparian condition and associated wetlands. Resource conditions within some riparian areas also were evaluated to some degree during timber sales, fish inventory or NNIS surveys. We have begun to use LiDAR to evaluate past riparian impacts such as gully networks, stream diversion, river channelization and wetland drainage for agricultural or other purposes. LiDAR has increased our abilities to evaluate these impacts and refine our expectations for upcoming work. Proposals for compensatory mitigation and priority watershed condition improvements have the potential to address many issues within those riparian areas that would be treated.

Findings

1. Forest and district staffs are implementing the riparian prescription. Riparian identification, delineation, functions and values are considered in field assessments. Forest personnel develop mitigation measures to address resource impacts, such as the presence of invasive species and undesignated trails, hillside erosion on campsites, developed facilities in floodplains or other concerns. Periodic review of field implementation of the riparian guidance and prescriptions is ongoing.

   Priority watersheds have been identified on the Forest. As projects are identified, current riparian conditions should be evaluated and considered during project development. The forest plans to

provide training for personnel in stream type and riparian area identification that facilitate this work. LiDAR is a valuable tool in assessing the current condition of the riparian areas and will facilitate the analysis. Many of the riparian areas on the riparian areas on the Enoree and Long Cane Ranger Districts have been ditched and drained. Many of these ditches are draining areas that should be wetlands. This is altering riparian benefits and habitats. Some of the ditches are contributing sediment into streams as well.

In general, the Francis Marion and Sumter Transportation Analysis Planning (TAP) indicates few opportunities to close roads with high soil and water risks. Ongoing efforts to improve erosion problem on roads issues continue in conjunction with efforts to reduce road maintenance backlog and costs. Since cost-cutting is a major objective, road closures or other approaches may be needed.

The forest is collaborating with a group of other agencies and non -government organizations (NGOs) led by SC DHEC to develop guidance for stream type evaluation in South Carolina. Some of this information will also be used with LiDAR to help expand and improve the geo-referencing of the official National Hydrography Dataset stream layer.

The forest is evaluating the possibility of providing compensatory mitigation opportunities for other public agencies where mitigation opportunities are not available on private lands.

2. Approximately, 20 acres of wetlands were restored in 2015. The actions required to restore wetlands in the riparian area also resulted in the creation of structural diversity and composition thru canopy gaps and day light reaching the forest floor. These areas were being used by a variety of amphibians, mammals, birds, and wetland plants.

3. Riparian condition assessments/inventories need to be included in the early stages of project planning. Information collected while riparian corridor conditions are being reviewed and evaluated is probably not being documented sufficiently in all cases to provide long-term benefits. In addition, integrated surveys may not obtain all the needed information. We need to address this lack of documentation in the future.

   LiDAR provides the most useful information on the extent of riparian areas. LiDAR will increase the amount of available information on riparian conditions, stream network, soil and other condition boundaries; it will also help evaluate needs or identify potential improved conditions. Although limited in extent, fish and stream surveys address the biological and physical components in aquatic systems. Information gathered during riparian wetland assessments indicates that a majority of the wetland areas have been ditched and/or filled during historic land management practices. Aerial photography from the early 1900’s show that many of the riparian areas were being farmed. This is also evident today in that the majority of the tree species are relatively young with little to no cavities. There is also a limited amount of large woody debris on the forest floor.

Issue 2. Sustainable Multiple Forest and Range Benefits

Sub-Issue 2.1 – Recreational Opportunities

MQ 9: Are high quality, nature-based recreational experiences being provided, and what are the trends?

Information

This monitoring question is responsive to goals 22 and 23. The monitoring element is defined as follows:

1. Results and trends in user satisfaction ratings relative to nature-based recreational experiences.

Results

1. Visitor use monitoring surveys were conducted on the Francis Marion and Sumter National Forests in FY 2008 and again in 2013. The National Visitor Use Monitoring (NVUM) program provides reliable information about recreation visitors to national forest lands at the national, regional, and forest level. To improve public service, the Forest Service requires measuring trends in user satisfaction and use levels. The survey is conducted approximately every 5 years.

Findings

Visitation

While the human population is increasing, the NVUM indicated a downward trend in visitation. Total site visits for the forests are down over 32% from 2008. The only increase is wilderness visits, up 48% from 2008. The total estimated site visits[2] in 2013 for the Francis Marion and Sumter National Forests is 927,000. Of the total use, there were 250,000 day use site visits[3], 27,000 overnight site visits[4], 629,000 general forest site visits[5], 21,000 designated wilderness site visits[6]. The total estimated national forest visits[7] is 771,000.

[2] ***Site visit*** is the entry of one person onto a national forest site or area to participate in recreation activities for an unspecified period. The site visit ends when the person leaves the site or area for the last time on that day.

[3] ***Day Use*** *site visits* are entry of one person onto a national forest site or area to participate in recreation activities at developed sites, such as picnic areas and shooting ranges, for an unspecified period.

[4] ***Overnight*** *site visits* are entry of one person onto a national forest site or area to participate in camping at a designated campground for an unspecified period.

[5] ***General Forest*** *site visits* are entry of one person onto a national forest to participate in recreation activities that utilize the large land base, such as hunting, fishing, boating, trails of all types, for an unspecified period.

[6] ***Designated Wilderness*** *site visits* are entry of one person into a designated wilderness on national forest to participate in recreation activities for an unspecified period.

[7] ***National Forest visit*** is the entry of one person onto a national forest site or area to participate in recreation activities for an unspecified period. A national forest visit can be composed of multiple site visits. The visit ends when the person leaves the national forest to spend the night somewhere else.

Demographics of National Forest visitors include the following:

- Males account for over 80 percent of the visits to the forests.
- African American visitors are about 7 percent of the visiting population.
- Children under the age of 16 are about 12 percent of visits.
- The forest's recreation market is mostly local. About three-quarters of visits are from people who live within 50 miles.
- Most visits to this forest are relatively short. The average visit duration is under 7 hours; half the visits are 3 hours or less.
- Hunting (20%) and fishing (10%) are among the key primary activities for this forest.
- Income results show that more than 80% of visits are from households earning between $25,000 and $75,000 per year.
- About 95% of visits indicate they are satisfied with their overall recreation experience.

Satisfaction

Almost 76 percent of the people who visited were very satisfied with the overall quality of their recreation experience. Another 18 percent were somewhat satisfied and less than one percent expressed any level of dissatisfaction.

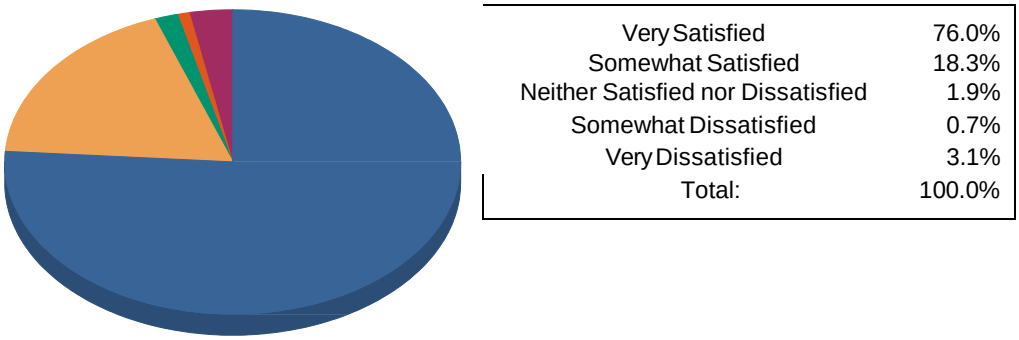


Figure 13. National Visitor Use Monitoring Survey Results for the Sumter National Forest

The surveys did show that there are areas that could use improvement or where the agency should concentrate more, at overnight sites (improve employee's helpfulness), general forest areas (improve restroom cleanliness, in such areas as trailheads and adequacy of signage).

The majority of the visiting population is very satisfied or somewhat satisfied with road condition and adequacy of signage forest-wide. Over three quarters of the visiting population also feel that road condition and adequacy of signage is important.

MQ 10: What are the status and trends of recreational use impacts on the environment?

Information

This monitoring question is responsive to goals 1, 3, 4, 5, 22, and 23, desired condition for management prescription 11 and standards FW-2, FW-10, FW-11, FW-14, FW-70, FW-76, and FW-77.

The monitoring elements are defined as follows:

1. Recreation activities impact to riparian areas and/or water quality.
2. Impacts associated with OHV activities.
3. Are motorized and non-motorized trails being maintained?

Results

1. Localized impacts to riparian areas from recreation activities have been observed through field observation in FY 2015. Most of these were associated with unauthorized trails or uses. The type of impacts tend to be localized and include effects from soil exposure, compaction, displacement, concentrated flow, erosion, sediment, damage to riparian trees, dispersal of human or solid wastes, etc. Most activities are located outside of riparian corridor or designed and mitigated to reduce effects.

2. Impacts from off-highway vehicles (OHV) still occur but are generally at acceptable levels. Wet weather closures on OHV trails continue and have reduced trail damage and associated impacts like rutting in riparian areas and areas adjacent to trails. More attention is being taken to avoid riparian areas and harden areas that tend to rut with geotextile or other materials. The installation and use of gradients that roll with the terrain to control excessive surface drainage, with outslopes, reverse grades, dips and other water control features are helping to limit the amount of accumulated concentrated flow, erosion, sediment and connections to streams. Sections with severe damage and problems difficult to rectify are considered for closure or relocation.

3. Motorized trail maintenance continues to be a high priority for the recreation program on the Forests. Funding comes from appropriated, recreation fee, and grant dollars (the latter is used almost exclusively for maintaining/reconstructing OHV trails to increase financial and environmental sustainability). We continue to find ways, like volunteer workdays and hosts, to leverage our limited resources while reducing the impacts associated with OHV activities.

   The better understanding of the need for wet weather and post maintenance closures has also resulted in reduced maintenance and better results. Non-motorized trails often have varying maintenance needs. Equestrian trails can be very difficult to maintain, especially if not properly located. Most trails will have issues if located within wetlands or riparian areas. Hiking trails tend to have the fewest impacts and lower maintenance needs. Maintenance levels and costs also depend to some degree on levels of trail use.

Findings

1. Most recreation areas have limited impacts on riparian areas, water quality, and comply with BMPs. Many recreational uses revolve around some proximity to streams and are most noticeable at the site location or in the general vicinity. Impacts are most noticeable when use levels are high. Many impacts can be avoided, minimized or mitigated with site closure and rehabilitation.

2. The policy of closing OHV trails during wet weather conditions has reduced impacts on riparian areas and other natural resources as well as the trail facility itself. The wet weather closure information also aids users in determining whether facilities are open before they travel. Poor trail sections are sometimes closed and relocated using better techniques to reduce effects. Mitigation measures such as trail hardening, reshaping and improving dips or other drainage features help reduce excessive rutting and off trail damage.

3. Increased emphasis on motorized trail maintenance with timely closures across the Sumter is reducing resource impacts. Forest personnel and user-groups have educated riders on when to avoid riding on trails when damage can occur (i.e. wet weather conditions). As a result, many of the trails are in good condition and maintenance has been reduced. However, dependent on the type and amount of use, continued diligence is needed to maintain them. Equestrian uses can be a challenge because the intensity of the impacts on the trail is greater. Impacts to trails from mountain bikes seem to be related to use levels. Hiking trails, when located properly, generally are easier to maintain and have fewer problems.

MQ 13: Are the scenery and recreational settings changing and why?

Information

This monitoring question is responsive to goals 13, 28 and 30 and Objective 23.02. In the piedmont (Objective 23.02), increase acreage that is at least ½ mile from an open road to 35,000 acres, emphasizing lands blocks that are at least 2,500 contiguous acres in size.

The monitoring elements are defined as follows:

1. Acres of National Forest land that meet or exceed established scenic integrity (SIO) and recreation opportunity spectrum (ROS) objectives.

Results

1. Project and field review of ground disturbing activities were ongoing in FY 2015. Proposed projects on the Sumter National Forest met the established SIO standards and ROS objective.

2. The National Forest acreage that is at least ½ mile from an open road is 44,327 acres per analysis in FY 2012, exceeding the forest objective.

Findings

1. Ongoing field reviews of projects being implemented are needed to determine that SIO and ROS objectives are being met.

2. More 2,500 acres areas that are at least ½ mile from a road could be created by emphasizing road closure in certain areas.

Sub-Issue 2.2 – Roadless Areas/Wilderness/Wild and Scenic Rivers

MQ 11: What is the status and trend of wilderness character?

Information

This monitoring question is responsive to goals 26 and 27. The monitoring element is defined as follows:

1. Is visitor use within limits that do not impair wilderness characteristics?

Results

1. A biophysical inventory was completed in FY 07 for the Chattooga Wild and Scenic River and the segment in Ellicott Rock Wilderness to assess impacts from recreational use.

Findings

1. The biophysical inventory indicated that visitor use impacts are occurring that could adversely affect wilderness character. An environmental assessment was completed in 2012[8] that not only permitted boating in the upper segment, but also established monitoring protocols to determine biophysical and social impacts from recreation use in the river corridor including the portion in wilderness.

   The initial biophysical monitoring of recreation impacts to endangered, sensitive and locally rare plant species and aquatic habitat has been completed. The large wood inventory indicated no impacts to aquatic habitat and to specific plant species (Chattooga River EA Plant Monitoring 2014 Report, Radcliffe). Three plant species populations were visited but only two were located. The two populations found showed no evidence of being impacted by recreation use. Social impacts will begin to be monitored starting in 2016.

MQ 12: What are the status and trend of Wild and Scenic River conditions?

Information

This monitoring question is responsive to goals 1, 28 and 29 as well as compliance with the Wild and Scenic Rivers Act, Clean Water Act and South Carolina Water Quality Standards.

[8] *Managing Recreation Uses in the Upper Segment of the Chattooga Wild and Scenic River Corridor* (2012 EA).

The monitoring elements are defined as follows:

1. Are free-flowing conditions and outstandingly remarkable values (ORVs) being protected for eligible and designated rivers?
2. Are water quality standards being met for eligible and designated rivers?

Results

1. A biophysical impact inventory was completed in FY07 for the Chattooga Wild and Scenic River. Detailed information is available in the report entitled "Capacity and Conflict on the Upper Chattooga River – An Integrated Analysis of 2006-2007 Reports" (Whittaker and Shelby, 2007). The inventory documented the miles of designated and user-created trails and the number of sites with erosion problems along the trails. A large wood inventory conducted in 2007 was reevaluated again in 2013/14 with a report prepared in 2014.

   The Chattooga River has certain indicators that help define limits of self-guided paddling use on Sections III and IV (lower segment). These indicators are numbers of people on certain sections of the river at certain times. On Section III of the Chattooga, the indicator for self-guided use is 175 persons on weekends and holidays, and 125 persons on weekdays.

   Private boating use has been monitored on the Upper Segment of the Chattooga River since boating started in December 2012.

2. Elevated fecal coliform in Stekoa Creek is the primary pollutant that affects the water quality of the Chattooga Wild and Scenic River. The Chattahoochee-Oconee National Forest works with local officials and non-profits because the water quality problems are generated in Georgia. A National Forest Foundation grant temporarily extended work into the Chattooga Wild and Scenic River downstream of Stekoa Creek. Rabun County, Georgia officials, in cooperation from the Chattooga Conservancy, Rabun County Trout Unlimited, and others, worked to identify problem sections of the wastewater conveyance system, collect fecal coliform data within Stekoa Creek and disseminate public information.

   Recently, an EPA 319 (h) grant was approved that will address some of the dispersed nature of the fecal coliform problems with septic systems, agricultural practices and stream buffers. At least two segments of the Rabun County sanitation lines are being replaced with grant funds. Additional monitoring efforts will identify other "hot spots" within the city's wastewater and sewer distribution system.

   Methyl mercury, PCBs and other water quality issues are noted near Tugaloo Lake where the Chattooga WSR flows.

   Eligible Rivers

   Most of the eligible rivers on the Sumter have little monitoring information documenting water quality. However, the watersheds are primarily forested, have low road density, low agricultural use and development densities. These factors usually indicate good water quality. At this time, there are no plans to allocate funds to expand data gathering.

Findings

1. Summary of Findings - Results of 2015 Boating Season on Lower Chattooga River

   On the Section III of the Chattooga River, the 175-person indicator was exceeded 0 times and the 125-weekday indicator was exceeded zero times in 2014. This does not cross the threshold for additional management actions. On Section IV, the indicators are 160 persons on weekends and holidays and 75 persons on weekdays. During the 2015 calendar year, the weekends and holidays were exceeded one times and the weekday indicators were exceeded zero times. This does not cross the threshold for additional management actions.

   The findings of the 2007 biophysical inventory on the Chattooga Wild and Scenic River indicate that visitor use impacts are occurring, but generally confined to heavily used river access trails and local camping areas. Water quality concerns remain in the downstream reaches of the Chattooga Wild and Scenic River relative to fecal coliform and sediment from Stekoa Creek. Findings from self-guided permits do no exceed the threshold for use levels on sections III and IV.

   Summary of Findings - Results of 2013 -14 Boating Season on Upper Segment of Chattooga River

   - About 25% of boaters paddled the Chattooga Cliffs Reach, with the Green Creek put-in attracting all the use (no boaters were recorded putting in at Norton Mill Creek).
   - Over half (63%) of all boaters started their trips at Bull Pen Bridge, and one extended their Chattooga Cliffs trip through the Ellicott Rock Reach during the 2013-14 boating season (about 88% of all boaters started their trips at either Green Creek or Bull Pen Bridge this season).
   - Relatively few boaters (13%) paddled the Rock Gorge Reach from Burrells Ford.
   - The take-out used most often was Burrells Ford, with about 75% of all use.
   - Relatively few boaters ended their trips at Bull Pen Bridge (13%) or Lick Log (13%).
   - Taken together, in 2013-2014, the highest boating use access areas were Burrells Ford (44% of all boaters used this for either put-in or takeout) and Bull Pen Bridge (38%).

   Summary of Findings - Results of 2014-2015 Boating Season on Upper Segment of Chattooga River

   - 60% of all boaters started their trips at Bull Pen Bridge, the other 40% started at Burrell's Ford Road.
   - The take-out used most often was Burrell's Ford, with about 60% of all use and the other 40% of boaters ended their trips at Bull Pen Bridge.
   - Total users for this season was 32 boaters

   The 2012 EA concluded that all of the Chattooga's outstandingly remarkable values (ORVs) are being protected or enhanced. No specific analysis was conducted on the ORVs for the lower

segment of the Chattooga, although the cumulative effects analysis found that ORVs for the entire river are being protected or enhanced.

Free-flowing conditions are preserved, water quality is protected and outstanding remarkable values are protected on eligible rivers on the Sumter National Forest.

2. Data to assess water quality concerns in the Wild and Scenic Rivers are probably adequate. The fecal coliform issues in the lower segment of the Chattooga Wild and Scenic River are being addressed, as time and funding permits, by the City of Clayton with assistance from the Chattooga Conservancy and Georgia Environmental Protection Division. Rabun County Trout Unlimited and others assist with collecting water samples and delivering them to be tested in the laboratory. Although progress has been made, additional work is needed to address water quality issues. Grant requests and other funding opportunities are being sought to address these needs.

   Issues with trails and camping are increasing, especially near some streams. Even on designated trails, equestrian uses are causing localized resource damage that needs ongoing attention and maintenance. User created trails create resource issues because they are not properly located, designed, managed or maintained and they have not been assessed for impacts to cultural, biological or other resources. Where these activities are occurring within designated or eligible wild and scenic rivers, increased attention, monitoring and mitigation are needed.

   Forest and District personnel monitor projects for compliance with BMPs and forest plan standards. A formal strategy on how to limit and mitigate some public uses, particularly user-created trails, may be needed to address resource damage. Some activities on private lands have affected water quality and other resources and additional work is needed to work with state and local officials to address these concerns.

Sub-Issue 2.3 – Heritage Resources

MQ 14: Are heritage sites protected?

Information

This monitoring question is responsive to goal 31. The forest manages areas with special paleontological, cultural, or heritage characteristics to maintain or restore those characteristics

The monitoring element is defined as follows:

1. Effectiveness of heritage protection measures.

Results

1. The results of site monitoring are presented below.

Table 14. Archaeological Sites

Total number of sites monitored	47
ARPA investigations	0
Damaged by logging	0
Sites damaged by forest users	2
Sites damaged by fire	0
Sites undisturbed	45

Four Priority Heritage Assets including the Badwell Cemetery (38MC360), Rose Cottage (38UN182), the Chattooga Town Site (38OC18) and the Russell House Site (38OC106) had condition assessments completed. Several cemeteries were photographed and records and photos posted on the Find A Grave website.

Vandals and artifact collectors continue to use metal detectors to search historic sites and remove artifacts. Soapstone cobbles and possible pieces of worked soapstone have been displaced and possibly removed from prehistoric soapstone quarries (38OC48, 38OC205) on the Andrew Pickens Ranger District. Unauthorized use of woods roads, ATV, horseback riding and bike trails are causing erosion and disturbance on sites. Protection boundaries were repainted on several unevaluated archeological sites. Eight fire lookout towers are historic sites in need of repair, restoration and documentation. Buildings at the Russell House Site (38OC106) continue to deteriorate.

Several sites are being damaged by water erosion along the shoreline of the Strom Thurmond Lake on the Long Cane Ranger District. South Carolina Electric and Gas Company submitted annual monitoring reports on significant archeological sites on the shorelines of the Stevens Creek and Neal Shoals Hydroelectric Projects impoundments. There was no active erosion reported. Monitored sites include 38CS167, 38CS224, 38ED48, 38ED118 and 38ED441.

Findings

1. The Forest has identified Priority Heritage Assets and is monitoring them at least once every five years. The Forest needs to develop Heritage Preservation Plans for at risk sites and implement regularly scheduled monitoring. Plowed wildlife openings should be inventoried for heritage resources and any significant sites found protected. A Forest Heritage Curation Plan should be developed to assess curatorial needs. The effects on archeological sites due to dispersed recreation should be assessed. Site management plans should be written for priority heritage assets and significant threatened sites.

Issue 3. Organizational Effectiveness

MQ 17: How do actual outputs and services compare with projected levels?

Information

This monitoring question is responsive to goals 14 and 18 and Objective 10B-OBJ-1. Objective 10B-OBJ-1 states provide local economies with 4.7 to 7.4 MMCF of wood products annually.

The monitoring element is defined as follows:

1. Emphasize high quality forest products on the Piedmont.
2. Are roads being maintained, constructed or reconstructed to reduce sediment delivery to water bodies? Provide a transportation system that supplies safe and efficient access for forest users while protecting forest resources.
3. Determine the costs of doing management.
4. Estimate the returns to counties.

Results

1. The Sumter NF sold 6.7 MMCF of forest products for sale in management prescription 10B in FY 15. Total Sumter volume sold (all management prescriptions) in FY 15 was 8.9 MMCF.

2. The roads constructed, reconstructed and maintained are shown in Table 15.

Table 15. Trend Data on Management Activities from FY11 to FY15

Activity	Unit of Measure	FY11	FY12	FY13	FY14	FY15	10 Year Plan Estimate
Volume Sold	MMCF	10.9	14.5	9.6	11.3	8.9	13.9
Road Construction	Miles	0.0	0.0	0.7	0.0	0.0	9.0
Road Reconstruction	Miles	0.0	0.6	19.0	24	13	342.0
Timber Roads	Miles	69.3	40.0	30.6	12.1	1	N/A
Roads Decommissioned	Miles	1.3	7.8	6.0[9]	6.0[10]	0.5	0.0
System Mileage	Miles	1,071	1,073	1,088	1,085	1,085	N/A
Roads Maintained	Miles	462	637	546[11]	590[12]	585.7	8,450

[9] Primarily associated with legacy and stewardship work on Enoree newly acquired lands.
[10] Soil & Water road erosion mitigation work on Long Cane district and forest wide unclassified road decommissioning
[11] Emphasis has shifted to accomplishing maintenance through timber sales and integrated target accomplishment.
[12] Emphasis has shifted to accomplishing maintenance through timber sales and integrated target accomplishment.

3. The regular budget allocation for both the Sumter and Francis Marion National Forests (information is not tracked separately for each forest) in FY2015 was $17,415,819.

4. FY 2015 payments to the counties within the Sumter National forested Totaled $1,307,990.68.

Findings

1. Timber volumes sold reflect current forest capacity. The amount of timber sold in management prescription 10B varies from year to year, depending on where timber sales are located.

2. The roads program continued to emphasize the reconstruction of roads to meet the intended traffic types and volumes safely and lessen impacts to forest resources. Road design plans emphasized mitigating negative impacts to resources and focused on improving watershed health and removing barriers to aquatic organism passage. System road projects, associated with timber sales addressed deferred maintenance activities including, resurfacing, culvert replacement and removal of vegetation encroaching on the roadway.

   Road decommissioning was emphasized through budget direction and funding allocations. Decommissioning activities were accomplished primarily on unclassified roads.

   The Sumter continued to assess the backlog of deferred maintenance needs with the focus on open roads classified as maintenance level 3, 4 or 5.

   Forest road mileage remained relatively steady, while corporate data continues to be reviewed and updated. Roads associated with new land acquisition were analyzed to be decommissioned, stored or added to the system by interdisciplinary teams.

3. The forest's regular allocated budget in FY 2015 was close to the same budget received in FY 2014.

4. Local counties again received payments in FY 2015 through The Secure Rural Schools and Community Self-Determination Act of 2000. Payments were slightly higher than in FY 2014.

MQ 18: Are silvicultural requirements of the forest plan being met?

Information

This monitoring question is responsive to goals 14 and 18.

The monitoring elements are defined as follows:

1. Are lands being adequately restocked within 5 years of regeneration treatments?

Results

1. Most stands are now regenerated by natural regeneration (seed trees vs. planted seedlings). These stands typically have regeneration far in excess of minimum numbers.

Findings

1. No additional action is needed.

MQ 19: Are forest plan objectives and standards being applied and accomplishing their intended purpose?

Information

This monitoring question is responsive to desired conditions, goals, objectives and standards in the plan.

The monitoring elements are defined as follows:

1. Are projects being managed according to requirements and making progress toward achievement of desired condition for vegetation?
2. Management of newly acquired lands.

Results

1. The Sumter has implemented timber sales and prescribed burns on a yearly basis since the forest plan was signed in 2004.

   Soil quality monitoring was conducted on the Long Cane district following protocols established in the *Soil Disturbance Field Guide* (2009). Monitoring was not done on the Enoree due to wet soil conditions at the time. Timber harvest units were randomly selected for survey. Soil-disturbance classes were used to assess effectiveness of management activities in achieving desired soil conditions relative to established Forest Plan standards. A number of soil attributes were measured (forest-floor, surface-soil and subsurface). Soil disturbance classes displayed in Table 16 range from "0" to "3" ("0" indicating no disturbance to "3" representing a high degree of soil disturbance). The overall detrimental rating reflects the percentage of the unit impacted by management activities.

Table 16. Randomly Selected Stands for Soil Quality Monitoring Disturbance Protocol on the Long Cane Ranger District

	Soil Disturbance Class				
Compt/Stand	**Proportion 0's (%)**	**Proportion 1's (%)**	**Proportion 2's (%)**	**Proportions 3's (%)**	**Detrimental Proportion (%)**
221/12	3	53	33	10	23
244/13	3	57	30	10	27
244/19	13	63	23	0	10

2. The Delta Tract was acquired on the Enoree Ranger District. Management activities began in FY 2015.

Findings

1. Timber sales and prescribed burns continue to be the major vegetation management treatments that the forest uses to create or maintain desired vegetation conditions. NNIS control and wildlife management activities also help achieve desired vegetation conditions particularly for threatened, endangered and sensitive species.

   Soil quality monitoring indicates that one unit complied with forest-wide standard (FW-3) and two units did not. The standard is set at less than or equal to 15 percent soil disturbance over the treatment area.

2. The first management activities included prescribed burning and the beginning of conversion of former hayfields back to native species. The Forest Service received Joint Chief's (Forest Service and Natural Resource Conservation Service) funding to begin project work. Management of this area and the surrounding landscape has included private lands and other federal and state agencies. A plan for management of the area has been developed. Expect future decisions and project work in the coming years.

Chapter 3 - Action Plan

Actions Not Requiring Forest Plan Amendment or Revision

a) Action: Recreation monitoring began on the Chattooga Wild and Scenic River in September 2016 and will continue for approximately 18 months. It will address monitoring questions identified in *Managing Recreational Uses in the Upper Segment of the Chattooga Wild and Scenic River Corridor* environmental assessment and Decision Notices for the: Sumter National Forest, Oconee County, South Carolina; Chattahoochee-Oconee National Forest, Rabun County, Georgia; and, Nantahala National Forest, Jackson and Macon Counties, North Carolina.

Responsibility: SO and district Recreation Specialists

Date: FY 2016 through FY 2018

Status: Data collection is underway.

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b) Action: Baseline acreage, condition and distribution of rare communities on the Forest.

Responsibility: Forest biologists and biological technicians

Date: Ongoing

Status: Continue to survey the location and condition of rare communities on the forest. Information should be entered into GIS corporate database. Project effects on rare communities and the introduction and spread of invasive plants in understory plant communities are to be addressed in project analysis.

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c) Action: Integrate plans to restore forest structure, rare communities, native understory, shortleaf pine and hardwood communities into timber projects and analysis areas.

Responsibility: SO and Districts

Date: Ongoing

Status: Completed and planned watershed assessments provide the basis for future project work and help identify opportunities to use KV and stewardship funds to accomplish work along with appropriated funds. The *Native Cane* and the *Georgia aster/Shortleaf Pine* environmental assessments has been completed and provides opportunities to improve habitat for key native species. The *AP Loblolly Pine Removal Project* environmental impact statement provides opportunities to develop woodland habitat on the Andrew Pickens Ranger District and includes improving habitat for the federally endangered smooth coneflower.

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d) Action: Incorporate wetland, riparian habitat and hardwood restoration activities into GIS corporate layer information and identify potential additional projects on the forest.

Responsibility: Forest biologists and soil scientist

Date: Ongoing

Status: Completed and planned watershed assessments provide the basis for future project work and provide opportunities to use KV and stewardship funds to accomplish work along with appropriated funds. Categorical exclusion number 18 has been used to complete NEPA analysis. This relatively new category is exclusive to restoring wetlands, streams, riparian areas or other bodies of water.

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e) Action: The forest will work with the State of South Carolina and supply information relative to prescribed burning on the forest in order to help the state meet air quality standards relative to fine particulates and ozone.

Responsibility: Districts and SO

Date: Ongoing

Status: Forest personnel will work with state personnel in order to help the state meet air quality standards. The SO will work toward collecting fine particulate monitoring information on the Andrew Pickens Ranger District.

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f) Action: The forest will develop protocols to monitor bats and will begin to inventory/monitor ecosystem recovery in restored wetlands.

Responsibility: SO Wildlife Biologist, Sumter Wildlife Biologist, SO Soil Scientist

Date: Ongoing

Status: Bat monitoring will continue on the Forest and additional information will be collected on the Andrew Pickens Ranger District coinciding with the recent federal listing of the Northern long-eared bat. An agreement with researchers at Clemson University is in place and bat monitoring will begin in FY 2016. Agreements will also be put in place to monitor/study species/habitat recovery in wetlands.

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g) Action: Aquatic species and habitat inventory and monitoring will be done on the piedmont and mountain districts through an agreement with the Center for Aquatic Technology and Transfer (CATT).

Responsibility: SO Wildlife Biologist and Sumter Wildlife Biologist

Date: Ongoing

Status: Funding agreement is in place and work will begin in FY 2016.

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h) Action: Recreation monitoring will begin on the Chattooga Wild and Scenic River starting in September 2015 and will continue for approximately 18 months. It will address monitoring questions identified in *Managing Recreational Uses in the Upper Segment of the Chattooga Wild and Scenic River Corridor* environmental assessment and Decision Notices for the: Sumter National Forest, Oconee

County, South Carolina; Chattahoochee-Oconee National Forest, Rabun County, Georgia; and, Nantahala National Forest, Jackson and Macon Counties, North Carolina.

Responsibility: SO and district Recreation Specialists

Date: FY 2015 through FY 2017

Status: Contract has been awarded and data collection is set to begin.

Actions That Require Forest Plan Amendment or Revision

No actions require a forest plan amendment.

Appendices

Appendix 1. Summary of Smooth Coneflower *Echinacea laevigata* Monitoring Data, Sumter National Forest, Andrew Pickens District

Name	EO ID	≤1980	1985/86	1991	1993	2000	2002	2004	2006	2007	2008	2010	2012	2014	2015	2016	Trend Since: 1993	Trend Since: 2006	Recent Veg Man[5]	EO located in Stand Interior?[6]
Flint Creek	**SC-12936**				1					7		6		2			>	<	2014	No
	SC-2094	193			95					14	20	23		50			<	>	2014	Yes -in part
	SC-2654*				35					nf		3		8			<	>	2014	No
	SC-7797				87					126		184	53	117			>	~	2014	No
	TOTAL	193			218					147	20	216	53	177						
Cedar Creek	**SC-7681**				45	32		38	52	61		22	16	14			<	<	2014	No
	SC-5644	38		40	10	nf	12	nf		28		18	19	16			>	<	2014	No
	TOTAL	38		40	55	32	12	38	52	89		40	35	30						
Joel Ridge	**SC-12899**[1]									100		213		73		461		>	2014/2016	Yes
	SC-12930											12				160		>	2016	Yes
	TOTAL									100		225		73		621				
Longnose	**SC-12931**[2]							331	190	116		5			50			<	2015	Yes
(SC-12931 is a planted	**SC-8455**				9		4	5	nf	nf		nf			2		<	>	2015	No
population)	**TOTAL**				9		4	336	190	116		5			52					
Pine Mountain	**SC-4348**			75	250			518		515		500			838		>	>	2015	Yes
	SC-7274			75	231			459		500		500				1160	>	~	2016	Yes
	TOTAL			150	481			977		1015		1000			838	1160				
Poor Mountain	**SC-10342**[1]									27	26			37		81		>	2014/2016	Yes -in part
[=Buzzards Roost]	**SC-2667**[1]										P	109		25		92		~	2014/2016	Yes -in part
	SC-7798				10						<10			3			<	~?	2014	No
	SC-3983				P							671					?	?		
	SC-6093[7]				P							253				231	?	?	2016	yes
	TOTAL			0	10					27	26	1033		65		404				
Rifle Range	**SC-12934**				11					1		nf			nf	3	<	<	2016	Yes -in part
	SC-3984				35			56		88		170	150	170		342	>	>	2014/2016	Yes
	TOTAL				46			56		89		170	150	170		345				
Rich Mt	**SC-2050**				12				10	7		23		30			>	>	2014	Yes
	SC-7464	9		150	130	350		343		540		300			519		>	~		Yes, in part
	TOTAL	9		150	142	350		343	10	547		323		30	519					
US76	**SC-5518**[3]			30	56			123		37		51		23			<	<	2014	Yes, in part
Unity Ch Rd/Steppes Mt	**SC-3998**				6					10	10	24		16		105	>	>	2014/2016	Yes, in part
Questionable EOs:																				
Poor Mountain	**SC-1361**[8]**#**		P								nf						?	?		
Poor Mountain	**SC-79#**			1							nf						?	?		
Rich Mt South	**SC-2687^**	P			4												?	?		n
Rich Mt South	**SC-6797#**		P								nf						?	?		n
Spy Rock Rd	**SC-8974#**	P/nf[4]															?	?		n
Unity Ch Rd/Longnose Mt	**SC-12932**											P(2)		nf				?		
Unity Ch Rd -Private	**SC-7218#**				25						nf	nf		nf				?		
AP TOTAL Known		240	0	371	1052	382	16	1873	252	2177	56	3087	238	584	1409	2635				

Legend:

nf = not found

2 areas of SC-2654 were recorded separately for some years but not consistently; therefore, only the summed EO record is shown.

1 IN 2014, Found/surveyed only 1 of 2 described 'patches' for each: SC-12899, SC-2667, and SC-10342

2 [2010 monitoring] site most likely not searched thoroughly (R. Mackie - 11/17/2011)

3 in 2010; 23 plants ROW, 28 plants interior; 2014 23 in ROW, none found in interior.

4 Pre-1979, population of unknown size. In 1979, unable to relocate.

5 Vegetation management refers to use of hand pruners and chainsaws in Smooth coneflower sites in late Fall/Winter of 2014 and 2015 for reducing woody competition;
This was usually done immediately following surveys (Contract Ecologist David White).

Legend Continued:

6 Most plants (EOs) are located on or adjacent to roadside right of ways except for a few in the interior of the stand. Some EOs occur in both.
7 All plants counted in 2016 were solely within State heritage preserve in 3 patches, 1 of them ca. 150 ft. from State/FS boundary (state painted boundary);
8 determined to be incorrect spatial information;

Inventory History:
1980: Inventory of Threatened or Endangered Plants on the Sumter National Forest. 1980. Southeastern Wildlife Services, Inc. Athens, GA;
1992, 2002, 2006: USFS - Sumter National Forest Personnel. 1991 (Shatley), 2002 (Mackie), 2006 (Mackie and Foster). Mountain Rest, Columbia, and Edgefield, respectively;
1993: Emanuel, Carlan M.1996.MS Thesis – Silvicultural Options for Recovering the Endangered Smooth Coneflower, Echinacea laevigata (Boynton and Beadle) Blake. Clemson, SC
2000, 2004: Earth Design. 2000, 2004. Monitoring, Evaluation, & Status of Smooth Coneflower (Echinacea laevigata) Population Sites, Pickens, SC;
2007: USFS – Joyce Foster, Robin Mackie, Jeff Magniez; SCDNR - Bert Pittman and Kathy Boyle, and Poor Mtn. by Mary Bunch
2010: USFS: Robin Mackie, Jeff Magniez: SCDNR: Bert Pittman, Kathy Boyle, Mary Bunch
2012: USFS - Robin Mackie; Contract Ecologist David White
2014, 2015. 2016 - Contract Ecologist David White

Appendix 2. Smooth Coneflower (*Echinacea laevigata*) Prescribed Burning History, Andrew Pickens Ranger District, Sumter National Forest, SC

Burn Unit	1994	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2012	2013	2014	2015	2016
Flint Creek										x						X 5/2				
Cedar Creek									x							X 5/2				
Rich Mountain	x		X 3/3					X 3/10		X 2/19			X 2/28				X 3/18		X 4/9	
Pine Mountain		x		X 3/17		X 3/2		X 3/11			X 2/10			X 3/4	x		X 3/28			
Rifle Range			X 3/3		x	X 1/26		X 3/10		X 2/19			x	X 3/19		X 3/14				X 3/16
Lake Cherokee[1]						X 2/3			X 3/25						X 3/20		X 4/22			X 3/7
Longnose							X 3/6					X 3/9			X 3/9				X 4/27	
Buzzard Roost			x												X 4/30					

[1]Lake Cherokee is a sun-facing coneflower (*Rudbeckia heliopsidis*) burn unit

_____ Month/Day information not located (no burn recorded)

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Current Amendments to Forest Plan

Amendment #1 to the 2004 *Revised Land and Resource Management Plan Sumter National Forest* was signed on January 31, 2012 for *Managing Recreation Uses in the Upper Segment of the Chattooga Wild and Scenic River Corridor*.

SUMTER NATIONAL FOREST
FISCAL YEAR 2015
MONITORING AND EVALUATION ANNUAL REPORT

COMMENT FORM

If you would like to submit comments on this report, please fill out this form and return it to the address indicated below. Please include your name and address at the bottom of the form.

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