National Forests in North Carolina

FY 2009 Monitoring and Evaluation Report

Nantahala * Pisgah * Uwharrie * Croatan

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Monitoring the endangered plant species
***Geum radiatum* (spreading avens)**

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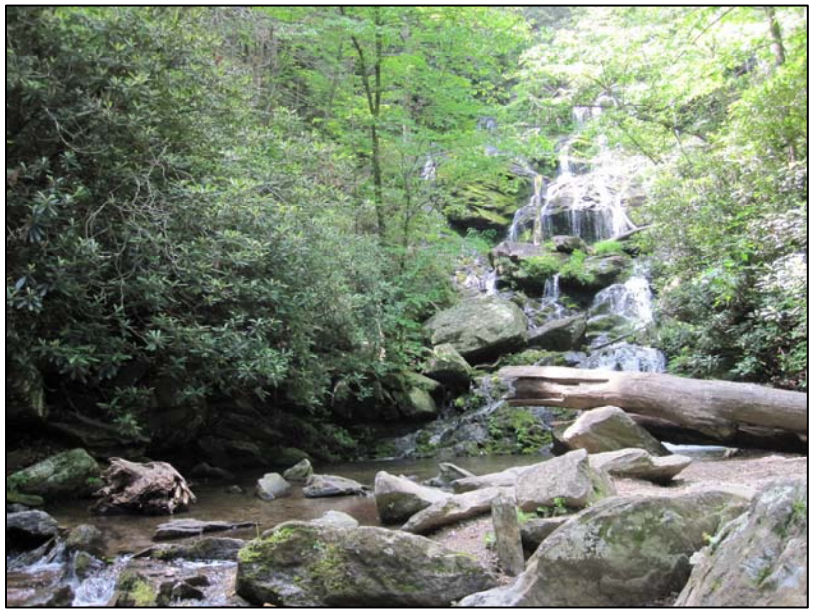
PREFACE



Catawba Falls – Grandfather Ranger District

Forest plan monitoring and evaluation reports are essential elements for maintaining valid and effective Land Management Plans. Nantahala and Pisgah National Forests operate under a plan signed in 1987 and significantly amended (Amendment 5) in 1994. Revision of this plan will begin no earlier than FY 2012. The original plan for the Uwharrie National Forest was signed in 1986. This plan's revision was on hold in FY 2009. A revised Croatan National Forest plan went into effect in FY 2003. A 5-year Review of the Croatan Plan was completed in FY 2009 and can be accessed through the Forest web site. The various plans also are available online.

The Annual Monitoring and Evaluation Report for FY 2009 is organized into broad resource topic areas.

KEY FINDINGS AND CERTIFICATION

- Improvements to recreation facilities took place on every district of the National Forests in North Carolina.
- Timber stand improvement activities exceeded plan projections by 54%.
- Nantahala/Pisgah timber harvest acres were 18% of plan projections; Uwharrie harvest acres were 75% of plan projections; Croatan harvest acres consist entirely of thinning loblolly stands (no specific amount designated in the plan.)
- Numerous projects to control the spread or non-native invasive species occurred on the Nantahala and Pisgah National Forests.
- The subpopulations of Threatened Mountain Golden-Heather (*Hudsonia montana*) on Shortoff Mountain more than tripled in response to lightening-set fire in 2007, whereas the subpopulations on the Chimneys (which did not burn) have declined by about half in the same time period.
- Black bear populations continue to increase, with the greatest amount of increase in the coastal areas.
- Eight Indiana bats and several new Indiana bat roost trees were identified on the Nantahala National Forest during FY 2009.
- Water quality monitoring indicates 91% of sites meet or exceed forest plan standards, with 7.3% exhibiting low sediment yields without adverse effects, and 1.8% of sites exhibiting adverse sediment yields.
- All four national forests are attaining the air quality standards for ozone and particulate matter.

Forest Supervisor's Certification

I have evaluated the monitoring results and I have directed that the Action Plan be implemented according to the time frames indicated, unless new information or changed resource conditions warrant otherwise. I have considered funding requirements in the budget necessary to implement these actions.

During FY 2010, the Plan for Nantahala and Pisgah National Forests will be amended to update direction for conservation of the Indiana bat. The revised Croatan National Forest Plan is sufficient to guide forest management. For the Uwharrie National Forest, plan revision is expected to resume in 2010.

Any amendments or revisions to the Forest Plans will be made using the appropriate National Environmental Policy Act (NEPA) procedures.

/s/ Steve Lohr (for) June 25, 2010

MARISUE HILLIARD
Forest Supervisor

Date

FY 2009 Monitoring Results

Goal or Desired Condition: A wide variety of recreational opportunities are provided with increased opportunities for non-motorized recreation. Activities, facilities, and programs are accessible to the extent possible.

Monitoring Item	Results
To what extent are management activities appropriate for moving areas of the Forest toward the desired conditions for recreation? To what extent has accessibility improved?	**Improvements to Recreation-related Facilities** **Pisgah National Forest** Appalachian Ranger District • Black Mountain Recreation Area: Constructed 4-unit toilet building and improved 5 campsites; constructed administrative office for campground hosts and interpretation • Carolina Hemlocks Recreation Area: Constructed 4-unit toilet building • Stackhouse Boating Take-out: Installed 2-unit CXT vault toilet with accessible walkways Pisgah Ranger District • Coon Tree Picnic Area: Constructed 4-unit toilet building and improved picnic sites • Sycamore Flats: Constructed accessible fishing pier in partnership with NC Wildlife Resources Agency • Lake Powhatan Recreation Area: Constructed 4-unit toilet building near the Lake day-use area • Cove Creek Group Camp: Installed two 2-unit CXT vault toilet with accessible walkways; constructed an accessible water hydrant • Cradle of Forestry: Developed an adventure trail in partnership with the Autism Society; repaired/improved historic structures: Black Forest Lodge, King House,

Monitoring Item	Results
	and Cantrell Creek Lodge **<u>Nantahala National Forest</u>** Cheoah Ranger District • Tsali Recreation Area: Installed 4 new recycled plastic picnic tables and hardened pads at the bike trailhead; installed solar shower at bike wash station Nantahala Ranger District • Dry Falls Recreation Area: Constructed 26-site parking area (including accessible parking, 2 picnic sites and information kiosk) and accessible overlook/desk to view falls; installed 2-unit CXT vault toilet with accessible walkways • Balsam Lake Lodge and Day Use Area: Repainted exterior of lodge**;** replaced picnic tables**;** repainted three accessible fishing piers; painted floating dock and improved trail access to it Tusquitee Ranger District • Jackrabbit Mountain Recreation Area: Constructed bike trail parking facility; assisted TVA and NC Wildlife Resources Commission with construction of accessible fishing platform/deck **<u>Croatan National Forest</u>** • Flanners Beach/Neuse River Recreation Area: Electrified 6 sites (increasing the number of electric sites from 14 to 20) **<u>Uwharrie National Forest</u>** • Tot Hill Trailhead: Constructed 7-vehicle parking facility • Flintlock Valley Shooting Range: Constructed accessible route to vault toilet • Badin Lake OHV Trail Complex: Constructed 2-unit CXT vault toilet

Monitoring Item	Results
Are Visual Quality Objectives being met? Is the scenery being maintained or enhanced?	NO REPORT
National Visitor Use Monitoring	NO REPORT

Goal or Desired Condition: A variety of silvicultural treatments are used to provide a continuous supply of wood products, with emphasis on high quality hardwoods (Nantahala/Pisgah).

Monitoring Item	Results
Southern Pine Beetle Restoration & Prevention FY 2009	**Croatan**: Reforestation: Site Prep. for Planting = **0** Planting & Natural Regeneration= **38** TSI: Release of Planted Seedlings = **0** SPB Prevention: Precommercial Thinning = **261** **Uwharrie**: Reforestation: Site Prep. for Planting = **160** Planting & Natural Regeneration= **128** TSI: Release of Planted Seedlings = **0** SPB Prevention: Precommercial Thinning = **0** **Nantahala/Pisgah**: Reforestation: Site Prep. for Planting = **0** Planting & Natural Regeneration= **145** TSI: Release of Planted Seedlings = **815** SPB Prevention: Precommercial Thinning = **0**
Timber Stand Improvements (TSI), FY 2009	TOTAL for FY 2009 Croatan: **308** Uwharrie: **130** Nantahala/Pisgah: **3,385** PLANS PROJECTED = 2,487 acres

Monitoring Item	Results
Acres Harvested in FY 2009 by Method, and Plan Projected Harvest	

Croatan

Method	FY 2009 Harvested Acres	Plan Projections*
Even-Aged/ Two-Aged	0	N.A. The thinning is occurring in predominantly loblolly stands that must removed before longleaf restoration can occur.
Uneven-Aged	0	
Thinning	573	
Salvage	0	
Shelterwood Removal	0	
TOTAL	**573**	

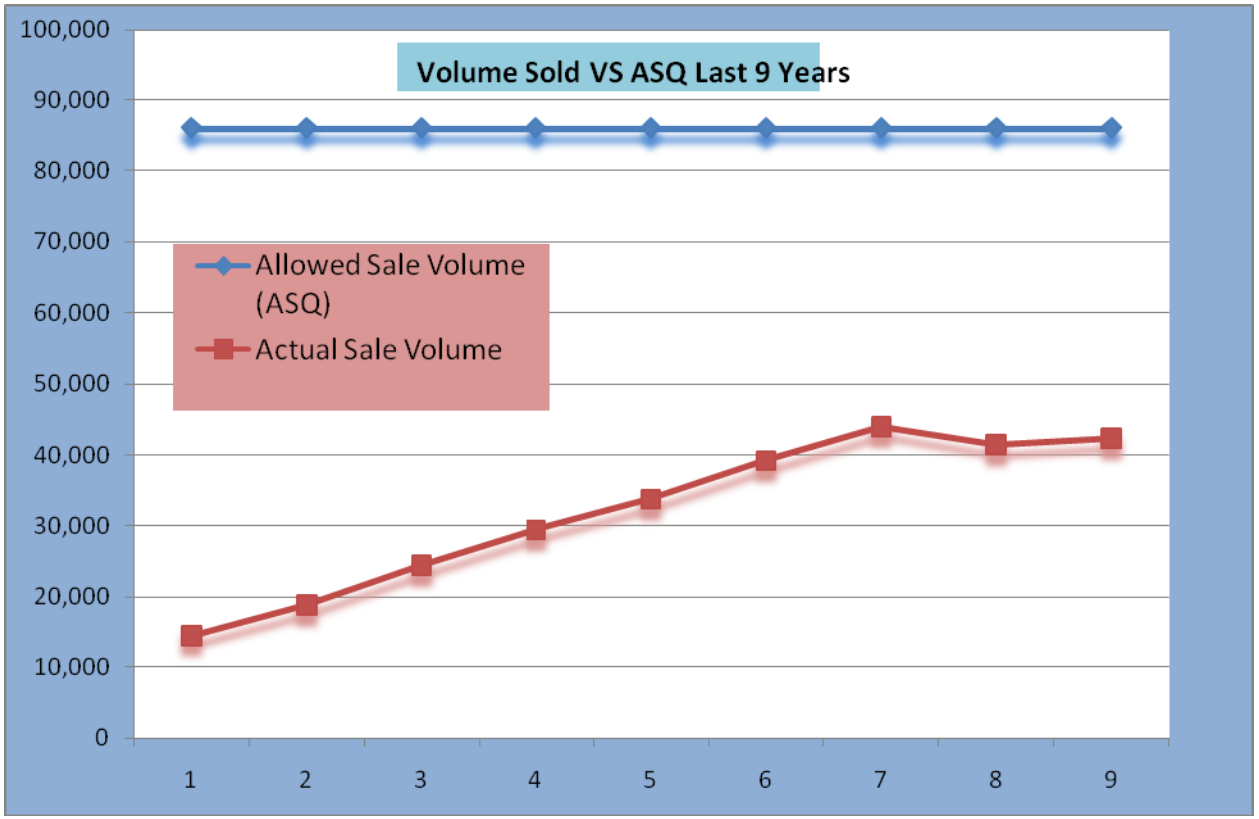
Uwharrie

Method	FY 2009 Harvested Acres	Plan Projections
Even-Aged/ Two-Aged	116	400
Uneven-Aged	0	0
Thinning	415	310
Salvage	0	N.A.
Shelterwood Removal	0	N.A.
TOTAL	**531**	**710**

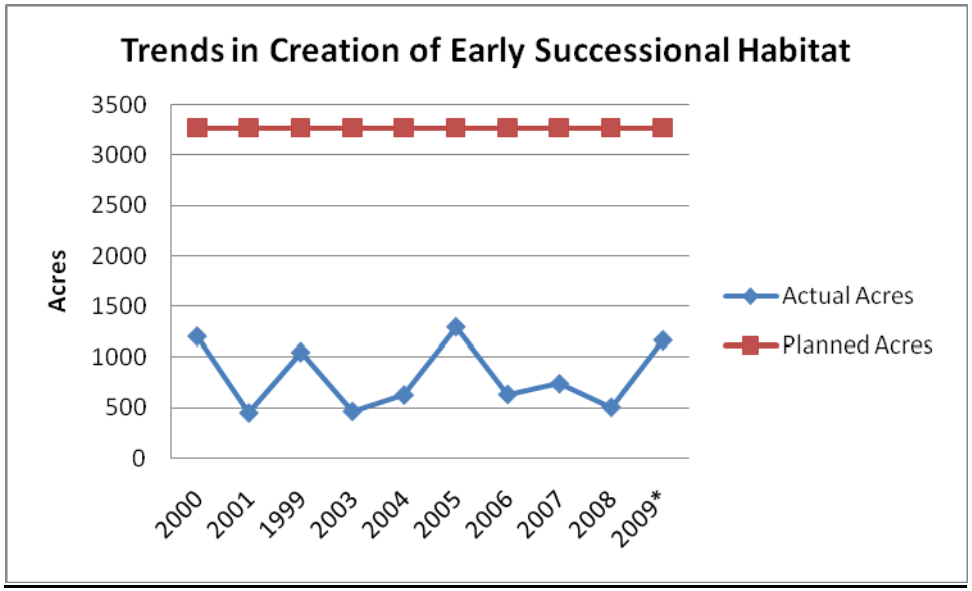
Nantahala/Pisgah

Method	FY 2009 Harvested Acres	Plan Projections
Even-Aged/ Two-Aged	403	2,767
Uneven-Aged	63	500
Thinning	83	N.A.
Salvage	0	N.A.
Shelterwood Removal	29	N.A.
TOTAL	**579**	**3,267**

Timber Sale Volume



Goal or Desired Condition: Maintain, and where possible, enhance the diversity of plant and animal communities.

Trends in Creation of Early Successional Habitat	 *FY 2009 Actual Acres include 580 acres of prescribed burning for wildlife habitat on the Uwharrie National Forest. All other displayed acreages are for creation of Early Successional Habitat through timber harvest and regeneration. Creation of early successional habitat is well below the amount desired.

Restoring Native Diversity

Non-native Invasive Species Removal:

Control of invasive plant species is prioritized across the forests based on threats to federally listed species, Region 8 sensitive species, NFsNC locally rare species, rare plant communities, and high quality plant communities within special interest areas. Emphasis is also given to control areas with identified cooperators or volunteers and control on adjacent non-USFS lands. Secondary emphasis is with projects controlling infestations of prioritized NNIS. Species were prioritized based on known infestations, threats to native ecosystems, potential rate of spread and management ease across the individual forests in North Carolina. Finally some sites are selected prior to vegetation management projects. All the control work in FY 2009 occurred in the mountain forests since there currently are no forest-wide decisions in place for the Uwharrie and Croatan NFs for control of invasive plant species.

Non-native invasive plant control projects across Nantahala and Pisgah NFs in FY 2009:

Site	Ranger District	Priority	Invasive Species
Shope Creek	**Appalachian**	**Impacts to rare communities, vegetation management**	**OB, JS**
Roan Mountain	**Appalachian**	**Impacts to globally rare plant communities**	**OB, C**
Nolichucky Gorge	**Appalachian**	**Impacts to federally listed species**	**OB, JK, MR**
Paint Fork/ Hot Springs	**Appalachian**	**Impacts to rare plants and communities in special interest areas**	**OB, LJ, P, JK**
Harmon Den	**Appalachian**	**Vegetation management project and early detection and control**	**GM**

Linville Area	**Grandfather**	**Impacts to rare species and rare communities**	**PT, TH**
Old House Gap	**Grandfather**	**Vegetation management project**	**MS, OB**
Pink Beds	**Pisgah**	**Impacts to federally listed plant and rare community**	**P, OB, MR**
Foster Creek	**Pisgah**	**Impacts to rare community**	**M**
Bent Creek	**Pisgah**	**Vegetation management project**	**OB**
Nantahala Gorge	**Nantahala**	**Impacts to rare plants and rare communities**	**P, MR**
Whiteoak Creek	**Nantahala**	**Impacts to federally listed plant**	**JK**
Tellico Gap	**Nantahala**	**Early detection and control**	**GM**
Chunky Gal Mountain	**Tusquitee**	**Impacts to rare communities**	**JS, MR**
Cheoah River	**Cheoah**	**Impacts to federally listed plant**	**OB, K, LJ, P, TH, M, PT, MR, D**
Fontana Village	**Cheoah**	**Impacts to rare communities**	**OB**
Yellow Creek Burn	**Cheoah**	**Vegetation management project**	**OB**

OS= Oriental Bittersweet (*Celastrus orbiculatus*)
JS = Japanese Spiraea (*Spiraea japonica*)
C = Coltsfoot (*Tussilago farfara*)
LJ = Japanese honeysuckle (*Lonicera japonica*)
P = Privet (*Ligustrum sinensis*)
JK = Japanese Knotweed (*Reynoutria cuspidatum*)
GM = Garlic Mustard (*Aillaria petiolata*)
PT = Princess Tree (*Paulownia tomentosa*)
TH = Tree-of-heaven (*Ailanthus altissima*)
MR = Multiflora Rose (*Rosa multiflora*)
K = Kudzu (*Pueraria montana*)
M = Mimosa (*Albizia julibrissin*)
D = Chinese Yam (*Dioscorea polystachya*)
MS = (*Miscanthus sinensis*)

	Non-timber Forest Products The two highest value non-timber forest products issued on the National Forests in North Carolina continues to be for Galax (*Galax urceolata*) leaves and American ginseng (*Panax quinquefolius*) roots. For the past five years the quantity of permitted Galax leaves has doubled. In FY 2009 there was a 47% increase in permits compared to the previous year. This increase is attributed both to the down turn in the economy and recent increases in wholesale values. American ginseng permits in the 2009 calendar year were similar to 2008 but still remained at an historical 10-year high. The increased number of permits issued is attributed to more compliance with the permit process given recent high profile prosecutions, and the continuing high value for ginseng roots.

Goal or Desired Condition: Maintain viable populations of existing native wildlife, fish, and plants. Threatened and endangered plant and animal species are protected, managed or recovered consistent with the Endangered Species Act; and sensitive species are conserved.

Status of Threatened and Endangered Species	**Monitoring Rare Plant species** Given the number of rare plant species documented across the four forests on the National Forests in North Carolina, monitoring priorities are determined based on the rarity of the taxon and the known or suspected threats. The top priorities are the federally listed species. **Federally Listed Plant Species** Eleven federally listed threatened and endangered (T&E) plant species have been documented in the National Forests in North Carolina (NFsNC). Two hundred ninety-two discrete T&E plant subpopulations have been documented for these 11 species (Table 1). As expected of those rarest species, the 11 federally listed plants are unevenly distributed across the NFsNC. Of the 11 recorded species, nine species have been documented on the Pisgah NF, four species across the Nantahala NF, and one each on the Uwharrie and Croatan National Forests. The Appalachian Ranger district has the greatest number of species, five, as well as number of subpopulations, 71 (Figure 1). Both the Nantahala

and the Grandfather districts have four species, even though the Grandfather has twice the number of subpopulations as the Nantahala. Most of the other districts have from 20-30 subpopulations, these representing either one or two species. The Croatan is unique with a large number of subpopulations of a single species. Currently there are no documented federally listed plant species on the Tusquitee, although two species are known nearby on private property. The number of subpopulations varies by species ranging from four for the possibly extirpated orchid, *Isotria medeloides*, to 60 for *Lysimachia asperulifolia* on the Croatan NF (Table 1).

Table 1. Distribution of federally listed threatened and endangered (T&E) plant species across the NFsNC.

Species	Subpopulations	Forest	Districts
Gymnoderma lineare	57	Pisgah, Nantahala	Cheoah, Nantahala, Pisgah, Appalachian, Grandfather
Isotria medeloides	4*	Pisgah, Nantahala	Nantahala, Grandfather
Spiraea virginiana	37	Pisgah, Nantahala	Cheoah, Nantahala, Appalachian
Hudsonia montana	33	Pisgah	Grandfather
Helonias bullata	14	Pisgah	Pisgah
Houstonia montana	19	Pisgah	Appalachian
Geum radiatum	22	Pisgah	Appalachian
Solidago spithamaea	8	Pisgah	Appalachian
Liatris helleri	16	Pisgah	Grandfather
Helianthus schweinitzii	22	Uwharrie	Uwharrie
Lysimachia asperulifolia	60	Croatan	Croatan

*Recently extirpated from all 4 sites, restoration efforts completed for 2 sites

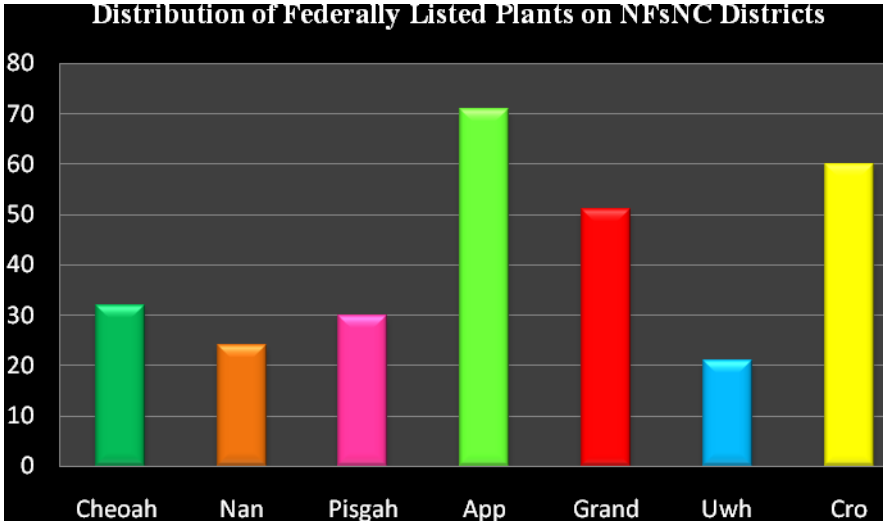


Figure 1. Number of federally listed plant subpopulations by NFsNC District.

In FY 2009 the following species were tracked by NFsNC personnel:

Houstonia montana: Nineteen separate subpopulations are documented for this species within the Appalachian Ranger District, all except one which occur on Roan Mountain. Two subpopulations on Roan Mountain were monitored in 2009 for the third year in sequence. The two subpopulations varied dramatically during the past three years (Figure 2). The bus parking lot subpopulation experienced less than a 1% change from year to year both in the area coverage and the number of occupied plots (varying from 165 to 176). In contrast the Cloudland Hotel subpopulation declined dramatically from 2007 to 2009 both in the number of occupied plots (315 to 224) and the coverage (2428 centimeters square to 1272).

Two other very small (less than 50 total stems) subpopulations were counted in 2009. There stem numbers have varied less than 5% during the past three years. Four other subpopulations were noted to be present in 2009, although no detailed quantitative data was recorded.

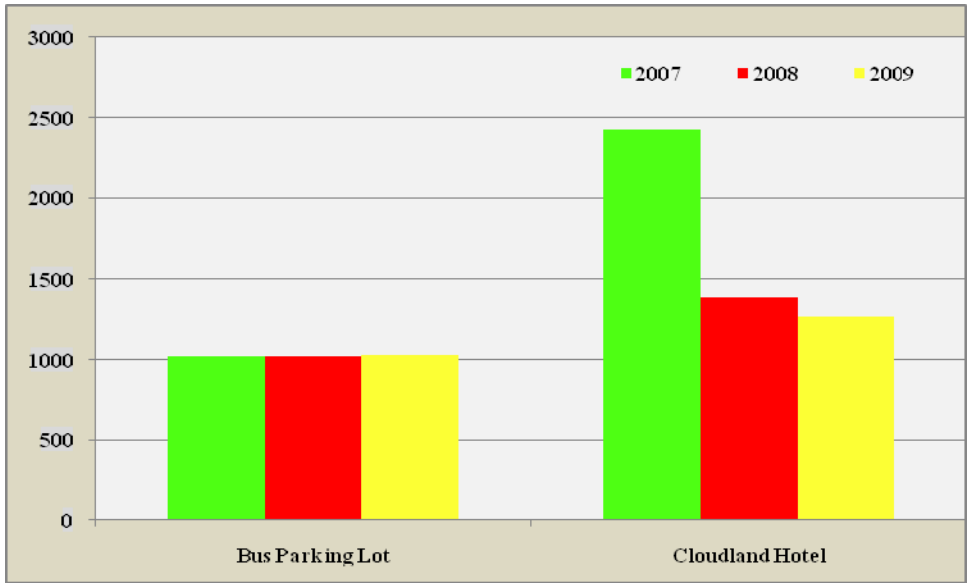


Figure 2. Change in area coverage (centimeters square) from 2007-2009 for Houstonia montana within 2 subpopulations on Roan Mountain.

Solidago spithamaea: Eight subpopulations of this unique goldenrod were historically documented on the NFsNC, all on Roan Mountain. Seven are known to extant. For the second year two of the smaller subpopulations were tracked by counting the number of clumps and rosettes. During the last two years this species has remained fairly constant, declining less than 3% from 2008-2009. One other large subpopulation of this species was noted to be present in 2009.

Geum radiatum: As for the previously two mentioned T&E species, all 22 subpopulations are known from the summit communities on Roan Mountain. With incorporation in a demographic study administered by Chris Ulrey, ecologist for the Blue Ridge Parkway, clumps for five of the subpopulations have been tracked for the last two to five years. Data recorded within the demographic study include clumps, denoted by a separation

	distance of at least 25 centimeters, number of rosettes per clump, and number of flowers per clump. Four of the five subpopulations with most extensive years of data collection appear to be relatively stable; however there has been exceedingly low seedling recruitment. Six other small subpopulations were also been tracked in 2009 by rosettes per clumps. They also appear to be relatively stable. **Helonias bullata:** Fourteen discreet subpopulations of swamp pink have been documented across the Pink Beds on the Pisgah Ranger District since 2000 (figure 3). An additional 16 subpopulations have been historically delineated since the early to late 1970s. Periodic searches for the historically known subpopulations have not been successful. Since the data was collected prior to GPS instruments, the resolution may be too coarse to precisely relocate and differentiate with currently known subpopulations. In 2009 three historical subpopulations were carefully searched for. Two subpopulations were not relocated while a third was relocated and combined to delineate a larger recently known subpopulation. Monitoring was completed across seven of the recently documented subpopulations in 2009. Precise rosette counts were recorded for three of the subpopulations while estimates were determined for the remaining three subpopulations. Since both flooding and non-native invasive plants are known to be threatening the Pink Beds area, the presence of invasive plant species was recorded as well as recent beaver activity. One of the sites is close to an enlarging beaver impoundment.

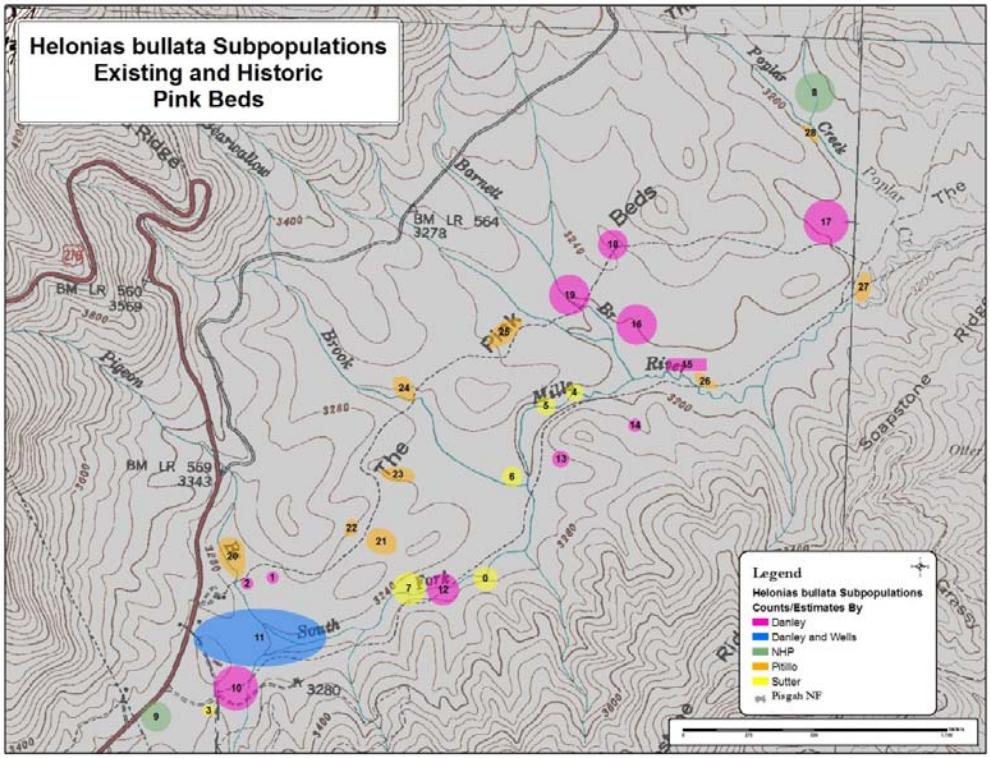
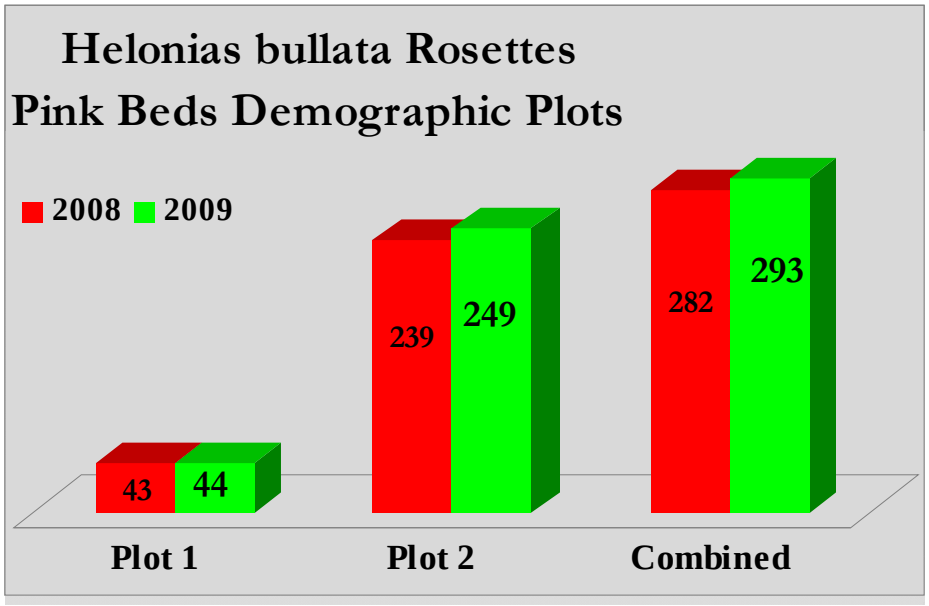


Figure 3. Existing (Danley, Danley and Wells, and NHP) and historical (Pittillo and Sutter) subpopulations documented across the Pink Beds in the Pisgah Ranger District.

The remaining monitored subpopulation is located downslope of the Cradle of Forestry amphitheater which was constructed in 2006. Rosette counts have been estimated along 50-meter lengths within the larger drain downslope of the amphitheater. In addition two macroplots were established in 2008 and demographic data (patches, rosettes and leaves) collected for the past two years. The demographic data did not vary by patch number although there was an increase in rosette numbers (282 to 293) and number of leaves (2172 to 2505) during the two years. Since the data collected across all the subpopulations have not been systematically and consistently collected for more than several years, meaningful population trends for the Pink Beds Helonias bullata population

have not been determined yet.

Figure 4. Change in *Helonias bullata* rosette numbers from 2008 to 2009 in two macro plots in the Pink Beds.



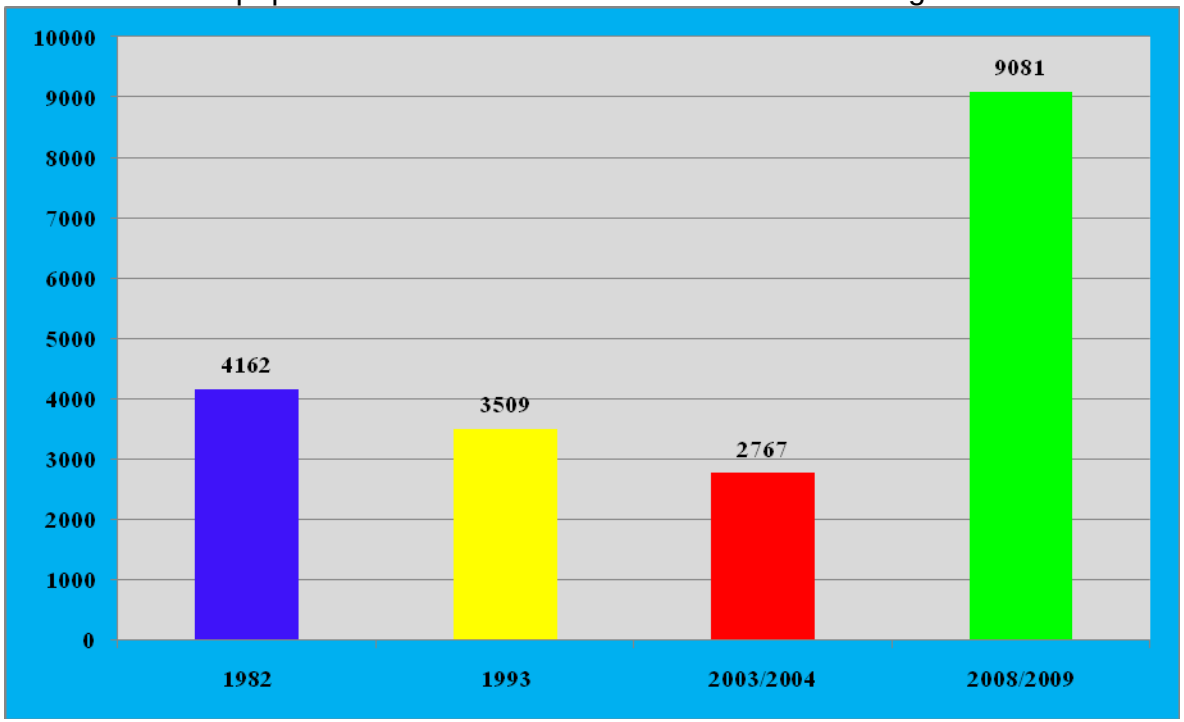
Gymnoderma lineare: This lichen is known to occur across every mountain ranger district except the Tusquitee. Fifty-seven subpopulations are currently known, one new site was detected in 2009 on the Cheoah Ranger District. In FY 2008, a new rapid assessment form, recording coverage estimates and health of the lichen, was developed by the US Fish and Wildlife Service, Blue Ridge Parkway, and USFS. In FY2009, baseline data was collected across four of the currently known subpopulations. All four of the sites were healthy. Two of the assessed sites were located within boulders along streams. The remaining two are located on shaded rock outcrops at high elevation.

In addition two sites with permanent long-term monitoring plots were revisited. It was no longer possible to monitor the permanent plot at Setrock Creek given down trees completely covering its extent. While no data was collected for the permanent plots, a

	larger *Gymnoderma lineare* colony was located upstream. The other site in the Horsepasture River was successfully monitored. Monitoring data indicate a slight decline (less than 5%) in the number of occupied plots and the coverage since 2004, when it was last monitored. One concern noted at the site was the prevalence of numerous unhealthy squamules on the lichen, with numerous black growths. **Isotria medeloides:** This diminutive orchid is known historically across four subpopulations **on** the Nantahala and Grandfather Ranger Districts. One-third of the surrounding canopy and sub-canopy trees were recently felled across two of the historic subpopulations to increase light levels at the forest floor and thereby improve suitable habitat. Searches across these two sites in 2009 were unsuccessful. **Spiraea virginiana:** The shrub is known across the NFsNC within the Nolichucky River Gorge, in the Cheoah River, and in Whiteoak Creek. Non-native invasive (NNIS) plants are threatening all 37 of these subpopulations. Visits were made to all the subpopulations in 2009. In the Nolichucky River Gorge four of the subpopulations were relocated, there were not. Either a dense infestation of NNIS or a substantial log jam was located in the sites with missing Virginia Spiraea individuals. Each relocated subpopulation was assessed for aerial extent of coverage. NNIS were treated across two of the occupied sites here in the Nolichucky Gorge. Impacts (gnawing and cutting stems) from beavers were noted across three subpopulations within the Cheoah River. NNIS were treated within 100 feet of all the Virginia Spiraea subpopulations on the Cheoah River as well as Whiteoak Creek. Two separate *Spiraea virginiana* clumps with five stems were recorded at the Whiteoak Creek site following treatment. This represents a decline of about 75% its previous extent in the mid-2000's. The treated Japanese knotweed infestation surrounding this small Virginia Spiraea subpopulation undoubtedly negatively impacted this federally listed shrub. **Hudsonia montana:** All the known populations for this sub-shrub occur on the Grandfather Ranger District. A complete census of the subpopulations has been completed approximately every 10 years since 1982. An update to the census was completed in 2008 and early 2009 on Shortoff Mountain to document any changes as a result of the

large stand replacement duff-burning lightening-set fire of 2007. The fire increased suitable habitat and more than doubled the previous high tally recorded for these 14 subpopulations. These increases are reflective of large increases in the smallest size class category recorded for the census.

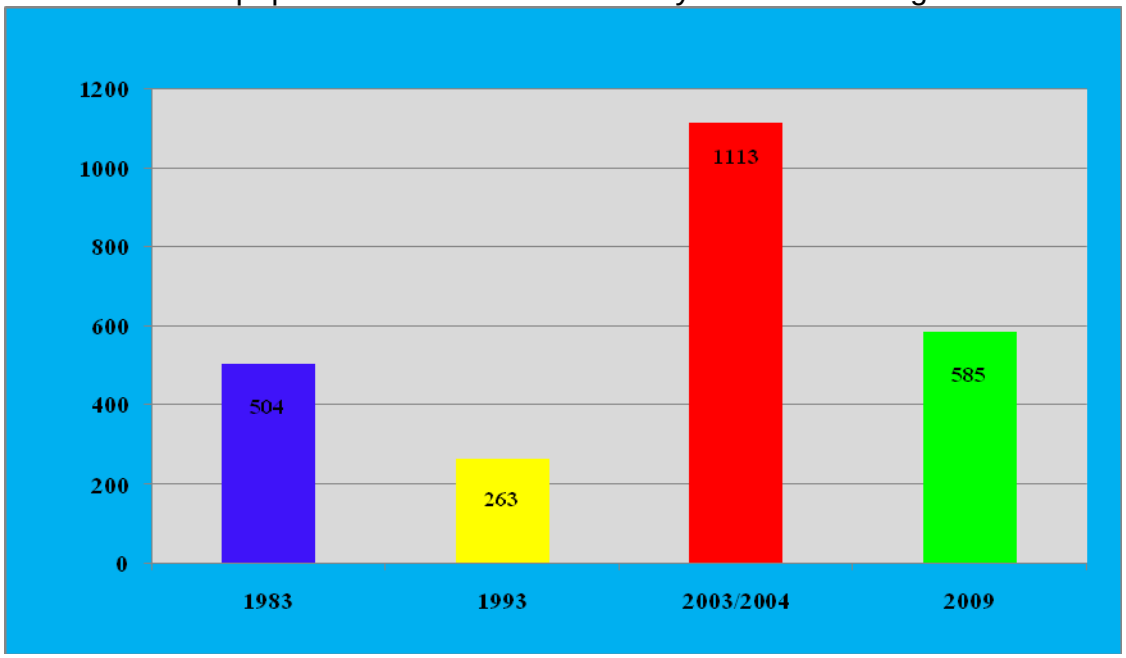
Figure 5. Population census (discrete clumps) from 1982 to 2008 and 2009 for 14 *Hudsonia montana* subpopulations on Shortoff Mountain in Linville Gorge Wilderness.



All the remaining *Hudsonia montana* subpopulations were also censused in 2009. This includes the single subpopulation on Table Rock, and the two subpopulations at Woods Mountain. In contrast to the increasing population numbers recorded at Shortoff Mountain, there has been a 53% decline in *Hudsonia montana* clumps across the 19 subpopulations surrounding the Chimneys and Chimney Gap in Linville Gorge Wilderness (Figure 6). A 76% decline in abundance (191 reduced to 46) was recorded at Table

Rock, while less of a decline (from 690 to 589 clumps) occurred at Woods Mountain during the last five years. All three of these areas in decline have not had a prescribed burn within the surrounding plant community for at least seven years.

Figure 6. Population census (discrete clumps) from 1982 to 2008 and 2009 for 19 *Hudsonia montana* subpopulations across the Chimneys in Linville Gorge Wilderness.

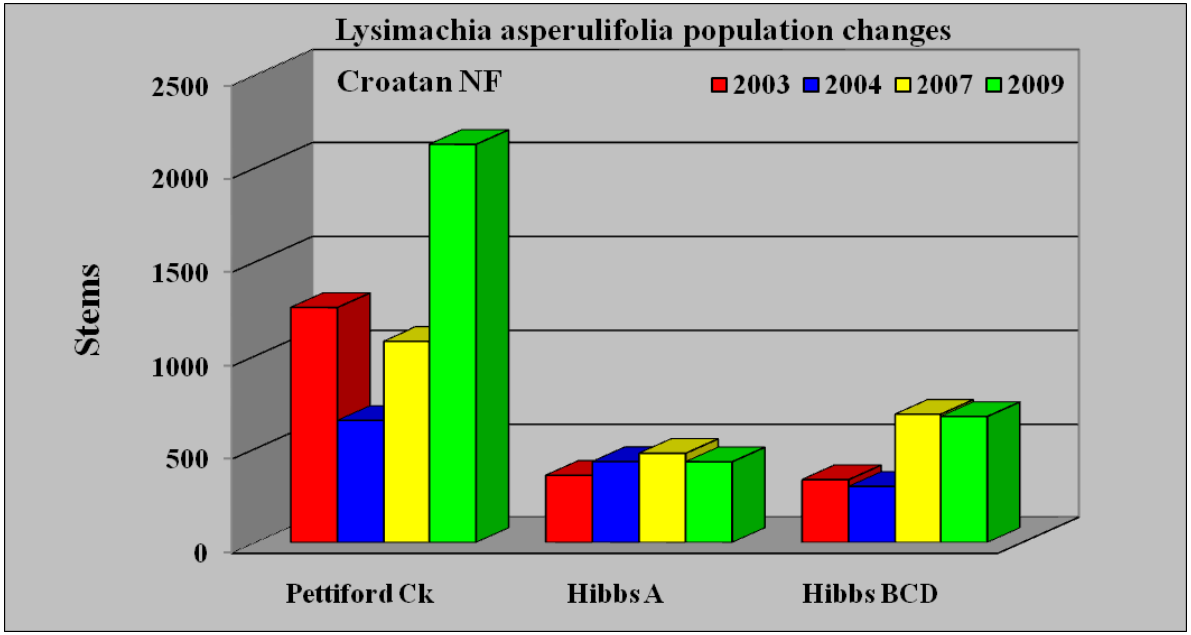


Liatris helleri: There are 16 subpopulations for this species recorded within the Linville Gorge Wilderness and Big and Little Lost Cove Cliffs. Eight subpopulations were noted (qualitative presence with flowers and/or fruits) during the monitoring surveys conducted for *Hudsonia montana* on Shortoff Mountain, the Chimneys, and Table Rock. Another subpopulation was identified as *Liatris turgida* based on the current USFWS separation between the two species. In 2006 tagged individual clumps were distinguished to detect any possible impacts from rock climbing activities at Little Lost Cove Cliff. In 2009 the population was to be re-sampled. However it was impossible to monitor given extensive damage from plant poachers (see attached document).

	Helianthus schweinitzii: There are 22 separate subpopulations of this federally endangered sunflower currently present or previously documented on the Uwharrie National Forest (UNF). Monitoring, consisting of stem counts was completed across 5 roadside subpopulations in 2009. Of these the three smallest subpopulations were stable in population size. Population counts at the two larger subpopulations increased. The increases are suspected to reflect less accurate counts at the one recently located subpopulation and an active prescribed burning program within the other site. A sewer line was proposed for construction across the roadside edge of the largest subpopulation for this species documented on the UNF. Potentially 10% of the population could be impacted by the project. The proposed mitigation was to transplant the impacted individuals out of the road corridor to a natural fire-maintained mature Piedmont Longleaf Pine Forest. Two trees were dropped within a ½-acre rock-strewn gap in this community prior to transplanting 87 individual sunflowers. Each individual transplant was tagged and will be tracked to monitor the success of the relocation to what appears to be more "natural" *Helianthus schweinitzii* habitat compared to the roadside edge. If successful the goal is to relocate many of the 21 subpopulations that are currently in vulnerable habitats such as roadside edge or adjacent to railroad tracks. Of the 87 individuals transplanted in March, 2009, 75 individuals (86% success rate) survived to the fall. Thirty-five of these individuals produced flowering stems. **Lysimachia asperulifolia:** Sixty subpopulations of rough-loose loosestrife have been documented in the Croatan National Forest (CNF). Except for a single population, all the occurrences of rough-leaved loosestrife occur within the southern third of the CNF. A portion of the occurrences, representing 3 subpopulations, have been more closely monitored by stem counts during the last 7 years. Two of the subpopulations increased in 2007 and have essentially remaining stable since then. The other subpopulation increased two-fold this past year. This increase followed an early season prescribed burn. The other subpopulations increased in 2007, although not as dramatically as the Pettiford Creek site during a year with abundant precipitation following a late dormant or early growing season burn. One new subpopulation was discovered in FY 2009, another one was expanded in size, while four other subpopulations that had not been

updated for over 15 years were not relocated. Three other subpopulations were monitored with updated stem counts in FY2009. Given the lack of precise subpopulation size data from the previous counts it is difficult to determine trends with these three subpopulations, however all three were flowering and appeared vigorous, occurring in sites that were burned at least every 3 years.

Figure 7. Long-term rough-leaved stem counts across three monitored subpopulations on the Croatan NF.



	Red Cockaded Woodpeckers The RCW population on the CNF showed a slight increase in 2009 from 2008. We documented 54 potential breeding groups and banded a total of 97 nestlings. This number remains down from the peak (in 2000) of 62 potential breeding groups. The RCW Recovery Plan (pg.165) estimates that the CNF RCW population should be at 101 potential breeding groups by 2010. The CNF will not be able to reach this goal. Midstory control in existing RCW clusters and the inability to quickly create new habitat are the limiting factors for RCW population growth on the CNF. There has not been a substantial effort in the past to open up new areas for potential breeding groups, even though this was agreed to when the USFS signed the RCW Recovery Plan. This is due in part to the amount of time it takes to implement vegetation management projects on the ground. And also to significant turnover in the biologist position on the CNF. For these reasons combined with prescribed fire restrictions, the CNF has been unable to maintain some historic, recently inactive, and even active clusters to Recovery Plan standards. Two years of unusually dry weather in 2006 and 2007, combined with tighter air quality rules significantly impacted our ability to do prescribed burning in critical habitats. In 2009 we burned 2,190 acres of RCW habitat in the growing season and 13,242 acres of habitat in the dormant season. Guidelines set forth in the Recovery Plan state that population monitoring should be done every breeding season (March – July) and should include all active clusters. All active clusters are monitored for breeding status and banding occurs at approximately 90% of known nests. Guidelines also include complete identification of every bird in each breeding group. We have not had the resources to complete this level of identification, and although an attempt was made in 2009, we ended up with less than 10% of all breeding groups identified. Guidelines also state that fledge checks should be done at every cluster to identify which banded nestlings were able to successfully fledge the nest. Resources were not available to do this time intensive work and less than 10% of fledge checks were completed in 2009.

Guidelines set forth in the Recovery Plan state that all clusters and cavity trees should be monitored between March and July every year. Due to limited resources, the CNF only has the capacity to monitor clusters that are active or have recently gone inactive on a yearly basis. Guidelines also state that surveys for new cavity trees and clusters should be conducted at least every ten years. The last time that was done on the CNF was in 1988, when 33% of the existing habitat was monitored. Every active cluster on the CNF is monitored for new cavity trees during population monitoring, although the survey method identified in the Recovery Plan may not always be used.

Guidelines set forth in the Recovery Plan state that foraging habitat should be monitored at least every ten years. This has never been done on the CNF and currently we don't have the resources available to do this large scale (over 11,000 acres) monitoring.

Sensitive Species Monitoring

Sensitive & Locally Rare Plant Species

Monitoring of the additional rare species is completed if field work for the season occurs near known populations or if a threat is known for the species. New plant locations are typically found during review of proposed projects. Table 2 lists the number of rare species currently known in the National Forests in North Carolina.

Table 2. Number of documented Region 8 sensitive and NFsNC locally rare plant species across four national forests in North Carolina.

Forest	Region 8 Sensitive	NFsNC Locally Rare
Croatan	23	36
Uwharrie	6	19
Pisgah	89	156
Nantahala	93	164
Unique Species*	133	254

*Some rare plant species occur on multiple forests

In the two mountain forests (Nantahala & Pisgah) new populations were located for the following sensitive species, *Viola appalachiensis, Trillium rugelii, Monotropsis odorata*,

	and *Megaceros aenigmaticus*. Previously documented populations and/or subpopulations of the following sensitive plant spent were observed to be present in FY 2009, *Hexastylis contracta, Aconitum reclinatum, Buckleya distichophylla, Cardamine clematitis, Carex misera, Carex biltmoreana, Coreopsis latifolia, Drepanolejeunea appalachiana, Geum geniculatum, Glyceria nubigena, Liatris turgida, Lysimachia fraseri, Lilium grayi, Megaceros aenigmaticus, Prenanthes roanensis, Robinia hartwegii, Solidago simulans, Thermopsis fraxinifolia* and *Tsuga caroliniana*. A search for one disjunct population of *Lilium grayi* was unsuccessful. New populations were documented for the following locally rare plant species, *Dicentra eximia, Carex purpurifera, Thermopsis mollis, Sphagnum pylaesii,* and *Sphagnum subsecundum*. A search for *Sceptridium oneidense* (= *Botrychium oneidense)* was unsuccessful as was a search for *Arethrusa bulbosa*. Populations or subpopulations were relocated for the following locally rare plants, *Carex leptonervia, Carex woodii, Dalibarda repens, Frasera caroliniensis, Campanula aparinoides, Thermopis mollis, and Trillium discolor*. No new sensitive plant species were located in the Uwharrie NF in FY2009. Previously documented populations and/or subpopulations of the following sensitive plant spent were observed to be present in FY 2009, *Amorpha schwerinii, Fothergilla major, and Symphyotrichum georgianum*. One of the *Symphyotrichum georgianum* populations was drastically smaller than previously documented and is believed to be suffered from overstory shade. A new site for *Helianthus laevigatus* was located in the Uwharrie NF. Populations of the following locally rare plant species were relocated in FY 2009, *Baptisia albescens* and *Helianthus laevigatus*. *Calopogon multiflorus*, a sensitive species, was located for the first time in the Croatan NF in FY 2009. Populations of the following sensitive plant spent were observed to be present in FY 2009, *Dionaea muscipula* and *Solidago verna.* A new site for *Pontheiva racemosas* was located in the Croatan NF. Populations of the following locally rare plant species were relocated in FY 2009, *Asclepias pedicellata* and *Malaxis spicata*.

Forest Concern Species Monitoring	No Forest Concern species monitoring occurred during FY 2009.
Trends for Management Indicator Species	The tables below estimate population trends for Management Indicator species (MIS) across the Forests based on habitat and population survey data. Some habitats and species are monitored annually, and others on a less frequent cycle, depending on the particular species and habitat requirements.

Nantahala and Pisgah National Forests

Species	Estimated Population Trend 2009
Black bear	Increasing
White tailed deer	Static to Slightly Decreasing
Pileated woodpecker	Static
Ovenbird	Static
Rufous-sided towhee	Decreasing
Pine warbler	Static
Acadian Flycatcher	Static
Ruffed grouse	Static
Brook, brown and rainbow trout	Static
Largemouth bass	Static
Blacknose dace	Static
Smallmouth bass	Static
Fraser fir	Static
Carolina hemlock	Decreasing
Ginseng	Static
Ramps	Static

Croatan National Forest

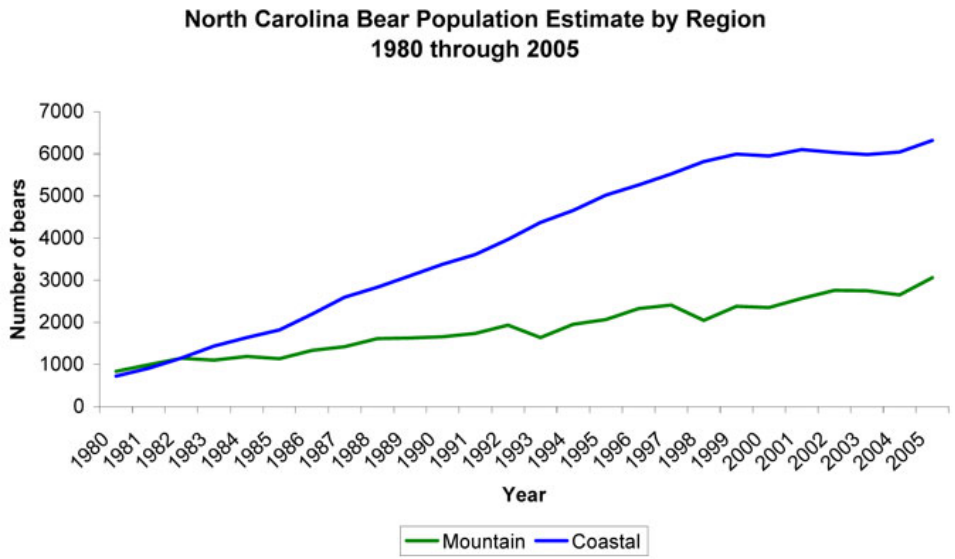
Species	Estimated Population Trend 2009
Red-cockaded woodpecker	Static
Longleaf pine	Increasing
Wiregrass	Increasing

Uwharrie National Forest

Species	Estimated Population Trend 2009
White tailed deer	Increasing
Gray Squirrel	Static in Cycles
Turkey	Increasing

Black Bear Population Trend

Historically, black bear thrived throughout North Carolina. By the early 1900's, largely because of persecution by early settlers and subsequent habitat modification, black bear were largely restricted to remote mountains and coastal swamps. During the last 30 years, through dedicated management by the North Carolina Wildlife Resources Commission and careful land management by the U.S. Forest Service, black bear populations are experiencing a dramatic increase.

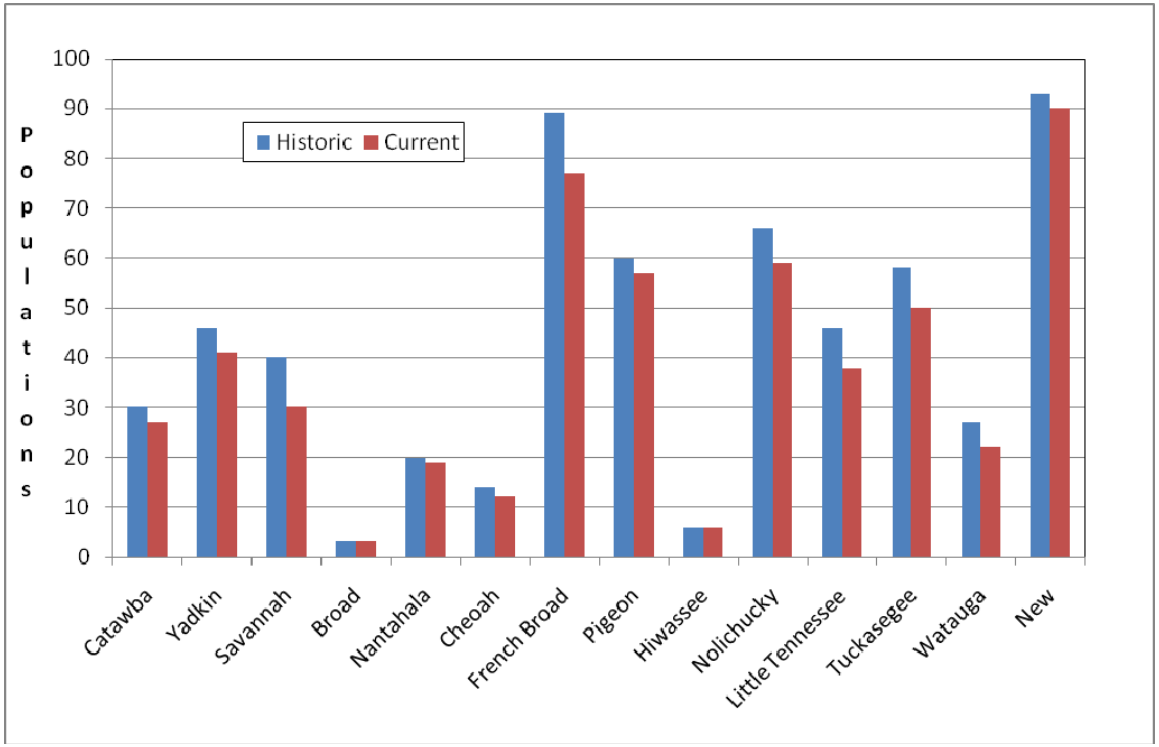
	
Bat Monitoring	**<u>Bat Surveys</u>** Indiana bat population monitoring was accomplished through mist netting of bat travel corridors and foraging areas at ten sites within the upper Santeetlah and Shoal Creek areas of the Nantahala National Forest during the summer of 2009. Anabat recordings were also used to record species not captured during mist net surveys. Thirty-eight bats were captured, including eight Indiana bats (*Myotis sodalis*). Several new Indiana bat roost trees were identified in Cherokee County during FY 2009. Acoustic surveys were conducted along four transects across the Pisgah and Uwharrie National Forests to establish bat community baselines in light of the recent spread of white-nosed syndrome (WNS) in cave-dwelling bat populations. An additional four transects will be added in FY 2010 on the Croatan and Nantahala National Forests. These eight transects will be monitored over the next several years to track potential effects of the WNS fungus on NFsNC bat populations. Other State and Federal agencies are conducting similar efforts to increase survey coverage and sample size. Data from these surveys is forthcoming.

Bat hibernacula and species assemblages were monitored by the NCWRC at four caves on the Nantahala and Pisgah National Forests during FY 2009. Bat species captured are summarized below.

Cave	Radford 1&2 (TUS/Cherokee)	Limekiln (GRA/McDowell)	Pseudosaltpeter (GRA/McDowell)	Wind Cave (GRA/McDowell)
Little brown myotis *Myotis lucifugus*	180	3		10
Northern myotis *Myotis septentrionalis*	1	2		3
Myotis sp.	23			2
Eastern pipistrelle *Perimyotis subflavus*	187	29	20	127
Big brown bat *Eptesicus fuscus*			1	

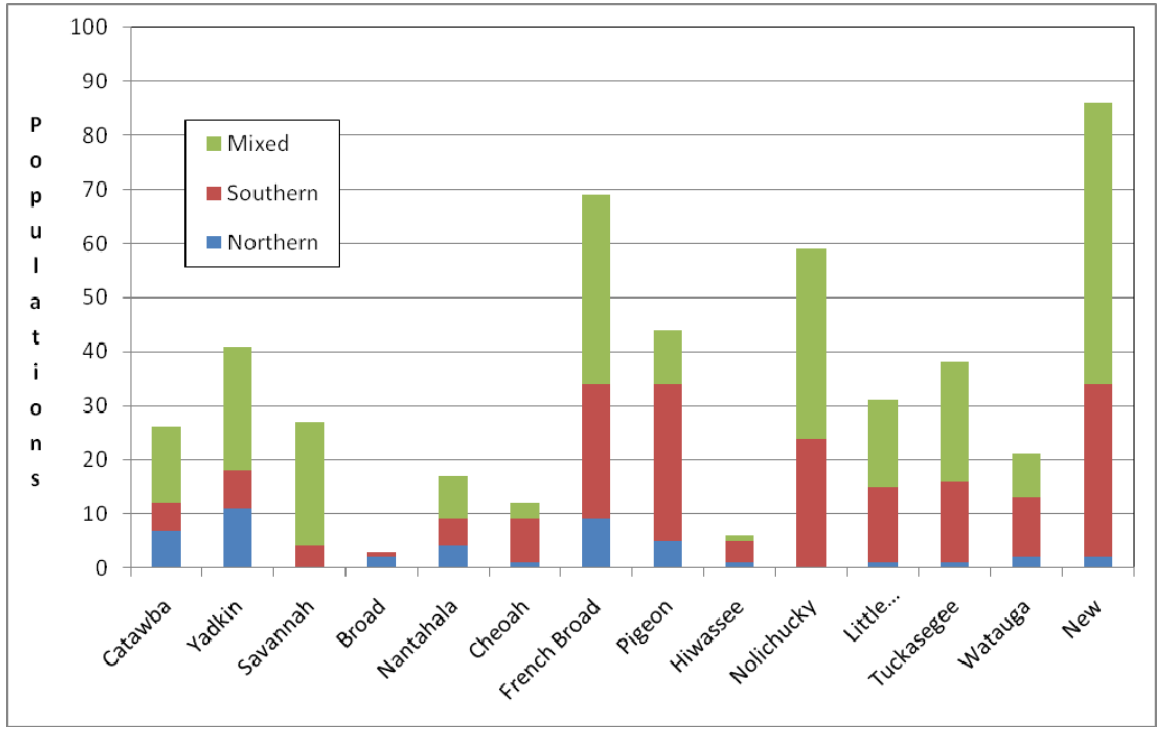
Summer and transitional roost surveys were conducted by the NCWRC and USFS at four locations on the Nantahala and Pisgah National Forests during FY09. Bat species captured are summarized below. No bats were captured at either site in Harmon Den in 2009. One Rafinesque's big-eared bat was captured on the Forest. This species is a Regional Forester's Sensitive Species.

Site	Radford 2 (TUS/Cherokee)	Harmon Den 1 (APP/Haywood)	Harmon Den 2 (APP/Haywood)	BullPen Mine (NAN/Jackson)
Northern myotis *Myotis septentrionalis*	2			
Eastern pipistrelle *Perimyotis subflavus*				18
Rafinesque's big-eared bat *Corynorhinus rafinesquii rafinesquii*				1

Native Species Restoration (brook trout)	**Brook Trout** Since the early 1990s, the NFsNC and NCWRC have been locating and mapping brook trout populations across the western mountains. This effort was completed in FY09, identifying 531 populations across 14 river basins. It is estimated that 70% of these populations are on the Nantahala and Pisgah National Forests.  Due largely to habitat loss on private land, brook trout populations have been lost over the last several decades This trend is not as apparent on the Forests; however, other causes of population decline are being examined, such as acid deposition and climate change.

Southern Appalachian Brook Trout

To date, the NCWRC has completed genetic work on 480 of the brook trout populations referenced above. It is estimated that 70% of these populations are on the Nantahala and Pisgah National Forests. The objective of this work is to identify where Southern Appalachian brook trout occur across Western North Carolina. The NFsNC, along with the NCWRC and other agencies and organizations, are part of the Eastern Brook Trout Joint Venture (EBTJV), working towards the restoration of native brook trout across its range.



Threatened, Endangered, and Sensitive Aquatic Species – SPECIAL REPORT	**Appalachian elktoe (*Alasmidonta raveneliana)*** The Appalachian elktoe is a rare freshwater mussel that is native to streams and rivers of the southern Appalachian region. It has a thin, but not fragile, kidney-shaped shell, reaching up to about 3.2 inches in length and 1.4 inches in height. Little is known about its habitat requirements, though the species has been reported from relatively shallow, medium-sized creeks and rivers with cool, clean, well-oxygenated, moderate-to-fast flowing water. The species is most often found in riffles, runs, and shallow flowing pools with stable, relatively silt-free, coarse sand and gravel substrate associated with cobble, boulders, and/or bedrock. According to the USFWS, the species is seldom found in stream reaches with accumulations of silt or shifting sand, gravel, or cobble. Ecosystem Restoration – Cheoah River: *Permanent, flowing, cool, clean water.* The new flow regime has provided more flowing, cooler water. Since March 2005, the Cheoah River has received a seasonally variable base flow of 40 – 100 cubic feet per second (cfs) and scheduled high flow events of 1000 cfs periodically. *Stable sand, gravel, cobble, and boulder or bedrock substrates with no more than low amounts of fine sediment.* The new flow regime is rearranging substrates, depositing some fines in backwater areas and sequestering some substrate particles from old deposits. Gravel/cobble material was added to the Cheoah River in 2009 to improve fish and mussel habitats (Figure 1). Additional gravels will be supplemented to enhance the spawning habitat of fishes and the mussel burrowing habitat within the river.

Figure 1. Gravel augmentation site on the Cheoah River (MacManamay et. al., unpublished). New gravel deposits providing spawning habitat for river species and burrowing substrate for freshwater mussels.

Fish hosts, with adequate living, foraging, and spawning areas for them. The improved minimum flows and gravel augmentation has improved habitats for the fishes within the Cheoah River and invertebrates. Fish species that serve as hosts for the Appalachian elktoe (Dr. Jim Layzer, Tennessee Technological University , unpublished data) which have been collected in the Cheoah River include warpaint shiner (*Luxilus coccogenis*), northern hogsucker (*Hypentelium nigricans*), river redhorse (*Moxostoma carinatum*), greenfin darter (*Etheostoma chlorobranchium*), tangerine darter (*Percina aurantiaca*), mottled sculpin (*Cottus bairdi*), and black redhorse (*Moxostoma duquesnii*). Monitoring of the fish community in the Cheoah River has produced variable results. The trend for the Tuckasegee Darter (formerly a sub-species of the greenside darter) has shown a decline in the population. This trend has also been observed in the tangerine darter population, however, this species is difficult to sample due to its preference for boulder runs. The greenfin darter population appears to be stable at this time (Ryan MacManamay, unpublished data).

Population Status:

	The Cheoah River population has remained stable relative to other Appalachian elktoe populations. In comparison, the Tuckasegee River population experienced an approximate decline of 90% since 2006. Surveys of the Cheoah River in 2009 documented the first evidence of recent natural reproduction in the river – one mussel aged 4 was located. Research for the captive propagation of Appalachian elktoe is ongoing at North Carolina State University. The initial attempt to spawn and rear juveniles was not successful. Mussel rearing facilities have been developed at the Marion fish hatchery (North Carolina Wildlife Resources Commission). The NCWRC is currently refining their mussel rearing techniques at this location in anticipation of receiving juvenile Appalachian elktoe mussels in the future. This facility will serve as a grow-out location for mussels destined for the Cheoah River. **Spotfin chub (*Erimonax monachus)*** Spotfin chub "habitat includes cool and warm, typically clear, large creeks or medium-sized rivers of moderate gradient, in upland and montane areas, generally in or near moderate and swift currents over gravel to bedrock, rarely over sand or silt. Eggs are laid in stone cracks, crevices, or in the narrow interface of two touching rocks. Jenkins and Burkhead (1994) reported breeding sites in moderate current of shallow portions of runs, in areas strewn with unsilted rubble and boulders" (Nature Serve 2009). Population status: The Cheoah River is the location of an effort to restore a population of the spotfin chub. Approximately 600 spotfin chubs, reared at the North Carolina Wildlife Resources Commission hatchery, were stocked into the Cheoah River near Santeetlah Church. Subsequent observations near the release site have confirmed the persistence of some of the spotfin chubs at this site. Captive propagation of this species and additional stockings are expected in FY 2010. **Wounded Darter (*Etheostoma vulneratum*)**: The wounded darter (Figure 2) has been stocked into the Cheoah River (approximately 200 individuals). These fish were stocked in 2008 but their survival rates are not known. This species is typically found in moderate to large rivers and is associated with moderate currents over boulder. The species typically spawns from mid May through late July.

a. 

b. 

Figure 2. Adult wounded darter (a.)(Nature Serve, 2010). Propagated wounded darter (Petty et. al. 2009) located in the Cheoah River (b.).

Population status:
Conservation Fisheries Inc. propagated 494 juvenile wounded darters for release into the Cheoah River in the fall of 2008 and spring 2009. Surveys conducted at the release sites on 23 July 2009 located one male wounded darter. Additional wounded darters (388 individuals) were released on 1 October 2009 and one additional female wounded darter was located from a previous stocking. Captive propagation, stocking, and monitoring for this species is ongoing.

Goal or Desired Condition: Attributes and resources of special interest areas including wilderness, research natural areas, and areas registered by the North Carolina Natural Heritage Program are maintained.

Monitoring Item	Results
Attributes and Resources of Wilderness	NO REPORT

General direction: Heritage resources, which are listed on or eligible for the national register of historic places or the national register of historic landmarks, are protected. Suitable sites are developed and/or interpreted for public use and enjoyment.

General direction: Cultural resources, historic properties or archeological sites, which are listed on or eligible for the National Register of Historic Places (NRHP) or are designated National Historic Landmarks, are protected. Suitable sites are developed and/or interpreted for public use and enjoyment.

Monitoring Item	Results		
Cultural Resources Identified in Relation to Acres Surveyed		**Sites & Properties Identified**	**Acres Surveyed**
	FY 2009	**148**	**2,252**
	ALL-TIME TOTAL	**6,163**	**191,895**

<table>
<tr><th>Monitoring Item</th><th>Results</th></tr>
<tr><td>Sites Monitored</td><td>
<table>
<tr><th>Forest</th><th>Number of Sites</th><th>Sites Stable</th><th>Adverse Cultural Effects*</th><th>Adverse Natural Effects**</th></tr>
<tr><td>Nantahala</td><td>17</td><td>5</td><td>3</td><td>9</td></tr>
<tr><td>Pisgah</td><td>14</td><td>5</td><td>5</td><td>4</td></tr>
<tr><td>Croatan</td><td>5</td><td>2</td><td>1</td><td>2</td></tr>
<tr><td>Uwharrie</td><td>5</td><td>3</td><td>1</td><td>1</td></tr>
<tr><td>Total:</td><td>41</td><td>15</td><td>10</td><td>16</td></tr>
<tr><td>Percent:</td><td>100%</td><td>37%</td><td>24%</td><td>39</td></tr>
</table>
*Effects from FS actions or public use / activities.

**Effects from weathering / natural conditions. (includes deteriorating lookout towers, some of which have been vandalized)
</td></tr>
<tr><td>Tribal Relations Activities</td><td>The Forest continues to work in partnership with the Eastern Band of Cherokee Indians, local communities and universities on the National Historic Trail of Tears and the NC Rock Art Project. Relationships with the Federally recognized Catawba Indian Nation are expanding as the Uwharrie Forest Plan Revision continues. The process for the gathering of forest products by Tribal members is being further developed.</td></tr>
<tr><td>Public Interpretation</td><td>The Forest helped update NC Highways interpretive signs. The Forest is working with several partners to record and interpret rock art. The Croatan NF hosted a volunteer Windows to the Past archeological site recording project. The Forest hosted several Civilian Conservation Corps (CCC) 75th anniversary celebrations.</td></tr>
<tr><td>Site Protection</td><td>Forty-one (41) cultural resources, including prehistoric archeological sites, fire towers, historic home sites and historic cemeteries, susceptible to vandalism or looting, potential impact from project implementation, visitor use and/or natural deterioration were visited and formally assessed and documented. One site on the Uwharrie National Forest was re-assessed and determined not to require preservation.</td></tr>
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Monitoring Item	Results
Trail across site hardened with gravel  Historic Cemetery 	**Monitored Sites:** *Some sites are multi-component, prehistoric & historic. Most Forest management projects such as recreation developments and timber harvest, etc., have not adversely impacted heritage resources. Several sites along roads and trails across the Forest have been successfully stabilized with hardening and vegetation. Lookout towers and historic structures are deteriorating and require maintenance. Three sites on the Grandfather Ranger District were adversely impacted by timber harvest and wildlife field construction. A site on the Nantahala RD is being adversely impacted by wildlife field maintenance. Road construction is causing erosion of two sites (Pisgah RD & Nantahala RD). Camping has impacted a prehistoric site on the Grandfather RD. The area is being decommissioned. Sites are being illegally dug into and artifacts collected on the Uwharrie National Forest. Recent law enforcement activities have apprehended individuals and they are being prosecuted. Vandalism is impacting fire towers across the Forest. The deteriorating condition of nine towers on the Forest was assessed in 2009 and all are planned for restoration in 2010. Illegal metal detecting at Civil War sites on the Croatan is continuing. The

Forest	Prehistoric Sites	Historic Sites	Total Sites Monitored*
Nantahala	10	9	17*
Pisgah	8	7	14*
Croatan	2	5	5*
Uwharrie	3	3	5*
Total:	*23*	*23*	*41**

Monitoring Item	Results
Artifacts exposed in road bed:   Camping impacts to site:	Forest has recently completed and implemented its metal detecting use regulations. Off-highway vehicle (OHV) use is impacting sites on the Uwharrie, Nantahala and Grandfather RDs. While OHV and horse trail relocation and the covering/hardening of sites are being planned, the existing damage must be mitigated and law enforcement activities need to increase along with education of users. Several sites along lakes and rivers on the Tusquitee RD and Croatan RD are being eroded. Monitoring must continue in these locations and plans must be developed and implemented as soon as possible to mitigate these impacts. The National Register of Historic Places listed Thornburg Property on the Uwharrie RD is in urgent need of maintenance and stabilization. The District has developed partnerships for some needed work. Across the NFsNC several CCC sites are deteriorating at an increasingly rapid rate and require stabilization. Most include constructed rockwork improvements. The Frenchbroad CCC Work Center on the Appalachian RD requires maintenance. Historic cemeteries need to be cleared of vegetation that threatens their preservation. All impacted sites need to be evaluated and stabilized. Sites impacted by wildfire suppression activities need to be stabilized and mitigated immediately. There are currently several incomplete mitigation projects at damaged sites on the Forest due to a lack of available funds. Sites impacted by wildfire suppression activities need to be more quickly assessed, stabilized and evaluated.

Monitoring Item	Results
Green Knob Tower 	 Eroding site along river  Collapsing CCC Rockwork:

Other Monitoring

Soil and Water

Monitoring Item	Results
Acres of Soil and Water Improvement	**Nantahala/Pisgah: 76 acres** **Croatan: 0 acres** **Uwharrie: 0 acres**
Are directions and standards being met for riparian areas?	**Nantahala/Pisgah:** In 2009, Forestry Best Management Practices (BMPs) were monitored on the Nantahala and Pisgah National Forests. The monitoring was done to determine whether or not BMPs were implemented and effective in controlling sediment and other pollutants during timber sale and road reconstruction and maintenance activities. Fifteen harvest units and 11 roads from the Baldwin Gap, Case Camp Ridge, East Fork, and Locust Cove timber sales were selected for the review. Specific BMPs were selected from the *Nantahala Pisgah Land and Resource Management Plan*, the *North Carolina Forest Practice Guidelines Related to Water Quality Regulations* and the 7730/2520 letter dated November 28, 1990, "*Specified Road Construction and Water Quality*." Six of the 44 BMPs reviewed were selected as a sub-set to characterize the protection of riparian areas (Table 1) and will be used here to address the Forest Plan monitoring question "Are directions and standards being met for riparian areas?" A discussion of the entire monitoring can also be found in this M&E Report. Of the 15 harvest units surveyed, 97.6 percent had BMPs implemented that met or exceeded the standard, while the remaining 2.4 percent (two units) experienced a minor departure from the "drainage not to stream channel" and "shade strips in place" standards (Table 1). These minor departures from the standards did not require corrective action since they resulted in only minor or temporary impacts. Therefore, effectiveness was adequate to protect stream channels and meet directions and standards for riparian areas. **Croatan:** Monitoring was not conducted in 2009 on the Croatan.

	Uwharrie: Monitoring was not conducted in 2009 on the Uwharrie.

Table 1. Number of harvest units by category of "Implementation", "Effectiveness", and "Visible Sediment" for selected Forestry BMPs used to characterize the protection of riparian areas relative to forestry activities surveyed in 2009.

Rule (BMP)	Implementation				Effectiveness					Visible Sediment		
	Meets or Exceeds	Minor Departure	Major Departure	Gross Departure	Improvement Over Past	Adequate Protection	Minor/Temp. Impact	Major Short-Term Impact	Major Long-Term Impact	No Visible Sediment	Non-Critical Visible	Critical Visible
HARVEST AREA INCLUDING SKID TRAILS/LOG DECK												
3. Barriers Used if W/I 300ft P/I Channel	11					11				11		
4. Drainage not to Stream Channel	14	1				14	1			14	1	
5. No Skidding in Ephemeral Channel	13					13				13		
6. Shade Strips in Place	14	1				14	1					
7. No Logging Debris in P/I Channel	14					14						
9. Violation W/I MA-18 (SMZ)	15					15				15		
Total	**81**	**2**	**0**	**0**	**0**	**81**	**2**	**0**	**0**	**53**	**1**	**0**
Percent in Class	**97.6%**	**2.4%**	**0.0%**	**0.0%**	**0.0%**	**97.6%**	**2.4%**	**0.0%**	**0.0%**	**98.1%**	**1.9%**	**0.0%**

Monitoring Item	Results
Prevent visible sediment from reaching stream channels in accordance with NC Forest Practices Guidelines Related to Water Quality (NC FPGRWQ).	In 2009, Forestry Best Management Practices (BMPs) were monitored on the Nantahala and Pisgah National Forests. The monitoring was done to determine whether or not BMPs were being implemented and effective in controlling sediment and other pollutants during timber sale and road reconstruction and maintenance activities. Fifteen harvest units and 11 roads from the Baldwin Gap, Case Camp Ridge, East Fork, and Locust Cove timber sales were selected for the review. Specific BMPs were selected from the *Nantahala Pisgah Land and Resource Management Plan*, the *North Carolina Forest Practice Guidelines Related to Water Quality Regulations* and the 7730/2520 letter dated November 28, 1990, "*Specified Road Construction and Water Quality*." This monitoring is intended to answer the Implementation Question "Are management practices in compliance with NC FPGRWQ?" A total of 273 individual BMPs were checked for implementation and effectiveness. By determining implementation rates, we are attempting to answers the question, "Have the rules been properly applied?" By determining effectiveness, we are attempting to answers the question, "Were the rules effective in preventing sediment or other pollutants from impacting water quality?" The overall monitoring implementation rate was 94.5% (Table 1). There was a minor departure from the rules 2.9% of the time and a major departure from the rules 2.6% of the time. The overall effectiveness rate was 93.8%. There was a minor or temporary impact to streams 3.7% of the time and a major short-term impact 2.2% of the time. There was a major long-term impact 0.4% of the time. Visible sediment was not entering the stream 90.9% of the time. Non- critical visible sediment reached the stream 7.3% of the time and critical visible sediment flow reached the stream channel 1.8% of the time. A non-critical amount of visible sediment is a low volume, short term sediment source that does not adversely affect aquatic habitats. A critical amount of visible sediment is a large volume, which may be deposited over a long term. The component structure of the stream is altered, which adversely affects aquatic habitats. A stream that has a critical sediment source is obvious, even to the casual observer. Implementation and effectiveness rates for the BMP category *Harvest Area Including Skid Trails/Log Decks* was 97.8% and 96.4%, respectively. This is a very good implementation

Monitoring Item	Results
	and effectiveness rate that indicates the application of BMPs is working in this category and sediment or other pollutants are generally not reaching streams from these activities. Therefore, management practices are largely in compliance with NC FPGRWQ. Although the numbers would indicate there is a problem with implementation and effectiveness of BMPs in the category *Skid Trail Stream Crossings*, we believe this is a function of a low sample size in this category. There were only 12 BMPs checked due to few skid trail stream crossings observed in the four timber sales. Additional sampling is needed in this category before any meaningful conclusions can be drawn. Implementation and effectiveness rates for the BMP category *Roads* was 96.8%. This is also a very good rate that indicates the application of BMPs is working, and management practices are largely in compliance with NC FPGRWQ. However, critical visible sediment was observed 2.4% of the time. This was the result of inadequate implementation of *BMP 29 – Drainage not to Stream Channel*. Additional rolling dips and gravel, especially near stream channels will improve this BMP. The last category monitored was *Road Stream Crossings*. Implementation and effectiveness rates were 88.7%. Approximately 8% of the time there was a major departure from the rules that contributed to a major short-term impact. Critical visible sediment was delivered to the stream channel 5.6% of the time. This is clearly the BMP category where improvement in implementation can provide the greatest improvement in water quality and compliance with NC FPGRWQ. Specific practices identified that need improving are *BMP 37 – Grade Carried Across Crossing*, *BMP 39 – Stable Banks/Protected From Accelerated Erosion,* and *BMP 40 – Minimum Runoff into Channel.* Preventing road grade decline over stream channels and maintaining stable stream banks and beds during culvert installation will most improve these practices.

Monitoring Item	Results
Are management practices in compliance with NC FPGRWQ?	***Table 1. NFsNC 2009 Forestry Best Management Practices (BMP) Monitoring Results.***

BMP Category	Implementation %				Effectiveness %					Visible Sediment %		
	Meets or Exceeds 4	Minor Departure 3	Major Departure 2	Gross Departure 1	Past 5 Improvement Over	4 Adequate Protection	Minor/Temp. Impact 3	Impact 2 Major Short-Term	Impact 1 Major Long-Term	3 No Visible Sediment	Non-Critical Visible 2	Critical Visible 1
Harvest Area Including Skid Trails/Log Decks	97.8%	1.5%	0.7%	0.0%	0.0%	96.4%	3.6%	0.0%	0.0%	98.8%	1.2%	0.0%
Skid Trail Stream Crossings	75.0%	25.0%	0.0%	0.0%	0.0%	75.0%	25.0%	0.0%	0.0%	50.0%	50.0%	0.0%
Roads	96.8%	1.6%	1.6%	0.0%	0.0%	96.8%	1.6%	1.6%	0.0%	88.1%	9.5%	2.4%
Road Stream Crossings	88.7%	3.2%	8.1%	0.0%	0.0%	88.7%	1.6%	8.1%	1.6%	83.3%	11.1%	5.6%
Total Percent	**94.5%**	**2.9%**	**2.6%**	**0.0%**	**0.0%**	**93.8%**	**3.7%**	**2.2%**	**0.4%**	**90.9%**	**7.3%**	**1.8%**

Conclusion: The 2009 monitoring indicated that the Nantahala and Pisgah National Forests are 91% compliant with the NC FPGRWQ standard to "Prevent visible sediment from reaching stream channels." The remaining nine percent of sites that are out of compliance are comprised mostly of low sediment yields that do not adversely affect aquatic habitats (non-critical, 7.3%). Critical amounts of sediment occurred at 1.8% of the sites as a result of improperly implemented road and stream crossing BMPs. Forestry practices that most need

<table>
<tr><th>Monitoring Item</th><th>Results</th></tr>
<tr><td></td><td>improvement are those related to the logging transportation system, including haul roads and road/skid trail stream crossings.</td></tr>
<tr><td>Soil Quality Monitoring

<u>Regional Guideline</u>: Do not exceed 15 percent detrimental soil disturbance within an activity area (E. Hudson, 09/01/2009 email correspondence).</td><td>In 2009, Soil Quality Monitoring (SQM) was conducted on the Nantahala and Pisgah National Forests using the Forest Soil Disturbance Monitoring Protocol (Page-Dumroese, et.al. 2009)[i]. The monitoring was done to determine if there was significant change in land productivity due to timber harvest activities. “Significant change” is defined as detrimental soil disturbance exceeding 15% of each individual harvest unit.

A summary of the 2009 SQM is presented in Table 1. Significant change in land productivity due to timber harvest activities was measured in the Eagle Fork Timber Sale in harvest unit 2. This unit had a detrimental soil disturbance of 16.3% due to skid trails and landings. No other detrimental disturbance was noted in the unit. The remaining timber sale units that were surveyed post-harvest all have some degree of detrimental soil disturbance, but were below the significant level. One unit in the Baldwin Gap Timber Sale was surveyed pre-harvest. No detrimental disturbance was found in this pre-harvest unit.

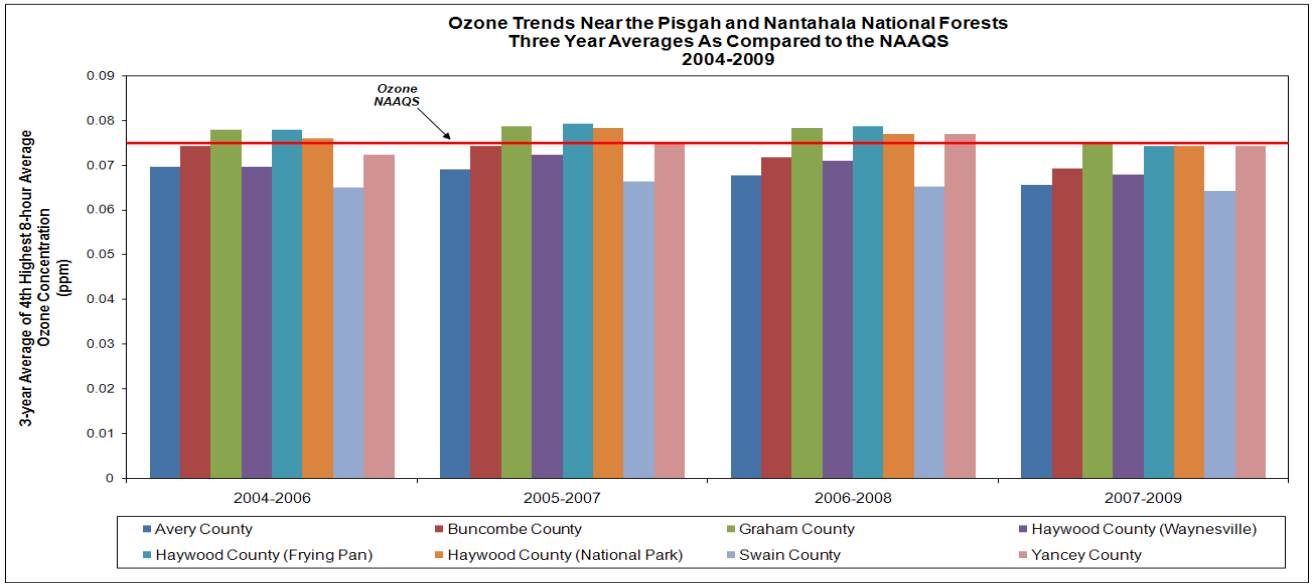
Table 1. NFsNC 2009 Soil Quality Monitoring Results – Detrimental Soil Disturbance
<table>
<tr><th rowspan="2">Timber Sale</th><th rowspan="2">Unit #</th><th rowspan="2">Pre-harvest (Pre) or Post-harvest (Post)</th><th rowspan="2">Unit Area (acres)</th><th colspan="3">Percent Detrimental Soil Disturbance</th></tr>
<tr><th>Skid Trails & Landings</th><th>Other within Unit</th><th>Total</th></tr>
<tr><td>Baldwin Gap</td><td>8</td><td>Post</td><td>23</td><td>9.1</td><td>0</td><td>9.1</td></tr>
<tr><td></td><td>9</td><td>Pre</td><td></td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Case Camp</td><td>3</td><td>Post</td><td>13</td><td>9.2</td><td>1.6</td><td>10.8</td></tr>
<tr><td></td><td>6</td><td>Post</td><td>8</td><td>2.5</td><td>0.1</td><td>6.2</td></tr>
<tr><td></td><td>8</td><td>Post</td><td>12</td><td>1.7</td><td>3.3</td><td>5.0</td></tr>
<tr><td>Eagle Fork</td><td>1</td><td>Post</td><td>25</td><td>2.4</td><td>0</td><td>2.4</td></tr>
<tr><td></td><td>2</td><td>Post</td><td>16</td><td>16.3</td><td>0</td><td>16.3</td></tr>
<tr><td></td><td>3</td><td>Post</td><td>25</td><td>9.6</td><td>1.4</td><td>10.8</td></tr>
<tr><td>Locust Cove</td><td>1</td><td>Post</td><td>10</td><td>0.7</td><td>0</td><td>0.7</td></tr>
<tr><td></td><td>2</td><td>Post</td><td>18</td><td>1.1</td><td>3.2</td><td>4.4</td></tr>
<tr><td></td><td>3</td><td>Post</td><td>17</td><td>0.5</td><td>0</td><td>0.5</td></tr>
</table></td></tr>
</table>

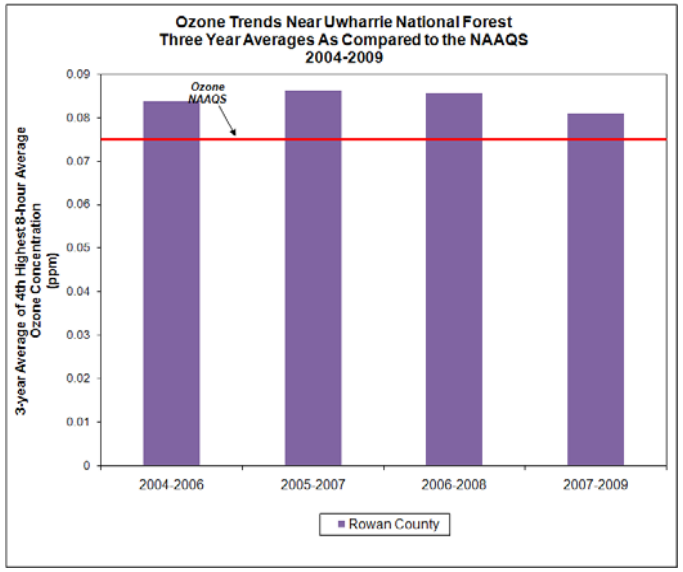
Monitoring Item	Results
Nantahala & Pisgah LRMP Implementation Question: Are there significant changes in land productivity?	Conclusion: Where detrimental soil disturbance exceeds the significant level, mitigation of the soil disturbance is necessary. In most cases, where ground based logging was the predominant logging system; mitigation of detrimental soil disturbance can be accomplished by subsoiling compacted skid trails and landings, and sowing the appropriate native grass seed. In the case of Eagle Fork T.S. Unit 2, mitigation is recommended including subsoiling (ripping) of skid trails and landings in the unit to bring detrimental soil disturbance below the 15% guideline. In instances where detrimental soil disturbance approaches the 15% guideline, consider mitigation to reduce future "legacy" disturbance. To help guide the planning process, the NFsNC will monitor a representation of timber sale units prior to those units being harvested. This would document pre-logging soil conditions and help in sale layout, e.g. length of skid trails and size of landings. Where detrimental disturbance from past activities remains, the degree of additional soil disturbance can be planned and kept below the guideline. Following the harvest of surveyed units, a post-harvest survey will be conducted to document change, for example, Baldwin Gap T.S. Unit 9, surveyed in 2009, is planned for post-harvest monitoring in 2010.

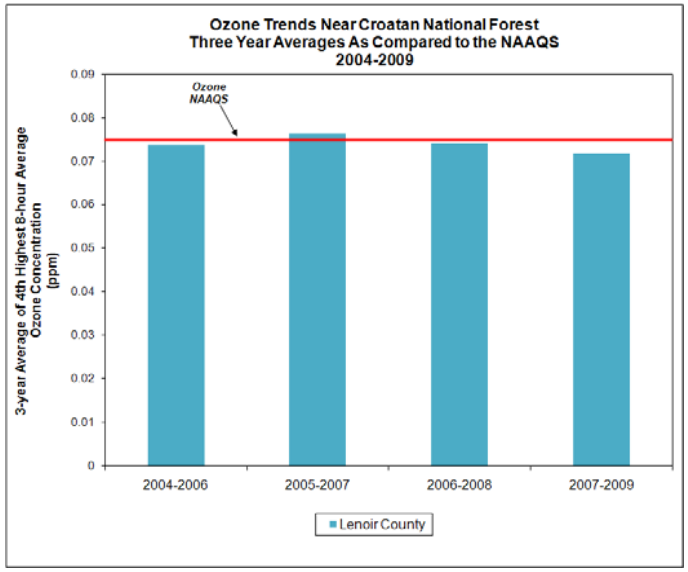
AIR QUALITY

Monitoring Item	Results
Attainment status with the National Ambient Air Quality Standards (NAAQS)	Levels of fine particulate matter and ozone are measured at air monitoring sites within or near the Pisgah, Nantahala, Uwharrie and Croatan National Forests. 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 of and visitors to the National Forests. At this time, all of the four National Forests that are located within North Carolina are attaining the air quality standards for ozone and fine particulate matter. However, the Clean Air Act requires periodic review of the science upon which the NAAQS are based, as well as the standards themselves. If the science indicates a more protective and stringent air quality standard is necessary in order to protect public health or the environment, regardless of the cost of meeting such a standard, then EPA will propose and typically finalize the stricter standard. Thus, even if an area meets the current NAAQS, it may not meet future standards if they are strengthened. If a portion of a National Forest does not meet the NAAQS and is designated nonattainment, then emissions from federal actions within the Forest (including prescribed burning activities) must be inventoried and assessed to ensure that those emissions do not cause or contribute to worsening of air quality in the region. As EPA is currently reviewing both the ozone and fine particulate matter NAAQS, this is an issue that could occur in the near future. The graphs on the next page show the measured ozone concentrations at air monitoring sites close to the four National Forests as compared to the NAAQS. Note that for the three-year period of 2007-2009, the monitoring site near the Uwharrie National Forest measured concentrations that were above the ozone NAAQS.[1]

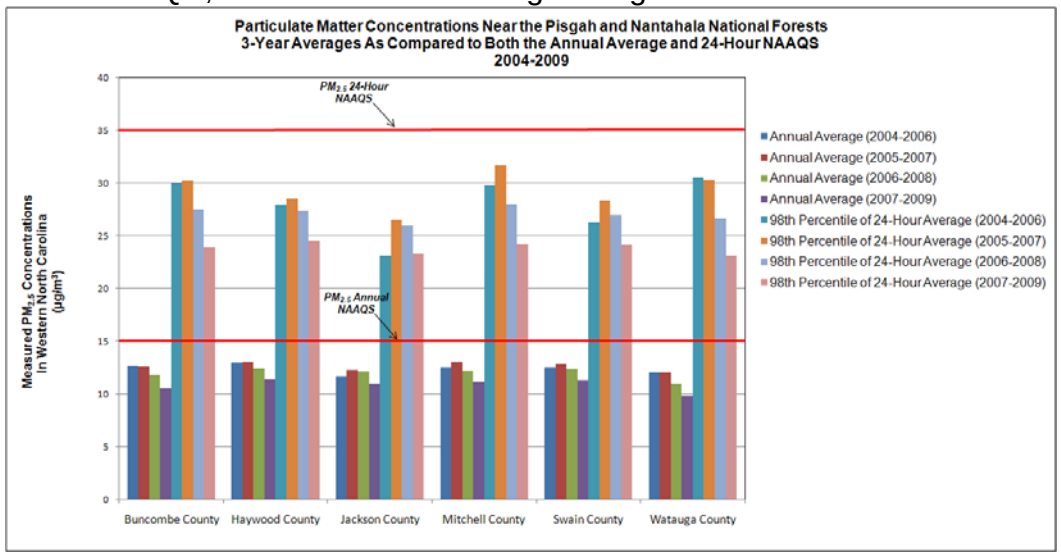
[1] The US EPA is currently reconsidering the NAAQS for ozone, and thus no designations for nonattainment near the Uwharrie National Forest have occurred. It is likely that EPA will ultimately set a lower NAAQS, in which case many areas within North Carolina, including areas on all four Forests, may exceed the standard.

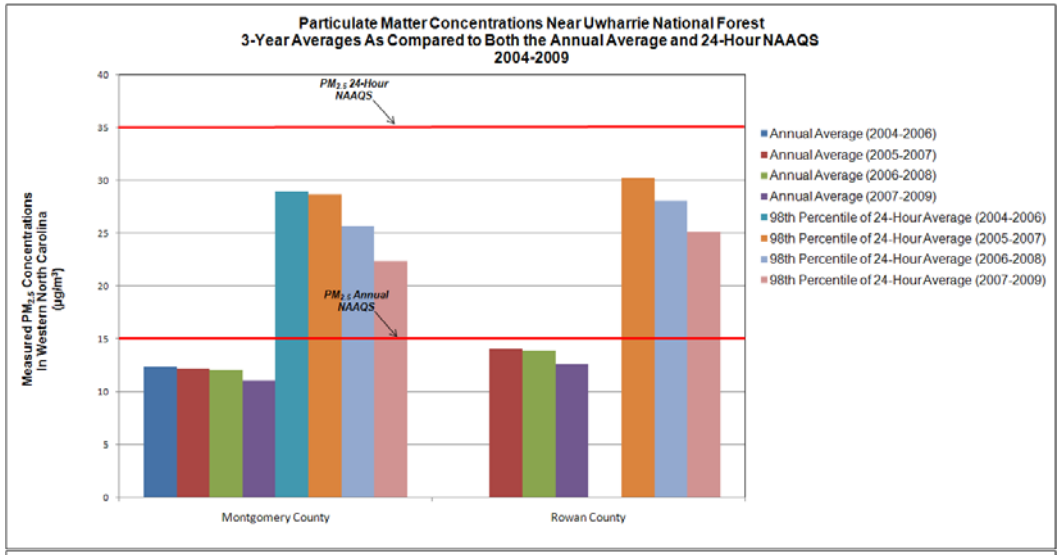

Ozone Trends Near the Pisgah and Nantahala National Forests
Three Year Averages As Compared to the NAAQS
2004-2009
3-year Average of 4th Highest 8-hour Average Ozone Concentration (ppm)
Ozone NAAQS
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
2004-2006
2005-2007
2006-2008
2007-2009
Avery County
Buncombe County
Graham County
Haywood County (Waynesville)
Haywood County (Frying Pan)
Haywood County (National Park)
Swain County
Yancey County

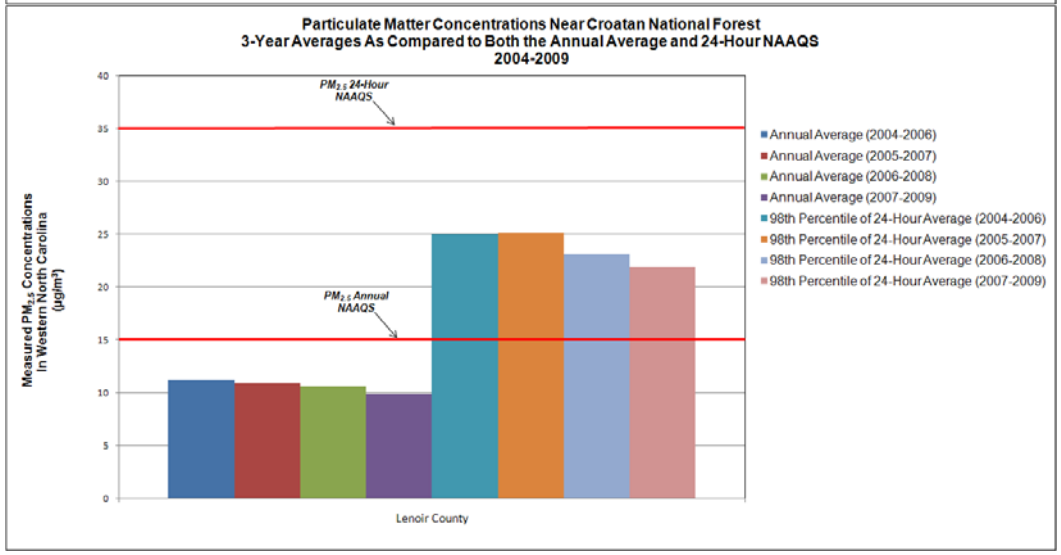




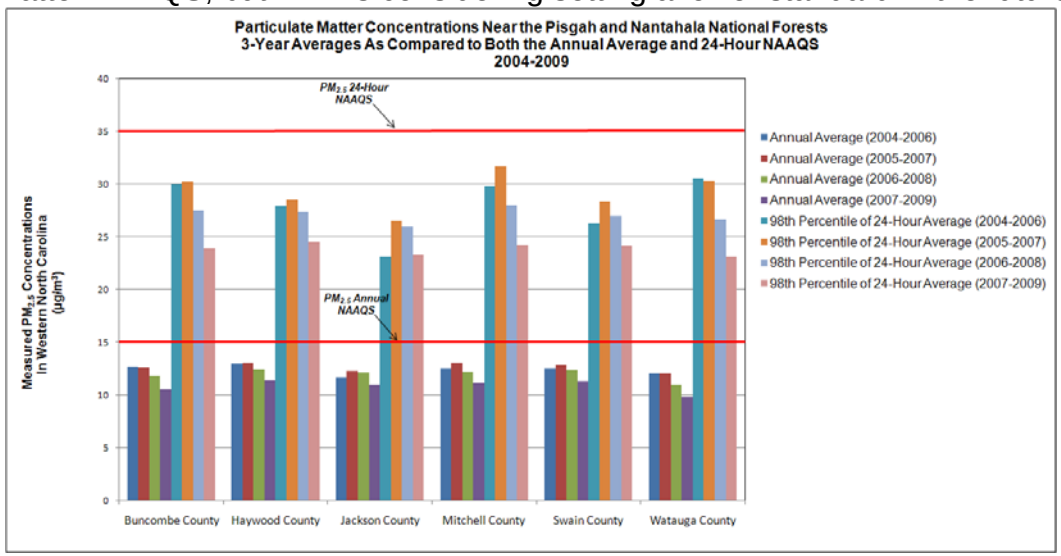
The graphs below and on the next page show measured fine particulate matter concentrations in comparison to the NAAQS. Note that none of the fine particulate matter monitors near any of the four National Forests are exceeding the current fine particulate matter NAAQS, but EPA is considering setting a lower standard in the future.

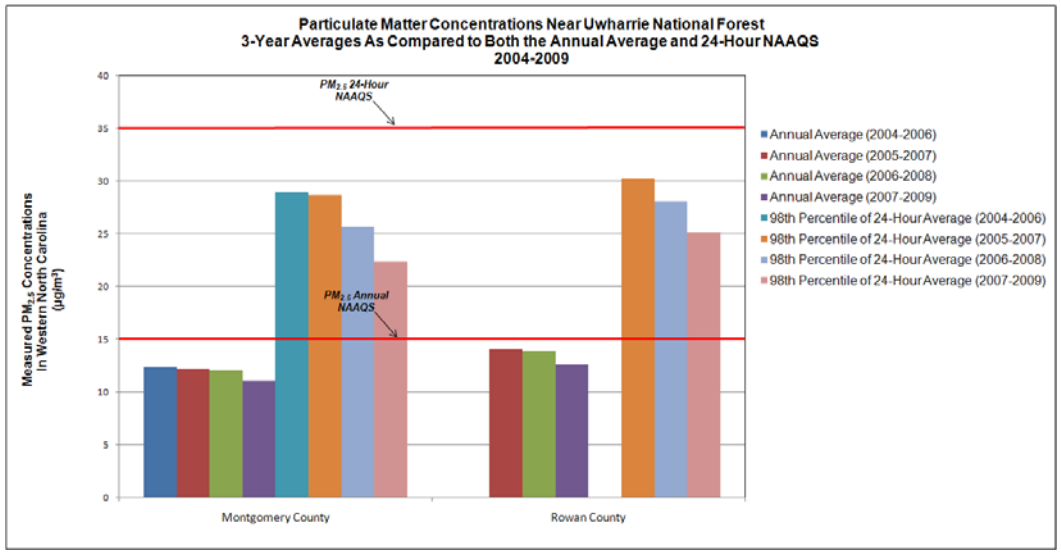


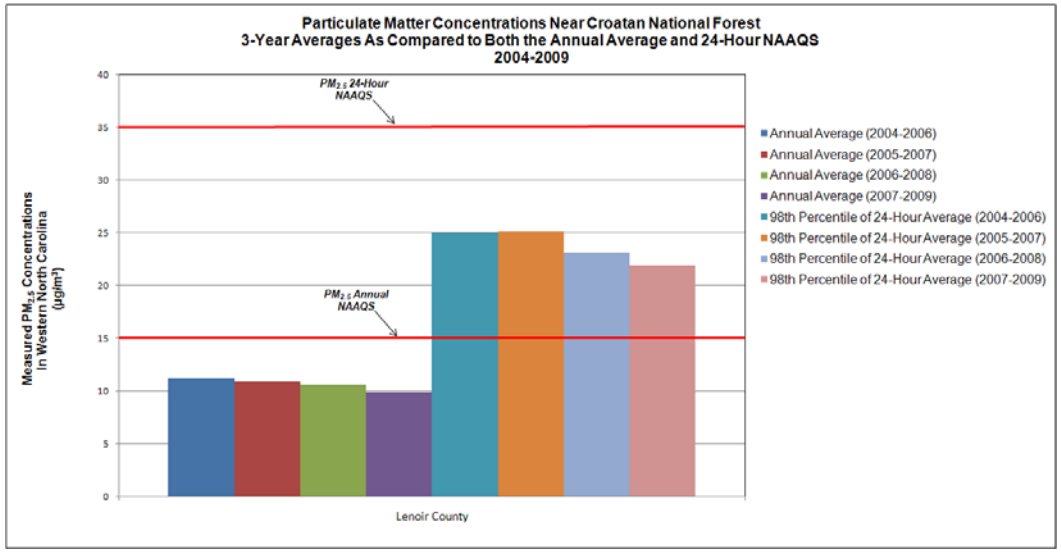

Particulate Matter Concentrations Near Uwharrie National Forest
3-Year Averages As Compared to Both the Annual Average and 24-Hour NAAQS
2004-2009
Measured PM2.5 Concentrations In Western North Carolina (µg/m³)
PM2.5 24-Hour NAAQS
PM2.5 Annual NAAQS
Montgomery County
Rowan County
Annual Average (2004-2006)
Annual Average (2005-2007)
Annual Average (2006-2008)
Annual Average (2007-2009)
98th Percentile of 24-Hour Average (2004-2006)
98th Percentile of 24-Hour Average (2005-2007)
98th Percentile of 24-Hour Average (2006-2008)
98th Percentile of 24-Hour Average (2007-2009)


Particulate Matter Concentrations Near Croatan National Forest
3-Year Averages As Compared to Both the Annual Average and 24-Hour NAAQS
2004-2009
Measured PM2.5 Concentrations In Western North Carolina (µg/m³)
PM2.5 24-Hour NAAQS
PM2.5 Annual NAAQS
Lenoir County
Annual Average (2004-2006)
Annual Average (2005-2007)
Annual Average (2006-2008)
Annual Average (2007-2009)
98th Percentile of 24-Hour Average (2004-2006)
98th Percentile of 24-Hour Average (2005-2007)
98th Percentile of 24-Hour Average (2006-2008)
98th Percentile of 24-Hour Average (2007-2009)

The graphs below and on the next page show measured fine particulate matter concentrations in comparison to the NAAQS. Note that none of the fine particulate matter monitors near any of the four National Forests are exceeding the current fine particulate matter NAAQS, but EPA is considering setting a lower standard in the future.






Particulate Matter Concentrations Near Croatan National Forest
3-Year Averages As Compared to Both the Annual Average and 24-Hour NAAQS
2004-2009
Measured PM2.5 Concentrations in Western North Carolina (µg/m³)
PM2.5 24-Hour NAAQS
PM2.5 Annual NAAQS
0
5
10
15
20
25
30
35
40
Lenoir County
Annual Average (2004-2006)
Annual Average (2005-2007)
Annual Average (2006-2008)
Annual Average (2007-2009)
98th Percentile of 24-Hour Average (2004-2006)
98th Percentile of 24-Hour Average (2005-2007)
98th Percentile of 24-Hour Average (2006-2008)
98th Percentile of 24-Hour Average (2007-2009)

Lands/Special Uses

<table>
<tr><th>Monitoring Item</th><th>Results</th></tr>
<tr><td>Land Adjustment in Support of LRMP Goals</td><td>Acres Conveyed by Exchange/Small Tracts or Admin Sale: Nantahala NF = 0
Pisgah = 0
Uwharrie = 0
Croatan = 0
Acres Acquired by Purchase, Donation, Exchange: Nantahala NF = 64
Pisgah NF = 0
Uwharrie NF = 0
Croatan = 0</td></tr>
<tr><td>Special Uses Compatible With LRMP Goals</td><td>Special use authorizations allow for the use of National Forest System lands for a wide variety of purposes. Some authorize facilities and services necessary for public health, welfare, and safety while others authorize uses of a private nature.

<u>Number of Special Use Permits by Forest</u>
<table><tr><th>Forest</th><th>Recreation</th><th>Lands</th><th>Total</th></tr><tr><td>Nantahala</td><td>125</td><td>530</td><td>655</td></tr><tr><td>Pisgah</td><td>177</td><td>340</td><td>517</td></tr><tr><td>Croatan</td><td>16</td><td>84</td><td>100</td></tr><tr><td>Uwharrie</td><td>27</td><td>100</td><td>127</td></tr></table>Of these permits state-wide, 1,054 are for land-based uses such as road easements and water systems, and 345 permits are for recreation activities such as outfitting, guiding, and whitewater rafting. There are a total of 1,399 permits state-wide.

Key projects include upgrading N.C. Highway Patrol Communication’s System Statewide, 25 State Highway projects, relicensing three hydroelectric projects and upgrading major transmission lines to comply with the 2005 Energy Act.

Program Emphasis is focused on the administration of existing permits and ensuring compliance with Title VI of the 1964 Civil Rights Act – processing new applications with an emphasis placed on energy uses.</td></tr>
</table>

Fire Management

Monitoring Item	Results
National Fire Plan Accomplishments for FY 2009	

Year	Prescribed Fire Accomplishments - National Forests in North Carolina					
		Fuels	Wildlife	Site Prep	Other (T&E)	Total Acres
2009	Croatan					21786
	Uwharrie	1867	580	125	160	2732
	N/P					2316
	TOTAL					**26,834**
2008	Croatan	21,783	452		2500 (Botanical)	
	Uwharrie	2,586	865	79		
	N/P	7,123	452	112	40 (Stevens Act)	
	TOTAL	31,492	1769	191	2540	35,801
2007	Croatan	18,379	494			
	Uwharrie	1,064	346	3		
	N/P	7,678	647			
	TOTAL	27,121	1,487	3		28,611
2006	Croatan	16,000	4,500	432		
	Uwharrie	1,819	335	225		
	N/P	5,796		294		
	TOTAL	23,615	4,835	951		29,401
2005	Croatan	18,885	4,654	965		
	Uwharrie	1,696		223		
	N/P	4,949		442		
	TOTAL	25,530	4,654	1,630		31,814
2004	Croatan	18,506		500		
	Uwharrie	1,808				
	N/P	5,573		259		
	TOTAL	25,887		759		26,646
2003	Croatan	15,810				
	Uwharrie	1,666				
	N/P	4,859				

		Fuels	Wildlife	Site Prep	Other (T&E)	Total Acres
TOTAL		22,335	0	0		22,335
2002		22,180				22,180
2001		20,000				20,000
2000		26,000				26,000
1999	No information available					
1998		22,734	3,618			26,352
1997		22,190	2,183	1,154		26,092
1996		13,900	1,231	401		15,964
1995		9,279	586	879		12,881
1994		7,940	2,931	648		13,027
1993		7,057	2,986.50	1,356		11,399.50
1992		4,862	2,202	725	155	7,944

Roads/Trails

Monitoring Item	Results
Amount of trails constructed/reconstructed	NO REPORT
Miles of roads maintained to standard	Nantahala/Pisgah: 1,118 Uwharrie: 34 Croatan: 206
Miles of road constructed/reconstructed/ Decommissioned	**Nantahala/Pisgah:** Constructed: 0 Reconstructed: 1.0 Decommissioned: 6.4 **Croatan:** Constructed: 0 Reconstructed: 0.8 Decommissioned: 0

Monitoring Item	Results
	Uwharrie: Constructed: 0 Reconstructed: 0 Decommissioned: 0

FY 2010 Action Plan

1. **Prepare a Plan Amendment to update direction for protection of the Indiana Bat on the Nantahala and Pisgah National Forests.**

2. **Continue the Uwharrie LRMP Revision process.**

3. **Over the next two years prepare analysis for a Chief's decision to permit prescribed burning for recovery of Mountain Golden-Heather in the Linville Gorge Wilderness.**

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