

Comments on the U.S. Forest Service's Nantahala and Pisgah National Forest Proposed Land Management Plan

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<http://www.arspvc.org/newsletter.html>

Introduction

The U.S. Forest Service has proposed a Land Management Plan for the Nantahala and Pisgah National Forests that will guide their actions for the next 15 years. Having studied this 283-page document carefully the past few weeks and having read other related research, I do have concerns. In this article, I will share my thoughts about preserving the beauty and diversity of this spectacular region.

These two National Forests cover over a million acres of forest land and some of the best displays of rhododendrons, azaleas, kalmia, and wildflowers in the Southern Appalachians. It includes Roan Mountain, Mount Mitchell, Grandfather Mountain, the Linville Gorge, and Hooper Bald just to name a few. The plan does not include Gregory Bald since it is in the nearby Great Smoky Mountains National Park and not part of the National Forests.



Overview

The following four headings summarize my main points but I will explain those assertions in greater detail later in the discussion portion of this document.

1. Biodiversity and Endangered Species

Although the plan claims to be addressing biodiversity and rare species, I feel that some of the assumptions are simplistic. The Southern Appalachians have an extremely rich ecosystem. Besides the eighteen Federally endangered species referenced by the document, there are many other unique plant and animal communities in those forest lands that seem to be ignored. Many are quite rare and could be threatened even though they may not have made the endangered species list. By comparison, an ongoing inventory of living organisms in the Great Smoky Mountains National Park has already found 9718 species previously unknown in the Park and an amazing 1025 species new to science.



Rare life forms are in greater danger of being harmed when people do not know they even exist. I would like to see a better approach for identifying rare species before radical forest management techniques are applied. I will cite two examples. One is of a very rare red rhododendron mutation that was found in the National Forest near Mount Mitchell. It has been admired by many over the past 90 years but was nearly destroyed by a prescribed fire set in 2010. The other relates a very successful cooperative venture between various groups and the U.S. Forest Service that saved a population of large flowered flame azaleas discovered on Hooper Bald. Those efforts ultimately launched a regional azalea festival.

2. Prescribed Fire and Temperate Rain Forests

I feel that the plan relies too heavily on prescribed fire as a preferred forest management technique. I understand the value of controlled burns in restoring health to fire-adapted ecosystems and for fighting invasive alien pests. There are microclimates in the Appalachians where that technique is appropriate, but I have questions about how widely and how often this tool is being used.

The climate of the Southern Appalachians is considered a temperate rain forest. Most places receive 50 to 60 inches of rain annually but some may receive 80 to 100 inches or more. Although that reality does not preclude the existence of fire in shaping those ecosystems, it is clear that natural fires are statistically rare. Droughts do occur which make forests vulnerable to fire but regular and repeated burns in those areas are not likely. The degree and frequency of prescribed burns in certain regions seems excessive.



3. The Role of Ericaceous Plants: Rhododendrons, Native Azaleas, and Kalmia

The management plan points out that approximately 2.5 million visitors come to these two National Forests every year just to see the scenery. Without a doubt, the incredible floral displays provided by the native azaleas, rhododendrons, and kalmia in the spring and summer months greatly enhance the vistas they see. These plants are frequently highlighted in publicity about Western North Carolina including the cover page of this management plan which featured a mountain view framed by purple rhododendrons.



I am worried that the plan does not consider these plant communities when decisions are made, even if it is just for their aesthetic value. The success of wildlife communities is addressed throughout the document but plant communities, other than certain tree species, are generally ignored. My concerns are sensitized because the Southside Project, a precursor to this management plan, had specific objectives relating to ericaceous plants, repeatedly calling them “undesirable” and targeted them for removal.

The proposed management plan had only one objective related to managing ericaceous, ECO-G-09. It echoes the Southside Project and recommends their removal. I find that quite concerning.

4. The Impact of Deer on Forest Regeneration

The management plan made repeated references to how the Forest Service is working closely with hunters. There were also many objectives noting how certain actions would improve habitats for deer. I was surprised that there was no mention of the destruction white-tailed deer are doing to our Eastern forests. The deer population has reached record levels and is now 100 times greater than it was in the 1890s. The cumulative effect of relentless deer browsing is doing serious damage to our forests in many ways.



Other scientists consider the explosion of the deer population to be one of the most serious threats to our forests. Some put their damage on par with

destruction caused by exotic insect pests and plant diseases. The destruction we now see due to deer browsing will only get worse as their numbers continue to increase. Deer foraging is particularly damaging to young tree seedlings needed for forest regeneration. Deer selectively browse on certain species which also reduces forest diversity, negating one of the primary objectives of this plan. I feel the deer problem needs to be formally addressed.

Discussion

1.0 Biodiversity in the Southern Appalachians

The Southern Appalachians are some of the oldest mountains on Earth. They were as high as the Himalayas a mere 250 million years ago, but have eroded over time to become the rich and diverse ecosystems we see today. One reason they are so incredibly rich is that they escaped mass extinctions caused by recent ice ages. Another reason is due to the significant rainfall it receives throughout the year. It is classified as a temperate rain forest. This unique area deserves our attention as much as other threatened rain forests around the world receive.



For nearly two decades, a non-profit organization known as Discover Life in America has been working with National Park Service in the Great Smoky Mountain National Park on a joint project called the All Taxa Biodiversity Inventory. (<https://dlia.org/about/dlia-and-atbi/>) A primary goal is to identify all life forms present in the park. They had expected to eventually find on the order of 60,000 forms of life but that expectation is now closer to 100,000 species. To date (6/9/2020), they have identified 20,391 species including 9718 species that were previously unknown in the park. The amazing thing is their research has already discovered 1025 species that were previously unknown to science.

Like other biodiverse regions including the rain forests in South America and remote forests in China and the Himalayas, we do not know what rare life forms exist until we study regions more carefully. It may seem surprising that several new species of rhododendrons have actually been discovered recently in forests of the Eastern United States.

One can only assume that the nearby Nantahala and the Pisgah National Forests are every bit as diverse as the Great Smoky Mountains National Park. A management plan that applies coarse tools like indiscriminate burning of large land tracts without careful assessment of the rare plant and animal communities that might be present seems particularly short sighted. It does acknowledge the eighteen PET (threatened or endangered) species known to occur in those two National Forests. In light of the All Tax Biodiversity Inventory mentioned previously, however, there are surely other rare and endangered organisms in those mountains. Without a careful assessment, how can even rare plants like Gray's Lily (right) be spared from destruction?



The Endangered Species Act

The Endangered Species Act of 1973 identified rare plants and animals according their imminent threats of extinction. The term “endangered” was used for organisms where the extinction might be imminent. The term “threatened” was for species that could easily become endangered.

Of importance in Section 3 paragraph 16 of that act, Congress clarifies that it has expanded the concept of a “species” by stating:

The term “species” includes any subspecies of fish or wildlife or plants, and any distinct population segment of any species...

The phrasing “any distinct population segment of any species” would seem to imply that unique communities of a species that might not be endangered could have some rare quality or mutation that is not found elsewhere. Thus, it could receive protection under the Endangered Species Act.

The plan does address concerns about maintaining plant and animal diversity by saying, “The approach for providing plant and animal diversity across the Forests requires both a coarse-filter and fine-filter.” I disagree with objective FR-DC-03 that states “The risk of losing key ecosystem components from the occurrence of high severity wildfire remains relatively low.” The research paper titled “Forest Fire Severity Affects Host Plant Quality and Insect Herbivore Damage” by S. Murphy, M. Vidal, et al. published in *Frontiers in Ecology and Evolution* (September 12, 2018) reinforces my view. Although it specifies that low-severity fire can boost *plant* species abundance and richness, it notes that *high-severity fires* may have the opposite effect. High-severity fires can also upset the balance of beneficial insects.

Like many in the American Rhododendron Society and the Azalea Society of America, I have been admiring and documenting the diversity of native azaleas, rhododendrons, and kalmia in the two National Forests. I have been studying these regions for over 25 years but others in our group have much greater experience than I do. We have explored regions in almost every one of the Geographic Areas defined in this plan and have documented rare color forms of many species, plants with double flowers, forms that have unusual foliage or unique plant habits, and more. We have admired the many wildflower communities, too. There are rare plants in the wild that plant society members may have observed that may not be known to staff in the Forest Service. I would like to cite examples.

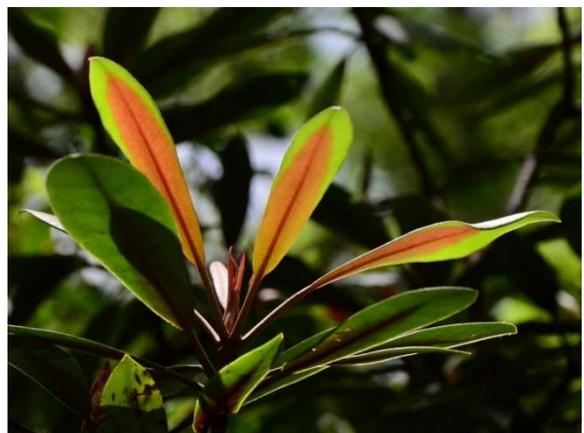
Example 1: The “Red Max”

This story relates to an extremely rare plant that was discovered on a forested hillside near Mount Mitchell in the 1930s when contractors were laying out the Blue Ridge Parkway in North Carolina. One of the men discovered a red form of our native *Rhododendron maximum* in the woods, recognized its unique color, and brought it to the attention of others. This solitary plant in the wild has been known as the “Red Max” (pictured right).

Most forms of *R. maximum* have white to pale pink flowers and are certainly not considered endangered or even threatened. The properties of this red mutation are not only unique for *R. maximum*, but unique in the genus *Rhododendron*. The “Red Max” has red flowers but it also has red sap the color of cranberry juice that works itself into stems and leaves turning them red, too. The red leaf color is exceptionally stunning in the new growth.

This plant might have died from forest competition over the years had it not been for a series of concerned local stewards who looked after its wellbeing. There was much fanfare in 1967 when many leaders of the American Rhododendron Society who had gathered in Asheville visited the site. The “Red Max” was estimated to be 100 years old, a massive specimen measuring perhaps 40 ft across with multiple trunks. Nearby were about 20 plants with the same qualities, presumed to be seedlings or possibly layers of the original plant.

Unfortunately, interest waned as the original stewards aged and passed on. By 1992, due to excessive shade and encroaching vegetation, the huge “Red Max” had died and there was but one small piece left,





either a layer or possibly one of its seedlings. A new group of stewards once again started looking after that plant and it has begun a period of slow recovery.

My first visit to the site was in 2003 and it was still quite spindly then, a solitary trunk leaning at a 45-degree angle (pictured left). Although must travel at least 500 miles each way to get there from my home, I have tried to check on the plant when I am in the area.

I was not aware that in early April of 2010, sometime around the Easter weekend, the National Forest Service set a controlled burn on the hillside where the “Red Max” grows. The vegetation in that area is one of those rhododendron “hells” and quite dense. During a trip to the site in July of that year, I noticed evidence of fire and became worried. As I worked my way up the hillside through charred vegetation, I could see how the intense flames had killed most of large *R. maximum* plants. I was certain the “Red Max” had been a casualty, too.

As I neared the small clearing where it grows, I was elated to see that not only was the “Red Max” alive, but it was also in bloom. Perhaps due to the clearing others had made around the plant or the spirits of its many admirers who had passed on, it had survived the fire. The flames had come to within feet of its

base but did not harm the plant.

I am happy to report that as of October 2019, the “Red Max” has continued to grow and is becoming a lovely specimen once again. About 8 years ago, it started sending up shoots from the base which can be seen to the left. Those growths are now taller than the original plant. I hope prescribed fire will not applied to that hillside again without careful measures to protect this rare specimen.

Example #2: Large Flowered Flame Azaleas on Hooper Bald

I want to share one additional story about a very successful partnership between the US Forest Service and members of several plant societies and other groups. It is a good model to follow that demonstrates how all sides benefit when knowledgeable people work together.

In 1995, members of the Middle Atlantic Chapter of the American Rhododendron Society Species Study Group to which I belong discovered a population of very large flowered flame azaleas, *Rhododendron calendulaceum*, on Hooper Bald. These plants had some of the largest flowers we had ever seen in the wild, some having individual blossoms measuring more than 3.5 inches across. Members of other ARS Chapters and the Azalea Society of America started visiting the site regularly to admire those large flower forms.

By 2003, many of those plants were getting overgrown. Knowing that excessive shade can kill, we realized these plants were now threatened so we became concerned. One of our members contacted Dr. Duke Rankin of the National Forest Service who had jurisdiction over that region and





discussed the problem. He was very accommodating and with the help of volunteers from several groups, we started a joint project to restore Hooper Bald.

Ecosystems are complex and these azaleas were not the only rare species on the bald. We were very careful to preserve plants required by the endangered Carolina northern flying squirrels that also reside there. They need red spruce and yellow birch trees for their survival so we made sure to protect those trees and encourage their seedlings.

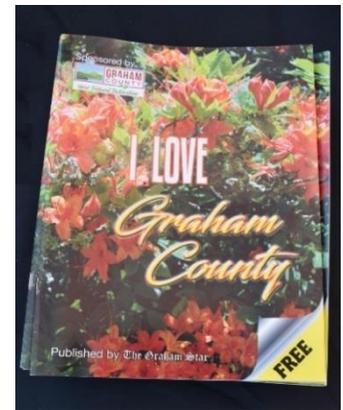


The plants started to respond and in just five years as seen to the left, a red azalea that was in trouble was now putting on a spectacular display. The project gained other partners including the Southern Highlands Reserve, the Sierra Club, Partners of Joyce Kilmer Slickrock Wilderness, leaders in the nearby town of Robbinsville, NC, officials from Graham County where it resides, the Boy Scouts, and even students and staff from Robbinsville Elementary School. By restoring the bald and the azaleas, we managed to spark a broad interest from the general public.



The Forest Service erected a kiosk at the parking area where the Hooper Bald trail begins. In addition to explaining the history of the bald, it highlights the project to preserve the large flowered flame azaleas that grow there. By 2018, the town of Robbinsville and the Chamber of Commerce in Graham County established an annual Azalea Festival which includes two days of

festivities in town, vendor sales, and guided tours of the azaleas on the bald.



2.0 Prescribed Fire and Temperate Rain Forests

First, let me say that I am not opposed to prescribed fire as a tool in forest management. I have read many research reports on the subject and I realize that fire suppression policies have caused many problems in some ecosystems. Prescribed burns are certainly helpful in maintaining healthy and rejuvenated growth in fire-adapted forests. Prescribed fire is also an effective tool in controlling invasive, alien pests. My concern is that this technique seems to have become the primary management tool in a region where natural forest fires are statistically quite rare.



There are many different microclimates in the Southern Appalachians. Due to the consistently high rainfall which is typically distributed equally throughout the year, climatologists classify this region as a temperate rain forest. It is true that moisture levels vary greatly depending elevation and terrain. However, with an average annual rainfall ranging from 50 to 60 inches to as much as 80 to 100 inches in some locations, this area is not a dry, or xeric ecozone.

I do acknowledge the actions of humans over hundreds of years have had an effect on the ecosystems we see in the Appalachians. Long before the first European colonists arrived in the New World, Native Americans were likely using fire to open up the balds we admire today. When settlers moved into the Appalachians and displaced many Native Americans, they likely used fire to assist their farming efforts, too. My objection is that fire is being routinely applied to ecosystems where fire was not normally a factor in its evolution. Using fire to mold a forest into another preferred model is inconsistent with nature.

Discussion of Specific Objectives Related to Prescribed Fire

Prescribed fire is a forest management technique usually applied to tracts of land during dormant periods. Low-intensity fires usually cause minimal damage and most plants can recover in time. On the other hand, high-intensity fires can kill many plants and organisms. Fire suppression techniques used repeatedly to the same tract has been shown to reduce diversity and inhibit forest regeneration in many situations.

In Table 4 on page 60, the first four ecosystems show how often fire would be applied to restore a perceived balance. For the drier regimes, those intervals can range from every 1 to 3 years in the restoration phase followed by every 3 to 5 years thereafter. For high elevation, moist regimes, that can be every 5 to 10 years during the restoration phase and then every 18 to 25 years thereafter. Footnote 12 in that table seems to imply that prescribed fire would be applied to other forest regions but with less frequency. I must emphasize that natural fires are very rare in those regions.

In Table 10 on page 80, five annual forest management actions are described: 1) regeneration harvests, 2) intermediate thinnings, 3) reforestation, 4) stand improvement, and 5) prescribed fire. Of those actions, the Tier 1 acreage managed by prescribed fire involves more land than the other four techniques combined.

There are rare weather extremes like the record drought of 2016 that can make parts of the Southern Appalachians susceptible to wildfires as happened in during November and December of that year. The tragic fire that spread from Chimney Tops in the Great Smoky Mountains National Park to the side of



Mount LeConte and then roared into the town of Gatlinburg caused major property damage and loss of life. It consumed 17,900 acres. The drought was an abnormality caused by nature. The fire ignition was arson caused by two teenagers throwing matches. In most years, Mount LeConte receives 85 inches of rain annually so fire is quite rare. A tract of land totaling 3422 acres on Wayah Bald also burned (pictured left) that same fall. That area averages nearly 80 inches of rain annually so it is not considered a fire-adapted ecosystem either. The ignition of that fire was also suspected arson.

Objective ECO-O-02

Tier 1: Provide 11,000-17,000 acres of **young forest conditions**, by steadily increasing new young forest conditions from 6,500 acres up to 12,000 acres through silvicultural practices with at least 70% above 2,500 feet elevation and 50% in oak-dominated, northern hardwood, and rich coves. Additionally, ensure at least 50% of these conditions are within NCWRC Wildlife Habitat Active Management focal areas.

Tier 2: Provide up to 37,000 acres of young forest conditions by increasing new young forest conditions up to 32,000 acres through silvicultural practices with similar elevation and spatial arrangements described above. This tier includes more focused use of prescribed fire to generate young forest conditions.

The US Forest Service manages over a million acres in those two National Forests, about equal acreage in each region. When I try to comprehend the cumulative effect of these burns during the 15-year lifetime

of this plan, I do have grave reservations about certain objectives. In objective ECO-O-02, Tier 1 calls for expansion of young forest conditions from 6,500 to 12,000 acres with 70% of the sites above 2500 feet in elevation and into rich coves. Tier 2 calls for even greater use of prescribed fire to accomplish those objectives for an additional 32,000 acres. Rich coves and high elevation sites are specified in these objectives but those regions are not prone to natural fires.

Objective ECO-O-06

Tier 1: Prioritize **prescribe burns** to restore the most fire-adapted ecozones and across ecozones where reducing fuel loads will improve public safety on adjacent private lands. Annually prescribe burn for 6,500 to 10,000 acres

Tier 2: Expand the extent of prescribed fire up to approximately 20,000 acres (annually) with emphasis on restoring the fire-adapted ecozones and across ecozones

In objective ECO-O-06, the Tier 1 discussion indicates that prescribed burns would be prioritized “across ecozones” that were not necessarily fire-adapted regions in order to protect private property. That is a valid concern but how are those regions determined? I visited Rainbow Falls on Mount LeConte in June of 2016 and saw no obvious buildup of incendiary materials that might make that pristine landscape prone to wildfire. The season was already dry so there was almost no water at the falls, but an imminent disaster was not obvious at that time. Perhaps there are tracts that are of concern near residential areas but I do not think the wildfires of 2016 were the result of poor forest management.

The Tier 2 objective is especially concerning since it calls for doubling the number of acres managed by prescribed fire from 10,000 acres per year to 20,000 acres. It then goes on to say that it will restore fire-adapted ecozones but will also be used across ecozones.

To understand the amount of acreage involved, 20,000 acres is comparable in size to the combined wildfire damage in 2016 which included the side of Mount LeConte, part of the town of Gatlinburg, Chimney Tops, and Wayah Bald combined. Since this plan is to be the guideline for the next 15 years, that would imply that 300,000 acres (20,000 x 15) or nearly one third of the Southern Appalachians could be subject to burning during the execution of this plan.

I realize that the plan calls for burning the same tracts repeatedly but considering the temperate rainforest nature of the region, that level of incineration does not make sense. Many activists have rightly expressed concern about burning the tropical rainforests, not just for the carbon dioxide it adds to the atmosphere which exacerbates climate change, but also due to the loss of biodiversity. We should treat our own temperate rainforests with similar reverence.

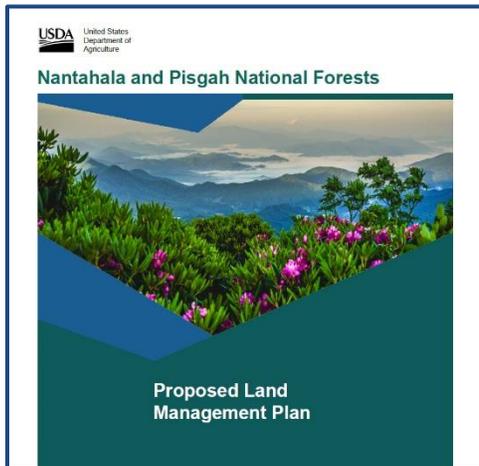
3.0 The Role of Ericaceous Plants: Rhododendrons, Native Azaleas, and Kalmia

The Forest Service plan mentions the need to preserve many rare plant and animal communities but has little to say about the fate of ericaceous shrubs like rhododendrons, native azaleas, and mountain laurel. I realize there is a separate management plan for 9,200 acres that includes Roan Mountain and the adjacent highlands but it is not very specific. However, there are many other scenic stands of ericaceous species and wildflowers that are not mentioned.

As a former Director of both the American Rhododendron Society and the Azalea Society of America, I do have a fondness for these plants but I am not alone. These native shrubs are highly prized for their beauty. They appear prominently in many travel brochures and videos advertising Western North



Carolina.



Carolina. Even the cover page of this land management plan shows views of distant mountains framed by a mass of purple *Rhododendron catawbiense*.

The aesthetic value provided by these magnificent flowering shrubs is a major attraction for millions of visitors who flock to the region every year. The Roan Rhododendron Festival celebrating the purple *R. catawbiense* has been a major attraction each year since 1947. More recently, Robbinsville, NC, has established Azalea Festival celebrating the Flame Azaleas (*R. calendulaceum*) on Hooper Bald. *Kalmia latifolia* is the state flower of both Pennsylvania and Connecticut. *Rhododendron maximum* is the state flower of West Virginia. They are valuable ornamental plants and obviously admired by many.

Although plan does address the importance of scenery to the general public on page 118, specific plants are not identified but perhaps they should be.

Combined, the two National Forests receive approximately 4.6 million visits annually. National Visitor Use Monitoring has shown that 55 percent of visitors to the Forests (approximately 2.5 million annually) engage in viewing scenery. The National Forests also provide much of the scenic backdrop for the Blue Ridge Parkway, a national park which receives approximately 13 million visits each year. The primary activity for 91 percent of these visitors (approximately 11.8 million) is viewing scenery.

The plan frequently referenced concerns for hunters or hunting which appeared 52 times in the document. It also addressed white-tailed deer and the need to improve their habitats 44 times. My concerns about deer browsing will be addressed in greater detail elsewhere, but I want to draw a comparison that the word “rhododendron” is only mentioned 8 times in those 283 pages and that includes the separate management area for Roan Mountain that begins on page 266. There are 4 references to the great laurel, a common name for *Rhododendron maximum*. The word “azalea” is mentioned only 4 times and “mountain laurel” or kalmia is mentioned 6 times. These plants deserve greater consideration in the plan.



Statistics show that there are 300,000 to 400,000 licensed hunters across the entire state of North Carolina and they generate about \$400 million in annual revenue. Tourism has a much greater impact on the economy. Looking at Buncomb County alone which includes the city of Asheville, the research firm Tourism Economics noted that in 2017, they attracted 11.8 million visitors to this county in Western North Carolina which resulted in a \$3.1 billion impact on the economy. Buncomb is only one of the 18 counties covered by this plan.

Objective ECO-G-09: A Major Concern

Open understory conditions should be enhanced to provide the natural range of variation through a reduction in ericaceous shrubs, such as deciduous azaleas and mountain laurel, to benefit many species of birds, bats, and other animals.

Had there not been the controversial 202-page Southside Project which preceded this forest management plan, I might not have been so concerned about objective ECO-G-09. The wording in the Southside Project clearly showed disdain toward ericaceous plants such as mountain laurel and *Rhododendron maximum*. It repeatedly claimed that prescribed fires would have a positive effect by reducing “undesirable shade tolerant species such as mountain laurel.” That phrase was used seven times in the Southside Project document. It also stated “Fire would help also reduce the density of rhododendron” which has also been expressed by the Forest Service in other publications.

Since objective ECO-G-09 is the only one specifically related to the management of native azaleas, rhododendrons, and kalmia in the Nantehala and Pisgah National Forests, it is unsettling since it seems to call for eradication of these plants to enhance the understory environment while claiming that their destruction will benefit birds and other animals.

I am not aware of research that backs the assertion that reducing ericaceous understory shrubs will benefit birds and other animals. In fact, the opposite seems to be more widely accepted. Stephen W. Kress, author of “The Audubon Society Guide for Attracting Birds,” recommends mass plantings of native shrubs and even retention of brush snags to provide shelter and protection for birds. The Cornell Lab notes that the Yellow Warbler prefers to nest in shrubby thickets and forage along small branches and twigs to find caterpillars and insects.

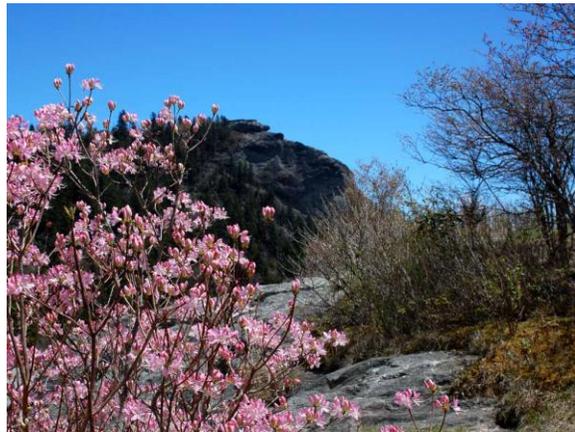


I found two papers that actually blamed the loss of woodland songbirds to destruction of understory shrubs by excessive deer browsing. In 2012, S. Chollet and J. Martin wrote an article titled “Declining Woodland Birds in North America: Should We Blame Bambi?” In the *Journal of Wildlife Management* in 1994, D.S. deCalesta published an article titled “Effect of White-tailed Deer on Songbirds Within Managed Forests in Pennsylvania. They said birds clearly benefit by understory shrubs.

I am familiar with those dense mountain laurel and rhododendron hells (left) that make portions of the Southern Appalachians difficult to traverse. I can understand a desire to clear those out but even those dense thickets are valued by some wildlife. They can actually provide a winter den for hibernating bears. The black bear population has also risen significantly and there are clearly not enough caves for them to use for winter hibernation. Dens don’t have to be physical caves as Don Henderson pointed out in the *Smoky Mountain News* in the “Naturalist’s Corner: Winter Miracle” (January, 21, 2009), “A den can be anything from a pile of leaves and sticks in a rhododendron slick for a bear in the Appalachians to a rock crevice in Maine...”

That was backed up by *The Oxford Journal of Mammalogy* in an article about research conducted by M. Reynolds-Hogland, M. Mitchell, and others in an article titled, “Selection of Den Sites by Black Bears in the Southern Appalachians.”

In the Southside Project, they did identify two native azalea species as being rare plants. One is the Pinkshell Azalea, *Rhododendron vaseyi*, (right) which grows in essentially two small regions of North Carolina above 4000 ft in elevation. One of those areas is a 17-mile stretch along the Blue Ridge Parkway near Mount Pisgah and a few other adjacent mountains. The other similarly small footprint is near Grandfather Mountain.



The other species mentioned is *R. cumberlandense* which is hard to distinguish from *R. calendulaceum*. We have observed it in scattered populations in the western and southwestern parts of the state in the Nantahala National Forest and along the Cherohala Skyway. There is a large population on Gregory Bald in the Great Smoky Mountains National Park including a rare “hybrid swarm” where it has been crossing with two other native species to produce some multi-colored azalea hybrids. That bald is not covered by this plan but the Park Service has been carefully preserving those azaleas. Incidentally, the American Rhododendron Society has worked cooperatively with the National Park in preserving those azaleas, too.



There are other native azalea species in these regions including the very fragrant *R. arborescens* (left) which was a major attraction on top of Wayah Bald. That population was decimated by the wildfires on 2016 that burned major portions of the bald but they are making a slow recovery. We have identified some unusual kalmia forms and a double *R. calendulaceum* on that mountain, too. There are scattered populations of *R. viscosum* in the region as well.



There are several forms of the small leaf rhododendron species called *R. minus* which has several variations. The early blooming *R. minus* var. *carolinianum* grows in a few isolated locations in North Carolina that almost parallel the habitat of *R. vaseyi*. One is near Mount Pisgah where the flowers tend to be white or pale pink and often have a prominent yellow blotch (left). Populations near Grandfather Mountain and lower elevations in the Linville Gorge where *R. vaseyi* does not grow seem to trend toward deeper pink with small spots in the throat rather than a bold yellow blotch. A more southern form *R. minus* var. *minus* can be found in isolated



spots in the southwest part of the state. It tends to have tubular flowers that open in midseason. There is another rare dwarf form of *R. minus* with dark purple flowers that we call *R. minus* var. *smokianum* (right). It seems to be restricted to high elevations and vertical cliffs like Mount LeConte and Chimney Tops.

4.0 The Impact of Deer on Forest Regeneration

I was surprised that the management plan did not adequately address the threats to forest regeneration caused by the white-tailed deer. The document repeatedly called for improving deer habitats but did not reference the damage already being done to the forests due to the ever-increasing numbers of deer and their selective browsing.

In 1830, the deer population in the Eastern United States was estimated to be less 300,000 animals. Today, it is over 30 million.



That 100-fold increase in the past 90 years has not only caused frustration to almost every suburban gardener, but the damage to our forests and natural landscapes is also well documented. Anyone who has regularly visited Roan Mountain over the last decade is aware of the defoliation of the rhododendrons due to deer browsing. Large plants have lost all lower foliage and smaller ones have been killed.

Many woodland tracts appear quite open due to the loss of understory plants as well as a lack of tree seedlings that would normally be a natural succession to an aging forest. Deer are also causing irrevocable damage to rare plant communities. The Great Smoky Mountains National Park has expressed serious concern for trillium populations in the park.

In a 2013 article published on the Nature Conservancy website titled “Too Many Deer: A Bigger Threat to Eastern Forests than Climate Change?” by A. Pursell, T. Weldy, and M. White referenced many concerns caused by deer browsing. They specifically addressed the lack of diversity in tracts treated by prescribed fire. Deer find the open areas easy feeding areas and they will consume favorite species first as tree seedlings attempted to regrow following a prescribed fire. That selective browsing reduces diversity in forest regeneration. They warned that such disturbances like controlled burns without controlling deer browsing may even be counterproductive. They also pointed out that deer are well documented agents for spreading non-native exotic pests into new areas. Deer also seem to avoid the foliage of many invasive alien plants which gives those plants an upper hand against desired species. The alien Princess tree (*Paulownia*) is an early colonizer after a fire and it is becoming a serious pest in the Linville Gorge.

I think this 15-year management plan for Nantahala and Pisgah National Forests needs to address the deer problem. The damage they are already doing is not going away and it will only get worse.

Conclusions

The proposed Nantahala and Pisgah National Forest Land Management Plan has many good points but I do have some concerns. I think it is important to recognize that protecting the rare species and the incredible biodiversity found in this region should go far beyond their current policies. It is important to do a more thorough assessment of rare life forms present in a region before any radical procedures like high-severity controlled burns are used to change characteristics of forest ecosystems.

There are fire-adapted ecosystems in this region but I think the Forest Service needs to move carefully in the use of prescribed burns in such a broad manner as described by this plan. The bulk of diverse life forms in the Southern Appalachians have evolved over many thousands of years in a temperate rainforest, not a dry forest that is prone to frequent fires.

The Forest Service needs to address the scenic value of various plant communities in this region and include objectives relating to them that will become part of the decision-making processes. They also need to revisit their current objections to ericaceous. There are many beautiful stands of our native azaleas, rhododendrons, and kalmia in this region and they are generally admired by the public.

Finally, the Forest Service must address the problems associated with the ever-increasing white-tail deer population. Although these animals are admired by many, they are doing irreparable damage to our forests and need to be brought into balance.

Photo Gallery

The following pages have additional photos from regions discussed. All photos taken by the author.



Roan Mountain: *R. calendulaceum* and *R. catawbiense*



Hooper Bald: *R. calendulaceum* and the Azalea Festival in Robbinsville, NC



Gregory Bald: *R. cumberlandense* and Native Azalea Hybrids



Grandfather Mountain: *R. vaseyi*



Mount Mitchell: *R. maximum* and the “Red Max”



Wayah Bald: *Kalmia latifolia* and *R. arborescens*

