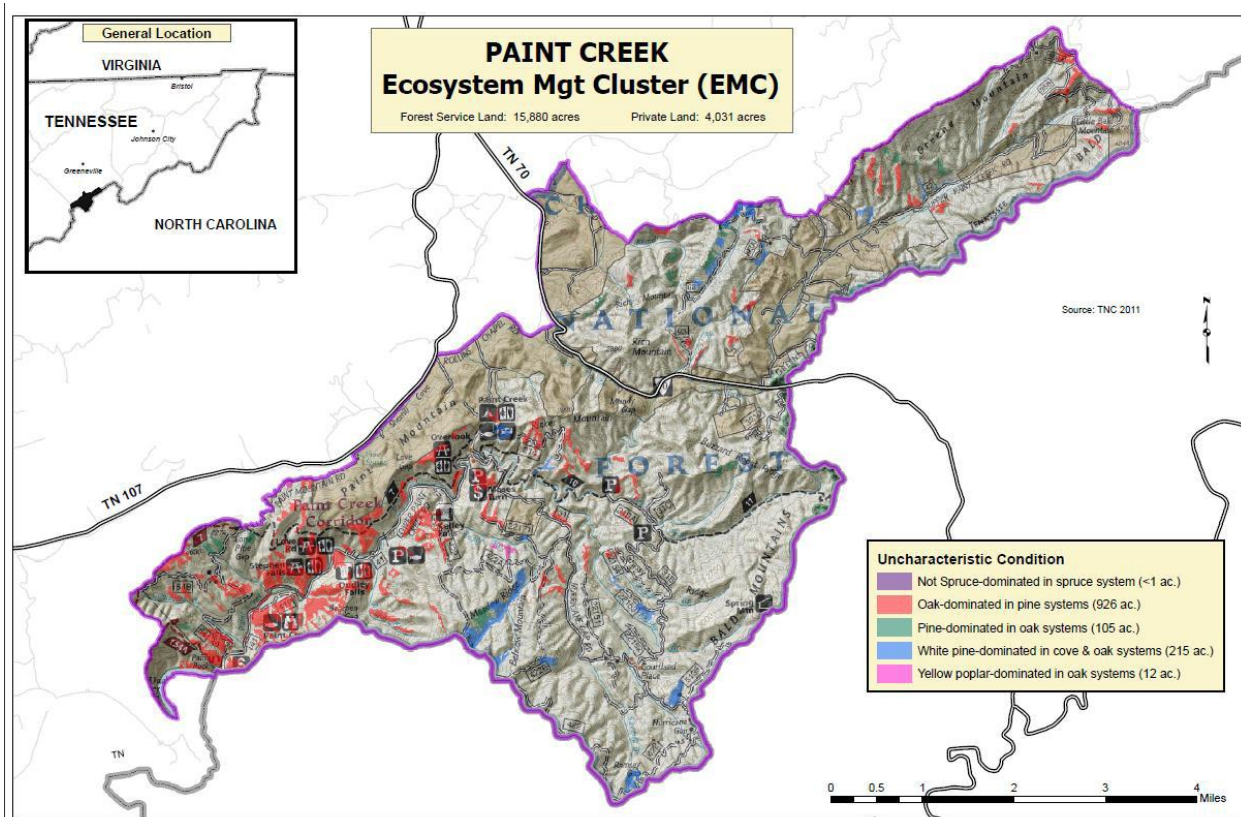


Cherokee National Forest Landscape Restoration Initiative

Watershed Team Recommendations for Paint Creek

Recommendations for Ecological Restoration of Forest Service lands in the Paint Creek Watershed



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View from the top of Viking Mountain at the north end of the Paint Creek watershed

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Context and Background

Working collaboratively with the Forest Service, the Cherokee National Forest Landscape Restoration Initiative (CNFLRI) developed a set of consensus based restoration recommendations for the North Zone of the Cherokee National Forest. The Steering Committee of the CNFLRI represented a diverse array of stakeholders and worked over a two year period to develop these restoration recommendations. The full set of restoration recommendations for the North Zone of the Cherokee National Forest and supporting documentation can be found at <http://www.communityplan.net/chokeee/>.

Overview and Definitions

The following explanation and definitions are designed to help clarify and remind the reader of the principles and process used to develop the CNFLRI restoration recommendations for the North Zone and should not be considered a substitute for the detailed descriptions and documentation found in the full report.

The Steering Committee of the CNFLRI used The Nature Conservancy's Enhanced Conservation Action Planning (E-CAP) process to develop restoration recommendations for the North Zone. E-CAP is a planning and modeling tool designed to improve landscape scale forest management decision making. (Low, Provencher, and Abele, *Journal of Conservation Planning*, Vol. 6 (2010) 36-60). E-CAP is based on the Ecological Systems described by the Biophysical Setting models (BpS model) found in LANDFIRE. Ecological Systems are the dominant vegetation type expected in the physical environment (geology, landform, and climate) under a natural disturbance regime. Each BpS model describes a Natural Range of Variability (NRV) that is determined using modeling software called Vegetation Dynamics Development Tool or VDDT (VDDT, by ESSA Technologies, Ltd). The NRV is the distribution of vegetation succession classes (S-class) for each Ecological System in a naturally functioning landscape. Succession Classes or S-Classes are determined for each Ecological System and describe both the seral stage and the canopy closure of the vegetation. These usually fall into the following categories: Early, Mid-Open, Mid-Closed, Late-Open, Late-Closed. E-CAP determines a metric for each Ecological System called the Ecological Departure Score. Ecological Departure is the departure of current vegetation from its NRV -- i.e., dissimilarity between expected and current vegetation classes. Ecological Departure scores range from 0 (exactly the same as the expected vegetation) to 100 (severely departed from the expected vegetation).

For the CNFLRI restoration recommendations, the current conditions were determined using FS Veg and some additional information provided by the Forest Service Staff and Steering Committee members. The expected Ecological Systems were mapped across the North Zone of the Cherokee National Forest by Steve Simon in accordance with the methodology described in *Ecological Zones in the Southern Appalachians; First Approximation* (Simon, Steven A.; Collins, Thomas K.; Kauffman, Gary L.; McNab, W. Henry; Ulrey, Christopher J. 2005., Res. Pap. SRS-41. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 41 p.). In some cases, the expected vegetation is not simply departed from the expected S-Class, but, is dominated by entirely different vegetation. This type of vegetation is considered uncharacteristic and referred to as U-Class. The CNFLRI restoration recommendations focused on treatments that reduced the U-Class and moved the S-Class of each ecological system toward its NRV. This focus on the reduction of U-Class conditions resulted in the name of the model run "U-B-Gone" that, along with the consensus of the Steering Committee was the basis of the CNFLRI restoration recommendations.

The following brief definitions are contained here as a reminder and refresher for the reader:

Ecological Systems- Dominant vegetation type expected in the physical environment (geology & climate) under a natural disturbance regime as described by the Biophysical Setting Models (BpS models).

Ecological Departure- Metric used to measure the dissimilarity between the expected and current vegetation class. (Range from 0-100)

Natural Range of Variability (NRV)- Distribution of vegetation succession classes (S-class) for each Ecological System in a naturally functioning landscape

S-Class- Succession class. A description of the seral stage and the canopy closure of the vegetation

U-Class- Uncharacteristic vegetation. Dominant vegetation is entirely different than the expected Ecological System.

Stepping it Down – Recommendations for a Watershed

Because the Forest Service uses watersheds as the geographic unit for assessing management opportunities and developing projects, the Steering Committee established a Watershed Team for the purpose of stepping down the recommendations for the North Zone to a single watershed – Paint Creek. The goal of the Watershed Team was to collaboratively develop watershed- scale restoration recommendations and provide a model process that the Forest Service could use for future restoration planning. The objectives of the Watershed Team are listed below.

- As a commissioned group of the CNFLRI Steering Committee, the Watershed Team should seek meaningful collaboration, employ the procedures and protocols set forth by that Steering Committee, and report back to it as necessary.
- In order to test the assumptions made by the VDDT modeling process, the Watershed team should develop achievable monitoring recommendations. These recommendations should focus on, but not be restricted to, the pilot watershed.
- The Watershed team should use available data to collaboratively develop restoration recommendations at the watershed scale that would maximize potential for reducing departure from the NRV across the North Zone of Cherokee NF and develop a model process for other watersheds. Examples of those data include, but are not limited to:
 - FS Veg data
 - Steve Simon’s ecological mapping
 - State Wildlife Action Plan
- The Watershed team should strive to provide site specific examples of recommendations via site visits and photos whenever possible
- Meaningful restoration includes public participation. Therefore, the Watershed team should encourage a meaningful Forest Service led public participation process by:
 - Making recommendations for format and structure of the public process
 - Participating and encouraging constituents to participate in the process

Methods

The Watershed Team developed a site assessment survey form that was used to document potential restoration opportunities at every location visited and provide consistent data for comparing those opportunities across all sites visited.

Cherokee National Forest Landscape Restoration Initiative

Paint Creek Watershed Team

Site Assessment Survey

Site Number (date and chronological order)	
FS Veg Compartment and Stand Number	
Approximate Elevation	
Slope	
Aspect	
What is the current Ecological system present at the site?	
What does FS Veg say is the current Forest Type?	
What did Steve Simon's model predict would be at the site?	
Is the site in a desired condition? Could it be improved? What S-Class or System would we like to move it toward?	
What treatment options could be used to do that? How many entries?	
How many of those treatments could be done commercially?	
Would there be a need for additional funding to complete treatments at this site?	
Does this site provide an opportunity to demonstrate a restoration treatment or condition that is better than other locations in the watershed? On the north end of the Forest?	
Additional Comments/Discussion Points or unanswered questions.	

Please paste photos below.

The Watershed Team first focused on visiting locations identified in our mapping as potentially containing U-Class vegetation. The Watershed Team also visited locations that were considered to have potential restoration opportunities based on the experience of members of the Team. Lastly, the Watershed Team visited several locations determined to be in need of silvicultural treatments by the Forest Service staff. The Watershed Team then reviewed the total acres of restoration treatments recommended by the CNFLRI for each of the Ecological Systems across the North Zone and compared them to the opportunities available in the Paint Creek watershed. This was done to ensure that we targeted treatments to a given Ecological System proportional to its representation within the watershed relative to the entire North Zone. Finally, the site assessment forms for each location were used to develop consensus around the tiered recommendations found below.

Additionally, a sub-group of the Watershed Team reviewed the list of species of conservation need that were thought to occur within the watershed. Using the State Wildlife Action Plan database that describes the Key Limiting Factors for each of these species, the group was able to determine the species that might benefit from each possible treatment. The list can be found in Appendix C. With some additional work, this same database could potentially be used to help identify treatment areas that would have the most benefit to species of conservation need.

Restoration Recommendations for the Paint Creek Watershed

The following recommendations represent opportunities that provide the best possible ecological benefits within the Paint Creek watershed. These recommendations include two broad classes of restoration treatments: those intended to remove uncharacteristic vegetation and others that would reduce the departure from the NRV by manipulating the distribution of S-classes within each ecological system. In many cases, treatments recommended for removing uncharacteristic vegetation would not be feasible through traditional timber sale implementation unless packaged into projects that would produce more economic value than they alone represent. For this reason, the team attempted to recommend S-class manipulations in locations that were both ecologically appropriate and increased economic potential for operating in locations where the highest priority U-class restoration opportunities exist.

General Recommendations

The following recommendations reflect the team's agreement about restoration of particular conditions that were often encountered in the Paint Creek watershed. They are not listed in priority order.

- When possible, consideration should be given to the future quality of individual trees within a stand and the poorest should be selected for removal during thinning.
- The team noted several locations throughout the watershed that could benefit from treating invasive plant species. When these locations were near a site recommended for restoration treatment, the presence of invasive species was noted under special considerations in the site recommendations.
- Regeneration harvests that have resulted in 25-40 year old stands of predominately yellow poplar should be treated to increase the diversity of these stands. Currently, the economic value of these stands may not allow for this type of treatment using traditional methods. These stands should be reviewed for alternative funding for restoration or flagged for treatment in 10-20 years when their value will pay for treatment designed to increase diversity of the stand.



Stand of yellow poplar meeting the description above of 25-40 year age range
(Photo 5.22.12 Site 4 below the road)

- Regeneration harvests that have resulted in 10-25 year old stands of predominately yellow Poplar should be treated now with the intent of increasing diversity in those stands for the future. Treatments should include mechanical, manual, and chemical options designed to suppress or remove some vegetation (poplar) while favoring others species within the composition of that Ecological system (oaks, or a diverse mix of cove species). Specific examples of locations in the watershed where this condition was obvious and in need of treatment included, but are not limited to:
 - Rough Branch 3, Compartment 217 Stand 4
 - Paint Rock-FSR 5135, Compartment 223 Stands 24 and 25
 - Sawmill Branch, Compartment 215 Stand 26



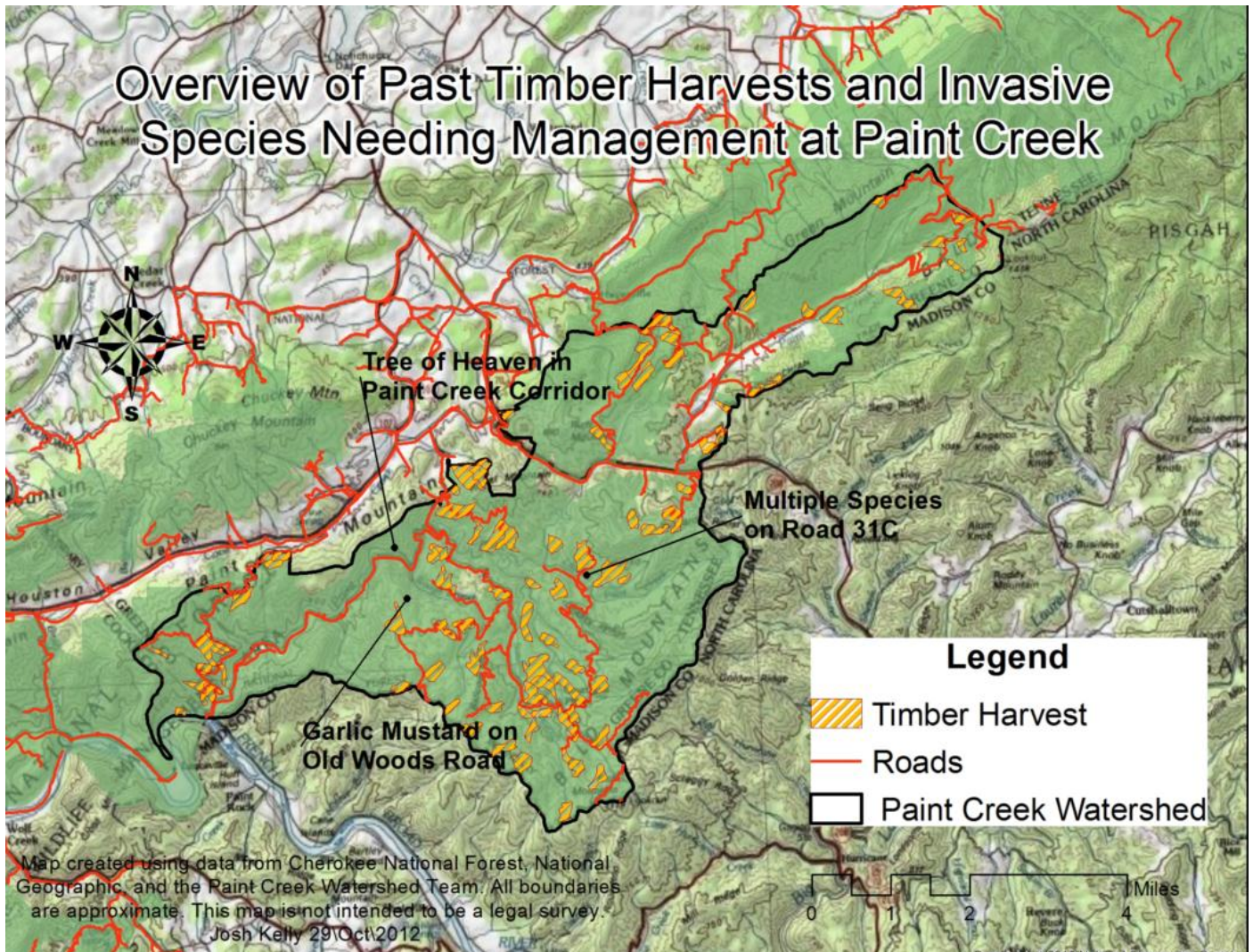
Stand of yellow poplar meeting the description above of 10-20 year age range
(Photo 4.10.12 Site 1)

- Burn units in the lower watershed contain significant acreages of the low-elevation pine Ecological System. These units should be monitored and burned on an interval which restores and maintains this system.



Photo of recently burned stand in the southern/lower portion of the Paint Creek watershed
(Photo 4.10.12 Site 2)

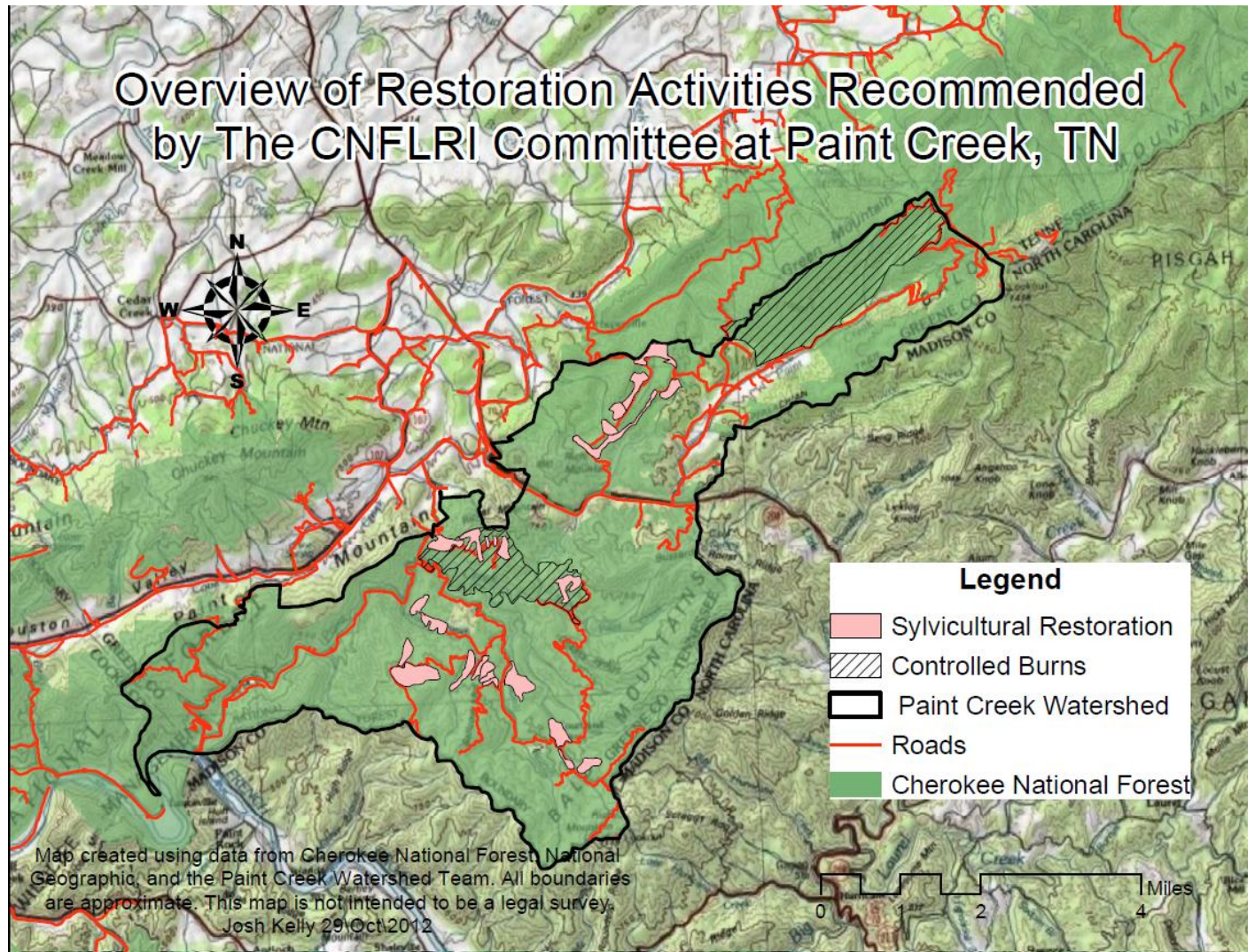
Overview of Past Timber Harvests and Invasive Species Needing Management at Paint Creek



This map shows the stands throughout Paint Creek watershed that were harvested and may be regenerating in a condition needing treatment, such as those described above for predominantly tulip poplar stands. It also shows several specific locations of invasive plant species that were noted by the team.

Site Specific Recommendations

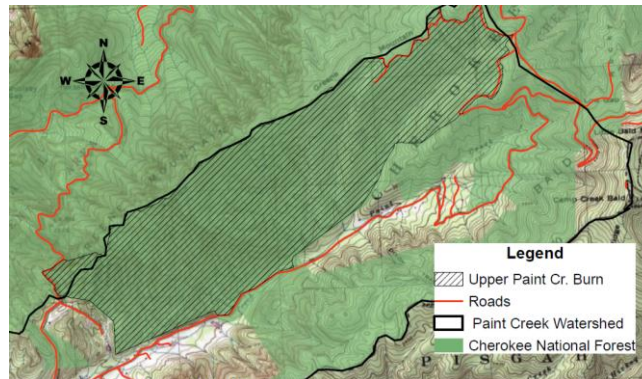
These are the sites that the team visited and agreed were of the highest ecological priority for restoration treatments. They are not listed in priority order.



Map of the site specific restoration recommendations in Paint Creek Watershed

Upper Paint Creek Burn unit (6.12.12 Site 2, 3, and 5)

Location and Map: This site is located along the Southeastern side of Green Mountain and is bordered by the Upper Paint Creek road. The boundaries of the burn unit are the same as FS Compartment 206 shown below as hashed lines.



Current Condition: This site contains numerous different ecological systems. Those most relevant to this recommendation are the white pine plantations found just north of Dillard Place along the Upper Paint Creek road and the degraded Montane pine systems found along Kennedy Cabin road.

Restoration Goal and Treatments Recommended: The restoration goal is to encourage characteristic vegetation and a more appropriate fire regime throughout this site. This would include late/open Montane Pine in several locations along the Kennedy Cabin Road as well as moving the white pine plantations to more characteristic vegetation that would include low elevation pine forest, dry-mesic oak forest, and some more mesic oak and cove forest vegetation.

Special Considerations: This site is located within a roadless area. Ashleaf Goldenbanner (*Thermopsis fraxinifolia*), Pink lady Slipper (*Cypripedium acaule*) and Turkey Beard (*Xerophyllum asphodeloides*) are all fire tolerant/dependent species that were observed from the Kennedy Cabin road.



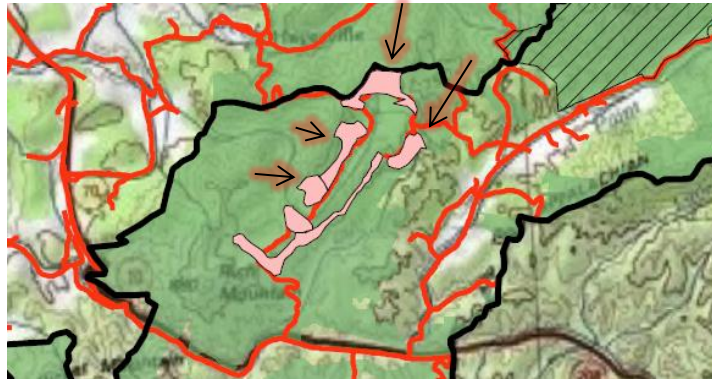
Site 5, white pine plantation



Site 2 Oak dominated site with remnant montane pine

Devils Kitchen Branch DK1-10.1 Acres, DK2-31.3 Acres, DK3-39.3 Acres, DK4-21 Acres.

Map and Location: This site consists of 4 stands located along Devils Kitchen Branch Road FS Road 93. The stand are indicated below with arrows



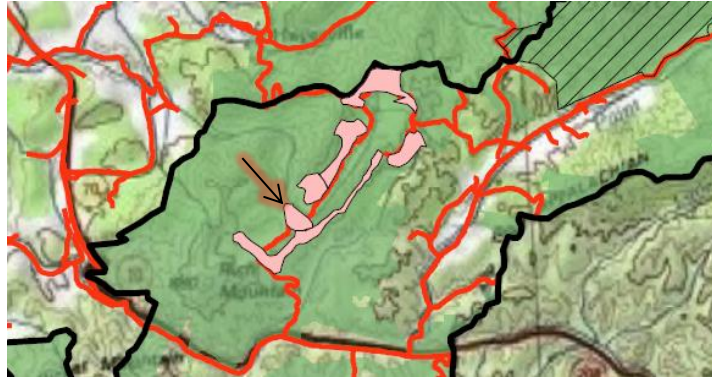
Current Condition: White pine plantation

Restoration Goal and Treatments Recommended: Restoration to characteristic vegetation. This could be done through several different treatments including a regeneration cut, cut and leave treatments, herbicide treatments, and even possibly prescribed fire. The result will be early conditions and will require follow up treatment to promote species diversity appropriate for the ecological system. If management of this site is deferred due to economic or feasibility considerations, the site should be prescribe burned to reduce the white pine in the understory. Special care should be taken to retain any characteristic tree and herb species present, especially shortleaf pine, pitch pine, and oaks.

Special Considerations: Repairing FSR 93 may not be possible or desirable. If not, the road should be gated, at least seasonally, to protect water quality and bog habitat in the area.

Devils Kitchen Ridge 1 DKR1-15.6 Acres

Map and Location: This site is located on the north side of the ridge separating the Devil's Kitchen Branch Watershed from the Paint Creek Watershed. Please note that the Paint Creek Watershed Assessment Area includes some lands whose waters do not flow into Paint Creek and Devil's Kitchen Branch is the largest drainage of that sort. The stand is indicated in the map below with an arrow.



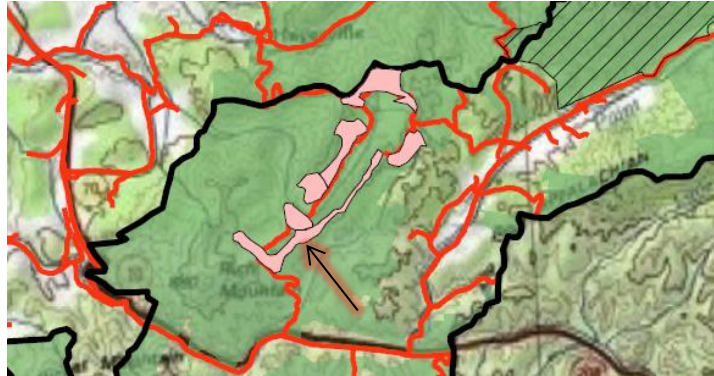
Current Condition: DKR1 contains, in descending order of abundance, the dry oak, dry mesic-oak, cove, and montane oak ecosystems (See Appendix D) The entire treatment area is currently in late-closed condition in the oak systems, and mid-closed condition for the Cove System. The treatment area contains approximately 2.8 acres uncharacteristically dominated by white pine. The remaining acreage is in characteristic condition, though it does not qualify as being of high conservation value. For example, the cove portion of the treatment area is dominated by poplar to the near exclusion of other species, and no rare species were observed during the site visit.

Restoration Goals and Treatment Recommendations: This area is recommended for regeneration via two-age harvest, the majority of which is an s-class manipulation that would transition the forest from a late and mid-closed condition to an early condition. We view treating the 2.8 acres of white pine plantation within the stand as restoration and the desired result of this restoration is returning the species composition to that characteristic of the dry oak or dry-mesic oak ecosystems.

Special Considerations: Forest Service Road 93 will need to be improved for approximately .5 miles to make the harvest of this stand possible.

Devils Kitchen Ridge 2 DKR2-53.1 Acres

Location: This site is located on the north side of the ridge separating the Devil's Kitchen Branch Watershed from the Paint Creek Watershed. Please note that the Paint Creek Watershed Assessment Area includes some lands whose waters do not flow into Paint Creek and Devil's Kitchen Branch is the largest drainage of that sort. The stand is indicated in the map below with an arrow.



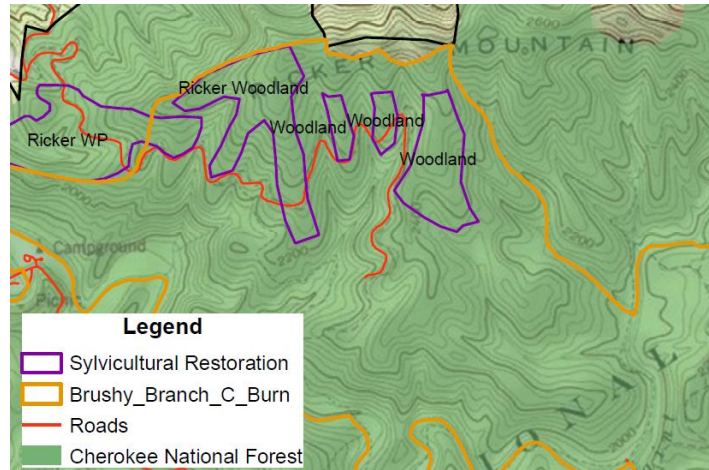
Current Condition: DKR 2 contains, in descending order of abundance, The dry-mesic oak, dry oak, low elevation pine, and cove ecosystems (See Appendix D). The majority of the site is in late-closed condition for the oak and pine ecosystems and mid-closed condition for the cove ecosystem, though there is a small blow-down present on one portion of the ridge. The entirety of this area observed by the restoration committee is in characteristic condition, though signs of fire suppression are abundant in the oak ecosystems.

Restoration Goals and Treatment Recommendations: This unit is recommended for Gap Harvest and Thinning treatment resulting in approximately 10.6 acres of early s-class and 42.5 acres of open s-class. This treatment is considered an s-class manipulation by the committee, designed to increase the structural diversity of the forest.

Special Considerations: Forest Service Road 93 will need to be improved for approximately .5 miles to make the harvest of this stand possible. Because this is a relatively long unit and access could be difficult in places, the committee recommends the use of a forwarder with low psi tires to accomplish this treatment. The committee also recommends the use of fire before and after harvest to discourage competition from mesophytic species and to maintain the open conditions created by harvest. While the low-elevation pine ecosystem is predicted to be present at this site, it has not been observed in field visits, and its predicted presence may be a modeling error.

Ricker Mountain (4.11.12 Site 5) RM-56.2 Acres, White Pine-33.7 Acres

Map and Location: This site is located along the ridge of Ricker Mountain and four spur ridges that lead south down to Ricker Mountain Road (FSR 214). Additionally, there is a white pine plantation to the west that could also be treated (Ricker WP on the map). The site is located in FS Compartment 214 Stands 13, 15, 20, 21 and 26.



Current Condition: The main ridge and four spur ridges above the road are currently composed of dry oak and Montane pine forests in closed condition.

Restoration Goal and Treatments Recommended: This site could be manipulated to provide an open Montane pine system on the ridges via commercial thinning. Thin to 40-70 basal area leaving Yellow Pine and older Chestnut oaks and Black Gums. Trees targeted for removal would be white pine, red maple, poplar, younger chestnut oaks and scarlet oaks. Maintain open condition and encourage yellow pine and oak regeneration with prescribed fire. White pine plantation could be reduced with prescribed fire.

Special Considerations: Will need to determine burn lines. This site is currently not within a burn unit. Pockets of older pitch pine and oak are present in the upper slopes and draws of the site and should be excluded from logging activities.



Little Paint Creek-FSR 31C (7.10.12 Site 2) 34.5 Acres

Map and Location: This site is located at the far end of FS Road 31. It can be found in FS Compartment 262 Stands 4, 14, 17, and 30.



Current Condition: Mostly late closed Dry oak and Dry mesic oak with some montane-red/chestnut oak.

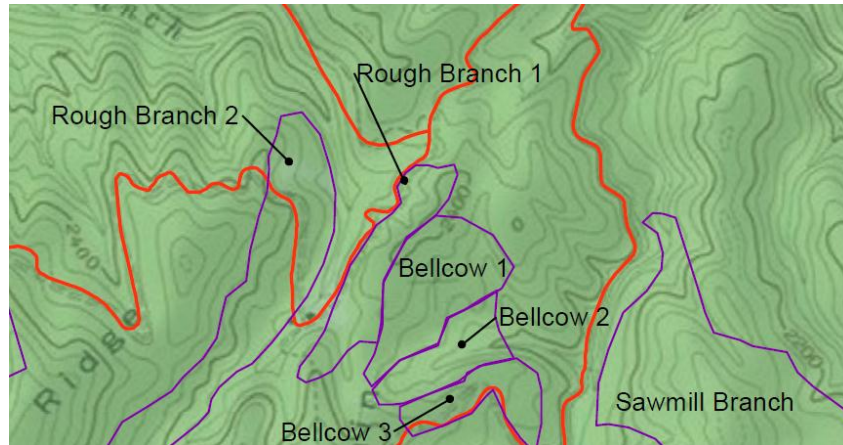
Restoration Goal and Treatments Recommended: The restoration goal at this site would be to create a late open oak condition with some pine still present. This could be done via a gap harvest and thinning. Fire would be needed to maintain the open condition.

Special Considerations: This site was also referred to as “Busted boot” in previous drafts and correspondence. FS Road 31C has abundant populations of several invasive species. These should be treated both before and after any vegetation management treatments at this location. Stand boundaries for stand 4 incorrect in FS Veg.



Rough Branch 1 (4.11.12 Site 1) RB1- 12 Acres

Map and Location: This site is located along Forest Service road 422A adjacent to Rough Branch. It is mostly found in FS Compartment 217 Stand 17 and some in FS Compartment 216 Stand 2. It is shown in the map below as the second stand from the left, directly to the east of the road.



Current Condition: This site is currently classified in FS Veg as Cove hardwood, white pine, hemlock. The team found that White Pine was especially dominant in the understory and midstory. Oaks dominate the canopy of the site, but white pine, poplar, and red maple also occur.

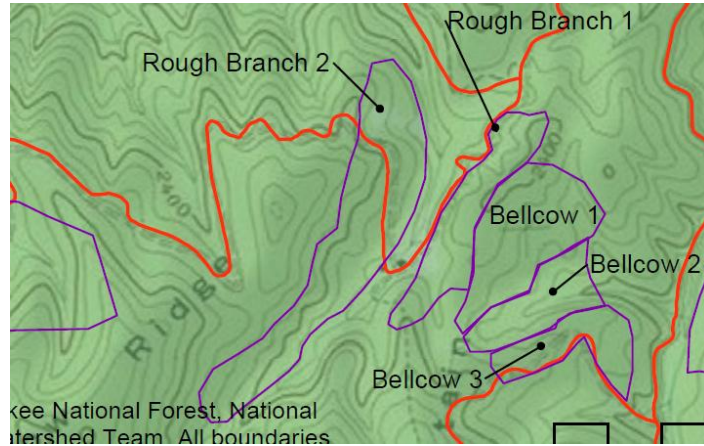
Restoration Goal and Treatments Recommended: The main restoration goal at this site would be to reduce the amount of white pine. This will result in the creation of both open and early habitat. The team recommends pre-treatment fire to remove white pine in understory followed by removal of the overstory white pine and poplar, maybe some scarlet oaks. Additionally, there would need to be post treatment white pine suppression to allow other species to compete.

Special Considerations: N/A



Rough Branch 2 (4.11.12 Site 2) RB 2- 28.4 Acres

Map and Location: This site is located along Forest Service road 422A adjacent to Rough Branch. It is mostly found in FS Compartment 217 Stand 36 and 19.



Current Condition: This site is currently classified in FS Veg as either white pine or Cove hardwood, white pine, hemlock. White pine is the dominant species at this site.

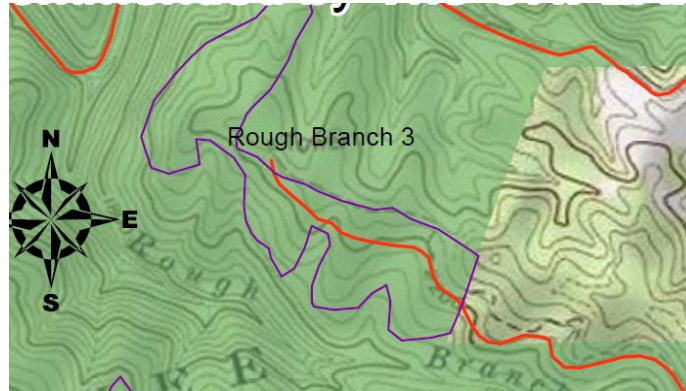
Restoration Goal and Treatments Recommended: Removal and/or suppression of white pine would be desirable here. Increasing the component of other cove hardwood species is desirable. Any regeneration would require follow up treatment to suppress white pine and yellow poplar. This location should be monitored and considered for supplemental planting of a mix of characteristic cove hardwood species.

Special Considerations: Rhododendron may need to be controlled after treatment at this site.



Rough Branch 3 (4.11.12 Site 4) RB3 - 45.3 Acres

Map and Location: This site was located along FSR 22171. The stands discussed below consist of Compartment 217 Stands 5, and 14.



Current Condition: White pine dominant and planted in many areas with lesser amounts of chestnut oak, scarlet oak, black oak, and white oak.

Restoration Goal and Treatments Recommended: The goal is to create an open montane pine system at this location. Recommended treatments are to remove the white pine, red maple and some scarlet oak via gap harvest and thinning. Favored leaf trees would be the existing yellow pine. The pine species would benefit from prescribed fire to maintain the open condition. If management of this site is deferred due to economic considerations, the site should be prescribed burned to reduce white pine in the understory.

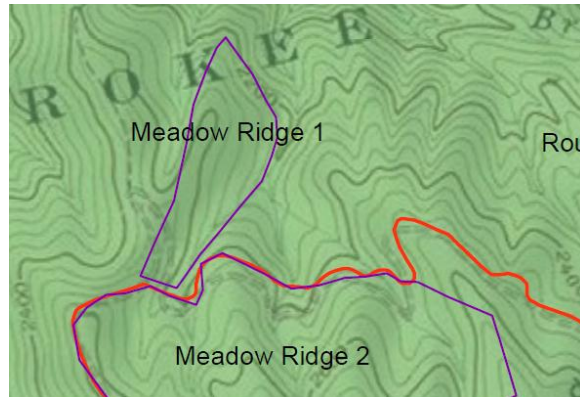
Special Considerations: Please see the general recommendations for poplar stands for additional treatments recommended in this area.



Photo of FSR 31 sown in clover

Meadow Ridge 1 (9.19.12 Site 4) MR1 - 19.7 Acres

Location and Map: This site is located North of FS Road 422 A (Shad Rd) along the east facing slope of the ridge descending to Rough Branch. It is shown in the map below as the northernmost stand. It is located in Forest Service Compartment 217 Stand 10



Current Condition: This site is composed of oak dominated forests in late closed condition with white pine dominating the understory and midstory.

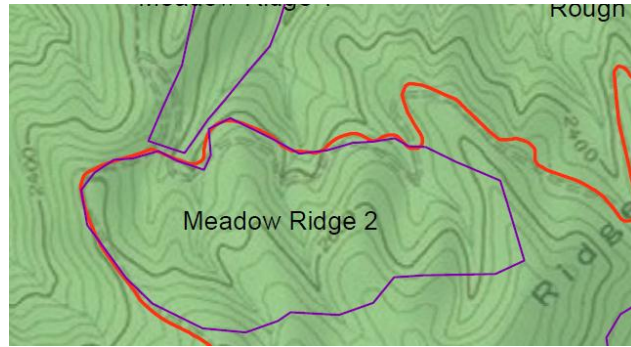
Restoration Goal and Treatments Recommended: The restoration goal for this site is to create an early oak condition. We recommend the regeneration treatment with follow up treatments designed to regenerate an oak/hickory forest at this location.

Special Considerations: N/A



Meadow Ridge 2 (9.19.12 Site 5) MR2 – 78.7 Acres

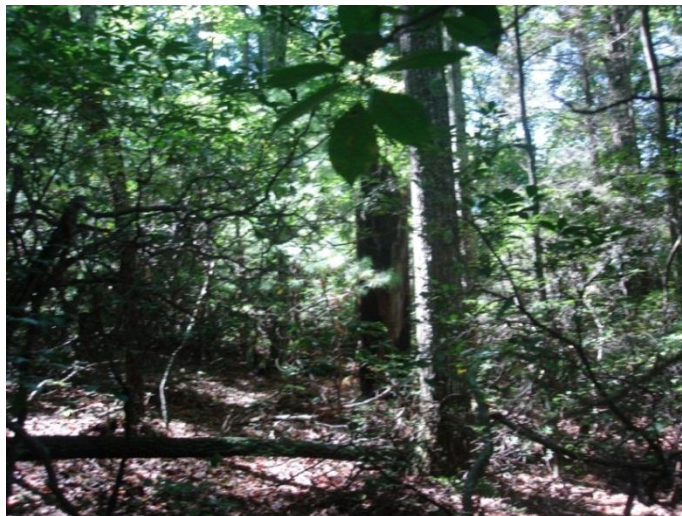
Location and Map: This site is located south of FS Road 422A (Shad Rd). The map below shows the boundaries recommended for treatment. However, the stand boundaries for Forest Service Compartment 217 Stand 31 differ. However, we recommend that the treatments described be considered for the whole area shown on the map.



Current Condition: This stand includes several systems including dry mesic oak, cove, montane oak and dry oak. It is currently in a late closed condition with a very thick understory of laurel and rhododendron. There are some white pines in the stand as well.

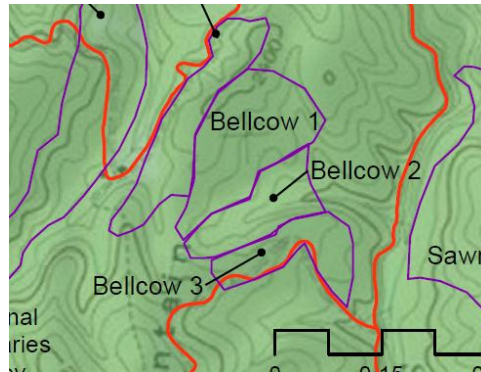
Restoration Goal and Treatments Recommended: Creation of an open condition with a more open understory would be the restoration goal for this location. Removal of the white pine and other species via gap harvest and thinning is the recommended treatment. Favored leaf trees should be mast producing species. Prescribed fire will be important for favoring oaks over white pine, poplar, and maple at this site.

Special Considerations: N/A



Bellcow Mountain (5.22.12 Site 4) Bellcow 1 and 3 – 23.95 Acres, Bellcow 2 – 8.75 Acres

Map and Location: This site is located along the northeastern slopes of Bellcow Mountain north of Bellcow road. The areas identified for treatment include Compartment 216 stands 2 and 29. Stands identified in this site are shown in the map below as Bellcow 1, 2, and 3.



Current Condition: This site contains a tulip poplar dominated Cove system (Bellcow 2 on map) in the cove and a Dry and Montane Oak system that contains encroaching white pine upslope (Bellcow 1 and 3 on map).

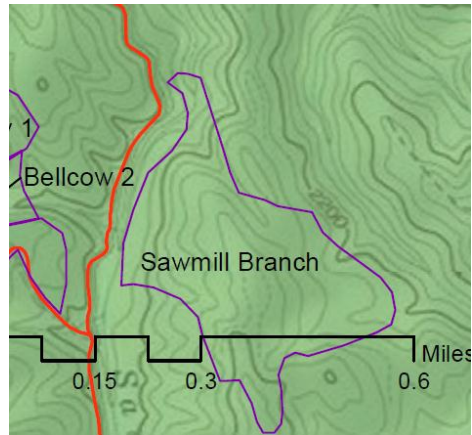
Restoration Goal and Treatments Recommended: The committee recommends creating an open cove system in the cove with the ultimate goal of creating greater diversity in the canopy (Bellcow 2). The Committee recommends creating open and early oak habitat (Bellcow 1 and 3 on map). Treatments include commercial thinning and regeneration cuts and prescribed fire to maintain the open conditions. Approximately 24 acres of regen/ESH in the upslope area with oak as the preferred leave tree (Bellcow 1).

Special Considerations: Small (~1/2 acre) patch of potential old growth on the ridge should be left adjacent to ESH. Poplar within the cove goes into Riparian area and may limit treatment options.



Sawmill Branch (7.11.12. Site 2) SMB – 51.4 Acres

Map and Location: This site is located along Saw Mill Branch Road in Compartment 215 Stands 27 and 28.



Current Condition: Currently in a characteristic mid closed cove hardwood and late closed dry-mesic oak condition.

Restoration Goal and Treatments Recommended: Creation of early and open conditions via gap harvest and thinning. This site offers the possibility of creating several small openings along the road within cove and oak systems with commercial thinning in between.

Special Considerations: This area contains very steep slopes that may dictate the type of treatments that are feasible. The site would need follow up treatment to ensure diversity of future stands. Please see table in general recommendations for additional recommendations in this area.



Courtland Place 1 (7.10.12 Site 5) CP1-9.5 Acres

Location and Map: This site is located south of Hurricane Gap Road. The area is in FS Compartment 216, Stand 25.



Current Condition: This is a low-lying area that is relatively flat and is currently used for dispersed recreation. It is very likely that this location was once a homestead or field. It is currently dominated by large white pine and tulip poplar.

Restoration Goal and Treatments Recommended: The goal for restoration in this location would be to increase the diversity of the stand in the future. The Committee recommends that all of the white pine and much of the tulip poplar be removed via regeneration harvest. Following this initial treatment, there will need to be efforts to suppress white pine and tulip poplar regeneration and favor a diversity of other tree species often found in coves such as magnolias, cherry, and oaks.

Special Considerations: This area is well used as a recreation site. There may be opportunities to help define the recreation usage and provide more amenities (fire pits, defined parking and trails, etc.). This area may have archeological resources that should be protected.



Courtland Place 2 (9.9.12 Site 1) CP2 – 33.05 Acres

Location and Map: This site is located directly across Hurricane Gap Road from Courtland Place 1 and is shown in the center of the map below. It is located in FS Compartment 215 Stand 22.



Current Condition: It is a low-lying area that is relatively flat. It is very likely that this location was once a field. It is currently dominated by characteristic Cove tree species with several large white pine and tulip poplar individual trees. However, there is an abundance of white pine in the understory that indicate the area will convert to a white pine dominated system without treatment.

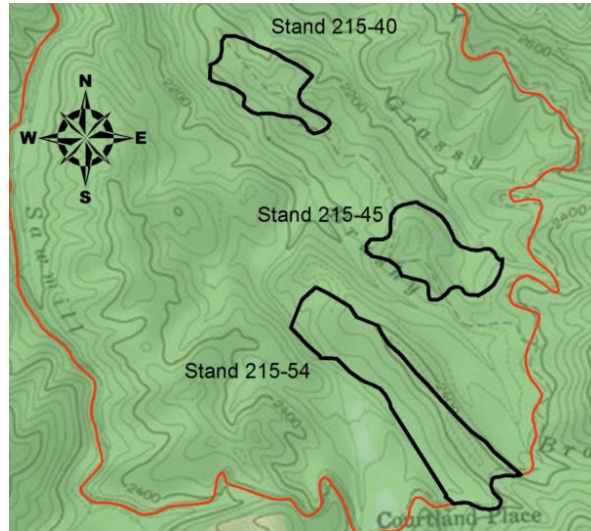
Restoration Goal and Treatments Recommended: The goal for restoration in this location would be to increase the diversity of the stand in the future. The Committee recommends that all of the White Pine and much of the tulip poplar be removed via gap harvesting and thinning. Following this initial treatment, there will need to be efforts to suppress white pine regeneration and favor a diversity of other tree species often found in coves such as magnolias, cherry, and oaks.

Special Considerations: This area may have archeological resources that should be protected. This area has several invasive species present that would need to be treated.



Brushy Branch (5.22.12 Site 3)

Map and Location: There are several stands in the area near Brushy Branch. They are located in FS Compartment 215 and the stand numbers are 40, 45 and 54 (shown in the map below).



Current Condition: These stands are currently regenerating with white pine and poplar, but have some oak component left. They were harvested between 1993 and 2000.

Restoration Goal and Treatments Recommended: The goal of this location would be to favor oak for the future dominant species via non-commercial crop tree release.

Special Considerations: This is a large area for this type of work. It may be difficult to pay for the entire area.



Hurricane Gap-FSR 5135 (5.22.12 Site 1) 22.4 Acres

Map and Location: This site is located just north of Hurricane Gap along FS Road 5135 in FS Compartment 215 stands 17, 20, 47 and a small portion of 19.



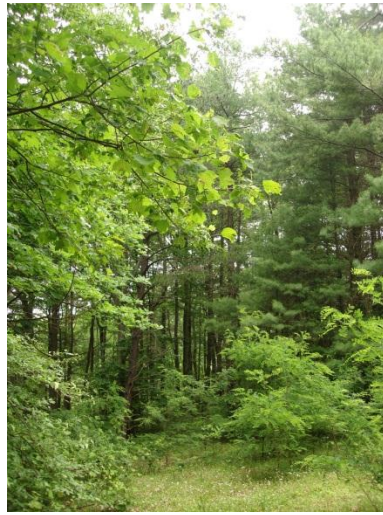
Current Condition: Closed canopy oak forest with some areas dominated by white pine and poplar.

Restoration Goal and Treatments Recommended: There are a number of treatments that would be desirable within this area. Options include the removal of white pine and poplar in Stand 17 via non-commercial crop tree release; creation of open oak conditions via gap harvest and thinning downslope from the old logging road; and reintroduction of fire to help suppress white pine.

Special Considerations: This site is located within the Appalachian Trail Corridor. The team recommends consultation with the ATC prior to any actions here.



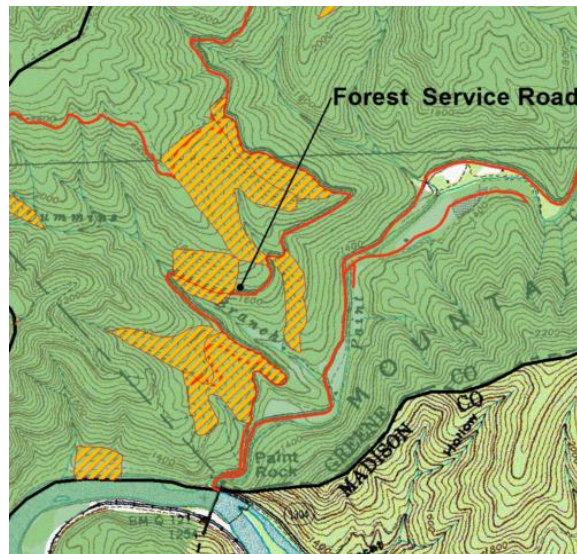
Closed oak system found at Hurricane Gap



White pine found on ridge at Hurricane Gap

Paint Rock-FSR 54 (4.10.12 Site 5) Stand 1-14 acres, Stand 2-17.5 acres

Map and Location: This site included several stands in several different conditions along FSR 54. The locations included FS Compartment 223 stand 24, 25, and 26.



Current Condition: Stands 24 and 25 are regenerating in tulip poplar. Stand 26 included an oak component on the lower slopes tending to more pine on the ridge top with damage from the Southern Pine Beetle.

Restoration Goal and Treatments Recommended: The team recommends the use of prescribed fire to help encourage the pine component on the ridge in the aftermath of the southern pine beetle. Of greater concern to the committee were the stands along the road that were regenerating in tulip poplar. Please see the general recommendations table for recommendations about treatments of those locations.

Special Considerations: N/A



Monitoring and Adaptive Management Recommendations

During the CNFLRI VDDT modeling process, the Steering Committee made several assumptions about the expected outcomes of specific treatments. The Steering Committee determined that these assumptions should best be tested in the watershed phase. Therefore, a list of monitoring questions associated with each of the recommended treatments was developed to test each of the assumptions made. Next, the team asked the Forest Service to determine which questions could be answered with the monitoring that they currently do and which ones might require additional information. That list, along with the resulting detailed recommendations for additional monitoring can be found in Appendix B. That list, which is divided by ecological system, can be condensed into the following priority recommendations:

- Recommend a pilot study to determine if the information collected on the Cherokee National Forest for each individual fire monitoring plot over the last 10-15 years is adequate to evaluate whether burn objectives are being achieved. If not, we recommend that additional monitoring plots (or transects) be established in individual burn units and sampling frequency be increased, if needed, to support this evaluation.
- Recommend that additional information be collected for each fire via remote sensing to determine the proportion of each burn that transitions from one S-Class to another (ex. closed to open, mid or late to early, etc.).
- Recommend that when a project area is entered 8-10 years post treatment, to assess the need for crop tree release treatment, that additional information about the vegetation composition and structure be collected.
- Recommend documentation of obstacles to restoration treatment implementation.

- Recommend that annual monitoring reports be made available to the public that present the methods for collecting and analyzing data, results, and an assessment of whether the data support the assumptions made by the Steering Committee concerning treatment effects.

The Steering Committee of the CNFLRI has agreed to reconvene annually to review monitoring reports related to the implementation of the restoration recommendations and provide additional recommendations in an effort to help implement an adaptive management approach to restoration treatments on the Cherokee National Forest.

Discussion and Conclusions

One of the primary purposes of developing site specific restoration recommendations in the Paint Creek watershed was to identify potential problems or obstacles to implementing the CNFLRI restoration recommendations for the entire North Zone of the Cherokee National Forest. As was noted in the CNFLRI restoration recommendation document, many decisions need to be made at a watershed or even site specific scale and though these may be the best decisions given on-the-ground circumstances, taken cumulatively they may impact the final outcome. The following represent observations from the committee that should be taken into consideration by the Forest Service as they attempt to implement the CNFLRI restoration recommendations across both Ranger Districts.

The team had difficulty identifying acres in the Dry Oak ecological system that were operable. These systems are often characterized by steep and rocky ground that results in lower economic values of the timber and significant obstacles to accessibility. This was certainly the case in the Paint Creek watershed and resulted in a reduced number of acres recommended for treatment within this system. There may be areas in other watersheds where this is not as pronounced that could essentially make up for the acres not treated in Paint Creek, but, it is equally likely that the number of acres recommended for treatment within this system will be difficult to achieve. Therefore, within the Dry Oak Ecological System, the North Zone of the Cherokee National Forest should expect a need to implement non-commercial silvicultural treatments in order to achieve the recommendations within the U-B-Gone model.

The team found a similar problem in the Montane Pine systems in Paint Creek. The majority of these were within an inventoried roadless area, or in steep fairly inaccessible areas. Therefore, the number of acres we

recommended for mechanical treatment within this ecological system is lower than expected. However, we did recommend the introduction of prescribed fire into the roadless area that contains the majority of this ecological system within the watershed.

The team found that the use of the gap harvest and thinning treatment was preferable in Ecological Systems where it was not modeled in the CNFLRI North Zone recommendations. Therefore, this treatment was recommended in several places where traditional thinning might not be feasible or economically viable, but, where gap creation along with thinning would mimic natural disturbance regimes.

It was important for the team to consider the current conditions on the ground before making recommendations. In doing so, we observed that the majority of the Low-elevation pine system found within the Paint Creek watershed has been recently burned (both wildfire and prescribed), or is planned to be prescribed burned in the near future. This has resulted in a much more open condition. Therefore, rather than recommend large acreages of mechanical thinning (as was recommended in the CNFLRI restoration recommendations) the team decided to simply encourage continued monitoring and prescribed burns as appropriate within this ecological system.

There was an abundance of uncharacteristic white pine in the Paint Creek watershed which resulted in a relatively high number of acres recommended for regeneration treatments. This may not be the case in other watersheds. However, the committee agreed that the condition should be treated wherever it exists. Removal of uncharacteristic vegetation was the focal point of the U-B-Gone Model and addressing this issue has been responsible for many of the actions recommended by the watershed team. Because white pine is such a prolific seed producer, eliminating the seed source through regeneration is the most efficient way to address this issue for the future over the long term.

The types of treatment used in each Ecological System vary from the original set of recommended treatments for each Ecological System. This is primarily due to the placement of stand boundaries that do not coincide with Ecological System boundaries. Each stand within Paint Creek was identified for treatment based on the primary Ecological System within that stand in need of treatment, however, a small portion of the stand would likely also be in another System. Therefore, when the numbers are tallied, there is some Systems shown as receiving treatments that were not originally recommended.

Though the specific numbers of treatments recommended within the Paint Creek watershed may not conform to the exact number of acres detailed within the CNFLRI restoration recommendations, the committee feels that the suite of site specific restoration treatment options presented in this report reflects the spirit and intent of the CNFLRI restoration recommendations. Furthermore, the committee feels that these are the best treatment methods for the habitat conditions present within these stands. In short, these recommendations will reduce the amount of acres in an uncharacteristic condition and increase the number of acres in the early or open condition within ecological systems where those classes are lacking. These recommendations also give careful consideration to the ecological needs of that particular location including, but not limited to: road access, feasibility, steepness of slope, potential spread of invasive species, and adjacent rare communities or sensitive botanicals.

The committee recognizes that these recommendations fail to meet the management levels recommended within the U-B-Gone Model within some ecological systems. These shortfalls could be addressed by S-class manipulation recommended by other Forest Service silvicultural recommendations within the watershed.

Literature Cited

Low, Provencher, and Abele, 2010. "Enhanced Conservation Action Planning: Assessing Landscape Condition and Predicting Benefits of Conservation Strategies", *Journal of Conservation Planning* Vol. 6 (2010) 36—60

Simon, Steven A.; Collins, Thomas K.; Kauffman, Gary L.; McNab, W. Henry; Ulrey, Christopher J. 2005., "Ecological Zones in the Southern Appalachians; First Approximation", *Res. Pap. SRS-41*. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 41 p

Appendix A: Site Assessments

Appendix B: Monitoring Questions in detail

Appendix C: Species to benefit from restoration treatments

Appendix D: Recommended Treatment Acreage

Appendix E: Map Overview

