Attachment 38

Comments on the Draft Plan submitted by Objectors on June 29, 2020, along with all attachments

Southern Environmental Law Center | The Wilderness Society
MountainTrue | Defenders of Wildlife

June 29, 2020

Via CARA Online Portal Submittal

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Nantahala-Pisgah Plan Revision
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Re: Comments on the Nantahala and Pisgah National Forests Draft Land Management Plan and Draft Environmental Impact Statement

Dear Allen,

The following comments are submitted by the Southern Environmental Law Center, The Wilderness Society, MountainTrue, and Defenders of Wildlife. Each of the undersigned groups should be considered commenters for purposes of NEPA and 36 C.F.R. Part 219, Subpart B. Thank you for this opportunity to comment on the Draft Plan and alternatives. We are grateful for your decision to extend the comment period during an unprecedented and difficult time. The extra time was essential to work around our inability to meet face to face. We appreciate the efforts of your staff to make themselves available to answer questions and support collaborative discussions.

As you likely know, our organizations have collectively invested thousands of hours to ensure the success of the Nantahala and Pisgah National Forests' revised forest plan. Our organizations and staff have extensive experience with plan development and implementation, including the current Nantahala and Pisgah plan and other more recent plans in the Southern Appalachians. We can provide intimate knowledge of the ecosystems and resources within these forests, both at the site-specific level and in the context of the broader Southern Appalachian bioregion. We are excited for this opportunity to offer our expertise with respect to the long-awaited draft.

Although we do have serious concerns about the draft and accompanying analysis, we do not want to lose sight of one important fact: the Forest Service listened to its collaborative stakeholders. To ensure that the plan is fiscally realistic while also giving partners the incentive to work and grow together, the draft includes a number of stretch goals, or "tiered objectives." Those tiers allow for consideration of a range of impacts *within* each alternative, rather than polarizing differences *between* alternatives. As a result, the alternatives can meet NEPA's requirements without sending stakeholders into their corners. The alternatives show an earnest

attempt to articulate different, but balanced, strategies. This type of structure was exactly right to encourage continued collaboration.

We also appreciate the Forest Service's transparency around the single most important question for plan revision—the tension between flexibility and certainty, which we discuss in detail below. The analysis is unusually self-aware, with the level of flexibility as the primary variable among the alternatives. Rather than trying to resolve that question prematurely, the Forest Service made it clear that there is "no preferred alternative," and it is open to either approach. Again, this was the right move to nurture the collaborative process. It signaled that the Forest Service is genuinely willing to record and reflect collaborative strategies in the plan. As explained in these comments, the more detailed information available during planning, the more specific the plan should be. Along these lines, it's no accident that the higher-certainty alternative (Alt. C) corresponds to the preliminary recommendations of collaborative partners.

These were innovative solutions to tough problems. And, like all innovations, we realize they were not easy or without risk. When plan revision began, we heard warnings from within the agency: Our planning process would be particularly hard. The conflicts from our previous plan revision were still reverberating. Our landscape is incredibly complex, both ecologically and socially. As an early test of the Planning Rule, our process would be scrutinized at all levels. With such high stakes, it might have been tempting to take the conventional approach, offering polarized alternatives that would have sent different factions into their corners, and a final plan that would have disappointed everyone more or less the same.

Thank you for taking a chance on your partners. The innovations pioneered by your staff have worked. Today, you will not only receive the separate comments of conservation, recreation, forest products, restoration, and wildlife habitat advocates; you will also receive their collective agreements supporting a set of goals and strategies that will accomplish more for all of the needs they represent. We are proud to be a part of the work that produced the agreements of the Nantahala-Pisgah Forest Partnership. This is a monumental achievement that we, both the agency and its partners, earned together. The Forest Service could not have forced cooperation on its stakeholders, and stakeholders could not have found compromise without the thoughtful support of the Forest Service.

Still, we believe the Draft Plan and analysis fall short of the agency's obligations in a number of ways. Without losing sight of the positive, our task in these comments is to explain how the plan and analysis can be improved between draft and final. To do that, we begin by taking the time to unpack why the current plan is falling short and articulate the principles that the final plan must follow to be successful. We then discuss overarching issues with the plan's structure and analysis, followed by specific changes needed to comport with relevant legal requirements.

There are a number of serious problems in the Draft Plan and analysis, but if the final plan fully adopts the recommendations of the Nantahala-Pisgah Forest Partnership, it will have our unqualified support. We are comfortable that the full package of the Partnership's recommendations, along with corrections to the analysis and additions to the monitoring plan,

will correct them. To be clear, however, if these problems are not corrected, the plan will not meet the Forests' legal obligations, and unresolved issues will haunt implementation.

Sincerely,

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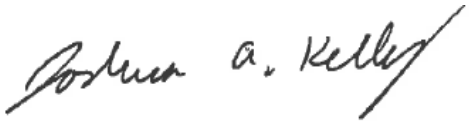

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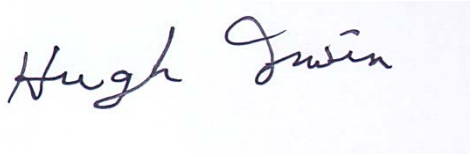

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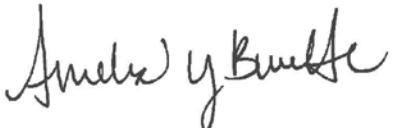

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I. The Problem with the Status Quo

What makes a successful plan? For starters, a successful plan must apply the 2012 Planning Rule, guiding future projects to maintain ecological integrity where it exists and restore it where it has been degraded. It must also be realistic, within the inherent capability of the land and the fiscal capacity of the agency and its partners. It must be "integrated" so that some objectives don't prevent the achievement of others. But most of all, it must be implementable. At bottom, a forest plan is a deal between the Forest Service and the public. If the agency breaks its promises, it will lose the social license to manage the lands in its trust. It is important to make promises that you can keep.

Most observers would agree that **the Nantahala and Pisgah National Forests have been underperforming under the current plan**. The Forest Service has not been able to keep the plan's promises. This is easy to see with respect to active management targets like timber harvest, but it is also true with respect to protection of conservation priorities. In 1994, the agency made a promise to do a better job protecting rare ecological values: "The Forest Service is changing," it said, and Amendment 5 was a promise to move "toward an ecological approach to management." Amendment 5 Record of Decision (ROD) at 6.

Fast forward to the present: The sprawling road system deteriorates further with each heavy storm. Old growth forests have been logged while young, degraded stands were added to the patch network. Rare and exemplary forest communities have shrunk or been degraded due to logging and invasion by non-native species. Some of the most connected and highest conservation priority landscapes in the continental United States have also been fragmented and degraded.

The Forests have made efforts to mitigate some of these harms, but lack the budgets to do so at any meaningful scale. Chronic underperformance has strained the social fabric around our forests. Even with low levels of timber harvest, somehow the Forest Service has found a way to target conservation priority areas in most of its projects. Successive zero-sum projects have convinced many stakeholders that conflicts are inevitable. Rather than cooperation, these projects invite blame. Our ruts have become trenches. And, after years of the same pattern, we risk losing our connection to a local history in which hunters and loggers and environmentalists worked together to save our treasured landscapes from development, acquire them as public lands, and even to designate some of them as wilderness.

If there is a silver lining in these failures, it is that stakeholders found ready agreement that there is room for improvement for all of us. **We can do more, better work, with less conflict and harm to ecological and social values**. This was our starting point in 2013, and we have worked together since then to show how.

In this planning cycle, the Forest Service is being asked to stretch beyond its current capacity, and to promise levels of active management for habitat creation, ecological restoration, and timber production in excess of anything the agency has been able to achieve under the current

plan. It is also being asked to show a clear, achievable strategy to maintain and restore old growth, rare and exemplary natural communities, and connectivity. Can we have it all? Not if we try to do things the same way we have been.

A. Flexibility Versus Certainty

Why have the Forests been underperforming under the current plan? Two theories, explicit in the draft alternatives, have been proposed. One theory suggests that the current plan is not flexible enough. If this theory is correct, then the solution would be a plan with a greater number of acres on which any type of management is allowed, up to and including timber production (as in Alternative B and, in nearly the same measure, Alternative D). Another theory maintains that the current plan does not provide enough certainty. If this theory is correct, then the solution would be a shift toward more prescriptive allocations and protective standards (as in Alternative C).

There are many issues that still need work in the final plan and analysis, but the dichotomy between flexibility and certainty matters most with respect to land allocations for three spatially explicit issues: old growth, Natural Heritage Natural Areas ("NHNAs"), and Wilderness Inventory Areas ("WIAs"). Collectively, we will refer to these as "conservation priority areas" in these comments. We can draw lines around these conservation priority areas and say *these areas are different*, or we can lump them into Management Areas ("MAs") scheduled for timber production and address their rare and unique values, if at all, at the project level. This basic choice divides Alternative C from the other alternatives: flexibility versus certainty.

Nobody wants flexibility for its own sake. Active management advocates, just as much as conservation groups, prefer certainty. Wildlife habitat advocates would like assurances that the Forest Service will provide those habitats. Timber industry representatives would like predictability in the flow of forest products. But it is difficult to provide plan-level certainty around actions that depend on future decisions, budgets, and political priorities. As a next-best option, some stakeholders have asked the Forest Service to maximize flexibility—in essence, to remove any potential obstacles from the plan.

This is a critical point: flexibility is at best a *strategy*; it is not a goal in itself. Instead, the goal of land management, always, is to *remove* flexibility. Land management is all about converting discretion to action. When we harvest acres or designate an old growth patch, build a road or close a trail, all flexibility is then gone—funneled into concrete, *certain* action.

Some participants in the planning process seem not to understand this fundamental concept. We have heard, for example, that this is an ideological fight over "who will control the Forests" in the future—i.e., whether the Forest Service will retain maximum discretion at the project level or whether members of the public will take away the agency's discretion by enshrining their "agendas" in the plan. Nonsense. No one is arguing that the Forest Service should cede its statutory responsibility or discretion to balance the multiple uses. The question is simply which decisions are more efficient to make at the plan level, and which choices should be deferred to the project level. Should we make decisions at the grocery store, when we have the perspective

we need to think about our diet? Or should we let our appetites make decisions for us at mealtimes?

Again, the current plan is our best gauge of what is and isn't working. To diagnose the current plan's problems, we don't have to rely on ideology or philosophy. We have data. And the data show clearly that **the current plan doesn't suffer from a deficit of "suitable" acres; it instead lacks the sideboards needed to avoid making proposals that are incompatible with sensitive environmental contexts**. These contexts are just as much a part of the agency's job as timber harvest. It must maintain and restore the values associated with conservation priority areas in order to exercise its discretion lawfully under the Planning Rule and principles of multiple use management. It can exercise that discretion painfully in successive projects, or more thoughtfully, comprehensively, and efficiently during planning.

To begin with, the Forest Service has come nowhere near exhausting the acres currently scheduled for harvest. The Forest Service cannot even *visit* all these stands for inventory, much less prescribe them for harvest. The current plan scheduled 275,000 acres for timber production, or about 3,300 acres annually. Amendment 5 Record of Decision ("ROD") at 10 (1994). Actual harvest levels have been only about 1/5 of this level. DEIS at 72.

To be sure, some of this shortfall can be explained by declining budgets. Since 1995, as wildfire suppression costs have soaked up a greater share of the agency's flat funding levels, the Forest Service has lost 39% of its non-fire personnel. 84 Fed. Reg. at 27,544. But budget trendlines alone do not tell the full story. Locally, fluctuations in harvest levels have been driven by environmental concerns: the 1994 Amendment reduced harvest by half in order to better protect values like old growth that had been neglected by the 1987 plan. ROD at 5, 6; Assessment Report at 104. Harvest bottomed out in 2000 and 2001 after the 1999 discovery of the endangered Indiana bat on the Nantahala National Forest. *See* Amendment 10 and accompanying Environmental Assessment.

In addition to these major changes, environmental concerns have continued to cause individual projects to shrink. In the last 10 years, the Forest Service completed 23 timber projects on the Nantahala and Pisgah National Forests (not including the relatively small, categorically excluded projects).

Table: NPNF Projects (2009-2019)

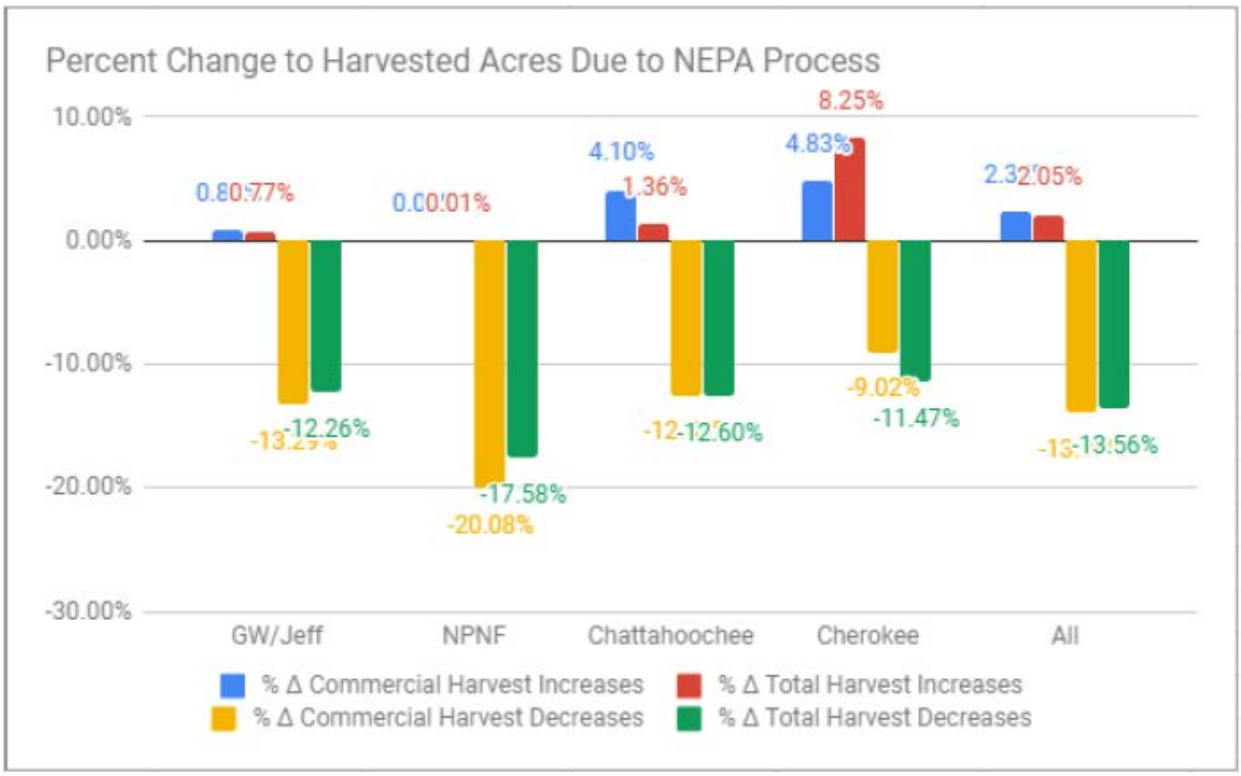
Project (Forest/District)	Total Harvest Proposed Acres (A)	Total Harvest Decision Acres (B)	Δ Total Harvest Acres (B-A)	% Change Total Harvest [(B-A)/A]	Commercial Harvest Proposed Acres (A)	Commercial Harvest Decision Acres (B)	Δ Commercial Harvest Acres (B-A)	% Change Commercial Harvest [(B-A)/A]
Harmon Den (NPNF / Appalachian)	1000	961	-39	-3.90%	306	267	-39	-12.75%
Franks Creek (NPNF / Cheoah)	1196	1128	-68	-5.69%	831	763	-68	-8.18%
Upper Santeetlah (NPNF / Cheoah)	1026	311	-715	-69.69%	442	292	-150	-33.94%
Armstrong (NPNF / Grandfather)	1269	1068	-201	-15.84%	563	362	-201	-35.70%
Roses Creek (NPNF / Grandfather)	535	535	0	0.00%	459	459	0	0.00%
Southside (NPNF / Nantahala)	371	317	-54	-14.56%	352	317	-35	-9.94%
Haystack (NPNF / Nantahala)	794.5	618	-176.5	-22.22%	462	384	-78	-16.88%
Copeland (NPNF / Nantahala)	389	371	-18	-4.63%	389	371	-18	-4.63%
Buckwheat (NPNF / Nantahala)	173	173	0	0.00%	173	173	0	0.00%
BBQ (NPNF / Nantahala)	279	234	-45	-16.13%	256	234	-22	-8.59%
Mossy Oak (NPNF / Nantahala)	323	298	-25	-7.74%	245	220	-25	-10.20%
Horse Bridge (NPNF / Nantahala)	197	197	0	0.00%	0	136	136	0.00%
Wetface (NPNF / Nantahala)	198	198	0	0.00%	157	157	0	0.00%
Fatback (NPNF / Nantahala)	632	538	-94	-14.87%	423	329	-94	-22.22%
Cane Pole (NPNF / Nantahala)	636	559.5	-76.5	-12.03%	334	323.5	-10.5	-3.14%
Brushy Ridge (NPNF / Pisgah)	1894	1666	-228	-12.04%	482	369	-113	-23.44%
Courthouse (NPNF / Pisgah)	1437	1351	-86	-5.98%	499	418	-81	-16.23%
Femelschlag (NPNF / Pisgah)	254	254	0	0.00%	145	145	0	0.00%
Lower End (NPNF / Tusquitee)*	735		-735		735		-735	
Brushy Flats (NPNF / Tusquitee)	242	242	0	0.00%	242	242	0	0.00%
Long Buck (NPNF / Tusquitee)	237	239	2	0.84%	237	239	2	0.84%
Prospect Hamby (NPNF / Tusquitee)	335	335	0	0.00%	320	320	0	0.00%
Thunderstruck (NPNF / Tusquitee)	335	290	-45	-13.43%	335	290	-45	-13.43%
Fontana (NPNF / Tusquitee)	1140	998	-142	-12.46%	721	579	-142	-19.69%
NPNF Totals	**15627.5**	**12881.5**	**-2746**	**-17.57%**	**9244**	**7389.5**	**-1854.5**	**-20.06%**
Southern Appalachian Totals	**61953.9**	**54822.5**	**-7131.4**	**-11.51%**	**42289**	**37373.5**	**-4915.5**	**-11.62%**

* The proposed Lower End project was split into three smaller projects (Brushy Flats, Long Buck, and Prospect Hamby) and was reduced by 735 acres of harvest based on concerns from environmental stakeholders that the District lacked the capacity to assess the impacts of such a large project. Lower End was not included as a separate project in this analysis because it did not go to a decision, but we document these acres in this table because the primary documents for the smaller projects do not otherwise show this change.

All together, 9,244 acres of commercial harvest was proposed, and 1,855 acres were dropped before reaching a decision—a drop of over 20%. *Id.* Although not counted here, some projects abandoned many more acres during implementation, after the decision was made (e.g., Courthouse). Of all the Southern Appalachian National Forests, the Nantahala and Pisgah dropped the greatest percentage of acres from its decisions during this time period. It also added the fewest acres to decisions.

Table: Comparison of S. Appalachian NFs (2009-2019)

Forest	Combined Increases in Total Harvest	Combined Decreases in Total Harvest	Net Change Total Harvest	Gross Change Total Harvest	% Gross Change Total Harvest	Combined Increases in Commercial Harvest	Combined Decreases in Commercial Harvest	Net Change Commercial Harvest	Gross Change Commercial Harvest	% Gross Change Comm. Harvest
Chattahoochee	241	-2226	-1985	2467	14.0%	637	-1949	-1312	2586	16.2%
Cherokee	890	-1237.4	-347.4	2127.4	19.7%	251	-469	-218	720	13.9%
NPNF	2	-2748	-2746	2750	17.6%	2	-1856.5	-1854.5	1858.5	20.1%
GW/Jeff	138	-2191	-2053	2329	13.0%	103	-1634	-1531	1737	14.1%
All	**1271**	**-8402.4**	**-7131.4**	**9673.4**	**15.6%**	**993**	**-5908.5**	**-4915.5**	**6901.5**	**16.3%**



These data show that, whether measured in gross or net terms, the Nantahala-Pisgah's ability to implement its current plan is the lowest in the Southern Appalachian region. It is no coincidence that our plan is also the oldest and most out of date. Acres of harvest were abandoned for a variety of reasons raised in public comments, including impacts to the conservation priority areas issues currently at issue in plan revision. The table below shows that project-level changes have often been made to avoid harm to Mountain Treasure areas, old growth, rare species and habitats, and risks to soil and water.

Table: Changes Due to Potentially Significant Issues ("PSIs"), NPNF (2009-2019)

Issue	Number of Times Present	Project Alterations	% of PSIs Resulting in Project Alterations
Mountain Treasures	10	2	20%
Old Growth	9	4	44%
Rare Species	16	10	63%
State Natural Areas	10	3	30%
Water Quality Risk	5	1	20%
Soil/Slope Risk	3	1	33%
Total	**53**	**21**	**40%**

In summary, these data show that the Nantahala and Pisgah National Forests changed projects between proposal and decision about 40% of the time when concerns were raised by the public. These were voluntary changes, meaning that the responsible line officer decided that the benefit of the proposed action in a specific location was not worth the harm or risk. In the aggregate,

these changes resulted in the loss of 20% of proposed commercial harvest acres. In round numbers, the agency proposes about 1,000 acres of harvest per year; the public raises concerns regarding about 500 acres per year; and the agency agrees that public concerns warrant dropping about 200 acres per year.

This is an extraordinary waste of time and resources for an agency with such limited capacity and so many urgent needs. With the current national emphasis on "streamlining" decisionmaking, solving this problem would be an opportunity for the Nantahala and Pisgah NFs to lead the way for the agency as a whole.

It is critical that the agency understand why the strategy of increased flexibility will not achieve its proponents' goals. **Removing obstacles from the plan will not increase active management levels, because the obstacles to active management are not in the plan; they are on the ground**. If the plan doesn't recognize sensitive on-the-ground contexts, then line officers are bound to trip over these obstacles more often, creating unnecessary friction and attrition at the project level.

How much staff time does it waste to prescribe, survey, and propose 200 acres per year that will later be abandoned? How much staff time does it take to revisit stands, to coordinate with the interdisciplinary team, and to respond to public concerns over 500 acres per year? How much delay results from objection processes that could have been avoided? What is the long-term impact to stakeholder support and investment? Simply put, how many more good things could we have accomplished if we had been rowing in the same direction?

B. A Tale of Two Projects

The differences between two recent projects illustrate what is at stake. The Twelve Mile project kicked off with a pre-scoping meeting in July 2016. It was scoped in May of 2018 with 956 acres of commercial regeneration. The final EA was complete in October 2019, and the decision was signed in January 2020, after receiving no objections. That final decision included 1,027 acres of commercial regeneration, plus an equal amount of group selection, thinning, and woodland treatments. Twelve Mile also designated 1,570 acres of new old growth patches, and it included less than a mile of new road construction. The project includes enough work to keep the Appalachian District busy for at least a decade.

The Buck project, in contrast, began with pre-scoping in the summer of 2010. After sitting on the shelf for some time, the November 2017 scoping notice proposed 1,277 acres of commercial regeneration. Those stands were trimmed to 953 acres in April 2019, and the final decision in May 2020 included only 795 acres, after a bitterly contested objection. The project did not designate any new old growth patches. It authorized 4.4 miles of road construction on new footprint. Even after dropping nearly 500 acres, the project invites continued entanglements between stakeholders and the Forest Service, because it is unclear whether the project as approved can proceed without violating the law.

To summarize, the Twelve Mile project grew by 7% while it sailed through the NEPA process, even though it was the largest project on the NPNF in over a decade. It authorized commercial harvest on three times as many acres as Buck. The Buck project took a year longer in NEPA, hemorrhaged 40% of the acres originally scoped, and remains the most contentious project in a generation.

These differences in project-level efficiencies add up to big differences on the landscape. If all the Districts worked at the same rate as the Appalachian District did in the Twelve Mile project, the Forests could reach the upper end of Tier 2 goals *with current, actual funding levels*. Twelve Mile authorized 2,181 acres of commercial harvest (both regeneration and intermediate treatments). Multiplied across all 6 Districts and divided by 3,800 acres, that's almost exactly 3.5 years' worth of harvest at the top of Tier 2—the same amount of time it took to complete the project from pre-scoping to final decision. Even acknowledging that Twelve Mile monopolized the shared resources of the Pisgah National Forest, this pace of work would at least allow the Forests to break into Tier 2. With one Twelve-Mile-sized project every three years on each of the Forests, forest-wide levels could be sustained at about 1,600 acres per year *without any additional capacity*. Compare this success to the abysmal performance of the Buck project: Buck authorized 795 acres. Multiplied across 6 Districts and divided by 3,800 acres, that's only 1.25 years' worth of harvest at the top end of Tier 2—for a project that took 10 years to complete from pre-scoping to final decision.

What accounts for the different results? The Buck project followed the current plan. Under the current plan, the controversial harvest units in Wilderness Inventory Areas and state natural areas were scheduled for timber production. The Buck project developers took those plan-level commitments seriously. The Twelve Mile project, on the other hand, did not follow the current plan. It instead anticipated a new, still-hypothetical plan that avoids cookie-cutter regeneration harvest in conservation priority areas, lays out a strategy to maintain and restore old growth, and pairs restoration treatments with more economically viable harvests. Indeed, if the Twelve Mile project had not needed to do all this work from scratch, it could have been finished even faster.

These projects illustrate that our current plan is simply not an efficient way to manage a forest as beloved as the Nantahala-Pisgah. Our ability to develop successful projects should not depend on the line officer's willingness to ignore the plan and instead prioritize the right things in the right places. Line officers and NEPA staff shouldn't be expected to decide how to balance landscape-level considerations that are outside the scope of a particular analysis area. And vocal members of the public should not be the only backstop to protect conservation priority areas from degradation.

C. Cumulative Impacts

It isn't controversial to say that a plan should make decisions so that project-level analysis and decisionmaking will be simpler. Imagine, for example, a forest plan that did not identify objectives for timber harvest, but instead deferred to the project level the choice of whether and how much to harvest. How could a line officer possibly determine how much work is enough, or

how much is too much? With a plan like that, how would you choose winners and losers between habitat for turkey and salamanders? How would you guarantee progress toward the Natural Range of Variation ("NRV")? How would you even begin to analyze the plan's environmental effects? It is essential that a plan provide an overall target, both for the sake of project development and NEPA analysis.

Setting harvest levels in the plan is important because an individual project cannot restore (or prevent the restoration of) ecological integrity and biological diversity. Under the 2012 Planning Rule, the *plan* must maintain and restore ecological integrity and biological diversity, through binding standards and guidelines and the land allocations to which they attach. 36 C.F.R. §§ 291.7(d), (e); 219.8(a)(1); 219.9(a)(2). The plan cannot defer the choice of whether to restore or degrade forests to the project level; the *plan itself* must make that choice, at the programmatic level. Beneficial and negative impacts from individual projects accumulate over the life of a plan. The sum of those impacts, not single projects, will either move us toward or away from restoration goals. Relatedly, these cumulative effects require disclosure and analysis under the National Environmental Policy Act (NEPA). 42 U.S.C. § 4332; 40 C.F.R. §§ 1502.16; 1508.7; 1508.8. Ultimately, the FEIS must support a conclusion that the program of work implemented under the plan will meet the 2012 Planning Rule's requirements.

The need to make plan-level decisions applies not only to levels and types of timber harvest, but also to other impacts that may be acceptable in a single project, but could cumulatively undermine the Planning Rule's requirements. For example, a single project's impacts to existing old growth might not, by itself, prevent the restoration of old growth consistent with the Planning Rule, but similar impacts in many projects over time would have that effect. The same is true of the rare and exemplary habitats identified by the Natural Heritage Program ("NHP"), which provide remarkable biodiversity, and the undeveloped Wilderness Inventory Areas, which provide the highest levels of connectivity—all values emphasized by the Planning Rule.

The Draft Plan and alternatives recognize that these issues deserve attention during the planning process. The alternatives leave open, however, the extent to which these conservation priority areas will be protected by plan-level decisions, as opposed to being scheduled for timber production and protected, if at all, only by project-level forbearance. Once again, this decision is best framed by looking at how the current plan has been implemented.

The current plan is working so poorly because it fails to treat sensitive ecological contexts differently from the rest of the forest. Indeed, existing old growth and NHNAs had not even been inventoried when Amendment Five was adopted. As a result, nearly every project proposes the kinds of impacts that, cumulatively, would degrade natural areas and diminish rare habitats forestwide, fragment our most intact and undeveloped areas, and liquidate rare old-growth forests. The plan forces a Hobson's choice between reducing the size of projects and allowing an accumulation of harms to rare ecological values. Worse, the choice is rigged: line officers must weigh the short-term politics and economics of harvest against the long-term consequences of many projects. Conservation stakeholders are asked, again and again, can't we just let *this* project go? Can't we compromise *this* time, with a commitment that we'll try to avoid similar

impacts next time? But the next time is always the same as the time before. Below are the projects currently listed on the Forests' webpage, other than Twelve Mile. Each is an example of the same old problems.

1. Courthouse (Pisgah District, Pisgah NF)

The Courthouse Project, like the Buck Project, began with promises of collaboration in 2011. At collaborative meetings, participants made it clear that the Daniel Ridge Mountain Treasure and the Pisgah Ridge Natural Heritage Natural Area would be controversial and unpopular areas for road building and timber harvest. Collaborators suggested, both before and after Scoping, that if a large timber sale was the goal of the project, that the analysis area was too steep and too sensitive to support that, and that the analysis area should be expanded or shifted to include more ground where a timber-focused proposal could succeed.

At Scoping, in September 2011, 499 acres were proposed for timber harvest. Seven stands, totaling over 140 acres, and seven miles of road construction were identified that overlapped with the Pisgah Ridge NHNA and the Daniel Ridge Mountain Treasure. Concerns were also raised about the amount of logging and road construction proposed on steep slopes with highly erosive soils, and the presence of two documented landslides in the project area resulting from timber harvest in the 1990s. The preferred alternative in the EA (December 2012) included 472 acres and alleviated none of the concerns raised during Scoping. The Draft Decision was appealed, and the appeal was subsequently resolved with the elimination of 7 miles of road construction and the meager 60 acres of timber harvest associated with it. Other stands were also identified during the appeal as being inconsistent with the Forest Plan, and those were dropped as well. The Final Decision and FONSI included 396 acres of timber harvest, including many areas that had been raised as concerns for timber harvest. The period from Scoping to Final Decision took two years, and the project was reduced by 103 acres of commercial timber harvest and seven miles of road construction during that time.

But the story doesn't end with the decision. The first timber sale out of the Courthouse Project was the Panther Branch Sale, which included approximately 57 acres of timber harvest. The Panther Branch Timber Sale ended up having multiple critical BMP failures that resulted in sediment reaching the North Fork of the French Broad. In the wake of the Panther Branch Sale, an additional 200 acres, many of which we had called out as having high erosion risks in our comments, were removed from project implementation. Between scoping and implementation approximately 300 acres were removed from the project. If the Plan had steered this project in a direction that could have supported collaboration, the project would have had far less environmental impact, and would have been much more efficient to plan and implement.

2. Mossy Oak (Nantahala District, Nantahala NF)

The Mossy Oak Project included 245 acres proposed for harvest at Scoping, including 11 that were identified as old-growth by MountainTrue and a 5-10 acre overlap with the Brushy Ridge Natural Heritage Natural Area. The Draft EA and Decision included 236 acres in the preferred

alternative, but did not address these concerns, and an Objection was filed. The Objection resolution removed the 25 acre stand that included the old-growth forest, but did not alter the boundaries of the logging unit inside the Brushy Ridge Natural Heritage Natural Area. A decrease in 35 acres of logging from the preferred alternative, or trading it for another stand not in old growth or NHNAs would have prevented the objection and made more efficient use of the staff time expended.

3. Southside (Nantahala District, Nantahala NF)

The Southside Project included 352 acres of timber harvest at Scoping and 314 acres in the preferred alternative in the Draft EA. Concerns were raised by various stakeholders about overlaps of logging units with wilderness inventory areas in the draft Forest Plan, inclusion of old-growth forest in logging areas, impacts to green salamanders, which were found within activity areas, and impacts to the Slickrock Natural Heritage Natural Area. Numerous objections were filed to the project. These objections could have been avoided if the plan had supported working together rather than allowing the targeting of old-growth forest, wilderness inventory areas, and NHNAs.

4. Buck (Tusquitee District, Nantahala NF)

This project's timeline is summarized above but is worth describing in more detail here. The first public meeting for the Buck Project occurred in Summer of 2010 with promises of collaboration from the Tusquitee District. The next public meeting occurred in December 2017, with no coordination with the public in the intervening 7 years. During that interim, the project was reportedly shelved because the District realized just how controversial it would be. Yet, in 2017, it was dusted off and presented to the public during a critical stage of plan revision, in which all the issues that made the project so controversial were being reconsidered at the programmatic level.

The Scoping Document (Dec 2017) for the Buck Project was not complete enough to permit an accurate estimate of acres, but it did list 1,277 acres in 36 Stands. In the Draft EA (April 2019) 953 acres of the same 36 stands were proposed. Scoping had revealed that around 450 acres of those stands required complicated planning and analysis because of steep slopes, existing old-growth forest, Natural Heritage Natural Areas, and Wilderness Inventory Areas. The Decision included 795 acres in 30 stands, approximately 205 acres of which had various combinations of the problems listed above. An objection (Sept 30, 2019) was filed to the decision based on the inclusion of the problematic stands, risky road building, and the appearance that the Decision created bias in the content of the revised Plan in the time leading up to the release of the Plan's Draft EIS. The Final Decision and FONSI (May 2020) maintained the entirety of the initial Decision from the year before. The period between Scoping and Final Decision for the Buck Project took 30 months due to the difficulty of planning and implementing a project in such steep, remote, and controversial terrain. Approximately 258 acres were dropped between the first proposal and the Final Decision.

In the EA Phase, the Buck Project became the first project we are aware of to literally hold water quality improvements and prescribed fire hostage to logging in unsustainable and controversial terrain. No other project we have seen on the Nantahala-Pisgah has threatened *not to do* needed work if the maximum logging proposal was not chosen.

5. Turkey Pen (Nantahala District, Nantahala NF)

The Turkey Pen Project was scoped in May 2018. It proposed a very modest 175 acres of commercial timber harvest, but somehow managed to have over 50 acres that overlap conservation priorities. Compartment 61 Stand 37 is 19 acres and overlaps the Rocky Bald NHNA. Inspection by MountainTrue in 2019 found the stand to be in old-growth condition, with trees over 4' in diameter and over 200 years old. Additionally, the stand has a large population of red legged salamander (*Plethodon shermanii*). Several other stands proposed for harvest have complete or partial overlaps with the Tellico Bald WIA. It is worth noting that the Forest Partnership agreement and comments clarifies which of these overlaps will continue to be problematic and which could be ameliorated with the Partnership recommendations on Management Area allocations.

6. Crossover (Tusquitee and Cheoah Districts, Nantahala NF)

The Crossover Project had its first public meetings in 2018, and got off to what seemed like a collaborative start. Conservation partners shared the location of old-growth forests and made clear they could live with any project that did not harvest timber in old-growth forests, Natural Heritage Natural Areas, or the Ash Cove Mountain Treasure/Wilderness Inventory Area. A Scoping Document for the Crossover Project was released in February 2020 but was hastily withdrawn. It is not clear if or how the project will be different when it is scoped again. What we know is that the Forest Service proposed to harvest 1,556 acres in February 2020. Many of those proposed acres were in areas where the Forest Service will not have broad collaborative support. Early analysis shows that 153 acres of harvest were proposed in stands greater than 130 years of age. Forty-four acres of harvest were proposed in known old-growth forest, the location of which was shared by with Forest Service by conservation groups. One hundred fifty-nine acres of harvest were proposed in Natural Heritage Natural Areas and 189 acres of harvest were proposed inside the Ash Cove WIA. Some of those acres overlap categories. For Example, the 44-acre stand of existing old-growth is also in a NHNA and the Ash Cove WIA. However, it appears that at least 400 acres of proposed timber harvest fall in locations and forest conditions that are known to be highly controversial. Large portions of the project would also affect the Trail of Tears. It appears that the Forest Service could move forward with a project that included approximately 700-800 acres of timber harvest with broad support. Recent events lead us to believe that a less collaborative strategy will be pursued by the Tusquitee District.

These projects, like many before them, targeted or are currently targeting existing old growth, Natural Heritage Natural Areas, and the undeveloped areas that have now been identified as WIAs. Because the current plan does not include limits to protect conservation values, it has been up to the public, in nearly every project, to push back against actions that would harm them.

As we have explained before, **if the forest plan does not provide a strategy for maintaining and restoring conservation priorities, then every project is a threat**.

It's worth noting the contrary perspective—namely, that every project is also an *opportunity*. With project-level flexibility, we *can* do good work without cumulatively degrading old growth, rare habitats, unroaded areas, and water quality. Sure, we can, but history has proven that we won't—at least not until the Forest Service's budgets and incentives change. For that reason, the revised plan must include strategies that transcend individual project decisions.

It turns out that a "flexible" plan, with conservation priority areas mapped into suitable MAs, doesn't actually offer very much flexibility at the project level. That's because the stands scheduled for harvest, which include conservation priority areas, are those in which "regeneration … is intended." FSH 1909.12, Sec. 61.2. This plan-level decision to regenerate ecologically sensitive areas is hard to ignore or reverse at the project level. The Forest Service is *counting* on those acres to meet its objectives, and there is considerable pressure to meet those objectives from both local stakeholders and the Regional office. Further, the Forest Service relies on receipts to pay staff and keep the lights on.[1] Without adequate budgets and staffing, it's difficult to substitute different stands without causing delays, so dropping stands usually results in smaller projects. In other words, even though dropping some stands is necessary to prevent harm, it also means that projects will include less habitat manipulation, less volume, and less stumpage to pay for other important work. As a result, once scoped, most projects are very rigid and difficult to change. And, the more aggressive the efforts needed to change a bad proposal, the greater the damage to social sustainability.

This is why it is so important, as we will explain below, that the Forest Service be very clear about where and to what extent scheduled timber production is compatible with maintaining and restoring ecological integrity, and where timber harvest should require more thoughtful, site-level consideration. By blurring the distinction between timber harvest and timber production, the Forest Service obscures tradeoffs that should be at the very heart of the decision. But those **tradeoffs do not disappear simply because they have been ignored in the plan; they will come back again at the project level**, at a stage where they will be much harder to resolve through compromise.

D. Principles for Planning

In a nutshell, **deferring hard decisions to the project level makes project-level decisions hard**. The plan should make tough choices, especially where they relate to cumulative impacts that are hard to balance at the project scale. But, of course, making decisions requires good information. The more information you have about ecological and social sustainability, the more

[1] Government Accountability Office (GAO), Forest Service Decision Making (1997) at 64-65, https://www.gao.gov/assets/160/155845.pdf.

specific you can be at the plan level, and the more efficient you can be at the project level. Where you lack information, project-level flexibility is important, but it comes with the potential for conflict, the necessity of additional, time-consuming project-level analysis, and a higher burden for monitoring and adaptive management.

Applying these principles to our planning process is straightforward. Relative to other units of the National Forest System, our Forests have much more information about the ecological and social contexts that matter. The Nantahala-Pisgah has received an unprecedented level of input, including detailed collaborative input, identifying top priorities, important sideboards, and spatial boundaries that show where different management approaches can be most successful. Conservation priority areas (old growth, NHNAs, and WIAs) are mappable at the plan level and should be addressed with tailored MA allocations.

Old growth, NHNAs, and WIAs aren't the only problems under the current plan that need to be addressed in the revised plan. Under the current plan, despite project-level analyses that predict good control of non-native invasive plants, infestations have spread via roads and harvest units. Without a mechanism to right-size the road system, new roads continue to be built while existing roads deteriorate and impact water quality. Harvest systems chosen for economic reasons are applied, repeatedly, in ecozones where they are inconsistent with needs to restore both species composition and structure. As discussed below, however, these are the kinds of issues that are appropriately addressed through forestwide objectives, standards, guidelines, and monitoring. Assuming the adoption of appropriate forestwide components, appropriate allocation of conservation priority areas would avoid nearly all conflict at the project level. Thanks largely to the Nantahala-Pisgah Forest Partnership's work, the Forest Service has reliable information about the ecological and social contexts for each of these areas, acre by acre. Their boundaries have been refined to show the maximum extent that timber production and timber harvest, respectively, can be accomplished without significant conflict or harm.

Two of the alternatives, B and D, would leave most of that information on the cutting room floor. Alternative B's map would leave 53,375 acres of inventoried old growth, 68,765 acres of NHNAs, and 106,000 acres of WIAs in MAs where they are scheduled for timber production. Alternative D, similarly, would leave 29,883 acres of old growth, 67,567 acres of NHNAs, and 112,000 acres of WIAs in timber production MAs. These allocations create an extraordinarily high risk of conflict. If regeneration harvest were distributed randomly on the suitable base for these alternatives, a high percentage of them (up to about half) would impact conservation priority areas. This would not improve on the status quo.

In contrast, Alternative C increases the area available for commercially viable harvest in the suitable base over the current plan but also manages to ensure that sensitive contexts are mostly mapped into MAs that prioritize tailored management instead of rotational harvest. Alternative C's map would leave zero acres of inventoried old growth, 34,383 acres of NHNAs, and 8,900 acres of WIAs in suitable MAs. This still leaves some risk of unnecessary conflict, but far less than the other options. If regeneration were distributed randomly on Alternative C's suitable base, only about 10% of the stands would be likely to impact conservation priority areas.

Proposals that we have seen to modify Alternative D would not solve its fundamental problems. We deeply respect the Wildlife Resources Commission's expertise and work to protect and manage the state's wildlife, but the Commission's modified Alternative D would actually make the plan more prone to conflict. For example, it would leave 115,000 acres of WIAs in the suitable base—the highest number of any option on the table, outside the range of alternatives proposed in the draft. Accordingly, we are grateful that the Commission recognizes the importance of collaborative recommendations and "trust[s] the Forest Service to finalize a plan that will allow for the greatest support for implementation and will also meet the habitat and resource needs of wildlife across the Forest."[2]

We believe that collaboration in the Partnership has indeed produced a set of recommendations that will allow for broad, strong support from all stakeholders, and will do a better job of meeting the needs of both disturbance-adapted and disturbance-sensitive species. Using both allocations and forestwide standards, it would fully resolve issues around old growth and NHNAs. Compared to Alternative C, it would leave a larger number of WIA acres in suitable MAs (around 23,000 acres), but unlike other alternatives, these choices would have the support of Partnership members. Furthermore, the Partnership's recommendations do not seek to prohibit management in other "unsuitable" MAs; they simply seek to ensure that management in unsuitable MAs is tailored to the ecological contexts for which they were mapped.

E. Social Sustainability

The current plan is set up to overpromise and underperform. It guarantees that conservation priority areas will be prescribed for regeneration harvest regardless of whether it would improve or degrade their ecological integrity. If those stands are abandoned to protect what makes them special, projects will accomplish less habitat management. This is the very definition of a zero-sum plan; it forces a false choice between young forest and rare ecological values.

If you wonder why some stakeholders believe that forest planning is zero-sum, this is it. It's because the current plan has taught them so. Those stakeholders don't blame the plan, however; they blame us. This is unfortunate, because we share many of the same priorities. We value all our native wildlife species, and we too are concerned with declines of species like ruffed grouse and golden-winged warbler. In these comments, we offer support for management to benefit these species and arrest their declines, to the extent it is within the Forest Service's ability and consistent with other obligations.

As laid out in the action alternatives, the choice between flexibility and certainty should be a no-brainer. Any of the alternatives is capable of supporting the Tier 2 objectives, so it is obvious

[2] NCWRC Comments on the Nantahala and Pisgah National Forests Land Management Plan and Draft Environmental Impact Statement (June 18, 2020).

that we should pick the alternative with the least conflict and friction, which will let us make the most progress possible toward those upper levels of management.

To those who blame conservation groups for gridlock, however, the choice is not so simple. If you believe that conflict is inevitable—that environmentalists will attempt to block active management regardless of what is in the plan—then it is eminently rational to advocate for a plan that would remove any limitation or obstacle to management. The data do not support this belief, but it can be hard to see the horizon when you are in the trenches.

Which brings us to the real reason that the Partnership recommendations are so important: they show that a critical mass of stakeholders are prepared to let go of past conflicts and work together. With reciprocal support for both increased levels of harvest and increased protections for conservation priority areas, we can ensure that more, better work gets done with minimal friction. Reflecting their agreements will therefore meet a central pillar of the Planning Rule—promoting social sustainability.

II. Range of Alternatives

In general, we compliment the Forest Service's effort to capture a range of alternatives in the DEIS without polarization. Now, however, the Forest Service has even more collaborative input than it previously did. In the Final EIS, the Forest Service can and should analyze the Partnership's recommendations as a distinct alternative, not picking and choosing its innovations or splitting them up between multiple alternatives. The Partnership approach was developed through years of solving tough problems collaboratively, and it contains interdependent solutions to most if not all the major issues and problems that are discussed in these comments. It is certainly a "reasonable alternative" for purposes of NEPA.

While we appreciate the thoughtful effort shown in the DEIS, the Forests did not fully capture the range of reasonable alternatives. Some specific areas (NHNAs and WIAs) were identified by the public as having ecological or social contexts making them incompatible with timber production, but those contexts were not considered in any of the alternatives. These NHNAs and WIAs were instead mapped into the "suitable" Group 1 Management Areas (Matrix or Interface) in all of the alternatives.

A. NHNAs

Natural Heritage Natural Areas are of significant importance biologically, not just on the NPNF, but also at the statewide, regional, and continental levels. These areas are ranked based on the occurrences of elements of natural diversity, such as rare plants and animals and high-quality natural communities. The intent of the Natural Heritage Program is to identify these exemplary areas so they may be protected, thus preserving the unique and biodiverse heritage of our state. When evaluating a Natural Area, one of the many criteria that staff considers is "the ability to be managed to protect and maintain ecological features in a natural condition, and a buffer area…to ensure protection." 07 NCAC 13H .0202(b)(5).

As we pointed out in our comments regarding the proposed Management Area framework and forest-wide desired conditions, "[a]ll Significant Natural Heritage Areas should be placed in a Special Biological Areas MA or another 'unsuitable' MA that emphasized protection of rare habitats." Comments for the Nantahala and Pisgah National Forests Land Resources Management Plan Revision –Proposed Management Area Framework and Forest-wide Desired Conditions, January 5, 2015, at 2. This was consistent with the 2017 Partnership comments. Accordingly, all "Exceptional," "Very High," and "High" ranked NHNAs should have been included in "unsuitable" Management Areas in at least one alternative. This issue has been at the center of the planning process, and the Partnership's 2017 recommendations clearly identified "unsuitable" management as a consensus solution. As such, it is certainly within the range of reasonable alternatives.

The Forest Service has failed to properly reflect reasonable NHNA protections in its range of alternatives. All of the alternatives would leave 17,435 acres of "Exceptional," "Very High," and "High" NHNAs in Group 1 MAs (Matrix and Interface). Nine total NHNAs ranked Exceptional

are allocated to Matrix and Interface only, and, of those, seven are allocated completely to Matrix in all three alternatives. In total, 62 NHNAs, totaling 17,434 acres, ranked Exceptional through High, are allocated completely to Matrix and Interface Management Areas with no variation across alternatives.

Table: NHNAs Allocated to Matrix and Interface in All Action Alternatives

NHNA	NHNA Rank	MA Allocation	Alt B Acres	Alt C Acres	Alt D Acres
Celo Community Natural Area	Exceptional	1	28.40	28.40	28.40
CTB/Johns River/Mulberry Creek Aquatic Habitat	Exceptional	1	2.39	2.39	2.39
CTB/Linville River Aquatic Habitat	Exceptional	1	3.14	3.14	3.14
CTB/Linville River Aquatic Habitat	Exceptional	2	3.44	3.44	3.44
Great Smoky Mountains National Park	Exceptional	1	139.11	139.11	139.11
HIW/Shuler Creek Aquatic Habitat	Exceptional	1	13.14	13.14	13.14
HIW/Shuler Creek Aquatic Habitat	Exceptional	2	1.02	1.03	1.03
LTN/Little Tennessee River (Lower) Aquatic Habitat	Exceptional	1	1.31	1.31	1.31
LTN/Tuckasegee River Aquatic Habitat	Exceptional	1	8.48	8.48	8.48
Western Plott Balsam Natural Area	Exceptional	1	342.47	342.47	342.47
Yellow Creek Wetlands and Slopes	Exceptional	1	54.76	54.76	54.76
Bear Creek Natural Area	Very High	1	4.40	4.40	4.40
Black Mountain/Parker Knob	Very High	1	405.75	405.75	405.75
Black Mountain/Parker Knob	Very High	2	155.17	155.17	155.17
Boone Fork/Johnnys Knob	Very High	1	951.88	951.88	951.88
Boone Fork/Johnnys Knob	Very High	2	71.70	71.70	71.70
Brown Mountain/Hench Knob	Very High	1	739.59	739.59	739.59
Edmondson Mountain	Very High	1	39.88	39.88	39.88
Edmondson Mountain	Very High	2	107.87	107.87	107.87
Foster Creek Wetlands	Very High	1	12.62	12.62	12.62
Hiwassee Lake Rare Plant Site	Very High	1	333.11	333.11	333.11
Milksick Knob	Very High	1	453.27	453.27	453.27
Montreat Watershed	Very High	1	1.61	1.61	1.61
Moore Knob	Very High	1	102.91	102.91	102.91

Pigeon Ford Rare Species Habitat	Very High	1	106.96	106.96	106.96
Pigeonroost Creek Forests and Seeps	Very High	1	386.87	386.87	386.87
Pinnacle Mountain/Mill Creek	Very High	1	114.57	114.57	114.57
Rainbow Springs Preserve	Very High	1	27.61	27.61	27.61
Rich Mountain/Sugar Creek	Very High	1	777.96	777.96	777.96
Round Mountain Cove	Very High	1	321.18	321.18	321.18
Round Mountain Cove	Very High	2	8.13	8.13	8.13
Sammy Basin	Very High	1	314.00	314.00	314.00
Satulah Mountain	Very High	1	12.19	12.19	12.19
Shorty Top	Very High	1	55.42	55.42	55.42
Skitty Branch Cove	Very High	1	18.45	18.45	18.45
Skitty Branch Cove	Very High	2	59.80	59.80	59.80
Slate Creek Forests and Powerline	Very High	1	18.71	18.71	18.71
Slate Creek Forests and Powerline	Very High	2	6.15	6.15	6.15
The Dismal/River Cliffs	Very High	1	317.50	317.50	317.50
Bald Rock/Bruce Ridge	High	1	1549.90	1549.85	1550.70
Bald Rock/Bruce Ridge	High	2	20.43	20.48	19.64
Beavers Branch Wetland and Slopes	High	1	28.71	28.71	28.71
Buck Knob	High	1	185.31	185.31	185.31
Charley Bald/Buck Knob	High	1	1023.40	1023.40	1023.40
Clear Creek Wetlands	High	1	21.24	21.24	21.24
Davis Branch Floodplain	High	1	25.35	25.35	25.35
Davis Branch Floodplain	High	2	4.38	4.38	4.38
Farley Branch	High	1	311.48	311.48	311.48
Farley Branch	High	2	20.16	20.16	20.16
Foster Knob/Rockyface Mountain	High	1	683.68	683.68	683.68
Guys Creek Rare Plant Site	High	1	66.58	66.58	66.58
Hanging Dog Mountain	High	1	175.76	175.76	175.76
High Hampton/Chattooga Ridge Natural Area	High	1	5.97	5.97	5.97
Jarrett Hollow/Big Branch Forest	High	1	112.70	112.70	112.70
John Green Bend	High	1	97.15	97.15	97.15
Kirby Knob Hornblende Slope	High	1	89.36	89.36	89.36
Lake Logan/Sunburst Slopes	High	1	1.02	1.02	1.02
LTN/Cartoogechaye Creek Aquatic Habitat	High	1	3.80	3.80	3.80
Meetinghouse Mountain	High	1	1329.19	1329.19	1329.19
Mulberry Creek Rare Plant Site	High	1	151.60	151.60	151.60
Naked Place Mountain	High	1	20.39	20.39	20.39
North Shoal Creek Falls	High	1	18.19	18.19	18.19

Pate Creek Wetland Plant Site	High	1	27.66	27.66	27.66
Richey Knob/Buck Knob	High	1	1207.96	1207.96	1207.96
Richland Ridge Natural Area	High	1	140.74	140.74	140.74
Rocky Knob	High	1	1429.50	1429.50	1429.50
Rocky Knob/Davis Creek Headwaters	High	1	961.78	961.78	961.78
Rocky Point Ferry Branch/Little Tennessee Slopes	High	1	86.05	86.05	86.05
Salt Bin Bluffs	High	1	37.63	37.63	37.63
Sugarloaf Knob	High	1	227.60	227.60	227.60
Trimont Ridge	High	1	234.09	234.09	234.09
Trimont Ridge	High	2	178.86	178.86	178.86
Tulula Wetlands	High	1	14.39	14.39	14.39
Wolf Creek/Cherry Gap/Brown Mountain	High	1	419.52	419.52	419.52
TOTAL:			**17,434.45**	**17,434.46**	**17,434.47**

B. WIAs

Wilderness Inventory Areas are typically unroaded with no public motorized access, thus providing naturalness, solitude, and other backcountry and wilderness related values. WIAs usually have high biological and ecological integrity and often include old growth. In the range of alternatives for WIAs, the Forest Service failed to consider the protection of portions of WIAs by putting them into Group 1 MAs across all alternatives. Approximately 9,307 acres are allocated to either the Matrix or Interface Management Area in Alternatives B, C and D for at least 20 WIAs. More appropriate allocations will assist in tailoring the management direction for different areas and guiding the development of non-controversial projects that are more likely to make it to a final decision and implementation. The DEIS, however, failed to consider an appropriate range of alternatives by failing to include these 9,307 acres of WIAs in an unsuitable MA in any of the alternatives.

Table: WIAs Allocated to Matrix and Interface in All Action Alternatives

WIA Name	MA Allocation	Alt C Acres	Alt D Acres	Alt E Acres	Lowest Common Acreage Across Alts
Bald Mountain	1	2.70	2.7	2.70	2.7
Black Mtns	1	540.00	538.98	539.03	538.98
Cheoah Bald	1	608.98	91.51	608.98	91.51
Cheoah Bald	2	4.55	4.55	4.55	4.55
Chunky Gal Ext B	2	63.53	73.04	63.60	63.53
Fishhawk Mtn	1	3714.54	1003.83	3714.54	1003.83

Fishhawk Mtn	2	1293.04	1114.61	1293.04	1114.61
Harper Creek	1	78.47	204.55	64.77	64.77
Harper Creek	2	223.52	172.46	224.89	172.46
Jarrett Creek	1	442.14	68.92	442.14	68.92
Jarrett Creek	2	40.18	40.46	40.18	40.18
Joyce Kilmer Slickrock Ext #1	1	2908.97	1976.22	2022.84	1976.22
Joyce Kilmer Slickrock Ext #1	2	410.60	300.48	410.60	300.48
Linville Pinnacle Ext	2	194.88	515.85	194.88	194.88
Lost Cove	2	249.64	253.52	249.75	249.64
Mackey Mtn	1	1365.64	918.9	744.31	744.31
Mackey Mtn	2	246.82	246.82	256.33	246.82
Middle Prong Ext	2	12.67	13.58	12.67	12.67
Nolichuchy Gorge	1	727.86	497.76	727.86	497.76
Overflow Creek	2	50.12	48.68	50.12	48.68
Shining Rock Ext Graveyard Ridge	2	324.14	324.19	324.14	324.14
Shining Rock Ext-Sam Knob	2	58.39	15.8	58.39	15.8
Siler Bald	2	16.10	16.1	16.10	16.10
Southern Nantahala Ext	2	340.62	22.67	340.62	22.67
Tusquitee Bald	1	8582.10	1211.39	11936.22	1211.39
Tusquitee Bald	2	271.44	158.79	271.44	158.79
Woods Mountain	1	332.12	90.83	332.12	90.83
Woods Mountain	2	169.15	29.78	169.15	29.78
TOTAL					**9307**

III. Analytical Basis for the Plan and Decision

The Partnership's success in reaching agreement is all the more remarkable because the DEIS did not provide a clear and solid analytical foundation for our discussions. Imprecise terminology and inconsistent models left stakeholders without a shared set of facts. Near the end of the comment period, it became clear that the upper end of Tier 2's regeneration objectives would create young forest levels in excess of NRV, but it was not clear what the actual long-term "ceiling" for regeneration harvest would be. The Partnership navigated this issue by focusing on the short-term—this planning cycle—and by ensuring that any "extra" harvest would be used to improve the ecological trajectories of stands.

The Partnership's ability to navigate around analytical defects, however, does not excuse the Forest Service from fixing them in the Final EIS. In this section, we describe the problems with the modeling processes that form the analytical basis for the plan.

A. The Forest Service's Spectrum Model is Deeply Flawed, and it Contains Assumptions that Conflict with Assumptions in the Forest Service's NRV Model, Leading to a Draft Plan that Violates NFMA and the Planning Rule and a DEIS that Violates NEPA.

There are multiple, major errors with the Forest Service's Spectrum model, the outputs of which are the basis for conclusions about environmental impacts in the DEIS and timber objectives in the Draft Plan. As discussed below, the most striking and problematic result of these errors is, *first*, a systematic under-estimation of natural disturbances on the forests and a corresponding over-estimation of how much young forest creation must occur in order to move the forests toward NRV, and *second*, a systematic over-estimation of old growth on the forests, which undermines the Forest Service's conclusions that the Draft Plan's objectives for young forest creation *and* its objectives for old growth conditions can both be met in all alternatives. As a result, the DEIS is not based on best available science and does not provide a reasoned basis for the choices proposed in the Draft Plan.

1. The Forest Service underestimated the amount of natural disturbances that are created across the Nantahala-Pisgah.

The first major flaw in the Forest Service's Spectrum model was its assumption about how much natural disturbance is likely to occur on the forests during the planning period. The Forest Service assumed that the *maximum* amount of gap creation was 13,000 acres, that gaps would not occur in any location where other management might occur, and that gaps would never re-set the age of the forest to zero. There are many errors to unpack in these assumptions.

First, the agency based its 13,000-acre assumption on a 2017 study of LiDAR data collected in 2005, from which it determined an approximate amount of gap creation which had occurred in

the previous decade.[3] Essentially, the LiDAR study is a snapshot in time, one which cannot be an accurate indicator of natural disturbance over multiple decades due to the fact that natural disturbance is often episodic: wildfires follow patterns of extended drought; outbreaks of insects and disease occur irregularly; and weather events, such as inland hurricanes or severe winter storms, often occur less frequently than every ten years. The models being compared are long-term models: 1,000 years for the NRV model and 200 years for the Spectrum model. The LiDAR study is at best an indication of disturbance during a previous 10-year period. This is an inadequate sample of long-term disturbance patterns. The DEIS fails to address the implications of how representative (or not) this slice of time would be in addressing natural disturbance levels. The LiDAR study does acknowledge this "slice of time" sampling as a limitation, stating that "[t]he biggest assumption here is that gap creation and loss/closure have been happening at the same rate since 2005."[4] However, the DEIS nevertheless uses these assumptions as the basis for its long-term predictions in the Spectrum model. In essence, the Forest Service says that the sample is unreliable but it relies on it anyway. Because of the episodic nature of disturbance, the slice of time in the LiDAR study cannot be expected to be representative. As discussed below, there are much better ways to estimate predicted natural disturbance.

In contrast to the "tiny slice of time" approach used in Spectrum, the NRV model deals with the episodic nature of disturbance by estimating the recurrence intervals of disturbance events. Fire return intervals that range from several years to decades and even centuries are estimated for each ecozone. Destructive storm and flood events that are not expected every year but are predictably expected to reoccur are built into the NRV model. Disease, insect infestations, and stress are also built into the NRV model to reoccur on an infrequent but reoccurring basis. Even unpredictable disturbance events of unspecified type are built into the NRV model to reoccur on a regular basis (as alt-succession).[5] In this way the NRV model addresses the episodic nature of disturbance. The NRV model has its own limitations, which will be discussed below, but it *does* deal with the fact that disturbance events which do not occur frequently nevertheless do predictably reoccur with decades or even centuries in between. The Spectrum model ignores this long-term pattern and falsely tries to apply an inappropriate sample of disturbance during a particular time.

Several of the most notable disturbance events to occur in Western North Carolina in recent decades are missed by the use of the LiDAR study. The destructive wildfires of 2016 were totally missed by this sampling. While hemlock wooly adelgid infestations were found in Western NC by 2005, almost all of the mortality occurred after 2005. Even trees killed by 2005

[3] Att. 1, Lewis, C. et al., Identification of Canopy Gap and Early Successional Habitat Patches on the Nantahala and Pisgah National Forests (2017).

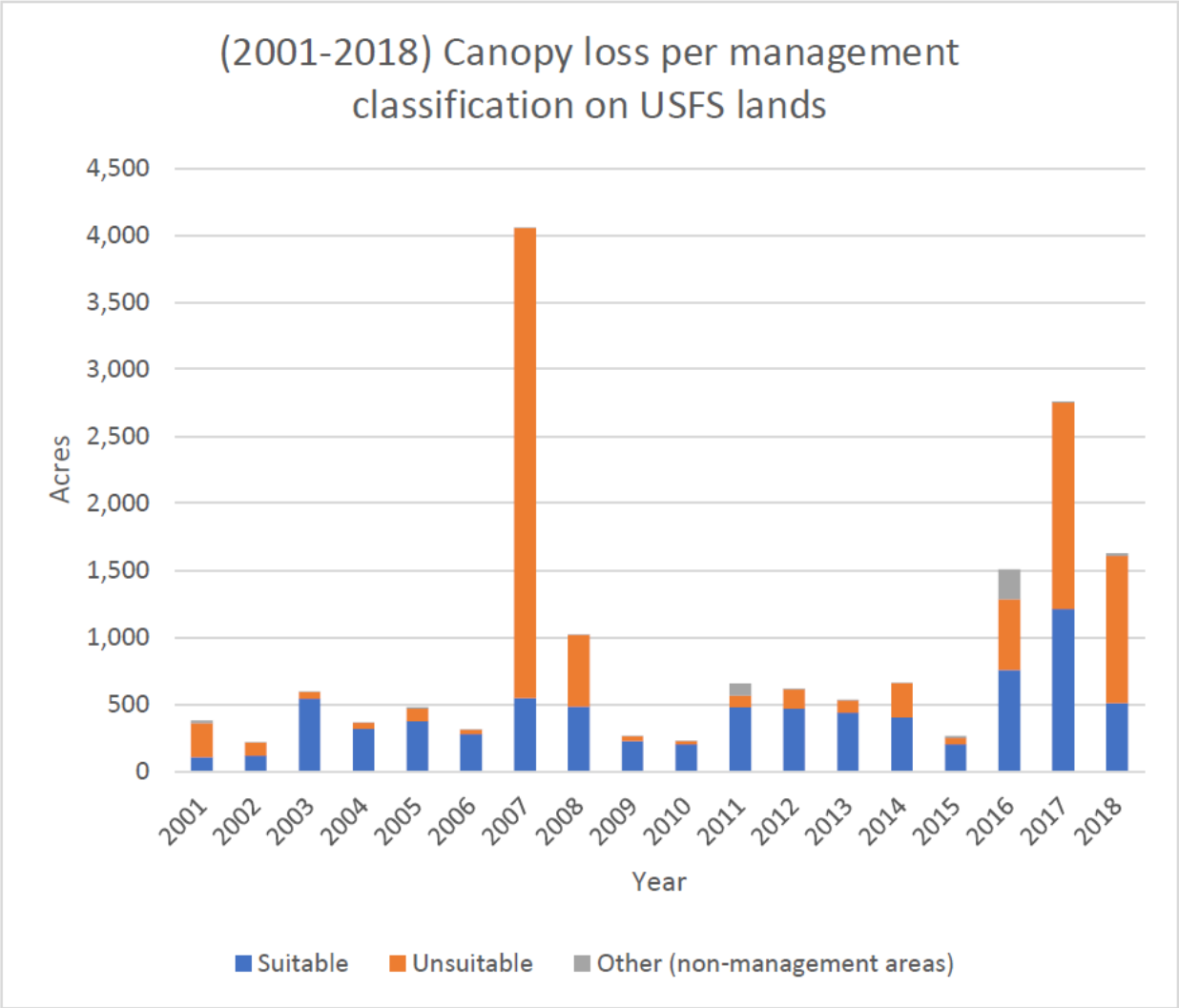
[4] *Id.*

[5] Att. 2, USFS, NRV Process Paper ("Procedure for Estimating the Natural Range of Variation") (2015) (hereinafter "NRV Process Paper"); Att. 3, Kaufman, USFS, Probability NRV Models for Nantahala and Pisgah NFs Plan Revision (USFS, Kauffman, June 2020) (hereinafter "Probability NRV Models").

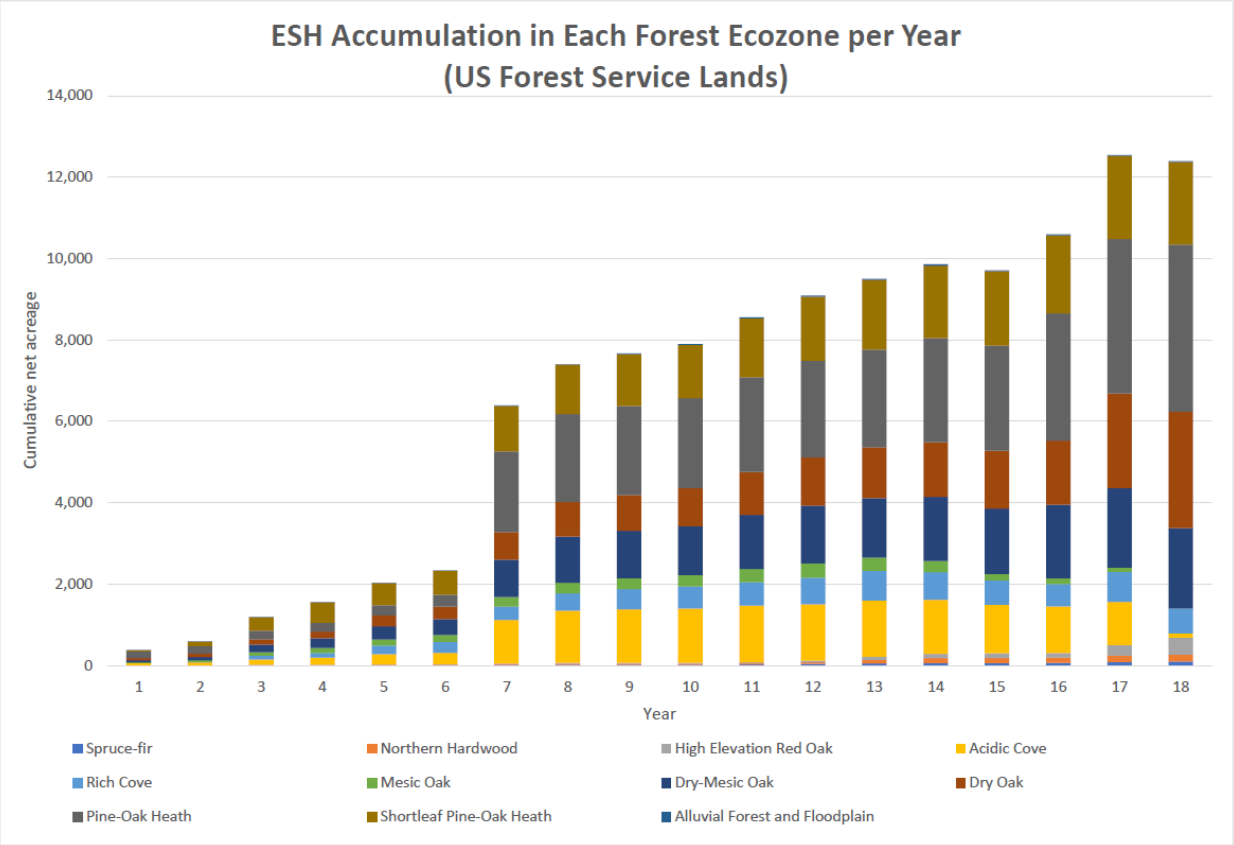
would almost assuredly still have been standing in 2005 and not identified as gaps in the LiDAR study. One could argue that these particular disturbance events were either typical or atypical, but that misses the point that these types of disturbance would occur during a 200 year model period. For the time period leading up to Plan revision, these disturbances are some of the most relevant because they provide the young forest conditions currently on the landscape. For the 200-year time period of the Spectrum model, they are the types of disturbance that the model should anticipate.

Thus, at the very least, the Forest Service must include more recent, readily available information to inform the public and decisonmakers about the likely effects of its proposed program of work. To help fill the gap between the 2005 study and the present day, we analyzed canopy loss data from Hansen, et al., on the Nantahala and Pisgah National Forests.[6] Far from atypical, the mortality caused by the 2016 wildfires is actually the *second* large young-forest-creation event in the 15 years since the LiDAR snapshot was taken. From 2016 to 2018, a little under 6,000 acres of new young forest was created on the NPNF. From 2007 to 2008, a little over 5,000 acres were created.

[6] Datasets available at http://data.globalforestwatch.org/datasets/63f9425c45404c36a23495ed7bef1314.



These periods of greater disturbance primarily affected two types of ecozones. First, the bulk occurred in dry ecozones: pine-oak heath, shortleaf pine, dry oak, and dry-mesic oak. Second, a notable level of disturbance occurred in the acidic cove ecozone. This strongly suggests that the primary drivers for these natural disturbances were fires and hemlock wooly adelgid. Notably, HWA mortality begins to show up as young forest creation in 2007, two years after the 2005 LiDAR snapshot. More young forest was created in 2007 than in any other single year, due to a double whammy of HWA and a severe fire season, particularly the Linville Complex (Shortoff and Pinnacle) and Dobson Knob fires. The drought that was responsible for these fires was also likely the additional stressor that contributed to a sudden increase in hemlock mortality in acidic coves.



From these data, it is apparent that accurately predicting natural disturbance matters not only at the landscape scale, but also at the ecozone scale. The Spectrum assumptions, based on the LiDAR snapshot, do not reflect where young forest is being created. For example, the gap coefficient for dry oak forests assumed that 5 of every 10,000 acres (annually, or 5 per 1,000 decadally) would become a "gap" each year.[7] From 2001 to 2018, however, an average 32.5 of every 10,000 acres of dry oak forest became young forest each year (2,864 acres out of 49,000 total). The rate of young forest creation in dry oak forests is therefore 650% of the rate assumed by the "gap coefficient" used in Spectrum. Differences of this magnitude totally undermine any attempt to use the Spectrum model outputs to predict effects to ecozones or the species associated with them.

[7] Att. 4, Spectrum Coefficients for Young Gap Creation process paper (USFS, June 2020).

		CUMULATIVE ECOZONE ACREAGE SUBTRACTING HARVEST ACREAGE AS IT AGES OUT OF THE YOUNGER CLASS																
ID	Ecozone	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1	Spruce-Fir	1	4	5	5	6	6	20	24	24	24	28	39	55	62	65	68	85	100
2	Northern Hardwood Slope	0	0	1	1	1	1	2	2	2	3	4	7	21	36	41	44	51	57
3	Northern Hardwood Cove	1	1	9	9	13	16	18	22	22	23	24	30	61	80	82	87	107	118
4	Acidic Cove	57	77	131	177	254	284	1,073	1,283	1,317	1,334	1,394	1,389	1,383	1,330	1,197	1,144	1,059	101
5	Rich Cove	5	6	94	107	210	268	323	418	490	540	574	646	725	678	596	550	741	608
6	Alluvial Forest	0	1	2	2	5	5	8	11	11	12	12	13	13	11	9	5	0	0
7	High Elevation Red Oak	0	0	7	7	9	11	11	21	21	22	26	47	84	110	111	113	260	416
8	Montane Oak Hickory Slope	4	8	41	43	84	99	137	181	191	219	240	276	308	337	352	412	914	1,154
9	Dry Oak Evergreen Heath	24	34	50	57	99	116	328	403	415	433	509	556	576	598	607	641	824	971
10	Dry Oak Deciduous Heath	2	5	10	14	16	22	39	50	52	53	53	55	59	64	65	93	124	155
11	Dry Mesic Oak	54	86	186	245	329	386	925	1,134	1,160	1,194	1,329	1,420	1,456	1,573	1,608	1,810	1,958	1,975
12	Low Elevation Pine	30	108	321	491	540	591	973	1,055	1,117	1,146	1,276	1,412	1,536	1,613	1,650	1,739	1,860	1,855
13	Pine-Oak Heath	157	184	208	221	247	291	1,977	2,162	2,185	2,211	2,326	2,373	2,404	2,552	2,583	3,124	3,793	4,104
14	Large Floodplain	0	0	0	0	1	1	1	1	3	5	14	16	16	16	16	19	19	18
15	Montane Oak-Hickory Rich	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	Grassy Bald	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
17	Montane Oak-Hickory Cove	15	41	79	124	148	171	235	264	273	285	328	354	327	270	161	135	103	0
18	Mixed Oak-Rhododendron	26	32	40	46	66	68	176	218	227	230	251	294	308	351	393	434	468	584
19	Heath Bald	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
20	Shortleaf Pine-Oak Heath	4	5	5	5	5	5	148	163	163	168	169	169	173	176	177	179	182	178
21	Reservoirs Ponds	0	0	1	2	2	2	2	3	3	3	3	3	3	3	3	6	7	7

		CUMULATIVE ECOZONE ACREAGE SUBTRACTING HARVEST ACREAGE AS IT AGES OUT OF THE YOUNGER CLASS																
ID	Ecozone	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1	Spruce-fir	1	4	5	5	6	6	20	24	24	24	28	39	55	62	65	68	85	100
2	Northern Hardwood	1	1	9	10	14	17	19	24	25	26	28	37	82	117	123	131	157	175
3	High Elevation Red Oak	0	0	7	7	9	11	11	21	21	22	26	47	84	110	111	113	260	416
4	Acidic Cove	57	77	131	177	254	284	1,073	1,283	1,317	1,334	1,394	1,389	1,383	1,330	1,197	1,144	1,059	101
5	Rich Cove	5	6	94	107	210	268	323	418	490	540	574	646	725	678	596	550	741	608
6	Mesic Oak	15	41	79	124	148	171	235	264	273	285	328	354	327	270	161	135	103	0
7	Dry-Mesic Oak	54	86	186	245	329	386	925	1,134	1,160	1,194	1,329	1,420	1,456	1,573	1,608	1,810	1,958	1,975
8	Dry Oak	56	80	141	159	265	305	679	852	884	935	1,053	1,182	1,251	1,350	1,417	1,579	2,329	2,864
9	Pine-Oak Heath	157	184	208	221	247	291	1,977	2,162	2,185	2,211	2,326	2,373	2,404	2,552	2,583	3,124	3,793	4,104
10	Shortleaf Pine-Oak Heath	34	113	325	496	546	597	1,121	1,218	1,280	1,314	1,445	1,581	1,709	1,789	1,827	1,918	2,041	2,033
11	Alluvial Forest and Floodplain	1	1	2	3	6	6	10	13	15	16	26	29	29	27	24	24	18	18
	TOTAL:	379	593	1,188	1,553	2,032	2,341	6,394	7,413	7,672	7,901	8,557	9,095	9,505	9,858	9,712	10,597	12,544	12,393

Even if the LiDAR study did provide a valid sample to assess long-term disturbance levels, the amounts used in the Spectrum model were not justifiable based on the LiDAR study. The 2005 LiDAR data showed 13,000 acres in "gaps" on the forest and another 47,000 acres of "early successional habitat" ("ESH").[8]

- Gaps were defined as: canopy cover <=25%, canopy height <=15', and shrub density <50%.

- ESH was split into two categories, moderate and dense:
    - Moderate ESH was defined as: canopy cover between 25% and 60%, canopy height <15'.
    - Dense ESH was defined as: canopy cover >60%, canopy height <15'.

[8] Att. 1, Lewis, *supra* note 3.

Effectively, the LiDAR study split ESH into three distinct conditions: “Gaps” are the youngest of the young forest. “Dense ESH” is closest to aging out of early condition. And “Moderate ESH” is in between. These categories are not overlapping. Gaps have less than 25% canopy cover, while ESH has more than 25% canopy cover. Adding "gaps" and “ESH” together provides a total of all the acres that had a canopy height less than 15' with any level of canopy closure.

There were 18,000 gaps found in the study, which added up together to 13,000 acres. There were an additional 46,836 acres of ESH. Both numbers exclude the Grandfather District,[9] so all of the disturbance creating this ESH occurred on an 852,000-acre landscape. Astonishingly, although it is revealed nowhere in the DEIS, this means that a total of about 7% of the landscape (59,836 acres) was in early successional condition in 2005—squarely in the middle of NRV. To be sure, many of these are small gaps, but the Forest Service made no attempt to explain how much of the ESH identified in the LiDAR study were the same kinds of gaps that “counted” toward young forest creation in the NRV model.

Instead, the Forest Service dismissed the significance of these large totals, stating that the numbers were not representative of natural disturbance because they included ESH created by timber harvest. Yet during the 10-year period from 1995 to 2005, the Forest Service only harvested approximately 7,600 acres—an average of 760 acres per year.[10] That leaves 52,236 acres unaccounted for—over 6% of the landscape analyzed. Certainly, some of these acres are in permanent wildlife openings and balds, but those areas will continue to provide open-area habitat under the Draft Plan. The issue is straightforward: an annual harvest of 760 acres, combined with wildlife openings and natural disturbances, was enough to create gaps and ESH on 7% of the landscape. The Forest Service has made no attempt to explain why higher levels of harvest are needed in the future, and a decision based on this record would not comport with NEPA or the APA.

Even subtracting all of the anthropogenic and permanent wildlife openings on the forests from the 60,000 acres shown in the LiDAR study, the total percent of the landscape in natural gaps and naturally-created ESH would be considerably higher than 13,000 acres. Thus, 13,000 acres is not an accurate figure for the amount of acreage that experienced natural regeneration events on the forests in the decade prior to the 2005 LiDAR study.

To determine the expected gaps created in the *future*, however, the Forest Service did not even carry forward the 13,000 acres cherry picked from the LiDAR analysis. Instead, the Forest Service created probability coefficients for each forest type by dividing the total gaps in each forest type—based only on the 2017 study of the 2005 snapshot—by the total acres in that forest

[9] Forest Service staff estimated that the total gaps for the forests would more likely be approximately 15,000 acres if Grandfather had been included.

[10] The average annual acreage of 770 was calculated by dividing the average timber harvested (CCF) from the years 1995 to 2004 (as listed in USFS “cut and sold” reports) by an estimated rate of CCF/acre of 23.

types.[11] These coefficients were then assumed to be the fraction of each acre, in each respective forest type, that would become young gaps in a given decade. To predict the amount of young gaps that would be created in the future, the Spectrum model applied these coefficients *only to* "minimum level" acres—i.e., acres that would receive no management during the 200-year modeling period.

In other words, if an acre received any mechanical treatment or prescribed fire, it became "off the table" for gap creation. As a result of the greater number of total acres modeled as receiving some kind of treatment at Tier 2, the Forest Service's modeling determined that under Tier 1 objectives, 7,600 acres of natural disturbance gaps would be created in each decade; under Tier 2 objectives, 3,500 acres of natural disturbance gaps would be created in each decade. *See* DEIS at 160. [12]

The decision to apply the gap coefficient, which was already too low, to only a fraction of the landscape, is arbitrary and capricious. The gap coefficient was derived from a snapshot of a landscape that has been actively managed for many decades, with precious few acres in the last 200 years that were completely untouched by human hands. Assuming that gaps would be less common in the future because of management is incoherent. In fact, the data clearly show that less-managed areas of the forest are actually providing *more* young forest habitat than the most actively managed areas, as shown in the chart above comparing annual young forest creation in suitable and unsuitable Management Areas.

Furthermore, the assumption simply does not reflect reality. In particular, prescribed fire often functions to *accelerate* the creation of gaps on the forest—not preclude them. In order to illustrate this issue, we analyzed a shapefile provided by Forest Service staff that represents the footprint of prescribed fire on the N-P in the period of 2006-2018. The footprint is a total of 97,217 acres, though some of the areas have been burned two or three times. We overlaid these boundaries with aerial imagery and searched for larger areas of tree mortality due to fires, generally greater than .5 acres, and conservatively identified 1,053 acres of early seral forest resulting from fires in these areas.[13] Most of these acres were in ecozones where such fire behavior is likely, such as Pine-Oak Heath, Dry Oak, and Low Elevation Pine. This represents approximately 1% of the young forest habitat being developed per decade inside prescribed fire units. Accordingly, 1% early seral forest per decade is probably the minimum that can be expected inside prescribed fire areas. If the Forest Service doubles prescribed fire (which is realistic and within the objectives), we should expect to see at least 2,000 acres of early seral

[11] Att. 4, Spectrum Coefficients for Young Gap Creation, *supra* note 7; confirmed by USFS staff statements during June 2, 2020 conference call with NPFP Ecological Restoration group.

[12] The process paper "Spectrum Coefficients for Young Gap Creation," *supra* note 7, shows a variation of these figures used in different alternatives and tiers.

[13] Available at https://southernenvironment.sharefile.com/d-s945e3f26d374060a.

forest per decade created by prescribed fire alone. To the extent that burn units are repeatedly burned, that habitat will be long-lasting. Under the Spectrum assumptions, that number is zero.

As noted above, the Spectrum model assumes between 3,500 and 7,600 acres of gaps per decade. These numbers are equivalent to .3% - .7% of the forests, respectively. Yet by comparison, the Forest Service's NRV model projects levels of young forest to be 5.7%-8.6%. DEIS at 161 (using 60,000-90,000 acres as NRV for young forests). This is over an order of magnitude greater than the Spectrum numbers, and it reflects the fact that, as described above, the NRV model assumes (appropriately) that significant amount of regeneration events from natural disturbances occur on the forests.

Given the fact that the Forest Service used the Spectrum model as the basis for both its stated need for the creation of young forests and the rate at which portions of the landscape will reach the minimum age for acquiring old growth conditions, this discrepancy between the NRV and Spectrum models' assumptions about natural gap creation on the forests is unacceptable. The Spectrum model assumes a static level of natural disturbance that is not accurate and does not constitute use of the best available scientific information.

2. The Forest Service failed to consider either prescribed fire or natural gap creation from wind, ice, wildfire, pests, disease, and stress as regeneration events in the Spectrum model.

The Forest Service's model for NRV for the Nantahala-Pisgah forests appropriately assumes that natural disturbance processes will contribute to the creation of disturbance gaps as regeneration events, resulting in the transition of a stand back to a "zero" in terms of its successional phase. These disturbance processes include fire, wind, weather, stress, pests, and disease, and the NRV model assumes that they will cause a significant amount of regeneration disturbance.[14]

The NRV model's treatment of these processes as leading to stand regeneration is appropriate because these processes *do* contribute to disturbance gaps on the forests. Furthermore, these processes are likely to increase in frequency and intensity in coming decades due to climate change. The DEIS even acknowledges this. *See e.g.* DEIS at 12 (increased drought and fire risk due to climate change); 388 (increased impacts from native and non-native pests); 390 (increased disease risk).

While larger scale disturbances caused by wildfire are likely to be below NRV levels in most years due to the need to put many fires out, there are wildfires on the Nantahala-Pisgah every year. Some years, like 2007 and 2016, are severe. Indeed, in a period of 18 years, the NPNF experienced two drought-related severe fire seasons resulting in 5,000 to 6,000 acres of young forest creation each. While any single weather event cannot be directly attributed to climate

[14] Att. 2, NRV Process Paper, *supra* note 5; Att. 3, Probability NRV Models, *supra* note 5.

change, it is obvious that the effects of climate change are already here. If these episodic droughts continue at the same rate (causing a 5,500-acre event every 9 years), we can expect an average of 611 acres of young forest per year from these events alone.

Across the forests, the level of disturbance from gap phase dynamics varies by ecozone, but it is the dominant natural disturbance in some ecozones, including rich and acidic cove ecozones. Draft Plan at 50-51; DEIS at 192-94, 198. Yet inexplicably, the Forest Service's Spectrum model does not consider natural disturbance gaps to be regeneration events.

Indeed, the Spectrum model does not include *any* young forest creation (regeneration events) from any source other than timber harvest. Prescribed fire, storms, gap-phase dynamics—all are modeled strangely as not resetting the forest's age. Wherever a gap is created, after 10 years it is assumed to revert back to the age of the surrounding forest. Agency staff explained that this was an intentional choice: these gaps were assumed to "melt" back into the surrounding forest without succeeding from young to mid to late to old, as mechanically created young forest was modeled. This may be appropriate for some very small gaps, but it is certainly not true that there are zero young forest creation events prompted by natural disturbance. Yet that is the assumption in the Spectrum model.

Even prescribed fire is treated this way in the Spectrum model—after 10 years, gaps created by prescribed fire would revert back to the age of surrounding forest after a decade. Since surrounding forest would have aged 10 years during this period, the burned acres are not set back at all. Here too, the DEIS is internally inconsistent because there is a fundamental difference in the way that the NRV model treats this disturbance. In the NRV model, replacement fire—which can include prescribe fire—*does* reset acreage of any age class back to zero, and consequently it has a significant effect on young forest creation and old growth predictions in the NRV model.

This remarkable point bears repeating: In the Spectrum model, there are *zero* acres of non-timber harvest disturbance that are modeled as creating ESH. The *only* ESH creation comes from regeneration harvest. This is not an accurate depiction of how disturbances occur and behave on the forests, it does not constitute best available science, and it is completely inconsistent with the way disturbance gaps are modeled in the NRV model. Simply put, it is bad scientific practice to treat these gaps as regeneration events in one model and to not similarly do so in another comparative model—particularly when this comparison forms the basis for the Forest Service's analysis in the DEIS and the Draft Plan's harvest objectives.

The NRV model can be considered to overestimate young forest and underestimate old growth. The model clearly lumps disturbances that would be single and multiple tree gaps (gap phase dynamics) into regeneration events.[15] In the ecological literature, gap phase dynamics are

[15] *See* NRV Process Paper, *supra* note 5; Probability NRV Models, *supra* note 5. The fact that NRV probabilities included gap phase dynamics has also been acknowledged by Forest Service staff on numerous occasions.

generally considered a natural part of other forest structure, particularly old growth structure.[16] By including gap phase dynamics as regeneration events, the NRV model would undercount old growth acres and overcount young forest acres in its model outputs. This has been an issue that we have frequently pointed out during use of the NRV model in the forest planning process, cautioning that it is an inaccuracy in the NRV model that we can accept, but any model comparisons need to take this into account.

The Forests cannot have it both ways. Because the NRV model includes gap phase dynamics as regeneration events, Spectrum also should have included gaps as regeneration events (events that take forest back to age zero). Alternately, the Forest could have used the LiDAR study to argue that the majority of natural disturbances are smaller gaps that shouldn't be included as regeneration events in the NRV model. But this would require redoing the NRV model with different probabilities for disturbance during recurrent disturbance events. What is indefensible is the use of disturbance events, including gap phase dynamics as regeneration events in the NRV model, while using all gaps (including larger gaps) as transient gaps that take on the age of adjacent forest after 10 years in the Spectrum model. But this is exactly what the DEIS does, exacerbating the inaccuracies in the NRV model with the errors in the Spectrum model. The NRV model tends to overestimate young forest while underestimating old growth; Spectrum underestimates young forest while overestimating old growth. One of the results of this skewed model comparison is Spectrum unsurprisingly predicts an excess of old growth under all alternatives and both tiers.

The implications of this error are significant, particularly for old growth projections. If Spectrum had included natural disturbance as regeneration events consistent with the NRV model, it would not make a large difference for old growth outputs in the first 10 years of the Spectrum model. But after each 10 year increment, the difference would grow. Spectrum *should* set acres "back to zero" every decade, and it would take each of those acres 100 – 140 years to reach minimum age for old growth conditions. This "resetting" is why the 5.7% to 8.6% of natural disturbance modeled in the NRV model would keep projected old growth to only around 50% of the forests, while Spectrum projects a vast overabundance of old growth in the future. *See* DEIS at 164.

In the Spectrum model as it was constructed, these 3,500-7,600 acres would revert back to the age of surrounding forest after 10 years. Surrounding forest would have aged by 10 years so the gaps do not actually lose any time in their aging process. Over the course of a century, the difference between the two models would be extraordinary: the difference would be *another* order of magnitude apart, on top of difference resulting from the Spectrum model's underestimation of natural disturbance creation, discussed above.

[16] Runkle, J.R., *Patterns of Disturbance in Some Old-Growth Mesic Forests of Eastern North America*, Ecology 63: 1533-1546 (1982).

To illustrate the point, imagine two Spectrum model runs, one that re-sets forests to zero after natural disturbance and another that does not. Even using the paltry acreage of gaps in the current model (3,500-7,600 per decade), the models would diverge considerably. After 13 decades (when gaps created during the first decade began to age into the old growth age class again), the models would show a difference of 100,000 acres in the old age class. If the Forest Service had included 15,000 acres of gaps, as its own interpretation of the LiDAR study suggests it should have, the cumulative difference would be closer to 200,000 acres. And if the Forest Service added the effects of episodic, drought-related fire (611 acres/year[17]) and a doubling of prescribed fire (100 acres/year[18]), then Spectrum would re-set 23,000 acres per decade, with a difference of around 290,000 acres of old growth. In other words, nearly 300,000 more acres would be "unavailable" to contribute to old growth totals in an appropriately constructed model, as compared to the model the Forest Service used, in which those acres would have reverted to their previous age class after 10 years.

3. Other Flaws in the Spectrum Model

The Spectrum model also fails to include young forest created by daylighting roads. The Plan calls for daylighting 2 miles annually at Tier 1 and 5 miles at Tier 2. This work is specifically intended "to create young forest conditions." Draft Plan at 99. The DEIS Transportation Analysis does not quantify the effects of these objectives, DEIS at 458-64, and it is not included in the Spectrum model. Consequently, it is hard to know how much young forest this would create. If the activity stretched for 50 feet on either side of the road, it would create 12 acres per mile, or 24 acres per mile with a 100-foot strip. At Tier 2 levels, this could create 120 acres per year or 1,200 acres per decade. This work must be quantified and modeled in Spectrum.

In addition, the Spectrum model does not seem to account for permanent wildlife openings or balds. While these may not be important to timber production calculations, they are very important for wildlife habitat projections, and they cannot be ignored. See generally DEIS discussion of demand species, including grouse and turkey. As best we can tell, there is no disclosure in the DEIS of how many acres of wildlife openings and balds currently exist. This omission itself is remarkable, and it seems likely that the Forest Service itself does not know how many acres are out there.

A best guess could be drawn from the plan objective to maintain 3,750 acres each decade. Draft Plan at 77 (ECO-O-01). The Forest Service intends to maintain all permanent openings. DEIS at 68. If wildlife openings require maintenance once every 10 years, this means there are about 3,750 acres currently. At Tier 2, the Forest Service would create another 1,450 acres. These

[17] See above (calculating annual average acres of young forest caused only by episodic, drought-related fire).

[18] See above (calculating likely acres of young forest caused by prescribed fire). At current levels of prescribed fire, about 100 acres annually have been created. Assuming that we double levels of prescribed fire, this would increase by 100 additional acres.

numbers should be added to the Spectrum outputs at each respective Tier. In other words, at Tier 2, there will be 5,200 additional acres of openings at any given time, plus open balds and Graveyard Fields. This is not an insignificant contribution to the landscape level goal of maintaining between 60,000 and 90,000 acres of these habitats.

4. Even putting aside the fundamental modeling errors discussed above, the Forest Service's Spectrum model outputs indicate that the Tier 2 timber objectives would create ESH in excess of NRV.

Spectrum's modeling errors also have a big impact on projections for young forest levels. The Forest Service's Spectrum model used constraints to keep projected acres of regeneration harvest between 31,000 acres and 35,000 acres during any given 10-year period. Draft Plan at D-26. In addition, the model used constraints to artificially keep the amount of ESH on the landscape between 60,000 acres and 90,000 acres, which is the landscape-level NRV for ESH. *Id.*

Kept to a *minimum* amount of regeneration harvests of 31,000 acres per decade (or 3,100 acres per year), the Forest Service's Spectrum outputs lead to landscape-level ESH of just below 90,000 acres after somewhere between 10 and 20 years, and they stay at that level for the entire modeling horizon. *See* DEIS at 160. This means that using the Forest Service's own skewed modeling, the absolute limit on annual regeneration harvests would be 3,100 acres, even assuming the artificially low levels of natural disturbance and improper treatment of disturbance that is currently assumed in the model.

Notably, the Forest Service's consolidated objectives for timber harvests would allow for up to 3,200 acres per year. Draft Plan at 80. In other words, the Forest Service's plan components are *already* outside the scope of its effects analysis, and if the Spectrum model assumed a realistic amount of natural disturbance gaps and treated them as regeneration events, the gap between the amount of regeneration harvests that would fall within NRV for ESH and the harvests allowed by the plan timber objectives would be even greater.

The math here is simple: with more natural disturbance built into the model, the ceiling for regeneration harvest would decrease by the same amount. At Tier 2, the Forest Service is modeling 3,500 acres of natural disturbance per decade, or 350 acres per year. Even with that implausibly low number, the regeneration harvest ceiling, again, is 3,100 acres per year. For every acre of natural regeneration events added into the model, another must be subtracted from the ceiling. Even ignoring gap-phase dynamics (which is totally inappropriate), historical data show that we will have an average of over 600 acres per year caused by episodic drought and wildfire and 200 acres per year caused by prescribed fire, not even counting the additional acres created in less active wildfire years. Just making those adjustments alone, the top of Tier 2 would need to be reduced to 2,650 acres per year.

This is a serious problem for the Plan. The Forest Service has attempted to justify all its restoration harvest based on landscape-level structural needs. However, the takeaway here should be clear: structural restoration alone does not provide a basis for regeneration harvest up

to the maximum of Tier 2. If the Forest Service wants to justify "extra" harvest, it must provide other reasons that are consistent with the Planning Rule's requirements. We believe that the Partnership's recommendations point the way, emphasizing *all* the dimensions of NRV—not just structure—as the foundation for a balanced plan.

B. As a Result of the Errors in the Forest Service's Spectrum Model, the DEIS Contains Analysis and Conclusions Which Are Not Supported by Best Available Scientific Information and Do Not Satisfy NEPA's "Hard Look" Standard.

The errors in the Forest Service's Spectrum model permeate the analysis and conclusions in the DEIS. By assuming levels of natural disturbance that are an order of magnitude below those used in the NRV model, and by failing to treat natural disturbance and prescribed fire as capable of producing regeneration events, the Forest Service's Spectrum model cannot serve as a valid scientific basis for significant portions of the DEIS.

Specifically, the Forest Service has compared the outputs from its Spectrum and NRV models to support a stated need for young forest creation, as well as to support its assertion that old growth conditions will exceed NRV under all alternatives and under all tiers within relevant time frames. DEIS at 161, 164. Yet the stated need for specified levels of young forest creation is necessarily and significantly exaggerated because the Forest Service has, in multiple ways, systematically underestimated the amount of natural disturbance that is likely to occur on the forests. Correspondingly, the Forest Service has drastically overestimated the proportion of the forests that are likely to reach minimum age for acquiring old growth conditions.

The Forest Service's DEIS acknowledges that increased levels of regeneration harvests on the landscape will have an impact on the speed with which areas of the forest reach minimum age for acquiring old growth conditions. *See, e.g.* DEIS at 162 ("Under Tier 2 objectives, young forest structural classes improve at a faster rate under all action alternatives") and 164 ("Within the action alternatives, the old growth structural classes increase more rapidly under Tier 1 than Tier 2, because Tier 1 calls for fewer actively managed acres than Tier 2….Under Tier 2 objectives, the rate of achieving old growth desired conditions across all the ecozones is slower…."). In other words, there are tradeoffs between meeting the Forest Service's objectives for creation of young forests and its objectives for old growth. But unmistakably, the Forest Service has failed to adequately disclose and analyze these tradeoffs. Rather, they are obscured by the Spectrum model's faulty assumptions.

For example, the DEIS notes that "[b]ecause young forest structural classes are ephemeral, species reliant on young forest habitats for all or part of their life history would continue to be affected if new young forest structural classes are not created at a rate high enough to balance forest aging." DEIS at 162. Yet the "balance" that the Forest Service seeks to strike is a false one due to the modeling errors that underestimate the amount of young forest created by natural disturbances. This idea of "balance" points to an obvious internal incoherence in the model. The Spectrum model isn't just incoherent with the NRV model; it's incoherent with itself. Consider: if the Forest Service were to attempt to harvest more timber in order to keep the model

projections for old growth within NRV, it would have to add hundreds if not thousands of acres to Tier 2 annually. Yet this would cause the ESH outputs, which are already maxed out at 90,000 acres across the landscape, to climb far beyond desired conditions. This cannot be right. In a properly constructed model, if ESH were at the top of the NRV range, then old growth would necessarily trend toward the bottom of the NRV range, and vice versa. By showing that we can simultaneously have too much of both age classes, this model proves itself to be utterly unreliable.

Elsewhere, the Forest Service states that "in the next fifty years more than half of the forest will be at the old growth successional age, even with meeting objectives for young forest," DEIS at 358, and "the amount of older forest structural classes would likely be more than 80 percent of the Nantahala and Pisgah NFs over the long term under the current plan, which would exceed the percent desired by the modeled Natural Range of Variation (NRV)." DEIS at 164. The NRV for old growth is between 430,000 to 560,000 acres of the forest in old growth conditions across all ecozones and elevations. *Id.* at 163. Yet if an extremely conservative 15,000 acres of natural disturbance were properly accounted for in Spectrum, this would pull the long range steady state-levels of old growth in the Spectrum model down by about 200,000 acres, resulting in Tier 1 levels at about 675,000 acres rather than 875,000 acres, and Tier 2 levels at about 500,000 acres rather than 700,000 acres. Furthermore, these levels of old growth would be approached at slower rates than is currently estimated in the DEIS. In other words, an accurate representation of natural disturbance patterns in the Spectrum model would completely undermine the Forest Service's conclusions about the respective needs to create early successional habitat and the amount and rate of the development of old growth conditions.

If the Forest Service were to re-run the Spectrum model to appropriately include more natural disturbance, one of two additional changes would have be made to model constraints: either the 90,000 acre upper limit for ESH would have to be increased—which would exceed NRV—or the 31,000 acre lower limit for decadal ESH creation would have to be reduced, which would require fewer regeneration harvests. This is clearly acknowledged in the Spectrum analysis process paper made available in June 2020:

> If young gaps were increased in periods 2 and beyond in Alt B and periods 3 and beyond in Alts C and D, then the constraints would need to be raised above 90,000 acres of young forest+ young gaps to achieve plan objectives.
>
> Or, if the constraints were frozen at 90,000 acres of young forest + young gaps, and the amount of young gaps were increased in periods 2 and beyond, then fewer regen acreages would go into solution. That would involve changing the other constraints above for the minimum amount of regeneration of 31,000 ac.[19]

[19] Att. 4, Spectrum Coefficients for Young Gap Creation, *supra* note 7.

Keeping the 90,000-acre total ESH limit and modeling 15,000 acres per decade of young gap regeneration events would likely reduce the decadal maximum for regeneration harvest by 11,500 acres, if not more—and it would show much slower restoration of older forests.

In sum, the Forest Service's reliance on its flawed Spectrum model has prevented it from adequately assessing and disclosing the tradeoffs between ESH creation and old growth, it cannot support the agency's conclusions about the amount of ESH that is needed on the landscape, and it cannot support the agency's conclusions about the amount or rate of development of old growth conditions on the landscape. In short, the Forest Service has not taken a "hard look" at these aspects of ecological restoration, as required by NEPA.

C. False Model Comparisons and Inaccurate Terminology Attempt to Obscure Failures to Assure Ecological Sustainability and Biological Diversity.

These problems in the Spectrum model and model comparisons detailed above are significant deficiencies in their own right, but the effects of these false assumptions extend throughout the section on Terrestrial Ecosystems (3.3.2) and the section on Designated Old Growth Network (3.3.3). As detailed above the comparisons of Spectrum outputs to the NRV reference conditions are incorrect and misleading. But these comparisons between Spectrum and the NRV reference conditions are used throughout these sections to draw conclusions and establish aspects of ecological sustainability required by the National Forest Management Act (NFMA) and the Planning Rule.

1. The Ecological Sustainability Analysis is based on faulty models and assumptions and do not satisfy requirements of the Forest Planning Rule.

The DEIS and Appendix C of the DEIS fail to adequately disclose how Spectrum model outputs compared to NRV references are used in the analysis of species habitat. However, it is clear that habitat predicted from the Spectrum model are compared to habitat predicted with the NRV model. We were shown charts during a "Species Analysis Deep Dive"[20] that showed the derivation of scores for species groups based on comparison of habitats predicted from the Spectrum model to habitat predicted with the NRV model. These tables are not found in the DEIS or in Appendix C. We have requested this background material on the Species analysis, but we have not received it. Please explain this process clearly in the Final EIS.

The best description of how Spectrum is related to the ESE tool is found in the Timber Calculations Q&A. When asked this question:

> It's fairly clear in the DEIS that species analysis is dependent on Spectrum because the ESE model seems to take outputs from Spectrum (e.g. young forest;

[20] Species Analysis Meeting, held March 13, 2020 at National Forests in NC, Supervisor's Office.

> old growth) to gauge effects on different species groups. What are the mechanics of using the Spectrum outputs in the ESE model? Is ESE dependent in any way on the NRV model? What are any explicit or implicit assumptions around the Spectrum and NRV models relating to species analysis?

The Forest Service answered:

> *The rare habitat analysis did not use Spectrum outputs. Spectrum modeled the objectives in the plan. The plan objectives took into account the Natural Range of Variation. Outputs from the Spectrum model from each alternative are in an excel file format. They are able to be sorted by the outputs identified in Appendix D of the EIS. Successional classes of forest type groups were estimated in Spectrum. However, there is not an exact match of forest type groups to Ecozones, especially since we do not have a current inventory of ecozones. An estimate of forest type to ecozones was made as a first approximation of the successional classes, and these were adjusted in the ESE model based on professional judgement. Successional classes that were studied included young forest, woodlands, and old growth. ESE rating scores by individual ecozones were based on the NRV model and reflective of balanced successional classes for the highest rating. For any individual successional class, if the percentage exceeded or did not meet the desired NRV range, ratings were adjusted. For some ecozones that exceeded either old growth or young forest, ratings were downgraded.*

Timber Calculations Q&A at 8 (May 1, 2020).

From this description, it appears that the Spectrum outputs for young forest, woodlands, and old growth were crosswalked to ecozones, and compared to the NRV reference model for each ecozone. Where the crosswalked Spectrum outputs were within NRV for a particular ecozone and structural type, the alternative received a better score, and when it was not within NRV, the alternative received a worse score. Thus, the ESE tool "scores" are only as reliable as the Spectrum outputs for structural conditions.

And, as explained above, Spectrum's outputs are not in the least reliable. The problems pointed out with Spectrum and the comparison of models above represent errors that overestimate old growth and underestimate young forest. The exaggeration of old growth is present in all alternatives and all tiers. Without these errors, old growth would not be as abundant or at least not overabundant compared to NRV. Habitat dependent on old growth would have a different balance vs young forest if the Spectrum model were fixed. The ESE tool's scores for each alternative, and especially the different Tiers, would be dramatically different. In weighing habitat dependent on old growth conditions vs habitat dependent on young forest conditions, changing the Spectrum outputs should have a significant effect on the Species analysis unless this model is constructed to have almost no sensitivity to model outputs. As it is, the Species analysis is unreliable because it is based on model outputs that are in error. As a result, the Forest

Service lacks a rational basis to conclude that any of its alternatives will meet the diversity requirements of NFMA and the planning rule.

2. The Forest Service fails to appropriately and consistently use terminology designed to address the old growth issue during Forest Planning

The DEIS introduces new terminology instead of using Region 8 Old Growth Guidance terminology established to guide how the old growth issue is addressed during Plan revisions.[21] This is directly contrary to the explicit direction in the R8 Guidance, which states:

> To minimize confusion, these guidelines use three **terms to be used by national forests when describing old growth**:
>
> Existing Old Growth. Forest stands or patches that meet the age, disturbance, basal area, and tree size criteria described in the operational definitions for the 16 forest community types. A stand or patch must meet all four criteria in order to be classified as existing old growth.
>
> Future Old Growth. Forest stands or patches allocated to old growth through land management decisions, but which do not meet one or more of the old-growth criteria in the operational definitions.
>
> Possible Old Growth. Forest stands identified during the preliminary inventory of old growth because they meet one or more of the preliminary inventory criteria. The areas of possible old growth will be used to help identify areas to consider for old-growth allocation during forest plan alternative development and to establish priorities for areas of old-growth field inventories during project-level planning. The identification of a stand as possible old growth infers no land management decision regarding the stand's status as existing or future old growth.

R8 Guidance at 7-8 (emphasis added). The R8 Old Growth team spent a lot of time and effort creating precise terms to use when providing for old growth in Forest Plans. The terms used in the DEIS are ambiguous and overlapping, making it difficult to determine what the Draft Plan and DEIS is referring to. The DEIS often does not even use the terms it presents in the DEIS and refers simply to "old growth" making it unclear what is being referred to. Other times the DEIS uses R8 old growth terminology in inappropriate ways. This creates a very confused and confusing discussion in Section 3.3.3 of the DEIS. While we do not attribute bad intent, the DEIS is misleading and obscures the Draft Plan's failure to meet very basic requirements of the Planning Rule.

[21] Guidance for Conserving and Restoring Old-Growth Forest Communities on National Forests In the Southern Region (June 1997) (hereinafter "R8 Old Growth Guidance").

The definition of "current old growth" suggests an equivalence with "existing old growth" in R8 old growth terminology. However, if the terms are equivalent, using a new and undefined term invites confusion. "**Current old growth**" is defined as "the term used to describe forests that currently contain the old growth characteristics described below." However, the characteristics listed in the DEIS are general and subjective. These subjective characteristics could not be used to objectively identify old growth patches through inventories. In contrast "**existing old growth**" is defined in R8 Old Growth Guidance as: "Forest stands or patches that meet the age, disturbance, basal area, and tree size criteria described in the operational definitions for the forest community types. A stand or patch must meet all four criteria in order to be classified as old growth." The criteria listed by forest community type are field operational and objective in contrast to those listed for "current old growth." These objective criteria **must** be used in the plan to define which areas do and do not qualify for old growth: "The forest plans will use the summaries of the scientific definitions of old-growth forest community types contained within this guidance to help formulate the DFC statements related to old-growth areas." R8 Guidance at 15.

In addition, the "current old growth" definition specifies that forests "**currently** contain the old growth characteristic listed" (emphasis added). This implies that the term only applies in the current time as opposed to existing old growth that applies at any point in time where the specified criteria are applied in an inventory. This is highly problematic. Existing old growth is a useful concept not only for current time but for future time, particularly during implementation of the Plan when the issue of what stands actually meet existing old growth criteria is relevant for monitoring, protection of existing old growth in some alternatives, and many other issues. The R8 Guidance does not instruct Forests to include plan components to address "current" old growth; it requires plan components to "provide direction regarding the management of small-sized, **existing** old growth stands when found." R8 Guidance at 17 (emphasis added); see also id. at 19 (stating that "forest plans should provide directions regarding existing and future old growth which occurs in small patches").

"Potential old growth" used in the DEIS also introduces ambiguity and overlap with other terms, turning what was clear terminology in R8 Old Growth Guidance into unclear and overlapping concepts that confuses the old growth discussion in the DEIS. "**Potential old growth**" is defined as "…those forests, independent of their current management, that have the potential to develop old growth characteristics. Generally, these forests are exhibiting characteristics that indicated progression toward old growth, but they may or may not be in the designated old growth network. These forests are sometimes called future old growth." It is unclear how forest that "[has] the potential to develop old growth characteristics" would be determined "independent of their current management". "Potential old growth" is a vague term that cannot be identified through mapping or other means. Conflating this concept with "future" old growth, which is well defined, creates more confusion. Future old growth, as noted below, are areas for which a *decision* has been made to manage the area as old growth. "Potential" old growth as defined in the DEIS is not the same as future old growth, because it may or may not be allocated to old growth management.

In contrast "**Future Old Growth**" in R8 Old Growth Guidance is defined as "Forest stands or patches allocated to old growth through land management decisions, but which do not meet one or more of the old-growth criteria in the operational definitions." This definition is not only relatively precise, it is also mapable. R8 Guidance makes clear that existing old growth can fall within future old growth. Again, the important difference here is that a patch becomes "future" old growth when there has been a *decision* made to manage it as old growth. The Forest Service cannot rely on acres to meet "future" old growth requirements unless it has allocated them to old growth management. This is the fundamental problem with the "Old Growth Trending Landscape," discussed further below.

The "**Designated old growth network**" used in the DEIS is mapable, but this category includes only a subset of "potential" old growth. The designated patch network includes the only acreage that counts as "future" old growth, because these are the only areas allocated to old growth management. What is actually included in the old growth network in different alternatives also makes little sense. For example, some areas recommended for wilderness in some alternatives are not included in the designated old growth network in those alternatives while existing designated wilderness and some recommended wilderness is included in the old growth network. The R8 Guidance is clear that wilderness areas and other similar areas are logical additions to the future old growth network. In allocating large patches,

> [N]ational forests should first include all congressionally and administratively designated lands not available for timber production (e.g., wildernesses, wild and scenic rivers, research natural areas) and lands currently classified as unsuitable for timber production within an ecological section.

R8 Guidance at 19.

"**Old growth trending landscape**" used in the DEIS is also vague. It confuses scale issues by referring to "old growth characteristics" that are only relevant and defined at the stand level. If active management is conducted within Management Areas, e.g. ecological interest area ("EIA"), or Appalachian Trail ("AT"), or Backcountry that regenerates forest, why should these areas still be considered part of the old growth trending landscape? The R8 Guidance requires that areas relied on to meet old growth restoration goals in the future must be part of the future old growth network, meaning that they have been "allocated to old growth through land management decisions." Allocation decisions are critical to ensure that the area is actually managed as old growth. The Forests cannot simultaneously claim that an area will be old growth if it is not making a decision to manage the area as old growth, and is instead reserving the option to regenerate stands to create young forest.

This category doesn't account for management within these Management Areas or for natural disturbance. It is clear that the NRV model predicts that a significant portion of the Old growth trending landscape (about 50%) would not meet existing old growth criteria under NRV conditions. Natural disturbance is ongoing and increasing due to climate stressors. Yet this is not accounted for in this definition nor in the DEIS (e.g. in Fig. 51). What the Forest Service really means here is *not* that this landscape is *trending toward old growth* conditions as defined by

Region 8; rather, it is *trending toward NRV*, which means that fewer than all the acres will be in old growth condition at a given time. This would be a much better description—lands that are trending toward NRV with restoration of primarily natural disturbance processes. It cannot be used, however, to show that we will somehow have "too much" old growth.

If the Forest Service had intended to confuse terms that have been clearly defined since 1997, they could not have done a better job. This terminology violates R8 Guidance and confuses one of the most important issues for planning rather than providing clear analysis to inform the public and the decisionmaker.

3. These confusing terms, plus incorrect and misleading model comparisons, generate confusion around the old growth network

The DEIS states:

> The designated old growth network would provide a portion of future old growth. However, the forest is continuing to age outside of the designated old growth network as well. Overall, the potential for old growth, based on minimum age criteria for individual ecozones, will increase dramatically as the forest ages over the next 50 years. Forest Service data shows that in the absence of further active management, old growth will increase from approximately 96,000 acres in 2017 to 160,000 acres in 10 years to more than 699,000 acres in 50 years. As shown in Figure 121 (below), the amount of older forest conditions would likely be more than 80% of the Nantahala & Pisgah NFs over the long term under the current plan, which would exceed the percent desired by the modeled Natural Range of Variation (NRV).

DEIS at 340 (bottom of page). This analysis is clearly based on the faulty Spectrum analysis outputs compared to NRV. As pointed out in discussions above, the disturbance levels and the faulty methodology used in Spectrum compared to the NRV model make these comparisons invalid. The fallacious conclusions from this invalid comparison are in full display in Fig 116, which shows old growth predictions under current management. DEIS at 341. The level of old growth is approaching the entire acreage of the Forest even with the current levels of active management. The levels of "old forest" (imprecise and ambiguous term) shown for the NRV model are only in these positions because of significant natural disturbance built into this model as regeneration (or young forest S-class). Spectrum model predictions for Alternative A approach 900,000+ acres only because it has practically no natural disturbance built into the Spectrum model.

This discussion also reveals another false assumption. In both Spectrum and the NRV model, old growth is assumed to be reached at the minimum old growth age. This is an understandable assumption to use in the models to simplify the analysis. However, this oversimplification should be acknowledged and accounted for because it grossly overestimates the existing old growth that is likely to be found in the future. Minimum old growth age is only one of the existing old

growth criteria enumerated in R8 OG Guidance. The plain reading of the criteria in R8 Old Growth Guidance as well as a couple of decades of application of these criteria to real forest stands makes it clear that forest stands are very unlikely to meet R8 criteria at the minimum old growth age. Spectrum model outputs, if properly constructed, would give a ceiling of old growth condition, not a predicted level. True old growth conditions are likely to take decades if not centuries past the minimum old growth age.

The Forests are using a fundamentally different approach to restoring old growth than the one required by Region 8 Guidance. The Forests are approaching the landscape as if it were a regulated forest in which levels of harvest are calibrated to ensure balanced age classes, except that instead of using concepts like CMAI, the "right" balance of age classes is defined by reference to NRV. In effect, the Forests have said, if we don't cut too much, we'll have plenty of old growth. This is not consistent with the R8 Guidance. Region 8 requires a spatially explicit approach to restoring old growth, prioritizing existing old growth and the best examples of potential old growth for inclusion in a patch network that will be deliberately managed as old growth. It is not enough to set harvest levels and hope for the best.

The concerns that are motivating the Forest Service's approach here are real, but they are remote. Agency NEPA documents, at the project level and now in the DEIS, cite levels of older and aging forests as reasons not to protect existing old growth or to identify an adequate patch network. We understand the concern. The forest is aging. In many many years, when old growth is restored, sooner for some ecozones than others, we may not need the patch network as a restoration strategy anymore. We can imagine that, at that time, agency policy may be updated to remove the requirement that restoring old growth means allocation of existing or potential old growth to spatially explicit patches with specific management direction. Perhaps old growth will then be common enough that it can be part of a regulated harvest program, with standards and guidelines only as needed to protect unique biological values. But we are nowhere near that future yet. For now, the R8 Guidance still applies, and the Forests cannot just ignore it.

4. The Forest Service uses model assumptions and information arbitrarily

The DEIS uses arbitrarily low estimates of natural disturbance and model outputs to create false narratives counter to how assumptions are used in the models. The Spectrum model is highly unrealistic, having incorporated almost no natural disturbance and using the small amount it does incorporate in a way that minimizes its effects. The NRV model, on the other hand has substantial amounts of natural disturbance (5.7% – 8.6%) that is considered regeneration (taking the forest to age zero). We covered in sections above how the comparison of these models is invalid.

It's not surprising that we see this false conclusion in the DEIS:

> Also, the revised plan considers that the current amount of old growth is underrepresented for ecozones compared with the NRV, however, an extensive amount of the forest is trending toward old growth conditions both inside and

> outside the designated network. For example, currently all ecozones are trending toward older age classes and acquiring old growth characteristics and vary in the rate of achieving the desired conditions for old growth after 50 years assuming no further active management. The driest types, the pines and dry oak, and a few of the high elevation mesic types, northern hardwoods and spruce-fir, are close to desired conditions after 10 years. In contrast, most of the more mesic types, representing 70% of the Nantahala & Pisgah NFs, are moving slower toward desired conditions with all achieving these by 50 years. (See Figure 123; this should be Fig 118.)

DEIS at 342-43. The NRV levels for different forest structure depend on the substantial natural disturbance built into the NRV model. By not incorporating natural disturbance realistically in the Spectrum model, the DEIS seems to be trying to argue that natural disturbance in the future is different than natural disturbance in the past (and in the NRV model). To be clear, the NRV model has NRV levels of old growth (about 50%) precisely because of the substantial natural disturbance built into the model. If there were no natural disturbance, old growth levels would be at 100% in the NRV model. The whole point of NRV modeling is to understand the effect of natural disturbance processes over long periods of time. Remarkably, not only the DEIS but the Draft Plan seem to try to make the argument that natural disturbance in the future should be considered a natural part of old growth structure:

The Draft Plan identifies a desired condition that old growth characteristics shift over time and disturbances are a natural part of the system (ECO-DC-20). Should a disturbance occur such that a designated patch is returned to an earlier seral stage, that patch need not be replaced. Draft Plan at 68-69.

It's interesting that this desired condition in the Plan recognizes the role played by natural disturbances in the context of old growth. However, this natural disturbance was not adequately modeled in Spectrum so that the Spectrum outputs would reflect natural disturbance. This disturbance was built into the NRV model. Both the DEIS and the Draft Plan treat natural disturbance in an incoherent, arbitrary, and unjustified manner that doesn't comport with BASI.

5. The Forest Service confuses scale in disclosing and analyzing old growth issues

The DEIS goes into a fair amount of detail discussing scale issues related to old growth. The discussion of Scale and Continuity on pages 345-346 of the DEIS would be appropriate if the DEIS were clear on what scales were being discussed in different sections of the DEIS and if care had been taken in applying and comparing models at appropriate scales. However, after building an NRV model that incorporates substantial natural disturbance and a Spectrum model with effectively no natural disturbance, the scale discussion seems like window dressing on models that agency staff surely realize are faulty.

The DEIS cites recent publications that use the concept of "minimum dynamic area":

> [M]inimum dynamic area … defined as the smallest area with a natural disturbance regime, which maintains internal recolonization, and minimizes extinction" (Pickett and Thompson 1978). In large patches it is possible to incorporate whole watersheds, a greater diversity of topographic continuity, a greater diversity of ecozones, and unique habitats which provide greater environmental and species diversity. As such, larger landscapes that do not currently demonstrate old growth characteristics have a high potential for restoration and should be valuable for future old growth.

DEIS at 345-46. The DEIS goes on to argue that:

> Lands that are designated in management areas where natural processes would prevail have a high potential for recovery of old growth characteristics, regardless of whether they reside in the designated old growth network. In this analysis, these lands are analyzed as patches called "Old Growth Trending" and described in detail below. Also, lands in other ownerships (beyond the borders of the Nantahala and Pisgah NFs) that are managed where natural processes would likely prevail are also evaluated for contributing to larger patches of potential old growth and called "All Lands." DEIS at 346.

This argument runs into the R8 Guidance's requirement that future old growth requires an allocation and a *decision* to manage it as such—not just wishes and hopes. Furthermore, the Forests *know* that these areas, even if they are left alone, will not be trending toward 100% old growth; they will be trending toward NRV, or about 50% old growth. The NRV model was developed based on assumptions of very substantial levels of natural disturbance within the large landscape specifically covered by this "old growth trending landscape." The NRV model covers *"… a size large enough to incorporate the 18 county area surrounding the Nantahala and Pisgah NFs. The size was large enough to be statistically significant based on the accuracy of the data for the disturbance frequencies."*[22] This area covered not only Nantahala-Pisgah but adjacent lands in this 18 county area. The "old growth trending landscape" is within this larger landscape that the NRV model predicted would have only a 50% component of old growth under NRV conditions.

The DEIS argues that the NRV model, with substantial natural disturbance, should set a desired level of old growth for the Forest, but the Spectrum model, with almost no natural disturbance, should predict future levels of old growth. This DEIS section on "scale" tries to sell the outrageous assumption that goes along with this that natural disturbance should not be considered because it's a natural part of an "old growth trending landscape." That assumption would have been valid if it had also been the assumption in developing the NRV model. It was not. The Forests cannot have it both ways, decreasing the NRV baseline for old growth by

[22] Att. 2, NRV Process Paper, *supra* note 5.

subtracting natural disturbance, then failing to subtract natural disturbance when comparing predicted future conditions.

This section of the DEIS also makes the argument that old growth characteristics are best considered at the landscape scale. However, "old growth characteristics" are defined in R8 Old Growth guidance as stand level characteristics (or criteria) for existing old growth, not landscape characteristics.[23] It is clear from the results of the NRV model (DEIS Fig 51 on page 164) that much of the Forest (approximately 50% depending on ecozone) would not be expected to have old growth characteristics at the stand or patch level.

The lack of adherence to scale consistency and applying reference to "old growth characteristics" at the landscape scale casts suspicion on the statement: "In this analysis, an indicator presents the percent increase or decrease of designated larger old growth patches compared with the current level." DEIS at 346.

This indicator tries to apply old growth characteristics at the wrong scale and uses invalid model comparisons to derive this indicator. If Spectrum actually built in realistic natural disturbance comparable to the NRV model, a landscape indicator might make sense. But the analysis of the Old Growth Designated Network and the Old Growth Trending Landscape using these indicators makes little sense because of its poor adherence to scale-dependent issues.

This muddling of scale issues becomes more apparent as this analysis is rolled out. Under **Indicator measures** the DEIS states:

> This analysis assumes that limited active management activities may occur in some of the Old Growth Trending management areas, however, it is assumed the activities would be isolated, small scale, and would mimic natural disturbances as much as possible. For example, a stand of white pine may be removed to restore composition in a dry mesic oak ecozone. However, the prevailing disturbance regime would be from natural events.

DEIS at 347. This assumption might be appropriate if Spectrum dealt with the various scales of old growth in a consistent manner. It does not. First, future natural disturbance dynamics at the stand level are ignored and then this output is compared to the NRV model where these natural disturbances (at all scales) are well represented. In the assumption above, the DEIS jumps to trying to address old growth at the landscape scale and essentially suggests that all small disturbances both natural and man-made should be ignored. With consistent models and assumptions, a discussion of landscape-scale old growth restoration issues would be welcome. Here, however, the models on which the analysis are based are wildly inconsistent with respect to scale. As a result, a landscape-scale discussion that conveniently ignores the defects in the

[23] R8 Old Growth Guidance.

Spectrum model is just covering up an egregious mistake. Spectrum should be able to deal with disturbances – both natural and management driven. Natural disturbances similar to those in the NRV model could be built into Spectrum. Projected management activities within Management Areas considered "old growth trending" could also be built into the alternatives to give realistic indicators that would allow comparison of alternatives. It is baffling that natural disturbances are acknowledged at the landscape scale (as a natural component of old growth), but these natural disturbances were not incorporated into Spectrum so that comparisons with the NRV model would be appropriate.

The DEIS again confuses scale issues in trying to document acreage in the old growth network and comparing alternatives on pages 348-350. The DEIS states: "The Designated OG Network identifies lands where old growth characteristics are developing for future high-quality old growth." DEIS at 348.

The Designated Old Growth Network is a broad-scale allocation, which is not the same scale at which old growth characteristics are defined in R8 Old Growth Guidance (or in the DEIS). The DEIS tells us that the Network will have "future high-quality old growth," but it it doesn't tell us what that means. This term is undefined and would not be related to the "future old growth" defined in R8 Old Growth Guidance. R8 Future Old Growth is a designation of management consistent with development of old growth characteristics at the scale of large, medium, and small patches. The "quality" of that old growth is only defined by inventory of a stand within the "designated old growth network" using the R8 Old Growth criteria. These steps would not happen at the landscape scale. Furthermore, the NRV model predicts (and a valid Spectrum model would predict) that only a portion of the forest within the designated old growth network will be in old growth condition meeting criteria for existing old growth. The acreages and percentages in Table 94 reflect what would be in the "designated old growth network" under different alternatives, but they do not accurately reflect the acreage "where old growth characteristics are developing for future high-quality old growth." These acreages fail to account for natural disturbance as well as management driven actions that would take stand conditions away from old growth characteristics - at least for the short term. In addition to being ambiguous because it fails to use well-defined terminology, Table 94 is highly misleading in its implication that *all* acreage within the designated old growth network will age over time into "high quality future old growth" having old growth characteristics, which is a meaningless and misleading reference generally and in reference to the alternative comparisons.

The DEIS also confuses scales and uses inaccurate terminology in discussing "Old Growth Trending Landscapes" on pages 350 – 358. The DEIS states: "Old Growth Trending (OGT) landscapes are broader than the Designated OG Network but have high potential of accruing old growth characteristics in the foreseeable future." DEIS at 350.

As pointed out above, the phrase "old growth characteristics," as defined by R8 Guidance, has no meaning at the scale of "old growth trending landscapes." Examination of old growth characteristics would never occur at the landscape scale, and it is meaningless to talk about a landscape meeting old growth characteristics that have to be determined on a site-by-site basis –

if a comprehensive old growth inventory could be conducted across this landscape, some stands could meet existing old growth characteristics and many would not. Which stands would have existing old growth characteristics at a given time would change over time.

The acreages and percentages within Table 95 are incorrect and misleading for the same reasons as Table 94. Table 95 is correct only in the limited sense that it accurately depicts acreages within the "old growth trending landscape" as defined in the DEIS. It is not an accurate representation of acreage with "old growth characteristics." These acreages fail to account for natural disturbances and management activities that would alter old growth characteristics when evaluated at the appropriate scale for addressing old growth characteristics – the stand level. The DEIS seems to hedge by presenting these areas as having "high potential of accruing old growth characteristics in the foreseeable future." Stands within OGT landscapes probably do have a higher potential of accruing old growth characteristics than lands in intensive timber management. But that characterization begs the question of how much of the OGT landscapes would actually develop old growth characteristics over time. The NRV model indicates that this number is about 50% (varying by ecozone), taking into account natural disturbance and ignoring management activities. It is certainly not **all** of the "old growth trending landscape." The comparison of alternatives here is also misleading because it relies on the assumption that **all** of the acreage within the "old growth trending landscape" is developing old growth characteristics.

6. The Forest Service carries false assumptions and misleading model comparisons into its discussion of the effects of timber harvest.

The DEIS continues to rely on the problematic Spectrum model outputs and comparisons to NRV when it discusses the effects of timber harvest. In addition, new assumptions emerge that are totally indefensible. The DEIS states: "Young forest creation requires regular human intervention to sustain the desired conditions over time, *whereas old growth conditions accrue rapidly over time*, because active management is not required." DEIS at 358 (emphasis added).

Old growth conditions do not accrue rapidly over time. This is a bizarre and unsubstantiated claim. The minimum old growth age alone exceeds the age of most stands on the Nantahala-Pisgah National Forest. Meeting just the R8 old growth criteria generally takes much longer than minimum old growth age. Stands with minimum old growth age likely do not have other characteristics in R8 Old Growth Guidance. Stands have often been rejected in USFS old growth inventories for not meeting criteria in the R8 old growth guidance. More subtle old growth characteristics – multiple age classes; diversity of tree and understory species; soil characteristics - likely take much longer to achieve than the simple metric of old growth minimum age, possibly multiples of the minimum age. [24,25] There is evidence that old growth forest provides a genetic

[24] Att. 5, Meier, Albert J. et al., 1996. Biodiversity in the Herbaceous Layer and Salamanders in Appalachian Primary Forests, in EASTERN OLD GROWTH FORESTS, at 40-64. (Mary Byrd Davis, ed. 2016).

reservoir;[26] tree genetic diversity is reduced in harvested old growth stands, and it is unknown how long this diversity would take to recover. [27] Perhaps the DEIS is generalizing from the fact that much of the Forest is "mature" and, according to Spectrum, much of the Forest will reach minimum old growth age within 50 years. However, even under this scenario, the statement above is false and misleading.

As has been stressed in these comments, there are tradeoffs between young forest and old growth. These tradeoffs are concealed by an inaccurate and misleading Spectrum analysis. The closest the DEIS comes to accurately disclosing these tradeoffs occurs in the section of the DEIS discussing project level old growth. The DEIS states:

> The existing condition of the forest further exacerbates the controversy, because both young forests and old growth are currently underrepresented on the Forests. Due to the advancing age of many forest stands, creating young forest would likely affect the late and older serial forest stands. One observation is that in the next fifty years more than half of the forest will be at the old growth successional age, even with meeting objectives for young forest (Figure 117). Conversely, since existing old growth is rare, and if a forest stand would meet criteria for old growth conditions, then should it be kept as old growth until the remainder of the forest gets to older forest age? Some believe that because of old growth's current rarity on the forest, any existing old growth conditions should be retained.

DEIS at 358. This disclosure in the DEIS is somewhat informative and helpful. It does accurately and candidly disclose the tradeoff between young forest and old growth: "Due to the advancing age of many forest stands, creating young forest would likely affect the late and older serial forest stands." However, the claim that "in the next fifty years more than half of the forest will be at the old growth successional age, even with meeting objectives for young forest" is misleading. That is what Spectrum predicts, but this is only true when Spectrum is set to very low levels of natural disturbance inconsistent with the NRV model.

The conclusions in this section of the DEIS on Project Level Action on old growth return again and again to inaccurate and misleading comparisons between Spectrum model outputs and NRV model outputs. The DEIS states:

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[25] Att. 6, Fahey, Timothy J., Belowground Ecology and Dynamics in Eastern Old-Growth Forests, in ECOLOGY AND RECOVERY OF EASTERN OLD-GROWTH FORESTS (Andrew W. Barton and William S. Keeton, eds. 2018).

[26] Att. 7, Mosseler, A. et al. *Old-growth red spruce forests as reservoirs of genetic diversity and reproductive fitness*, Theoretical and Applied Genetics 106(5): 931-7 (2003).

[27] Att. 8, Buchert, George P. et al., *Effects of Harvesting on Genetic Diversity in Old-Growth Eastern White Pine in Ontario, Canada*, Conservation Biology 11(3): 747-758 (1997).

> Under all forest plan alternatives, the forests are aging rapidly into the old growth successional classes and toward the desired condition range of 435,800 to 562,000 acres of forest in old growth condition with a net annual gain of older forests. While the Designated OG Network emphasizes the development of high-quality old growth as a primary goal, there is an additional proportion of the Forests that is aging rapidly toward old forest conditions. Across the Forests, old growth conditions would be expected to reach the desired condition within 75 to 100 years. Based on Spectrum modeling, all the ecozones will reach the desired conditions in 50 to 75 years under Tier 1 objectives, while it will take 75 to 100 years with Tier 2 objectives. As a result of overshooting the desired amount of the forest in the desired condition range for old growth conditions, in 75 to 100 years other age classes of the forest, including young and middle age forest, will become further departed from their modeled NRV.

DEIS at 364. These conclusions again illustrate the problematic assumptions, faulty methodology, and false comparisons made in the DEIS. These problems are so pervasive that it is hard to see how *any* of the DEIS analysis related to terrestrial ecosystems and biological diversity can survive scrutiny. The above conclusions and documentation are impossible, but they are reported as true because Spectrum model outputs with almost nonexistent levels of natural disturbance are compared with NRV outputs with very substantial natural disturbance. These are not valid comparisons representing best available science. The tradeoffs disclosed in the cited section above would be a much greater tradeoff for old growth in *all* alternatives if valid model comparisons were made.

7. The Forest Service makes invalid conclusions regarding cumulative effects.

The DEIS conducts a cursory analysis on all lands to draw cumulative effects conclusions. The cumulative effects analysis is ridden with the same false assumptions, reliance on the faulty Spectrum model, and invalid comparisons to the NRV model to make sweeping conclusions that are false. The DEIS states: "Discussed above, under all forest plan alternatives, the Nantahala and Pisgah NFs are aging into the old growth successional classes, and the forest would be expected to reach old growth desired conditions." DEIS at 365.

As detailed throughout these comments, the comparison of Spectrum outputs with NRV outputs leads to the false conclusion that all alternatives will result in an overabundance of old growth. The Spectrum model is skewed by false assumptions and faulty methodology. The inappropriate mixing of scales in old growth analysis also leads to equating the designated old growth network, the old growth trending landscape, and the broader all lands analysis with forest with acres of "old growth characteristics." A valid comparison of models would almost certainly not result in all alternatives reaching old growth desired conditions.

8. The Forest Service fails to use best available scientific information.

We have detailed in these comments the extensive problems in the Spectrum model. Why does this matter? Much of the analysis in the DEIS depends on comparisons of Spectrum model outputs to NRV model outputs. Analysis of old growth issues, species viability issues, habitat issues, ecological sustainability issues, and most other issues analyzed in the DEIS all depend on these comparisons. Because one of the models itself is deeply flawed (or, perhaps more accurately, because both of the models are flawed in different ways that create internal incoherence in the analysis), the results of the environmental analysis cannot be relied on. By neglecting the effects of natural disturbance, Spectrum grossly overestimates old growth and underestimates young forest in the future when compared to the NRV model. Spectrum predicts an overabundance of old growth under all alternatives and all tiers of management, but this is only because of the skewed model comparisons. Fair model comparisons would tell a very different story. The false narrative in the DEIS builds a case for less protection of known, inventoried old growth and less need to protect priority conservation areas like State Natural Areas and Wilderness Inventory Areas. The DEIS also uses the skewed Spectrum predictions of too much old growth and old growth habitat, regardless of the amount of timber harvest and active management, to create a narrative that more areas, including priority conservation areas, should be scheduled for timber harvest to restore young forest.

This is a false conclusion that depends on unsupported assumptions and faulty methodology. The Planning Rule and its directives lay out requirements for how environmental analysis is performed. One of these requirements is to use "Best Available Scientific Information" ("BASI"). 36 C.F.R. § 219.3. These requirements specify that data and methodology used in environmental analysis must be accurate, reliable, and relevant. FSH 1909.12, Sec. 7.12. A critical aspect of reliability is the proper use of the scientific method and for results to be consistent with scientific principles. "Reliability reflects how appropriately the scientific methods have been applied and *how consistent the resulting information is with established scientific principles*. *Id.* (emphasis added). Making assumptions about future natural disturbance that ignore the presence of recent and ongoing natural disturbance, including major storms, landslides, insect infestations, diseases, and ongoing wildfire, is counter to best available science. Using methodology in one model that minimizes the effects of natural disturbance (Spectrum) while comparing it to a model that exaggerates the effects of natural disturbance (NRV) is not best available science.

Based on these errors, the Forest Service simply cannot justify the proposed pace and scale of active management using the analysis in the DEIS. In order to reach a defensible conclusion, the Forest Service must first re-run the Spectrum models with realistic levels of natural disturbance. To the extent that there is a range of uncertainty about how much natural disturbance has been occurring and will occur, the Forest Service should use *both* ends of the range and disclose the corresponding range of Spectrum outputs—i.e., the ceiling on regeneration harvest corresponding to lower and higher levels of natural disturbance. Then, to the extent that Tier 2 objectives for "structural restoration" exceed this *lower* ceiling, the Forest Service must commit

to monitoring and adaptive management that can respond to increased scale or frequency of natural disturbance in excess of the model's assumptions.

We also strongly recommend that the Forest Service adopt the recommendations of the Partnership. Those recommendations include land allocations and an old growth patch network that can assure progress toward restoration of old growth consistent with the Region 8 Guidelines. They also provide a framework for balancing the proportions of structural and compositional restoration. An emphasis on actively restoring species composition may justify "extra" young forest creation even at levels beyond what would otherwise be needed, in combination with natural disturbance, to meet NRV in the long term.

To be clear, under the cohesive framework recommended by the Partnership (but not independently of it), we believe there is a potential to provide higher levels of timber harvest during this planning cycle to arrest declines of ESH associate species without needing to wait for stochastic disturbance events that are likely to provide additional habitat, on average, in the longer term.

However, as discussed elsewhere in these comments, the Forest Service *must* consider the possible tradeoffs between higher levels of harvest, which could restore NRV levels of young forest in the short term, and lower levels of harvest, which as part of a NFS-wide strategy to maximize carbon storage might help to mitigate climate change and protect ecological integrity and resilience in the longer term. While it may not change the immediate decision in the Plan, this analysis is critical to anticipate both the effects of local decisions and NFS-wide decisions on ecological integrity.

IV. Old Growth

Because of the defects in the Spectrum model, the Forest Service simply cannot rely on the conclusion that we will have "too much" old growth in the future. This conclusion, at least implicitly, is used in the DEIS to wave away concerns about protection of existing old growth.

The DEIS does offer some helpful comparison between alternatives based on the levels of known, inventoried old growth patches and old growth trending landscapes that would be included in each. One particularly telling observation: Protecting known old growth and old growth trending landscapes is critical to protecting rare and endangered species and unique habitats, and Alternative C is significantly better by that metric. DEIS at 354-55.

The DEIS also provides a meaningful discussion of how the action alternatives would address harvests in existing but "un-designated" old growth. Draft Plan, ECO-S-28, at 70. Under Alternative B, the designated patch network "may be adjusted at the small patch scale to include higher quality existing and future old growth . . . . Existing old growth that is not added to the designated old growth network will be managed consistent with the Management Area where it is found." Alternative B would provide a base patch network of 203,000 acres. Under Alternative C, no new patches may be added to the patch network at the project level. "Existing old growth that is found outside the designated network will be managed consistent with the management area where it is found." Alternative C would provide a patch network of 256,000 acres. And under Alternative D, "existing old growth shall only be added to the designated potential old growth network when its inclusion contributes designated old growth acres to an ecozone, elevation or patch size of old growth that is underrepresented at the forest level and or not redundant within the designated network." Alternative D would provide a base patch network of 226,000 acres.

In comparing these alternatives, an important consideration is the description of how projects would be implemented, with discussions of administrative headaches and potential for conflict. DEIS at 358-64. This is probably the single most helpful discussion in the entire 600 page DEIS. It is very useful for both the public and the decisionmaker. We suggest that the FEIS make an attempt to provide similar discussions around other topics, consistent with the data and analysis we have provided in preceding sections.

Alternative C shines here too, with greater immediate progress toward achieving a representative old growth patch network and greater certainty. The only drawbacks: "not being able to add high quality old growth to the designated OG network could result in controversy," and "under-represented ecozones would likely remain under-represented." DEIS at 363. We agree that these are significant drawbacks. When existing old growth is found at the project level, it should always be an option to add it to the patch network to protect local values for species, or to improve the representativeness, distribution, or connectivity of the network as a whole. Yet we also strongly support the need for certainty about the fate of inventoried old growth. For these reasons, we are supporting the "cap and trade" approach recommended by the Partnership.

To begin with, the Forest Service should include the Alternative C patch network and all Group 3 and Group 4 Management Areas in the designated patch network. These Management Areas include Special Interest Areas, Backcountry, Recommended Wilderness, Wilderness Study Area, Wilderness, Research Natural Areas, and Roan Mountain. These MAs make up the bulk of the old growth trending landscape, but as we explain at length above, the Forests cannot rely on these areas to meet old growth restoration needs unless it has made a decision to do so, allocating them to the patch network. We do not intend this recommendation to change any management direction for these areas. Plan components should clarify that management activities otherwise allowed in these Management Areas are compatible with old growth management in the patch network, including open area management (e.g., maintaining balds). Including these MAs in the patch network would not change management options and therefore would not limit opportunities for timber harvest, but the total size of the patch network would allow for ecozones to be well represented.

When new existing old growth is encountered at the project level, the Forest Service would be authorized to add new acreage to the designated patch network, but in order to so, it would be required to remove other, lower quality acreage from the patch network and move it into Group 1 MAs. This trade would enable the Forest Service to improve the quality of the network by adding high quality patches as they are found, without increasing the total quantity of acres in the network. Criteria for adding old growth would include local benefits to species, ecozone representation, distribution, and connectivity.

This approach provides needed flexibility. Some patches in the current network are not on good ecological trajectories. This is a sore subject. During the first round of entries under the current plan, line officers authorized the harvest of existing old growth in some cases while designating much younger, less healthy stands in the network. The legacy of these unwise decisions lingers in some of the small patches we have today. By adding patches that improve the network and releasing others, we can begin to correct those past mistakes.

To aid in this approach, the Plan should include direction that responsible officials identify whether a stand is old growth during the initial stand exam, using the George Washington National Forest protocols or a collaboratively developed approach here. It’s important that the assessment to identify old growth occur as early as possible. If the Forest Service identifies existing old growth during project development, a good management approach would be to inform collaborative stakeholders, who may have additional capacity to visit other small patches in the same analysis area to determine if there may be smart “trades” to make.

Further, the Plan should clarify that a project-level decision not to add an existing patch to the network would not equate to a decision that the patch should therefore be regenerated. Rather, the decision to not add a patch would mean only that the patch remains available for treatment in the future. The Plan should also clarify that adding a patch to the network does not mean that there is no need for management. For example, in accordance with plan standards, treatment may be prescribed in a newly added patch to maintain or restore the stand’s old growth characteristics or to benefit rare species.

V. All Lands

A forest plan should "reflect[] the unit's expected distinctive roles and contributions to the local area, region, and Nation, and the roles for which the plan area is best suited, considering the Agency's mission, the unit's unique capabilities, *and the resources and management of other lands in the vicinity*." 36 C.F.R. § 219.2(b)(1) (emphasis added). This is known as the "all-lands approach," and it requires the Forest Service to "look across boundaries throughout the assessment, plan development/revision, and monitoring phases of the planning process." Preamble to 2012 Planning Rule, 77 Fed. Reg. 21162, 21173 (Apr. 9, 2012).

In plan revision, the Forest Service is required to "assess the sustainability of social, economic, and ecological systems within the plan area, in the context of the broader landscape," 36 C.F.R. § 219.5(a)(1), and plans must "[d]escribe the plan area's distinctive roles and contributions within the broader landscape." *Id.* § 219.7(f)(ii). Agency regulations define "landscape" as "a defined area irrespective of ownership or other artificial boundaries, such as spatial mosaic of terrestrial and aquatic ecosystems, landforms, and plant communities, repeated in similar form throughout such a defined area." 36 C.F.R. § 219.19. In this way, planning regulations recognize that activities on state and private lands may affect ecological conditions on national forests, both contributing to and causing adverse impacts to Forest resources. Plan components must take into account both "contributions of the plan area to ecological conditions within the broader landscape influenced by the plan area" and "conditions in the broader landscape that may influence the sustainability of resources and ecosystems within the plan area." 36 C.F.R. § 219.8(a)(ii), (iii). The relevant landscape here must be at least as broad as the planning area, including other ownerships in the counties where NPNF lands are located. This is the same landscape used to derive the NRV model that serves as the analytical foundation of the plan.

The Preamble to the 2012 Planning Rule emphasizes that "only this kind of approach can address problems such as maintaining watershed conditions, conserving wide ranging species, and providing for effective transportation and infrastructure on and off" national forest lands. 77 Fed. Reg.at 21179. The purpose of the all-lands approach is twofold: both "to consider conditions beyond the plan area and how they might influence resources within the plan area" and also to consider "how actions on the [National Forest System] might affect resources and communities outside of the plan area." *Id.* As such, the all lands approach is also intended to foster coordination and cooperation with other land owners and entities with control over the lands near National Forests. *Id.* at 21173, 21176, 21178. It requires the Forest Service to carefully consider ecological conditions and connectivity at "multiple temporal and spatial scales," and to consider, among other things, the "ability to restore and maintain desired features or conditions that are scarce in the broader landscape." FSH 1909.12, Sec. 23.11b (providing guidelines for conditions and contributions of the plan area to the broader landscape and vice versa that should be considered during plan revision).

The all lands approach can help "provide focus or context and can aid in developing plan components." FSH 1909.12, Sec. 22.32. As described in the Forest Service Handbook, "[a] plan area may have multiple roles and contributions within the broader landscape," and "[d]esired

conditions and objectives should address all-important roles" for the plan area. *Id.* For example, "[d]esired conditions should be developed with the context of the plan area's distinctive roles and contributions within the broader landscape in mind." *Id.* at Sec. 22.11.

The DEIS includes an "all lands" look at old growth forests, but it conspicuously omits a similar analysis of young forest trends. To fill this gap, we compared young forest creation in the planning area by ownership. This analysis used the Hansen, et al., dataset to determine canopy loss. We then subtracted "forest loss" to other uses, using Land Use Land Cover (LULC) data. This subtraction did not appreciably change the results on public lands, but did differentiate between canopy loss that creates young forest and canopy loss that accompanies development to non-forest land uses. We also ground-truthed the model's spatial results to ensure that modeled young forests were actually young forests on the ground. The results are conservative, and because they reflect annual canopy loss, they exclude all permanent or pre-existing openings that provide similar habitat, such as balds or Graveyard Fields. The results are summarized below:

Owner	(2001-2016) Acres of early successional habitat creation per ownership category in the 18-counties that include Pisgah and Nantahala National Forests																
	Land base (acres)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Private lands/local government		7,384	6,052	5,788	6,823	8,742	8,085	9,957	7,560	4,080	4,597	5,329	6,097	5,551	6,761	7,414	13,523
% of **total** land base (private/local)	Total = 3,336,294	0.22%	0.18%	0.17%	0.20%	0.26%	0.24%	0.30%	0.23%	0.12%	0.14%	0.16%	0.18%	0.17%	0.20%	0.22%	0.41%
% of **forested** land base (private/local)	Forested = 2,434,410	0.30%	0.25%	0.24%	0.28%	0.36%	0.33%	0.41%	0.31%	0.17%	0.19%	0.22%	0.25%	0.23%	0.28%	0.30%	0.56%
US National Park Service		19	16	20	60	36	19	37	103	66	11	13	61	53	26	28	65
% of land base (USNP)	Total = 316,184	0.01%	0.00%	0.01%	0.02%	0.01%	0.01%	0.01%	0.03%	0.02%	0.00%	0.00%	0.02%	0.02%	0.01%	0.01%	0.02%
US Forest Service		363	209	569	354	466	307	4,048	1,017	255	223	666	611	528	649	262	1,496
% of land base (USFS)	Total = 1,037,833	0.04%	0.02%	0.05%	0.03%	0.04%	0.03%	0.39%	0.10%	0.02%	0.02%	0.06%	0.06%	0.05%	0.06%	0.03%	0.14%
State		635	330	158	87	93	38	58	85	34	91	75	56	215	94	110	155
% of land base (State)	Total = 101,128	0.63%	0.33%	0.16%	0.09%	0.09%	0.04%	0.06%	0.08%	0.03%	0.09%	0.07%	0.06%	0.21%	0.09%	0.11%	0.15%

Annual ESH creation on private forest lands averaged 0.293% annually, compared to 0.071% on USFS lands. As noted earlier in these comments, most of the young forest created on USFS lands occurred on "unsuitable" lands and in dry, more fire-prone ecozones. Again, the raw numbers are very conservatively estimated for all ownerships, but these proportions are telling: ESH creation on private lands is happening at more than 4 times the rate of ESH creation on NPNF lands. ESH is being created on state lands at half the rate of private lands and double the rate of National Forest lands (0.143% annually). This comparison to state lands is particularly relevant, given requests from state agency staff asking the Forest Service to quintuple harvest levels on National Forest lands *at a minimum*, far beyond the levels that state land managers have seen fit to provide on their own lands.

With a few exceptions, such as those noted at pages 365-66 of the DEIS, private forest lands are not providing notable levels of old growth or unfragmented interior habitats. Such habitats, unlike young forest, are "scarce in the broader landscape" and should receive special consideration under an all-lands approach. The Forest Service is already aware that the lands in its ownership include areas (the Wilderness Inventory Areas) which are absolutely unique in Western North Carolina for their ability to provide habitat connectivity and resilience to climate change. Since these irreplaceable values are not being provided on private lands, it is arbitrary and capricious for the Forest Service to fail to consider the relative importance of maintaining their connectivity, as opposed to utilizing them for scheduled harvest, in the all-lands context. *See* DEIS at 61.

To be clear, we are not advocating that national forest lands are not important for creating young forest habitat. Young forest is important to many species, including some rare or declining species, at one or more phases of their life cycles. Young forest is also important to maintain populations of demand species, because hunting opportunities are much more limited on private lands. However, this all-lands information must be used to inform the fundamental choice of allocations, as framed by the alternatives. If it is impossible to move toward NRV simultaneously for competing dimensions or scales of ecological integrity, then knowing which value is more scarce on the broader landscape is necessary to rationally choose between them. Fortunately, this is not a zero-sum choice. Alternative C (and the Partnership recommendations) would ensure that the creation of young forest does not undermine the Forests' unique role and responsibility in the all-lands context. The DEIS should fully analyze all-lands trends with the best available information, rather than acknowledging some private lands with old growth and ignoring trends on the vast majority of private lands in the planning area, and it must present the comparison of alternatives in this light.

VI. Failure to Disclose Tradeoffs

With the exceptions discussed in Section II, the Forests did a good job of structuring the alternatives to provide a reasonable range of alternatives without polarizing issues unnecessarily. However, the analysis did not do a good job comparing the effects of these alternatives and showing their tradeoffs as needed to inform the public and support a reasoned decision. See *Baltimore Gas and Elec. Co. v. Nat. Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983) (describing "twin aims" of NEPA). Specifically, the DEIS does not show important differences (both advantages and disadvantages) between Alternatives B, C, and D; nor does it show important differences between Tier 1 and Tier 2 objectives.

A. Tradeoffs Related to Special Interest Areas

The Special Interest Area Management Area ("SIA") was developed to identify discrete areas with special biological, geological, or scenic resources. These values are associated with both NHNAs and WIAs. As a result, SIAs include portions of both NHNAs and WIAs. The Draft Plan deliberately creates the impression in the reader that areas that are special enough to be included in SIAs will be protected *no matter what alternative is chosen*. For example, the DEIS states:

> Not all Natural Areas possess the same degree of unique ecological characteristics and range on a scale from general to exceptional. The Forest Service reviewed the exceptional Natural Heritage Natural Areas that are within the boundary of the Nantahala and Pisgah NFs and identified areas to include in the Special Interest Area management area. As a result of this review, all action alternatives delineate 85 Special Interest Areas (101,000 acres).

DEIS at 231. Elsewhere, the Forest Service states that SIA allocations "are consistent across all alternatives." DEIS at 19. These statements are misleading. The total number and acreage of SIA allocations is also inconsistently reported in the DEIS. At one point, the DEIS states that there are 85 areas with 101,000 acres, and at another point, that there are 91 areas with 101,349 acres. Compare DEIS at xviii with DEIS at 31, Table 1. More importantly, however, the SIA allocations vary significantly between alternatives.

When looking at the Management Area allocations for NHNAs, significant discrepancies are apparent between alternatives. Out of the 71 NHNAs that have a SIA designation for at least a portion of the area, 12 have acreage variations between alternatives, resulting in around 3,800 acres difference between the alternatives.

Table: Special Interest Area Allocation Differences Across Alternatives for NHNAs

NHNA Name	NHNA Rank	Alt B Acreage	Alt C Acreage	Alt D Acreage
Black Mountains/Celo Knob Natural Area	Exceptional	87.21		87.21
Brush Fence Ridge/Point Misery	Exceptional		738.04	740.03

Chunky Gal/Riley Knob	Exceptional	9.19		461.23
HIW/Upper Hiwassee River Aquatic Habitat	Exceptional	14.53		14.53
Linville Falls	Exceptional	51.96		51.96
Linville Gorge	Exceptional	38.61	36.82	38.61
Linville Mountain Dolomite Areas	Exceptional	150.36	68.64	150.36
Nantahala River Wetlands	Exceptional	73.48	57.89	73.48
Pisgah Ridge/Pilot Mountain	Exceptional	2706.36	101.48	2702.76
John Rock/Cedar Rock Mountain	Very High	517.28	40.45	517.28
Fires Creek Gorge	High	12.48		12.48
North Fork Ivy Creek Cove	High			5.67
TOTAL		**3661.46**	**1043.32**	**4855.60**

A similar issue is present regarding differing acres allocated to SIA Management Areas in Wilderness Inventory Areas (WIAs). There are 18 WIAs with SIA allocations; of those 10 have acreage variations between alternatives, resulting in around 3,600 acres difference between the alternatives. At least part of this difference is related to the DEIS's failure to clarify which MA allocation controls when there are overlapping or embedded allocations, which we discuss further below. For example, backcountry is shown in Alternative C as subsuming the embedded SIAs.

Table: Special Interest Area Allocation Differences Across Alternatives for WIAs

WIA Name	Alt B Acreage	Alt C Acreage	Alt D Acreage
Cedar Rock Mountain	501.17		501.17
Cheoah Bald	230.82	230.82	230.82
Chunky Gal Ext B	9.48		462.32
Craggy		742.13	745.55
Daniel Ridge	2720.18	101.73	2711.77
Dobson Knob Ext B	82.41		82.41
Santeetlah Headwaters	985.50	984.94	984.88
Snowbird	5.80	5.9	5.80
Southern Nantahala Ext	15.19		15.19
Tusquitee Bald	8.71		8.71
TOTAL	**4559.26**	**2065.52**	**5748.62**

NHNAs and WIAs comprise 89 total SIA Management Area allocations across the Forest. Of those 89 areas, 22, or almost 25%, have variations of acreage, several having no acreage allocated to a SIA at all in at least one of the alternatives. This is far from the consistency of SIA allocations purported in the DEIS. To fix this issue, SIA allocations should be re-evaluated and allocated consistently across all alternatives.

B. Other Tradeoffs Between Alternatives B, C, and D

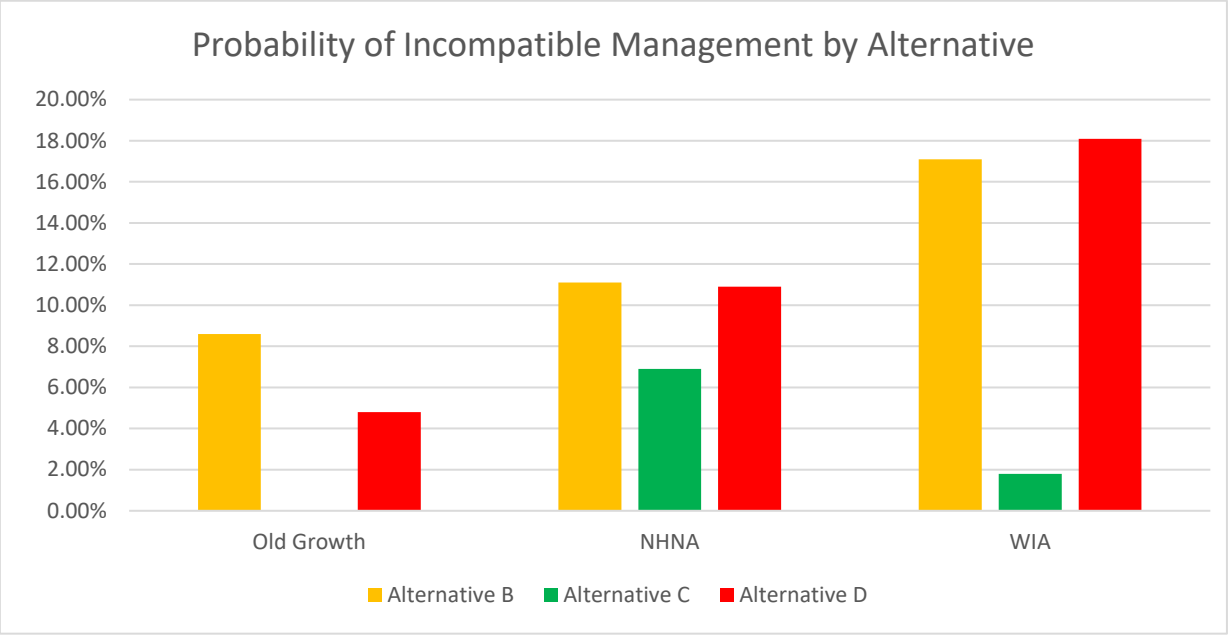
In the DEIS and in conversations with staff, the Forests have explained that the analysis shows few differences between the action alternatives because overall levels of harvest are the same in all of them. This makes sense with respect to impacts that do not differ based on where they occur. It does not make sense with respect to impacts that differ depending on where they occur.

The alternatives do share the same overall objectives, but they differ in terms of where those objectives will be pursued. The differences are particularly important for the spatially explicit conservation priority areas. As noted above, Alternative B would schedule timber production on 53,375 acres of inventoried old growth, 68,765 acres of NHNAs, and 106,000 acres of WIAs. Alternative D would schedule timber production on 29,883 acres of old growth, 67,567 acres of NHNAs, and 112,000 acres of WIAs. Alternative C would schedule timber production on only 34,383 acres of NHNAs and 8,900 acres of WIAs. As a result, Alternatives B and D both have a much greater probability of proposing and implementing management actions that are incompatible with the ecological values represented in the conservation priority areas.

Table: Comparison of Action Alternatives by Probability of Incompatible Rx*

Conservation Priority	Alternative B	Alternative C	Alternative D
Old Growth	8.6%	0	4.8%
SNHA	11.1%	6.9%	10.9%
WIA	17.1%	1.8%	18.1%

* Acres of conservation priority areas in suitable MAs divided by total acres in suitable MAs (621,000 for Alternative B, 496,000 for Alternative C, and 618,000 for Alternative D)



Because the Plan doesn't include components that would prevent these areas from being prescribed for regeneration harvest, the DEIS must assume that they will be prescribed for regeneration at least at the same rate as other suitable acres. Indeed, because these areas are generally older forests, they may actually be *more* likely to be targeted for regeneration. That has certainly been true under the current plan. Further, because the Plan doesn't include components to limit the circumstances or total number of these prescriptions that may be implemented, the DEIS must assume that *all* of them will be implemented. For example, even though the Plan contains a Desired Condition that NHNAs will be managed for their rare values, it does not contain any Standards or Guidelines that would prevent their regeneration to meet landscape-level goals, for example, after merely buffering a rare species occurrence.

As a result, the likelihood of harm to conservation priority areas is much higher for Alternatives B and D than for Alternative C. For example, regeneration harvest (other than regeneration harvest prescribed to meet site-specific restoration needs) would be an astonishing 10 times more likely in WIAs under Alternative D as compared to Alternative C.

Over multiple planning cycles, this likelihood of harm would become a certainty. Assuming that about half of suitable acres will be harvested over the 200-year modeling horizon (which we understand is consistent with the Spectrum model outputs), Alternatives B and D would result in the regeneration of about 15,000 to 27,000 more acres of existing old growth, about 17,000 more acres of NHNAs, and about 50,000 more acres of WIAs, as compared to Alternative C. These are significant differences between the alternatives, and the DEIS entirely fails to acknowledge them.

Of course, as described above at length, these impacts could be reduced at the project level after the public mobilizes to oppose them. And we will play our part in that process, if need be. But the DEIS must analyze the impacts of the plan itself, and cannot depend on the diligence, organization, and determination of conservation groups to stop bad projects from going forward.

Along those lines, the data above suggest that there are major differences between the action alternatives in terms of how likely they are to accomplish Tier 2 levels of harvest. The probability of regeneration harvest being prescribed in conservation priority areas can be thought of as a "conflict score" for each alternative. The greater the conflict score, the greater the per-acre cost of management, and the less overall work that the Forest Service can accomplish at any given budget level. The draft hints at this problem: Estimates of the total acres that would "foreseeably be impacted by commercial timber operations … are programmatic estimates, and site-specific conditions would likely further reduce the land operable for commercial timber harvest operations including local topographic considerations, mitigations necessary for public health and safety, threatened and endangered species, rare ecological communities, cultural resources, scenery, and recreation." Draft Plan at B-4. However, the analysis fails to estimate the level by which these factors would reduce harvest and to compare (even qualitatively) how the reduction would differ by alternative. With a suitable base that includes conservation priority areas, the reduction in harvest at the project level would be greater. With a tighter footprint that excludes conservation priority areas, projects would have less attrition.

Furthermore, these are not merely differences in abstract acreages; they relate to the Forest Service's most important obligations in the Planning Rule—ecological sustainability and biological diversity.

- Old Growth: Existing old growth is very rare in the Southern Appalachians. The DEIS does not disclose the effects of allowing the regeneration of up to 30,000 acres of inventoried, existing old growth in Alternative D and up to 53,000 acres in Alternative B. While these acres "may" be protected at the project level in Alternative B, or in limited circumstances in Alternative D, they may also be regenerated. Conflating the "old age class" with actual old-growth forests, the DEIS obscures this tradeoff with an analysis that shows all alternatives will have "too much" old growth in the future regardless.

- NHNAs: Rare species, especially the vulnerable dispersal-limited species for which the Nantahala and Pisgah National Forests should be their most secure habitats, occur in specific locations, not as probabilities associated with generic ecozones anywhere on the forest. The Natural Heritage Natural Areas are estimated to contain 70% of rare species occurrences on the forest, which should not be surprising given that they were delineated to identify and protect rare species and habitats. Even if rare species occurrences are found by project-level surveys (which is by no means certain) and buffered (also not certain), the integrity of the habitat may nonetheless be degraded and connectivity with other suitable habitat may be impaired by timber harvest and associated road construction. The likelihood of these impacts differs significantly by alternative, but the DEIS does not disclose these differences.

- WIAs: As one of the four dimensions of ecological integrity, connectivity must be maintained or restored by the plan. WIAs provide the greatest intactness of any areas in the Nantahala and Pisgah. Developing these areas for timber production—both harvest activities and the associated road footprint—will fragment intact interior forests, with major differences between alternatives. Function (process) is another of the four dimensions of integrity, and a larger footprint for suitable management will also reduce the fraction of the landscape on which natural disturbances are operating at appropriate scales. Again, this impact varies by alternative.

In addition to the impacts associated with conservation priority areas, the action alternatives also have tradeoffs for other resources because of their different land allocations. For example:

- The mileage and footprint of the forest road network: The future extent of the road network is limited only by MA boundaries. Indeed, in the Matrix and Interface MAs, both total road mileage and open road mileage would increase under the Draft Plan. In order to achieve Tier 2 objectives, levels of annual road construction would double. While the DEIS suggests that road construction levels would be highest in Alternative C, DEIS at 463, the road network would increase proportionally to the suitable base over multiple planning cycles. Given a constant level of harvest across the alternatives, a

larger road network to serve a larger suitable base is less economically efficient than a smaller road network on a smaller suitable base. The Forest Service is already unable to maintain its roads, DEIS at 460, and a less efficient road network means a lower ability, per mile, to perform needed maintenance. The larger the suitable base, the greater the impact to water quality.

- The extent of the road system is also a proxy for the extent of spread of non-native invasive plants. *See* DEIS at 174. No matter how hard we try to control them, non-native invasive species ("NNIS") infestations will spread along road corridors and into harvest units. The alternatives therefore differ with respect to where NNIS infestations will be found in the future.

- Soil: Some areas are at greater risk of base cation depletion as a result of harvest activities. *See* DEIS at 48 (noting that 36% of the forest is in "areas of concern"). The alternatives should be compared to show their relative impacts to these areas. The DEIS dismisses the problem, stating that "the total area of concern is likely to decrease because of additional reductions in sulfur deposition." First, an overall decrease in base cation depletion does not excuse the Forest Service from showing which alternatives would locate more harvest in areas of concern. Second, the prediction that sulfur deposition will decrease is not accurate based on the current administration's policies. The so-called Affordable Clean Energy Rule would actually increase sulfur dioxide (SO_2) emissions in North Carolina and surrounding states.[28]

  Erosion risk also varies considerably by location, based on factors that can be assessed spatially (e.g., soil types and annual precipitation). *See* DEIS at 85-86. The alternatives should also be compared to show their respective risk levels for erosion.

- Species Composition: The DEIS does not adequately disclose the differences between alternatives with respect to species composition. The DEIS explains that the Ecological Interest Area was developed as a Management Area where timber harvest would be used to improve species composition, DEIS at 20, and that compositional restoration does increase structural diversity. *Id.* at 29 (EIA would allow habitat and forest product goals to be met on a "larger footprint"). The DEIS also notes, however, that compositional restoration alone would not be economically viable at scale, and that "structural restoration" (i.e., harvest for timber production and structural benefits) is needed on a suitable land base. *Id.* at 28-29. And, with different acreages dedicated to compositional restoration, the alternatives are set up perfectly to allow a comparison of the economic

[28] Keyes, et al., *The Affordable Clean Energy Rule and the impact of emissions rebound on carbon dioxide and criteria air pollutant emissions*, 14 Envt'l Res. Letters 4 (2019) (available at https://iopscience.iop.org/article/10.1088/1748-9326/aafe25).

and ecological tradeoffs of different levels of compositional restoration emphasis. *Id.* at 20. Yet the analysis stops short, and does not actually provide a comparison of the alternatives based on their respective abilities to restore (or degrade) species composition over time.

- Carbon Storage: Alternatives with different emphases on compositional restoration would also be expected to have different carbon storage benefits. Hardwoods generally store more carbon than softwoods, and mesic sites store more carbon than xeric sites. Compositional restoration would focus on priorities like restoring characteristic hardwoods to sites dominated by white pine or Virginia pine and working in the drier systems where compositional restoration is more needed and more likely to succeed. Structural restoration, in contrast, would much more often occur in more mesic hardwood stands. Acre for acre, the more emphasis on compositional restoration, the greater the carbon storage benefits.

All of these differences, if properly analyzed and disclosed, would point to Alternative C as the superior choice. But these differences are not apparent to the public or the decisionmaker after reading the DEIS.

C. Tradeoffs Between Tier 1 and Tier 2 Objectives

The impacts above differ by alternative at *either* tier; some impacts also differ between Tier 1 and Tier 2. The Forest Service is relying on the tiered structure to show a range of alternatives; as a result, the Forest Service must acknowledge the different impacts of each tier. The DEIS attempts to quantify some of the relevant differences—primarily the effects of different management levels on age classes at the landscape scale and by ecozone. This age-class analysis is also the foundation for the ESE tool analysis.

We have already discussed the problems with those analyses above. To reiterate, the DEIS does not adequately disclose the effects of Tier 1 and Tier 2 objectives on young forest and old growth. If the Forest Service had modeled the combined effects of regeneration harvest, prescribed fire, wildfire, and other natural disturbance events, it likely would have shown that Tier 1 levels of regeneration harvest are capable of restoring NRV levels of young forest, while Tier 2 levels of harvest would overshoot for young forest and impede old growth restoration.

In addition, the DEIS fails to disclose the differences between Tier 1 and Tier 2 for carbon storage. Increasing harvest levels in a forest that has so much potential as a carbon sink is a choice with significant effects that should not be made blindly. The DEIS dismisses the issue, concluding that even Tier 2 levels of harvest would have "negligible" effects on carbon storage. DEIS at 72-73. However, as discussed further elsewhere in these comments, the Nantahala-Pisgah is relatively important among the units of the National Forest System (NFS) as a potential carbon sink. This plan decision may be delegated to the Forest Supervisor, but ultimately it belongs to the Forest Service, which has responsibility for nearly 200 million acres of public lands. While any one unit's role in sequestering carbon may be small, the cumulative impact of

federal public lands management is significant, and the consequences of accelerating climate change are profound.

The agency has the responsibility to weigh the tradeoffs between strategies that would increase carbon storage on the NFS, even if they would cause a short-term loss of habitat benefits, compared to strategies that might provide optimal habitat levels in the short-term but contribute to a cascade of changes that will undermine the ability to provide stable, connected habitats in the future. We do not argue that carbon storage should take priority over NRV requirements. However, each Forest and Grassland has the obligation to disclose its potential role in an agency-wide effort to forestall catastrophic climate changes.

VII. Transition from Tier 1 to Tier 2

Some tradeoffs between Tier 1 and Tier 2 are disclosed in the DEIS, but without a direct acknowledgement that the negative impacts associated with Tier 2 may frustrate other plan objectives or cause violations of law, and without any mechanism to prevent those outcomes. Two examples are instructive:

- The DEIS notes that Tier 2 levels of harvest "would further increase infestations" of NNIS as compared to Tier 1. DEIS at 402. This outcome is directly contrary to the requirements of Executive Order 13112, which prohibits the authorization of any action "likely to cause or promote the introduction or spread of invasive species," except where "pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm." Here, the Draft Plan contains no such determination, nor any guidelines for future projects to weigh site-level risks against landscape-scale needs.

- The road system cannot be maintained at current budget levels. Although the draft contains a Desired Condition that the road system be sustainable, the DEIS acknowledges that the agency cannot meet this obligation unless "new sources of funding [are] identified or required maintenance [is] reduced, either by reducing mileage or reducing existing maintenance levels." DEIS at 460. Yet the rate of the road system's growth would double under Tier 2. DEIS at 463. At the Forests' current maintenance capacity, Tier 2 resource management objectives and the BMPs needed to maintain and restore water quality cannot be part of the same integrated plan.

These are examples of a simple concept: different priorities and objectives within the plan are in tension with each other—i.e., advancing one resource objective may directly interfere with achievement of another resource objective. As another example, the desire to increase trail mileage and recreational opportunities is potentially in tension with the desire to increase the sustainability of the trail network as a whole, because inadequately maintained trails contribute to sedimentation.

At Tier 1 levels, we can be confident that achieving one objective will not undermine another, because we know what we've been able to accomplish at current capacity levels. At Tier 2, however, we cannot be so confident. How far can we advance each goal before potential tensions ripen into goal interference? In order to deal with these kinds of uncertainties, the Forest Service must incorporate adaptive management strategies into the plan. We have called these "triggers" during the planning process, but under Region 8 monitoring guidance, they should instead be called adaptive management "alerts" corresponding to measurable "indicators."

Tiered objectives are a species of adaptive management. Ordinarily, adaptive management uses negative feedback: if an impact is greater than expected, then management would be scaled back. In other words, with traditional adaptive management approaches, we can do less than we hoped, but we can't do more. With tiered objectives, adaptive management creates a positive feedback

mechanism: by demonstrating that growing toward one objective isn't impairing our ability to meet another, management can be scaled up responsibly.

A. Why Adaptive Management Alerts Are Essential to the Use of Tiered Objectives

Adaptive management alerts are integral to the use of tiered objectives for several reasons:

1. Range of alternatives

Without alerts to justify the transition from Tier 1 to Tier 2, the tiered objectives are not actually tiered at all; they are merely single objectives with large ranges. In other words, without alerts, all draft alternative allow up to about 3200 acres per year of regeneration harvest (action alternatives) or up to about 3300 acres per year (no action). The Forest Service, with our support, has been relying on the tiered approach to make sure that it has analyzed a full range of options. Without alerts that clearly mark the transition from Tier 1 to Tier 2, the Forest Service leaves itself open to arguments that its range of alternatives is inadequate.

To be clear, the analytical work has been done, subject to the problems identified elsewhere in these comments, but the *boundary* between the tiers is still missing. The DEIS analyzes the tiers as if they were separate alternatives, but the plan itself does not create any separation between them. When the Plan is signed, it should be two plans in one: a plan based on current capacity, and a plan based on possible future increases in capacity. What separates them? It may be tempting to think the answer is simply "more money," but we know that capacity can increase because of budgets, partner contributions, or the increased efficiencies of a low-conflict plan.[29] It would be unwise to condition our transition to Tier 2 on some level of future funding, because we might not need that funding to get the work done. Instead, we must identify clear measures of success that can alert us when Tier 2 is within our fiscal capability.

2. Fiscal capacity and plan integration

A forest plan must be fiscally realistic. 36 C.F.R. § 219.1(g) ("plan components," including objectives, must be "within … the fiscal capability of the unit"). All forest plan objectives, whether Tier 1 or Tier 2, are subject to the fiscal capability limitation. In addition, a forest plan must be "integrated." An integrated plan is one in which "plan components are internally consistent," such that "[o]ne plan component [does] not directly conflict with another plan component *or prevent its accomplishment*." FSH 1909.12 Sec. 22 (emphasis added).

[29] As noted elsewhere in these comments, there is a big difference between efficient projects and inefficient projects even at current funding levels. If all the Districts worked at the same rate as the Appalachian District did in the Twelve Mile project, the Forests could authorize around 3,500 acres of harvest per year. In contrast, if all the Districts worked at the same rate as the Tusquitee District did in the Buck project, the Forests would be able to authorize only about 480 acres of harvest per year. To be clear, this is the difference between falling short of the lower end of Tier 1 and hitting the high end of Tier 2, with current, actual funding levels.

Tier 2 is clearly is not within the Forests' current fiscal capability. Even if the agency could reach those harvest objectives now, it certainly could not keep pace with the other work needed to meet integrated plan objectives, such as the work needed to protect water and control NNIS.

The tiered objective concept is consistent with these legal requirements only if it includes adaptive management alerts that allow for a move from Tier 1 to Tier 2. By specifying "alerts," we can provide clear thresholds for success—what it means to overcome current fiscal limitations. Fiscal capability doesn't just mean we have the funding to create more young forest habitat or build more trails; it means that we can create more young forest habitat while also preventing the spread of NNIS. It means that we can build more trails while also protecting water quality.

To generalize, additional resources must be distributed appropriately between objectives in tension; otherwise we haven't really transcended our capacity limitations at all. Alerts are essential to show that we have the ability to stretch from one tier to the next. How will the Forest Service know whether moving to Tier 2 for one resource will not prevent the accomplishment of other related resource objectives in light of capacity limitations? Indicators and alerts corresponding to the other resource objectives can answer that question.

3. Effects analysis and other requirements of law

Tiered objectives were intended, among other things, to facilitate NEPA compliance—providing an analytical basis for increasing outputs without need of a plan amendment or supplemental analysis. This works only if we use alerts to demonstrate that additional resources have been distributed appropriately between objectives that are in direct tension. In other words, alerts are needed to show that those tensions have been mitigated, so that one resource is not moving away from desired conditions while another moves ahead.

During the NEPA analysis for an integrated plan, the Forest must assume that all its objectives will be met. It must also be able to rationally conclude that the plan's effects will comply with other laws. For example, the NEPA analysis must assume that NNIS control objectives are being met at the same time as harvest objectives. If the Forest Service were to devote additional capacity to timber harvest but did not increase resources for NNIS control commensurately, then the DEIS prediction about levels of NNIS spread would be undermined. Thus, without alerts showing that NNIS prevention and treatment levels are being achieved, Tier 2 levels of timber harvest would require additional analysis of the extent of NNIS spread in order to meet NEPA requirements, defeating a main purpose of including the Tier 2 objectives in the plan.

Alerts are therefore a necessity for integrated planning, but for the same reasons they are also a necessity to safeguard the future reliability of the plan EIS, on which all future project-level analyses will rely. Moreover, to the extent the Forest Service is relying on the plan EIS to support a conclusion that the plan and future projects will comply with other laws, like the Executive Order on NNIS, alerts provide a mechanism to ensure that such reliance is not arbitrary and capricious.

4. Collaboration

The need for alerts is more acute where the plan is well balanced and ambitious, as the Forests intended in this draft. It would be much easier to avoid tensions and uncertainties in a lopsided plan. For example, if an alternative emphasized NNIS control but held timber harvest at low levels, there would be little chance of tension between those objectives. Likewise, if the plan were balanced but unambitious, goal interference would be unlikely. On the other hand, balanced alternatives that attempt to achieve the greatest possible progress for many different resource objectives are more likely to encounter goal interference, especially where capacity is limited. Well-calibrated alerts are most likely to be needed, as here, where the Forest Service is attempting to integrate a higher level of outputs in a balanced plan.

Finally, adaptive management alerts support collaborative planning. Without clear alerts in the plan, stakeholders who care about the spread of NNIS would likely feel the need to oppose objectives that create a higher risk of spread. On the other hand, indicators and alerts can give stakeholders the freedom to support more ambitious objectives, because objectives will be scaled up carefully.

B. When Adaptive Management Alerts Are Needed

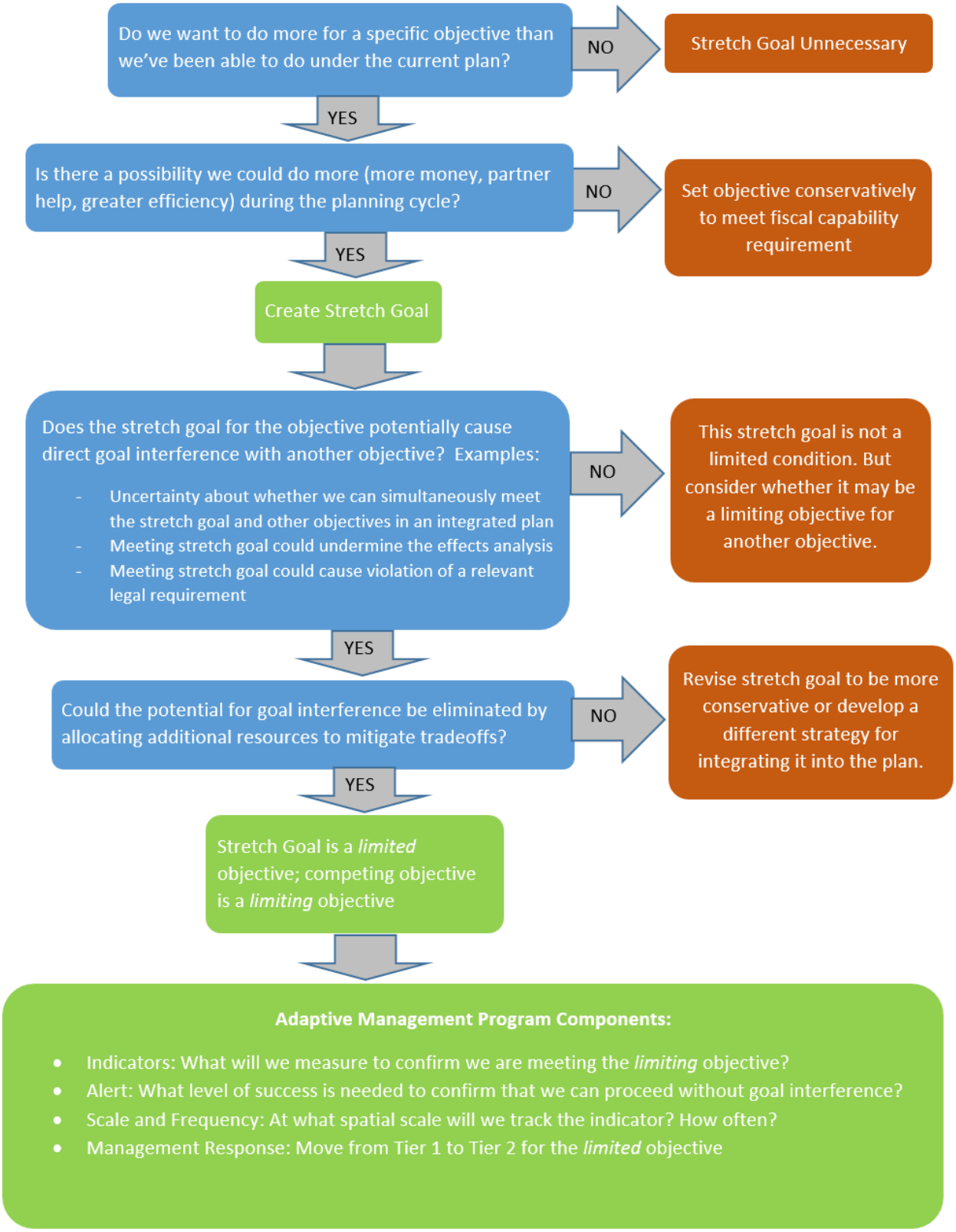
Based on the legal requirements above, adaptive management alerts are needed (1) when the plan has stretch goals (i.e., goals that exceed current fiscal capacity) that are potentially in direct tension with other objectives or requirements; and (2) when the potential for goal interference can be eliminated or ameliorated by allocating additional resources to mitigate tradeoffs, but there is uncertainty about what how much additional capacity is needed or whether it will materialize. (See illustration below.)

To create these alerts, it is useful to identify a “limited” objective and a “limiting” objective for each pair of objectives in tension. For example, the desire to increase timber harvest is a “limited” objective, because it is limited by the Forest’s responsibility to prevent the spread of NNIS. Accordingly, the desire to control NNIS is a limiting objective. Similarly, the desire to increase trail miles and opportunities is a limited objective, while the desire to increase trail system sustainability and protect water quality is a limiting objective. Adaptive management alerts should identify measurable thresholds corresponding to the limiting objectives. By showing that limiting objectives are being met, the Forest Service can “release” the limited condition and move into Tier 2 with confidence that it is meeting fiscal capability and plan integration requirements and staying within the scope of effects analyzed under NEPA.

In general, it is preferable to use implementation indicators for these alerts (as opposed to indicators for effectiveness or validity), because implementation indicators are the easiest to measure. For example, “acres of X condition treated with prescribed fire” is an implementation indicator. Effectiveness and validation monitoring require asking whether our treatments are having the desired effect, and if that effect is actually promoting the outcomes we assumed it would. This is much more difficult to do at scale. Using implementation indicators, to the extent

possible, should help avoid the situation where the Forest Service is ready to move to the second tier, but can't do it because it has not yet finished gathering or analyzing data.

Flowchart: When to use adaptive management alerts



C. When Adaptive Management Alerts Are Not Needed

Some planning tensions cannot be addressed by use of adaptive management alerts. Some tensions, for example, may be created by legal requirements. The desire to allow unconfined recreational experiences, for example, could be in tension with the desire to slow the spread of white nose syndrome. Additional capacity would not ameliorate this tension, because we lack the ability to control white nose syndrome, even if we had unlimited budgets. An adaptive management alert would therefore be of no use; the legal requirement to protect endangered bats would dictate the closure of caves to recreational use, and additional capacity would not make a difference. Likewise, some interests are in tension, but are not subject to any uncertainty. For example, some stakeholders have been concerned that new wilderness recommendations would result in a loss of road access. This tension is concrete: a recommended area will either have road access that would be lost, or not.

In summary, where additional capacity is not needed or is not able to ameliorate tensions, adaptive management alerts are not necessary. However, where there is tension between stretch goals and additional capacity could ameliorate that tension, alerts are essential.

D. Essential Alerts That Must Be Included in the Final Plan

1. NNIS

The need for this alert is relatively straightforward, as discussed in examples. Expanding timber harvest is a limited objective, and preventing the spread of NNIS is a limiting condition. There is uncertainty about whether enough additional resources will be available to meet both objectives at the same time. An alert is therefore needed to ensure that Tier 2 levels of harvest are actually within the Forests' fiscal capability—i.e., that at those higher levels of harvest, we can also prevent the unlawful spread of NNIS.

The Partnership has recommended specific levels of monitoring and treatment needed to create confidence that NNIS spread is being prevented and controlled. Specifically, all new harvest units and roads should be monitored for new infestations, and any new infestations should be prevented or controlled. We recommend including monitoring indicators for both needs, plus adaptive management alerts: (1) were all new units and roads surveyed; and (2) were all new infestations prevented or controlled? If the answer to both is yes, then the Forest Service is demonstrating that it can conduct Tier 2 levels of harvest operations (with associated roads) without causing the unlawful spread of NNIS, and Tier 2 is therefore within its fiscal capability.

2. Transportation system

The road system provides a similar challenge. Tier 2 objectives for timber harvest will require a significant expansion of the road system. The current road system, however, is not being

adequately maintained. According to draft transportation analyses,[30] the Pisgah NF has only about 12.5% of the funding to meet maintenance needs, and the Nantahala has only about 14% of needed funding. The longer roads are neglected, the greater threat they pose to water quality. Many roads, moreover, are barriers to aquatic organism passage, and the need to replace culverts accounts for a significant fraction of the maintenance backlog. DEIS at 461.

Under the Planning Rule, the Forest Service is required to articulate as a Desired Condition that the road system be sustainable. The draft does so in TA-DC-01. As discussed further in a separate section, the failure to maintain the road system is causing significant environmental harm. In light of this difficult reality, moving to Tier 2 for timber harvest (which requires expanding the road system) is a "limited" objective, and increasing sustainability is a "limiting" objective.

The Draft Plan sets a Tier 1 objective to maintain a modest percentage of the road system annually, with a Tier 2 objective to reduce the maintenance backlog of the system as a whole. While this is a good start, it is not enough. In order to show that expansion of the road system is within the Forests' fiscal capability, the maintenance backlog must be reduced *before* expanding. Of course, the backlog cannot be eliminated overnight. For that reason, the Forest Service should build into the plan an adaptive management framework that allows new road construction based on incremental reductions of the maintenance backlog. In some ways, this "road bank" would be similar to the "trail bank" proposed in Alternative D. However, new roads would not be conditioned on decommissioning elsewhere, because decommissioning is only one way to reduce the backlog. Other strategies for reducing the backlog include bringing roads up to standard using project receipts, refining the maintenance schedule for roads that are relatively low risk, downgrading roads to a lower maintenance level, or relocating especially risky roads.

In summary, the Plan should include a monitoring indicator for the road maintenance backlog, and an alert that allows construction of new roads as the backlog is reduced. Overall, the Partnership has recommended that the Forest Service reduce its backlog to 50% during this planning cycle. While this is still not good enough, it would show enough progress to justify expansion of the road system in appropriate areas. During this planning cycle, the Forest Service anticipates needing a net addition of about 3.1 miles of system roads annually at Tier 1. DEIS at 463. At the upper end of Tier 2, this number would double, requiring another 2.7 to 3.1 miles annually, depending on the alternative. *Id.* Over the life of the plan, this adds up to between 45 and 90 miles of new system roads—or, if we further assume linear growth from Tier 1 to Tier 2 over 15 years, just under 70 miles. Proportionally, therefore, the road bank should allow an additional 10 miles of system roads for every 5% reduction of the maintenance backlog.

[30] Att. 9, Pisgah National Forest Transportation System Analysis Process (TAP) Report, (Oct. 2012); Att. 10, Nantahala National Forest Transportation System Analysis Process (TAP) Report (Sept. 2015).

3. Recreation and trails

The challenges for recreation infrastructure are similar to those of the road system, albeit with less overall risk to waters. The Forest Service has articulated three goals for the trail system: move uses other than foot travel onto the managed trail network; protect water quality; and respond to user demands and preferences, including additional trail construction. We support all these goals, but they create tensions that should be addressed using an adaptive management framework.

We would not support setting objectives for recreation infrastructure that do not allow growth of the trail system, especially with a prohibition on non-system trail use for bikes and horses, because this would not meet the needs of local user groups and visitors that support local economies. Like other stakeholders, recreation users should be able to look ahead to Tier 2 goals that incentivize partner contributions. Indeed, it is imperative that volunteer groups see the potential for growth, because they are providing the bulk of the resources needed to maintain trails and protect water quality in the first place. The best way to ensure trails are not harming water quality is to reward volunteer groups for the work they're doing to maintain individual trails and improve the trail network as a whole, including giving them the ability to build and realign trails to better meet visitors' needs on the managed trail network.

Consistent with the Partnership's recommendations, we support the use of an adaptive management framework that articulates specific stretch goals for trails, ideally by Geographic Area. In order to support a move to these Tier 2 objectives, the plan should monitor an appropriate indicator for the ecological sustainability of the trail system—e.g., the number of miles meeting National Quality Standards or some other suitable measure. Based on incremental progress for that indicator, the plan should allow progress toward recreation stretch goals, including new trails, adoption of historical trails onto the system, or realignment of trails as appropriate. Ultimately, meeting recreation demand on the managed trail network is the only way that we will decrease use on unmanaged, non-system trails, which is essential to protect water quality and other resources.

4. Timber harvest to restore structure and composition

There is a fundamental tension between timber harvest to restore structure and species composition. In suitable MAs, projects will be driven by overlapping landscape-level goals to restore structure and provide forest products to benefit local economies. As the Forest Service notes, this approach is not totally inconsistent with the goal of restoring species composition, because harvesting commercially valuable stands in one area can pay for more ecologically appropriate work in another area. DEIS at 28-29. Over successive projects, however, an imbalance between structural and compositional work may cause a landscape-level loss of diversity, which would be contrary to the Planning Rule's ecological sustainability requirements.

Timber harvest for purposes of creating structural diversity, if improperly located, may cause negative shifts in species composition over time. For example, regeneration harvest in mesic

forests can create low diversity stands with abundant poplar. Although compositional restoration can also increase structural diversity, the Forest Service has explained that focusing exclusively on stands where structural work can also improve composition will not be economically viable at scale. DEIS at 28-29. The forests most in need of harvest for restoration will often be less commercially viable than harvest in mature, characteristic forests where harvest is more likely to lead to a loss of compositional diversity.

The tension between structure and composition is less acute in alternatives that include the Ecological Interest Area, because harvest in this MA will be intended primarily to restore composition, with ancillary structural benefits. Yet in all alternatives, there is still a risk that structural restoration will cumulatively degrade species composition.

Thus, there is a direct tension between structure and composition, and this tension is caused by a lack of capacity. If the Forest Service had the budgets to locate work where it is most needed, there would be no tension. Accordingly, the Plan must provide an adaptive management framework, including indicators and alerts. Alerts are essential to ensure that stretching into Tier 2 for timber harvest, which will include harvest that degrades species composition, does not cumulatively degrade ecological integrity in violation of the Planning Rule.

Here, Tier 2 harvest is the "limited" objective. It is limited by the requirement that the Plan must maintain and restore not just structure, but also composition. The limiting objective is compositional diversity. The Plan should include an indicator of the ratio of treatments that may degrade composition locally to treatments that are expected to maintain or restore composition. We endorse the Partnership's list of priority treatments (condition-based objectives) as an appropriate indicator. Acres of these treatments should be tracked as the relevant indicator. All treatments within the Ecological Interest Area would contribute to this indicator, too.

In order to increase levels of structural restoration, the Plan should also include an alert that shows that Tier 2 levels of harvest can be accomplished without cumulatively degrading species composition, within our fiscal capability. The Partnership has recommended that priority treatments should be at least 25% of regeneration harvest and 50% of thinning at Tier 1, and at least 50% of regeneration harvest and 75% of thinning at Tier 2. We support the use of these levels as alerts. To operate within Tier 2 for timber harvest, the Forest Service should show, in its periodic monitoring reports, that at least 50% of regeneration harvest and 75% of thinning harvest over Tier 1 levels are implementing priority treatments.

Table: List of Priority Treatments (Condition-Based Objectives)

Priorities	Anticipated level of harvest and volume based on estimation of opportunity (not prescriptive)
Thinning in Shortleaf Pine-Oak Ecozones to create 40-60% canopy closure conditions followed by prescribed fire.	14,300 accessible acres

Thinning in Pine-Oak Heath Ecozones to create 40-60% canopy closure conditions followed by prescribed fire.	7,600 accessible acres
Thinning in Dry Oak Ecozones to create 40-60% canopy closure conditions followed by prescribed fire.	23,500 accessible acres
Mid-story treatment targeting fire-intolerant species in fire-adapted ecozones.	200,000 accessible acres
Regeneration harvest of white pine dominated forest in a stand modeled as dry oak forest, combined with fire at an appropriate return interval. Treating this condition could be expected to improve composition.	11% of Dry Oak Ecozone is in this condition; Of these 2,600 acres are accessible
Removal of poplar from a poplar dominated forest in a stand modeled as dry-mesic oak. Combined with follow-up prescribed fire and release of desired canopy trees, this treatment could be expected to improve composition. Without additional prescribed fire, this may or may not improve species composition, but should not degrade it either.	18% of Dry-Mesic Oak Ecozone is in this condition; Of these 1,400 acres are accessible
Selective removal of white pine, poplar, cherry, and red maple from a site modeled as mesic oak ecozone where less than half the canopy is removed. Treating this condition could improve structure and composition if combined with release work and invasive plant control.	26% of Mesic Oak Ecozone is in this condition; Of these 20,100 acres are accessible
Regeneration harvest of a white pine-hardwood dominated forest in a stand modeled as shortleaf pine-oak, combined with site prep burn and regular prescribed fire, and possibly including planting. Treating this condition is likely to move the site closer to its desired condition of a shortleaf pine-oak forest or woodland.	9% of Shortleaf Pine-Oak Ecozone is in this condition; Of these 1,300 acres are accessible.
Removal of white pine, poplar, maple, and	18% of Shortleaf Pine-Oak Ecozone are in

other hardwoods from a site modeled as shortleaf pine-oak, followed by regular prescribed fire. Treating this condition in this manner is likely to improve species composition and provide open woodland habitat.	this condition; Of these 2,600 acres are accessible
Harvesting white pine from white pine dominated coves with robust invasive species control. Treating this condition may or may not improve species composition but should not degrade it either.	9% of Cove Ecozones are in this condition; Of these 8,200 acres are accessible
Harvesting poplar from poplar dominated coves with a low-quality herb layer and with robust invasive species control. Treating this condition will hopefully improve species composition, not further degrade the site, and will provide that invasive species infestations are prevented. Follow up treatments will occur to promote desirable species composition returning via natural regeneration. "Low quality" herb layer would mean <50% cover of native herbs and an absence of any plant species of conservation concern.	

E. Monitoring for Alerts – Implementation and Validation

As with all adaptive management alerts, these will require monitoring. We realize that the Forest Service is reluctant to limit its ability to pursue active management objectives merely because of a lack of monitoring, but let us be clear: if the agency cannot demonstrate that Tier 2 objectives are within its fiscal capability while also meeting its obligations for other resources, then it has no business stretching into Tier 2. We believe both can be accomplished by working together more efficiently, but the former cannot lawfully be done without the latter. Monitoring for these alerts is the *only* way the Forests can lawfully include objectives outside its fiscal capability for management actions that are in tension with its other resource goals and legal obligations.

Neither we nor our collaborative partners were unaware of the limitations on the Forests' ability to conduct monitoring. Accordingly, the alerts above are designed to be shown through *implementation* monitoring, which should be well within the Forests' ability to conduct. For example, monitoring to ensure that the road backlog is being reduced is a reliable proxy for

maintenance and restoration of water quality, and it does not require “boots on the ground” to directly measure water quality.

Similarly, tracking condition-based treatments is simply a matter of aggregating tables from individual projects. To be sure, this should be accompanied by validation monitoring to ensure that priority treatments are having their desired effects.

The alert related to NNIS does require a certain level of boots-on-the-ground monitoring, but this too should be seen as implementation monitoring. Surveying and finding NNIS is integral to treating them. This alert would therefore track how well the Forest Service is *implementing* the work needed to meet its obligation to prevent NNIS spread. If the agency cannot afford to scale up *both* timber harvest *and* NNIS treatments (which for obvious reasons require surveys), then it can afford to do neither.

Finally, monitoring for the water quality impacts of recreation may use a range of indicators, from tracking progress toward meeting National Quality Standards to tracking volunteer hours spent doing maintenance activities. If monitoring in the field is needed for the chosen indicator, it would be primarily conducted by volunteers, who would have a strong incentive to make sure it gets done so that they can show that new trail proposals are considered favorably.

None of these monitoring needs is beyond the Forest Service’s ability, with its partners, to achieve. These are the bare minimum needed to show that the Forest Service is able to balance competing objectives in an integrated plan within its fiscal capability. We have been strongly supportive of the inclusion of Tier 2 objectives, because it’s important to give all stakeholders a vision for what we can accomplish by working together. But, again, if the Forest Service can’t do at least this much, then the Tier 2 objectives will not be consistent with the requirements of the Planning Rule.

VIII. Vegetation Management: Suitability

Perhaps the most important question for a forest plan is where to schedule rotational harvest. Most of the work during the life of a forest plan will happen where rotational harvest is allowed (i.e., the "rotational base," as conceptually distinct from the "suitable base"). Likewise, almost all of the conflict under the current plan has happened in the rotational base. Excluding an area from the rotational base does not mean that it will not be harvested, but it does mean that it will not be harvested solely because it was scheduled to meet landscape-level goals for volume and/or structural restoration. Conceptually, the issue is simple: Where do we intend to regenerate stands indiscriminately, and where do we want to wait and see what needs we find on the ground?

The question begins to look complicated only when we try to parse it simultaneously using the anachronistic language of timber suitability and the more recent language of ecological integrity. Because of these two different languages, it is important to differentiate between scheduled rotational harvest and timber production. They are essentially the same under the older paradigm, but they are distinct ideas under the new one. Under the new Planning Rule, it is possible to schedule rotational harvest even in an area that is not suitable for timber production.

NFMA requires the Forest Service to identify lands as either suitable or unsuitable for timber production. But the 2012 Planning Rule also necessitates the identification of lands as appropriate or not appropriate for scheduled rotational harvest. The Forest Service must explain the reasons, types, and probable quantities of harvest needed to meet landscape-level, ecozone-level, and site level restoration needs. As a practical matter, as the Forest Service recognizes in its draft, this means balancing "local" needs against landscape-level needs in light of economic realities that prevent the achievement of both without some level of efficient, scheduled harvest. *See* DEIS at 47. The agency must address that tradeoff transparently and quantitatively.

Although they overlap, "suitability" and scheduled harvest are not the same concept. In the draft, it is possible to identify areas as appropriate for scheduled rotational harvest even if they are not suitable for timber production. For example, the dry-oak ecozone is not productive enough to be economically suitable for timber production, but it is prioritized for rotational harvest in the Draft Plan to meet structural restoration goals.

Because "suitable" lands must be economically suited for production *and* compatible with other desired conditions needed to maintain and restore ecological integrity, lands should be identified suitable only when scheduled rotational harvest would further both timber production and ecological restoration goals. Non-productive ecozones would therefore be "unsuitable." Subject to this understanding, however, we believe it is appropriate to include non-productive ecozones within otherwise "suitable" Management Areas, because rotational management for timber production and rotational management for structural restoration do not require different Management Area direction.

In our view, the easiest piece of the puzzle is identification of areas that are not suitable for timber production *or* appropriate for scheduled rotational harvest. Indiscriminate regeneration

harvest of either sort would undermine ecological sustainability and biological diversity goals in some parts of the forest. As discussed at length in these comments, these parts of the forest include the conservation priority areas—inventoried old growth, NHNAs, and WIAs. We recognize that rotational harvest in these areas might further economic timber production goals in some cases, but it would not further restoration goals. The table below shows the relationship between timber suitability and rotational harvest based on ecozone and location within or outside conservation priority areas.

Table: Suitability for Timber Production, Use of Rotational Harvest

Type	Description	Can rotational harvest further…		Suitable?	Rotational allowed? (suitable MA)	Site-specific allowed?
		Restoration Goals?	Commercial / Production Goals?			
1	Productive ecozones not within conservation priority areas	Yes*	Yes	Yes	Yes	Yes
2	Non-productive ecozones (e.g., dry oak) not within conservation priority areas	Yes	No	No	Yes	Yes
3	Productive ecozones within conservation priority areas	No**	Yes	No	No	Yes
4	Non-productive ecozones within conservation priority areas	No**	No	No	No	Yes

* Rotational harvest in productive ecozones, like coves, is discussed further below. We acknowledge that this *can* be a part of a plan that accomplishes landscape-level and ecozone-level restoration goals, subject to limitations discussed herein.

** While rotational harvest (or, for that matter, any harvest) could contribute to landscape-level structural restoration goals, such contributions would generally be outweighed by impacts to the rare and exemplary natural values represented in these areas.

A. Suitability for Timber Production

In developing a forest plan, the Forest Service must identify those lands in the plan area which are not suited for timber production. 16 U.S.C. § 1604(k). "Timber production" is defined as "[t]he purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts, or other round sections for industrial or consumer use." 36 C.F.R. § 219.19. The Forest Service directives state that suitable lands are managed for "saw timber-size crop trees," to provide wood products and to use "appropriate silvicultural practices to utilize site productivity." FSM 1926.15. In other words, lands deemed suitable for timber production are managed on a rotation to produce crops of timber.

In identifying unsuitable lands, the Forest Service must consider "physical, economic, and other pertinent factors to the extent feasible … and shall assure that, except for salvage sales or sales necessitated to protect other multiple-use values, no timber harvesting shall occur on such lands for a period of 10 years." 16 U.S.C. § 1604(k).

Under the new Planning Rule, "timber harvest," on the other hand, is defined as "[t]he removal of trees for wood fiber use and other multiple-use purposes." 36 C.F.R. § 219.19. Whether it occurs as part of timber production, salvage sales, or for another multiple-use purpose, the forest plan may allow for timber harvest only as necessary to meet the plan's goals. *See* 16 U.S.C. § 1604(f)(2).

The Planning Rule requires that the primary goal of a new forest plan must be to ensure the maintenance or restoration of ecological integrity. Consequently, where timber production would be incompatible with requirements of ecological restoration for a particular areas or ecosystems, these areas and ecosystems should not be included in the plan's suitable base.

Because timber harvest can be used only where necessary to meet plan goals, and because the plan's primary goal is the maintenance and restoration of ecological integrity, the question for during forest planning is: "In which areas or ecozones, and under what conditions, can timber production contribute to maintaining and restoring ecological integrity on the Nantahala-Pisgah?" Or the inverse: "In which areas or ecozones is timber production incompatible with maintaining and restoring ecological integrity?"

To the extent that the Forest Service has, in its Draft Plan, designated certain areas of land as suitable for timber production, we must interpret these designations to be the agency's answer to foregoing questions.

Harvest on "unsuitable" lands will be discussed in Section VIII.B, below, but it is necessary to mention here that while the "economic" incentives of timber production are distinguishable from timber harvest necessitated to protect other multiple-use values, the "physical" characteristics are often the same. In the wrong places, those physical characteristics may undermine ecological integrity. Thus, intensive timber harvests intended to maintain or advance ecological restoration, but which are concentrated in ecozones where such harvests will have the opposite effect, are no

less problematic than scheduling rotational timber harvests on lands that should be deemed unsuitable for timber production.

There are three main ways in which the Forest Service's suitability determinations in the Draft Forest Plan are problematic. First, the Forest Service's analysis of the need for and impacts of estimated timber harvests in individual ecozones is inconsistent and confusing, and it does not support the Forest Service's suitability determinations for these ecozones. Second, while the DEIS notes that certain ecozones were determined to be suitable while others were not, these determinations are not reflected in the Draft Plan's components. And third, the plan components do not make clear that certain ecologically important areas which are incompatible with timber production are in fact "unsuitable."

1. The DEIS's analysis of the need for and impacts of timber harvests does not support the Forest Service's suitability determinations for individual ecozones.

The Forest Service directives lay out a two-step process that the agency should use to determine whether lands are suitable for timber production. FSH 1909.12 Ch. 61. For the Draft Plan, the Forest Service presented the results of this process both in the DEIS's "Timber Resources" section and in a "Timber Calculations" public webinar. DEIS at 502-04.

First, the Forest Service should identify lands that are "not suited" for timber production based on the legal and technical factors listed in the 2012 Planning Rule at 36 C.F.R. §219.11(a)(i),(ii),(iv),(v), and (vi). Specifically, lands are not suitable where:

> (i) Statute, Executive order, or regulation prohibits timber production on the land;
>
> (ii) The Secretary of Agriculture or the Chief of the Forest Service has withdrawn the land from timber production;
>
> (iv) The technology is not currently available for conducting timber harvest without causing irreversible damage to soil, slope, or other watershed conditions;
>
> (v) There is no reasonable assurance that such lands can be adequately restocked within 5 years after final regeneration harvest; or
>
> (vi) The land is not forest land.

FSH 1909.12 Ch. 61. If any of these factors apply to the land, it is not suited for timber production.

While the DEIS lists these five factors and acknowledges that the Forest Service used them to identify lands that are not suited, the specifics of how the agency interpreted each of these factors are not discussed. Nor are the *results* of the agency's analysis expressly listed. *See* DEIS at 503. This information needs to be included in the DEIS.

However, the agency's "Deep Dive" timber webinar did include a slide which presented the agency's interpretations of these factors (but not a discussion of the results of the analysis).[31] According to the webinar, under factors (i) and (ii), the agency identified lands classified as Wild Rivers, Wilderness, Wilderness Study Areas, and Inventoried Roadless Areas. Under factor (iv), the agency identified lands for which the classification of "FSVeg Irreversible Damage" applied, bogs, rock outcrops, hydric soils, and slopes greater than 70%. The webinar did not attempt to explain how the classification of "FSVeg Irreversible Damage" relates to factor (iv), how it was developed as a classification, or what lands it identified.[32] Likewise, under factor (v), the webinar indicated that the agency identified those lands with classifications of "FSVeg SI < 40" and "Unprod LSC or Forest Type," but the agency did not explain in practical terms what these classifications mean or what lands were identified as falling under them. Finally, under factor (vi), the agency identified "non-forest" lands as railroad buffers, Forest Service or NCDOT road buffers, special use areas, developed recreation sites, waterbodies, wildlife openings, balds, and Forest Service facilities.

The Forest Service directives state that "[a]fter subtracting the lands that are not suited from the total of National Forest System lands [under step 1], the remaining lands are lands that *may be* suited for timber production, and are considered in step 2." FSH 1909.12 Ch. 61. At step two, the Forest Service should consider the following factors to determine if timber production is compatible with the desired conditions and objectives of the plan:

> 1. Whether timber production is a desired primary or secondary use of the land;
>
> 2. Whether timber production is anticipated to continue after desired conditions have been achieved;
>
> 3. Whether a flow of timber can be planned and scheduled on a reasonably predictable basis;
>
> 4. Whether regeneration of the stand is intended; and
>
> 5. Whether timber production is compatible with the desired conditions or objectives for the land designed to fulfill the requirements of 36 CFR 219.8 to 219.10.

FSH 1909.12 Ch. 61.2. Both the Forest Service's Timber Calculations webinar and the DEIS discuss the agency's interpretation of these factors. *See* DEIS, at 503-04.

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[31] Forest Service "Deep Dive: Timber" webinar, slide 12. Available at https://nationalforestfoundation.adobeconnect.com/_a961852781/pefhkm7q9eva/?launcher=false&fcsContent=true&pbMode=normal (accessed June 22, 2022).

[32] *Id.*

Under factor 1, the Forest Service identified riparian and lake buffer zones—specifically, 100-foot buffers for shorelines and perennial streams, and 15-foot buffers for intermittent streams. Under factor 2, the agency identified habitat identified as critical by the U.S. Fish and Wildlife Service—specifically, habitat for mountain golden heather, the spruce-fir moss spider, and the Appalachian elktoe. Under factor 3, the Forest Service identified specific ecozones that are "not economically compatible with timber production"—specifically pine oak heath, dry oak, spruce fir, floodplain, grassy bald, heath bald, and lakes. However, the agency did not explain in this analysis *why* these ecozones were determined to be "economically" incompatible with timber production. Under factor 4, the Forest Service identified areas that are part of the designated old growth patch network. And, under factor 5, the Forest Service identified those "lands not suited for timber production based on compatibility with desired conditions and objectives"—in other words, lands located in unsuitable Management Areas as specified in plan components. Lands identified under these factors were then "subtracted from the Step 1 endpoint." DEIS at 503.

With both Steps 1 and 2, the Forest Service's failure to adequately explain its interpretation of the analytical factors or describe them in practical terms is a problem. On the one hand, it leaves the public without a clear sense of how the agency made such important decisions as: 1) under Step 1, where timber production would result in "irreversible damage," or 2) under Step 2 which forest communities are economically incompatible with scheduled timber harvests. Some of the outcomes are puzzling such as the connection between "whether timber production is anticipated to continue after desired conditions have been achieved" and critical habitat designated under the Endangered Species Act, which does not seem to have been consistently applied (*e.g.*, Indiana bat). On the other hand, the Forest Service directives expressly state that in preparing this suitability analysis, "[d]etails such as the criteria and methods used, and lands identified for each category, should be kept in the planning record and summarized in an appendix to the plan EIS or appropriate environmental document." FSH 1909.12 Ch. 61. It is not sufficient to simply say that "[m]ethods and assumptions associated with each step are further detailed in the planning record." DEIS, at 504.

More problematic, and as explained below, is the fact that the Forest Service's analysis of the need for and impacts of its estimated timber harvests for various ecozones simply does not support the agency's suitability determinations under "step 2." The agency's analysis is internally inconsistent and confusing, leaving the public without a clear sense of how the agency will decide to allow intensive timber harvests, and in which forest types. This inconsistency is impermissible under NFMA and the Forest Service directives. NFMA requires a single, "integrated" plan, 16 U.S.C. § 1604(f)(1), and the directives make clear that this means that the plan is internally consistent. FSH 1909.12 Ch. 22. Furthermore, the Forest Service directives note that "[r]esource information and other data" must be "factual and accurate," and "assumptions, analytical approaches, and data" must be "consistently applied within the plan." FSM 1926.21. The Draft Plan falls short of these requirements.

a. Some ecozones were determined to be "economically incompatible" with timber production and inappropriate for commercial timber harvest generally, but the Plan nonetheless estimates significant commercial harvests for these locations.

As noted above, during "step two" of the Forest Service's timber production suitability analysis, the agency determined several ecozones to be unsuitable for timber production because they are "economically incompatible" with this use: specifically, pine oak heath, dry oak, spruce fir, and floodplains. However, the Timber Resources section of the DEIS does not explain why these ecozones are economically incompatible with timber production.

At most, the DEIS specifically notes that in both the pine oak heath and dry oak ecozones, "the size and quality of tree species … generally precludes commercial timber harvest." DEIS, at191, 204. But there are no similar statements made in the DEIS pertaining to the other ecozones determined to be unsuitable for timber production.

However, the Draft Plan's estimated timber harvests suggest that significant harvests would likely occur in both dry oak and pine oak ecozones. *See* DEIS at B-10. Although the Draft Plan states that the timber calculations are a "summary of planned methods of timber harvest" and that "tabular results listed … are approximations," these estimates are nonetheless the output of the Spectrum model on which the DEIS's analysis of impacts to ecozones is based.

The inconsistency between the DEIS's analysis of these "unsuitable" ecozones and the Spectrum timber harvest outputs is striking. For example, despite deeming it "economically unsuitable" for timber production and describing it as containing trees of a size and quality that "generally precludes commercial timber harvest," the Forest Service has estimated more regeneration harvests (12,639 acres) in the dry oak ecozone under Tier 2 objectives for Alternative B than for *any other ecozone*, under *any other alternative,* under *either tier*. (The Tier 2 estimate for Alternative D, at 11,730 acres, is not far behind.) In other words, the Forest Service estimates that an ecozone that is unsuitable for timber production and not generally suitable for commercial harvest is in fact likely to contain the most intensive commercial logging.

When asked about this inconsistency, the Forest Service noted that the dry oak ecozone "represent[s] a good option for regenerating oak and would have our best success with woodland creation in hardwood communities when using timber harvest and fire," and that "dry oak likely contains some of the largest sized gaps and young forest openings." Att. 11 (communication with Forest Service siliviculturalist Jason Rodrigue, May 2020). But the Forest Service also said, in regards to harvests in the dry oak ecozone, that "[t]here is the need to develop markets where there has been none before and some of our wood products folks have said that markets for low value products are fine in the area surrounding Canton for example." *Id.*

To summarize, the Forest Service has determined the dry oak ecozone to be economically incompatible with timber production (without expressly saying why), and it has separately noted that this ecozone is generally unsuitable for commercial timber harvest. Yet elsewhere it has

estimated that under Alternatives B and D this ecozone will contain more regeneration harvests under Tier 2 objectives than any other ecozone (only "cove and mesic oak" would have more harvest in any alternative, namely Alternative C), and it has acknowledged that these harvest levels are in part intended to develop new commercial markets. This simply doesn't add up.

There are similar inconsistencies with the pine oak heath ecozone. Like the dry oak ecozone, the Forest Service identified the pine oak heath ecozone as one which is "economically incompatible" with timber production and one where the size and quality of tree species makes it "generally unsuitable for commercial timber harvest." DEIS at 204. Yet the Draft Plan estimates thousands of acres of regeneration harvests in this ecozone under Tier 2 objectives, with significantly more intermediate treatments. *See* DEIS at B-10.

In sum, the DEIS does not adequately explain why these ecozones are compatible with thousands of acres of commercial timber harvest per decade, as estimated by Spectrum but are *not* economically compatible with timber production. On its face, the Forest Service's suitability determination and its analysis appears arbitrary and capricious and internally inconsistent in violation of NFMA and the Forest Service directives.

Ultimately, the problem is that the Forest Service has included multiple, inconsistent explanations for harvesting low-productivity forests—an explanation for every perspective. While we do not disagree that these ecozones may be relatively good options for creating large patches of young forest, the Forest Service must use a coherent framework to justify this kind of work under the relevant authorities.

b. Some ecozones are identified as suitable, but the Plan estimates that zero or practically zero timber harvest will take place there.

Conversely, there are some ecozones that the Forest Service deemed *suitable* for timber production where Spectrum modeling indicates that zero or practically zero timber harvesting would take place. Yet, without explanation, the DEIS's analysis of restoration opportunities in these ecozones indicates that the Forest Service would expect improvement in structural and compositional integrity due to harvest activities. (Ecological restoration in particular ecozones will be discussed in greater detail in Section IX.G, below.) Here, too, there appears to be inconsistency between the DEIS's analysis of impacts, the Plan's estimates for timber harvest, and the Forest Service's suitability determination.

For example, the Forest Service has identified the northern hardwood ecozone as suitable for timber production, with between 9,700 and 13,750 acres of this ecozone falling within the Matrix and Interface Management Areas. DEIS at 175. Thus, these acres will be scheduled for regular timber harvest. Yet the DEIS states that there will be only "limited canopy manipulations" in this ecozone, and the plan estimates *zero* timber harvests of any kind under Alternatives B and D, under both Tier 1 and Tier 2 objectives. DEIS at 174*; see also* Draft Plan at B-10. The only harvests estimated are 23 acres over the course of two decades under Tier 2 objectives for Alternative C.

If the Forest Service does not expect there to be any commercial timber harvests because the northern hardwood ecozone is "economically incompatible" with timber production or "generally unsuitable" for commercial harvest, then why it is included in the suitable base? If, on the other hand, this ecozone *is* economically compatible with timber production and commercial harvests, then what factors are preventing timber harvests in this ecozone, and why are there no plan components corresponding to those factors?

Compounding this inconsistency is the fact that the DEIS's analysis of environmental impacts to the northern hardwood ecozone states that ecological integrity of this ecozone will improve due to a variety of vegetation management treatments, including thinning and release, various uneven-aged, and limited even-aged treatments, and that "Alternatives B and D may have a higher potential to increase the pace and scale of restoration because they include more acres in MA Group 1," where timber production is allowed. DEIS at 174-75. Again, this simply does not align with the Forest Service's estimated harvests as modeled by Spectrum.

The basic problem, then, is that these Spectrum assumptions do not correspond to any plan components or suitability determinations. These 9,700 to 13,750 acres of Northern Hardwoods, for example, are scheduled for timber production and no plan components limit harvest within them. The Forest Service should explain why it does not intend to harvest within these systems, explain what that means for their "suitability," *and include plan components to effectuate that intent.*

c. The Forest Service's environmental analysis does not adequately support its conclusion that cove ecozones are suitable for timber production, nor does the Plan provide components to ensure timber production in these ecozones does not conflict with desired conditions.

The Forest Service has determined that both the rich cove and acidic cove ecozones are suitable for timber production, and both the Draft Plan timber calculations in Appendix B and the DEIS estimate that there will be a significant amount of regeneration harvests in cove ecozones under Tier 2 objectives.[33] Indeed, the plan objective for young forest, ECO-O-02, calls out cove ecozones specifically for regeneration harvest. However, the DEIS's analysis of environmental impacts to cove ecozones clearly indicates that timber production involving repeated, intensive commercial timber harvests has the potential to drive these ecozones away from NRV for structure, composition, and function. This result would be inconsistent with the Draft Plan's desired conditions for these ecozones and would violate the Planning Rule's requirement to maintain and restore ecological integrity at all dimensions and relevant scales. Discrete spatial areas of forest, at the scales used for forest planning, can't be "suitable" for timber production if

[33] *See* Draft Plan at B-10 (estimating between 8,534 acres (Alternative D) and 12,591 acres (Alternative C) of regeneration harvests over a ten-year period of time); *see also* DEIS at 511 (acknowledging the concentration of harvests under Tier 2 in cove ecozones).

timber production would be incompatible with other desired conditions. This is dictated by step 2 of the timber production suitability analysis, described above.

There are multiple ways in which the Forest Service's suitability determination for cove ecozones is flawed. First, the DEIS acknowledges that estimated regeneration harvests under Tier 2 objectives would exceed forest-wide desired conditions for the amount of young forest in cove ecozones. DEIS at 196, 200. At the other end of the age-class spectrum, Tier 2 levels of harvest would impede old growth restoration in coves and result in lower ESE scores. The stated reasons for concentrating Tier 2 harvests in coves (in excess of desired conditions) would be to

> 1) meet the higher activity levels of Tier 2 plan objectives; 2) continue to support the restoration efforts on other lower value community types; 3) reflect the location of the current forest service road network; and 4) return to stands previously harvested to continue silvicultural intent and improve/restore forest conditions.

DEIS at 511. In other words, the Forest Service intends to log too much of the economically valuable cove forests to subsidize non-viable harvests in unsuitable ecozones. We have deep reservations about the wisdom of this approach, and we note that, as currently conceived in the draft, it appears to violate the Planning Rule. Regardless, this is an incredibly significant choice, and it should not be buried deep in the DEIS and hidden behind euphemisms and jargon.

Second, the DEIS impliedly admits that allowing the amount of regeneration harvests estimated by the Draft Plan for cove ecozones could contravene desired conditions for composition. The DEIS states that in coves, "[r]estoration of canopy composition would be at a slower pace compared to [other ecozones] because less is known about the silvics and reestablishment of mesic hardwoods." DEIS at 196, 200. Elsewhere, the DEIS is more explicit, stating that

> some stands … would need to be harvested with structural goals in mind … to meet vegetation structure and wildlife habitat objectives, to continue to support local economies, and to fund other restoration priorities....In these situations, there may be less opportunity to focus on the future stands composition….Possible locations for these structural/habitat centric types of action are on mesic sites with already high densities of tulip poplar….

DEIS at 499. In other words, in some cove forests, the Forest Service appears to be proposing harvests that would make stands with departed conditions even worse in order to pursue structural goals that are admittedly in excess of desired conditions.

Taken together, these two acknowledgments regarding impacts to structural and compositional ecological integrity in cove ecozones suggest that timber production is not compatible with maintaining or restoring ecological integrity in those locations.

A third problem with the Forest Service's suitability determination for cove ecozones is the fact that the agency's stated need to create young forest in coves is based on flaws in its Spectrum

modeling. The desired conditions for cove ecozones state that disturbance gap sizes consist primarily of single tree fall gaps, "around 1/8 acre" to "rarer 15-20 acres wind-blown acres." Draft Plan at 50-51. The DEIS likewise notes that disturbance gaps in coves are generally the result of gap phase dynamics, stating that these ecozones, which "exist on more protected portions of the landscape, are generally stable, and subject to smaller-scale natural disturbances." DEIS at 194, 198.

Yet both the Draft Plan and the DEIS state that there is a need for significant amounts of young forest creation in cove ecozones. This apparent need is based on flaws in the Forest Service's Spectrum model (discussed in greater detail in Section III.A) which underestimates levels of naturally created gaps and fails to accurately treat gap-phase dynamics as regeneration events. These modeling flaws undermine the agency's determination that timber production is compatible with the desired conditions for cove ecozones, because the large-scale disturbances created by timber production are neither necessary nor consistent with structural integrity in coves. If the Forest Service counted the numerous small natural disturbance gaps in coves toward future young forests, the agency would not need to create many (if any) larger patches.

A fourth problem is the fact that the Forest Service's suitability determination completely ignores the negative effect that creation of larger young forest patches has on the functional integrity of cove ecozones—specifically, that creation of large patches of young forest *displaces* naturally occurring gap phase dynamics. In other words, in addition to its blatant error in underestimating the *amount* of natural gaps in cove ecozones, the Forest Service has also failed to consider the ecological harm that will result from displacing natural disturbance processes in coves through large scale commercial harvests.

These problems with the analysis of cove ecosystems are present to a lesser degree for other mesic ecozones. But they are most apparent for cove systems.

The Forest Service explains its theory that "it may be appropriate to locally deviate from desired conditions" because of landscape-level needs. Draft Plan at 47. To be sure, some short-term, local deviations from ecozone desired conditions are inevitable if we are going to restore NRV for structure, composition, function, and connectivity. Removal of a pine plantation, for example, may create a patch size that is out of character for the ecozone where it was located, but it would nevertheless be appropriate in order to improve species composition. However, this is quite a different matter than identifying areas as suitable for rotational timber production, which means that these ecozones would experience repeated, rotational regeneration and would never be allowed to develop their characteristic structure, pattern, and function as required by the Planning Rule.

To be clear, because of these problems the DEIS cannot support a conclusion that the plan will meet the NRV or integration requirements of the Planning Rule. Nevertheless, we also acknowledge the practical reasons that regeneration in coves may be necessary to accomplish landscape-level goals. To allow regeneration harvest in coves, the Forest Service must include plan components to make sure that the cumulative effects of those harvests will not violate the

Planning Rule. Specifically, as detailed elsewhere in these comments, the Forest Service must exclude conservation priority areas from suitable MAs, so that coves in these relatively intact areas are not regenerated except in the rare circumstances where regeneration is needed to improve a particular stand's ecological trajectory. In addition, the Forest Service must adopt the condition-based framework described in the preceding section, so that regeneration of coves it emphasized where it will do the least harm.

For the reasons described above, the Forest Service's identification of certain ecozones as suitable or unsuitable for timber production is not supported by adequate analysis in the DEIS and is inconsistent with the Draft Plan's harvest estimates. Further, errors in the Forest Service's Spectrum model fundamentally undermine the agency's analysis of whether specific ecozones are appropriate for creation of large patches of young forest. The result is a Draft Plan and DEIS that are incongruent, confusing, and not based on the best available science, leaving the public without a clear sense of how the Forest Service would go about deciding where and why to conduct timber harvests. This is a violation of NFMA and the 2012 Planning Rule. The Forest Service must acknowledge and correct these errors in the Final EIS.

2. The Forest Service's suitability determinations for ecozones are not reflected in Plan components.

To the extent that the Forest Service's Final Plan and EIS continue to identify certain ecozones as unsuitable for timber production at step two of the suitability analysis, as described above, the Plan components should reflect this restriction.

In response to a question concerning the high amount of "unsuitable" ecozone acreage that the Draft Plan allocates to the "suitable" Management Areas of Matrix and Interface, the Forest Service responded that

> [O]ur timber production suitable MAs include a mix of both suitable and unsuitable lands. It is not feasible to segregate by management areas all the typically non-productive ecozones, such as dry oak and pine-oak/heath, from other potentially more productive ecozones, such as dry-mesic oak and mesic oak, since the ecozone model typically occur within the same landscape and they all occur across all management areas.[34]

If the Forest Service intends for "unsuitable" ecozones to be interspersed throughout suitable Management Areas, then plan components must make clear that timber production may not occur on these ecozones, and explain the extent of the types of harvest allowed in Matrix and Interface that would be "necessitated to protect other multiple-use values." 16 U.S.C. § 1604(k). This should not be an insurmountable hurdle; because these ecozones are not economically

[34] Att. 11, Communication with Forest Service silviculturalist Jason Rodrigue (May 2020).

attractive on their own, the EIS should explain (and the plan should include components to reflect) the intent that these unsuitable ecozones would be treated for other reasons (and what those reasons are).

In the Draft Plan, ecozone desired conditions are listed in Table 2 in Chapter 2, Terrestrial Ecosystems. For ecozones that are unsuitable for timber production, these desired conditions should contain a clear prohibition on timber production.

3. The Draft Plan's components do not make sufficiently clear that certain ecologically important or sensitive areas incompatible with timber production are in fact "unsuitable."

Across the Pisgah-Nantahala National Forests, there are many locations where timber production is incompatible with maintaining or restoring ecological integrity. Forest plans must include binding components to maintain ecological integrity where it exists and restore it where it has been degraded. 77 Fed. Reg. at 21,173 (explaining the Planning Rule "provides for the maintenance of" areas that do not need restoration). Areas of high ecological integrity cannot be considered suitable for timber production if the physical effects of indiscriminate, rotational harvest would degrade the characteristics that support their existing integrity.

Overall, the Draft Plan and DEIS identify these areas and explain that they are different in a way that precludes the use of indiscriminate, rotational-style harvest. However, in a few instances the Draft Plan standards do not make sufficiently clear that timber production is prohibited in ecologically sensitive areas, even though other components or analysis in the DEIS suggest that these areas are clearly unsuitable.

a. Hydric soils

During step 1 of the Forest Service's timber suitability analysis, discussed above, the agency identified lands containing hydric soils as locations that are not suitable for timber production due to the fact that this use would cause "irreversible damage." In ECO-G-02, the Draft Plan provides a somewhat murkier limitation, stating that "[t]imber production *should not* occur on hydric soils. Project-specific determinations of hydric soil locations may occur so they can be considered in project design." Draft Plan at 68 (emphasis added).

Given that the Forest Service has unambiguously identified hydric soils as "unsuitable" in accordance with the 2012 Planning Rule, plan components should be equally unambiguous in prohibiting timber production in these locations. The Forest Plan should include a standard that prohibits timber production on hydric soils. Further, this standard should expressly *require* that project-specific determinations of hydric soil locations occur prior to implementation of timber production projects. *See* 16 U.S.C. § 1604(k) (stating that plans "shall *assure*" that timber production does not occur on unsuitable lands (emphasis added)).

It is not entirely clear whether the Forest Service intended for the second sentence of ECO-G-02 to refer specifically to timber production or more generally to timber harvests for any purpose. If

the Forest Service intends for it to apply to all harvests, then the agency should clarify the scope of this guideline.

b. Designated Old Growth

Although step 1 of the Forest Service's timber production suitability analysis identified designated old growth as lands that are unsuitable, there are no plan components expressly prohibiting timber production in these locations. The Forest Service should include a standard that makes clear designated old growth is unsuitable. We assume this is an oversight that can be easily corrected.

In addition to the required timber production suitability analysis, the Forest Service also prepared an analysis of "commercially viable" acreage across the forest. *See* DEIS at B-3. While the Forest Service stated during its Timber Calculations webinar that designated old growth was *not* included in its calculation of commercially viable acreage, in Alternative B designated old growth patches *are* included as commercially viable. The Forest Service has stated that this was an error.[35] This error skews the comparison of alternatives, so it must be corrected in the Final EIS.

c. NHNAs

Plan direction concerning North Carolina Natural Heritage Natural Areas is found in the Plant and Animal Diversity section of the Draft Plan. Draft Plan at 81. NHNAs are areas "identified for their special biodiversity significance due to the presence of either terrestrial or aquatic rare species, unique natural communities, important animal assemblages or other ecological features." *Id.* However, the Draft Plan also notes that "[w]here [NHNAs] have been identified … the Forest Service retains the authority to manage these areas" and "[v]egetation management, including prescribed fire, integrated pest management and timber harvest, is allowed when unique attributes of the area can be maintained or enhanced." *Id.*

The only desired condition that expressly refers to NHNAs is PAD-DC-04, which states that "[u]nique ecological characteristics are maintained or enhanced within the [NHNAs]." Draft Plan at 84. There is also one plan objective, PAD-O-05, that refers to NHNAs. This objective is split into two tiers: under Tier 1, the Forest Service would coordinate annually with the NC Natural Heritage Program to identify NHNAs in potential project areas; under Tier 2, the Forest Service would coordinate with the Natural Heritage Program to review *all* NHNAs on the forests. Draft Plan at 87.

Under all alternatives, NHNAs would be distributed throughout both suitable and unsuitable Management Areas. Between 34,383 acres (Alternative C) and 68,765 acres (Alternative B) of

[35] Att. 12, Forest Service Deep Dive Q and A – Timber Calculations (May 1, 2020).

NHNAs would be allocated to Matrix and Interface. Because areas are considered suitable for timber production unless the plan expressly identifies them as *not* suitable, and because there is no plan component stating that NHNAs are not suitable, they presumptively *are* suitable when they are located in suitable Management Areas. This is problematic, because the desired conditions and objectives which provide direction for management of NHNAs make clear that timber production is not compatible with these areas. Managing areas for their rare, unique, or exemplary values, even if it sometimes includes timber harvest, is not compatible with timber production, because timber production is a decision (made before a specific area has even been looked at) that regeneration is intended.

To fix this problem, the Forest Service must expressly state that NHNAs are not suitable for timber production, allocate them to unsuitable MAs, or both.

d. Base cation depletion

As noted above, the Planning Rule requires that the Forest Service identify lands as unsuitable for timber production where "technology is not currently available for conducting timber harvest without causing irreversible damage to soil, slope, or other watershed conditions" and where "there is no reasonable assurance that such lands can be adequately restocked within 5 years after final regeneration harvest." 36 C.F.R. § 219(a). The Forest Service's DEIS indicates that the agency considered these factors during step 1 of its suitability analysis, but the DEIS does not explain how these factors were interpreted or which lands were identified. *See* DEIS at 503.

On the other hand, the Forest Service's "Deep Dive" timber webinar indicated that lands identified under these factors were those for which the classification of "FSVeg Irreversible Damage" applied, as well as bogs, rock outcrops, hydric soils, slopes greater than 70%, and lands with classifications of "FSVeg SI < 40" or "Unprod LSC or Forest Type." Yet the Forest Service still didn't explain in practical terms *which* lands were identified using classifications like "FSVeg Irreversible Damage," nor how this criterion was modeled.

As a result, the DEIS does not disclose whether the Forest Service determined certain areas at risk of irreversible damage from timber harvest to be unsuitable—specifically, areas at risk of base cation depletion and areas at risk of landslides. Lands with soils that fall into either of these two categories are not appropriate for timber production under the Planning Rule, and the Forest Service's Final Plan and EIS should clarify this.

The Draft Plan includes one component that addresses the risk of base cation depletion in soils; ECO-O-10 provides an objective that the Forest Service will "annually, conduct a site-specific analysis of base cations in 1 to 2 project locations where there is a concern for base cation depletion. Develop mitigation or restoration strategies when these strategies are necessary to restore or protect at-risk water, soils, flora and fauna." Draft Plan at 79. While acknowledging that soils at risk of base cation depletion are a concern, the Draft Plan does not include any other components designed to ensure that these soils are not further damaged.

The DEIS discusses the problem of base cation depletion in more detail, acknowledging that "acid deposition, especially from sulfur compounds, has and continues to contribute to nutrient

base cation (calcium, magnesium, and potassium) losses from soils." DEIS at 43. The DEIS notes that base cations are "essential for healthy terrestrial plants, animals, and aquatic organisms. If lacking, some species may suffer from nutrient deficiency, and the catchment will lack the ability to buffer strong acids entering the ecosystem, causing acidification. Too much acidity will decrease the soil and water pH and may release previously soil-bound aluminum. In high concentrations, aluminum is toxic to both terrestrial and aquatic species …." DEIS at 47. In other words, where soils are already depleted of base cations, maintaining or restoring ecological integrity requires mitigation measures; where soils are at risk of base cation depletion, the Forest Service must refrain from management activities that would accelerate the development of this condition.

The DEIS briefly mentions some mitigation strategies that could be implemented under ECO-O-10, and among them is "designing the timber harvests with acidification risks in mind." DEIS at 49. Yet it's not clear what this means in practical terms, particularly given the DEIS's acknowledgement elsewhere that "there is uncertainty on when and how much recovery of nutrient base cations will occur in sensitive catchments …. *Timber harvesting does remove nutrient base cations, and this can be important to future forest health in catchments where nutrient base cation in the soil are currently low*." DEIS at 50 (emphasis added).

Thus, the DEIS makes clear that soils which are at risk of base cation depletion are unlikely to be improved by timber harvest. It is abundantly clear, then, that lands with at-risk soils are unsuitable for timber production, which would *require* repeated intensive harvests. The DEIS indicates that soils depleted of base cations improve slowly because accumulations of soil-bound sulfur are released slowly over multiple decades. *See* DEIS at 48-50. In other words, at risk areas are likely to remain at risk areas over the course of multiple planning cycles. Scheduling these areas for repeated harvest is clearly inconsistent with maintaining or restoring their ecological integrity, and therefore the Plan must make clear that they are unsuitable for timber production.

e. Lands at risk of landslide

The DEIS notes that in the wake of landslides in 2004 that were triggered by Hurricanes Frances and Ivan, the North Carolina General Assembly authorized the North Carolina Geological Survey to prepare county-scale landslide hazard maps for 19 mountain counties. The DEIS states that the "NCGS and other landslide hazard map projects have provided new information on landslide hazards on the Forests" and that these maps "show where landslide have occurred or may occur; where landslides like debris flows may start on the Forests; and where debris flows may travel downslope onto private land." DEIS at 77.

Further, the DEIS acknowledges that logging can make lands more susceptible to landslides and resulting debris flows. *Id*. The DEIS points out that

> [d]ebris flows are not only a natural landslide hazard, but a project-induced hazard. Debris flows can be caused by failure of fill slopes such as those constructed for roads or log landings. Ground disturbance for management activities (such as road construction and reconstruction, timber harvest activities,

> trail construction and reconstruction) has the potential to result in project-induced landslides (cut slope failures, fill slope failures, and resulting debris flows).

Id. The DEIS furthermore states that, given the projected *increase* in logging activities across the forests under all action alternatives, these alternatives "have greater potential to adversely affect these geologic hazards than Alternative A." DEIS at 81.

The Draft Plan provides some components intended to address the risk of project-induced landslides. Under GEO-DC-04 the Draft Plan provides that "[g]eologic hazards (e.g. rockslides, waterfalls, acidic rock, etc.) are recognized and associated risks to public health and safety or facilities and infrastructure are minimized," and under GEO-DC-05 the Plan states that "[g]round-disturbing activities do not cause or contribute to geologic hazards, such as acid rock drainage and landslides." Draft Plan at 29. Under GEO-S-02, the Draft Plan would direct responsible officials to "screen[] for the presence of geological hazards relevant to the geologic setting. If geologic hazards are present, then location and design measures shall be provided for management activities that may affect or be affected by the geologic hazards." *Id.* at 30.

The Draft Plan also discusses how these components should be implemented as part of a management approach, stating generally that responsible officials should "provide for slope stability … by considering site-specific engineering geologic data," that the North Carolina Geologic Survey Landslide Geodatabase and County Landslide Hazard Maps should be "included" when the agency screens for landslide hazards, and that responsible officials should "[c]onduct early detection and loss prevention of unstable and fill slopes (roads, log landings, etc.) that may create a downslope debris flow hazard and risk to public safety." *Id.*

Yet, conspicuously absent from this Draft Plan direction is a statement that lands at risk of landslide or other geologic hazards due to timber harvest activities are not suitable for timber production. While the Forest Service's suitability analysis did identify lands with a slope of greater than 70% as unsuitable for timber production, it's not clear how this subset of lands compares to those identified by the North Carolina Geological Survey or in County Landslide Hazard Maps as being at risk for landslides.

The DEIS plainly acknowledges that timber harvest and associated road building makes landslide-prone lands even more vulnerable. While some degree of vegetation management may be appropriate in areas of the forest that have been identified as landslide-prone, it is clear that these areas are *not* appropriate for indiscriminate, repeated, intensive commercial harvests. However, neither the DEIS—in its suitability analysis—nor the Draft Plan indicate that these lands have been identified as unsuitable. Allowing timber production to occur in geologically unstable areas violates the Planning Rule's prohibition on timber production in situations where it would lead to "irreversible damage to soil, slope, or other watershed conditions." 36 C.F.R. § 219.11(a).

To remedy this problem, the Forest Service must first revise its EIS to include an explanation of how it determined which lands are unsuitable due to the risk of "irreversible damage" and what lands were identified in this analysis. It is not sufficient to simply say that "[m]ethods and assumptions associated with each step are further detailed in the planning record." DEIS at 504.

The *results* of this analysis should be unambiguous: lands prone to geologic hazards are not suitable for timber production.

Second, the Forest Service should include plan components which expressly prohibit timber production from occurring on lands that have been identified in the NCGS Landslide Database, the County Landslide Hazard maps, or any other professional assessment as either being the location of a previous landslide or being at risk of a future landslide. Because the NCGS database does not include assessments of all areas of the Nantahala-Pisgah National Forests, the Plan should also include components which specify that *un*-assessed areas are not (by virtue of this fact) therefore suitable. Rather, the Plan should include standards which require the Forest Service to consult with NCGS and use the best available scientific information to determine, at the project level, whether lands in question would likely be identified as landslide-prone in the NCGS database. If so, they should be deemed unsuitable for timber production.

B. Limitations on Timber Harvest in Unsuitable MAs

1. Reasons for harvest in unsuitable MAs

On lands identified as unsuitable for timber production, NFMA prohibits timber harvests except for "salvage sales or sales necessitated to protect other multiple-use values." 16 U.S.C. § 1604(k). The 2012 Planning Rule states that, "[e]xcept as provided in paragraph (d) of this section [which lists limitations on timber harvest], the plan may include plan components to allow for timber harvest for purposes other than timber production throughout the plan area, or portions of the plan area, as a tool to assist in achieving or maintaining one or more applicable desired conditions or objectives of the plan in order to protect other multiple-use values, and for salvage, sanitation, or public health or safety." 36 C.F.R. § 219.11(c).

The Draft Plan lists several reasons that harvest may occur on unsuitable lands:

> (1) to address issues of public health or safety;
> (2) to reduce hazardous fuels and manage wildfire;
> (3) to improve, restore or maintain a terrestrial or aquatic ecological system or wildlife habitat over time;
> (4) to meet or restore habitat for federally threatened and endangered animals or plants and species of conservation concern;
> (5) to harvest dead or dying trees from fire, natural disturbances, insects, and disease;
> (6) to enhance recreation, scenic or transportation management purposes;
> (7) to accommodate special use permits and outstanding rights; or
> (8) for research, demonstration or education purposes.

ECO-S-02. The Draft Plan then suggests that the reasons for harvest on unsuitable lands are "not limited to" this list. *Id.* Not so. The plan *may* choose to specify reasons for harvest of unsuitable lands, but if it does not, there is no authority for the Forest Service to later create additional loopholes at the project level.

The list itself is generally unexceptional. While we agree that harvests in these categories may sometimes be pursued on unsuitable lands, the fact that a harvest is assigned one of these reasons does not mean it is *automatically* appropriate for unsuitable lands. As explained throughout these comments, sometimes restoration using commercial harvest is appropriate on unsuitable lands and sometimes it is not. To help prevent misapplication of these criteria, the agency should clarify that restoration of a terrestrial ecological system means improving the ecological trajectory of the particular site, consistent with ecozone desired conditions, such as restoring species composition. The list should also include a new item explaining that harvest without a commercial *purpose* (whether commercial harvest or preparation for future commercial harvest) is permitted on unsuitable lands. *See* 16 U.S.C. § 1604(k) (prohibiting "sales" except where needed for salvage or to protect multiple-use values).

2. Limitations needed on unsuitable harvest

The plan may not allow (and must include binding standards or guidelines to prohibit) timber harvest that would "irreversibly damage[]" "soil, slope, or other watershed conditions" or harvest that cannot be "carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and aesthetic resources." 36 C.F.R. § 219.11(d).

Separately, the Planning Rule requires that plans be integrated, which means that plan components allowing timber harvest cannot interfere with a plan's other desired conditions. As relevant here, those other desired conditions include the ecozone desired conditions, which describe the NRV for each ecozone.

Although the Draft Plan includes many components which do clearly limit timber harvest under certain circumstances, in other cases the plan does not provide sufficient clarity. These parts of the plan do not adequately ensure that timber harvest will occur within the limitations imposed under NFMA and the Planning Rule described above, and they must be revised.

a. Steep slopes

In its "Deep Dive" timber webinar, the Forest Service described the processes by which it prepared its analyses of "timber operability" and "commercial viability," the results of which are presented in the Draft Plan. *See* DEIS at B-3, Table 2. In these analyses, "operable" acres were determined to be those acres which "meet operability requirements of local, conventional harvest systems and are administratively available for timber harvest." *Id*. "Commercially viable" acres, on the other hand, are a subset of the "operable" acreage that have mature and productive forests and either current or potential future road access.

The webinar discussed some assumptions that went into this analysis. One set of assumptions, listed on slide 21 of that presentation, pertains to "general equipment accessibility requirements." Specifically, the Forest Service assumed that ground-based logging equipment would be used for areas of the forest that are within ½ mile of existing roads, on both sides of the road, on slopes

less than 40%, while aerial logging systems would only be used on lands within ¼ mile of existing roads, on the downslope side, on slopes between 40% and 70%.

However, there are no corresponding plan components that actually require these limitations on timber harvests. The only plan component that expressly pertains to use of various logging systems on slopes is ECO-S-06, which states that the Responsible Official should "[c]onduct a site-specific review to determine the appropriate logging systems for management on sustained slopes (>200ft) over 40% slope." Draft Plan at 62.

The failure of the plan to provide further guidance to responsible officials with regard to allowable logging systems on steep slopes creates a problem. On the one hand, if the Forest Service assumed that only aerial systems would be used on slopes greater than 40% in its operability analysis, plan components should provide corresponding limits (or at least state that aerial systems are the default system and provide guidance for when exceptions would be appropriate). On the other hand, if the Forest Service does not intend to limit logging of slopes greater than 40% to use of aerial logging systems, then this suggests that the agency used an inappropriate assumption in its operability analysis and effects from logging on those slopes will be greater than assumed.

b. Vague Plan components

In some cases, the Draft Plan components are simply too vague to serve as effective guidance to responsible officials in determining whether timber harvest is or is not permitted in certain locations, and under what circumstances. Plan components must ensure that harvest only occurs "where soil, slope, or other watershed conditions would not be irreversibly damaged" and that harvest "would be carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and aesthetic resources." 36 C.F.R. § 219.11(d). Particularly for conservation or restoration-focused Management Areas, to the extent that plan components purport to allow harvest on unsuitable lands but do not ensure that harvest would only occur when compatible with desired conditions for these areas, the plan does not comply with the Planning Rule.

The Forest Service should clarify the following plan components:

> EIA-S-06: "Salvaging of dead and dying trees is only allowed if compatible with the biological resource for which the area was established or for public health and safety."

The Draft Plan does not list any "biological resources" for which individual EIAs are established. It is our understanding that this unclear wording was left over when this component was split from a similar component related to Special Interest Areas (many of which were established for specific biological resources). Still, there is no clear standard for determining whether salvage harvests would be allowed. This standard should be revised to explain whether and when salvage may be allowed in the EIA. The EIA is intended primarily to restore species

composition, and these areas "typically contain individual threatened, endangered, or rare species, and high quality natural communities or high quality existing old growth." Draft Plan at 214. Consequently, the standard should be revised to allow salvage in the EIA only if compatible with maintaining or improving the desired community composition, the condition of any threatened, endangered, or rare species, high quality existing old growth, and any other high-quality natural communities.

> EIA-S-12: "In EIAs, wildlife habitat improvements may be created, maintained, or enlarged if compatible with species for which the area is recognized."

Similarly, the Draft Plan does not list any species for which individual EIAs are recognized, and therefore it is unclear when and under what conditions this standard may be used to justify timber harvest and other treatments in EIAs. The fix is similar, too: The standard should be revised to allow new or expanded wildlife openings only when compatible with maintaining or improving the desired community composition, the condition of any threatened, endangered, or rare species, high quality existing old growth, and any other high-quality natural communities.

c. Inventoried old growth

As best we can tell, nowhere in the Draft Plan does the Forest Service explicitly say that old growth patches are unsuitable for timber production. We assume that this is just an oversight. To be sure, the Draft explains that these areas were excluded from suitable calculations (notwithstanding the mistaken inclusion of designated patches in the timber base for Alternative B). However, this exclusion from the calculations does not substitute for plan content. The Forest Service must clearly state that designated old growth patches are not suitable for timber production.

d. NHNAs

As discussed in Section X.C, NHNAs would be located within both suitable and unsuitable Management Areas. Because the Draft Plan's components for managing NHNAs on the forests are incompatible with timber production, the plan should also contain components which expressly state that NHNAs are themselves not "suitable." NHNAs must be excluded from timber calculations. Basing volume predictions on regeneration of NHNAs would be making a promise that the Forest Service cannot keep, and would be a source of continuing conflict.

Whether they are located within suitable or unsuitable Management Areas, the Draft Plan would require that timber harvests be compatible with the desired condition PAD-DC-04: "Unique ecological characteristics are maintained or enhanced within the North Carolina Natural Heritage Natural Areas." Elsewhere, the Draft Plan confirms that this desired condition is intended to limit timber harvest to site-specific needs, stating that "[v]egetation management, including prescribed fire, integrated pest management and timber harvest, is allowed when unique attributes of the area can be maintained or enhanced." Draft Plan at 81. This is incompatible with "suitable"

management, in which "regeneration of the stand[s] is intended" regardless of site-specific needs.

The Draft Plan also includes an Objective to "coordinate" with the North Carolina Natural Heritage Program to identify NHNAs, discuss their values and characteristics, review their boundaries, and discuss potential boundary updates. The agency has explained that coordination is needed in part because the boundaries of some NHNAs need to be verified. The agency fails to mention, however, that the need to adjust boundaries is not always due to bad mapping; sometimes it is due to the fact that the Forest Service has conducted harvest activities in these areas already, degrading them so that portions are no longer contributing to the ecological integrity of the mapped area. Such was the case in the Southside project, which adjusted the boundary of the Whitewater River Falls and Blackrock Mountain/Granite City NHNAs because of degradation due to prior harvest.

Specifically, Stand 41-44 was excluded from the Whitewater River Falls and Gorge NHNA boundary after review by the North Carolina Natural Heritage Program, as a result of "more recent group selections harvests which do not meet natural area criteria." Southside EA at 54, 199. The boundary of that same NHNA was modified further "in other areas to exclude young and mid-seral habitat." *Id.* at 54. The boundary of the Blackrock Mountain/Granite City NHNA was redrawn to exclude stand 31-18 after a review of the site, because that area included "younger forest and previously disturbed forested areas with roads." *Id.* at 53–54, 200. This is what happens when NHNAs are scheduled for harvest.

In other words, even though it may be the intention of the Forest Service not to implement a commercial timber harvest within or near an NHNA such that the "unique attributes of the area" are harmed, the reality is that if they are scheduled for regeneration, NHNAs will be at risk of degradation. This is problematic because NHNAs are among the most important areas on the Nantahala and Pisgah National Forests for the maintenance and restoration of biodiversity and ecological integrity.

To address this problem, we urge the Forest Service to adopt the proposal put forward by the Nantahala-Pisgah Forest Partnership, which is also consistent with the discussions of the Stakeholders Forum.

- First, the Draft Plan notes that most "exceptional" NHNAs are included in Special Interest Areas. The Forest Service should include all "exceptional" NHNAs, in their entirety, in SIAs.

- Second, the Forest Service should move all NHNAs classified as "very high" and "high" that are found in Matrix or Interface to Ecological Interest Area Management Areas. Where "very high" and "high" NHNAs are found in EIA, Appalachian Trail corridor areas, Wild and Scenic Rivers areas, or any Group 3 or Group 4 Management Areas, then they would remain within these Management Areas.

- Third, the final plan should include a standard which expressly requires that coordination with the Natural Heritage Program *must* occur *before* any stands in NHNAs are prescribed for treatment, and that the purpose of coordination is to determine whether the areas need any management actions to maintain or restore the rare or exemplary values for which they were identified. This standard must also explicitly recognize that such values are not limited to rare species occurrences, but also include forest communities that the NHP has identified as exemplary. We also suggest an explicit requirement that the input of the Natural Heritage Program be noted in the project record.

We realize that some NHNAs will need boundary adjustment. Where NHNAs are in the Matrix and Interface MAs, this could be accomplished through the informal coordination process above. Where NHNAs are mapped into "unsuitable" Management Areas, it is possible that boundary adjustments might require changes to the plan. The plan should explain the process needed to make boundary adjustments at the project level, to wit:

- If field verification and NHP coordination shows that the MA boundary is based on an NHNA boundary that was poorly drawn in the first place, the MA boundary may be enlarged or tightened to more accurately reflect the rare or exemplary values associated with the NHNA. Such minor adjustments could be made using an "administrative change" to the plan. *See* 36 C.F.R. § 219.13(c). This is the appropriate tool for correcting minor errors that do not have the possibility of adversely affecting the relevant resource values. *See* FSH 1909.12, Sec. 21.5 (administrative changes for minor corrections such as "clerical errors"). The Nantahala-Pisgah National Forests have used this type of change previously to correct minor mapping errors for old growth patches, such as in the Camp Branch salvage sale.

- In contrast, if MA boundary adjustment is proposed for other reasons (such as where the NHNA was degraded by logging after it was mapped), a plan amendment would be required. This type of change has the potential to undermine the assumptions on which the plan analysis was based. The plan analysis assumes that certain values will be adequately protected and restored *because* they are represented at a given level in appropriate MAs. If the Forest Service learns through field verification that these assumptions are incorrect and those values are represented at lower levels than assumed (because they have already been degraded), then re-mapping would require a project-level plan amendment. See FSM 1926.51 (amendment needed when adjusting MA boundaries would affect multiple-use Goals and Objectives, even if the effect is not significant). Project-level analysis would determine whether such degradation requires mitigation or should be offset by a change in management direction for other similar habitat.

C. Adequate Restocking

As noted by the Forest Service directives, NFMA directs that plans "insure that timber will be harvested from National Forest System lands only where … there is assurance that such lands

can be adequately restocked within five years after harvest." FSH 1909.12, Ch. 64.12 (citing 16 U.S.C. § 1604(g)(3)). "The Planning Rule requires plan components, including standards or guidelines, to meet this limitation at §219.11(d)(5)." *Id.*

The Forest Service directives further provide that "[s]uch standards should be based on the different types of forests within the plan area, the harvest methods applied and the desired conditions and objectives of the plan." *Id.* There are three approaches that the Forest Service may take in developing restocking standards:

> 1. In the first approach, the plan contains standards that limit timber harvest to situations with reasonable assurance (see definition) that the stand can be adequately restocked within 5 years of harvest. The standard also identifies what would constitute adequate restocking for specific harvest situations. … plan documentation should support the determination that there is reasonable assurance (see definition) that the identified lands and harvest methods can be adequately restocked for the situations described. The determination of reasonable assurance should be based on best available scientific information.
>
> …
>
> 2. In the second approach, the plan also contains standards that limit timber harvest to situations with reasonable assurance (see definition) that the stand can be adequately restocked within 5 years of harvest. However, these standards require individual timber harvest projects to state findings and provide site-specific documentation that supports the reasonable assurance determination that lands can be adequately restocked within 5 years. The determination of restocking expectations is based on plan desired conditions and objectives applicable to the area and project, and consistent with all other applicable plan components.
>
> …
>
> 3. In a third, mixed approach, the plan contains standards that limit timber harvest to situations that have reasonable assurance (see definition) that the stand can be adequately restocked within 5 years of harvest. These standards also identify of what would constitute adequate restocking as in the first approach. However, the standards explicitly allow for other situations or exceptions supported by a project-specific determination of adequate restocking. The Responsible Official in determining a finding of adequate restocking can rely on documentation in the plan record for the situations described in the plan, but must provide project-specific documentation for situations not included in the plan.

FSH 1909.12, Ch. 64.14. The Forest Service Handbook defines "reasonable assurance" as "[a] judgment made by the Responsible Official based on best available scientific information and

local professional experience that practices based on existing technology and knowledge are *likely to deliver the intended results*. Reasonable assurance applies to average and foreseeable conditions for the area and does not constitute a guarantee to achieve the intended results." FSH 1902.12 Ch. 60.5. "Stocking," meanwhile, is defined as "[a]n indication of growing space occupancy of trees *relative to plan-defined desired conditions for the stand or area*. Common indices of stocking include the number of trees by size and spacing, percent occupancy, basal area, relative density or crown completion factor." *Id.*

The DEIS does not discuss adequate restocking at all. If there is information or analysis in the DEIS that is intended to serve as "[p]lan documentation [which] … support[s] the determination that there is reasonable assurance … that the identified lands and harvest methods can be adequately restocked for the situations described," then it is not identified as such, either in the Draft Plan or the DEIS.

As for the Draft Plan, it appears that the Forest Service has decided to take Approach 3 of the options listed above. While the Plan does contain the required standard, at ECO-S-04, which limits harvests to situations where "[t]here is assurance that such lands can be adequately restocked within five years after harvest," it does not provide adequate standards for determining what constitutes adequate restocking in different situations. Five other plan standards, ECO-S-08 through ECO-S-12, appear to be intended to satisfy the additional requirements for Approach 3. However, there are multiple problems with this section of the Draft Plan, and as currently written it does not comply with Forest Plan directives, the Planning Rule, or NFMA.

To begin with, there appears to be one or more typographical errors in standards ECO-S-08 and ECO-S-09. It's not clear whether there is plan content missing or whether these standards are mislabeled. In any case, as written, it's not clear how and under what circumstances these components would apply, or what they would mean when they do apply. Specifically, as current written, ECO-S-08 and ECO-S-09 appear to actually be one standard. *See* Draft Plan at63-63. They are separated onto different pages of the plan document and there is at least one missing character (an opening parentheses), but the text of each standard appears to be two parts of a single paragraph. The portion of the text labeled as ECO-S-09 actually refers to ECO-S-09, so unless the Forest Service intended to create a recursive loop, there is a missing piece of plan content.

Planting is uncommon on our forests and, if it were routinely needed, the cost would significantly depress the receipts recouped from timber sales and undermine the Forests' ability to increase harvest levels. Accordingly, most harvests will fall under ECO-S-10, which offers stocking guidelines for natural regeneration. The guidelines are based on the percentage of 1/100-acre sample plots which are "occupied by at least one desirable stem in a free-to-grow position on or before the age of five." *Id.* Similar to standards ECO-S-08 and ECO-S-09, this standard expressly states that "project-specific determinations of adequate stocking may occur." The stocking guidelines for natural regeneration provided by ECO-S-10 are as follows:

- Minimum Stocking Levels for regeneration harvests that include production objectives or those requiring future full site utilization = 80%.

- Minimum Stocking Levels for management objectives requiring less than future full site utilization = 30% to 80%.

Unlike standards ECO-S-08 and ECO-S-09, ECO-S-10 does not distinguish between stand community types by ecozone or even coarser types (e.g., "hardwoods," "mixed pine-hardwood," etc.).

Finally, ECO-S-11 provides stocking guidelines for "stands that receive an intermediate treatment and the stand has trees of merchantable size (five-year restocking requirement does not apply)." Here too the Draft Plan states that "project-specific determinations of adequate restocking may occur." The guidelines under ECO-S-11 distinguish between treatment types—i.e., "thinning," "woodland," "permanent opening," and "salvage or sanitation"—but they do not distinguish between forest community types.

These standards and stocking guidelines do not meet the requirements of NFMA, the Planning Rule, and the Forest Service directives. The standards do not provide enough guidance to differentiate situations where adequate restocking would or would not be likely to occur. Ultimately, the DEIS must provide "documentation … [which] support[s] the determination that there is reasonable assurance that the identified lands and harvest methods can be adequately restocked for the situations described … based on best available scientific information." FSH 1909.12, Ch. 64.14. The Draft Plan does not provide a baseline for restocking against which lands or methods could be compared using best available science, so it is no wonder that the DEIS does not provide the required documentation. The Forest Service must provide this documentation in the Final EIS, but first it must tighten up its too-generic stocking standards.

Unlike the guidelines for planting, the stocking standards for natural regeneration do not make any distinction between areas of land or ecozone types; rather, they differ based only on whether "future full site utilization" is required. This is contrary to the directives, which state that "[s]uch standards should be based on the different types of forests within the plan area, the harvest methods applied and the desired conditions and objectives of the plan." FSH 1909.12, Ch. 64.14.

The guidelines for intermediate treatments similarly fail to distinguish between stand types. This is particularly problematic because analysis of woodland canopy cover in the DEIS actually appears to contradict the Draft Plan's stocking guidelines. Specifically, the DEIS states in relevant part that "[o]pen woodland structural classes are assumed to represent 40-60% canopy cover for the fire-adapted oak and pine types," but "[f]or more mesic habitats the open woodland structural class would have a higher canopy cover, up to 80%." DEIS at 165. This number (80%) is outside of the range of desired stocking presented in the guidelines. The plan stocking guidelines must be consistent with analysis in the DEIS and must take into account different forest types.

The failure to differentiate between different ecozones is problematic primarily because it causes the Forest Service to miss the most important issue—species composition. Adequate restocking isn't just about stem counts; it's about ensuring that regeneration is likely to achieve the desired outcome. And, under the Planning Rule and as described by the ecozone desired conditions, the desired outcome is to regenerate a stand with characteristic species composition. Plan standards *must* provide reasonable assurance that harvests will occur only where the future stand will be consistent with ecozone desired conditions. *See* FSH 1909.12, Ch. 64.12 ("[S]tandards should be based on the different types of forests within the plan area, the harvest methods applied and the desired conditions and objectives of the plan"). The Forest Service must revise ECO-S-10 and ECO-S-11 to require monitoring for species composition. This is necessary to support decisions about needed follow-up treatments. Monitoring and follow-up treatment are absolutely required for silvicultural interventions intended for restoration. The Forest Service cannot rationally expect to accomplish restoration objectives without knowing what species are regenerating, including species that will hopefully one day reach the canopy and species that might outcompete them without follow-up treatments. The Final Plan and EIS must provide documentation for its conclusions.

D. Tiered Objectives – Implications for Timber Analysis

As discussed above, the Draft Plan presents objectives for timber harvests as two "tiers." "Tier 1 objectives are those within current and expected future fiscal and staffing capacity of the Nantahala and Pisgah National Forests, and … Tier 2 are those that may be achieved if additional funding, staffing, or partnership assistance becomes available." Draft Plan at77.

Similarly, the Draft Plan's estimated timber harvests, which are listed by treatment type and ecozone, are also divided into Tier 1 and Tier 2 objectives. *See* DEIS at B-10 through B-14. As stated by the Forest Service, these estimates "are intended to comply with FS Handbook 1909.12 Chapter 60 Section 65.1: Display of Forest Vegetation Management Activities."

The cited section of the Forest Service Handbook states that NFMA "requires plans to include specific information regarding timber management at 16 USC 1604 (e)(2) and (f)(2)"—specifically, "[p]lans developed in accordance with this section shall … be embodied in appropriate written material, including maps and other descriptive documents, reflecting proposed and possible actions, including the planned timber sale program and the proportion of probable methods of timber harvest within the unit necessary to fulfill the plan." FSH 1909.12, Ch. 65.1 (emphasis added).

Likewise, the Planning Rule requires this information as "plan content other than plan components," stating that every plan must "[c]ontain information reflecting proposed and possible actions that may occur on the plan area during the life of the plan, including: the planned timber sale program; timber harvesting levels; and the proportion of probable methods of forest vegetation management practices expected to be used (16 U.S.C. 1604(e)(2) and (f)(2))." 36 C.F.R. § 219.7(f)(1)(iv).

The Tier 1 and Tier 2 timber harvest estimates presented in Tables 5-7 in Appendix B are outputs from the Forest Service's Spectrum model. These modeling outputs were in turn used in the DEIS to evaluate impacts to individual ecozones under each tier and alternative, including progress toward structural and compositional desired conditions.

Notably, the timber harvest estimates for Tier 1 and Tier 2, as presented in Tables 5-7, were the result of independent modeling runs. In other words, they are estimates based on two management pathways: in the first pathway, the Forest Service pursues Tier 1 objectives for timber harvest for the entire time period being analyzed; in the second pathway, the Forest Service pursues Tier 2 objectives for the entire time period being analyzed. What the Spectrum model did not evaluate—and consequently what the Forest Service did not analyze—is a management pathway that actually reflects how the Forest Service proposes to implement the Draft Plan's Tier 1 and Tier 2 objectives, i.e., the Forest Service would begin by pursuing Tier 1 objectives and then, based on "additional funding, staffing, or partnership assistance [which] becomes available," the Forest Service could move to Tier 2 objectives.

The fact that the Forest Service's Spectrum-generated harvest estimates and its related impacts analysis do not reflect, even proportionally, the tiered transition approach proposed in the plan is plainly reflected in the estimates themselves. For example, for Alternative B, the Forest Service estimates that, forest-wide, the dry oak ecozone would receive 4,530 acres of intermediate treatments per decade under Tier 1. Yet under Tier 2, this number drops to 782. Similarly, the shortleaf pine ecozone would receive 1,174 acres of regeneration treatments under Tier 1 and 22 acres of regeneration treatments under Tier 2. Additional examples of Tier 2 estimates being lower than Tier 1 estimates are found throughout Tables 5-7, for each alternative.

As a result, if the Forest Service pursues Tier 1 harvest objectives for a period of time until "additional funding, staffing, or partnership assistance becomes available," the agency may have already exceeded the estimated treatments for a given ecozone under Tier 2 estimates. While the Forest Service makes clear that the estimates in Tables 5-7 "are approximations and should not be related directly to future forest level treatment levels," the estimates nonetheless make clear that under Tier 2, the Forest Service's own modeling suggests that the agency would not simply pursue proportionally more harvest in some ecozones, but it would instead pursue a fundamentally different management strategy across all ecozones, one which would likely involve few to zero treatments in some ecozones that would have been specifically targeted for vegetation treatment under Tier 1. This incoherence highlights two problems with the Forest Service's Draft Plan and its DEIS.

First, it is clear that the DEIS does not analyze the environmental effects of this transitional approach. If the agency acquires "additional funding, staffing, or partnership assistance" five years into the planning period and decides to pursue Tier 2 timber objectives, the Spectrum modeling and the Draft Plan timber estimates suggest that the new objectives would shift focus away from certain types of treatments in certain ecozones. Yet the work the Forest Service would have already done in these ecozones could not be undone. If the Forest Service then targets different ecozones under its newly adopted Tier 2 objectives, the result, at the end of the

planning period, would be environmental impacts in some ecozones that are greater than those analyzed separately as Tier 1 and Tier 2 estimates in the Draft Plan and DEIS. This plainly violates NEPA.

The Forest Service may believe that this paradox can be solved by merely disclaiming any intention to hold itself to the Spectrum outputs. After all, the agency has been clear that it views the Spectrum model as merely one scenario that would be allowed under the plan. However, these scenarios are the *foundation* for the DEIS and ESE tool analysis. If these scenarios don't matter, then the Forest Service has nothing to analyze at this stage, and nothing to tier its project-level analyses to later. If the Forest Service intends to rely on the Spectrum analysis, then it *must* include plan components that ensure those assumptions are met in individual projects and cumulatively in the program of work over time.

When the Forest Service re-runs its Spectrum models, it should take care to ensure that Tier 1 outputs are included within Tier 2 outputs, to prevent this paradox from reappearing in the final plan. The Spectrum assumptions about which ecozones will be prioritized for harvest should be consistent with a real-world transition from Tier 1 to Tier 2. Even more important, the Forest Service should ensure that those assumptions are reflected by plan components, so that the EIS is taking a hard look at what the plan will actually do, rather than what it might or might not do.

IX. Vegetation Management: Ecological Integrity – Structure and Composition

A. NRV Basics

Under the 2012 Planning Rule, plan components must maintain ecological integrity where it exists, and restore it where it has been degraded. This requires that the plan *ensure* that systems stay within or move toward the natural range of variation (NRV), at least to the extent available within the fiscal capability of the agency and the inherent capability of the land.

Specifically, the Planning Rule states that plans "must include ... components ... to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems," 36 C.F.R. § 219.8, and it defines ecological integrity as "the quality or condition of an ecosystem when its dominant ecological characteristics ... occur within the natural range of variation." 36 C.F.R. § 219.19. The Directives reiterate this overarching requirement, stating that "plan components [must] be designed to maintain resources that have ecological integrity and to restore conditions where they are degraded, damaged, or destroyed." FSH 1909.12, Ch. 23.

Ecosystems function at multiple spatial scales, from the landscape level to the microhabitat. *See* FSH 1909.12, Ch. 12.13 (spatial hierarchy of ecosystems). The NRV is the variation in ecosystem characteristics "produced by dominant natural disturbance regimes." FSH 1909.12, Ch. 05. It is measured along four dimensions: structure, composition, function, and connectivity. 36 C.F.R. § 219.19. "Composition" consists of the "biological elements" of the system, including the species present and their genetic diversity, and, at a broader scale, the communities and systems of which they are a part. "Structure" is the "physical arrangement" of those biological elements. For vegetation, structure includes fine scale considerations, such as presence of snags or down woody debris and vertical and horizontal heterogeneity, and, at the landscape level, pattern and connectivity.

While the Forest Service directives state cryptically that NRV "does not constitute a management target or desired condition," FSH 1909.12, Ch.05 (defining NRV), the Planning Rule itself expressly requires that plan components maintain or restore the condition of being within NRV, 36 C.F.R. §§ 219.8(a), 219.19. So, when developing desired conditions, the Forest Service does not have the flexibility to ignore NRV. To comply with the Planning Rule, moving toward desired conditions must also be moving the forest toward NRV. Desired conditions should be "sufficiently detailed" such that the purpose and need of future projects can be determined by reference to the desired conditions themselves. FSH 1909.12, Ch. 22.11. Desired conditions must also be specific enough that "progress toward their achievement can be measured." *Id.* In the draft, the ecozone desired conditions do a good job of showing where we should be heading.

The Forest can "manage for characteristics outside the NRV" only where meeting NRV is truly impossible or inappropriate. FSH 1909.12, Ch. 23.11a. Moreover, this exception is limited to "specific areas" in which the Forest can document its rationale for departing from NRV in the Record of Decision, based on the best available science. *Id.* To apply this exception generally

rather than in specific, discrete areas would run afoul of the Planning Rule, which makes ecological integrity (and therefore NRV) the overriding goal for ecosystems at all relevant scales. 36 C.F.R. § 219.8. Maintaining and restoring ecological integrity is, by definition, working toward the NRV for all dimensions within ecosystems at all scales. FSH 1909.12, Ch. 12.13, 23.11b.

Without question, timber harvest is a tool which may be used where "necessary" to meet desired conditions and move areas of the forest toward NRV. 16 U.S.C. § 1604(f)(2) (requiring the plan to state the "proportion of probable methods of timber harvest within the unit necessary to fulfill the plan"). Yet timber harvest is also the activity most likely to cause degradation and departure from the NRV when used incorrectly. This is particularly true in the complex communities found in the Southern Appalachians, where regenerated stands seldom retain the characteristic species associations and diversity that existed prior to logging. While regeneration harvest certainly can contribute to landscape-level needs for young forest habitat, it can also negatively impact composition, both at the stand level and cumulatively, and it can displace fine-scale processes and functions like gap phase dynamics that would otherwise keep stands within NRV for fine-scale structure.

B. Restoring Composition as a Plan-Level Strategy

To show consistency with the Planning Rule, the Forest Service must include plan components that limit timber harvest to locations and situations in which it will contribute to, and not undermine, progress toward NRV at all relevant scales.

Ideally, regeneration harvest would only be used where the existing stand's composition is so uncharacteristic that regeneration harvest will plausibly improve it. Such treatments would also meet structural needs if carried out at scale.

We understand the Forests' explanation that this approach would not be economically viable. DEIS at 28-29. We also understand the explanation that regeneration in mesic, productive ecozones will help to pay for needed restoration work elsewhere, even though it will cause "local" departures from ecozone desired conditions. *Id*. at 47.

This explanation does not excuse the Forests from analyzing the "compositional restoration" approach in more detail. What would be the effect if the Forests focused only on the highest priority work? How much less overall work would get done because of lower stumpage? What would be the effect on landscape- and fine-scale structure? On species composition? By failing to analyze the alternative, the Forest Service missed an opportunity to show tradeoffs in a way that could inform not only the planning decision, but could also inform policymaking.

If the Forests had unlimited budgets and an instruction to restore NRV, we are confident they would not prioritize regeneration harvests in cove forests as the best way to do so. They would instead do higher priority work that may be less commercially viable but would provide more ecological benefits. Given current budgets, we can accept that landscape-level structural targets

cannot be achieved without some level of scheduled harvest in productive ecozones. Still, the Nantahala and Pisgah, along with every other unit that goes through planning under the new rule, should explain how much high-priority work it can accomplish with current budgets. If there is a gap between the need and capacity, it is important that this information be available to policymakers, so that budget requests can reflect the true need. If the Forests do not differentiate between a program of high priority work and a program of work that sacrifices NRV "locally" to keep the lights on, this critical information will not be available.

To put a point on the issue: the Forests must analyze the cumulative impact of operating a timber sale program without adequate budgets to do it responsibly. If the Forests must choose between meeting landscape-scale goals for structure and cumulatively improving species composition, it must make that choice transparently and based on quantitative analysis.

C. Tradeoffs Between Composition and Structure

Even as between the action alternatives, the DEIS fails to adequately acknowledge or analyze the tradeoffs between the goals of structural restoration and compositional restoration. This falls short of NEPA's "hard look" requirement.

Throughout the DEIS, the Forest Service repeatedly makes statements suggesting that, as between alternatives, the more acreage of an ecozone that is allocated to MA Groups 1—where timber production is allowed—the greater opportunity there is to increase the pace and scale of "restoration." *See e.g.*, DEIS, at 199 ("Alternatives B and D may have higher potentials to increase the pace and scale of restoration because they include higher amounts of MA Group 1 compared to Alternative C."). The clear implication of this statement is that regeneration harvests are equivalent to restoration because they create young forests. Really? Is scheduled harvest in NHNAs and WIAs "restoration"?

As explained above, NFMA and the Planning Rule require that the Forest Service include plan components which move the forest toward NRV for all four elements of ecological integrity: structure, composition, function and connectivity. Structural restoration objectives cannot work against the desired conditions for species composition. 16 U.S.C. § 1604(f)(1) (requiring "one integrated plan"). Importantly, with respect to species composition, regeneration often causes a shift *away* from NRV.

Again, ideally, the Forest Plan would include standards and guidelines to ensure that regeneration harvests only take place on stands where it will not degrade composition. However, as explained by the agency, there is a tradeoff between getting enough structural work done and doing work that maintains or restores composition. As noted above, this isn't strictly true, because the tradeoff comes from the agency's budgets, not from physical factors. However, even accepting the reality of the tradeoff, the Forest Service absolutely must show the effects of both choices. To the extent that the plan components would allow for regeneration harvests on stands where species composition will *not* plausibly be improved, the DEIS must expressly acknowledge the relative tradeoffs of creating young forests and improving composition.

The Forest Service does acknowledge the *possibility* of these tradeoffs in the DEIS. For example, in regard to oak ecozones, the Timber Resources section of the DEIS notes that

> Given the long-term investment … needed to develop advanced competitive oak regeneration, *some stands within the oak community landscape would need to be harvested with structural goals in mind* … to meet vegetation structure and wildlife habitat objectives, to continue to support local economies, and to fund other restoration priorities on the forests. *In these situations, there may be less opportunity to focus on the future stands composition* (i.e., a decrease in oak composition in young forest stand). Possible locations for these structural/habitat centric types of action are on mesic sites with already high densities of tulip poplar, on cove sites where there is currently an overabundance of oak outside the natural range of variation, or on dry sites that are natural accumulators of oak.

DEIS at 499 (emphasis added). In other words, the Forest Service admits that its oak forest prescriptions will be bad for oak regeneration. Elsewhere, with respect to shortleaf pine ecozones, the DEIS expressly notes that "[c]ompositional and structural restoration are closely linked within the shortleaf pine ecozone. Typical treatments to adjust the composition will lead to variable density stand structural conditions and open conditions over time in the presence of prescribed fire." DEIS at 208. However, this is the *only* ecozone where the Forest Service states that compositional and structural restoration are "closely linked," implying that in many other cases, there are, in fact, tradeoffs.

Yet the DEIS completely fails to analyze the environmental impacts of these tradeoffs under different tiers or different alternatives. Nor does the analysis of impacts to individual ecozones directly acknowledge that pursuing structural goals can cause a regression of ecological integrity for composition. At best, the DEIS notes that in cove ecozones, in light of the large amount of regeneration harvests estimated under Tier 2 objectives, "restoration of canopy composition would be at a slower pace compared to pine and oak dominated ecozones because less is known about the silvics and reestablishment of mesic hardwoods compared to pines and dry oaks." DEIS at 196.

That is an astonishing understatement. Less is known? The Forest Service has example after example of how timber harvest in mesic hardwood systems affects future stand composition. Where it disturbs mineral soil and creates high-sunlight conditions, as in a regeneration harvest, the result is almost uniformly poplar regeneration. Here are just a few examples of this ubiquitous problem:

- Golden Ridge
- Shope Creek (right-hand drainage)
- Pilot Cove
- Cub Gap trailhead
- Foster Creek (1990s project)

- Courthouse Creek (just west of the intersection of Courthouse Road and Mill Station Road)
- Corner Rock Creek (from the Sugar House Cove timber sale)
- Hurricane Ridge

The list could go on, but these comments are long enough without listing all the projects that promised oak regeneration and instead produced thickets of tulip poplar. In all these examples, the Forest Service has degraded the local compositional diversity of the harvested stands. The sum of these and other similar impacts is a cumulative loss of compositional diversity at the landscape level. Over multiple planning cycles, these impacts will continue to degrade compositional diversity in productive ecozones unless the Forest Service includes plan-level limitations to prevent that outcome.

If by "less is known," the Forest Service means instead to say that it has not developed a reliable silvicultural system to maintain or restore species composition in these stands, then we agree. But the DEIS should be honest about that, and acknowledge that such harvests are not intended for restoration; they are intended to meet commercial purposes.

Most glaringly, the DEIS fails to disclose these tradeoffs between composition and structure based on the relative proportion of the landscape in each alternative in the Ecological Interest Area (EIA). This Management Area is only found in Alternatives C and D; there are no EIA acres in Alternative B.

Between Alternatives C and D, Alternative C has more acreage (79,550 acres) allocated to EIA than Alternative D (26,000 acres), resulting in comparatively "more limitations on the timber management activities that can occur in these locations." DEIS at 25. As noted by the DEIS, the EIA "emphasizes activities that focus on enhancing or maintaining high quality ecological communities and their local attributes. This is accomplished by restricting timber harvest, except where it contributes to desired species composition." *Id*. at 26.

The Draft Plan states that "top priorities in [the EIA] management area would be to restore community composition by treating stands with uncharacteristic vegetation. The need for balancing age classes at the landscape scale would not drive stand level prescriptions. Ecological restoration would result in a mix of forest habitats of various ages, sizes, and configuration." Draft Plan at 214. Specifically, at EIA-S-02, the Draft Plan limits timber harvest to only those situations in which "it does not result in departure from the desired community composition." Draft Plan at 215. In other words, compared to Alternative B, Alternative C would have 79,550 more acres in which harvest would improve species composition and provide structural diversity as an ancillary benefit.

The EIA is an incredibly important innovation. It provides appropriate management that can and will provide structural benefits while also improving stand-level ecological trajectories. As a result, it is a good option for areas of the forest with high ecological integrity but some needs for active management for restoration, as opposed to harvest that creates "local" departures from

NRV for commercial reasons. The Forest Service should have explained the beneficial effects of this innovation by comparison to Alternative B (and to a lesser extent, D).

Under Alternative B, more harvests would degrade species composition and fewer harvests would restore it. The reverse would be true in Alternative C. The public deserves to see a quantitative estimate of what those effects would be, and the decisionmaker needs to know as well. Unfortunately, the DEIS does not analyze this issue at all. In fact, the DEIS does not seem to anticipate *any* real level of work in the EIA.

In its analysis of impacts to individual ecozones, the closest the DEIS comes to assessing the comparative effects of allocating differing acreages to the EIA is where it makes statements like "Alternatives B and D may have higher potentials to increase the pace and scale of restoration because they include higher amounts of MA Group 1 compared to Alternative C," which by comparison, has a higher amount of acreage in EIA. *See* DEIS at99. Yet, as discussed elsewhere in these comments, this observation implies that "restoration" is equivalent to "harvests on suitable lands"; it does not even pay lip service to the other dimensions of ecological integrity that the Forest Service must restore. Nor does this observation specify that the restrictions on timber harvest in the EIA are the reason for Alternative C's comparatively "slow place." Nowhere does the Forest Service expressly analyze the impacts to individual ecozones due to allocation in the EIA Management Area.

The DEIS similarly fails to analyze the impacts to achieving structural desired conditions at the forestwide scale from allocating acreage to the EIA. In discussing the impacts of different action alternatives on the amount of young forests, old growth, and woodlands, the DEIS does not directly address the effects of allocating acreage to the EIA. Rather, the DEIS simply displays charts indicating that each action alternative would lead to a nearly identical amount of young forests and old growth based on its Spectrum modeling. *See* DEIS at 161, 164. While the DEIS does include a chart showing that the amount of woodland conditions would vary between action alternatives—albeit only under Tier 2 objectives—the DEIS does not attempt to explain why this is so, for example, by attributing this outcome to differences in Management Area allocations or other plan components. DEIS at 166.

The DEIS's failure to disclose or analyze any differences in impacts to ecological integrity based on EIA allocation, either at the ecozone or forestwide scales, constitutes a failure to take a "hard look" under NEPA. The Forest Service must fully analyze these impacts in its final EIS.

D. "Local" Departures from NRV

NRV is the default reference model for the entire forest. FSH 1909.12, Sec. 14a ("use [NRV] as the ecological reference model."). Consistent with this instruction, the Forest Service acknowledges that NRV is "a guide to understanding how to restore a resilient ecosystem with structural and functional properties that will enable it to persist into the future." Draft Plan at 343 (quoting FSH 1909.12, Sec. 23.11a). Accordingly, the Forest Service developed a detailed set of ecozone desired conditions that are based on best available scientific information. Draft Plan at

47-57. However, the Draft Plan prefaces the description of these desired conditions with a puzzling disclaimer:

> While these conditions generally apply to each ecozone, in some situations when restoration of the terrestrial ecosystems interacts with goals and objectives of other resources or needs to address changes required for ecosystem adaptability, it may be appropriate to locally deviate from desired conditions. Site specific projects will be designed to restore the landscape structure and pattern of ecozones by contributing toward desired conditions at the forestwide scale. Social and economic conditions will be considered during project design while providing for ecological resilience at local and landscape scales. It is appropriate to be outside the range of desired conditions at the local scale in order to achieve social, economic, cultural or ecological desired conditions at the landscape scale.

Draft Plan at 47. The idea that the Forest Service can simply ignore NRV on some dimensions or scales is unlawful for at least two reasons.

E. Deviation from NRV is Limited

The relevant authorities are explained at length above: The Planning Rule requires that plans maintain ecological integrity where it exists and restore it where it does not. 36 C.F.R. §§ 219.8(a); 219.19 (defining maintenance and restoration). Ecological integrity is defined as the condition of being within the NRV, and NRV is measured at all relevant scales along the four dimensions of structure, function, composition, and connectivity. Id. § 219.19.

Despite this clear instruction, the Draft Plan purports to create a loophole as large as the footprint of possible timber harvest on the Nantahala & Pisgah. Whenever needed for a breathtakingly broad list of reasons— "social, economic, cultural, or ecological desired conditions at the landscape level"—the Forests claim that they can simply ignore ecozone conditions "locally."

For support, the Forests argue that "In some locations on the forest, it is appropriate to be outside the range of desired conditions in order to achieve social, economic, cultural, or ecological objectives." DEIS at 147 (paraphrasing FSH 1901.12, Sec. 23.11a). The relevant section of the directives provides that, "[i]n general, where appropriate" plan components should be "aimed at maintaining or restoring the natural range of variation." FSH 1901.12, Sec. 23.11a. However, the directives also state that "For specific areas within an ecosystem, the Responsible Official may determine that it is not appropriate, practical, possible, or desirable to contribute to restoring conditions to the natural range of variation." *Id.* Similarly, the directives explain that "not every … acre has to meet the definition of ecological integrity, because some specific areas may not have the capability or because another concern such as public safety is more important in a specific area." *Id.* Sec. 23.11.

When may the Forest Service determine that maintaining or restoring NRV is not "appropriate, practical, possible, or desirable"? The directives offer a list, including situations in which

restoration is "not possible" or because of "health and public safety concerns." *Id.* Sec. 23.11a. But the directives' final example is an elephant in a mousehole: NRV can be ignored when "directly opposed to integrated desired conditions (desired conditions that represents a balance of social, economic, cultural and ecological needs)." *Id.*

This loophole is not supported by the text of the Planning Rule. To be sure, meeting NRV is not required when it is outside the forest's fiscal capability or beyond the fiscal capability of the land, but the Planning Rule does not offer other compromises. Seemingly realizing that this exception is on shaky legal ground, the directives attempt to confine it to "specific areas." FSH 1909.12, Sec. 23.11, 23.11a. The only example we are currently aware of where this exception has been applied is to recognize tree clearing in a western ski resort. To our knowledge it has never been applied, as the Nantahala and Pisgah purport to use it, to allow deviation from NRV anywhere, for any timber harvest, for any "landscape-scale" need related to "social, economic, cultural, or ecological" values.

The Forests are out on a limb here. As applied here, the loophole in Sec. 23.11a is well outside of the agency's lawful discretion under the Planning Rule.

F. Plan Integration

As noted above, the Draft Plan incorporates NRV concepts by ecozone into detailed desired conditions. Draft Plan at 47-57. The Forests' decision to disregard its own desired conditions violates the requirement that plans be "integrated."

Plan "integration" is a fundamental requirement of NFMA and the Planning Rule and directives. It means, simply, that one plan component cannot be inconsistent with or prevent the achievement of another. FSH 1909.12 Sec. 22. While we appreciate the inclusion of the ecozone desired conditions, which are based on the best available scientific information, the Draft Plan disclaims any intent to integrate these desired conditions into its timber sale program.

The Draft Plan and DEIS seem to suggest that desired conditions for NRV can be ignored at the "local" scale without any harm to overall progress toward NRV at the landscape scale. However, there is no such thing as a strictly "local" departure from NRV for structure. Is a 40-acre young forest patch within mesic oak forest characteristic for that ecozone? The question is unanswerable at the "local" level. What matters is whether there are too many large patches or not enough small patches in the ecozone at the landscape scale to appropriately mimic the structure that would be created if natural disturbance processes were operating normally. By allowing "local" departures anywhere the Forests want to prioritize commercial factors, the Forests also allow cumulative impacts that are inconsistent with landscape-scale NRV for structure.

If the Forest Service wants to allow these "local" departures, it must show that the plan components will nonetheless restore NRV along all dimensions and at all relevant scales. In other words, the Forests cannot give themselves the flexibility to conduct all regeneration

harvests in productive ecozones in which large patches are inconsistent with ecozone desired conditions. They must also show that some portion of those large patches will be in more appropriate ecozones, or that large patches are being used to restore species composition, or both. The Partnership's recommendations solve these problems. By including appropriate lands in the Ecologial Interest Area and ensuring that an appropriate proportion of regeneration harvests are priority treatments (which will maintain ecozone desired conditions locally), the Forests could show consistency with the Planning Rule's ecological integrity requirements and avoid exposing the legal vulnerability of the loophole in the directives.

G. Requirement that the Plan Itself (Not Future Projects) Maintain and Restore Integrity

The Planning Rule requires that the plan include components which will maintain or restore ecological integrity by moving the forest toward the natural range of variation. *See* 36 C.F.R. §219.8; *see also* FSH 1909.12, Ch. 23. The difference between progress toward NRV and degradation cannot be left to project-level decisions, because project-level analyses cannot weigh landscape-scale considerations effectively. But that is exactly what the Draft Plan proposes to allow. We agree that Objectives *should* "outline the proposed path from current conditions to desired [ecozone] conditions," but the plan's Objectives emphatically do not. *See* DEIS at 150.

Outside of the EIA, the Draft Plan does not make any attempt to limit or prioritize the situations in which harvest would occur. As a result, the plan allows regeneration harvest anywhere, at any level, subject only to project level decisions. Regeneration harvest could be focused either in cove forests (where cumulatively it would degrade ecozone-scale structure and composition) or shortleaf pine ecozones (where it would be much more likely to restore NRV). Yet the Spectrum model rests on assumptions about which ecozones would see the most and least active management. *See generally* DEIS at D-21 to D-30. For example, at Tier 2, Spectrum assumed that at least 50% of young forest creation "must" occur in oak forest types. *Id.* at D-26. Nowhere in the Draft Plan have we found components corresponding to these "rules" in Spectrum.

In effect, the DEIS is not analyzing the plan itself; it is analyzing a single scenario that *could* result from the plan. Even if this scenario would maintain and restore NRV (which, for other reasons explained in these comments, is dubious) other possible scenarios would not. Those other scenarios' outcomes, or the range of possible outcomes, is simply not described. This cannot pass muster under NEPA, which requires transparency, or NFMA, which requires that the plan must make the decisions needed to ensure progress toward NRV.

In addition, the assumptions for certain ecosystems are either inconsistent with ecozone desired conditions and NRV, or are consistent with desired conditions but not reflected in plan components. Either way, the EIS does not support a reasoned conclusion that the Draft Plan would maintain and restore NRV.

1. Northern hardwoods

For this suitable ecozone, with between 9,700 and 13,750 acres estimated to fall within suitable Management Areas across alternatives, the DEIS suggests there will be only "limited canopy manipulations," and the Spectrum model estimates that there would be few if any timber harvests. *See* DEIS at 175; *see* Draft Plan at. B-10 (estimating *zero* acres harvested under both tiers of Alternative B and D and under tier 1 of Alternative C, and only 23 acres under tier 2 of Alternative C).

Despite these estimates for practically no harvests in the northern hardwood ecozone, the DEIS instead states that active management would include "[t]hinning and release, various uneven-aged, and limited even-aged treatments" which would be "beneficial to … structural development as well as creating more diverse habitat conditions" and which "may also provide the opportunity to enhance the composition of longer-lived, shade tolerant hardwood species….." DEIS at175. The DEIS goes on to say that "Alternatives B and D may have a higher potential to increase the pace and scale of restoration because they include more acres in MA Group 1 compared to Alternative C"—the implication being that restoration opportunities are more prevalent because timber production is allowed MA Group 1 and harvest-related management activity more generally is more appropriate in Matrix and Interface. Yet the Spectrum model estimated *zero* harvests of *any kind* in this ecozone under Alternatives B and D.

In terms of impacts to structure and composition, the DEIS observes that under Tier 2 objectives, composition in northern hardwood ecozones would improve more than under Tier 1 objectives. In terms of creating young forests, the DEIS concludes that "[t]he amount of young forest would follow forestwide trends of increasing over 10 years to 50 years for all action alternatives. Tier 2 objectives would create slightly more young forests under all action alternatives." DEIS at 176. Correspondingly, the DEIS notes that "Tier 2 objectives would result in a slower rate of increase in the old growth structural class." *Id.*

In other words, the DEIS's conclusions about the environmental impacts to the northern hardwood ecozone is appears based on an expectation that a variety of timber harvests would take place, but this is not reflected in the Forest Service's modeling and Draft Plan timber harvest estimates—without explanation. In short, the Forest Service's analysis simply doesn't add up; the "alternative" assessed in Spectrum does not appear to be the alternative the agency actually plans to execute, or the agency wants to leave itself the discretion to cause impacts that are outside of the analysis supported by the Spectrum model.

2. Dry Oak

As discussed in greater detail elsewhere in these comments, this ecozone has been determined to be unsuitable for timber production and has been acknowledged to be generally unsuitable for commercial timber harvest due to the size and quality of trees present. Draft Plan at B-10. Yet the Spectrum outputs in Appendix B estimate between 8,500 and 12,600 acres of regeneration harvest per decade under Tier 2 objectives. Draft Plan at 50-51; DEIS at 192-94, 198.

The Forest Service has explained this inconsistency by stating that the agency wants to use timber harvest to create young forests and woodlands in this ecozone, and also to develop new wood product markets. Att.11 (communication with Forest Service silviculturalist Jason Rodrigue, May 2020). With regards to the need for young forests and woodlands, the agency cited the fact that NRV for young forests in dry oak is up to 22% of the forestwide acreage. *Id.* However, the upper range of the Spectrum harvest estimates for this ecozone (12,600 acres) would appear to *exceed* NRV for young forests. With 12,600 of regeneration harvests over a decade, this would create young forest in nearly 26% of the dry oak ecozone forestwide. The degree to which NRV would be exceeded would actually be even higher if the Spectrum model accounted for natural disturbances on the forests.

3. Coves

As discussed elsewhere in these comments, the Plan and DEIS state that there would be significant harvests to create young forests in cove ecozones, and this would exceed NRV. Draft Plan at B-10; DEIS at 196, 200. These estimated harvests would occur despite the fact that gap phase dynamics are the dominant structural process in cove ecozones and creation of large patches of young forest is not consistent with this component of ecological integrity. Draft Plan at 50-51; DEIS at 192-94, 198.

The DEIS also acknowledges that compositional restoration would proceed slowly or slightly in cove ecozones, and elsewhere it is impliedly acknowledged that in fact on some stands—i.e. poplar dominated—composition would get even worse as a result of structure-focused harvests. *See* DEIS at196; 499.

Strikingly, the Spectrum timber harvest estimations in Appendix B show very few harvests for cove ecozones under Tier 1 objectives but a significant increase—by thousands of acres—under Tier 2 objectives. This raises the question of whether ecological restoration is really the goal under Tier 2 objectives. If ecological restoration *were* the goal, then presumably it would consist of activity that could be expected not to degrade the harvested stands. Elsewhere, the DEIS suggests that there would be an increased need to harvest within the cove ecozones under Tier 2 objectives in order to

> 1) meet the higher activity levels of Tier 2 plan objectives; 2) continue to support the restoration efforts on other lower value community types; 3) reflect the location of the current forest service road network; and 4) return to stands previously harvested to continue silvicultural intent and improve/restore forest conditions.

DEIS at499. In other words, the DEIS essentially says that, among other reasons, harvests under Tier 2 would need to increase because Tier 2 harvest objectives call for an increase. This is the definition of an arbitrary justification for what the DEIS characterizes elsewhere as “ecological restoration.”

Although the DEIS clearly suggests that compositional restoration of cove ecozones may not occur or may occur more slowly, it nonetheless concludes that "Alternatives B and D may have higher potentials to increase the pace and scale of restoration because they include higher amounts of MA Group 1 compared to Alternative C." DEIS at 199. Once again, the implication of this statement is that harvests, no matter where they occur, equate to restoration. Yet the Forest Service's own analysis suggests this is not true—not for stand composition, and not for stand structure.

Even putting aside the fact that the DEIS's conclusions about environmental impacts to ecozones is based on flawed modeling and correspondingly inappropriate timber harvest objectives, the DEIS's analysis of impacts to individual ecozones is internally consistent. In a number of places, the DEIS's assumptions and conclusions simply do not make sense when compared to the Draft Plan's timber harvest estimates. This runs afoul of Forest Service directive which state that "[r]esource information and other data" in forest plans must be "factual and accurate," and "assumptions, analytical approaches, and data" must be "consistently applied within the plan." FSM 1926.21.

X. Biological Diversity

At a time when the biological diversity of the Southeast region faces ever-growing threats from climate change, habitat destruction and fragmentation, and pollution of air, soils, and water, public lands are increasingly important in providing a safe haven for species to survive. National Forests provide some of the last, best habitat for safeguarding rare plants and wildlife. Congress has directed National Forests to steward their lands and waters to protect native species and aid in the recovery of threatened, endangered, and other rare animals and plants.

Under the National Forest Management Act, forest plans must "provide for diversity of plant and animal communities." 16 U.S.C. § 1604(g)(3)(B). The agency is directed to provide for "social, economic, and ecological sustainability within Forest Service authority and consistent with the inherent capability of the plan area." 36 C.F.R. § 219.8. Sustainability-related plan components include components designed to "maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity." 36 C.F.R. § 219.8(a)(1). The agency is also charged with developing plan components for riparian areas that take into account, among other things, "aquatic and terrestrial habitats" and "ecological connectivity." *Id.* § 219.8(3)(i)(D), (E). Overall, the Forest Service's most important obligations in plan development are to restore and maintain ecological sustainability and biological diversity. *See, e.g.*, 36 C.F.R. §219.10(a)(7) (noting multiple use plan components must "meet the requirements of §§ 219.8 and 219.9" and requiring consideration of foreseeable risks to ecological sustainability in multiple use planning).

Section 219.9 directs forests to adopt "a complementary ecosystem and species-specific approach to maintaining the diversity of plant and animal communities and the persistence of native species in the plan area." 36 C.F.R. § 219.9. Under this approach, the sustainability plan components required by § 219.8(a) are paired with ecosystem-level components "to maintain or restore the diversity of ecosystems and habitat types throughout the plan area." 36 C.F.R. § 219.9(a)(2). Specifically a plan must include components "to maintain or restore:

> (i) Key characteristics associated with terrestrial and aquatic ecosystem types;
>
> (ii) Rare aquatic and terrestrial plant and animal communities; and
>
> (iii) The diversity of native tree species similar to that existing in the plan area."

Id. This is known as the "coarse filter."

Next comes the "fine filter." Where it is determined ecosystem plan components are "insufficient" to "contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area," "then additional, species-specific plan components, including standards or guidelines, must be included in the plan to provide such ecological conditions in the plan area." 36 C.F.R. §219.9(b)(1).

In addition to fulfilling its NFMA obligations, the agency must also satisfy NEPA. NEPA requires the Forest Service to take a "hard look" at the direct, indirect, and cumulative effects of the Forest Plan revision. *See Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989). That includes taking a hard look at impacts from the plan on federally listed threatened and endangered species, species of conservation concern,[36] and other sensitive species in the planning area.

In developing plan components related to ecosystem integrity and evaluation impacts to species, the Forest Service must utilize the best available scientific information. 36 C.F.R. § 219.3.

The Draft Plan and DEIS show real progress from the current plan with respect to ecological integrity and NRV at the landscape scale. However, the Plan relies too heavily on the landscape-level changes that will occur in the effort to move the Forests towards a more natural state, and as a result it does not fully consider impacts to species or address how those impacts would differ under each alternative. The coarse filter components are not sufficient to account for all significant species issues, and the fine filter elements do not adequately fill the gaps in species protection. Additionally, the Plan does not demonstrate how it will contribute to the recovery of federally-listed threatened and endangered species. Many of the problems we will describe below could be addressed by adopting the recommendations made by the Nantahala-Pisgah Forest Partnership, which identify areas of special importance to biological diversity for management compatible with those biological values. In the following sections, we also make further recommendations to improve the Draft Plan and ensure that species impacts are sufficiently considered and disclosed in the DEIS.

A. The DEIS Approach to Assessing Species Impacts

The Draft Plan and DEIS utilize a "coarse filter" (ecosystems) and "fine filter" (species) model to fulfill species-related requirements. The "coarse filter" is defined as "the Terrestrial Ecosystems section of the plan components" which "provide[] . . . protections for ensuring plant and animal diversity across the Nantahala and Pisgah." Draft Plan at 44. Coarse filter components "identif[y] conditions to maintain or restore ecological integrity and resilience of ecological zones at broad and finer scales, and by doing so, should account for the needs of most native species that occur on the forest." *Id.* The Terrestrial Ecosystems components address landscape patterns, ecozone characteristics, and management priorities. These components include priorities related to timber management and old growth forests, as well as addressing

[36] "Species of conservation concern. For purposes of this subpart, a species of conservation concern is a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area." 36 C.F.R. § 219.9(c). SCC for the Nantahala and Pisgah were determined in 2015. *See* Att. 13, Species of Conservation Concern (SCC), Nantahala-Pisgah Forest Plan (July 2, 2015) (hereinafter "SCC for Nantahala-Pisgah NFs"). We believe that the SCC list as developed during this process is based on the best available scientific information.

terrestrial wildlife habitat across all ecozones and forest health. In short, the coarse filter components provide a guide for how ecosystems will be impacted by the Forest Plan within the limits of Forest Service resources and authority.

The DEIS describes the purpose of the coarse filter as follows: "[t]he underlying assumption is that the ecological conditions provided by an effective coarse-filter approach contribute to the overall biological diversity across the entire plan area. With a biologically effective coarse-filter approach in place, more costly and information-intensive fine-filter strategies can be focused on the few species of special concern whose habitat requirements are not fully captured by coarse-filter attributes." DEIS at 149.

The "fine filter" is intended to "provide[] for specific habitat needs that are not met by the coarse filter." Draft Plan at 81. The fine filter consists of plan components that are specific to species-related issues (standards, guidelines, and management approaches applicable to all species groups) or specific to certain unique habitats or certain species. Draft Plan at 87-89. These strategies are based on "an understanding of individual species' life requirements and demographic information and on direct measurements of critical habitat elements needed for their survival, distribution, and abundance." DEIS at 149.

As described in the DEIS and Draft Plan, as well as in the Wildlife and Plant Species Analysis Deep Dive Webinar, the Forest Service utilized the Ecological Sustainability Evaluation (ESE) Tool process to assess coarse filter components, evaluate ecological sustainability, and analyze species impacts in the Plan. In that process, the Service started by determining a list of rare sensitive species on the Nantahala and Pisgah that warrant consideration in the plan for a variety of reasons. This includes federally-listed species, SCC, and other rare species on the Nantahala and Pisgah. Planners then defined elements based on the coarse filter, which include watersheds, ecozones, and unique habitats, as well as species groups. These coarse filter elements were linked back to individual species, such that a species was grouped into a number of coarse filter categories representative of its habitat needs and life cycle. For each species in the species group coarse filter elements (e.g., closed canopy associates), the element is assigned a weight, representing how important that element is for the particular species. Ecozone and unique habitat elements were not assigned a weight for each species, so the analysis is not sensitive to different ecozone preferences between species within a given group.

Key characteristics/indicators were then identified for each coarse filter element. Indicators represent stressors that the Forest Service determined have a certain level of impact on the coarse filter element in question. Indicators for species *groups* (not individual species) are assigned a weight for each element, representing the strength of the relationship between the indicator and the species group element. For each indicator, the Service estimated outcomes for the 10 and 50 year horizons under each alternative. Those estimated outcomes were used within the ESE tool to estimate a composite "ecological sustainability score" for each ecological system (coarse filter element) considered. As stated in Appendix C to the DEIS, "it is assumed that plant and animal species associated with the ecozone or species group would persist and potentially even expand"

where the ESE tool shows an improving ecological sustainability score over time. DEIS at C-3 to C-4.

For threatened and endangered species, as well as demand game species, the DEIS provides a breakdown of coarse filter elements with which those species are associated, which demonstrates how improvement in the condition of those elements is associated with improvements for the species. *See, e.g.*, DEIS at 250, Table 69. Ecological Sustainability Scores for Ecosystems and Species Groups Relevant to Carolina Northern Flying Squirrel (NPESE 2019).

Next, the Forest Service matched plan components to related species groups and ecosystems, creating a table that demonstrates which plan components have impacts on which coarse filter elements. After that process, and presumably where the ESE model scores did not show maintenance or improvement, the Service considered fine-filter components to address specific species needs outside of age class and ecozone preference.

Appendix C to the DEIS provides information outlining the coarse filter elements, associated species, indicators for those elements, and outcomes for each indicator.

B. Flaws in the ESE Analysis Result in Inflation of Benefits to Species.

The ESE tool analysis shows an impressive amount of work. But it has its limits in assessing impacts to species.

1. Lack of sufficient information for meaningful comment opportunity on modeling and species impacts

First, the information made available with the Plan is insufficient to provide the public a clear picture of the ESE tool analysis. To the extent we have been able to reconstruct the process, it is only because we were fortunate to meet with agency staff and participate in follow-up webinars and Q&As. The DEIS itself, however, does not provide enough information to allow the public to weigh in on the adequacy of the determination of impacts for sensitive species. This fails to live up to the Forest Service's obligation under NEPA to "insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken." 40 C.F.R. § 1500.1(b). "Accurate scientific analysis . . . and public scrutiny are essential to implementing NEPA." *Id.* Essential determinations made during the ESE analysis process are lacking in the DEIS's discussion of the ESE tool, which as a result is a sort of "black box" that assures the public that species will persist, but fails to explain how the Forest Service reached that conclusion. To fulfill its obligation to publicly disclose the basis for its decisions, an "agency must provide to the public 'the underlying environmental data' from which [it] develops its opinions." *WildEarth Guardians v. Montana Snowmobile Ass'n*, 790 F.3d 920, 925 (9th Cir. 2015).

The DEIS and Wildlife Webinar provide information about the ESE process generally, and provide specific information about the initial coarse filter designations used (e.g., ecozones, unique habitats, species groups, and indicators for ecological systems) and the end results (e.g.,

sustainability scores). But no documents provide information on the key step bridging those start and endpoints—the estimation of change to indicators over 10- and 50-year time frames under each alternative. Without this information, it is difficult to provide informed comment on the Forest Service's analysis at this stage. This must be corrected in the Final EIS.

Because those estimated outcome inputs provide the basis for ESE composite score calculations, they are extremely important in evaluating whether the sustainability scores at the end of the process accurately reflect what is likely to occur. To provide an example, take the "sedimentation risk" indicator included in the ESE tool for aquatic ecosystem species groups. This indicator is characterized by "riparian road and trail density" on FS lands. DEIS at C-63. It has the potential to be flawed in multiple ways. First, density of roads and trails is not the only factor leading to sedimentation in streams. Ground-disturbing activities from timber harvest in or near riparian areas, especially in areas with erosion prone soils and steep slopes, areas with high landslide risk, and areas with high annual precipitation rates, also create sedimentation risks. *See* Section XI to XII. The NEPA documents do not clarify whether the potential for sedimentation impacts into these streams from timber harvest was considered in determining the outcome for this indicator. Additionally, as discussed in Att. 26, the BMP monitoring results that assess compliance with BMPs to reduce sediment from road-building and other forest management are not reliable indicators of sedimentation risk. We do not know if the indicator estimation for sedimentation risks relied on the flawed BMP implementation assumptions discussed elsewhere in these comments. We do know that the way ESE accounts for sedimentation is not sensitive to changes in roads planned for different alternatives and tiers. ESE uses large scale road density that does not change appreciably between alternatives and tiers. This road density indicator depends more on the existing road network than roads built under different alternatives and tiers. Additional roads in alternatives and tiers make an insignificant impact to overall road density. Smaller scale road density that would be sensitive to changes between alternatives and tiers should have been used. Alternatively, other measures such as the added road density rather than total road density should have been used in order to get at differences between alternatives and tiers. The sedimentation risk "estimated indicator value" for each stream was not sensitive to differences with respect to any of these very real concerns about sedimentation risks, and as a result also cannot meaningfully determine whether the ecological sustainability scores for aquatic species groups that incorporate those estimated indicator values are reliable. Without any of that information, it is not possible to consider or comment on the specifics of the indicators used to run the models.

Similarly, it is not at all clear how the Spectrum model outputs were incorporated in the ESE tool. As discussed in Section III.A, the Spectrum model contains major flaws. How those flaws impact the ESE analysis is unclear without additional information regarding the model.

A basic problem with using Spectrum assumptions to inform the ESE tool, even if the model were not fundamentally flawed, is that it models a possible scenario of how the plan would be implemented, but the assumptions driving that scenario are not based on plan components. DEIS at 153. In other words, the assumptions in the model go much further (and are more specific) than the plan language. To the extent that the draft plan allows different choices during

implementation—e.g., different levels of harvest in various ecozones—incorporating outputs of the Spectrum model would also undermine conclusions for ecozones of the ESE model. This is of out-sized concern because defining ecozones and estimating what will happen within those ecozones at the 10- and 50-year horizons is a pillar of the entire ESE process.

As discussed in detail in Section III.A, the Spectrum model's failure to include natural disturbance causes it to underestimate the levels of young forest that will be created, and it therefore overestimates the amount of regeneration harvest that can be sustained in the long term and vastly overestimates the levels of old growth that will be restored over time. The only indicator for the Old Growth Forest Associates species group is "Percent Old Forest (by ecozone)." This is similarly the measure used for estimating outcomes for the "Percent Ecosystem Acres in Old Growth Seral Class" indicator that is used in part of the ESE analysis for many ecozones. Thus, the estimated outcomes, and therefore the composite scores for every species, would be incorrect with regard to coarse filter categories that include amount of old growth as an indicator. Similar issues arise where Spectrum modeling was incorporated into outcome estimates for indicators based on the amount of timber harvest or management in certain ecozones, the amount of young forest, and others.

This information is fundamental to the plan analysis and to understanding how plan components impact species. It should be available as part of the analysis in order to provide the public with adequate information for meaningful public participation. *See* 40 C.F.R. § 1500.1(b); *California v. Block*, 690 F.2d 753, 761 (9th Cir. 1982) (holding that an EIS's form, content, and preparation must foster informed public participation).

And the disclosure problems are not just related to ESE model inputs. The entire DEIS discussion of impacts to species is hazy. We do not disagree with the appropriateness of using groups to simplify analysis, but because of the questions left unanswered by the DEIS, it is not possible for the public to comment on whether the Plan is meeting its NFMA requirement to "maintain a viable population of each species of conservation concern within the plan area." 36 C.F.R. § 219.9(b)(1).

Ultimately, without adequate information on modeling inputs and results for sensitive species and rare communities on the forest, we cannot fully comment on the modeling used, nor assess whether impacts to species were adequately considered. This, in turn, means the public cannot fully weigh in on whether the Plan meets the requirements of 36 C.F.R. § 219.9(b)(1).

2. Modeling based on forest-wide outcomes ignores other scales that should have been considered in the coarse filter.

    a. *The ESE model overlooks particular species' needs by only considering landscape level factors.*

As described above, the ESE model is structured around coarse filter elements. The tool requires associating individual species with relevant unique habitats, ecozones (or watersheds in the case

of aquatic species), and species groups based on their habitats and life cycles. It then requires the user to estimate the change in various indicators associated with those ecozones and species groups, which reflect the condition of that element as considered on a landscape-level; that is, the assessment of how an ecozone indicator changes over time is considered over the entirety of that ecozone across both the Nantahala and Pisgah NFs.

As this analysis is set up, the "coarse filter" is sensitive only to the landscape-scale components used by the Forest in an effort to reach NRV. In order to assess whether the plan components will meet species' needs, the ESE tool depends on a crude measure of whether the forests are moving toward NRV.

Effects on unique ecosystems are considered at a landscape-level scale, for all areas in which that type of ecosystem is found on either Forest. For example, consider the Caves and Abandoned Mines Associates species group, in which all cave-associated species across both Forests are found, including a variety of spiders, salamanders, and bats, as well as one species of bird and one species of mollusk. The indicators for this ecological system are "[p]ercent of occupied mines or caves (by rare bats) adversely impacted by recreational traffic" and "[p]resence or absence of WNS in this system." DEIS at C-382.

The same landscape-level assessment is used for species groups associated with forest structural types. For example, the sole indicator for the Closed Canopy Associates group is "[p]ercent system with moderately closed forest canopy." DEIS at C-276. For the Forest Edge and Transition associates group, the single indicator for which expected outcomes were estimated is "[a]cres of edge and transitional habitat" on the forest.

Species can be sorted into any number of coarse filter elements. An individual species can be linked to the closed canopy associates species group, old growth, and any number of other ecozones, habitats, and species groups based on its habitat and life cycle. However, regardless of the number of coarse filter elements with which a species is associated, the outcomes for those elements are assessed on the landscape scale accounting for both forests.

For some species, this type of modelling might make sense, at least at the conceptual level. A bird, for instance, can travel fairly freely across the Forest to any area with the correct ingredients for suitable habitat.[37] But for a species with a limited ability to disperse (or a likelihood of dispersal known to be low) on the forest, it does not much matter what the total acres of the correct ecozone and age class are across both Forests, because only a small subset of those acres are actually significant to the viability of that species. Positive outcomes after ten or fifty years for a particular coarse filter element at the forestwide scale make little difference to species that stay within one relatively small area for generations, are scattered in small pockets

[37] Whether it does so in reality is another issue, one which is not analyzed in the DEIS.

across the forest, or have other habitat needs unaddressed by the model. But the ESE model provides no way to account for that type of species-specific need.

For example, salamanders occur within areas of the forest that are smaller than the landscape-scale but larger than a typical project analysis area. It makes little sense to worry about habitat for particular kinds of salamanders forestwide, when we know they are more limited in range. Conversely, within that limited range, we should worry much more about the impacts of incompatible management.

As another example, Ruffed Grouse is a demand species popular with hunters that utilizes early successional habitat as part of an optimum mix of habitats during its life cycle. Ruffed Grouse is associated with the young forest age class, as well as a wide variety of ecozones and unique habitats. DEIS at 320-23. The species is linked with 26 coarse filter elements (weighted based on the strength of the relationship between the element and the species). But none of those 26 elements account for a vital habitat components for the species—elevation above 2000 feet (or, based on our current understanding, above 3,500 feet to mitigate the impact of climate change and West Nile virus). Thus, the model views all 26 of those coarse filter areas as providing potential habitat for ruffed grouse, when in reality, elevation differences are important to understand the benefit of other habitat elements to the species.

The model assigns a relative weight to indicators for species based on assumptions that certain indicators or outcomes are more or less strongly associated with that particular species' needs to remain viable on the forest. However, no weighting element is included with regard to ecozones or unique habitats. If a species can be associated with multiple ecosystems but prefers or needs certain ecozones over others, the model is incapable of telling the difference. For example, the Santeetlah dusky salamander (*Desmognathus santeetlah*) can be found in several of the more mesic ecozones but is most strongly associated with cove ecozones. The ESE tool would not be able to show a difference for that species between a management system that include more timber harvest in coves versus other mesic systems.

Additionally, it is unclear how the viability of some species is predicted by the indicators assigned to them, or whether the indicators chosen for some ecological systems represent the only outcomes that need to be analyzed to assess the ecological sustainability of that system. Take as just one example the Cave and Abandoned Mine ecological system mentioned above. It is not entirely clear how the viability of salamanders, spiders, and other non-bat species found in this ecological system is demonstrated by estimating outcomes for "[p]ercent of occupied mines or caves (by rare bats) adversely impacted by recreational traffic" and "[p]resence or absence of WNS in this system," indicators that appear to relate only to bats. Estimates for these two outcomes cannot represent how *all* mines and caves across the forest will be affected by plan components and how that will impact *all* species that use mines and caves as habitat. Similarly, for Snag *and Den Tree* Associates—is the number of snags per acre the only outcome that needs to be estimated to assess the ecological sustainability of that habitat element and impacts to associated species? Put simply, it is unclear how well the indicators chosen actually represent what will happen to certain included species over the life of the plan.

Fundamentally, the model confuses necessary and sufficient conditions. For the Green Salamander — a species associated with the coarse filter elements for several different ecozones and unique habitats, as well as structurally with old growth, closed canopy, and interior forest — old growth may be necessary to provide optimal habitat, as may mesic oak-hickory forest. But that does not mean that old growth in mesic oak-hickory forest is *sufficient* to provide such habitat no matter where it occurs at a forest-wide scale. Not every species (indeed, the minority of species) are broadly dispersing generalists. For specialists, the overlap between elevation, range, ecozone, structural type, and/or other habitat elements must be considered. Where do we know the Green Salamander occurs? Where might it occur? In *those* places, are other needed habitat elements protected by the plan?

For the habitat elements measured (and in the way they are measured and weighted), it is unclear whether restoring NRV will actually benefit species as claimed. The problem goes deeper, however, because it is not even clear that the Draft Plan will restore NRV. Under the Draft Plan, "[i]n some locations, it is appropriate to be outside the range of desired conditions [NRV] in order to achieve social, economic, cultural, or ecological objectives." DEIS at 147. Under the Planning Rule, however, the coarse filter depends on restoring ecological integrity, defined as the condition of being within the NRV. The ESE tool is therefore totally incapable of showing compliance with the Planning Rule for species whose success depends on conditions at the "local" scale as opposed to conditions at the landscape scale. If NRV is going to be ignored at certain scales, then the Forests *don't even have a coarse filter* that can account for species' needs at those scales.

Ultimately, the ESE model inflates the benefits to species of management on a forest-wide scale. Because the ESE methodology does not capture the needs of species that are not adequately defined by ecozone or structural type and age class, it does not satisfy the requirement of an impacts analysis for species under NEPA, nor does it demonstrate for NFMA purposes that the Draft Plan "contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area." 36 C.F.R. § 219.9(b)(1).

b. The ESE model does not account for spatially significant areas for biodiversity.

The issue described above is especially problematic with respect to the importance of specific areas of the forest to biological diversity.

First, the DEIS does not address the very real existence of "hot spots" on the forest for certain species or species groups. Those hot spots would experience differing levels of impact under different alternatives. As an example, the Nantahala and Pisgah contain salamander hot spots, areas in which maintenance of connectivity is particular important to avoid impacts to

salamander species and ensure viability in the face of numerous stressors.[38] Because of their specific aquatic and terrestrial connectivity needs, many salamander species are sensitive to road density, and as such they are included in the Road Density Sensitive Species group. However, the only indicator established for that group is "Total Open Road Density" on the entirety of both Forests. It is true that, at the landscape scale, lower road density overall is likely to contribute to salamander viability. But it is equally true that *where* higher vs. lower road density occurs is the most important thing for a species with hot spots throughout the forest. High road density in hot spots will have significantly greater impacts on salamanders. That reality is not captured by the model and goes unaddressed and unanalyzed in the DEIS.

As a result, the species analysis in the DEIS does not show the tradeoffs between alternatives caused by their different "footprints" for roads and timber harvest, especially scheduled or regulated timber harvest. Intuitively, Alternatives B and D are more likely to result in management impacts near hotspots because they greatly expand the possible footprint of timber harvest. For the same reason, they are more likely to have impacts to streams that contain brook trout or other rare species. The DEIS does not consider any of those impacts. If the ESE tool can account for hot spots, range, and elevational limitations, it should be re-done for the FEIS. If it cannot allow for that consideration, the FEIS must be "patched" with additional analysis performed outside of the model, else the Forest Service will not have disclosed impacts in a way that can be used to make an informed decision or support informed public comment.

Similarly, the EIS does not address actual element occurrences for species on the forest. This is a more significant problem for dispersal-limited species like salamanders, snails, and spiders, and species with highly specific habitat needs. But it is also a problem for any species that has existing subpopulations on the forest and is not likely to move or to survive disturbance to its preferred habitat. For example, Carolina Northern Flying Squirrel has high density in specific areas of spruce fir forest and is particularly sensitive to fragmentation. It also relies on adjacent areas of hardwood forest as part of its life cycle.[39] While spruce fir forest is not considered suitable for harvest under the Plan, large amounts of regeneration are targeted in neighboring hardwood. Thus, impacts to Carolina Northern Flying Squirrel could occur from regeneration, and the extent of those impacts depends on whether northern hardwood forest in areas close to where the species is actually found are regenerated, as opposed to regeneration occurring elsewhere on the forest. The ESE model does not capture the reality that impacts to species will be greater in certain areas of the forest depending on where species are currently found, and therefore that different alternatives have different degrees of species impact.

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[38] Att. 14, Apodaca, JJ and Smith, Hope, *An Analysis of Important Areas for Salamander Conservation and Connectivity in the Nantahala and Pisgah National Forests* (2019).

[39] Att. 15, Weigl, P.D., *The Northern Flying Squirrel (*Glaucomys Sabrinus*): A Conservation Challenge*, Journal of Mammalogy, 88(4): 897-907 (2007).

A special case of the same problem, and perhaps the single biggest flaw in the ESE analysis, is the failure to consider whether impacts would occur within Natural Heritage Program Natural Areas (NHNAs). NHNAs are known to be repositories of biological diversity. For example, these natural areas contain roughly 70% of element occurrences for rare species on the Nantahala and Pisgah. This should be no surprise: they were identified and delineated by the Natural Heritage Program precisely because they contain globally, regionally, and state rare species and rare and exemplary habitats.

State natural areas are scattered throughout the plan area but are mapped in all but two counties. Some of these special areas will receive protective designation in the plan under any alternative, but others lack protection in one or more alternatives. Given the disproportionate ecological significance of these areas, scheduled timber harvest (as opposed to management to meet site-specific needs) and ancillary impacts like road construction, introduction of non-native invasive plants, and sedimentation in or near these areas will cause more significant impacts to species than harvest elsewhere on the forest. But the ESE tool was not used to account for the interaction between land allocation for suitable timber harvest and distribution of NHNAs, and therefore provides no analysis of the impacts to NHNA values that would occur. The model should have incorporated NHNAs at the coarse filter level to ensure impacts to these species, and to the NHNAs themselves, were considered. *See* Section X.C, below.

All of these spatial issues with the ESE model make the coarse filter almost totally ineffective for many rare species. Explaining these choices, staff have explained that this was supposed to be a "30,000 foot" view of species impacts. We understand that, and we see some value in that broad look. However, as the Forest Service surely knows, analysis not conducted at the plan level is pushed to the project level. Critically, the missing analysis here cannot and will not be performed at the project level. The missing pieces are bigger than any single project, spatially or temporally, and they should be considered at the plan level. To be sure, a project-level decision can consider whether a particular stand will create good grouse habitat or impact salamander connectivity, but it cannot effectively determine whether it will create *enough* good grouse habitat or impact *too much* salamander habitat, because these questions are bigger than the project, and they are functions of the Forests' program of work over time and in many different places. If the Forests intend to schedule harvest in NHNAs, then they must first find a way to analyze the impacts to species and compare them for different alternatives. Further, the FEIS should also disclose the comparative advantages of adopting the Partnership recommendations, which would ensure that management within NHNAs would be used only to maintain and restore their rare and exemplary values, including biological diversity.

c. The aquatic species analysis contains particular flaws that further ignore species needs and obscure species impacts.

In its analysis of aquatic species, the Forest Service identified a set of 9 species groups: Aquatic Species Sensitive to Invasive Species; Hydrologic Modification Sensitive Species; Medium and Large River Associates; Non-point Source Pollution Sensitive Species; Point Source Pollution Sensitive Species; Pond, Lake and Reservoir Species; Sediment Sensitive Species; Small River

Associates; and Stream Associates. Because these are species groups, a weight category was assigned to indicate the strength of the relationship between the species and the species group. Some aquatic species are associated with multiple species groups.

However, the model assigns only *one* set of indicators that apply to *all* aquatic species groups. Those indicators are as follows:

- Hydrologic Connectivity: combined dam and stream crossing rating (density).
- Sedimentation Risk: riparian road and trail density (mi/mi^2).
- Aquatic Community Composition/Invasive Species Abundance: percent of suitable brook trout habitat occupied by brown and/or rainbow trout.
- Water Temperature Regime: extent (percent) of riparian areas classified as forested.
- Invasive Species Abundance: presence or absence of Corbicula in watersheds known to support freshwater mussels.
- Nonpoint Source Pollution Threat: extent of (percent) urban and agricultural landcover classes.
- Point Source Pollution Threat: number of permitted discharges.

It is unclear why, if the exact same indicators apply to all aquatic species in the exact same way, the Forest Service went to the trouble of delineating separate species groups at all. The weighting of these indicators is not even changed for different species groups, such that the "Invasive Species Abundance" indicator has moderate weight even for the "Aquatic Species Sensitive to Invasive Species" species group; "Nonpoint Source Pollution Threat" has moderate weight for Point Source Pollution sensitive species; and "Point Source Pollution Threat" has a *low* weight even for Point Source Pollution Sensitive Species. This defies logic. For species in multiple groups, the exact same analysis of outcomes would apply multiple times, with different "weights" as assigned for that species in each particular species group. How this analysis considers, much less discloses, impacts for species with unique habitat needs and susceptibility to stressors is unclear.

Outcomes based on these indicators were run for an extensive list of watersheds. Based on the species profiles provided for endangered aquatic species in the DEIS, aquatic species appear to be assigned to specific watersheds or water bodies. But that information is not provided for other aquatic species anywhere in the analysis, so the connection between all of those species and outcomes is not clear, particularly considering that qualitative outcomes vary widely across the different water bodies. The aquatic species analysis also suffers from missing information. For example, did the estimation of outcomes for the hydrologic connectivity indicator include consideration of the amount of road building under Tier 1 vs. Tier 2, and where that road building will take place under different alternatives? It is not clear in the planning documents. What is clear is that cumulative impacts to aquatic species from road building, especially in light of the current maintenance backlog and call for more road building in the plan, have not been considered or disclosed in the EIS. *See generally* Sections XI (Water) and XIV (Transportation).

The analysis also fails to provide any comparative difference between the Plan alternatives. The outcomes table actually lists "BCD" as one "Alternative" for purposes of analyzing outcomes in each waterbody. For reasons discussed below, this conflation is problematic and entirely fails to satisfy NEPA, especially given that there is no question at least some of these indicators (e.g., hydrologic connectivity, sedimentation risk) would show different results under different alternatives because distance from roads to specific waterbodies where rare species occur will depend on what areas are designated as suitable for timber harvest. Impacts will differ based on whether harvest takes place in areas of high landslide risk or high risk of base cation depletion. Impacts will also differ significantly based on tier, as Tier 2 will require substantially more roadbuilding, which affects both the hydrologic connectivity and sedimentation risk indicators based even on the limited factors the Forest Service chose to include in those indicators. The NEPA analysis therefore fails to satisfy its simple, essential purpose: using alternatives to consider the different environmental impacts of different options, and to present that information in a way that is useful to the public and the decisionmaker.

We do not agree with the apparent factors the Forest Service chose to include in the indicator for sedimentation risk. As described in Appendix C, that indicator is only affected by riparian road and trail density. First, it is not clear how far a road or trail must be from a stream for it to no longer be considered riparian. This factor could be significant, considering that in some areas, like those with steep slopes or erosive soils, sediment can travel a good distance before reaching a waterbody. Second, it appears to entirely fail to account for sedimentation resulting from timber harvest, a substantial source of sediment in the planning area. *See* Section XI.A. Any analysis of sedimentation risk that does not account of timber harvest impacts is wholly inadequate.

Because of these flaws, the DEIS fails to adequately consider impacts to aquatic species.[40] Additional analysis would be required to meet NEPA's requirements and show under NFMA that aquatic plan components maintain viability for native aquatic species and contribute to the recovery of federally-listed aquatic species. The extent of that required analysis, however, could be reduced by adopting additional plan components that lessen aquatic impacts. Recommended plan components are discussed below.

C. The Plan Should Have Considered NHNAs in the Coarse Filter.

The Forest Service must revise its DEIS to include analysis of the effect of scheduled harvest in NHNAs on rare species. These impacts differ wildly by alternative. Projects under Alternatives B and D are twice as likely to negatively impact NHNAs by prescribing unneeded regeneration harvest, as compared to Alternative C. Alternatives B and D would schedule harvest in approximately 68,000 acres of NHNAs, while Alternative C would schedule harvest in 34,000

[40] It is possible that at least some of these issues are not as problematic as they appear on the surface, but because of the lack of information provided in the DEIS and Appendix C, it is not possible to know.

acres of NHNAs. Over multiple planning cycles, all of the operable acres in these scheduled areas would be regenerated.

Despite these important differences between alternatives, the DEIS does not offer any attempt to compare alternatives on this basis. Indeed, the DEIS states, "[r]ather than analyze effects to NHNAs as a separate indicator, this analysis addresses the ecological integrity of these areas by considering … ecozones and unique habitats, species groups, and rare species." DEIS at 152.

The DEIS continues: "Using a coarse-filter perspective, when the ecological sustainability score improves over the existing condition …, it is assumed that plant and animal species associated with the ecozone or species group would persist and potentially even expand." DEIS at 153. This might make some sense for broadly dispersing species, but not for dispersal-limited species.

Effectively, the Forest Service claims that NHNAs do not matter for maintaining and restoring biological diversity, even when 70% of known rare species occurrences on the forest are contained within NHNAs. The DEIS acknowledges, without quantification, that NHNAs are forest sites which "contain special biodiversity significance," but it completely ignores their significance when comparing alternatives.

The Forest Service cannot both acknowledge that NHNAs are places of "special biodiversity significance" worthy of specific plan components that require their protection and also fail to independently analyze the environmental impacts of scheduled regeneration harvest to these places. This does not satisfy NEPA, for multiple reasons.

First, the ESE tool analysis is based on the Spectrum model's predictions of how management regimes would affect age classes by ecozone, with an additional nod to important habitat elements like snags. To be sure, rare species are often associated with specific ecozones or age classes or habitat elements, but they are more strongly associated with NHNAs. In other words, knowing that you are standing in a mesic oak forest is less likely to tell you whether there are rare species in the area than knowing you are standing in a NHNA. The ESE tool analysis has its uses, but as modeled it ignores the incredibly useful, spatial information provided by the Natural Heritage Program. This does not constitute a "hard look" under NEPA. It also ignores the best available scientific information about where rare species are located.

Second, even if the ESE tool analysis were adequate to compare impacts to rare species, this would not excuse the failure to separately analyze differences for NHNAs. Some NHNAs are recognized by the NCNHP as exemplary natural communities even where they are not known to contain rare species. These communities offer good opportunities for restoring old growth and the species that are associated with old growth. The Forest Service has completely ignored the tradeoffs that come with scheduling the best examples of natural communities for harvest.

Ideally, the Forest Service would have included spatial information about NHNAs in its models analyzing impacts to species groups. At the very least, the agency must now provide supplemental analysis comparing the alternatives' relative ability to protect biological diversity

in the long-term. That analysis would have to recognize the portion of NHNAs that would be sacrificed to timber production over multiple planning cycles, and for each alternative, analyze the effect that sacrifice would have on the Forests' ability to maintain and restore biological diversity.

D. The ESE Model Does Not Provide Information Allowing the Forest Service to Meaningfully Distinguish Between Alternatives.

Alternatives are at the heart of the NEPA process. 40 C.F.R. § 1502.14. An EIS must provide sufficient analysis to allow for meaningful comparison of alternatives.

The ESE tool also incorporates plan strategies, which are in turn linked to coarse filter plan components. *See* Wildlife Deep Diver Webinar. The Deep Dive webinar described these strategies as the "backbone" of the relationship between the plan and the key characteristics/indicators of the ecological systems considered with the tool. The plan components themselves are identical across alternatives. Because plan components do not differ based on alternatives, these "strategies" cannot capture the differences between alternatives, which are based on differences in where management occurs rather than differences in plan components. As a result, the ESE tool cannot capture the differences between alternatives because the key difference in alternatives – where management will occur on the landscape – is not considered in the ESE tool. The analysis, based on strategies that are identical regardless of alternative, is simply not designed to capture differences in how each alternative will impact species. This means that the ESE tool was incapable from the outset of showing the effects of differences between alternatives. To the extent that some minor variations show up between alternatives, they appear to come from random differences in the scenarios modeled by Spectrum, not from any differences compelled by different land allocations.

With regard to rare wildlife and plant species found on the Nantahala-Pisgah, this strategy is insufficient. This is because for many wildlife species, the "where" matters just as much as, if not more than, the "what" in terms of forest management. To put it simply, the problem in terms of impacts to biodiversity and rare communities is not how much treatment or management occurs; it is where that management takes place. The ESE tool analysis cannot capture those differences based on the inputs used, and as such does not represent meaningful consideration of how those impacts differ between alternatives. The analysis and disclosure of that information is required under NEPA.

Planning, with landscape-level analysis, is the time to analyze the cumulative impacts to species and special habitats like NHNAs of actions that will be taken repeatedly over time. At the very least, the DEIS should assess the impacts of scheduled harvest in NHNAs that are mapped to Group 1 Management Areas in each alternative. The Forest Service may have decided not to analyze these impacts because it expects NHNAs to be managed consistent with the desired condition that they be maintained or enhanced. However, if these areas are scheduled for harvest, each project that targets them will turn into a struggle over whether they are "unique" enough to change the management prescription. *See* PAD-DC-04. This is essentially the status quo, and it

often results in these areas being logged—a death by a thousand cuts that has never been analyzed cumulatively. This also leads to creating “postage stamps” or “shrinking islands” of biodiversity where “unique” occurrences are buffered but the integrity of the surrounding habitat is lost. If the Forests fail to include clear standards limiting incompatible management in NHNAs, then it must analyze those cumulative effects, past and future, at the plan level.

Meaningful analysis will necessarily show some differences between alternatives that provide a different spatial layout of areas of the forest that will be managed under the plan. In Alternative C, fewer higher-quality habitats for species will be regenerated. If scheduled harvest is distributed randomly on the suitable base, the probability of incompatible management being prescribed in NHNAs in Alternative C is half of the probability in either Alternative B or D, which have twice as much NHNA acreage in Group 1 MAs. Under Alternatives B and D, there will be cumulative impacts of those actions on rare communities and species. Under Alternatives B and D, dispersal-limited species would be more likely to lose habitat or be buffered into isolated islands of habitat (e.g., Green salamander). The ESE analysis obscures these differences by focusing only on plan components rather than spatial differences between alternatives. As a result, the EIS does not provide the cumulative impacts analysis required under NEPA, and does not provide any way to distinguish between alternatives.

Similarly, for aquatic species, the density of open roads and trails was used as an indicator related to sedimentation, as well as utilizing combined dam and stream crossing density as an indicator related to aquatic ecosystem connectivity. Under Tier 2, a substantially greater amount of roadbuilding will be required to reach currently inaccessible areas of the forest. Aquatic species goals and the road-building necessary to achieve other goals are in tension in the plan. But if roadbuilding is going to expand, then it matters even more where it will occur, which in turn depends on which areas have been placed into suitable management designations. Each alternative suggests a different spatial arrangement of suitable management designations, with Alternative C designating more areas important for species as unsuitable for regeneration. That means that under Alternatives B and D, there will be more open roads in areas significant for biodiversity than there will be in Alternative C.

The ESE model is not sensitive to land allocations and therefore does not capture these differences. It captures only that open roads affect aquatic species, and therefore that less road will have less impact. Place-based impacts are not analyzed anywhere else in the DEIS. This does not satisfy NEPA’s requirements to take a “hard look” at impacts to species under the Draft Plan.

One strategy to resolve this issue of conflating species impacts in all alternatives, and to meaningfully evaluate impacts at both Tier 1 and Tier 2, is to include consideration of the likelihood that a rare plant or animal species would be impacted by management during plan implementation. For example, the Service could consider a probability indicator of species impacts in different scenarios. The land most likely to be slated for management projects under Tier 1 is land which is considered operable, accessible via the existing road network, viable for harvest, and is located in a suitable management designation. Mapping land based on those

factors provides an index of land most likely to be managed under Tier 1, and would look different under each alternative as determined by suitability designations. That index could then be compared to known areas of biodiversity or species importance on the forest, using element occurrences for all rare species or a proxy like SNHAs. SHNAs represent one way to estimate the areas of the forest most significant to rare species and communities; for many SHNAs, this is the reason they were designated. Subtracting the acreage of overlap between the index demonstrating likelihood of management and SHNAs, and then dividing by the total acreage in the index would provide a probability that rare species and communities are likely to be impacted under Tier 1 of a given alternative. The same analysis would then be run for Tier 2 by removing the consideration that land be accessible to be considered likely to be managed.

These probability indicators could then be used to assign proportional risk that a stand proposed for harvest would be within an NHNA, which would allow for a quantitative comparison of qualitative, cumulative impacts to species diversity. It would provide a basis to distinguish between alternatives for purposes of likely species impacts. To be clear, however, it would not prevent the need for project-level analysis. Even with a probability index allowing for quantitative comparison between alternatives, when this issue actually arises at the project level—meaning when a stand is proposed for harvest within or partially overlapping an NHNA—the Forest Service would still be required at that time to do the full NEPA analysis for impacts in that area that the plan currently does not provide.

This kind of analysis, though it would be revealing, ought to be unnecessary. There is no excuse for any alternative to allow the regeneration, fragmentation, or degradation of NHNAs for the sake of landscape-level goals such as "structural restoration" or timber production. The landscape-level goals that matter most in these areas are their values for biological diversity. Maintaining biodiversity where it occurs is a central command of the Planning Rule. 36 C.F.R. § 219.9(a)(2)(ii).

This extensive additional analysis could therefore be avoided, saving the Forest Service the time and effort of doing analysis just to learn that it cannot sacrifice these areas to timber production without violating the Planning Rule, by adding components that adequately protect NHNAs.

Specifically, we recommend that the Forest Service adopt the recommendations of the Partnership with regard to NHNAs. Under the Partnership recommendations, all NHNAs classified as "exceptional" should be designated as Special Interest Areas (SIAs), and all NHNAs classified as "very high" and "high" currently in Matrix or Interface should be moved to Ecological Interest Area classification. NHNAs rated "high" and "very high" that are currently in EIA, AT, WSR, or Group 3 or 4 MAs may stay in those Management Areas. Coordination with the Natural Heritage Program would always be conducted before stands in NHNAs are initially prescribed for treatment in a project. The purpose of this coordination would be to

determine how best to maintain the rare and exemplary ecological characteristics of the NHNA.[41]

If the Partnership's recommendations are adopted, the likelihood of areas of important biodiversity overlapping management would be negligible under any alternative and at any tier. That is not the case under the action alternatives, because there are no clear and explicit standards to prevent incompatible management.

Outside of NHNAs, there is still a possibility of encountering rare species at the project level. The Plan should therefore include components that make it clear the Forest Service will survey, consider, and disclose at the project level impacts where element occurrences overlap with planned management. We appreciate the Draft Plan's inclusion of a framework to determine when surveys are needed, but as discussed below it is far from strong enough.

E. The DEIS Should Consider Cumulative Impacts of Overcollection

Another cumulative impact not fully reflected in the DEIS is the problem of unlawful overcollection of rare species. The ESE tool analysis should have included a species group element for forest species at risk from poaching. Illegal collection is an unfortunate reality on our national forests and a huge threat to many rare and at risk species. It is also an incredibly difficult problem that we know the Forest Service simply has not been provided the resources to solve. However, NEPA still requires consideration of the cumulative impacts of over-collection, in addition to the impacts of other threats, on these species. Because over-collection presents such a serious threat, the ESE analysis must account for it in analyzing how species that may be over-collected will fare at the 10- and 50-year horizons. As such, the Forest Service must include and analyze an additional species group for species sensitive to over-collection. This species group would consist of salamanders, butterflies, ginseng, and any other rare or at-risk species the Forest Service is aware of as popular for collection. We recognize that any indicator outcomes for this species group are likely to be "Poor," but that is all the more reason they must be considered cumulatively with other impacts to these species in the DEIS. As an example, the George Washington National Forest included such a group in its revised forest plan in 2014.[42] That plan also included a Standard, FW-69, that "limits collection of species identified in the Species Sensitive to Over Collection Species Group to approved scientific purpose, specifically: a) limit permission to collect these species; b) limit sharing of location information of these species; c) avoid improving access to these locations; d) evaluate seasonal closure of access to these

[41] The Partnership additionally recommends that the draft desired condition for NHNAs be clarified to make clear that the NHNA's "unique ecological characteristics" to be maintained or restored include not only element occurrences, but also exemplary natural communities as described by the NHP.

[42] George Washington National Forest, Revised Land and Resource Management Plan, 3-10 (Nov. 2014), https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3822820.pdf ("Species Sensitive to Over-Collection. The strategy for these species is to continue to educate the public on species needs, restrict access to known populations, and limit approval of collections of these species to permitted scientific purposes only.").

locations; and e) evaluate relocation of access to these locations."[43] We recommend that the Pisgah and Nantahala National Forests make a similar species group for these Forests and adopt a Standard with similar restrictions as those found in the George Washington's Standard FW-69.

F. The Draft Plan and DEIS Do Not Demonstrate How the Plan Will Contribute to the Recovery of Threatened and Endangered Species.

Section 7 of the Endangered Species Act requires that federal land management agencies do not jeopardize the continued existence of federally-listed species or adversely modify their critical habitat. Under NFMA, the revised plan must "contribute to the recovery of federally listed threatened and endangered species." 36 C.F.R. § 219.9. The Draft Plan fails to demonstrate how it fulfills this requirement.

The DEIS provides a discussion of each federally-listed species, including background information, a brief assessment of current status on the forest, the collected set of coarse filter elements associated with each species in the ESE tool, and a table compiling ESE scores to show how each coarse filter element related to the species qualitatively changes over 10- and 50-year time frames under each alternative.

However, the Draft Plan makes relatively scant mention of species recovery. Stating the intention that "[e]cological and habitat conditions on the Nantahala and Pisgah NFs contribute to the recovery of federally Threatened and Endangered (T&E) species," the Plan provides only one recovery-related desired condition, PAD-DC-01, that is vaguely worded and not specific to any species: "Habitats are consistent with recovery plans and Biological Opinions for federally-listed and proposed species in order to contribute to recovery of these species." Draft Plan at 81. This non-specific condition is further reflected in a non-mandatory guideline, PAD-G-01, that states "USFWS Recovery Plan and relevant Biological Opinion guidance for federally-listed species should be incorporated into project design and implementation." Draft Plan at 88. Table 11 provides a list of "Contributions to Species Recovery" for Threatened and Endangered Species. Draft Plan at 82. For most of these animal species, these "contributions" involve either determining whether a species is present on the forest, or continuing to "work with partners to expand known range on the NP and within western North Carolina" while "[m]aintain[ing] species presence within currently occupied habitat on the NP." Draft Plan, Table 11 at 82-83.[44] There is no actual commitment in the Plan to make the contributions in Table 11.

The closest the plan comes to making a commitment is PAD-S-03, a mandatory standard, which provides that "[i]n areas occupied by federally-listed species and species of conservation concern, management shall maintain characteristics required by these species." Draft Plan at 88.

[43] *Id.*

[44] For Indiana Bat and Northern Long-eared Bat, Table 11 further provides: "Protect summer maternity habitat consistent with the most recent recovery plan or Biological Opinion for the species." Draft Plan at 82.

The wording of PAD-S-03 is not sufficiently specific to account for variation in the way species use and occupy habitat. For example, if roost trees are used by Northern Long-eared bat or Indiana bat during the summer but then abandoned during hibernation, are those trees still considered occupied for purposes of this standard, or could they be removed during hibernation? More problematically for NFMA purposes, PAD-S-03 is a standard that maintains the status quo, which can only be shown to contribute to recovery if that status quo is already contributing to recovery of listed species. As the discussions of various listed species in the DEIS indicate, that is not the case.

Given that most species, including most threatened and endangered species, were examined only through the coarse filter approach, the generic guidance of PAD-DC-01 and PAD-G-01 is also not sufficient to show contribution to recovery. For example, under this guideline, it is unclear what would occur when an area of appropriate ecozone and age class to be a potential habitat for a federally-listed species is found during project design. Because that is potential habitat under the coarse filter model, would all of that habitat be managed "consistent with recovery plans and Biological Opinions for federally-listed and proposed species"?

Like the Draft Plan, the DEIS addresses species recovery only briefly in its discussion of specific threatened and endangered species on the Forests. Where recovery is mentioned for animal species, it generally demonstrates that the current elements of the Draft Plan do not "contribute to" recovery for listed species.[45] For other threatened and endangered species, the DEIS only states whether, under the Draft Plan and according to ecological modeling used, they will continue to "persist" on the Forest. DEIS at 255 ("Nantahala and Pisgah NFs will . . . contribute to the persistence of" Virginia Big-Eared Bat); 257 ("the Forests will . . . contribute to the persistence of" Gray Bat); 264 ("Forests will . . . contribute to the persistence of" Indiana Bat and Northern Long-Eared Bat).

[45] Carolina Northern Flying Squirrel: "[T]his analysis shows that despite potential improvements on Forest Service lands discussed above, Carolina northern flying squirrel will continue to persist across the species' estimated range, although potentially at lower densities than can effectively contribute to species' recovery." DEIS at 251; Rusty Patched Bumblebee: "This analysis shows that despite potential improvements on Forest Service lands discussed above, current knowledge of occupied habitats for rusty-patched bumblebee prohibits conclusions on species' persistence and subsequent recovery." DEIS at 267; Spruce-fir Moss Spider: "This analysis shows that despite potential improvements on Forest Service lands discussed above, spruce-fir moss spider will continue to persist across the species' estimated range, although potentially at lower densities than can effectively contribute to species' recovery." DEIS at 270; Noonday Globe: "This analysis shows that despite potential improvements on Forest Service lands discussed above, current knowledge of occupied habitats for noonday globe prohibits conclusions on species' persistence and subsequent recovery." DEIS at 273. Appalachian Elktoe, Littlewing Pearlymussel, and Spotfin Chub: "However, because ownership patterns are generally fragmented, and much of the species' estimated range is not under Forest Service ownership, it is possible that habitat for the Appalachian elktoe may continue to persist range-wide, although at lower densities than can effectively contribute to species' recovery." DEIS at 277, 280, 283.

But persistence of a species is not the same as recovery. Persistence is related to the standard used for species of conservation concern (SCC), for which the Forest Service has a responsibility in planning to "maintain a viable population . . . within the plan area." 36 C.F.R. § 219.9(b)(1). The Planning Rule defines "viable population" as "[a] population of a species that continues to *persist* over the long term with sufficient distribution to be resilient and adaptable to stressors and likely future environments." 36 C.F.R. § 219.19. Persistence is, essentially, a standard that means a species is resilient enough not to be wiped out on the Forest.

As defined by the Fish and Wildlife Service however, recovery of a federally listed species means "improvement in the status of a listed species to the point at which listing is no longer appropriate."[46] This is a higher bar to meet than merely ensuring a species remains on the forest; instead, the prospects for that species actually need to *improve* over time, with the ultimate goal of downlisting and eventually delisting a species. In order to "contribute to recovery," the Forest therefore needs to actually contribute to improving the condition of threatened and endangered species within its boundaries. As the Forest Service Handbook explains, "National Forest System habitats and activities" should be "manage[d] . . . for threatened and endangered species *to achieve recovery objectives* so that special protection measures provided under the Endangered Species Act are no longer necessary." FSH 2670.21 (emphasis added). Recovery objectives are outlined in recovery plans for many listed species.

The current, vague desired condition that habitats will be "consistent with recovery plans and Biological Opinions" is not sufficient to meet the Service's requirements. For one, Biological Opinions are not strictly focused on species recovery. As explained in the current Indiana Bat programmatic Biological Opinion for the Forests, its purpose is "to minimize incidental take and provide guidance for monitoring the species."[47] Incidental take, or take that occurs during otherwise lawful activities, must be limited for endangered and threatened species so that agency actions do not tip the species into jeopardy, or reduce the numbers of a species to such an extent that recovery becomes impossible. While we fully support the use of Biological Opinions to limit take of threatened and endangered species during forest management activities, and recommend that the Plan carry forward existing obligations from Biological Opinions associated with the current plan, it is important to understand the difference between following the instructions of a Biological Opinion, which limits degradation of a species, and contributing to the recovery of that species.

The Draft Plan declines to define any concrete recovery objectives, from a recovery plan or otherwise, for any listed species, and therefore provides no information about how the Service will contribute to those objectives. Conversations with members of the planning team provided

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[46] US FWS and NMFS, Endangered Species Consultation Handbook (1998) at 4-36, https://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf.

[47] Environmental Assessment For Amendment 10 Nantahala & Pisgah National Forests Land and Resource Management Plan (2000) at 5, https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm8_050393.pdf.

information that specific elements of recovery plans have not been incorporated because the Service wants to maintain flexibility in the event that recovery plans change with time. But the desire for flexibility does not outweigh the legal responsibility to include elements at the plan level that are designed to contribute to the recovery of listed species.

The inclusion of components PAD-S-03 and PAD-G-01 indicates that whatever efforts to "achieve recovery objectives" the Service intends to make under this plan will be decided at the project level, if it determines to take them at all given that PAD-G-01 is not mandatory. Not only does that decision push *all* public participation related to these choices to the project stage, introducing uncertainty and potential conflict during project planning that will lead to inefficiencies, but it also is not sufficient to satisfy 36 C.F.R. § 219.9, which applies at the *planning* level. The plan components, whether ecosystem-level or species-specific, must "provide the ecological conditions necessary to: contribute to the recovery of federally listed threatened and endangered species." 36 C.F.R. § 219.9(b)(1).

As discussed above, the coarse filter analysis method oversimplifies species needs by relying on projected improvements in ecozone at the landscape level, which obscures differences between alternatives and differences between species themselves. To be sure, the Planning Rule requires plans to start at the level of ecosystem plan components, but the requirement to "contribute to" recovery for listed species necessitates that the Forest Service analyze how its ecosystem-level components and assumed improvements relate to the recovery criteria for listed species. For example, according to the DEIS, Indiana Bat and Northern Long-eared Bat are capable of occupying a wide range of habitats on the forest. DEIS at 261 ("[T]hese species are basically habitat generalists."). As such, the DEIS determines that under any alternative, all important forest conditions associated with the species remain "good" or "improve under all alternatives." DEIS at 264. The current draft recovery plan for the Indiana Bat, however, emphasizes certain specific habitat conditions and types, like the importance of connectivity in maternity habitat, a large area of undisturbed fall swarming habitat near known hibernacula, and the risks of downing trees in summer maternity habitat that have been used in the past, to which the species has a high level of fidelity in subsequent years.[48] Based on this most recent recovery plan draft, there are specific areas of habitat that the Forest Service could be focusing on, or protecting from management, in ways that would actually contribute to recovery objectives for the Appalachian populations by managing the most important habitat for the species in a more protective way.

Further, for endangered aquatic species like the Appalachian elktoe, littlewing pearly mussel, and spotfin chub, the DEIS states that "because ownership patterns are generally fragmented, and much of the species' estimated range is not under Forest Service ownership," it is only "possible that habitat for the Appalachian elktoe may continue to persist range-wide, although at lower

[48] Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision (2019), at 56, 75-78, 80 https://www.fws.gov/midwest/Endangered/mammals/inba/pdf/inba_fnldrftrecpln_apr07.pdf.

densities than can effectively contribute to species' recovery." DEIS at 277, 280, 283. This statement misses the mark.

The Planning Rule does not provide an escape hatch for the requirement that Forest Plans contribute to the recovery of endangered and threatened species. For species of conservation concern, the regulations provide that, "[i]f the responsible official determines that it is beyond the authority of the Forest Service or not within the inherent capability of the plan area to maintain or restore the ecological conditions to maintain a viable population of a species of conservation concern in the plan area," the Forest can follow other guidelines rather than utilizing species-specific components to "maintain a viable population of each species of conservation concern within the plan area." 36 C.F.R. § 219.9(b). But there is no equivalent "way out" of the requirement that the Forest Plan "provide the ecological conditions necessary to contribute to the recovery of federally listed threatened and endangered species." 36 C.F.R. § 219.9(b)(1). The Plan must provide some level of detail with regard to actions that will contribute to recovery and how they do so.

To be sure, the Forest Service is not solely responsible for ensuring actual recovery, but it is required to "contribute to" that recovery at the planning level, through plan components. And where coarse filter, ecosystem-based components are missing the mark for some listed species by failing to provide sufficient specificity, the plan must provide species-specific plan components that fulfill this requirement, or make a more general but enforceable commitment to species recovery. Given the threats to these species from outside the Forest, components for species affected to a large extent by issues outside the forest may look different from components for a species over which the Forest Service maintains a higher degree of control. But the Forest Service cannot simply give up on recovery and determine that persistence, if that, is all it need consider. That does not fulfill the 2012 Planning Rule's mandate.

One way to resolve this issue while maintaining the flexibility to modify the approach to recovery as recovery plans and conditions change with time, would be to incorporate plan conditions like those used on the George Washington National Forest in its most recent plan revision. That plan includes standards for certain endangered and threatened species on that forest, like FW-42, which directs the forest to "[f]ollow the USFWS Recovery Plan for Virginia Northern Flying Squirrel, as amended."[49] Similarly, the Francis Marion National Forest included plan components that adopted similar language, like DC-T&E-2 for the Red-Cockaded Woodpecker, which includes the condition that "[p]roject development is based on implementing guidelines in the most recent Recovery Plan in the management of cavities, clusters, and foraging habitat."[50] Plan components like these provide the flexibility to change specific management

[49] George Washington National Forest Revised LRMP, *supra* note 42.

[50] Francis Marion National Forest, Final Revised Land Management Plan (2017), at 43, available at https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd515622.pdf.

strategies as direction from USFWS updates with time, but also provide a strong commitment to contributing to recovery for threatened and endangered species on the forest.

We recommend that the Plan include a specific objective or standard calling for implementation of the relevant guidelines of recovery plans, as amended, for threatened and endangered species on the Nantahala and Pisgah. Such a standard would likely replace PAD-G-01, which is a non-mandatory guideline, and would focus on implementation of recovery plans, rather than vague commitments to "incorporate" recovery plans to some extent in project planning and implementation. For example, PAD-G-01 could be modified to become a new component: "PAD-S-04 Management in areas occupied by federally-listed species shall implement relevant USFWS Recovery Plans, as amended."

G. Recommended Fine-Filter Components and Other Species-Related Changes to Draft Plan

As noted above, we recommend that the Forests adopt the recommended plan components related to NHNAs. In addition, the Forests must include components and changes related to particular species.

Fine-filter components are designed to fill the gaps where the coarse filter does not sufficiently provide for species needs. Given the issues with the coarse filter as discussed above, we recommend adoption of additional fine-filter components for specific species (discussed below), as well as adoption of other plan components that will benefit biodiversity, connectivity, and ecological integrity. We further recommend that several coarse filter elements be adopted into the plan to improve ecological sustainability and connectivity and provide for better support for rare plant and animal communities on the forest.

1. Carolina Flying Squirrel

The endangered Carolina Northern Flying Squirrel (CNFS) is a small, nocturnal mammal that lives in boreal and deciduous forests of the high mountains of western North Carolina, eastern Tennessee, and southwest Virginia.[51] The diet of this northern flying squirrel subspecies consists primarily of fungi and lichens, but it also consumes seeds, nuts, buds, fruit, sap, insects, and occasionally vertebrates and eggs.[52] As a result of its diet and breeding preference for cavities in mature trees, CNFS is reliant on moist, cool habitats of mature, intact forest with "abundant standing and down snags." DEIS at 249. CNFS has been listed as endangered under the Endangered Species Act since 1985. DEIS at 248.

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[51] NCWRC, North Carolina Wildlife Profiles: Carolina Northern Flying Squirrel (2017), http://www.ncwildlife.org/Portals/0/Conserving/documents/Profiles/Carolina_Northern_Flying_Squirrel_2017.pdf.

[52] *Id.*

Coarse filter components do not adequately capture the complicated needs of this species. While CNFS primarily occupies spruce fir forest, which is not suitable for logging in the plan, it is also highly dependent on adjacent hardwood forests. DEIS at 174.[53] CNFS is particularly sensitive to needing a diversity of adjacent undisturbed habitat types[54] and to fragmentation issues.[55] Because of this, islands of regenerative management in northern hardwood habitat near squirrel occurrences could isolate populations, interrupting gene flow and reducing resilience in a species already struggling as a result of "isolated gene pools and limited dispersal ability, analogous to populations of mammals on islands in marine environments." DEIS at 249. As noted in a review of studies related to northern flying squirrels, "[t]he small disjunct squirrel populations of the central and southern Appalachians appear particularly vulnerable to any further modification or reduction of their habitats."[56] As a species that relies on high elevation forests that are moist and cool, DEIS at 249, CNFS is also vulnerable to climate change.

Under Tier 1 of the Draft Plan, 50% of planned regeneration of 11,000 to 17,000 acres of young forest habitat will take place in "oak-dominated, northern hardwood, and rich cove" ecozones. Draft Plan at 77. At Tier 2, the total amount of regeneration increases to "up to 32,000 acres of new young forest conditions," 50% of which will still occur in the same three ecozone types listed. *Id.* Because the DEIS focuses on the landscape-level coarse filter and does not account for spatial occurrences of CNFS in relation to spruce fir/northern hardwood ecotones, it does not assess impacts to CNFS of logging in northern hardwood forests adjacent to or near known CNFS occurrences, especially at the scale contemplated in the Plan. This does not satisfy the requirements of NEPA to take a hard at impacts to this imperiled species. It also conflates all alternatives in terms of impacts to CNFS.

The Plan should avoid active management near CNFS habitat, as regeneration is incompatible with CNFS habitat needs. It should further adopt a fine filter Standard specifying that any vegetative management scheduled in northern hardwood forests near known CNFS habitat will be designed based on best available scientific information to maintain or restore optimal hardwood habitat for the species and will place high importance on preserving connectivity.[57]

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[53] Att. 15, Weigl, *supra* note 39.

[54] *Id.* ("In the Appalachians northern flying squirrels are commonly found in older forests . . . especially in the ecotones between conifers and hardwoods.").

[55] *Id.* (discussing reluctance of CNFS to crossing new road built across habitat). Fragmentation near CNFS habitat also risks greater exposure to terrestrial and aerial predators. *Id.*

[56] *Id.*

[57] The appropriate size of buffer around CNFS habitat in which to avoid management not specifically designed to benefit CNFS should be based on best available scientific information about their home range and habitat needs, and should take into account connectivity. As discussed by Weigl, "the greater the reduction of contiguous forest, the wider the barriers to dispersal. Such fragmentation of flying squirrel distributions could destroy the viability of metapopulation-structured groups of squirrels, and the resulting small isolates then would be susceptible to" issues related to genetic isolation. Att. 15, Weigl, *supra* note 39.

This is especially important because, as described by Weigl, "[s]uccessional and regenerating communities require considerable time to develop into habitats of sufficient quality to support flying squirrels."[58] It is imperative that the Forest Service protect connectivity, food resources, and undisturbed old growth and mature forests for this species, particularly because so much of its suitable habitat in North Carolina lies on the National Forest. DEIS at 249. CNFS is a true example of a species whose last, best hope in this region is on Forest Service lands, and as such, the Forest Service should take extra care to restore and maintain CNFS habitat and not sacrifice those values for regeneration that could be performed elsewhere.

2. Indiana Bat and Northern Long-Eared Bat

Indiana Bat is an insectivorous bat that hibernates in caves and abandoned mines in the winter. In spring, pregnant female bats migrate to maternity roots colonies in wooded areas to bear and raise their young, while nonreproductive females and males stay close to the hibernaculum or migrate to summer habitat. In the fall, all bats return to the area around the hibernaculum to swarm and mate, and then return to hibernation until the following year.[59] Indiana bat was listed as endangered in 1973.

Northern Long-Eared Bat (NLEB) shares high similarity to Indiana bat in terms of habitat needs and life histories. DEIS at 257. NLEB was listed as threatened in 2015.[60] This species is "generally associated with mature forests and interior forest habitat" and generally forages "within forests, along forest edges, over forest clearings, and occasionally over ponds." DEIS at 258. Like the Indiana bat, most NLEB nurseries are found "in cavities or beneath loose bark in trees or snags in upland forests." *Id.* Like Indiana bat, the species has experienced significant declines resulting from white-nose syndrome. *Id.*

We recommend that the Nantahala-Pisgah adopt species-specific plan components related to the Indiana Bat, which by association will also likely benefit NLEB. As described in the DEIS, "several known hibernacula occur on the Nantahala and Pisgah NFs, and summer maternity habitat is widespread" for NLEB. DEIS at 259. There are no known hibernacula for Indiana bat in Western North Carolina, but "summer maternity habitat is widespread across the Forest." DEIS at 260. For both species, "maintaining and restoring habitat within today's known (estimated) occupied range where it overlaps the Forests is critical to species' persistence into the future." DEIS at 259, 260.

Currently, the ESE modeling for these species "indicates that these species are basically habitat generalists, optimizing on suitable habitat elements across the landscape." DEIS at 261. The

[58] *Id.*

[59] Indiana Bat Draft Recovery Plan at 7, *supra* note 48.

[60] A recent court ruling requires FWS to reconsider that listing determination and may result in the species being listed as endangered. *Center for Bio. Diversity v. Everson*, 435 F. Supp. 3d 69 (D.D.C. 2020).

Draft Plan provides standards related to Caves, Abandoned Mines and Other Bat Hibernacula (PAD-S-08 through PAD-S-11), which we support, and standards preserving a minimum amount of snags and trees with exfoliating bark on the forest. However, given the specific importance of summer maternity and foraging habitat on these particular Forests, we recommend that the Plan adopt species-specific components that will support the maintenance and restoration of suitable summer maternity habitat for these species. The Draft Plan commits to protecting summer Indiana bat maternity habitat in accordance with "the most recent recovery plan or biological opinion," but the current programmatic Biological Opinion for the Forests is admittedly out of date and focuses on streamside zones even though the DEIS recognizes that "recent studies indicate that upland habitats are used by maternity colonies much more extensively than previously reported." DEIS at 259.

According to the most recent 5-Year Review for Indiana Bat, "[b]ecause maternity colonies are widely dispersed during the summer and difficult to locate, all the combined summer survey efforts have found only a fraction of the colonies presumed to exist. . . . [T]he geographic locations of the vast majority of Indiana bat maternity colonies remain unknown in much of the range."[61] As described in the First Revision of the Indiana Bat Draft Recovery Plan,[62] "[a]lthough researchers have found it difficult to predict where maternity colonies may occur relative to forested habitat, we can reliably predict that once Indiana bats colonize maternity habitat, they will return to the same maternity areas annually."[63] And according to the DEIS, maternity roosts for Indiana bat are not found in open canopy under 30% coverage. DEIS at 259. For these reasons, current summer survey information is imperative in the Nantahala and Pisgah, where suitable summer maternity habitat is available and it will be important to design projects that do not interfere with potential habitat.

According to the 2020 Indiana Bat Survey Guidelines, survey results greater than 5 years old are likely to be out of date.[64] As far as we are aware, there are numerous areas of the Nantahala and Pisgah National Forests that are likely to be assigned for treatment (areas that are suitable, accessible, viable, and operable) where the most recent bat surveys are outdated or where surveys have never occurred. While the Plan says in Table 11 that the Service will "[c]ontinue to work with partners to expand known range on the NP and within western North Carolina," the

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[61] Indiana Bat (*Myotis sodalis*) 5-Year Review: Summary and Evaluation (Sept. 2019) at 13, https://ecos.fws.gov/docs/five_year_review/doc6293.pdf.

[62] The draft recovery plan was last updated in 2007. Although it has not been finalized, USFWS uses the recovery criteria and information in the draft plan in conducting its 5-Year Reviews, including in its review of recovery criteria. For this reason, we believe the criteria in the recovery plan are the best standard for the Forest Service to utilize in planning with regard to the Indiana Bat.

[63] Indiana Bat Draft Recovery Plan at 75, *supra* note 48.

[64] USFWS, Range-wide Indiana Bat Survey Guidelines (Mar. 2020), at 4, https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/FINAL%20Range-wide%20IBat%20Survey%20Guidelines%203.23.20.pdf.

Plan should provide more specific guidance in order to actually demonstrate how the Nantahala-Pisgah will contribute to species recovery. For this reason, we recommend that the Forest Service adopt a plan component relating to bat surveys with partners like the NCWRC, particularly in areas of the forest that are likely to be assigned for treatment within the following five-year period.

Providing for additional surveys would also provide better information for the implementation of SZ-S-03, which calls for the maintenance of foraging and roosting habitat along intermittent and perennial streams in area "occupied by" Indiana bat. For this Standard to have a meaningful effect, the Forest Service must know what areas are "occupied."

The George Washington National Forest 2014 Plan includes numerous species-specific components related to the Indiana Bat, many of which would also be applicable here. We believe the components in that plan can be used as a model to develop relevant components for the species' needs within the Nanthala and Pisgah. For example, FW-50 and FW-59 from the George Washington Plan, provide buffers around active roost trees and maternity roost sites identified during project implementation.[65] Similar standards should be adopted here, as the DEIS recognizes that protecting roost trees is vital to Indiana Bat because of the high degree of site fidelity to roost sites. DEIS at 259. While the George Washington National Forest has more documented hibernacula and known active roost sites than the N-P currently, bat occupancy patterns are changing in response to climate change and the presence of WNS. As such, we believe it is important for these Forests to adopt specific, mandatory guidance protecting Indiana bat and its potential habitat.

3. Rusty-patched Bumble Bee

Rusty-patched bumble bee (RPBB) is a species of bumble bee that was once widespread in eastern and central North America, but has experienced precipitous declines in population size and range. Endangered Species Status for RPBB, 82 Fed. Reg. 3186, 3188 (Jan. 11, 2017). RPBB is a eusocial species and a generalist forager, meaning it gathers "pollen and nectar from a wide variety of flowering plants." *Id.* at 3187. This species is one of the earliest emerging bumble bee species in spring and latest to go into hibernation in fall, and as such it "requires a constant and diverse supply of blooming flowers." *Id.* Primary stressors to RPBB include "[p]athogens, pesticides, habitat loss and degradation, small population dynamics, and effects of climate change." *Id.* at 3189. "The pesticides with greatest effects on bumble bees are insecticides and herbicides: Insecticides are specifically designed to directly kill insects, including bumble bees, and herbicides reduce available floral resources, thus indirectly affecting bumble bees." *Id.*

[65] George Washington National Forest Revised LRMP at 4-5, *supra* note 42.

In the plan, RPBB is one of the species that will purportedly benefit from creation of young forest habitat. DEIS at 160. But RPBB is not suspected to be in decline in this part of the country due to lack of foraging habitat. *See* 82 Fed. Reg. at 3190 (discussing that "many researchers believe [habitat loss] is unlikely to be a main driver of the recent, widespread North American bee declines"). While we believe it is important that RPBB have high quality foraging habitat, building that habitat is not likely to be what brings RPBB back to these Forests.

Additionally, young forest created through regeneration provides a small window of opportunity for foraging before it closes up. Encouraging conditions that facilitate natural gap-phase dynamics across the forest is likely more beneficial to RPBB. If anything, more permanent openings on the forest would provide more suitable foraging habitat long-term, and management for RPBB foraging habitat is likely better focused on maintaining openings, timed to avoid destruction of plants in bloom during the long period when these bees are foraging, than making lots of new openings through regeneration that will then close over time and likely remain closed at the stand level for a significant period of time. Seed mixes used for potential RPBB foraging habitat should include a variety of native flowering plants that flower at differing times throughout the spring and summer, to provide "a constant and diverse supply of blooming flowers" *suitable for RPBB.*

Pesticides and herbicides are a major issue for RPBB viability. Herbicides are likely to be deployed in regenerated stands to suppress nonnative invasive species spread. We support the Plan's approach to pesticide use only after site-specific analysis, Draft Plan at 76, but in order to preserve native insects like the RPBB and insectivores like Indiana Bat and NLEB, the plan should include clearer spatial and temporal limits on pesticide and herbicide usage. Pesticides and herbicides should be employed with extra caution in areas where potential foraging habitat for bees or Indiana bat/NLEB has been created nearby. We also recommend that the Forest Service adopt a Standard requiring extra caution in the use of herbicides in areas that provide suitable or historical RPBB habitat but have not been surveyed. Further, given the long active period for RPBB colonies, herbicides should not be applied in suitable habitat for RPBB during the time period from early March to the beginning of hibernation in order to reduce the risk that necessary foraging resources will be damaged.

Additionally, the Forest Service acknowledges that there are no current occurrences of RPBB on the forest. It would therefore be more beneficial to the RPBB to expend resources surveying for RPBB on the forest and then determining what management actions are best to protect and enhance bee habitat if RPBB is found. Similarly to Indiana bat, we recommend the Plan commit to specific plans for RPBB surveys, or at minimum to pre-project monitoring to establish baseline data in suitable habitat where up-to-date surveys have not been completed.[66] We recognize that, while the range of RPBB historically included Western North Carolina, RPBB

[66] We note that project-specific compliance with the Endangered Species Act may require the Forest Service to do more than is proposed here.

has not been documented on the forest since 2001. However, like the Forest Service, we are hopeful that updated conservation and monitoring efforts for this extremely vulnerable species will reestablish known occurrences of the species in Western North Carolina.

Expanding knowledge of RPBB range using established survey guidance will allow the Forest Service to fulfill its requirement to contribute to RPBB recovery. In service of that effort, we recommend the Service adopt a plan Standard requiring pre-project monitoring or survey efforts in suitable RPBB habitat within the historical range before management activities take place. RPBB will be further benefitted by modification of PAD-G-01 to become a Standard mandating implementation of recovery plans.

4. Aquatic species: Appalachian Elktoe, Littlewing pearlymussel, Spotfin chub, Eastern hellbender.

Appalachian Elktoe is a freshwater mussel endemic to cool waters in the Upper Tennessee River system. DEIS at 273. It was listed as endangered in 1994, and critical habitat for the species was designated in 2001. *Id.* Approximately 67% of designated critical habitat for the species in the Nolichucky River is bordered by the Pisgah and Cherokee NFs, and approximately 88% of critical habitat in the Cheoah River is bordered by the Nantahala NF. Designation of Critical Habitat for the Appalachian Elktoe, 67 Fed. Reg. 61016, 61029 (Sept. 27, 2002)." Land-clearing and disturbance activities carried out without proper sedimentation and storm-water control pose a significant threat to the Appalachian elktoe and other freshwater mussels." *Id.* at 61018. Other threats to the species include "habitat loss and water quality deterioration from impoundments, industrial and municipal pollution, acid mine drainage, and siltation." DEIS at 274.

Littlewing pearlymussel is a small, federally endangered freshwater mussel found in coolwater tributary streams of the Tennessee and Cumberland Rivers. DEIS at 277-78. As a freshwater mussel, it is also sensitive to sedimentation, and other similar threats to the Appalachian elktoe. *Id.* at 278. According to the DEIS, while the species is not considered extirpated from North Carolina, the last documented occurrence was in 2005 and species levels are so low as to be considered basically undetectable. *Id.*

Spotfin chub is an imperiled freshwater fish in the minnow family endemic to the Tennessee River Basin.[67] The species was listed as threatened in 1977. DEIS at 281. It is now found in only four river systems, one of which is located in Western North Carolina.[68] The species is known to inhabit "large creeks or medium-sized rivers" with cool to warm temperatures and good current. DEIS at 281. Major threats to the species include impoundments, sedimentation, and other pollution resulting from land use. *Id.* While much of the suitable habitat for the species is

[67] NCWRC, Spotfin Chub, https://www.ncwildlife.org/Learning/Species/Fish/Spotfin-Chub.

[68] *Id.*

downstream of NF control, as noted by the DEIS, "maintaining or improving watershed health and resilience on Forest Service lands is important to the persistence of this species." *Id.* at 282.

The eastern hellbender is a species of giant aquatic salamander that inhabit clear, fast-flowing, and well-oxygenated streams.[69] They require large slab rocks with accessible crevices.[70] Its populations have been declining since the 1970s; "[t]he declines of Eastern Hellbenders can largely be attributed to the degradation of stream quality, which is caused by the damming of rivers, water pollution, and siltation of streams."[71] Sedimentation impacts hellbenders by reducing available oxygen, burying habitat rocks, filling in rock crevices, suffocating eggs, and killing crayfish and other invertebrates they consume.[72] Hellbender was selected as a Species of Conservation Concern during the Nantahala and Pisgah plan revision process.[73]

We group these four species found in or affected by the plan area together because for all four, sedimentation and siltation are direct, primary threats. The DEIS does not adequately analyze the risks of logging and road construction delivering sediment to nearby streams because it overestimates the effectiveness of BMPs. *See* Att. 26. As such, the ESE tool outcome estimates for sedimentation related indicators are likely inaccurate, both not accounting for a major source of sediment and estimating much lower sediment loads into streams that actually occur for the roads and trails that were considered in the sedimentation analysis. The DEIS does not appear to contain any analysis of likely sedimentation impacts resulting from ground-disturbing activities like regeneration of stands, which present significant risk of sedimentation in practice. This lack of analysis is inadequate under NEPA for purposes of assessing impact to these aquatic species.

To reduce possible impacts to these and other aquatic species, including salamander, and reduce the corresponding analysis burden in the EIS, we recommend expansion of streamside buffers, which are currently insufficient. *See* Section XI.B. This will reduce the risk of sedimentation and siltation in streams, which are major threats to these species. It will also help mitigate the issue of increased water temperature caused by loss of canopy in streamside zones, which can also affect these species.

We further recommend that the Service undertake an effort to either perform wider surveys for these species or identify suitable habitat for these species on the forest based on their particular life cycle needs, and commit in the Plan to protect that habitat from siltation. Habitats for these specific species on the forest are generally in discrete areas with isolated populations, so, for

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[69] Va. Dep't of Game and Inland Fisheries, Eastern Hellbender, https://www.dgif.virginia.gov/wildlife/information/eastern-hellbender/.

[70] Defenders of Wildlife, Hellbender, https://defenders.org/wildlife/hellbender.

[71] Va. Dep't of Game and Inland Fisheries, Eastern Hellbender, https://www.dgif.virginia.gov/wildlife/information/eastern-hellbender/.

[72] *Id.*

[73] Att. 13, SCC for Nantahala and Pisgah NFs, *supra* note 36.

example, a plan component that would incorporate suitable streams as EIAs when found would protect that habitat.

5. Noonday Globe

The Noonday globe is a snail species "endemic to a small area in Western North Carolina," including an area of "less than two square miles of the Nantahala NF." DEIS at 270. The globe is found on "[s]teep wet slopes with calcareous rocks" and "moist substrates" that require intact forest canopy to avoid drying out. *Id.* at 271. It was placed on the Endangered Species List in 1978. Snails are generally sensitive to impacts from fire, but individuals of the species survived the intense wildfires in Nantahala Gorge in 2016. *Id.* According to the DEIS, "it is assumed that noonday globe was protected from these drying effects only by their association with moist substrates that generally do not burn as intensely as surrounding areas." *Id.*

The habitat area for noonday globe is made up of acidic and rich cove forests, *see* Draft Plan at 179, which will both receive vegetative management under the plan to create early seral habitat, *see* Draft Plan at 175-76. Nantahala Gorge component NG-GLS-02 states a Goal to "Maintain and restore intact forest habitat for the noonday globe." Goals "highlight key opportunities and values that will guide Forest Service management and reflect values the Forest Service has heard from the public." *Id.* at 180. We recommend a Standard that will require any vegetation management near noonday globe habitat to maintain or restore species habitat, including the moist microclimate and abundance of leaf litter that are important for the snail. Climate change is only spurring the frequency and intensity of wildfires, and as such it is vital that the globe be equipped to survive future fires in the same way it did the 2016 wildfires.

Additionally, NG-GLS-04 calls for recurrent prescribed burning in the Gorge. The species is designated in the ESE model as part of the Fire Intolerant species group. As such, we recommend the plan specify that prescribed burning will not take place in the Noonday Globe's limited habitat range to avoid risk of impacts to the species, and that any prescribed burning plans in the area will contain measures to ensure Noonday Globe habitat is not put at risk. Otherwise, the FEIS must analyze the impacts of putting the species at risk of exposure to fire through prescribed burns.

6. Green Salamander

Green salamander is a microhabitat specialist salamander species "generally associated with crevices and hollows of rock outcrop, woody, and arboreal habitats within cove forests."[74] Green salamanders spend the winter hibernating in moist rock outcrops and, with the exception of

[74] Att. 16, Patton, Austin et al., *A New Green Salamander in the Southern Appalachians: Evolutionary History of* Aneides aeneus *and Implications for Management and Conservation with the Description of a Cryptic Microendemic Species,* Copeia 107(4): 748-763 (2019).

brooding females, are primarily arboreal from spring until late fall.[75] Because of this seasonal life history, Green salamanders are restricted to areas of the forest with suitable rock outcrops that are also in accessible proximity to mature hardwood trees.[76] The species is listed as a Species of Conservation Concern for the Nantahala and Pisgah NFs.[77]

The Draft Plan provides a fine filter component for Green Salamanders, PAD-S-13, which states:

> Within the documented range of green salamanders, shaded rocks greater than 36 square feet in size shall be surveyed for species' presence. If present, project activities shall be designed to avoid direct and indirect disturbance of the species and habitat, to protect thermal and moisture characteristics of the rocks (e.g., when appropriate, identification of a 300 foot no canopy tree removal buffer or other mitigations) and provide for habitat connectivity and dispersal. If the rocks are determined to be unoccupied, design activities to maintain suitable habitat.

Draft Plan at 89.

We appreciate that the Plan commits to surveys for Green salamander presence within the documented range of Green salamanders at suitable locations. We note that in the past, field surveys for Green salamanders have not been based on best available science, and encourage the Forest Service to adopt policies that correspond with the most current information on Green salamander life history to design these surveys. That would include, for example, a recognition that adult males, adult non-egg laying females, and juveniles do not typically occupy specialized rock crevices during summer months and are instead likely to be foraging in trees.[78] Minimally adequate surveys for Green salamander would include multiple surveys covering various times of year, environmental conditions, and times of day to survey an individual outcrop.[79]

We further recommend amendment of PAD-S-13 to provide that surveys be conducted during project design but also, in the case where projects have a long timeline for implementation, within 2 years of the actual time of implementation. This will ensure that the species has not dispersed to other nearby suitable habitat in the intervening time. We recommend that if PAD-S-03 is going to suggest the use of a 300-foot buffer around Green salamander occurrences in projects, the standard be amended to include language that corridors between rock outcrops also need to be maintained to allow for dispersion and interbreeding.

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[75] Att. 17, Waldron, James L. and Humphries, Jeffrey, *Arboreal Habitat Use by the Green Salamander,* Aneides aeneus, *in South Carolina*, Journal of Herpetology 39(3): 486-492 (2005).

[76] *Id.*

[77] Att. 13, SCC for Nantahala and Pisgah NFs, *supra* note 36.

[78] Att. 17, Waldron, *supra* note 75 (discussing seasonal use of arboreal habitat by Green salamander).

[79] *See* Att. 18, JJ Apodaca Comments on Southside Project.

Additionally, to satisfy NEPA, the DEIS should address the cumulative impact on Green Salamander of creating isolated islands of occupied rock outcroppings. While buffering may protect one isolated rock outcropping, given the importance of arboreal connectivity for this species,[80] the DEIS must analyze the impacts of habitat fragmentation to Green salamander. It is not known how far Green salamander disperse while in the trees, and as such, the DEIS must assess the risk that connectivity between appropriate habitat could be destroyed by vegetation management outside of a 300-foot buffer. This is yet another "islanding" effect that goes unaddressed by the current DEIS analysis, which must be resolved in the Final EIS.

7. Other salamander species

The Nantahala and Pisgah contain a number of salamanders designated as Species of Conservation Concern,[81] some of which are also designated as Region 8 Sensitive Species.[82] These salamander species are all dispersal limited, and each has unique habitat and life cycle needs that have not been addressed by the ESE model, as discussed above. For example, the Cheoah Bald salamander (*Plethodon cheoah*) is a rare salamander species found on a limited range in the forest; it is vulnerable to extinction and is the subject of stewardship efforts by the Forest Stewardship Council. With the exception of the green salamander (discussed above), these salamander species rely on riparian area connectivity for dispersal. The Southern Appalachian region is a hotspot for salamander diversity; "the region as a whole contains roughly one fifth of the world's salamander diversity and more families and genera than anywhere in the world. Meaning that not only does this area have an incredible diversity of salamanders, but also a high amount of 'deep' or phylogenetic diversity in the region."[83]

Amphibians are declining worldwide, including in the Southern Appalachian region.[84] The key to maintaining persistence of these species on the forest is to ensure the preservation of functioning metapopulations, which "maintain genetic diversity and minimize the effects of inbreeding."[85] Metapopulation health for salamanders depends on "available habitat patches and an intact and connected landscape."[86] Connectivity is defined in the Planning Rule as "[e]cological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species, such as in response to climate change.

[80] *Id.*; Att. 14, Apodaca, *supra* note 38.

[81] *See* Att. 13, SCC for Nantahala and Pisgah NFs, *supra* note 36.

[82] *See* Att. 19, Regional Forester's Sensitive Species List (revised Feb. 15, 2018).

[83] Att. 14, Apodaca, *supra* note 38.

[84] *Id.*

[85] *Id.*

[86] *Id.*

36 C.F.R. §219.19." With over a million acres between them, the Nantahala and Pisgah provide an opportunity to establish and maintain functional metapopulations for several at risk salamander species at a time when they are experiencing increasing stress from habitat loss, climate change, disease, and fragmentation.

Connectivity for salamanders is not currently factored into forest-wide management decisions, and connectivity, vital to the health of salamander metapopulations, is not considered in a systematic way. Isolation of salamander populations is a significant issue in maintaining the viability of salamander species on the forest. Assuming that salamanders will necessarily be swept along in a tide of improving aquatic connectivity ESE scores at the landscape-level does not provide the kind of systematic planning that is necessary to maintain salamander viability because salamanders need aquatic connectivity to improve in areas where they are specifically located in order to benefit directly. Though, to be sure, salamander species also need riparian area connectivity to be ensured forest-wide so that species can continue to disperse across the forest as they face new and growing threats. As such, the Forest Plan should adopt an Objective that prohibits forest management and road construction from creating barriers to the movement of salamanders.

Under that Objective, any road, temporary or permanent, that is used, maintained, reconstructed, or constructed for a project, must ensure that any stream crossing will permit the passage of salamanders. To support that Objective, we recommend inclusion of a related Standard, particularly important in areas that are of outsized significance for salamander connectivity and therefore salamander persistence,[87] that culverting of flowing streams always provide for salamander passage upstream. To do so, culverts must have continuous substrate and be perched no more than 0.1m.[88] If the culvert fails either question, it is a barrier to salamander passage upstream. We recommend these criteria be adopted in a formal Standard, such that new culverting of flowing streams will not create a barrier to salamander passage.[89]

Additionally, to help solve legacy aquatic passage problems in the Nantahala and Pisgah, and as discussed elsewhere in these comments and recommended by the Nantahala-Pisgah Forest Partnership, we recommend that the Plan include a specific Objective for replacement of impaired stream crossings to improve aquatic organism passage. Priority for improving stream crossings should be considered in places most significant to salamanders on the forest.[90]

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[87] *See id.*

[88] *See* Att. 20, Anderson, James T. et al., *Culvert Effects on Stream and Stream-Side Salamander Habitats*, International Journal of Environmental Science and Development 5(3): 274-281 (2014).

[89] Under Section 404 of the Clean Water Act, forestry roads are excluded from permit requirements, but only if they provide for aquatic organism passage, which requires identification of affected aquatic organisms and their needs. 40 C.F.R. § 232.3(c)(6)(vii).

[90] *See* Att. 14, Apodoca, *supra* note38; *see also* Section XV.

8. Golden-winged Warbler

The Golden-winged Warbler (GWWA) is a North American forest songbird that has experienced sharp declines in the Appalachian region as well as across the country, and is also one of the most well-studied songbirds.[91] Individuals migrate to South America during the winter and return to North America to breed. GWWA utilizes young forest openings for nesting but also forages in mature forests, and may use these forests in other parts of their life cycle.[92]

It is unclear whether lack of young forest habitat is the primary cause of decline of GWWA in the Southern Appalachian region. While guidance suggests this reasoning,[93] recent studies suggest otherwise.[94] For example, a recently-completed white paper on GWWA in the region surveyed "different types of the available early successional habitat embedded within . . . mature forest landscape" in the Unicoi Mountains.[95] Over three years of surveys, no GWWA were found in the early successional habitat available, suggesting that already-existing early seral habitat in the region is not being utilized by GWWA.[96] This brings into question whether creation of more young forests, particularly at the cost of biologically rich mature and old growth forests, would produce benefits to GWWA at all.

For these reasons, we recommend the Plan incorporate the Partnership recommendations and adopt the guidelines outlined in the Golden-winged Warbler International Working Group policies for best practices in creating GWWA habitat, including the additional limitation that habitat creation be limited to within 2 miles of known GWWA occurrences. The Appalachian Regional guidance for GWWA habitat creation specifies that habitat creation projects should "avoid places where other rare or imperiled resources are higher priority and have conflicting management objectives."[97] It also provides a list of landscape considerations for GWWA management sites, including elevation generally about 1,800-ft (although much higher in some

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[91] Golden-winged Warbler Working Group, Golden-winged Warbler: Status Review and Conservation Plan (2019), at 1-5, http://gwwa.org/gwwa_conservation-plan_191007_low-res/.

[92] *Id.*

[93] *See, e.g.,id.* at 1-65.

[94] *See* Att. 21, Kramer, Gunnar R., et al., "Population trends in *Vermivora* warblers are linked to strong migratory connectivity" (2017).

[95] Att. 22, McKinley, Peter S., "Habitat availability may not be limiting potential Golden-winged Warbler *Vermivora chrysoptera* populations in the Unicoi Mountain Range of western North Carolina" (2020), at 1 ("McKinley Paper").

[96] The paper acknowledges that the habitats studied were "not necessarily the optimal habitat required by this species" but rather represent existing types of early successional habitat in the area. McKinley Paper at 4. However, it notes that Chestnut-sided Warbler, a songbird species that breeds in similar habitat to GWWA, were observed at many of the surveyed sites, suggesting the habitat could be used by GWWA as well. *Id.* at 2, 4.

[97] Golden-winged Warbler Working Group, Best Management Practices For Golden-winged Warbler Habitats in the Appalachian Region: A Guide for Land Managers and Landowners (rev. 2019), at 4, http://gwwa.org/gwwa-applregionalguide_190711/.

areas); forest cover greater than 70%; a forest type that is no more than 20% coniferous existing as mixed forest or pure coniferous stands; and tree communities including yellow poplar-red oak, sugar maple-beech-yellow birch, aspen-paper birch, and mixed oak.[98] The guidance provides detailed suggestions for ideal patch characteristics, and guidelines for timber management, which should be incorporated in projects designed to create potential GWWA habitat.[99] As the Appalachian Region guidance suggests, it is also important to consider in the landscape context whether the best approach for management involves determining whether it is best to "create, maintain, or restore Golden-winged Warbler habitat."[100]Incorporating these guidelines as revised over time also ensures that GWWA projects are designed using the best available science.

We further recommend that the Forest Service adopt post-project monitoring at sites created to benefit GWWA to determine actual population response to those restoration efforts. *See also* Recommendations Related to Monitoring below. This monitoring will allow the Service to gather data about whether restoration practices are actually working and make changes at the project level accordingly.

Finally, we note that there are many other at-risk species on the Nantahala and Pisgah in addition to Golden-winged Warbler. To fulfill its mandates with regard to biological diversity and ecological integrity, the Forest Service must treat all of these species with an equal degree of concern and provide an equal level of restoration effort for *all* SCC, not just those species like Golden-winged that fit neatly into goals for increasing timber harvest. If the Forest Service is going to design projects that include creation of Golden-winged habitat (and habitat for other species that rely on early successional forest), it should also design projects to benefit other at-risk species on the forest. For example, a project designed to create GWWA habitat could also include plans to replace culverts that create legacy aquatic passage problems.

9. Cerulean Warbler

Cerulean warbler, a Nantahala and Pisgah National Forests SCC,[101] is small songbird species that migrates long distances from wintering grounds in the South American Andes to the Appalachian region for breeding.[102] It has experienced significant population declines.[103] Cerulean warblers breed in large, undisturbed tracts of deciduous forests, where they nest and

[98] *Id.*

[99] *Id.* at 5-7.

[100] *Id.* at 4.

[101] Att. 13, SCC for Nantahala and Pisgah NFs, *supra* note 36.

[102] Cornell Lab, Cerulean Warbler, https://www.allaboutbirds.org/guide/Cerulean_Warbler/overview.

[103] *Id.*

forage in tall trees at the top of the tree canopy.[104] However, they have also been known to forage for insects from tall trees near gaps in the canopy.[105] Cerulean warbler has complex habitat needs, living and nesting in hardwood forests with heterogeneous stand structure including large diameter trees, understory vegetation, and natural canopy gaps.[106] Even the second growth forests that occur throughout many forested landscapes are not suitable for cerulean warbler, as they lack the complex forest structure the bird seeks.[107]

Conservation efforts for this declining species "are focusing on forestry practices such as long rotation timber extraction and selective logging to create natural canopy gaps and uneven-aged forest stands."[108] The primary threat to the species is habitat loss and habitat degradation.[109]

A substantial amount of young forest habitat creation is indicated in North Carolina Wildlife Habitat Active Management focal areas. *See, e.g.*, DEIS at 15. NCWRC designated focal areas for six species: elk, white-tailed deer, wild turkey, ruffed grouse, cerulean warbler, and golden-winged warbler. Unlike the other five species on this list, cerulean warbler requires habitat for nesting in intact, mature interior forest habitat with a complex canopy of uneven aged stands.[110] As such, we recommend adoption of a Plan Standard that makes it clear that young forest creation management targets will primarily be met in the focal areas for the 5 species that require early seral habitat, while any management in the cerulean warbler focal area will not focus on young forest creation but instead on enhancement of habitat conditions suitable for cerulean warbler. That enhancement should be based on best available science for cerulean warbler, which at present suggests preferred habitat for the species includes long rotations and selective logging to create natural canopy gaps while preserving large diameter, tall trees and dense understory vegetation.[111]

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[104] Att. 23, Weakland, Cathy A. and Wood, Petra Bohall, *Cerulean Warbler (*Dendroica Cerulea*) Microhabitat And Landscape-Level Habitat Characteristics In Southern West Virginia*, The Auk 122(2): 497-508 (2005); Hamel, USDA, Cerulean Warbler Status Assessment (2005), https://www.srs.fs.usda.gov/pubs/ja/ja_hamel001.pdf.

[105] Cornell Lab, Cerulean Warbler, https://www.allaboutbirds.org/guide/Cerulean_Warbler/overview.

[106] U.S. Fish & Wildlife Service, Midwest Region, Species of Concern, Cerulean Warbler (Dendroica cerula) Fact Sheet, https://www.fws.gov/midwest/es/soc/birds/cerw/cerw-fctsheet.html.

[107] Att. 24, Wood, P.B., et al. *Management guidelines for enhancing Cerulean Warbler breeding habitat in Appalachian hardwood forests*, American Bird Conservancy (2013) ("Cerulean Warbler Management Guidelines").

[108] *Id.*

[109] Hamel, USDA, Cerulean Warbler Status Assessment (2005), https://www.srs.fs.usda.gov/pubs/ja/ja_hamel001.pdf.

[110] Att. 23, Weakland, *supra* note 104 ("We found that loss and fragmentation of forests [on reclaimed mines] in southern West Virginia negatively aff ected populations of Cerulean Warblers through edge and area effects. . . . Distance from mine was positively related to territory density, indicating that Cerulean Warblers are avoiding the large-scale edges . . . .").

[111] *See* Cerulean Warbler Management Guidelines, *supra* note 107 ("In mature forest stands that have high cerulean densities and high nest success, *the no-harvest option is most favorable* for sustaining cerulean populations. In

We also note that removal of canopy may expose birds like the cerulean warbler and other SCC to an increased risk of nest parasitism by brown-headed cowbirds.[112] The DEIS does not analyze this risk at the plan level, and so it must be analyzed at the project level for any project taking place in the North Carolina Wildlife Habitat Active Management focal area for cerulean warbler, or elsewhere with known cerulean warbler habitat.

H. Further Recommendations

1. Recommendations related to surveys

The Forest Service often overlooks the presence of rare species in stands proposed for harvest under the current plan. Capacity limitations mean that a stand may get only a single look, even though some relevant species may be harder to find during that time of year. Some examples:

- On the Welch project (Nantahala National Forest), citizen scientists found Aconitum reclinatum that was missed by the agency.

- On the Buck project (Nantahala National Forest), the Forest Service missed Polygala senega and Geum donium, which were found by citizen scientists.

- The North Carolina Wildlife Resources Commission found new occurrences of Green Salamander (Aneides aeneus) in the Southside project (Nantahala National Forest), resulting in new buffers on those locations.

- In the Turkeypen project (Nantahala National Forest), agency staff missed red-legged salamanders (Plethodon shermani) which were later located by a citizen scientist.

Other units in the Southern Appalachians have even overlooked federally listed species and their critical habitats:

- In one particularly egregious example, the Forest Service missed the same issue twice in two successive entries to a watershed well known for its rare aquatic species. A 1980s-era project in the Citico Creek drainage of the Cherokee National Forest failed to consider

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actively managed forests, there are opportunities to use forest management practices to mimic the structure and natural disturbance regimes of oldgrowth forests to enhance habitat for this species. . . . [R]etaining RBA levels of ~40-90 ft2/acre after harvesting trees in 25 acre harvest units in oak-dominated stands creates a forest structure that is generally favorable for ceruleans. Small-sized harvest stands (~10-27 acres) and their edges are not avoided by ceruleans.") (emphasis added).

[112] *See, e.g.*, Cerulean Warbler Fact Sheet, *supra* note 106 (Mostly cleared forest tracks are unsuitable due to high rates of nest parasitism and predation); U.S. Bureau of Reclamation, Brown-headed Cowbird Management Techniques (2004), at 7, https://www.usbr.gov/tsc/techreferences/env/Siegle_Cowbirdmanual.pdf.

impacts to the endangered Smoky Madtom and the threatened Yellowfin Madtom, even though the species are highly affected by sedimentation and the project would have drained immediately to their critical habitat. After three consecutive administrative appeals (which were all won by the appellants), the Forest Service finally disclosed the impacts in the project's fourth iteration. When the watershed was scheduled for its next entry, the Forest Service cursorily mentioned that those same species were present in the analysis area, but failed to realize that project activities were located immediately adjacent to their designated critical habitats. Environmental groups notified the Forest Service of the issue during the NEPA process (in comments on the Nov. 2010 Draft EA), which ultimately resulted in relocating project activities, mitigation, robust monitoring commitments, and, during implementation, the decision to drop some risky stands.

- Another recent example is bombus affinis, the rusty patched bumble bee, which was listed in 2017 due to precipitous declines. As FWS has stated, "The rusty patched bumble bee is so imperiled that every remaining population is important for the continued existence of the species." When the George Washington National Forest proposed the Duncan Knob vegetation management project, the species was not known to exist in the project area. That project was proposed under a CE, and it is highly unlikely that surveys for the bee would have been conducted in advance of its implementation. Fortunately, a separate NEPA process was ongoing for the Atlantic Coast Pipeline (ACP), which overlapped the project area. A contractor for ACP found the species near the project area. The end result: Duncan Knob stands within the subsequently-developed "high potential zone" for occurrence of bombus affinis were dropped. Those stands would have been implemented, and "take" would likely have resulted to this highly imperiled species, but for the lucky timing of a separate NEPA process that made up for the shortcomings in the Forest Service's proposed use of a CE.

It is hard enough to find rare species even with competent and expert staff looking for them. It is impossible without surveys. We sympathize with the agency's capacity limitations, but experience under the current plan shows that the Forests should be redoubling their commitment to surveys, not looking for ways to limit them. Individually and cumulatively the Forests are already impacting rare species in ways that have never been counted or disclosed to the public; it is unacceptable to make that problem worse.

PAD-S-02 provides the Draft Plan's standard related to surveys. Under it, surveys are only required when they are "commensurate with the risk of potential activities" and *all* of the following conditions are met: "the proposed treatment area has a high potential for occupancy, and project activities may affect the population or habitat of a federally-listed species or Species of Conservation Concern, and adequate population inventory information is unavailable, and information on number and location of individuals and habitat conditions would improve project design, the application of mitigations to reduce adverse effects, or the assessment of effects of the population." Draft Plan at 88. What makes population inventory information "adequate" to satisfy this standard is not clear. Similarly, what the Forest considers a "high potential for

occupancy" is unknown. Thus, despite the Plan's characterization of its approach as "consistent and efficient," this standard does not ensure consistent application. Instead, it provides broad discretion. Further, the final requirement, that "information on number and location . . . would improve project design" does not seem to account for all project situations. For example, there are likely to be situations in which information on mere presence or absence of a species in the project area could indicate a need for the project design to account for the species. A pre-survey determination about whether surveys improve project design risks generating controversy, not efficiency; it is hard to judge the worth of a survey to designing a project before the survey has been conducted.

Given how outdated much of the information about rare species occurrences is, we are concerned that these rules allow for a substantial amount of project design and implementation without adequate information about species locations. In particular, the DEIS concluded that the Service lacked sufficient information about Spruce Fir Moss Spider and Rusty-Patched Bumblebee to make conclusions about persistence and recovery in the Plan. DEIS at 267, 273. Additionally, information about occurrences for many SCC is also outdated or insufficient.

As such, we recommend PAD-S-02 be changed to provide clear, specific guidelines for when surveys will be required, which it currently does not. The Forests should be aware that if they attempt to bypass surveys at the project level, they invite controversy. NGO staff and consultants are capable of showing the presence of rare species that the Forest Service has not looked for, and this is likely to result in changing projects after much more substantial investments have been made in developing the project proposal. It is in the Forests' best interest to ensure that surveys are conducted using a clear and conservative approach that results in a high confidence of absence before stands are proposed to the public.

For example, a set interval after which occurrence data or previous surveys will be considered outdated could be provided for each federally-listed species, and a more general list could be provided for SCC based on their life cycles. The "number and location" requirement should be updated to include the desirability of information regarding species presence or absence in the project area. Additionally, the agency should define what is meant in PAD-S-02 by "high potential." Given the way the DEIS assessed species impacts, it would be reasonable to conclude that "high potential" means any area with overlap of the ecozone and age class characteristics that the ESE tool defined for a species. Whether this is the agency's intention should be made clear, and the manner in which all of these requirements are defined should take into account the assumptions made in the planning process about where species might be impacted on the forest. Clarity regarding all of these elements is necessary for the survey requirement to have any significance in ensuring the recovery of listed species and the viability of SCC and native forest species are not negatively impacted by projects.

2. Recommendations related to new information

In the course of project design and implementation, the Service will inevitably discover new information with regard to species occurrences, unique habitats, and areas with special biological

significance. Currently, the Draft Plan does not provide clear guidelines related to what will happen with that information. We recommend the plan adopt a Standard establishing what will happen when new occurrences of SCC are found during project design and implementation and how that information will be shared outside of the agency. Similarly, a plan component should be developed to address what will happen when new areas of special biological significance are found.

We additionally recommend the plan adopt a specific commitment to working with partners to expand the known range of threatened and endangered species and SCC on the forest. Table 11 is not an actual commitment, because it is not clear that the Forest Service is required to abide by it. Baseline data for these species is vital to understanding species impacts from forest management activities and to fulfilling the obligation of the Forest Plan to restore and maintain biological diversity as required by the Planning Rule.

3. Recommendations related to monitoring

36 C.F.R. § 219.12(a)(1) requires the plan to include "a monitoring program for the plan area" that "should enable the responsible official to determine if a change in plan components or other plan content that guide management of resources on the plan area may be needed." Section 219.12(a)(2) continues:

> The plan monitoring program sets out the plan monitoring questions and associated indicators. Monitoring questions and associated indicators must be designed to inform the management of resources on the plan area, including by testing relevant assumptions, tracking relevant changes, and measuring management effectiveness and progress toward achieving or maintaining the plan's desired conditions or objectives. Questions and indicators should be based on one or more desired conditions, objectives, or other plan components in the plan, but not every plan component needs to have a corresponding monitoring question.

Specifically, the Plan must include monitoring questions and associated indicators addressing "[t]he status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern." *Id.* § 219.12(a)(5)(iv).

The Draft Plan contains monitoring indicators related to bat caves, DEIS at 277, but not to bat foraging habitat, which the Draft Plan explains will be improved by creating young forest through projects. *See, e.g.,* DEIS at 72. Some focal species-related monitoring conditions address certain SCC. *Id.* at 277 (golden winged warbler, cerulean warbler, also contains general references to all freshwater mussels, salamanders, and bats). However, all of those monitoring conditions are assigned to Tier 2 and cannot actually be completed by the Forest Service without additional resources. So the Plan effectively contains no required monitoring related to

demonstrating that the Plan will "contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern." Without plans for surveys, we are not sure how the monitoring questions the Draft Plan does contain will be answered consistently. And the questions are not tied in any way to the management from which species benefits will theoretically stem.

The ultimate goal of the Forest Plan is to establish and protect ecological integrity and biological diversity. The Draft Plan includes detailed components to achieve that goal, but it lacks components related to monitoring to determine whether that goal is actually being achieved for rare species as projects are completed. Monitoring population response to management, not just overall population status, is an absolute necessity in ensuring the Plan is actually working toward its goals for wildlife. As such, the Plan must adopt a requirement for monitoring and develop a framework for how to achieve monitoring requirements that relates to project outcomes.

We see two possible ways the plan can meet this requirement, both of which will be needed, with a sliding scale between them. One method would be to include monitoring questions that effectively create "alerts" based on measuring species populations that would show the Forest Service needs to amend the Plan or change course if populations do not respond to management as predicted. When individual projects are implemented, these monitoring questions are assessed, and future projects are meaningfully informed by that assessment. But the downside of this project-level monitoring system is that where predictions or assumptions were off in the original Plan, it would usually be necessary to either do less management or go back to the drawing board. We do not believe this approach is compatible with the tiered objective approach found in the Draft Plan.

The monitoring burden could be much reduced if the Forest Service makes plan-level decisions that prioritize work in the right systems and conditions, minimizing risk and maximizing benefit. By reducing risk, the urgency of monitoring would be lower. Including appropriate areas in the Ecological Interest Area, fully protecting NHNAs, and utilizing the condition-based objective (priority treatment) approach will achieve this risk reduction without getting in the way of project-level flexibility. For example, the conditions identified as priority restoration treatments are less likely to shelter rare species because they are already somewhat degraded in terms of species composition. Monitoring implementation of condition-based objectives is much easier than monitoring populations, and validating the effectiveness of those treatments can be done on fewer than the total number of stands treated—e.g., did this project make progress restoring oak systems previously dominated by uncharacteristic white pine? Again, this is much easier than measuring populations of species associated with those oak systems. It is also more logical to use effectiveness monitoring to ask whether restoring specific conditions is "adding without subtracting," (or restoring without creating additional restoration needs) as opposed to trying to assess the population-level effects of creating ESH across ecosystems indiscriminately. For this reason, we recommend that the Forest Service adopt a commitment to monitor condition-based objectives after project implementation.

XI. Water

Water resources play a critical role in forest and aquatic ecosystem integrity, both in the forests and within the broader landscape of our region. Streams and rivers, many designated as outstanding resource waters (ORW) by the state, support a remarkable array of biodiversity, including rare aquatic species like hellbenders and freshwater mussels and populations of native brook trout. These water resources also help sustain recreational fishing and outdoor economies, as well as supply drinking water for downstream communities. Wetland complexes, bogs, and fens are integral to biodiversity hotspots for rare species in the Southern Appalachians. Headwaters to multiple major Southeastern river systems originate in the Pisgah and Nantahala national forests, having a profound influence on shaping downstream water quality off the forest.[113] Streams and rivers are a refuge for species that depend on pristine water quality and face habitat degradation due to urbanization and development in surrounding lands. And healthy water resources are vital to a climate resiliency strategy for the region and to help sensitive species withstand the stressors of climate change. In addition to ecosystem integrity, water resources contribute to social and economic sustainability in our region. That these watersheds are held in public ownership allows the Forest Service and stakeholders to assure their lasting and sustained contribution to ecological integrity on the forests and to communities and ecosystems downstream.

Under the existing plan, we have repeatedly raised concerns with road infrastructure and ground-based logging in steep, backcountry terrain with erosive soils near sensitive streams.[114] At the project level, we have advocated for the Forest Service to consider readily available information indicating areas are at high-risk of erosion and sedimentation near streams that support rare and sediment-sensitive species. The lack of clear guidance in the current plan about risk factors and when to use additional design measures during project development has led to conflict at the project level. And we have unfortunately observed the damage when ordinary practices that were assumed effective under the last plan were not sufficient for the specific, extraordinary site conditions. *See* discussion, *infra* at XI.A.2.b. The new plan is a chance to anticipate these known indicators of risk and provide a commonsense approach that allows land managers to nimbly mitigate against sedimentation and protect pristine waters in high-risk areas.

The Planning Rule requires the Forests to address the multiple dimensions of water resource health. The plan must include standards or guidelines for maintenance or restoration of water

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[113] Alexander, R. B. et al., *The Role of Headwater Streams in Downstream Water Quality*. JAWRA Journal of the American Water Resources Association 43: 41–59 (2007), available at http://onlinelibrary.wiley.com/doi/10.1111/j.1752-1688.2007.00005.x/pdf.; Barton D. Clinton and James M. Vose, *Variation In Streamwater Quality In An Urban Headwater Stream In The Southern Appalachians*, USDA Forest Service Southern Research Station, Coweeta Hydrologic Laboratory (2005) (suggesting undisturbed stream reaches on national forest lands are effective at improving water quality in streams where other reaches are heavily affected by urbanization or other land uses), available at https://www.srs.fs.usda.gov/pubs/ja/ja_clinton013.pdf.

[114] *See, e.g.*, objections and appeals filed for Buck Project (2019); Southside Project (2018); Mossy Oak (2017); Courthouse Creek (2013); Haystack (2011), available at https://www.fs.usda.gov/projects/nfsnc/landmanagement/projects and https://cara.ecosystem-management.org/Public/Letter/2126589?project=50345 (Buck).

quality, ecological integrity of riparian areas, and integrity of aquatic ecosystems and watersheds. 36 C.F.R. § 219.8. The plan must take into account disturbance and stressors like climate change and the ability of aquatic ecosystems to adapt to change. *Id.* In developing plan components for multiple use, the plan must consider water quality, public water supplies, recreation, and protection of wild and scenic rivers. *See* 36 C.F.R. § 219.10. And the Plan must include standards that ensure timber harvest will be carried out in a manner that protects watershed conditions. 36 C.F.R. § 219.11(d).

To comply with these requirements, we have in prior comments recommended development of plan standards to enhance riparian protection and protect against erosion and sedimentation. Steep slopes, erosive soils, intense rain events and landforms prone to landslides are conditions that occur throughout the forest. Ground-disturbing activities like roads and timber harvest under these conditions carry a risk of causing slope failure, rutting, and erosion, disrupting hydrologic connectivity and channelizing runoff into streams. Ongoing climate change is likely to continue to cause more intense rain events. Consideration of a matrix of factors, including soil erosion ratings, steep slopes, presence of sensitive streams, and the likelihood of significant rain events should compel restrictions on ground-disturbing activities and enhanced design measures, like expanded riparian buffers. In the following sections we first address the Draft Plan components related to protecting water quality and preventing sedimentation. And following the draft's structure, we then turn to riparian areas and information that supports expanding buffers and protecting ephemerals. Separately, we address soils resources – although protection of water and soil resources is inextricably connected, and the plan components should work in tandem.

A. Sedimentation and Water Quality

1. The Draft Plan Components

The Draft Plan's desired conditions recognize the importance of water resources to ecosystem health and aquatic systems. Below we focus on conditions most directly related to protecting water quality and sensitive stream and aquatic ecosystems. The following conditions name as objectives maintaining physical, biological, and chemical properties integral to aquatic systems and riparian species, meeting state and federal water quality standards, and protecting all stream channels, including ephemerals:

Desired Conditions[115]

WTR-G-01	Water quality is sustained at a level that retains the biological, physical, and chemical integrity of the aquatic systems and benefits survival, growth, reproduction, and migration of native and desired nonnative aquatic and riparian

[115] The Desired Conditions for water resources, Draft Plan at 36-37, appear to be inadvertently enumerated as Guidelines and need to be corrected.

	species.
WTR-G-02	Water quality meets state and federal water quality standards, including those in the Clean Water Act, and supports designated beneficial uses and native and desired nonnative aquatic species. Short-term exceedance of water quality standards (i.e., temporary period of declining water quality) due to management activity occurs only in the anticipation of long-term improvement of watershed condition and water quality.
WTR-G-06	Emphasize the protection of all stream channels. Protect the integrity of perennial, intermittent, and ephemeral stream channels including their bed and banks

We support these desired conditions and think they provide a framework for development of guidelines and standards that protect water quality and sensitive water resources.[116] To achieve these desired conditions, the Draft Plan helpfully retains some existing protections from the prior plan, like preventing visible sediment from reaching streams by relying on best management practices. Although that is part of the picture, that standard alone is not sufficient to make sure these desired conditions are attained. Missing are guidelines and standards to incorporate consideration of high-quality waterbodies and sediment-sensitive streams into project-level planning, like outstanding resource waters and trout waters that might be particularly susceptible to sedimentation risks posed by ground-disturbing activities. Anticipating the presence of these sensitive resources at the plan level would guide development in a way that reduces the need for successive project-level NEPA analysis assessing worst-case scenarios, which increases the analysis burden under the current plan, or failing to assess those scenarios and allowing acute failures that impact water quality. Below are recommendations about how to fill the gaps left by the Draft Plan and DEIS. Many of these recommendations complement recommendations of the Partnership and build on approaches from other newer forest plans.

[116] With regard to WTR-DC-02's reference to short-term exceedances of water quality standards, we understand this is intended to limit short-term exceedances to activities designed to improve watershed condition, water quality, and aquatic systems (*e.g.*, upgrading culverts or certain stream restoration work). We note such work may necessitate additional agency approvals. The Southside Project, for example, approves stream restoration activities in an ORW, and as a result will require a separate determination from the Army Corps "that the impacts to the critical resource waters will be no more than minimal," even if the Forest Service pursues that work under a nationwide permit. *See* Corps Nationwide Permit 27, condition 22, http://www.saw.usace.army.mil/Portals/59/docs/regulatory/regdocs/NWP2012/NWP27_3-23.pdf.

a. Protecting high-quality waters

We agree that water quality must meet state and federal water quality standards. In service of that desired condition, proposed standard WTR-S-01 brings forward the existing plan's requirement to prevent visible sediment in accordance with North Carolina Forest Practice Guidelines Related to Water Quality (FPGs). And under terrestrial ecosystems, ECO-0S-07 lays out standards for design and erosion control features, including FPGs, minimizing soils disturbance and avoiding seeps, springs, and hydric soils, providing design standards for crossing stream channels, locational restrictions on skidding, and cable logging on slopes over 40 percent unless site-specific analysis requires otherwise. We support the intent of these plan components, to design management activities in a way that reduces the potential for sedimentation. In discussion of soils, we note changes including clarifying language requiring cable logging on steep slopes in a related standard (ECO-S-06), unless a site specific analysis demonstrates another method of logging will meet soil and water protection standards. That revision will add necessary clarity and reduce both project planning and conflict at the project level.

Not included in the water resource plan components are guidelines and standards assuring particularly sensitive waters that carry heightened designation are protected with any additional measures necessary to assure compliance with water quality standards. The 1987 Plan acknowledged these standards by including a list of high quality and outstanding resource waters. *See* B-1-14. We previously noted in comments that Outstanding Resources Waters (ORWs) should be granted extra protection in the new Forest Plan given their recreational and ecological importance. The highest classification in North Carolina, ORW designation is reserved for "unique and special" waters of the state that are of "ecological significance" and "exceptional water quality." 15A NCAC 02B .0225. Inherent in this supplemental designation is the recognition "that the characteristics which make these waters unique and special may not be protected by the assigned narrative and numerical water quality standards." *Id.* In addition, North Carolina's water quality standards have "deemed" as ORWs certain waters of exceptional recreation or ecological significance, including wild and scenic rivers and waters that provide habitat for rare and endangered species. 15A NCAC 02B .0225 (b). Waters classified ORW occur throughout the NPNF and must be maintained to protect the outstanding resource values; no degradation is allowed.[117] The Forest Service must assure its decisions comply with this requirement. 15A NCAC 2B .0201.

Waters classified trout waters are also found throughout the NPNF. "Trout waters" are those that possess conditions that "sustain and allow for natural trout propagation and survival . . . ." 15A NCAC 02B .0202 (55). Waters designated Trout waters are subject to more protective

[117] A DEQ map of waters classified ORWs is at the following link and should be incorporated for reference into the plan, https://ncdenr.maps.arcgis.com/apps/webappviewer/index.html?id=6e125ad7628f494694e259c80dd64265.

standards.[118] This includes a requirement that turbidity in the receiving water not exceed 10 Nephelometric Turbidity Units (NTU).[119] There is no forestry exemption related to turbidity: "The N.C. Forest Practice Guideline Related to Water (FPG) rules are not intended to restrain or curb turbidity. The state's turbidity standards are governed under a different set of rules."[120] The Forest Service cannot rely exclusively on FPGs (established to maintain an exemption under the sedimentation pollution control laws) to assure compliance with this standard.[121]

Although not currently anticipated in the Draft Plan, additional, project-specific best management practices and design standards are necessary for controlling non-point pollution sources in order to meet watershed desired conditions and maintain heightened water quality designations. To the extent these are developed in the context of individual projects, we also suggest the addition of a standard requiring that these design standards be incorporated into project plans.

Previously we also have commented that plan guidance and standards should provide direction as to the frequency of monitoring efforts during projects to gauge compliance with design measures and water quality standards. This information is necessary both at the individual project level and across the full range of project activities over time. *See* 36 C.F.R. § 219.12(a)(5)(ii, vii, viii).

b. Hydrologic connectivity

The interaction of roads (system, legacy, prisms, temporary, and skid) and streams historically has been a source of impacts across the forest. And the increased intensity in storm events with the changing climate means the challenges of managing runoff will be greater, not fewer. To meet these challenges, we suggest adding a desired condition for maintaining natural flow paths and hydrologic connectivity (used here in the ecological sense, meaning connectivity within an aquatic ecosystem, and not in the limited sense meaning harmful connections between roads and waters) and a requirement that roads, prisms, skid roads and trails do not disrupt connectivity and do not divert flows. This would complement road design standards related to stream crossings (TA-S-04, iv) (design stream crossings to allow aquatic passage), as well as restoration objectives targeted to disruption of natural contours by unauthorized roads (TA-O-04) and prioritizing road maintenance work on existing roads connected to the stream network (WSD-O-

[118] *See, e.g.,*15A NCAC 02B .0211 (noting tighter limits for turbidity, chlorophyll, dissolved oxygen, cadmium, temperature, toluene).

[119] For an example of the comparatively light visibility of 10 NTU, see https://www.ncforestservice.gov/publications/Forestry%20Leaflets/BF5.pdf

[120] *Id.*

[121] Meeting the standard for turbidity may require a combination of best management practices to reduce nonpoint source inputs in order to achieve water quality protection goals. 15A NCAC 02B .0202 (8); 15A NCAC 02B .0211 (21).

01, iii). The challenges with disrupting hydrologic connectivity are not just legacy problems, however, and anticipating them in the future requires more than just plan components related to roads crossing streams. Activities authorized with future timber harvest, like roads, temporary roads, and skid roads and trails, can disrupt flow paths and channelize stormwater flow.[122] The Forest Service should develop standards to maintain natural flow paths in future projects.[123] This will require greater attention to buffering ephemeral streams, as discussed below.

2. The DEIS's analysis of effects on water resources

The DEIS does not disclose the need for or the advantages of additional standards and guidelines to protect sensitive streams or address long-term impacts of road prisms and skid roads to hydrologic connectivity. Instead of providing this kind of analysis, the EIS primarily relied on best-case assumptions about the performance of best management practices (BMPs) in timber sale implementation in the future. Based on a glowing self-assessment, the agency concludes, for the most part, it needn't do more to achieve water quality in logging projects.

As a consequence, even where the DEIS recognizes risks that management activities pose to streams, the agency assumes those risks away, rather than analyze them at a forest-wide scale or commit to a framework to avoid them at the project level. For example, the DEIS recognizes that "Forest roads can contribute to stream impacts where road drainage is inadequate and soils are prone to erosion." DEIS 99. But it concludes monitoring data from 2008-2013 shows BMPS were "effective" at controlling sediment from roads at "94.7 percent of sites surveyed." DEIS (citing 2009-2013 monitoring data). For roads stream crossings, it concludes BMPs were "89.5 percent effective" in protecting water quality. DEIS at 100.

The DEIS recognizes sedimentation "commonly poses the greatest risk to water quality from forest management." DEIS at 117. But it couches the risk as one being entirely and effectively controlled by current BMPs, which it says are 97.6 percent effective in preventing sediment or other pollutants from reaching streams, again citing monitoring data from 2009-2013. DEIS 101-104.

Based on these assumptions, the DEIS makes no attempt to analyze how site-specific factors influence soil erosion and sedimentation risks, like slope, soil erosion rating, or logging in erosion-prone soils near ORWs. The EIS instead assumes BMPs in timber sale implementation

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[122] *See, e.g.,* Att. 25, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System. Misc. Report FS-643, USDA Forest Service, Washington, DC, August 1999.

[123] Proposed desired conditions, guidelines, and standards discussed under remedy, see a similar desired condition in the Chugach National Forest Land Management Plan (2020), FW-GL3-WAE-DC, 9, FW-WAE-MAP, https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd725270.pdf ; Jefferson National Forest, Land and Resource Management Plan (2004), at FW-127, FW-133, https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd519617.pdf.

will ameliorate any risks under any scenario, across all parts of the landscape, and under all alternatives.

As explained below, the DEIS's assumptions about the effectiveness of BMPs at controlling sediment and protecting water quality are wildly optimistic and disconnected from reality.

a. Reliance on best-case assumptions to avoid analyzing the full extent of direct, indirect, and cumulative impacts to water resources is error

The DEIS's analysis of effects displays no sensitivity to waters with heightened water quality standards, like Trout waters, and does not relate risk to steep slopes, erosive soils, high rainfall, or greater ground disturbance or road density. Instead of engaging this analysis, the bulk of the agency's analysis relies on past BMP monitoring to downplay any risks. This monitoring, however, paints only a partial picture of experience gained on the forest – and in some instances obscures chronic problems.

The agency's attempt to use BMP monitoring data to shield a candid disclosure of effects is not a new problem. In the recent Buck project the agency displayed the same recalcitrance to a candid assessment of risks of cutting temporary roads into backcountry areas – including those proposed as recommended wilderness and EIAs – to carry out ground-based logging, in steep slopes and erosive soils, in areas that drain to ORWs. And it relied on the same kind of BMP monitoring results to do it.[124]

Because the agency continues to exaggerate these monitoring results and use them as a basis to sidestep analyzing effects of logging in steep erosive soils, as it did in the Buck project and other recent projects like Courthouse Creek and Southside, we analyze them in detail in the attached Review of NFNC Best Management Practices Monitoring, Att. 26. Based on a review of the underlying field forms on which the Forest Service relies, and other site-specific data not reported in the forms, below we highlight key problems with using the Forest's limited BMP data to dismiss all potential direct, indirect, and cumulative effects of timber harvest and related road-building for a decade or more under the new plan.

- ***BMP Monitoring Shows Sediment Reaching Streams***. Problems like visible sediment entering a stream, obstruction of aquatic passage, and ground-based logging on sites that should be cable-logged are recurring problems. That timber sales with multiple problems nonetheless receive high "scores" for BMP performance reveals a flaw in the scoring system. Even when sediment enters a stream because of a failure of a single BMP, a logging unit receives high compliance marks for "effectiveness" at preventing sedimentation because each individual BMP is scored separately. In this way a unit with

[124] The Buck project EA incorporated more recent monitoring data through 2018; the DEIS here relies on monitoring data from 2009-2013.

a sediment release still receives a high score for using BMPs that control sediment.[125] The Ten-Year Summary Report of Best Management Practices Monitoring (Ten-Year Summary) illustrates this point. From 2009 to 2018 the Forest Service reviewed 63 timber sales. Seventy times across these sixty-three sales, sediment reached a stream. Ten-Year Summary at 2 (noting 63 sales were surveyed) and 4 (noting visible sediment reached a stream channel 70 times). In other words, on average, streams were impacted with sediment more than one time per sale evaluated. The Forest Service scores this 97.4 percent effective in controlling sediment. Att. 26-a. But the ten-year report instead shows that the Forest Service must assume that, under current practice, a stream will almost certainly be impacted with sediment in any routine timber sale.

- ***"Non-critical" visible sediment is a problem.*** The reports downplay sediment problems by making up a new category called "non-critical visible sediment," which still receives an elevated score as only a minor departure. To be sure, the Plan (like state and federal law) forbids the delivery of "visible sediment" to streams. The current Forest Plan directs the Forest Service to "[p]revent visible sediment from reaching perennial and intermittent stream channels and perennial water bodies in accordance with NC Forest Practice Guidelines Related to Water Quality" (FPGs). Forest Plan at III-40. These FPGs, in turn, define "visible sediment" as "solid particulate matter, both mineral and organic, which may be seen with the unaided eye that has been or is being transported by water, air, gravity, or ice from its site of origin." 02 NCAC 60C .0102. Non-critical visible sediment is not a standard defined under the current plan or in agency regulation or guidance, but appears as a convention in the field forms to downplay certain sediment problems: "A non-critical amount of visible sediment is a low volume, short-term sediment source that does not adversely affect aquatic habitats." *E.g*, NFNC 2018 Forestry BMP Monitoring at 4.[126] There is no effort in the monitoring reports, through turbidity monitoring or otherwise, to discern whether something deemed non-critical may in fact correspond to an exceedance for turbidity (present or past), may indicate a prior, more severe sediment release that has since moved downstream, or may have greater or cumulative impacts in successive projects or downstream waters with sediment-sensitive species like trout.[127] The DEIS makes no effort to fill these gaps.

- ***BMP Monitoring Misses Impacts Through Site Selection and Timing***. The monitoring is not comprehensive in any sense. Not all harvest units are inspected, and the ones that are selected by district rangers for inspection are generally examined well after the units

[125] *See* Att. 26, BMP Review and attachments.

[126] *See* Att. 26-d, BMP Review and attachments.

[127] *See, e.g.*, Eastern Brook Trout: Status and Threats, Produced by Trout Unlimited for the Eastern Brook Trout Joint Venture (listing sedimentation as the third largest impact to brook trout), http://easternbrooktrout.org/reports/eastern-brook-trout-status-and-threats/view.

are closed. Often this is greater than six months after a sale has closed, even though the field forms themselves indicate that inspections should take place within about a month of closure. The timing is nearly always too late to evaluate the short-term effects and too infrequent to discern long-term effects.

In summary, the select review of logging sites, infrequent nature of inspections, limits in the design of the monitoring forms, and flaws in the scoring system strongly undermine the conclusions that the NPNF derives from the BMP monitoring. Instead of forthrightly disclosing these potential harms based on the practical limitations of BMPs, the analysis in the DEIS is built upon a series of best-case assumptions disconnected from reality and experience.

In addition to its BMP reports, which are inadequate to predict future compliance, the Forest Service has other experience to inform its understanding of effects. Unfortunately, the plan DEIS ignores this experience. Real-world experience implementing projects in steep, backcountry terrain in the NPNF reveals significant risks and undermine the conclusions of the BMP assessments.

b. The Forest Service's analysis ignores recent implementation problems at other projects on the Pisgah and Nantahala National Forests

i. Courthouse Creek Timber Sale

We have previously pointed out in project analyses that ordinary design criteria and BMPs are unlikely to be successful at keeping sediment out of streams in challenging, erosive terrain – for example, Courthouse Creek and its tributaries in the Panther Branch sale. In July 2017, with logging operations well underway, it was clear that storm events and road cuts proved too intense for the usual BMPs the Forest Service relies on in this EIS; sediment was not contained on-site as predicted and instead ran off into trout streams. Once the damage was done, the Forest Service observed: "After a very wet period during logging, sediment was found entering nearby streams in Unit 1 and Unit 2." [128]

DWR reported "~200 feet of a headwater stream/seep was impacted with sediment measured to be 2-3 inches in depth."[129] The Panther Branch sale confirms that temporary roads, skid roads, and skid trails can, with ordinary BMPs, prove to be acute and damaging sources of sediment runoff in areas with highly erosive soils and high rainfall. Other sales throughout Region 8 have experienced similar problems (*see* Hogback in Cherokee National Forest).[130]

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[128] Att. 26-f, Forest Service, Panther Branch Road Decommissioning Monitoring Report (2019).

[129] *See* Att. 26-g, DWR Inspection Report (July 27, 2017).

[130] SELC, Timber Sale Voluntarily Cancelled by Cherokee National Forest, https://www.southernenvironment.org/news-and-press/news-feed/suit-voluntarily-dismissed-after-timber-sale-cancelled-by-cherokee-national (discussing Hogback project)

Logging unit (Panther Branch Sale, July 2017)

Sediment runoff into Courthouse Creek (from Panther Branch Sale, July 2017)

Logging unit (Panther Branch Sale, September 2017)

ii. Upper Santeetlah Timber Sale

On a field visit to a stand in the Upper Santeetlah Project, Josh Kelly at MountainTrue observed problems with implementation, including sediment reaching a stream in stand 43-25. At the top of a skid road, the road intersects an ephemeral stream and is dumping sediment into it. The logging road runs straight up the slope and may be a vector for channelized runoff during rain events.

Logging unit 43-25 (Upper Santeetlah, September 2019)

In addition, it appeared logging in unit 45-29 and the group selection that surrounded it exceeded the intensity of harvest allowed by that Decision document and existing forest plan. As a result, likely more ground was disturbed and the risks to soil and water were greater than were analyzed at the project level.

c. The analysis of effects is incomplete; sedimentation in streams is a likely outcome in the absence of additional Plan standards to meet desired conditions

These dramatic examples are illustrative, but they should not overshadow the chronic BMPs that occur, on average, more than once per project. Visible sediment reaching streams during and after timber harvest is not an aberration, but a pattern, and the Forest Service must anticipate site conditions that increase that risk, like steep slopes and erosive soils. Instead of forthrightly disclosing these potential harms based on the practical limitations of BMPs as evident through other timber harvests and a deeper look at BMP monitoring, the analysis in the EIS is built upon a series of best-case assumptions disconnected from reality.

This is not the hard look demanded by NEPA. "The hallmarks of a 'hard look' are thorough investigation into environmental impacts and forthright acknowledgment of potential environmental harms." *Nat'l Audubon Soc'y,* 422 F.3d at 187. An agency may not escape the obligation to analyze site-specific environmental consequences of the action by relying on general mitigation measures, without the requisite analysis determining the efficacy of those measures at the site-level. *See Colorado Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1173 (10th Cir. 1999) ("merely list[ing] possible mitigation measures" is insufficient); *Neighbors of Cuddy Mountain*, 137 F.3d at 1381 (disapproving an EIS that lacked such an assessment); *see also Ohio Valley Envtl. Coal. v. Hurst*, 604 F. Supp. 2d 860, 889 (S.D.W. Va. 2009) (a "perfunctory description" or "mere listing" of mitigation measures without supporting analysis insufficient to support a FONSI). Because the BMP scores are not reliable indicators of whether sediment has entered streams or whether flow or aquatic passage has been impacted, the BMP monitoring cannot be used to realistically assume away the effects of road construction and timber harvest of plan implementation over the next decades.

The Fourth Circuit Court of Appeals recently held the Forest Service's reliance on an "overly high efficiency rate of erosion control devices" of 96 percent in the George Washington National Forest was an error in its NEPA analysis. "The problem… was assuming that these devices would function nearly perfectly to reduce erosion and sediment, despite a wealth of evidence to the contrary." *Cowpasture River Pres. Ass'n v. Forest Serv*., 911 F.3d 150, 177 (emphasis added);[131] *see also Sierra Club, Inc. v. Forest Serv.*, 897 F.3d 582, 590 (4th Cir. 2018) (finding the Forest Service failed to take a hard look at sedimentation concerns). The Forest Service

[131] A part of this decision unrelated to NEPA was reversed in *Forest Serv. v. Cowpasture River Pres. Ass'n*, No. 18-1584, 2020 WL 3146692 (U.S. Supr. Ct. June 15, 2020).

repeats that error here and, as a result, does not analyze the direct and indirect impacts of logging on sedimentation risk under various alternatives in the DEIS. An incomplete analysis of environmental effects, or the efficacy of measures to reduce the severity of those effects, "undermine[s] the 'action-forcing' function of NEPA," because "neither the agency nor other interested groups and individuals can properly evaluate the severity of the adverse effects." Robertson, 490 U.S. at 352 (citations omitted).

In addition, the DEIS also overlooks risks to water quality other than sedimentation. Lacking is a candid analysis of other impacts to hydrology and water quality caused by loss of ground cover, skid trails, log landings, soil disturbance, temperature, and channel erosion. For timber harvest activities, the DEIS briefly discusses possible stream channel impacts from increased water yield, before concluding those risks are effectively managed through buffers. DEIS at 101. The DEIS does not acknowledge the extent of potential hydrologic modifications related to timber harvest related activities, and fails to analyze the direct and indirect impacts alteration of hydrologic flow paths and soil loss.[132]

d. The DEIS does not assess cumulative effects to water resources

Having cut short its analysis of direct and indirect effects, the Forest Service also fails to acknowledge adverse potential cumulative effects of timber harvest under the action alternatives. "Under all alternatives, The Forest Service will not add to potential adverse cumulative impacts to water quality." DEIS 118. Despite the planned increase in timber harvest over current levels and potential for additional disturbance on the landscape affecting and water and soil resources, the DEIS concludes that "trends on Forest Service lands will be static to improving in most watersheds during the life of the plan under all alternatives." DEIS 118 (emphasis added).

The Forest Service found 70 visible sediment failures in 10 years of monitoring 63 timber sales. Many more failures surely occurred in areas not monitored, but this means the timber sale program was responsible for at least 7 violations of state and federal water quality laws each year, at current levels of harvest. Now, with alternatives that would quintuple harvest levels, the Forest Service closes its eyes to the problem. The Forest Service cannot rationally multiply a non-zero risk by five and get zero for an answer. As a math teacher might note, this is the whole reason that you must show your work (as NEPA requires).

The Forest Service must significantly revise its analysis of effects to account for the potential impacts of timber harvest and related roads on sedimentation and hydrologic alterations cumulatively, across multiple watersheds in the forests, and to water resources downstream

[132] *See, e.g.*, J.M. Vose & C.R. Ford, Early Successional Habitats and Water Resources, 266, https://www.srs.fs.usda.gov/pubs/ja/2011/ja_2011_vose_002.pdf (although proper BMP implementation may prevent a "significant negative impact," it is "also clear" that forest operations associated with forest cutting can create permanent changes to hydrologic flow paths and serve as long-term sources of concern for water quantity and quality).

which may be highly dependent on conditions in headwater streams.[133] The Forest Service should consider both the classification or sensitivity of receiving streams in the timber harvest area, as well as the condition of downstream waterbodies, for example, before it dismisses what is believes is non-critical sediment, which may be adding pollutants in downstream impaired waters. There are in fact numerous stretches of waters listed as impaired waters by DEQ that cross or are downstream from national forest lands, for example, including parts of the Little Tennessee, Tuckaseegee, French Broad, and Nolichucky rivers.[134]

e. The DEIS fails to meaningfully distinguish between alternatives

The DEIS's distorted and incomplete assessment of effects of the Draft Plan components on water quality carries over into the analysis of alternatives, and leaves the agency incapable of distinguishing between alternative courses of action. The agency concludes, for timber harvest, under "proposed alternatives, timber harvest impacts are expected to improve from current, and *would continue to rarely have long-term adverse impacts to water quality*." DEIS 116 (emphasis added). For cumulative impacts the agency concludes, under "all alternatives, the Forest Service will not add to potential adverse cumulative impacts to water quality." DEIS 118. The cumulative effects discussion notes briefly that management activities would increase in watersheds "dominated with Matrix and Interface Management Areas where there may be an increase in road and trail construction," but dismisses the risks with best management practices, and therefore, does not explain where those risks are greatest under different scenarios. DEIS 117.

NEPA requires a comparison of the full measure of impacts under each alternative. *See Baltimore Gas & Elec. v. Nat. Res. Def. Council*, 462 U.S. 87, 97 (1983) (requiring consideration of "every significant aspect of the environmental impact of a proposed action"). Absent that, there is not clear basis for choices by the decision maker and the public as it relates to water resources. *See* 40 C.F.R. § 1502.14. Relevant differences between alternatives include how Group 1 MAs overlap with high-risk soil conditions or sensitive receiving waters' watersheds. These differences influence the probability of harm in any project. Over time, they will determine the level of cumulative harm.

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[133] Meyer, Judy L. et al., *The Contribution of Headwater Streams to Biodiversity in River Networks*, JAWRA Journal of the American Water Resources Association (2007), 43:86-103 (2007), available at http://www.srs.fs.usda.gov/pubs/ja/ja_myer001.pdf (concluding "the biological integrity of entire river networks may be greatly dependent on the individual and cumulative impacts occurring in the many small streams that constitute their headwaters").

[134] DEQ's most updated map of impaired waters is available at https://deq.nc.gov/about/divisions/water-resources/planning/modeling-assessment/water-quality-data-assessment/integrated-report-files, and the 2018 303(d) list is available at https://files.nc.gov/ncdeq/Water%20Quality/Planning/TMDL/303d/2018/2018-NC-303-d--List-Final.pdf.

3. Specific changes to Plan components

Below we proposed revisions and new standards to address the concerns we raise above. With these we aim to provide a roadmap to meeting desired conditions for water quality protection. The specific standards set out to limit risks we identify, that have not been fully analyzed in the DEIS, and to allow project design to take into account particularly sensitive water resources. We indicate with a * where these support recommendations of the NPNF Partnership.

Table: Proposed Revisions to Water Resources

Proposed component	Proposed Language	Recommended Revision
ECO-S-07	Design, construct and maintain erosion control features to meet soil and water quality standards. In particular: … b. Plan forest management activities to minimize detrimental soil disturbance, stream crossings and avoid springs, seeps and hydric soils.	*Add clarifying language to b.* Examine sites during or shortly following a rain event so that the seeps and springs, as well as ephemeral and intermittent stream channels, can be more easily identified. * *partnership recommendation*[135] *Add subsection to address hydrology*: Dips or waterbars or other dispersal methods will be constructed and maintained to direct stormwater off skid trails and reduce potential sediment flow to streams. Ruts will be smoothed to restore hydrology and drainage paths.[136] *Add subsection* Project-specific best management practices, including FPGs and any additional design standards necessary for controlling non-point pollution sources in order to meet soil and watershed desired conditions, shall be incorporated into project plans.137

[135] This supports a NPNF partnership recommendation to incorporate language requiring a site visit during or shortly after a rain event so that the seeps and springs, as well as ephemeral and intermittent stream channels, can be more easily identified.

[136] Similar standards can be found in the Jefferson National Forest LRMP, *supra* note 123, at FW-127, FW-133.

[137] For an example of a similar standard, see Flathead National Forest Land Management Plan (2018), FW-STD-WTR 02, https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd603490.pdf.

WTR-DC-*		*Add desired condition* Water follows natural flow paths and hydrologic connectivity is maintained. Roads, skid roads and trails, do not disrupt hydrologic connectivity and do not act as an extension of the stream network. [138]
WTR-O-*		*Add objective* Maintain hydrologic and aquatic connectivity by using design measures to avoid disruption to hydrology and drainage paths and eliminating barriers such as undersized culverts.[139]

Develop standards WTR-S-*

- **Site screening for high-quality waters and those with heightened standards:** The presence of sensitive receiving waters should be factored into project planning. Sensitive waters include those classified ORW by the state, WSR, and those carrying supplemental designations like Tr or WS. The presence of sensitive receiving waters should compel evaluation of design measures in light of other site conditions, including soil erosion ratings and slopes. Additional design measures include:
    - Expand buffer requirements around perennial, intermittent and ephemeral streams carrying heightened designations.
    - Reduce ground disturbance, like limiting ground-based equipment during site preparation, preventing stacked skid trails, and requiring cable logging in units that carry higher erosion risks
    - Increase monitoring pre- and post-sale and include turbidity monitoring, not just visual assessment of BMP implementation.

    *This complements the partnership recommendation to develop the following standard related to Watersheds, which we support: "*Outstanding resource values in watersheds classified as Outstanding Resource Waters (ORW) are considered during management activities.*"* NPFP Draft Plan Comments at 70.

[138] See a similar desired condition in the Chugach National Forest Land Management Plan (2020), FW-GL3-WAE-DC, 9, https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd725270.pdf.

[139] *Id.*, at FW-WAE-MAP, provides an example of a similar objective.

- **BMP Monitoring**: We support monitoring and review of timber harvest practices to better gauge operator compliance. To obtain data that better informs the conclusions the Forest service is trying to draw, the new Plan should require both implementation and performance monitoring, at specified frequencies, and within the times anticipated in field forms to ensure Best Management Practice (BMPs) are consistently implemented and that they are effective. We welcome the opportunity to develop a monitoring protocol, with stakeholder input.

B. Streamside Zones

The Planning Rule requires the Plan to establish "riparian management zones" to ensure the ecological integrity of riparian areas. *See* 36 C.F.R. § 219.8(a)(3). Riparian areas are where aquatic and terrestrial ecosystems interface.[140] The rule, at a minimum, requires the plan to establish "width(s) for riparian management zones around all lakes, perennial and intermittent streams," and suggests the agency should special attention to the first 100 feet. *Id.* In riparian management zones "riparian-dependent resources receive primary emphasis." § 219.19. Plan components for riparian areas "must ensure that no management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment that seriously and adversely affect water conditions or fish habitat shall be permitted within the riparian management zones . . . ." *Id.*

The Draft Plan addresses components for riparian areas separately from protecting water resources under a framework for "Streamside Zones," but as § 219.8 (a)(3) recognizes, the ecological integrity of riparian areas is key to protecting water quality. The Forest Service's own Assessment for this plan revision noted that the Riparian Protection Areas (MA-18) under the current Forest Plan were "instrumental" in mitigating impacts from water yield and sediment. Assessment of Watersheds, Hydrology, Geology & Soils at 12.

In previous comments, we supported enhancing riparian protection consistent with the new Planning Rule's emphasis on protecting riparian integrity and its role in regulating water resources. Instead, the plan components propose riparian management zones that are out of step with other national forests in the Southern Appalachians and best available science.

1. The Draft Plan Components

The two desired conditions for streamside zones generally recognize conditions important to sustaining ecological integrity within riparian areas.

[140] The planning rule defines riparian areas as: "Three-dimensional ecotones of interaction that include terrestrial and aquatic ecosystems that extend down into the groundwater, up above the canopy, outward across the floodplain, up the near-slopes that drain to the water, laterally into the terrestrial ecosystem, and along the water course at variable widths." 36 C.F.R. § 219.19.

Desired conditions

SZ-DC-01	Areas along streams and rivers and around ponds and reservoirs are healthy, functioning, and contain a variety of forest compositions and structures representative of the existing forest community. Streamside zones may vary based on site-specific conditions that consider geology, soils, vegetation, and water flows.
SZ-DC-02	Streamside zones are dominated by native vegetation that provides shading to the streams, filters sediments from upslope areas, stabilize streambanks and reservoir shoreline, and provide potential large woody debris for aquatic habitat. Native trees in these zones influence water temperature and provide in-stream habitat and nutrients.

To ensure desired conditions also comport with the Planning Rule's emphasis on the role of riparian integrity in protecting water quality, we suggest adding the following desired condition. This is consistent with the plan narrative's recognition that the conditions of streamside zones are a "primary influence" on water quality and aquatic habitat. Draft Plan at 41.

SZ-DC-*	Water quality ensures survival, growth, reproduction, and migration of aquatic and riparian wildlife species; and contributes to the biological, physical, and chemical integrity of aquatic ecosystems. Water quality meets or exceeds state and federal standards. Water quality (e.g.: water temperature, sediment level, dissolved oxygen, and pH) will be improved where necessary to benefit aquatic communities.[141]

The desired conditions generally provide a framework for development of guidelines and standards to protect the ecological integrity of riparian areas. And the related objectives set out targets for restoration work in streamside zones to enhance and restore riparian structure and function. The standards limiting vegetative management and ground-disturbing activities (**SZ-S-01 and SZ-S-02)**, however, neither enhance protections for riparian areas consistent with the Planning Rule's emphasis on riparian ecosystem integrity, nor ensure their protection. SZ-S-01 provides a streamside management zone, where any vegetative management activities must be aimed at ecosystem restoration (and that should be *riparian* ecosystem restoration). The riparian management zone must be defined as width, and for perennial *and* intermittent waterbodies, the rule suggests emphasis on the first ***100 feet***. 36 C.F.R. § 219.8(a)(3)(emphasis added). While the Plan proposes 100 feet for perennial waterbodies, it proposes far less for intermittent waterbodies, only ***15 feet***. Riparian areas for channelized ephemeral streams receive no plan-

[141] *See, e.g.,* for reference, George Washington NF Revised LRMP, *supra* note 42, at DC 11-17; Francis Marion National Forest Final Revised Plan, *supra* note 50, at 39.

level protection. Also missing is specific guidance on conditions, like slope intervals, that should compel wider streamside zones. (There is only a requirement to "consider" wider areas in steep slopes). Furthermore, while SZ-S-02 limits ground-disturbing activities in riparian management zones, which is consistent with protecting them, in the same breath allows that limitation to be bypassed with unspecified "mitigation measures."

These standards should be significantly improved to meet the stated desired conditions and to ensure ecological integrity of riparian areas under the new plan. Below, we address the DEIS's analysis of effects of the Plan's approach Streamside Zones. We then propose expanding and strengthening protections for the riparian management zone, consistent with plans in our region and literature that goes beyond the region. Specifically, streamside zones for the Nantahala and Pisgah should meet or exceed the water quality protections given for other Southern Appalachian National Forests. We suggest a streamside zone of 100 feet on each side of (or perimeter around) perennial streams, 50 feet on each side of intermittent streams, and 25 feet on each side of ephemeral streams. Also consistent with other forests, the NPNF must consider the need for expanded buffers limiting certain activities based on site sensitivity conditions like slope. These changes are compelled by best available scientific information and the Planning Rule's emphasis on ensuring riparian and ecological functions are emphasized in plan components. 36 C.F.R. § 219.19.

2. DEIS analysis of streamside zones

The DEIS's brief discussion of "riparian buffers" does not analyze the direct, indirect, or cumulative effects of the standards proposed for streamside zones discussed above on ecological integrity in the riparian areas. *See* DEIS at 108-110. The DEIS does not reveal the basis for the choices made in the Draft Plan. For example, the basis for only a 15-foot buffer for intermittent streams, which is less protective than other regional forests, is unclear. There is no explanation for the decision not to assign a streamside zone around ephemeral streams. The DEIS does not consider whether to expand buffers on steep slopes and at what intervals to do so. The discussion of alternatives does not differentiate between alternatives regarding impacts to riparian areas even though it is possible to do such an analysis. The GWNF plan revision EIS, for example, compared riparian integrity, sediment risk, habitat complexity, temperature, acid deposition and aquatic passage under each alternative.[142]

Unanswered by the DEIS then is the effects of the Draft Plan standards on the ecological integrity of riparian areas under the action alternatives. Instead, the DEIS primarily focuses on the same BMP monitoring, flawed for the reasons discussed previously, that scored BMP implementation and effectiveness at preventing sediment at a select number of units in a subset of logging projects, typically well after the site inspected had closed. *See* DEIS at 108-110.

[142] *See* George Washington National Forest LRMP FEIS, General Riparian Direction by Forest Plan Alternative, 3-248, https://www.fs.fed.us/gwjeff/core/2014-GWNF-FEIS-full-document.pdf.

Based on the monitoring, the DEIS and Draft Plan apparently do not anticipate the need for stronger standards to ensure "riparian-dependent resources receive primary emphasis" and water temperature, composition, flow, quality and aquatic habitat is protected. 36 C.F.R. § 219.19. Of course, the categories scored make clear that the previous monitoring did not attempt to gauge whether previous plan standards for riparian corridors ensured *ecological integrity* of riparian areas. That monitoring, whatever its utility, explains neither the choices made in the Draft Plan for management of Streamside Zones, nor the effects of those choices. The DEIS's equally brief discussion of a few studies relating to riparian buffers and nitrate, loss of hemlock, and rhododendron treatments also do not supply the missing analysis. *See* DEIS 109-110.

And there is important information that the DEIS does not, but should, take into account. The Draft Plan's streamside zone widths are less protective than other regional plans. For comparison, the GWNF starts with a core area of 100 feet for perennial waterbodies and 50 feet for intermittent streams – the latter is far greater than the NPNF.[143] As slopes increase, an "extended area" ranging from 25 feet (slopes >10 percent) to 50 feet (slopes > 45 percent) is added to core areas.[144] The Cherokee National Forest similarly provides a riparian corridor width of 100 feet for perennial streams and 50 feet for intermittent streams. CNF Plan at 165.[145] It overlays a streamside filter zone for perennial and intermittent waterbodies with a focus on water quality, which expands with slope, for example from 75 feet (10 percent) to 183 feet (40 percent); the two together comprise the Streamside Management Zone. CNF Plan at 160. Within the filter zone, significant ground disturbance is restricted. CNF Plan, FW-3. Both the Chattahoochee and Francis Marion forests also have greater protections for intermittent streams – 50 feet for the Francis Marion and 100 feet to 150 feet for the Chattahoochee, depending on slope.[146]

The Forest Service must evaluate the buffer widths deemed necessary to protect the ecological integrity of riparian areas and their functions in other forests with similar conditions in our region. Scientific literature also points to a more protective buffer than proposed by the NPNF. For example, a scientific literature review of riparian buffers noted long term studies demonstrate the need for wider buffers and that 100 feet is "sufficiently wide to trap sediments under most

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[143] George Washington National Forest LRMP, App. A (Riparian Corridors), https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd525098.pdf.

[144] All Riparian Corridor standards apply to the core and extended areas; specific standards allow additional activities in the extended areas. *E.g.*, George Washington National Forest Revised LRMP, *supra* note 42, at 11-018, 11-020, 11-022.

[145] Prescriptions relating to riparian corridors are at, CNF Plan, Prescription 11, Riparian Corridors: Streams, Lakes, Wetlands, at 160, https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5269436.pdf.

[146] Francis Marion National Forest Final Revised Plan, *supra* note 50, at 4.2.1.4 Standards for Riparian Management Zones; Chattahoochee-Oconee National Forest Plan (2004), Table 3-12 (Riparian Corridor Widths For Intermittent Streams), https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm9_028662.pdf.

circumstances," but "should be extended for steeper slopes."[147] A base width of 100 feet for "all perennial and intermittent" streams "provides the greatest level of protection for stream corridors, including good control of sediment and other contaminants, maintenance of quality aquatic habitat, and some minimal terrestrial wildlife habitat."[148] A review of riparian buffer width guidelines based on stream or streamside ecosystem factors (properties, components, or functions), also found intermittent stream buffers *far exceeding* the Draft Plan's streamside zone of 15 feet were the norm in the Southeast region.[149]

The DEIS must account for this additional information. The use of best available science is required by both the Planning Rule and NEPA. 36 C.F.R. § 219.3; *see* 40 C.F.R. § 1500.1(b) (accurate scientific analysis based on high quality environmental information is essential to implementing NEPA). Furthermore, a candid assessment of effects of the Draft Plan standards related to Streamside Zones should lead to consideration of stronger standards that would meet the Planning Rule's requirements for riparian ecological integrity.

3. Specific changes to Plan Components

The proposed revisions and new standards that follow address the concerns we raise above. The specific standards incorporate the direction of best available science on riparian integrity and to limit risks of vegetative management and ground-disturbing activity relative to conditions in Southern Appalachian Forests. We indicate with a * where these proposed revisions support recommendations of the NPNF Partnership.

Table: Proposed Revisions to Streamside Zones

Component	Component Language	Recommended Revision
SZ-S-01	Vegetation management activities	Vegetation management activities within

[147] Att. 28, S. Wegner for UGA Institute of Ecology, *A Review of the Scientific Literature on Riparian Buffer Width, Extent And Vegetation* (1999); *see also* Att. 29, B.W. Sweeny & J.D. Newbold, *Streamside Forest Buffer Width Needed to Protect Stream Water Quality, Habitat, And Organisms: A Literature Review*, Journal of the American Water Resources Association 50(3):560-584 (2014) (streamside forest buffers ≥30 m wide are needed to protect water quality, habitat in the streams evaluated).

[148] *See See* Wegner, *supra* note 147. Wegner noted buffers should also extend to intermittent and ephemeral channels as well. For purposes of aquatic habitat, the literature demonstrated "10-30 m (35-100 ft) native forested riparian buffers should be preserved or restored along all streams." The EPA recommends a minimum width of 35 to 50 feet for Streamside Management Areas (SMAs) to be effective: "Areas such as intermittent channels, ephemeral channels, and depressions need to be given special consideration when determining SMA boundaries." USEPA, National Management Measures to Control Nonpoint Source Pollution from Forestry Draft, 3B: Streamside Management Areas, available at https://www.epa.gov/sites/production/files/2015-10/documents/ch3b.pdf.

[149] P. Lee, C. Smyth and S. Boutin, *Quantitative review of riparian buffer width guidelines from Canada and the United States*, Journal of Environmental Management 70:165-180 (2004) (finding existing buffer guidance in the Southeast average about 40 feet, and that existing guidance was less than most ecoregions), available at https://www.napawatersheds.org/img/managed/Document/2887/RiparianBufferReview.JEnvMgnt2004.pdf.

	within streamside zones (as defined below and in) must contribute to ecosystem restoration and not compromise aquatic system and riparian structure and function with the exception of short term impacts for long-term improvements. For example, water temperature regulation, sediment transport, streambank stability, and recruitment of large woody debris must exhibit natural dynamics after treatment. In these areas other objectives must be secondary to ecosystem restoration. • Within 100 feet of either side of (or perimeter around) perennial waterbodies (streams, ponds, and reservoirs); • Within 100 feet of perennial springs, bogs, and other wetlands; • Within 15 feet of either side of (or perimeter around) intermittent waterbodies (e.g., streams, natural vernal pools, and seeps). …	streamside zones (as defined below) … • Within 100 feet of either side of (or perimeter around) perennial waterbodies (streams, ponds, and reservoirs); • Within 100 feet of perennial springs, bogs, and other wetlands; • Within <u>50 feet</u> of either side of (or perimeter around) intermittent waterbodies (e.g., streams, natural vernal pools, and seeps). • Within 25 feet of either side of (or perimeter around) channeled ephemeral streams, including 25 feet upstream for the point at which the scoured channel begins (the "nick point").[150]
SZ-S-02	Avoid ground disturbing activities, such as skid roads and trails, temporary or permanent roads, log landings and loading areas, and waste disposal areas within streamside	Avoid ground disturbing activities, such as skid roads and trails, temporary or permanent roads, log landings and loading areas, and waste disposal areas within streamside zones <u>except for</u>

[150] This supports one of the alternative Streamside Buffer proposals of the NPNF Partnership: "Leave the 100' of functional riparian buffer on either side of perennial streams and springs, ponds, reservoirs, bogs and wetlands unchanged from the Draft Plan. Also provide functional riparian buffer with identical language as that of the perennial SZs for 50' on each side of intermittent streams. Provide SZs for 25 feet on each side of a channeled ephemeral stream, including 25 feet upstream for the point at which the scoured channel begins (the "nick point"), using language similar to that of neighboring Forest Plans, including the Cherokee and Jefferson NFs." NPNF Partnership Comments at 40.

	zones unless satisfactory mitigation measures have been designed. When soils sensitive to erosion, steep slopes and other factors identified by the analysis dictate, consider site specific mitigations, including wider exclusion zones for logging equipment. (See Terrestrial Ecosystems: Timber Standards)	designated stream crossings or when placement of disturbance-prone activities outside of the SZ would result in more environmental disturbance than placing such activities within the SZ. When soils sensitive to erosion, steep slopes and other factors identified by the analysis dictate, consider site specific mitigations, including wider exclusion zones for logging equipment. (See Terrestrial Ecosystems: Timber Standards) ** This supports a NPNF Partnership recommendation*
Management Approach (climate change, p. 28)	Restore native vegetation in streamside zones to help moderate changes in water temperature and stream flow.	Protect and restore native vegetation in streamside zones to help moderate changes in water temperature and stream flow and enhance habitat. ** This supports a NPNF Partnership recommendation*

Develop New Standards:

- **Expanding Buffers**: In addition to the core buffers proposed above, the NPNF should overlay protections dependent on increasing slope. Examples of expanding streamside zones based on slope are included below from Cherokee National Forest and GWNF Plans. In addition to slope as a site-specific factor warranting a more protective buffer, the presence of federally listed species should compel larger buffers; we support the NCNHP program request for 300-foot buffer on aquatic habitats with federally listed species and a 200-foot buffer on tributaries to those aquatic habitats.

Cherokee National Forest Plan, FW-3

TABLE 2-1. STREAMSIDE FILTER ZONE – SLOPE DISTANCE WIDTH IN FEET BETWEEN MAJOR DISTURBANCE AND PERENNIAL, INTERMITTENT STREAMS, LAKES AND OTHER WATER BODIES							
Slope (%)	0	10	20	30	40	50	60

Width (Feet)	40	75	102	146	183	224	274
Note: Roads, trails, bladed firelines are examples of significant disturbance. These may be allowed where designated crossings are unavoidable.							

GWNF Plan, Table A-1. Riparian Corridor Minimum Widths for Perennial Streams, Lakes, Ponds, Wetlands, Springs or Seeps

Slope Class	0-10% Core Area	11-45% Core + Extended Area	45%+ Core + Extended Area
Minimum width in feet (as described	100	125	150*

GWNF Plan, Table A-2. Riparian Corridor Minimum Widths for Intermittent Streams

Slope Class	0-10% Core Area	11-45% Core + Extended Area	45%+ Core + Extended Area
Minimum width in feet (as described above)	50	75*	100*

* The Extended Area is the outer 25 feet (on 11-45 % slopes) and 50 feet (on 45% and greater slopes).

- **Daylighting**: The draft objectives for daylighting will contribute to creation of young forest conditions. Develop a standard providing that daylighting does not occur in riparian areas or cove forests within areas that are important to core habitat or connectivity for salamanders. These areas have been modeled and mapped by NGOs. *Proposed standard:* Daylighting will not occur in streamside zones or relevant ecozones (cove or other mesic forests) within areas modeled as important for rare salamander core habitat or connectivity unless site-specific surveys confirm absence of those species. *This supports a NPNF Partnership recommendation.

XII. Soil and Geologic Hazards

SELC and its partners have a longstanding interest in ensuring management activities that result in ground-disturbing activities, like timber harvest and roads, protect against soil damage, erosion and landslides. In many project-level analyses we have repeatedly raised concerns relating to the consequences of ground-based logging and road infrastructure in steep terrain with erosive soils, near sensitive streams. And we have unfortunately observed the damage when ordinary practices that were assumed effective under the last plan were not sufficient for the specific, extraordinary site conditions. For this reason, we have supported robust protections for soil and water resources in the planning process and an approach that allows land managers to anticipate and mitigate against soil loss and erosion in high-risk areas. Indeed, this is a foundational requirement of NFMA.

NFMA, at 16 U.S.C. § 1604(g)(3)(E)(i), requires that "timber will be harvested from National Forest System lands only where...soil slope, or other watershed conditions will not be irreversibly damaged." The plan must therefore include standards that ensure timber harvest "would only occur where soil, slope or other watershed conditions would not be irreversibly damaged." 36 C.F.R. § 219.11(d).

To comply with these requirements, in scoping comments we recommended plan standards to strengthen protections against erosion and sedimentation. Ground-disturbing activities on steep slopes generally carry a risk of erosion and slope failure which, among other problems, often leads to increased sedimentation of streams. BMPs are often effective, but certainly not always, and soil can be damaged even where sediment is not reaching streams. There are many areas where repeated harvest has cumulatively damaged the soil resource. It is essential that the Plan contain standards adequate to ensure that soils are not damaged or lost during harvest activities at such rates that they will not be fully restored before the next entry. The DEIS does not include any basis for concluding that the Draft Plan would do so.

We suggested adding to the "existing plan's limits on the types of logging based upon slope, in the revised plan, new road construction and land disturbance across steep, unstable slopes with high risk factors for failure should be avoided." Scoping Comments at 8. Additional standards should "restrict activities on steep slopes, highly erosive soils, and other site characteristics to minimize landslide risks, based upon best available soil and slope data." *Id*. at 16. The Forest Service's own monitoring data supplied during Assessment confirmed road and skid trail stream crossings, legacy roads near streams, and roads generally suffered the highest rates of BMP ineffectiveness – and visible sediment. We identified a need to develop avoidance measures and enhance BMP effectiveness, rather than simply maintain "current direction." *Id*. at 16 (citing Forest Service Assessments of Geologic Hazards and Watersheds, Hydrology, Geology, discussing predominant risk factors.)

Information about a matrix of factors, including soil erosion ratings, slope, and the likelihood of significant rain events, is readily available to inform restrictions on ground-disturbing activities and when to look to a suite of enhanced best management practices.

A. The Draft Plan Components

The Draft Plan sets Desired Conditions for soils that recognize the important role that soils play in ecosystem health and integrity. For example, the following Desired Conditions name as objectives maintaining physical, biological, and chemical properties integral to vegetation growth, hydrologic function, nutrient cycling, carbon storage, and slope stability, ensuring soil productivity, avoiding sedimentation in streams, and assuring a soil profile typical for undisturbed soils:

Desired Conditions

SLS-DC-01	Forest soils have adequate physical, biological, and chemical properties to maintain or improve vegetation growth, hydrologic function, nutrient cycling, carbon storage, and slope stability.
SLS-DC-02	Soil productivity is sustained through nitrogen and carbon fixation, nutrient mineral release from parent material, decaying organic matter, and recycling of nutrients. Soils do not contribute sediment to streams at levels that negatively affect instream uses and lifecycles of aquatic species. Erosion and compaction are minimized as a result of our management activities.
SLS-DC-03	Generally, soils dedicated to growing vegetation have a normal soil profile that is typical for undisturbed soils on similar landforms in the local area.
GEO-DC-05	Ground-disturbing activities do not cause or contribute to geologic hazards, such as acid rock drainage and landslides.

To achieve these Desired Conditions, the Draft Plan helpfully retains some existing protections from the prior plan. However in terms of adding protections, Draft Plan components stop short of providing a suite of concrete guidelines and standards to make sure these desired conditions are attained. Missing is a matrix of risk factors in erosion-prone soils, as we suggested in previous comments, that would guide management activities and reduce the need for successive project-level NEPA analysis assessing worst-case scenarios, which has increased the analysis burden under the current plan. Below we note where standards have gaps or should be strengthened to meet the Desired Conditions. And we make recommendations about how to fill the gaps left by the Draft Plan and the DEIS's analysis. These recommendations compliment many of the zones of consent from the Partnership.

1. Screening for erodible soils and geologic hazards

The following standards require a screening for the presence of "highly erodible soils" and "geologic hazards," and a requirement to provide design measures to address risks.

- **SLS-S-01** "Vegetation management activities, road and trail design shall be screened for the presence of highly erodible soils. If present, location and design measures shall be provided to reduce erosion potential and effects to natural resources."
- **GEO-S-02** The location of proposed roads, trails, facilities, and management activities shall be screened for the presence of geological hazards relevant to the geologic setting. If geologic hazards are present, then location and design measures shall be provided for management activities that may affect or be affected by the geologic hazards.

We agree with the presumed intent behind these plan components, to reduce erosion potential and design management activities to avoid creating a geologic hazard (*e.g.*, landslides or exposure of acid-producing rock). Before turning to design measures, we support the Partnership's recommendation to consider avoidance of geologic hazards. Furthermore, unspecified are the design measures that should be provided, and scenarios or other site conditions that might warrant degrees of additional measures to mitigate against erosion or slope failure. While ECO-S-07 provides design measures that apply generally, it does not identify erosive soil screening as an indicator for using cable logging or avoiding stacked skid roads (linking these instead to the presence of steep slopes). Also not included is a definition of highly erodible soils that would compel the unspecified design measures and whether the determination would be made by a qualified resource specialist, for example a hydrologist or soil scientist. These omissions leave it less clear that the standards will in fact achieve Desired Conditions needed to assure compliance with NFMA.

2. Soil impairment standard

The draft plan proposes the following standard and guideline, among others, designed to limit impacts on soils.

- **SLS-G-02** During construction of roads, trails, and other infrastructure, the risk of soil erosion should be reduced by implementing mitigation measures such as erosion control matting, slash (tree branches, etc.) placement, seeding, and mulching. The minimum amount of soil should be exposed at any given time during project execution.

- **SLS-S-02** On all soils dedicated to growing vegetation, at least 85% of the activity area will be able to grow vegetation without Substantial Soil Impairment. Reforestation shall be accomplished within 5 years. (Footnote: "Substantial Soil Impairment" is detrimental changes in soil properties (physical, chemical, or biological) that result in the loss of the inherent ecological capacity or hydrologic function of the soil resource that lasts beyond the scope, scale, or duration of the project causing the change.)

We support SLS-G-02 and suggest the last sentence has distinct value and should become a separate guideline.

SLS-S-02 introduces a standard that, on its face, appears to *allow* 15 percent of soil in an activity area to become impaired, or subject to detrimental changes that last beyond the scope of the

project. There are a number of problems with this approach. As discussed below, the DEIS assumes, but does not analyze whether, allowing impairment up to 15 percent, across any activity areas, would protect against soil impairment across the varied ecozones, soil types, erosion rating factors, and slopes, within the NPNF. The analysis also would have to analyze the cumulative effects of those varied scenarios. Likely such an analysis would produce a range of acceptable soil disturbance based on specific conditions – but not the one-size-fits-all approach here.

The 85/15 standard was at one time assumed to reflect the best available science for preventing cumulative soil impairment. At that time, it was an explicit requirement from Region 8, and something that Forests could rely on without independent, original analysis. That Regional requirement has now been withdrawn, because the literature now suggests that the simple 85/15 rule is not reflective of best available science. This leaves the Forests in the position of having to do their own analysis to understand whether soil erosion, compaction, rutting, and other damage are likely to be fully restored before the next expected entry, based on the risks to particular soils or slopes caused by specific kinds of activities like ground-disturbing harvest. The Forests must also account for the absence of critical soil inputs from the trees removed in a commercial harvest in this analysis. If the Forests lack the ability to perform this analysis at the Plan level, then they must adopt conservative standards that leave an ample margin of error. The current standards do not get the job done.

The language used in this particular standard is problematic because it leaves open the possibility of 15 percent *impairment* rather than 15 percent *disturbance*. The choice matters. NFMA states that "timber will be harvested from National Forest System lands only where...soil slope, or other watershed conditions ***will not be*** irreversibly damaged." 16 U.S.C. § 1604(g)(3)(E)(i) (emphasis added). This leaves no room for a little irreversible damage. Even if the metric was acceptable, the language in draft SLS-S-02 and the corresponding definition of Substantial Soil Impairment would need revision to make sure soil disturbance allowed at the site is not opening the door to violating NFMA. The Forests also cannot assume that zooming out to the landscape scale will help its case. The standard must apply at the scale of the activity area. Sure, one project may impair only a fraction of the forest's soils, but multiple planning cycles the entire footprint of harvest could be degraded without adequately protective standards for the particular activity area.

SLS-DC-02 notes that compaction and erosion should be minimized. We agree that erosion *and* compaction can affect long- and short-term soil productivity. The plan lacks guidance and standards addressing compaction, particularly on soil types that might be most easily damaged by compaction. We also suggest adding language to SLS-DC-02 to make sure Desired Conditions meet state water quality standards and requirements that land-disturbing activities prevent visible sedimentation. This will help prevent downstream degradation, cumulatively, which is outside the scope of project monitoring.

3. Limitations on steep slopes

The Draft Plan suggests a site-specific review on slopes over 40 percent to determine an appropriate logging method and a limitation against stacking skid roads on steep slopes:

- **ECO-S-06** Conduct a site-specific review to determine the appropriate logging systems for management on sustained slopes (> 200ft) over 40 % slope.

- **ECO-S-**07 Design, construct and maintain erosion control features to meet soil and water quality standards. In particular:
  …
  i. In cable logging units, use cable that suspends at least one end of the log on sustained slopes over 40 percent unless site-specific analysis determines that other logging methods meet soil and water protection standards.
  …
  k. Avoid "stacking" multiple skid roads on steep slopes. Consider obliterating legacy skid roads on steep slopes where soil or water quality is a concern.

We agree with a Standard that sets a threshold for cable logging on steep slopes, but the articulation in the Draft Plan appears to walk back the default presumption in the prior plan that cable logging would be used on slopes over a certain threshold. The current Forest Plan requires "cable yarding that suspends at least one end of the log on sustained slopes over 40% ***unless*** site-specific analysis determines that other logging methods meet soil and water protection standards." Forest Plan at III-34 (emphasis added). In other words, the clarity in the last plan is replaced in the Draft Plan with only additional analysis, with no guidance on how much analysis is needed. Is it enough that the prescriptionist believes the stand is operable using ground-based equipment, without structured input from a soil scientist? This *should* increase project-level analysis by deferring this decision to site-specific review, but does not require it. It would be far better to adopt standards that provide a clear framework to avoid questions about whether the determination is justified.

The new proposed standard at ECO-S-06 provides no guidance about what exactly site-specific analysis should include or who should do it. Is distance to streams and their sensitivity rating relevant? What about erosive soils and precipitation rates? Also missing is any upper limit on when cable logging should just be required. This not only creates additional work for the agency, but sets the Forest Service and stakeholders up for project-level tensions. It also creates additional work here, since the DEIS would have to address the risks and effects of potentially more frequent ground-based logging and disturbance on steep slopes (which as discussed below, has not been analyzed). We recommend 35 percent as the sustained slope where cable logging (or something equally protective) is presumptively required *by default*, in line with other plans in the region, and support additional clarifying language proposed by the Partnership.

We agree in principle with the limit on stacking skid roads on steep slopes. Left unclear however is how steep slopes need to be to trigger the limit, and whether certain sensitive site conditions

warrant this limitation before cable logging becomes necessary? Should additional review of ground-based logging disturbance or limits on heavy equipment be triggered at 35 percent?[151] Again, the standard should be clarified to allow nimble application. And it should be mandatory; stacking should never occur again on our forests. If a slope is steep enough to require stacking, then it is too steep to log using ground-based methods. Period.

In summary, absent from the proposed Standards and Guidelines is a framework to evaluate a matrix of risk factors for soil and to guide site-level planning in a way that reduces environmental risk (and site-level analysis). The piecemeal approach reflected in the components above leaves gaps between the Standards, Guidelines, and meeting the Desired Conditions. The Forest Service also has missed an opportunity to craft a clear set of factors or scenarios that would compel additional, specific design measures necessary to minimize environmental risks and achieve Desired Conditions.

B. The DEIS Omits Important Analyses Related to Soils

Where the proposed plan Standards leave gaps or ambiguities that allow the potential for greater effects than may be anticipated by the agency, the DEIS also lacks the necessary information to analyze the risks of the Draft Plan's approach on soil resources. In the absence of this analysis, the agency and stakeholders are unable to evaluate the significance of potential adverse effects or consequences of implementing these proposed Standards on a forest-wide scale. That, in turn, further complicates any attempt to gauge how these environmental consequences play out under different alternatives. Indeed, the DEIS makes no effort to answer that question. This leaves both the public and the agency uninformed to evaluate the Draft Plan's effect on soils.

To be clear, the DEIS identifies a number of risk factors relevant to soil resources and soil productivity. A majority of soils are sensitive to erosion, with over 73 percent of soils in the current suitable base carrying a severe or very severe erosion risk, according to the NRCS web survey tool. DEIS at 85. Roads are an ongoing source of impacts to soil, altering soil properties and converting them to a "non-productive state." *Id*. at 89. Legacy roads have long-lasting impacts on soil structure that are "unlikely to recover without active restoration." *Id*. at 92. Roads located on soils sensitive to erosion are disclosed as a particular concern, as they interrupt flow of surface and groundwater and risk sedimentation to nearby waters. *Id*. at 90. Temporary roads, the DEIS recognizes, are often sources of lasting adverse impacts to soil productivity. *Id*. at 93.

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[151] This approach has been adopted by the Chugach National Forest Land Management Plan, *supra* note 138**,** at FW-SOIL-G, 4: "Management activities using ground-based equipment on slopes greater than 35 percent gradient should be reviewed by a qualified resource specialist, typically a hydrologist or soil scientist." The George Washington National Forest limits ground-based logging on slopes >35 percent. *See* George Washington National Forest Revised LRMP, *supra* note 42, at FW-132, FW-135. The Jefferson National Forest and Chattahoochee-Oconee National Forests limit mechanical site preparation on slopes over 35 percent, and in erosion prone soils, on slopes over 20 percent. *See* Jefferson National Forest Plan, *supra* note 123, at FW-118; Chattahoochee-Oconee National Forests Plan, *supra* note 146, at FW-058.

The analysis notes miles of roads and how they intersect erosion hazard ratings, suggesting this could be useful in determining the need for certain erosion control mitigation measures, like increased water diversion structures (although no such plan standards are proposed). *Id*. at 90. Finally, the DEIS discloses that soil disturbance from timber harvest varies by soil type, harvest method, topography, and climate, and skid roads, temporary roads, and log landings, are subject to soil productivity loss within "a spatial and temporal context." *Id*. at 91.

Missing, however, is an analysis of the interaction between these risk factors and effects to long-term soil productivity and ecosystem integrity of soils across the forest, under the timber harvest and road infrastructure scenarios allowed in the Draft Plan. This is a remarkable omission given the proposed increases in harvest levels. The agency is required to take a hard look at the potential direct, indirect, and cumulative impacts that could result from timber harvest, road building, and other ground-disturbing activities under the Draft Plan.

Instead of providing this analysis, the DEIS instead relies on best-case assumptions about the performance of best management practices (BMPs) in timber sale implementation on a forest-wide scale. Therefore, while the DEIS recognizes the existence of risk factors like "very erosive" soils, lasting impacts from temporary roads, and variation by harvest method and climate, it assumes timber harvest BMPs will negate any potential harm. And no matter which alternative the agency selects – and under either Tier of logging or extent of road-building – the agency's conclusion is the same: the alternatives "would not contribute to the decline in soil productivity occurring cumulatively across all lands." DEIS at 95.

Core to the agency's analytical error is over-reliance on the snapshot provided by BMP monitoring and soil disturbance monitoring, which paints only a partial picture of experience gained on the forest – and in some instances obscures chronic problems. Because the agency continues to exaggerate the monitoring results and misuse them as a basis to sidestep a forthright analysis of the effects of logging in steep erosive soils – as it did in the Buck project and other recent projects – we analyze them in detail in the attached Review of Nantahala-Pisgah Monitoring of Best Management Practices. To be clear, we support monitoring and review of timber harvest practices to gauge operator compliance, but here the select review of logging sites, infrequent nature of inspections, limits in the design of the monitoring forms and flaws in the scoring system, strongly undermines the conclusions that the NPNF derives from the BMP monitoring, as described above. We would welcome the opportunity to develop a monitoring protocol, with stakeholder input, that better answers the question, how well are BMPs preventing sediment from entering streams, assuring compliance with water quality standards on a short- and long-term basis, and avoiding impacts to aquatic resources? A review of the field forms on which the Forest Service relies, and other site-specific data not reported in the forms, demonstrates that: (1) problems like visible sediment entering a stream, obstruction of aquatic passage, and ground-based logging on sites that should be cable-logged are recurring problems; (2) the reports are under-inclusive and not sufficiently comprehensive for purposes of evaluating the short- and long-term effects of timber harvest in the Southern Appalachians; and (3) experience implementing sales in steep, backcountry terrain in the NPNF reveals significant risks.

The snapshots offered by these field forms, while of some utility, are not a substitute for analyzing the risks to soil resources across the forest under varied site conditions. All told, field forms from years 2013 and 2018 reveal that ten of the fourteen timber harvests with units evaluated in the Nantahala and Pisgah National Forests experienced exactly the kinds of problems that go unanalyzed in the DEIS under assumed BMP efficacy – excessive soil disturbance, sediment entering streams, and problems with streams crossing. Review of NFNC BMP Monitoring, Att. 26.

Instead of forthrightly disclosing these potential harms based on the practical limitations of BMPs, the analysis in the DEIS is built upon a series of best-case assumptions disconnected from reality. This is not the hard look demanded by NEPA.

In addition to relying on questionable assumptions about BMP implementation to shortcut a complete analysis of effects, the DEIS also evaluates the forest's compliance with "guidance" that it asserts allows up to 15 percent of an activity area to "lose potential long-term soil productivity." DEIS at 87-89. This, in turn, appears to be the basis for the following proposed Standard: "SLS-S-02 On all soils dedicated to growing vegetation, at least 85 percent of the activity area will be able to grow vegetation without Substantial Soil Impairment." First, our understanding is that the Region Eight Office withdrew prior guidance that had recommended a similar formulation. In other words, there is no Regional guidance to tier to here. Critically, a uniform 15 percent requirement ignores potentially significant localized impacts in sections of the forest from timber harvest activities in particularly sensitive soils. To support such a Standard, then, the DEIS would have to separately analyze why allowing impairment up to 15 percent, across any activity areas, would actually protect against soil impairment across the varied ecozones, soil types, erosion rating factors, and slopes, within the NPNF. And the analysis would have to analyze the cumulative effects of those varied scenarios. As noted above, likely such an analysis would produce a range of acceptable soil disturbance based on specific conditions – not the one-size-fits-all approach here.

That analysis did not occur. The DEIS does not analyze whether allowing 15 percent of soils to be substantially impaired would result in significant effects, but instead offers as a conclusion that it will not: "Effects to the soil from projects are considered not significant on the Forest when 85 percent of the activity area is unaffected and retains its long-term soil productivity." In other words, "no more than 15 percent of the activity area and each individual harvest unit are affected and lose potential long-term soil productivity." DEIS at 87. Why this degree of impact would be "not significant" is neither explained nor analyzed. The aggregate effect of allowing 15 percent of soils to be substantially impaired over multiple activity areas in close proximity is also un-analyzed. The requirement further provides no regard to conditions that cause soil movement and loss of productivity. Although the DEIS asserts it is relying on the Forest Soil Disturbance Monitoring Protocol,[152] that protocol specifically recognizes that the consequences

[152] *Available at* https://www.fs.fed.us/rm/pubs_series/wo/wo_gtr082a.pdf.

of activity on soil productivity "vary by soil type" and does not itself assign a disturbance value that correlates to detrimental soil disturbance. Even the DEIS recognizes that soils "vary widely in productivity, behavior, and response to management" (DEIS at 83), but then stops short of analyzing the range of impacts that could result from applying a disturbance standard uniformly.

In the absence of analysis, it is not clear how allowing 15 percent of soil to lose long-term productivity would comply with NFMA. The sensitivity of soils and steep slopes present in these forests suggests this degree of disturbance could be both significant and violate NFMA's prohibition against damaging soils. This is particularly true for cumulative impacts. In the absence of a plan-level analysis, the Forest Service has no basis to determine whether project-level impacts will cumulatively impair soil productivity in violation of NFMA.

Next, there appears to be a gap between the proposed 85 percent Standard and assumptions in the DEIS. The proposed Standard requires only that 85 percent of an activity area "be able to grow vegetation without Substantial Soil Impairment," while the DEIS assumes 85 percent is left "unaffected." DEIS at 87. If the DEIS assumed impacts were limited by leaving 85 percent unaffected, that is different from the degree of disturbance allowed by the Draft Plan language.

The DEIS also does not clarify whether the Forest Service intends to allow for 15 percent of the activity area to be merely disturbed or 15 percent of the project area to be substantially impaired in a way that causes long-term damage. This distinction is important. NFMA, at 16 U.S.C. § 1604(g)(3)(E)(i), states that "timber will be harvested from National Forest System lands only where...soil slope, or other watershed conditions will not be irreversibly damaged." Thus, the plain language of § 1604(g)(3)(E)(i), simply prohibits irreversible damage to soils – with no exceptions. There is no qualification that some, in this case 15 percent, soil could be damaged without any assurance that it will recover fully before it is once again disturbed.

Even if the Forest Service fixes these problems and determines a more appropriate Standard to limit maximum amount of detrimental soil disturbance (or ranges correlated to ecozones, soil types and topography), any proposed Standard would still need language clarifying that irreversible damage is not allowed. Any such Standard should be further tied to concrete requirements ensuring soil health. Such requirements could call for as an example, leaving organic layers, topsoil and root mat over the site, and ground cover to provide nutrients and reduce soil erosion, at a rate that ensures soil productivity.

Without these analyses, the effects of the proposed Draft Plan Standards are unknown. That omission frustrates a comparison of alternatives because, in the absence of understanding impacts, the agency also cannot evaluate the comparative merits and tradeoffs of the alternatives it considers, especially the differences between Tiers. The DEIS does the opposite of differentiating between alternatives and instead lumps the action alternatives and Tiers together: "Overall, the alternatives would not contribute to the decline in soil productivity occurring cumulatively across all lands." DEIS at 95. The DEIS must, at a minimum, differentiate between the disturbance potential under plan alternatives (including no action) and levels and locations of harvest and roads contemplated in each, as it relates to soil resources.

To understand the consequence of implementing the Draft Plan across the landscape, the DEIS must make some meaningful effort to assess the risk of soil impairment, including impacts to soil productivity, from surface disturbance, soil loss, and compaction. This must take into account that some soils are at higher risk to loss of soil productivity.[153] This should be informed by a review of best available science. NEPA insures that "high quality" environmental information is available to the public and decisionmakers. 40 C.F.R. § 1500.1(b). "Accurate scientific analysis" is "essential to implementing NEPA." *Id.* Environmental documents must provide a "full and fair" discussion and agencies must "insure the professional integrity, including scientific integrity, of the discussions and analyses" in their environmental analysis. 40 C.F.R. §§ 1502.1, 1502.24.

The Forest Service has identified several basic elements influencing soil productivity. Scientific information is available to inform the interaction of disturbance on soil properties and erosion under various scenarios. In its FEIS, the Forest Service should also consider additional factors like soil recovery rates and expected soil loss rates under baseline conditions and with disturbance.[154] Existing models would enable the Forest Service to predict a range of expected soil loss and sedimentation values under various conditions.[155]

The Watershed Erosion Prediction Project (WEPP) is a readily available tool that the Forest Service could incorporate into planning.[156] The model inputs several relevant erosion variables, including climate, soil texture and erodibility, and includes modules for soil disturbance scenarios (*e.g.*, roads). Conventional USDA erosion planning models such as Revised Universal Soil Loss Equations and Revisions (RUSLE)[157], likewise, can provide advanced erosion predictions.

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[153] *See, e.g.*, George Washington National Forest FEIS, *supra* note 142, at 3-91 (noting soils "could be impacted by acid deposition, road construction and decommissioning" or because they are low in "natural fertility") and example of corresponding plan standard, George Washington National Forest Revised LRMP, *supra* note 42, at 3-3 ("Soils that are determined to be low in natural fertility and have low buffering capacity to acid deposition will be managed to ensure that any planned activities will not affect the long-term productivity of the land.").

[154] *E.g.*, Page-Dumroese, Deborah S. et al., *Soil physical property changes at the North American Long-Term Soil Productivity study sites: 1 and 5 years after compaction***,** Can. J. For. Res. 36: 551–564 (2006) ("The impact of forest management operations on soil physical properties is important to understand, since management can significantly change site productivity by altering root growth potential, water infiltration and soil erosion, and water and nutrient availability."), available at https://www.srs.fs.usda.gov/pubs/ja/ja_page-dumroese001.pdf.

[155] Hood, S.M. et al., *Universal Soil Loss Equation (USLE)-Predicted Soil Loss for Harvesting Regimes in Appalachian Hardwood*, Northern Journal of Applied Forestry (2002), available at https://academic.oup.com/njaf/article/19/2/53/4788532; Vinson, J. Andrew et al., *Suitability of Soil Erosion Models for the Evaluation of Bladed Skid Trail BMPs in the Southern Appalachians*, Forests (2017), https://vtechworks.lib.vt.edu/bitstream/handle/10919/82421/forests-08-00482.pdf?sequence=1&isAllowed=y.

[156] Available at https://forest.moscowfsl.wsu.edu/fswepp/.

[157] USDA, Agricultural Research Service, Revised Universal Soil Loss Equation (RUSLE) - Welcome to RUSLE 1 and RUSLE 2, https://www.ars.usda.gov/southeast-area/oxford-ms/national-sedimentation-laboratory/watershed-physical-processes-research/docs/revised-universal-soil-loss-equation-rusle-welcome-to-rusle-1-and-rusle-2/.

Other forests have utilized similar modeling techniques to analyze soil loss and sediments. For example, in the Citico Creek Project, the Cherokee National Forest developed a model based on four processes, including WEPP, to predict sediment yield from project alternatives. That modeling estimated annual sediment yield from action alternatives, as well as the cumulative annual sediment yield from each alternative combined with other activities in a sensitive watershed.[158]

While modeling exercises have limitations, they can be useful to compare effects of alternatives over baseline conditions and to gauge comparative risk across different scenarios. This makes them very useful for plan-level analysis. These readily available scientific tools could assist in identifying sensitivity factors that dictate the use of enhanced design measures.

C. Specific Changes to Plan Components

Below we proposed revisions and new Standards to address the concerns we raise above. With these we aim to provide a roadmap to meeting Desired Conditions for soil productivity. The specific Standards are proposed to limit risks we identify above and to allow project design to take into account sensitivity factors affecting soil productivity. This is especially important where, as here, the DEIS has not analyzed the application of the Draft Plan'sStandards in light of soil conditions present in the NF. A number of these support recommendations of the NPNF Partnership, as indicated with *.

Table: Proposed Revisions to Soil Resources

Component	Component Language	Recommended Revision
SLS-S-01.	Vegetation management activities, road and trail design shall be screened for the presence of highly erodible soils. If present, location and design measures shall be provided to reduce erosion potential and effects to natural resources."	*Add:* "During planning of roads, trails, and other infrastructure not associated with vegetation management activities, first attempt to avoid highly erodible soils. If avoidance is not possible, design additional measures to limit erosion and sedimentation both during and after construction."

[158] CNF, Allison Reddington, Hydrologist, Middle Citico Environmental Consequences–Soil and Water Report, Appendix C–CNF RLRMP Aquatic Cumulative Effects Model: Citico Creek Analysis (2012), https://www.fs.usda.gov/project/?project=26125. In addition to WEPP, erosion research by Dissmeyer and Stump (1978) was used to determine erosion coefficients for various land uses and silvicultural prescriptions. Sediment delivery research by Roehl (1962) was used to determine the percentage of land erosion delivered to streams as sediment. Baseline conditions were calculated by removing all sedimentation attributed to present human influences in the analyzed watersheds. The results are compared to Sediment Risk Threshold values that were estimated in the process papers for Forest Plan revision (Clingenpeel 2003a). *Id.*

		**also a NPNF Partnership recommendation* *Clarify:* Meaning of "Highly erodible soils" with reference to soils rated severe or above
SLS-S-02	On all soils dedicated to growing vegetation, at least 85% of the activity area will be able to grow vegetation without Substantial Soil Impairment. Reforestation shall be accomplished within 5 years. (Footnote: "Substantial Soil Impairment" is detrimental changes in soil properties (physical, chemical, or biological) that result in the loss of the inherent ecological capacity or hydrologic function of the soil resource that lasts beyond the scope, scale, or duration of the project causing the change.)	*Standard needs significant revision, consider:* Soil-disturbing activities are not conducted in such a manner that they cause sedimentation or loss of soil productivity. [159] In no case will more than 15% of an activity area be disturbed during harvest activities. *This articulation would clarify that the 15% limit on soil disturbance is a minimum criterion, and that site-level conditions may require additional design criteria to ensure no irreversible soil damage occurs. To be clear, we strongly urge the Forest Service to provide additional analysis using the best available science to model soil loss and set a more defensible standard. But some measurable criterion must be retained regardless, in addition to the overriding requirement that productivity will not be impaired in the long term.*
SLS-DC-02	Soil productivity is sustained through nitrogen and carbon fixation, nutrient mineral release from parent material, decaying organic matter, and recycling of nutrients. Soils do not contribute	*Add water quality compliance*: Soils do not contribute sediment to streams at levels that violate water quality standards or negatively affect

[159] As an example of this simplified language, *see* El Yunque National Forest Plan (2018), at 3.1.7, S2, https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd592253.pdf.

	sediment to streams at levels that negatively affect instream uses and lifecycles of aquatic species. Erosion and compaction are minimized as a result of our management activities.	instream uses and lifecycles of aquatic species
GEO-S-02	The location of proposed roads, trails, facilities, and management activities shall be screened for the presence of geological hazards relevant to the geologic setting. If geologic hazards are present, then location and design measures shall be provided for management activities that may affect or be affected by the geologic hazards.	*Revise second sentence*: "If geologic hazards are present, every attempt should first be made to avoid them. If relocation/avoidance is not feasible, then specific location and design measures shall be provided to minimize the effect of hazards associated with management activities." **also a NPNF Partnership recommendation*
SLS-G-02	During construction of roads, trails, and other infrastructure, the risk of soil erosion should be reduced by implementing mitigation measures such as erosion control matting, slash (tree branches, etc.) placement, seeding, and mulching. The minimum amount of soil should be exposed at any given time during project execution.	*Split last sentence of SLS-G-02 into new guideline:* SLS-G-03: "The minimum amount of soil should be exposed at any given time during project execution." **also a NPNF Partnership recommendation*
ECO-S-06	Conduct a site-specific review to determine the appropriate logging systems for management on sustained slopes (> 200ft) over 40 % slope.	Cable logging shall be used for management on sustained slopes (>200ft) over 35% slope to guard against erosion and landslides unless site-specific analysis determines that other logging methods meet soil and water protection standards. Distance from bodies of water should be considered as a part of this analysis. In no case will "stacked" skid roads or trails be constructed on steep slopes. Recommended logging methods should be outlined in the project's environmental review

		documents. **This incorporates revised language of the NPNF Partnership but recommends 35 percent in line with other regional plans*[160]
ECO-S-07	Design, construct and maintain erosion control features to meet soil and water quality standards. In particular: … i. In cable logging units, use cable that suspends at least one end of the log on sustained slopes over 40 percent unless site-specific analysis determines that other logging methods meet soil and water protection standards. … k. Avoid "stacking" multiple skid roads on steep slopes. Consider obliterating legacy skid roads on steep slopes where soil or water quality is a concern.	*Proposed change:* i. In cable logging units, use cable that suspends at least one end of the log on sustain slopes over <u>35</u> percent unless site specific analysis determines that other logging methods meet soil and water protection standards. *Proposed addition*: i. Recommended logging methods should be outlined in the project's environmental review documents. **also a NPNF Partnership recommendation* *Proposed clarification*: k. Define "steep slopes" as sustained slopes over 35 percent; add limits on heavy equipment in site preparation activities (see standard proposed below).
ECO-G-02	Timber production should not occur on hydric soils. Project-specific determinations of hydric soil locations may occur so they can be considered in	Change "should" to "shall" and make this a Standard, rather than a Guideline.

[160] Several forest plans limit ground-disturbing activities on slopes over 35 percent. *See* George Washington National Forest Revised LRMP, *supra* note 42, at FW-125 ("Use advanced harvesting methods (such as cable or helicopter) on sustained slopes 35 percent or greater to avoid adverse impacts to the soil and water resources."); Jefferson National Forest LRMP, *supra* note 123, at FW-118 ("No heavy equipment is used for site preparation on sustained slopes over 35 percent or sustained slopes over 20 percent when soils have a high erosion hazard or are failure-prone."); Chattahoochee-Oconee National Forests Plan, *supra* note 146, at FW-058 ("No mechanical site preparation equipment is permitted on sustained slopes over 35 percent.").

	project design.	**also a NPNF Partnership recommendation*
Management Approach - Geologic resources (p. 30)	On slope gradients of 40 percent or more, the design of cut and fill slopes of road, log landings, or other excavations may include a debris flow hazard and risk assessment including…	On slope gradients of 40 percent or more, the design of cut and fill slopes of road, log landings, or other excavations shall include a debris flow hazard and risk assessment including… **also a NPNF Partnership recommendation*

The Forest Service should also add the following Standards:

- **Soil compaction**: Soil compaction cannot be allowed to cause long-term impacts to soil productivity—i.e., longer than the expected time before the stand would be disturbed again under relevant plan-level assumptions. Develop standards to limit compaction from heavy equipment based upon soil conditions. These will work in tandem with limits proposed to reduce soil disturbance and movement to maintain soil productivity.

- **Site screening for slopes over 35 percent:**[161] Management activities proposing ground-based equipment on slopes greater than 35 percent gradient must be reviewed by a qualified resource specialist, typically a hydrologist or soil scientist for evaluation of additional design measures to reduce soil erosion based on site-specific risk factors such as proximity to sensitive waters, soil type sensitivity to degradation when disturbed, presence of landforms more susceptible to landslides, and soil erodibility. Prescribe appropriate soil conservation practices, such as avoidance and timing restrictions, to protect high-risk soils during ground-disturbing activities.[162] Design criteria may include: limiting ground-based equipment, including for site preparation, on sustained slopes over 35 percent; expanded buffers around perennial, intermittent and ephemeral streams,

[161] Multiple forests recognize ground-based equipment on slopes over 35 percent is a special circumstance requiring additional site review. Decision Notice and FONSI: Restoration of Dry Forest Communities on the South Zone of the Cherokee National Forest (2019) ("Ground based mechanical treatments on slopes equal to or less than 35% will be covered by this programmatic analysis. Operations on slopes greater than 35% should be considered a special circumstance and will require additional, site specific analysis.") https://www.fs.usda.gov/nfs/11558/www/nepa/110674_FSPLT3_4660947.pdf; Chugach National Forest Land Management Plan, *supra* note 138**,** at FW-SOIL-G, 4 ("Management activities using ground-based equipment on slopes greater than 35 percent gradient should be reviewed by a qualified resource specialist ….").

[162] *See* similar language in Chugach National Forest Land Management Plan, *supra* note 138**,** at FW-SOIL-G.

particularly sensitive receiving waters (see proposal under streamside zones); pre- and post-sale monitoring of soil properties, erosion control and sedimentation.

- **Monitoring Soil Productivity**: Develop a monitoring strategy to assess projects for short- and long-term effects to soil productivity. In reviewing monitoring data, detrimental changes must be compared to the best available scientific information relating to the recovery of soils for the site's conditions. Evaluate the effectiveness of best management practices applied to timber harvest and roads to validate changes in particular soil properties (soil organic matter, respiration, porosity) that are key to sustainable forest management and site productivity, and incorporate ecosystem health indicators such as forest understory characteristics or soil microbial diversity.[163]

- **Temporary Roads (including revision of TA-S-08)**: Temporary roads would be physically decommissioned after serving the need for which they were constructed, and stream crossings must be removed entirely. Road prisms should not be reused successively as temporary roads; instead, if re-use is needed, the road should be placed on the system (e.g., as a road in "storage" between entries). These standards are needed to prevent the proliferation of temporary roads as a way to avoid limits on system roads. *Supports a NPNF Partnership recommendation; see also "Transportation System," below.

[163] *See* Bergstrom, Robert M. and Page-Dumroese, Deborah S., USDA, *How Much Soil Disturbance Can Be Expected as a Result of Southern Pine Beetle Suppression Activities?* (Sept. 2019) (advising soil monitoring strategy in the context of salvage logging to validate "particular soil properties (e.g., soil organic matter, respiration, porosity) that are key to sustainable forest management and site productivity"), https://www.fs.fed.us/rm/pubs_series/rmrs/gtr/rmrs_gtr399.pdf.

XIII. Non-Native Invasive Species (NNIS)

Nonnative invasive species are recognized as one of the four critical threats to National Forest ecosystems. DEIS at 75. Regarding ecological sustainability and ecosystem integrity, the Planning Rule requires a forest plan to include components that take into account "stressors, such as natural succession, wildland fire, *invasive species*, and climate change; and the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change." 36 C.F.R. § 219.8(1)(iv) (emphasis added).

The Forest Service additionally has a responsibility to "refrain from authorizing, funding, or implementing actions that are likely to cause or promote the introduction, establishment, or spread of invasive species in the United States unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions." Exec. Order No. 13,751, Safeguarding the Nation From the Impacts of Invasive Species, 81 Fed. Reg. 88,609 (Dec. 8, 2016); *see also* DEIS at 399.

The Forest Service Manual likewise establishes a strategic objective to "[t]ake proactive approaches to manage all aquatic and terrestrial areas of the National Forest System in a manner to protect native species and ecosystems from the introduction, establishment, and spread of invasive species." FSM 2902. It directs National Forests to "[i]nventory and survey susceptible aquatic and terrestrial areas of the National Forest System so as to quickly detect invasive species infestations, and subsequently implement immediate and specific actions to eradicate those infestations before they become established and/or spread." *Id.* The Forest Service has also established a policy to "[e]nsure that all Forest Service management activities are designed to minimize or eliminate the possibility of establishment or spread of invasive species on the National Forest System, or to adjacent areas" and to "[m]onitor all management activities for potential spread or establishment of invasive species in aquatic and terrestrial areas of the National Forest System." FSM 2903.

The Draft Plan provides in Desired Conditions ECO-DC-31 and ECO-DC-32 goals for the Forests that "[e]cosystem diversity, function, and connectivity are minimally impacted by non-native invasive species and disease" and "[n]on-native invasive plants are eradicated or controlled in order to maintain or restore healthy and resilient ecozones with primary emphases where threatened or endangered species habitat occurs." Draft Plan at 76. Objective ECO-O-09 establishes that at Tier 1, 750 to 1000 acres of forest will be treated to eradicate or control NNIS annually, and 1000 to 2000 acres will be inventoried for NNIS. Under Tier 2, those figures rise to "up to approximately 3000 acres" of treatment and "up to approximately 4000 acres" of inventory. *Id*. at 78-79.

To support these Desired Conditions and Objectives, the Plan includes Standards ECO-S-33 through ECO-S-36, which provide in part that "[o]ff-road equipment must be clean and free of plant material before entering the National Forest boundary" and use of nonnative plant species

is not permitted in revegetation and planting efforts. Draft Plan at 76. The Plan additionally includes Guideline ECO-G-17, which directs that "[t]ools and practices should be utilized to minimize the spread of non-native invasive plants along trails, roads, waterways, and other corridors." *Id*. at 77. Under Forest Health Management Approaches, the Plan provides guidance for project design and implementation and monitoring: "[r]isks of insect and disease are reduced by conducting risk assessments, developing risk maps and responsive management options. . . . Early detection and rapid response occur by contributing to a monitoring and adaptive management program that includes all cooperators." *Id*.

Showing the tension that exists with these goals, however, the DEIS is fairly candid about the significant risks of NNIS spread created by active management, which would increase substantially in the Draft Plan, especially at Tier 2, bringing with it a substantial increase in risk if prevention and control is not scaled up commensurately. The DEIS states that "[a]ctivities that disturb soil and increase light availability in proximity to known non-native invasive plant populations have the potential to increase the possibility for spread of these populations." DEIS at 400. Those types of activities include forest regeneration, roadbuilding, and daylighting. The DEIS also recognizes that because "the majority of vegetation management activities would occur in MA Group 1, Alternative C, with approximately 100,000 fewer acres in Group 1, would have a lower risk of non-native invasive plant spread." *Id*. at 402. For multiple ecozones and unique habitats, the DEIS recognizes that increased road density has greater NNIS impacts, *see, e.g., id*. at 174, and determines that a higher amount of activity in Tier 2 would result in increased impacts from invasive species over 10 years, *see id*. at 184, 191, 196, 200, 208, 211. It assumes that after 50 years, those impacts would reduce, *id.*, but that includes the assumption that Tier 2 NNIS management is also implemented, which is not currently guaranteed, as discussed below. The one exception to this assumption is the Pine oak-heath ecozone, where the DEIS discloses that "[i]nitially, there would be greater invasive species outbreaks which would take time to control, (greater than 10 years). Gradually, control would reduce some outbreaks, but it is *assumed it would never get back to the existing condition*." *Id*. at 204.

As the DEIS recognizes, the likelihood of NNIS spread increases under Tier 2 vegetation management goals. DEIS at 400. At Tier 2 for NNIS, management for NNIS also increases. *Id.* at 400. However, there is currently no link between these two requirements. The DEIS states that Tier 2 for NNIS "*should be* implemented" when Tier 2 is implemented for vegetation management, "in order to reduce the potential impacts of new invasive species infestations," *id.* (emphasis added), but it makes no commitment to this actually occurring. Without such a commitment, the NEPA analysis provided in the DEIS, which is based on simultaneous Tier 2 implementation for both NNIS and vegetation management, is not adequate. The Final EIS must candidly analyze the risks in terms of NNIS treatment if Tier 2 vegetation management objectives are implemented and Tier 2 NNIS objectives are not, resulting in up to 37,000 acres of young forest habitat being created, in addition to prescribed burning, daylighting of roads, and restoration of other open forest habitats, while a maximum of 7,000 acres are treated for NNIS.

In the alternative, the Plan could adopt the recommendation of the Partnership, which calls for a minimum level of monitoring demonstrating no net spread of priority NNIS on the forest in order

to operate within Tier 2 for active management. With this commitment, the increased risk of NNIS spread during Tier 2 would be significantly decreased, because monitoring would have demonstrated that net spread of NNIS on the forest is not occurring as a result of active management.

In terms of monitoring, the Plan establishes two monitoring questions related to NNIS. MQ 2-7-T1 requires the Forest Service to examine "What is the trend in occurrences of NNIS? What are occurrences within ecozones? Unique habitats? What percent of NNIS have been treated and how effective have treatments?" The Tier 2 monitoring question MQ 2-8-T2 asks "What are the trends in occurrence of NNIS across all lands?" Draft Plan at 276.

MQ 2-7-T1 alone is not sufficient to address the question of whether NNIS is being spread on the forest. While looking at NNIS on a landscape scale may be helpful in determining whether NNIS-specific treatments performed under ECO-O-09 are working, it entirely misses the mark on monitoring the vectors by which NNIS spread are most likely to occur: vegetation management and roadbuilding. As such, the Plan must commit to implementation of post-project monitoring in stands where the forest has been regenerated, as well as along any new roads (temporary or permanent) constructed for the project and existing roads reconstructed for or used in the project.[164]

Post-project monitoring and adaptive management is the only way to understand and reduce the spread of NNIS on the Nantahala and Pisgah NFs, particularly when so much active management is proposed in the Draft Plan. *See* Section VII.D.1. For example, cleaning of equipment, as required by ECO-S-33, is already an included requirement for recent timber projects on these National Forests. Given the lack of post-project monitoring data on this practice, while we support its inclusion as a Plan Standard, monitoring would provide information about its effectiveness in preventing NNIS spread on these Forests, and provide an opportunity to adapt project design if it is not effective.

Post-project monitoring would also satisfy the guidance in FSM 2903, which directs that National Forests "[m]onitor all management activities for potential spread or establishment of invasive species," an issue currently not addressed in the Draft Plan. It would similarly satisfy the guidance of FSM 2902 to survey "susceptible" areas for NNIS, allowing for quick detection of invasive species infestations and subsequent implementation of immediate and specific actions to eradicate those infestations. Given that the DEIS recognizes the serious risks for NNIS spread created by active management and road density, the Plan must adopt appropriate monitoring after projects to ensure NNIS are not being spread, and be willing to make changes to project design in the future if the current methods are not preventing spread of NNIS on the

[164] Monitoring of this type would necessarily include a component to return *after* all post-project NNIS treatments (e.g., herbicides) have concluded. A designated time after which a project is considered closed should be established, such that in situations where multiple herbicide treatments are planned but not actually executed, the project will be deemed closed after a certain amount of time and post-project NNIS monitoring can take place.

forest. The recommendation of the Partnership with regard to post-implementation monitoring would satisfy this major monitoring gap in the current plan, and reduce the tension between Tier 1 and Tier 2 that could result in goal interference without adaptive management.

Additionally, neither the Draft Plan nor DEIS has made the finding required by Executive Order 13112 on NNIS even though both recognize the possible spread of NNIS. This finding, and the analysis of those impacts, must be added to the Final EIS. The landscape-level analysis of the Plan Revision is the right time to consider the cumulative impacts of NNIS spread on the health of the forest, including its resilience to climate change, that will occur as a result of many projects over the years. For example, as mentioned above, the DEIS discloses that in the pine oak-heath ecozone, "it is assumed [that NNIS] would never get back to the existing condition." DEIS at 204. Under the Executive Order, that determination is unlawful, without a finding that "the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions," based on notice-and-comment rules promulgated by the Forest Service to enable such a finding (which we do not believe even exist). Currently, neither the Draft Plan nor the DEIS have made such a finding, nor is it clear how they could do so. Instead, the information provided by the DEIS indicates that NNIS are a serious threat to ecosystem integrity, and interfere with the goal of returning the forest to NRV. As such, until the required finding is made that the benefits of active management on the Nantahala and Pisgah National Forests outweigh the risks of NNIS spread, the Plan cannot go forward.

Finally, we adopt the remaining recommendations of the Partnership with regard to NNIS, which we believe would do a better job of reducing NNIS spread on the forest and better allow the current DEIS analysis to satisfy NEPA's requirements for a hard look at NNIS risks when the plan is implemented.

XIV. Transportation System

A. System Roads

The sprawling and unmaintained road system is the single greatest source of risk to water quality on the Forests. DEIS at 99 ("Roads generally pose the greatest risk to streams, both stream channels and water quality."). The DEIS acknowledges the importance of roads' location and relationship to streams in affecting water quality. *Id.* at 115 ("[W]ater quality could decline in some watersheds and improve in others largely depending on presence or absence of new roads and their relationship to streams."). Roads are also vectors for unauthorized OHV use and the spread of non-native invasive plants, and they can also reduce the connectedness of both terrestrial and aquatic species.

Forest roads and their impacts have been among the most important and discussed issues in the planning process, and they *must* be addressed consistent with Planning Rule and Travel Management Rule. Astonishingly, the Draft Plan includes components that would increase the mileage of the road system and increase the level of open road access, both of which would further reduce the ability of the agency to adequately maintain roads and fails to include any check on impacts to water quality.

Draft Plan Objectives allow increases in open road access in the Matrix and Interface MAs, TA-O-06. The Forests also anticipate a dramatic increase in road mileage to meet Tier 2 timber objectives. The Draft Plan's timber analysis "assumes that current road building levels will continue under Tier 1 and that additional permanent and temporary road construction would be needed under Tier 2 …." Draft Plan at B-3. During this planning cycle, the Forest Service anticipates needing a net addition of about 3.1 miles of system roads annually at Tier 1. DEIS at 463. At the upper end of Tier 2, this number would double, requiring another 2.7 to 3.1 miles annually, depending on the alternative. *Id.* Over the life of the plan, this adds up to between 45 and 90 miles of new system roads—or, if we further assume linear growth from Tier 1 to Tier 2 over 15 years, just under 70 miles.

While the DEIS suggests that road construction levels would be highest in Alternative C, DEIS at 463, the road network would increase proportionally to the suitable base over multiple planning cycles. In the longer term, therefore, Alternative C would have the smallest road network for timber production, serving a footprint of 490,000 acres, while Alternatives B and D would expand into a footprint of between 535,000 and 540,000 acres. Draft Plan at B-3, Table 2. Given a constant level of harvest across the alternatives, a larger road network to serve a larger suitable base will be less economically efficient than a smaller road network on a smaller suitable base. Since the Forest Service is already unable to maintain its roads, DEIS at 460, and a less efficient road network means a lower ability, per mile, to perform needed maintenance, this means there will be a greater risk to water quality.

The differences between alternatives would also affect local connectedness, although the Forest Service's transportation analysis ignores the data that would quantify those differences. Local

connectedness is average or below average on only 5.7% of the forest. By comparison, 20% of the forest ranks as slightly above average, and 74.2% of the forest ranks as above average or far above average. This spatial data must be used to illustrate the differences between alternatives. How many acres would experience local declines in connectedness? How do those differences square with the Forests' responsibility to maintain and restore connectivity under the Planning Rule?

There are no plan components proposed to reduce road mileage or maintenance levels to ensure that the system as a whole can be adequately maintained in light of the Forests' fiscal capability (e.g., road density limitations or objectives for decommissioning). There is an objective to decommission *unauthorized* roads, TA-O-04, but that cannot be a substitute for maintaining the road *system*. Indeed, although decommissioning unauthorized roads is a worthy and necessary objective, it may reduce available funds to maintain system roads, and the Forest Service must account for that reality in transportation planning.

To be sure, there is a Desired Condition (as required by the Planning Rule and directives, *see* FSH 1909.12, Sec. 23.23l) that the transportation system be "sustainable," with "minimal impacts on resources." TA-DC-01. But it is hard to see how the current draft can be expected to make any progress toward that goal. The objective to maintain 280 miles of roads annually appears to be based on current levels of maintenance, which is exactly why the backlog is as serious as it is. We are grateful to see an objective for reducing the backlog by 10% annually, TA-O-01 (Tier 2), but this is absolutely not adequate. Nothing in the Draft Plan requires the Forest Service to *do anything* that would reduce the backlog. Indeed, including this as a "Tier 2" objective is an explicit acknowledgement that it is *not achievable* unless the Forest Service receives additional, unexpected funding. Under these components, the Forest Service would continue to expand the road system, and the backlog would continue to grow, and the Tier 2 objective to reduce the backlog would remain out of reach. This is unacceptable, because it would take us farther away from the desired condition of sustainability and violate the requirement for an "integrated" plan. To correct this, the plan as a whole must ensure that we will reduce the backlog *regardless* of whether additional funds materialize. Other options for reducing the backlog include decommissioning, downgrading, relocating, and revising maintenance schedules based on inventories and per-mile risk assessments that help to triage scarce maintenance funds.

To be clear, we do recognize that the Draft Plan includes concepts that were recommended by the Partnership in 2017—including the Desired Condition for sustainability, the Objective to increase public access where it matters most to the public, and the Objective to reduce the backlog. But the way these concepts were cherry-picked from the Partnership recommendation and rearranged to make them ineffectual is deeply disappointing.

Despite a plan strategy to grow the road system and ignore its risks, the DEIS spends only seven pages discussing the road system holistically, sweeping obvious problems under the rug. There is a way forward that can improve the road system's ecological sustainability while also

contributing to social and economic sustainability, but the Forests have much more work to do—both in the final plan itself and the FEIS.

We have raised these same concerns to the Forest Service throughout the planning process and at the project level. We have submitted much more comprehensive data about the effects of neglected roads than the Forest Service has managed to collect on its own. We have submitted formal and informal comments explaining the relevant requirements and applying them to our local situation. We have worked with collaborative colleagues to provide solutions that meet stakeholder needs while remaining sensitive to agency limitations. The Draft Plan's superficial treatment of this issue is disrespectful of our tremendous investment of time and effort, and it is baffling in light of the high quality of information provided. The DEIS fails to consider an important aspect of the problem, and the Forests' conclusions are therefore arbitrary and capricious.

We genuinely thought that the Forests would have welcomed our help. The unsustainable road system is a national problem. The agency manages over 370,000 miles of roads.[165] Of the Forest Service's $5.5 *billion* maintenance backlog, $3.2 billion is attributable to deferred maintenance on roads.[166] And these problems are just as acute locally. The National Forests in North Carolina (NFNC) have a backlog of $45 million in road maintenance alone. The NFNC make up just 0.65% of the National Forest System, but are responsible for a disproportionately high share of the backlog—1.43%. Our best information indicates that the Pisgah National Forest has enough funding to maintain only about 12.5% of its road system, and the Nantahala National Forest is in similar shape, at 14%.[167] These maintenance deficits and backlogs are proxies for risk to water quality.

Chronic annual deficits and a large backlog lead to problems on the ground. The March 2014 Assessment assumed that BMPs are being implemented 88.5% of the time on the Nantahala and Pisgah National Forests (Assessment at 71). This assumption is implausible, especially in light of the profound funding shortfalls. Implementation rates on other units in Region 8 have been much worse, at about 12%[168] The Forests vastly overestimate their rate of compliance with BMP requirements due to a lack of capacity to survey and catalogue BMP failures.

Based on our experience, the Forests apply their limited maintenance budgets in a sort of triage, where open roads receive a much greater share of funding. Even then, budgets are inadequate to keep up with maintenance needs on open roads, resulting in some long-term closures. For many

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[165] USDA, Forest Service Deferred Maintenance, (May 2017), at 1 available at https://www.usda.gov/oig/webdocs/08601-0004-31.pdf.

[166] *Id.* at 32.

[167] Att. 9 and Att. 10, Draft TAPs, *supra* note 30.

[168] Att. 30, Coffman, et al., Fish Passage Status of Road-Stream Crossing on Selected National Forests in the Southern Region, USDA (2005).

roads, “maintenance” means they only receive grading and gravel with no upkeep of the BMPs. With inadequate funds even for open roads, maintenance funds seldom trickle down to closed ML1 and ML2 roads. While some ML2 roads may receive occasional use and attention, our experience suggests that many of these roads are not used between entries, and they are therefore “out of sight, out of mind.”

In 2015, we commissioned a survey of closed ML1 and ML2 roads to determine if they were being maintained sufficiently to protect aquatic ecosystem integrity. We focused particularly on roads in the Wilderness Inventory Areas. These areas are relatively undeveloped, generally with gated, dead-end roads which, due to their low use, are more likely to have considerable deferred maintenance. The survey is documented in the attached report,[169] and the results were sobering.

Failed sediment BMPs were ubiquitous on roads within Mountain Treasures areas, often causing direct and serious harm to aquatic ecosystem integrity. We surveyed 438 stream crossings and 67 other BMP sites on 45 roads, 322 of which were crossings of perennial or intermittent streams (which are subject to North Carolina’s Forest Practice Guidelines (FPGs)). Fully 40% (127) of these 322 crossings were in violation of the FPGs because of accelerated erosion in the crossing or visible sediment delivery into the stream. An additional 7 sites (not at stream crossings) were found to have failed BMPs that were contributing visible sediment to perennial or intermittent streams, sometimes through long, well-defined erosion channels. In almost all cases, accelerated erosion and visible sediment violations were caused by inadequate BMP installation or maintenance—for example, water eroding the road surface due to a blocked or buried culvert intake or inside ditch. The severity of these FPG violations varied dramatically, from relatively minor erosion at a culvert outfall to large slope failures and deep erosion gullies.

In addition, 314 sites (60% of the 505 total) had other BMP failures that were not causing obvious violations of the FPGs when inspected but if left unmaintained, are likely to do so in the future. Many of these BMP failures were causing erosion of the road surface, channeling water in a way that is likely to cause accelerated damage during severe storms. These included inside ditch and road culvert blockages, failures of erosion control features like dips, and BMP installation or location problems.

The BMP failures we observed were directly contributing to aquatic resource degradation. In general, state monitoring data show that improperly implemented BMPs cause risk to waters 70% of the time in the mountain region where the Nantahala and Pisgah are located (NC Forestry BMP Implementation Survey Results, 2006-2008). Our investigation similarly showed that BMP failures and FPG violations have had observable adverse impacts on aquatic ecosystem health. Waters downstream of failed BMPs often showed significant sediment accumulation compared to waters immediately upstream, with noticeable effect on the number and diversity of benthic macroinvertebrates. In fact, we failed to find any aquatic organisms whatsoever at 55 of 194

[169] Att. 31, Analysis of Forest Road Conditions and the Impact on Water Quality and Aquatic Organisms in the Pisgah-Nantahala National Forests (2015).

culverted, flowing stream crossings—a failure rate of 28%. These were generally streams with considerable sediment accumulation and embeddedness.

In addition to sediment impacts, we also determined that aquatic organism passage was very poor on these low-standard forest roads. Larger perennial streams provided the best aquatic organism passage, because many were spanned by bridges. Crossings of smaller streams with pipe culverts, however, were nearly all impassable for small fish and/or salamanders. Specifically, of the 22 pipe-culverted stream crossings we surveyed with a summer flow depth of 4 inches or greater, none were passable for small fish. The passage rate for salamanders was slightly better—14%. Connectivity for trout in trout waters was slightly better (at 35%), but still unacceptably low.

Like sediment pollution, connectivity barriers have a negative impact on aquatic ecosystem integrity. Impassable stream crossings cause genetic isolation and decrease the availability of food sources for downstream species. While connectivity for fishable trout streams is important and should be prioritized, connectivity on smaller streams where the trout's food supply originates is also important. Furthermore, some connectivity barriers (such as improperly sized, installed, or maintained culverts) can also increase the risk of sediment pollution by making stream crossings more prone to washouts or surface erosion.

As noted above, these BMP failures are not only contributing to resource damage; they are also violations of the Forests' legal responsibilities. Protection of aquatic ecosystem integrity cannot be compromised. Indeed, it is the primary reason that Weeks Act forests were created. Federal and state water quality laws prohibit the kinds of impacts we observed on the Nantahala and Pisgah. First, a forest road stream crossing that creates a barrier to aquatic organism passage is considered an unpermitted discharge under the Clean Water Act (36 C.F.R. § 323.4(a)(6)). Second, failed BMPs impacting perennial or intermittent streams–by contributing visible sediment to the stream, causing accelerated erosion in a stream crossing, or by exceeding a state water quality standard)–is a violation of state water quality law and, by extension, the Clean Water Act (N.C. Gen. Stat. § 113A-50; .02 N.C.A.C. 60C .0101-.0209; 33 U.S.C. § 1323).

To sum up, the Forests have a serious maintenance backlog that disproportionately affects low-use roads that are closed to the public. These neglected roads, which can be found throughout the Forests but are especially common within the Mountain Treasures areas, are riddled with inadequate and failing BMPs. These BMP inadequacies and failures are causing resource impacts that are individually and cumulatively significant.

Since we submitted these results to the Forest Service in 2015, the problems have only gotten worse. Severe storms have caused extraordinarily expensive damage to roads, draining budgets. A few examples of recent, acute road failures during storms include:

- Neals Creek Road (FS 2074)
- Mineral Creek Road (FS 63)
- Craigs Creek Road (FS 982)
- Newberry Creek Road (FS 482A)

- Lickstone Ridge Road (FS 97)
- Tuni Gap Road (FS 440)
- Tatham Gap Road (FS 423)
- Fires Creek Road (FS 340)

Severe damage to roads will continue to accelerate in the future because of climate change. The FEIS should disclose the trends relevant to road maintenance, repair costs, and agency funding, in a quantitative analysis that shows the likely trends for the maintenance backlog under each Alternative and Tier. The Forest Service cannot simply close its eyes to a serious problem because it will be difficult to solve.

But that is exactly what the Forest Service is doing, now, at the moment when it has its best opportunity to solve the problem. The Draft Plan punts any tough decisions to the future, after promised completion of Transportation Analysis. TA-O-02. TAP and the "road maintenance plan" would identify and evaluate roads for possible "closure, upgrade, conversion, or decommissioning." DEIS at 462. This is an important process to develop information about specific roads and rank them by need and risk, but it does not help the Forest Service make decisions about the extent of the road system as a whole. That is a question of land allocations, because the road system should be designed to serve the lands on which roaded access is needed to meet resource management objectives like scheduled harvest. Because it is a question of land allocations, it is a question for forest planning.

Yet, now during planning, the Forest Service attempts to create the impression that *everything is fine*. According to the DEIS,

> Monitoring of road BMPs, conducted at the time of the Forestry BMP monitoring, found that Roads BMPs on the Nantahala and Pisgah NFs were properly implemented and effective at controlling sedimentation at 93.1 and 94.7 percent of the sites surveyed, respectively. . . . [For] Road Stream Crossings, . . . [i]mplementation and effectiveness rates were 88.5% and 89.5%, respectively.

DEIS at 100. We have described at length (Att. 26) why the post-sale monitoring the Forest Service relies on exaggerates BMP effectiveness at keeping visible sediment out of streams. Even where sediment reaches streams, the scoring system affords high scores. The problem of using this data to dismiss long-term road impacts is even more stark. The Forests monitoring of BMPs and stream crossings has focused on those that had recently been implemented, installed, or maintained—long before neglect and lack of maintenance has caused or contributed to failures. DEIS at 102 (noting that monitoring occurred on harvest units and roads from timber sales). Monitoring of recently installed BMPs tells us nothing about the effectiveness of those measures years down the road though the DEIS acknowledges that failure of BMPs over time is a significant problem for water quality.

For Alternative A, the DEIS does admit,

> Current trends … appear to be in the direction of increased visitor use and decreasing maintenance. Where existing roads … are poorly designed and especially those on unstable soils, the trend for water quality maybe [sic] a declining one, particularly if rainfall intensities are on the rise. The old road … network would continue to be maintained and improved only as funding allows . . . .

DEIS at 110-11. In contrast, for Alternatives B, C, and D, the DEIS fails to mention any negative impact of neglected roads and inadequate budgets. *See* DEIS at 115-16. The DEIS offers no reason to assume that these trends under Alternative A are any less likely under the action alternatives.

This is a serious problem with the DEIS; the Forest Service has presented *no data* to show the degree of risk associated with maintenance backlogs. It has *ignored* data submitted by the public showing that the risk is substantial. By sweeping this risk under the rug, the Forests attempt to evade their responsibility to right-size the road system to match funding expectations and protect water quality.

The Forests response simply does not match the seriousness of this problem. To the best of our knowledge, the Nantahala and Pisgah National Forests are the *only* forests in the country that have yet to complete Transportation Analysis and identify a minimum road system as required by the Travel Management Rule. Agency requirements are clear about the Forests' obligation during travel analysis:

> Ultimately units must balance the costs of maintaining the identified system such that the recommendation will not result in accrual of deferred maintenance on roads and bridges once the TAP is implemented (i.e. there should be a zero balance between anticipated maintenance revenue and anticipated maintenance cost on an annual basis).

Sub-Part "A" Travel Analysis (TAP) Southern Region Expectations, Revised to align with 2012 Chief's Letter. In other words, the minimum road system should have *zero* deferred maintenance in light of expected budgets.

The failure of the Forests to identify a minimum road system puts them at a serious disadvantage in plan revision. Rather than starting the planning process with a minimum road system that can be used to inform resource management objectives and Management Area boundaries, the Forest Service dove headfirst into planning, delineating Management Areas without respect to whether it could afford to support their associated management objectives with a sustainable road system. We realize that the Forests have promised to complete TAP after plan revision is finished, but that is unacceptable. In each of the draft alternatives, the Forests determine the future extent of the road system by allocating lands to Management Areas that will be developed with roads to support scheduled timber harvest. This effectively "locks in" the future road system, making it impossible to identify a minimum road system that can meet resource management objectives

and have zero deferred maintenance. As a matter of law, if the Forests are planning for a road system that would *increase* deferred maintenance and result in greater risk to waters, then the plan is not fiscally realistic. 36 C.F.R. § 219.1(g). And, if the Forests are planning for a road system that because of funding limitations will be *less* sustainable in the future, then the plan is not "integrated" with the desired condition of sustainability.

To recap, with current budgets the Forests cannot maintain their current road system while also protecting water quality. Budgets are not within the Forests' control, and the requirements to maintain roads and protect water quality are obligatory. But access "needs" (*which are determined during planning*) are flexible and largely discretionary, and the Forest may scale back its resource objectives to match its budget.

Based on the overall funding expectations revealed by the Pisgah TAP (which will likely be similar in the Nantahala TAP), the only sustainable path forward is to focus management activities which are dependent on road access in areas that already have a well-developed and maintained road system. To the extent that meeting resource objectives will require an expansion of the road system, the plan *must* include a mechanism to ensure that the plan remains integrated.

Despite the impacts of an oversized road system to water quality and the Forest's obligation to protect water quality, we realize that the right-sized road system cannot be achieved overnight. But the Forests must make progress toward the desired condition of sustainability. They cannot adopt a plan that is incapable of moving in that direction.

The questions under Tier 1 are easier: the Forest Service should calibrate Tier 1 objectives so that they can be achieved with current budgets based on recent trends. The more efficient the land allocations used in an alternative—i.e., the better the land allocations match up with areas in which roads have been well maintained in the past and are capable of supporting resource management objectives—the higher Tier 1 can be.

The questions under Tier 2 are tougher. As discussed previously, the transition from Tier 1 to Tier 2 raises concerns about both plan integration and fiscal capability. Again, the plan must contain a mechanism to ensure that adequate resources are devoted to maintaining roads as the road system expands to meet harvest goals. The Forest Service has not offered any such mechanism in any of its alternatives. The Partnership, however, has developed a solution we believe is consistent with these requirements.

Consistent with the Partnership recommendations, the Forest Service should build into the plan an adaptive management framework that allows new road construction based on incremental reductions of the maintenance backlog. In some ways, this "road bank" would be similar to the "trail bank" proposed in Alternative D. However, unlike the trail bank, new roads would not be conditioned on decommissioning elsewhere, because decommissioning is only one way to reduce the backlog. Other strategies for reducing the backlog include bringing roads up to standard using project receipts, refining the maintenance schedule for roads that are relatively low risk,

downgrading roads to a lower maintenance level, relocating especially risky roads, and of course additional funding or partner assistance.

In summary, the plan should include a monitoring indicator for the road maintenance backlog, and an alert that allows construction of new roads as the backlog is reduced. This alert should be calibrated to reduce the backlog to 50% during this planning cycle. As explained in a preceding section, we believe that this could be accomplished while also reaching Tier 2 objectives by allowing an additional 10 miles of road construction for every 5% reduction of the maintenance backlog.

B. Temporary Roads

Temporary roads can be just as much of a problem as permanent system roads; often their uses and their effects are anything but temporary. Unless they are obliterated, their impacts remain on the landscape for much longer than a project's duration. As the DEIS acknowledges, "Success of restoring soil productivity on temporary roads is often marginal and adverse impacts frequently remain." DEIS at 92-93. If there was any doubt about the long-term effects of "temporary" roads, it was erased by the new digital elevation models derived from the 2017 LiDAR data. These high resolution models show precisely the extent of the ghost road system, and it shows that roads that have never been added to the system accumulate on the landscape.

To start with the good: The Draft Plan requires obliterating temporary roads constructed into backcountry areas for restoration purposes. BAC-S-10. We strongly support this requirement.

However, the Draft Plan will leave the tendrils of this ghost road system on the ground, with continued risk of unauthorized use by motorized vehicles, spread of non-native invasive plants, and slope failures. Outside of backcountry, new temporary roads may be left on the ground too, and there will be plenty of them. The DEIS anticipates building 2.6 miles of temporary roads each year to meet Tier 1 objectives and between 2.6 and 2.9 miles per year at Tier 2, for a total of 5.2 to 5.5 miles annually. DEIS at 463. Over the first 15 years of the plan, this adds up to between 78 and 83 miles.

There is only one standard applicable to these new temporary roads:

> Temporary roads are located and constructed to minimize impacts to resources while providing short-term, single-purpose access, and are decommissioned when no longer needed, using techniques such as but not limited to removing drainage structures, re-contouring, and stabilizing the final slope.

TA-S-08. This standard will not solve the project-level problems associated with the use of temporary roads.

The primary problem with temporary roads is that they will be reused if they remain on the landscape and provide access to areas that will be revisited in a future entry. In suitable MAs,

therefore, there are few truly "temporary" roads; such roads should usually be classified as ML 1 roads "in storage."

Forest Service policy defines a "temporary road" as a road "necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road." 36 C.F.R. § 212.1. Temporary roads are "decommissioned at the conclusion of the project or activity." FSM 7711.2. Decommissioned roads are unneeded and may not be used for public or administrative access. In contrast to temporary roads, "forest roads" are assigned a "maintenance level" based on their usage. Maintenance level 1 roads, for example, are roads "in storage between intermittent uses." FSH 7709, Sec. 62.32.

In project after project, the Forest Service uses "old" temporary roads in new projects and builds new temporary roads that it will use again in future entries. In just the Buck project alone, the Forest Service showed why it cannot be trusted to tell the difference between temporary and permanent roads:

- 6232A is a temporary road in Compartment 113, first constructed and utilized to harvest stand 113/28 in 1992. The road was utilized again 17 years later to harvest stand 113/33 in 2009. In the Buck project it was decided to use this road again, with the extension of another 1.3 miles of *new* temporary road at the end. Based on this pattern, it is almost certain that the agency would propose to use the old temporary road and the new temporary again in a future timber sale.

- Road 71A in Compartment 109 was a "temporary" extension constructed in 1994 to harvest stand 109/30 as part of the Black Branch Timber Sale. The same road, with a 0.57-mile extension, was included in the Buck project decision to harvest stand 109/35.

- Stand 111/40 was thinned circa 2003-2004 in the Riley Cover Timber Sale, and now the exact same 0.39-mile segment of so-called "temporary" road is slated for reconstruction for regeneration harvest in the same stand 16 years later.

- In 1978, a road was constructed to harvest stand 114/3. Subsequently, that road was not added to the system. The same road prism will be used to harvest stand 114/7 in the Buck Project more than 40 years later. Despite the road being repeatedly used for timber harvest, it is still classified as a temporary road by the Forest Service.

These are clearly "roads in storage." The DEIS seems to acknowledge this problem: fully 80% of new roads are constructed on "existing corridors … that may have been used as temporary roads on past projects and remain on the landscape (unobliterated)." DEIS at 463. Further, project-level analyses contemplate the re-use of temporary roads and skid trails in the future, ostensibly to *protect* soil resources. In the Buck Project, for example, the Forest Service stated that "skid roads and trails…could be reused in the event that silvicultural treatments are proposed in the future" to "reduce the amount of soil disturbance over time." Buck Draft EA at 82. Even where project-

level analyses are not as candid, construction of temporary roads in areas where future access will be needed all but guarantees that they will be reused again.

The primary driver for the use of "temporary" roads as opposed to permanent system roads is the Forests' extraordinary funding shortfall for road maintenance. The Forests realize they cannot afford to expand the road system, so they attempt to have it both ways: building roads that will be used for successive entries, but failing to account for their costs or risks by labeling them "temporary." This shows a serious lack of accountability to the public and invariably leads to physical impacts to soil and water, as well as vectors for unauthorized OHV use and NNIS spread.

Project-level analyses do not acknowledge these long-term cumulative impacts. At plan revision, the Forests have a choice: fully disclose the cumulative, long-term effects of these roads or include plan components to prevent their abuse as a way to avoid constraints on the permanent road system. As recommended by the Partnership, TA-S-08 should be clarified to explain that temporary roads must be decommissioned when they are no longer needed *for the single purpose for which they were constructed*, not when they are no longer needed for other conceivable purposes, as the Standard could be interpreted.

We also emphasize the following Partnership recommendation: "Road prisms should not be reused successively as temporary roads; instead, if re-use is needed, the road should be placed on the system (e.g., as a road in 'storage' between entries)." We strongly support this recommendation. To translate the concept into plan components, the Plan should clarify that if a temporary road is likely to be re-used in the future, it should also be placed on the system. In order to make these determinations, we believe the best approach is to involve the Forest Roads Engineer. The Engineer will be able to assess whether the cost or risk of the temporary road outweighs the benefits from the immediate project. A brief description of this cost-benefit assessment should be provided in project documentation.

In our view, if the cost of a road in Matrix or Interface outweighs the expected receipts from the immediate project, then it is highly unlikely that road would be built unless it was expected to be used again. In unsuitable MAs, however, the ecological need for management may justify the use of a temporary road even if the treatment will be "in the red" after access costs. However, temporary roads in all MAs (not just backcountry) should strongly be considered for obliteration after the final entry to accomplish the site-specific purpose for which it was built.

XV. Climate Change

A. Background and Planning Framework

Climate change is the defining issue of our time. It affects or will affect nearly every aspect of our lives; the ecosystems and species found on national forests are no different. As we explained in our scoping comments on the Forest Plan revision, "[o]ver the life of the next plan, the forest will face no greater 'stressor' than the impacts of climate change." Scoping Comments at 5. There also has never been a time as important as now for taking action to slow climate change including actions that bolster carbon sequestration and protect carbon already stored in forest ecosystems rather than release it to the atmosphere. The revised Forest Plan is the agency's best opportunity to ensure that the landscapes of the Pisgah-Nantahala can sustain in the face of a changing climate and to take action to stymie climate change for the benefit of people, plants, and animals.

Conservation Groups have a longstanding interest in ensuring the Pisgah-Nantahala is managed in way that both allows it to adapt to the effects of a changing climate and helps prevent the worst consequences of climate change by sequestering and storing carbon. Climate change poses an unprecedented threat to many of the ecosystems and species that Conservation Groups and their members enjoy and seek to protect. High-elevation forest types risk extirpation as temperatures climb. Aquatic species will be harmed by climate-change-driven precipitation events of increased intensity leading to sedimentation of streams. Rare species with limited ability to migrate substantial distances such as green salamanders face unprecedented challenges as their home ranges change. Climate change is likely to result in increased disturbances from pests and non-native invasive species, threatening whole ecosystems across the forests. Conservation Groups seek to preserve the health of the forest and the species that live there – climate change is the greatest overall threat to those efforts.

Climate change concerns permeate almost every aspect of the Forest Service's forest plan revision obligations. Several are worth noting here. First, and as explained elsewhere, the National Environmental Policy Act requires the Forest Service to take a "hard look" at the direct, indirect, and cumulative effects of the Forest Plan revision. *See Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989) (explaining hard look requirement). This "hard look" must include consideration of the effects of climate change on forest resources and the effects of management decisions on climate change.

Second, the requirement to prepare a forest plan comes from the National Forest Management Act (NFMA). *See* 16 U.S.C. § 1604(a). NFMA requires that forest plans "provide for multiple use and sustained yield of the products and services" from national forest system lands. *See id*. § 1604(e)(1). The multiple-use mandate requires "management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions." 16 U.S.C. § 531(a).

The agency is explicitly charged with managing for the multiple-use "service" of "long term storage of carbon" and "climate regulation." *See* 36 C.F.R. §§ 219.10, 219.19. To that end, as part of the forest plan revision process the agency was required to compile a "[b]aseline assessment of carbon stocks." 36 C.F.R. § 219.6(b)(4).

NFMA also requires that forest plans "provide for diversity of plant and animal communities." 16 U.S.C. § 1604(g)(3)(B). Managing for plant and animal diversity must consider threats posed by climate change.

Forest plans must provide for social, economic and ecological sustainability. *See id*. § 1604(g)(3)(B); 36 C.F.R. § 219.8. This too includes consideration of "climate change," *see* 36 C.F.R. § 219.8(a)(1)(iv), and "[r]easonably foreseeable risks to ecological, social, and economic sustainability" such as those posed by climate change. 36 C.F.R. § 219.10(a)(7). The agency must "[m]itigat[e], if feasible, the effects of widespread environmental stressors such as air pollution and influence of changing climate." FSH 1909.12 § 32.13e. Climate change must also be considered when assessing how to manage riparian areas, *id*. § 23.11e, soil productivity, *id*. § 23.12b, and rare species, *id*. § 23.13a.

Further, forest plans must provide for "continuous monitoring and assessment in the field" to evaluate the effects of and need for active management, 16 U.S.C. § 1604(g)(3)(C), including "changes on the plan area related to climate change," 36 C.F.R. § 219.12(a)(5)(vi); *see* FSH 1909.12 § 32.13e. The agency's forest planning regulations specifically contemplate that plans may have to be amended based on "changing conditions, including climate change." 36 C.F.R. § 219.5(a). For that requirement to have meaning, the agency must monitor the effects of climate change on the forest.

Finally, underpinning all of these (and other) requirements is the obligation to use the "best available scientific information." 36 C.F.R. § 219.3.

Many of these requirements are admirably addressed in the Draft Forest Plan and DEIS, others need improvement, while still others are unfulfilled. We endorse the recommendations made by the Pisgah-Nantahala Forest Partnership to fix some of these analytical problems and to improve the Draft Forest Plan. As the Partnership explained, anticipating and planning for increased disturbances from intensified storms is critical, particularly in terms of appropriately sizing culverts to accommodate changes in streamflow and ensuring the road system does not lead to channel impacts and sedimentation of streams. Maintaining connectivity across terrestrial and aquatic habitats is equally critical to allow species to move while adapting to a changing climate. Stream connectivity in particular must be protected and improved by avoiding further impediments to aquatic organism passage. We also want to emphasize the importance of including climate change as a potential stressor when assessing ecosystem vulnerability and when considering the implications of management actions on carbon storage and carbon sequestration. Finally, we join the call for development of a climate-informed adaptation framework for project implementation. The framework should also be used to evaluate if the

revised Forest Plan should be amended based on "changing conditions, including climate change" consistent with the 2012 Forest Planning Rule.

In the remainder of this section, we discuss the shortcomings in the DEIS's analysis related to climate change and suggest improvements to that analysis and the Draft Forest Plan. Our comments are divided into two mains sections: one focused on climate adaptation and another focused on climate mitigation. But first, we begin by summarizing our understanding of how the Draft Forest Plan and DEIS approach this issue. We include this here in an effort to make sure our understanding of the current draft of the Plan and DEIS matches the agency's. If we are mistaken, or if we have missed important information, please let us know.

B. How the Draft Forest Plan and DEIS Approach Climate Change

We commend the agency for including an independent section on climate change in the Draft Forest Plan. That section discloses that the Forests are currently experiencing climate change-driven "increased threats from fire, insect and plant invasive species, disease, extreme weather, and drought." Draft Plan at 27. Climate change is likely to intensify these threats. *Id*. The Draft Plan includes Desired Conditions of keepings forests "resilient to disturbance regimes allowing for adaptive capacity of landscape level plant communities to respond to climate" (CC-DC-01), maintaining ecosystem services (CC-DC-03), maintaining plant and animals habitats (CC-DC-04, -06, -07) and water quality (CC-DC-05), and considering "renewable" energy opportunities (CC-DC-08). The Draft Plan then includes a list of management approaches intended to help achieve those Desired Conditions. Draft Plan at 27-28. The Draft Plan does not include any Objectives, Standards, or Guidelines related specifically to climate change. Related to transportation access, the Draft Plan includes a Standard instructing the agency to "[c]onsider climate change predictions of changing precipitation when designing drainage control features (rolling-dips, culverts, grade-sags, etc.) that are of adequate frequency and size to ensure runoff is able to seep into the soil without causing erosion, including gullies and catastrophic events of mass wasting of road material." TA-S-04, Draft Plan at 100.

1. DEIS climate change assessment indicators

To frame the assessment of climate change effects, the DEIS looks to three primary indicators: temperature, precipitation, and landscape resilience. DEIS at 51-52. The "geographic analysis unit" used in the DEIS to assess impacts to and from climate change "is typically forestwide" and the analysis period typically extends to "mid-or end-of-century." *Id*. at 52. Changes in temperature and precipitation were assessed based on both a high and low continuing emissions scenario compared against a 1961-1990 baseline period. *Id*.

a. Temperature

The DEIS discloses that by 2065, mean temperature on the Forests is predicted to increase by 4.1°F and 5°F respectively under the low and high emissions scenarios. *Id*. "The number of days per year with maximum temperature above 90°F would increase by more than a full month

over the course of a year by [2065], with values of 33 days and 42 days for" the low and high emission scenarios. *Id*. at 53. "The number of days per year with minimum temperatures below 32°F would decrease by an average of 20 to 24 days" under the low and high emission scenarios. *Id*. The reduction in freezing temperatures is likely to have a significant effect on "botanical, silvicultural, and pest management processes." *Id*.

b. Precipitation

Predicted changes in overall precipitation are not as substantial as those for temperature but still represent "a statistically significant increase in total precipitation" under both emissions scenarios. *Id*. at 55. The DEIS acknowledges that climate change will result in more intense storms. *Id*. at 63.

c. Landscape resilience

"Landscape resilience" was assessed using The Nature Conservancy's "Resilient Sites for Terrestrial Conservation" modeling product ("Resilient Sites Model"). *Id*. at 56. The Resilient Sites Model identifies areas with average, below average, and above average resiliency scores across the eastern seaboard. The study area includes all or portions of 30 states and Canadian provinces.[170] The model is "informed by landscape diversity and local connectedness metrics." *Id*.

Landscape diversity "represents the variety of microclimates present in a landscape and is intended to estimate the capacity of the site to maintain species and functions." *Id*. It "is measured by counting the variety of landforms, the elevation range, the diversity of soil types, and the density and configuration of wetlands present."[171] "Forest-wide, 97.1 percent of the Nantahala and Pisgah NFs have average or greater landscape diversity, with 72.5 percent of the area categorized as above average." DEIS at 56. These high scores appear to have been driven by the landform and elevation factors.[172]

"Local connectedness" is a "measure of landscape structure (not individual species movements) which characterizes the hardness of barriers, the connectedness of natural cover, and the arrangement of land uses that influence ecological processes and the movement of many types of organisms."[173] The base dataset for this analysis is the 2011 National Land Cover Dataset.[174] Because the roads data in that dataset is "older and inaccurate" it was supplemented with data

[170] Anderson, M.G., et al., *Resilient Sites for Terrestrial Conservation in Eastern North America*, The Nature Conservancy, Eastern Conservation Science (2016).

[171] *Id*.

[172] *Id.*

[173] *Id*.

[174] *Id*.

from the 2014 Tiger Road dataset.[175] Even then, "[d]irt roads or unpaved forest management roads [were] unevenly mapped" so the analysis was further supplemented with data from the 2014 OpenStreet Map though "the quality and consistency of this dataset is not known."[176] The analysis codes cells in a grid based on land type and then assess connectedness based on the similarity of adjacent cells. Cells coded for "forest" receive the highest connectivity ratings.[177] "Forestwide, 97.1 percent of the Nantahala and Pisgah NFs have average or greater local connectedness with 68.4 percent of the area categorized as above average." DEIS at 56.

Overall landscape resilience was then measured "by averaging landscape diversity and local connectedness" scores. DEIS at 57. The final result was that "[f][orestwide, 97.1 percent of the Nantahala and Pisgah NFs have slightly above average or greater landscape diversity, with 86.1 percent of the area categorized as above average." *Id.* The DEIS also identified "climate corridors" and "climate flow zones" which are areas where plants and animals can migrate in response to a changing climate. *Id*.

As we do in these comments, the DEIS divides its discussion of climate and carbon into two sections: the first on the "potential impacts of climate change on the Forest," and the second on "the potential effects of management actions on climate change." DEIS at 51.

C. Potential Impacts of Climate Change on the Forest

Against the backdrop of changes in temperature, precipitation, and the resiliency of the landscape, the DEIS assesses the likely impacts of climate change on the Forests. These effects include:

- "Higher temperatures will cause many species to shift ranges, generally moving to track their suitable habit." DEIS at 61. "The species most likely to be negatively impacted by climate change will be highly specialized and habitat restricted." *Id.* "Amphibians may be most at risk, due to dependencies on moisture and cool temperatures that could be altered in a future climate." *Id*. at 62.

- "Forest decline may lead to reduced oak dominance and species change in the canopy." *Id*. at 61.

- "Non-native and invasive plant and insect species may increasingly outcompete or negatively affect native species in the future. Winter freezes currently limit many forest pests, and higher temperatures will likely allow these species to increase in number." Some invasive species are expected to increase "dramatically." *Id*. at 62.

[175] *Id*.

[176] *Id*.

[177] *Id.*

- "Changing temperature and rainfall patterns may threaten the survival of high-elevation communities in mountain forests." *Id*. Temperature stress on hardwood may allow pines and other fast-growing species to become more dominant. *Id*.

- The potential for severe storms and extended droughts are both expected to increase. *Id* . "Increases in heavy downpours and more intense hurricanes can lead to greater erosion and more sedimentation in our waterways." *Id*.

- "Warmer air and water temperatures and changes in stream flow will affect the abundance and distribution of fish species." *Id*. "Cold-water species, such as trout, will be the most vulnerable to population declines with future warming. The native brook trout may be most at risk, as warmer stream temperature and competition with invasive species will continue to reduce their populations." *Id*. at 63.

The DEIS offers *no* analysis of the effect of the different action alternatives on mitigating the impacts of climate change on the forest. The only conclusion offered is that "the action alternatives are more responsive to changing climatic conditions than Alternative A." *Id*. at 64.

D. Potential Effects of Management Actions on Climate Change

The DEIS considers the effects of management actions on climate change by assessing how actions affect carbon stocks and carbon sequestration. "[C]arbon uptake and storage and accompanying potential climate regulation are key ecosystem services provided by forests." *Id*. at 65. The carbon analysis in the DEIS "draws largely from two recent U.S. Forest Service reports: the Baseline Report (USDA Forest Service 2015) and the Disturbance Report (USDA Forest Service, in review)." *Id*. at 64. The Baseline Report reveals that "Forests in the NFs in NC are maintaining a carbon sink;" carbon stocks increased by 15% between 1990 and 2013. *Id*. at 66. Currently, there are currently approximately "73 million metric tonnes of carbon stored" on the Pisgah-Nantahala National Forest. *Id*. at 71. According to the DEIS, around 47% of this carbon is stored in the above-ground portion of live trees and 32% is stored in soils. *Id*. at 66. The remainder is stored in roots, standing dead trees and downed wood, the understory, and forest floor litter.

Since 1990, the most prevalent disturbance on the forest decreasing carbon stocks has been timber harvesting. *Id*. The second most prevalent disturbance related to carbon stocks is fire, both wildfire and prescribed fire. *Id*. at 67.

According to the DEIS, the "greatest influence on overall carbon dynamics on the forest is the legacy of intensive timber harvesting as reflected in forest age classes." *Id*. "Although older forests store more carbon and can continue to take up significant amounts of carbon even as they age, the rate of carbon uptake generally declines as forests age." *Id*. As a result, "in coming decades, aging stands on the Forests may have lower rates of carbon accumulation, although stocks are projected to continue to increase above current levels." *Id*.

The DEIS concludes that because in a "global atmospheric CO2 context, even the maximum potential management levels described by the plan alternatives would have a negligible impact on national and global emissions and on forest carbon stocks . . . a quantitative analysis of carbon effects is not warranted and thus is not meaningful for a reasoned choice among plan alternatives." *Id*. at 68. Instead, the DEIS focuses on a qualitative analysis. Specifically, it concludes that:

- "All of the proposed management activities would initially reduce carbon stocks on the Forests" but asserts that the "initial negative carbon effects would be mitigated or even reversed with time, reducing the potential for negative cumulative effects." *Id*. "Negative effects will be offset when the forest stands in the proposed managed area regenerate and recover, as well as by facilitating carbon storage in [harvested wood products]." *Id*. at 69.

- Because "[a]ll action alternatives provide the same desired conditions for terrestrial ecosystems and the standards and guidelines that help achieve or maintain those conditions" there are effectively no differences between the alternatives regarding carbon stocks. *Id*. at 68. Restated, "[e]ach of the action alternatives include the same number of acres to be treated, thus they are projected to have similar effects on carbon." *Id*. at 72.

- "Older forest stands are desirable because they provide a range of ecosystem services, including storing more carbon than do younger stands." *Id*. at 69.

- "Carbon can be stored in wood products for days to centuries, depending on the commodity produced and end use." *Id*. at 70. "As more commodities are produced and remain in use, the amount of carbon stored in products increases, creating a cumulative benefit when considered with forest regrowth. Even as more wood products are discarded, the carbon stored in solid waste disposal sites also increases." *Id*.

- "[H]arvested wood and discarded wood products can be burned to produce heat or electrical energy (including about four percent of roundwood removals in North Carolina), also producing a benefit by substituting for more carbon-producing energy sources." *Id*.

- Rising temperature may leave fire-dependent forests "more at risk to more frequent and severe wildfires . . . potentially increasing carbon emissions and lowering carbon stocks." *Id*. "[P]rescribed fires and thinning can lower overstory tree mortality [from wildfires], potentially reducing amounts of carbon emissions that might be emitted if the same area were to burn in a high-severity wildfire." *Id*.

- Achieving the high-end of Tier 2 management goals may cause carbon stocks to be affected "up to five times above past levels." *Id*. at 72. "[P]rescribed burning in Tier 2 results in about 33 times the carbon lost as compared to historical fire levels." *Id*., n. 11.

- Regarding cumulative impacts, the DEIS concludes that "[a]ll of the plan alternatives are projected to contribute negligibly to overall GHG emissions" and therefore "the contribution of the plan's proposed actions to cumulative effects on global atmospheric GHG concentrations and climate change would also be negligible." *Id*. at 73.

In summary, the DEIS concludes there is no net effect on carbon stocks or climate change from any of the action alternatives. Any negative effects to carbon stocks will be "offset" leading to "negligible" effects on greenhouse gas emissions which, in turn, causes the Forest Plan to have a negligible effect on climate change.

E. Proposed Revisions to the Draft Plan and DEIS's Approach to Potential Impacts of Climate Change on the Forest

For the agency to meet its NEPA and NFMA obligations, it should make the following changes.

1. The Forest Plan must ensure that all infrastructure is designed to accommodate increased storm intensity

NFMA requires the Forest Service to manage for plant and animal diversity, water quality, and ecological sustainability. Climate change poses unique risks to these values including effects associated with storms of increased intensity. The DEIS is clear that climate change is likely to result in a higher likelihood of severe storms and that "[i]ncreases in heavy downpours and more intense hurricanes can lead to greater erosion and more sedimentation in our waterways." DEIS at 62. The DEIS also discloses that "[r]oads generally pose the greatest risk to streams, both stream channels and water quality." *Id*. at 99. We commend the agency for recognizing the problem that roads and other infrastructure pose to water quality in the face of a changing climate and support incorporation of TA-S-04 which requires the agency to "[c]onsider climate change predictions of changing precipitation when designing drainage control features (rolling-dips, culverts, grade-sags, etc.) that are of adequate frequency and size to ensure runoff is able to seep into the soil without causing erosion, including gullies and catastrophic events of mass wasting of road material." Simply *considering* climate change predictions will not always be adequate however. The agency could also gain efficiencies in project planning by incorporating Standards into the Forest Plan which set minimum thresholds for planning drainage control features rather than completing that analysis anew with each crossing, project by project. **To protect species diversity, water quality, and ecological sustainability we recommend**

retaining TA-S-04 but adding a new forest-wide Standard requiring that all infrastructure (e.g. stream crossings and culverts) be designed and maintained to accommodate expected storm flows for the expected life of the asset.*[178] This is required to ensure that the Forest Service remains eligible for the silvicultural exemption for forest roads under the Clean Water Act. 40 C.F.R. § 323.4(a)(6)(iii).

2. The Forest Plan must maintain ecological integrity and allow for species movement by ensuring that stream crossings provide for aquatic organism passage

As the DEIS discloses, "[h]igher temperatures will cause many species to shift ranges, generally moving to track their suitable habit." DEIS at 61. Those most likely to be negatively impacted are those with restricted habitats that prevent these range shifts. *Id*. Road and trail stream crossings pose unique threats to aquatic species, restricting their habitat and home ranges if those crossings do not allow for aquatic organism passage. To ensure that does not occur we support incorporation of TA-S-04 which requires that road "[s]tream crossings shall be designed to allow for native aquatic organism passage where needed by the species and shall be designed to minimize impacts, including erosion and sedimentation from the road." We note that this Standard must be implemented to account for projected increases in storm intensity due to climate change. We also suggest that this Standard explain that the relevant species for a stream reach must be considered in light of the stream or catchment size or based on biotic surveys. Like the requirement that culverts be sized to accommodate flood flows, ensuring passage for the aquatic species "inhabiting the water" is an explicit requirement under the Clean Water Act. 40 C.F.R. § 323.4(a)(6)(vii).

Many problems related to aquatic organism passage on the landscape are the result of past land management practices. To that end, the Draft Forest Plan includes an objective of "[r]eplac[ing] a minimum of two impaired stream crossings annually to improve aquatic organism passage and aquatic community connectivity across the planning unit." AQS-O-03. Priority replacements are those that "improve[] the entire aquatic community and enable[] reconnection of fragmented populations of native brook trout and other aquatic federally-listed species or species of conservation concern or restoration of these species to suitable unoccupied habitat." *Id*. While this is a positive start, replacing only two impaired stream crossings annually is likely to leave many species unable to migrate in response to changing environmental conditions from climate change. **We suggest improving this objective by calling for replacement of a minimum of two large impaired stream crossings annually, one in Pisgah and one in Nantahala NF and replacement of a minimum of three small impaired stream crossings annually, making an effort to locate the projects across both Forests.*** The distinction between large and small projects should be whether it costs more than $60,000 which is the average of cost an aquatic organism passage project. **If the Forests move into Tier 2 goals, this objective should be increased to replacing three large and six small (one in each Ranger District) impaired**

[178] An asterisk indicates requests that are also being made by the Pisgah-Nantahala Forest Partnership.

stream crossings annually across both Nantahala and Pisgah National Forests.* We also recommend prioritizing projects in areas where aquatic species may need to migrate in response to warming water temperatures.

3. The Forest Plan should protect cold water-dependent species by limiting canopy removal in streamside zones

Cold water-dependent species in the Southern Appalachians face outsized risks from climate change. "Warmer air and water temperatures and changes in stream flow will affect the abundance and distribution of fish species." DEIS at 62. "Cold-water species, such as trout, will be the most vulnerable to population declines with future warming. The native brook trout may be most at risk, as warmer stream temperature and competition with invasive species will continue to reduce their populations." *Id*. at 63. At least one Forest Service study predicts a 53%-97% loss in trout habitat due to climate change.[179] To protect aquatic diversity, the revised Forest Plan must mitigate the effects of warming air temperatures on stream temperatures. One simple but important technique will be keeping streams shaded by preserving canopy cover over streams. This will become increasingly important as climate change-driven disturbances increase, leading to increased reductions in stream canopy cover regardless of management. Canopy over many streams is already being reduced due to Hemlock Wooly Adelgid. **To give cold water-dependent species their best shot at survival in a warmer climate, the Forest Service should add a forest-wide Standard prohibiting in Streamside Zones management actions that are intended create open forest conditions unless the action is necessary to fulfill a restoration objective that can only be met in that particular location**.

4. The Forest Plan needs to include a method for adapting projects based on monitoring of disturbances

The Draft Forest Plan concludes that disturbances are likely to increase as a result of a changing climate. Draft Plan at 27. The DEIS explains that "[m]anagement activities, such as timber harvests and prescribed fire" are often intended to mimic those disturbances. DEIS at 65. If management activities are intended to approximate natural disturbances, the need for those management activities must be assessed against changing levels of disturbance as a result of climate change.

Indeed, future rates of natural disturbance is probably the most important open question that the Forest Service must resolve between now and the final decision. The answer will have profound implications for the "ceiling" on regeneration harvest, as explained at length in preceding sections. Although we again emphasize the importance of accuracy in the Spectrum models, we presume that there will be some lingering uncertainty in the levels of natural disturbance likely to

[179] Flebbe, Patricia A. et al., *Spatial Modeling to Project Southern Appalachian Trout Distribution in a Warmer Climate* (2006). This study was provided with our Assessment Comments.

occur in the future. If timber harvest objectives are pushing the limits on the ceiling for harvest, adaptive management is critically important to ensure that the DEIS's predictions for species and values associated with older forests remain reliable.

To ensure the relationship between natural disturbances and the need for management is adequately considered in project planning, we join the Pisgah-Nantahala Forest Partnership's call for the Forest Service to develop a climate-informed adaptation framework.* That framework should facilitate an iterative process that takes climate vulnerabilities and threats into account before authorizing management activities and considers the need for specific actions in light of the prevalence of other climate change-driven disturbances. From a cost-benefit standpoint, it makes less sense to use limited agency dollars to implement actions intended to mimic natural disturbances at specific places on the landscape if disturbances are already creating desired conditions at increased rates due to climate change. The framework process would also aid the agency's application of the best available scientific information in project planning. **Critically, the framework must take into account disturbance trends across all lands in the planning area**. The "all lands" scope will allow the Forest Service to assess the value of the ecosystem services the national forests are providing and the role the forests are playing in preserving ecological integrity and sustainability at the regional level. The analysis could lead the Forest Service to focus on replicating certain disturbance types over others depending on the regional prevalence of those disturbances. The framework will also yield efficiencies in project planning, helping ensure the agency takes a hard look at the evolving effects of climate change on the forests, and effects of management actions on climate change, as projects are planned years down the road.

5. The Resilient Sites Model is ineffective at assessing climate resiliency and connectivity at the forest-level

The Resilient Sites Model is an excellent tool for assessing landscape resilience in the face of climate change at the regional level but it largely confirms information we already knew regarding public lands in the Southern Appalachians: they are hotspots of biodiversity and critical climate refugia. Because the model has a regional scope, it is ineffective at assessing landscape resilience within the confines of the national forest. That is why the authors of the model note that it uses a "coarse-filter approach" and recommend that it "be used in conjunction with supplementary information such as local studies." [180] We know that at the regional scale, the national forests rate average or above average for most of the categories of information that feed into the overall landscape resiliency score but we do not know what areas of the forest rate as average or above average when compared solely against other areas of the forest. Stated as a question: what areas of the national forest have average, above average, or below average, landscape resiliency scores when compared solely against other areas of the national forest?

[180] Anderson, *supra* note 170.

The answer to that question has real consequences because it relates to the agency's obligations to preserve ecological integrity and species diversity on the forests. The Forest Service is relying on Draft Plan direction to "[m]anag[e] ecosystems in the face of climate change [by] focus[ing] on maintaining or creating resiliency and adaptability" to meet its NFMA obligations, but the Resilient Sites Model does not tell the Forest Service where those resilient areas are *on the forest* and thus what areas should be avoided when building roads and harvesting timber. DEIS at 63. The agency cannot assume that species diversity will be preserved by pointing to the Resilient Sites Model just because the model indicates high landscape resiliency at the regional scale.

Salamanders are an example of an order that is highly affected by this gap in analysis. Climate change in combination with other factors has led to serious declines in amphibian populations worldwide including in the Southern Appalachians.[181] Maintaining functioning metapopulations with genetic diversity is critical to ensuring salamanders and other amphibians can adapt to changing conditions stemming from climate change.[182] To maintain functioning metapopulations, corridors linking salamander habitat patches must be preserved. This not only facilitates genetic transfer but also allows these animals to move between limited habitats if climate change makes previous habitat less suitable. This type of connectivity is obscured in the Resilient Sites Model which rates most of the forest as above average at the regional scale. That scale is too coarse to provide relevant information about preserving salamanders (and other similar animals) on the Pisgah-Nantahala National Forest in the face of climate change. The agency must consider how actions its takes under the revised Forest Plan affect salamander viability on the forest. Applying the Resilient Sites Model at the regional level does not aid that consideration.

The Resilient Sites Model's scale problem is also exemplified in the consideration of connections of habitats unfragmented by roads, past timber harvesting, and transmission corridors, on the forest. Connections of undisturbed patches of interior forests that facilitate species movement between the patches on the national forest specifically, is largely obscured at the regional scale. However other forest-specific analyses, including The Wilderness Society's Mountain Treasures analysis and The Nature Conservancy's Matrix Forest Block analysis, approximate this analysis. Comparison of the inputs for the Resilient Sites Model and Mountain Treasures/Matrix Forest Block analyses suggest each will produce similar outputs at least regarding the connectivity of intact forests. In lieu of rerunning the Resilient Sites Model at the finer, forest-specific scale, the agency could rely on the Mountain Treasures and Matrix Forest analyses as proxies for assessment of intact forest connectivity.

To resolve these analytical problems we suggest that the Forest Service prepare an analysis of climate resilient sites at the forest level. An accurate assessment of climate resiliency at the forest level is critical particularly in light of planned increases in timber harvesting and road

[181] Att. 14, Apodaca, *supra* note 38.

[182] *Id.*

building. The forest-specific analysis should take into consideration the intact, unfragmented forests identified in the Mountain Treasures and Forest Matrix analyses and connections between those unfragmented forest blocks. Sites identified in the forest-specific analysis as having above average climate resiliency should be placed into Management Areas with no timber or road building objectives (e.g., backcountry). The connectivity analysis must also take into account connections between habitats for dispersal limited species such as salamanders. That analysis should build on work completed by J.J. Apodaca attached to these comments. With that analysis in hand, the Forest Service can make its desired condition for salamander connectivity into an actionable standard. **The agency should adopt a forest-wide Standard prohibiting timber harvest and road construction from creating barriers to the movement of groups of salamanders at the individual or population level.*** These areas could easily be avoided in project planning rather than requiring analysis of whether each individual project intersects salamander habitat or corridors between habitats.

F. Revisions to the Draft Plan and DEIS's Approach to Potential Impacts of the Management Actions on Climate Change

The agency discusses the effect of its actions on carbon sequestration and carbon storage differently in different contexts. The Baseline Report that is one of two foundational reports supporting the DEIS proclaims that the "Forest Service has a strong basis for leading the national conversation and action on forest carbon" and that the "update and storage of carbon . . . is becoming more valuable as the impacts of greenhouse gas emissions are becoming more fully understood." Baseline Report at 2. The Report underscores the importance of "[u]nderstanding the consequences of harvesting, thinning, and other vegetation management practices on forest carbon cycles." *Id*. Critically, the Report recognizes that there are "tradeoffs between carbon and other services" that must be considered in land management and project planning. *Id*. This echoes the conclusion of the Pisgah-Nantahala Forest Plan Assessment Report that "[f]orest management activities will play a critical role in ensuring that forests remain net carbon sinks." Assessment Report at 80. The agency plainly recognizes that there are tradeoffs between, for instance, harvesting timber and storing carbon.

But that recognition is missing from the DEIS. Instead, the agency effectively takes the position that any action it pursues will only have a "negligible" impact on greenhouse gas levels and climate change generally. The DEIS fails to recognize the tradeoffs between the location and levels of timber harvest on one hand, and carbon storage and sequestration on the other. This is a fatal flaw in the DEIS and is underpinned by numerous analytical errors. To meet the hard look standard under NEPA, and to accurately assess provision of ecosystem services under NFMA, the agency must fix the numerous errors discussed below.

1. The Agency's assessment of carbon in soils must be based on the best available science

To assess the impacts of management activities on carbon stocks the agency must start with an accurate accounting of existing carbon stocks. The DEIS assumes that the Pisgah-Nantahala

contains about 73 Tg of carbon. DEIS at 66. Of that, 32% is assumed to be stored in soils. *Id*. This estimate appears to have been "based on the National State Soil Geographic (STATSGO) spatial database (USDA 1991), and the approach outlined in Amichev and Galbraith (2004)." Baseline Report at 12. More recent scholarship has found that this approach "grossly underestimate[s]" the amount of carbon stored in soils.[183] The current approach to assessing carbon in soils finds that far more carbon is stored in soils than in live trees in forests across the United States.[184] **The Forest Service should explain its assumption that only 32% of carbon stored on the Pisgah-Nantahala is found in soils. If more recent scholarship has proven that assumption incorrect, it must be revised to reflect that best available scientific information**. Such as revision may reveal that the Pisgah-Nantahala stores even more carbon than assumed in the DEIS.

The DEIS is also lacking any analysis of how management activities may affect carbon stored in soils. As noted in a recent meta-analysis of the effect of timber harvest on soil carbon: "the inclusion or exclusion of soil in ecosystem [carbon] models and ecological monitoring programs can have a major impact on forest policy when attempting to mitigate climate change through forest management."[185] That meta-analysis found that "there is a significant loss of soil [carbon] in response to harvest" and that "[r]ecovery of soil [carbon] after harvesting can take several decades."[186] Burning following harvesting was found to further exacerbate carbon soils losses.[187] Other studies have shown that losses in soil carbon offset any gains in carbon sequestered in tree growth for up to fifteen years following whole-tree-removal harvesting.[188]

Given the significant amount of carbon stored in forest soils, it is critical that the agency include an assessment of the effect of management activities on forest carbon soil stocks in the Final EIS. Any assertion that harvesting will increase carbon stocks due to subsequent biomass growth must also be tempered by findings regarding the loss of soil carbon from harvesting. Failure to include that analysis violates NEPA's hard look requirement and the agency's obligation to consider and provide the ecosystem service of carbon storage under NFMA. **Given the importance of soil carbon, the Forest Plan should also include an Objective to use timber harvesting techniques that minimize the release of carbon stored in soils.**

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[183] Att. 32, Domke et al., *Toward inventory-based estimates of soil organic carbon in forests of the United States*, Ecological Applications 27(4): 1223-1235 (2017).

[184] Att. 33, Woodall et al., The U.S. Forest Carbon Accounting Framework: Stocks and Stock Change, 1990-2016 (2015).

[185] Att. 34, James, Jason and Harrison, Rob, *The Effect of Harvest on Forest Soil Carbon: A Meta-Analysis*, Forests 7(12): 308 (2016).

[186] *Id*.

[187] *Id*.

[188] Att. 35, Vadeboncoeur et al., *Losses of mineral soil carbon largely offset biomass accumulation fifteen years after whole-tree harvest in a northern hardwood forest*, Biogeochemistry 144: 1-14 (2019).

2. The Agency must accurately disclose the role of harvested wood products in sequestering carbon

The DEIS suggests that the negative effects of reducing carbon stocks will be "offset . . . by facilitating carbon storage in [harvested wood products]" and that as "more commodities are produced and remain in use, the amount of carbon stored in [harvested wood] products increases, creating a cumulative benefit when considered with forest regrowth." DEIS at 69-70. While we agree that harvested wood products store carbon to some degree, and that this storage should be taken into account, the DEIS's qualitative analysis overstates the benefits of harvested wood products ("HWPs") to carbon storage. If the agency is going to consider carbon stored in HWP when assessing the effects of forest management on carbon storage, it must accurately disclose the role HWP plays in sequestering carbon. **To that end, the agency should complete a carbon life-cycle analysis for wood products coming off of the Pisgah-Nantahala.** Besides a handful of qualitative statements, the DEIS currently provides very little information on the role of HWP in sequestering carbon.

As noted above, the first step in properly accounting for the carbon sequestration benefit of HWP, and the carbon tradeoffs between timber harvesting and passive management, is to account for soil carbon lost during the harvest process. This carbon is lost immediately with no potential for storage in HWP.

The second step is calculating the amount of carbon lost through logging, milling, and manufacturing waste. Only a portion of the wood removed from a site is ultimately converted into an end product. Some material is left on site (and frequently subject to subsequent burns), some material is discarded during the milling process and still other material is discarded during manufacturing. A recent study of western forests estimates that up to 40% of harvested wood does not ultimately become a product.[189] Ingerson similarly found that, on average, approximately 40% of live-tree volume is left onsite following a harvest.[190] Forest Service studies also recognize that timber harvests result in the immediate release of some carbon and a dramatic increase in down dead wood left onsite which relatively quickly decays, releasing stored carbon back to the atmosphere.[191] Even after calculating the amount of wood physically removed from a site, to accurately assess carbon stored in HWP, the Forest Service must account for additional wood discarded during processing. Ingerson estimates that harvesting, primary processing, and secondary processing may leave as little as 18% of live-tree volume to be

[189] Att. 36, Hudiburg et al., *Meeting GHG reduction targets requires accounting for all forest sector emissions*, Environ. Res. Lett. 14 (2019).

[190] Att. 37, Ingerson, Ann, Wood Products and Carbon Storage: Can Increased Production Help Solve the Climate Crisis?, The Wilderness Society (2009).

[191] Att. 38, Smith et al., USDA, Methods for Calculating Forest Ecosystem and Harvested Carbon with Standard Estimates for Forest Types of the United States (2006).

converted into HWP.[192] Similarly, Stockman estimates that of the wood delivered to mills, only 67.5% of softwoods are converted to HWP, and 56.8% of hardwoods, "with the balance of carbon assumed to be immediately emitted to the atmosphere."[193]

After calculating the amount of carbon remaining after harvesting and processing, further assessment of the carbon stored in HWP requires information related to the end product of the harvested wood. We were unable to find estimates of end product uses of wood removed from the Pisgah-Nantahala National Forest and ask the Forest Service to disclose that information in the Final EIS. As explained by Smith, the "amount of carbon sequestered in products depends on . . . [the] products the harvested wood is allocated [to], and the half-life of wood in these products." A "half-life" is "the number of years it takes for half of the initial inflow amount to be discarded," or in other words, the decay rate at which carbon passes from the "in-use" HWP pool to the "discarded" HWP pool.[194] This change in "pools" is analytically necessary because HWP loses carbon at different rates based on whether it is "in use" or "discarded." Skog estimates the "in-use" half-lives for various forest product end uses as follows:

- Solid wood used in single family housing = 78-86 years depending on the age of construction
- Solid wood used in multifamily housing = 48-52 years depending on the age of construction
- Other solid wood uses (e.g., furniture) – 38 years
- Paper = 2.6 years[195]

Carbon emitted from HWP after it moves from being "in-use" to "discarded" depends on how the HWP is discarded. There are effectively five options. The HWP can be burned, recovered, composted, landfilled, or placed in a dump. Carbon from burned and composted HWP is assumed to be emitted to the atmosphere. Recovered HWP is added back to the "in-use" pool. In landfills, 77% of solid wood carbon and 44% of paper carbon is assumed to be fixed carbon; the remainder emits to the atmosphere over time based on different half-life decay rates for

[192] Ingerson, *supra* note 190.

[193] Att. 39, Stockman et al., *Estimates of carbon stored in harvested wood products from the United States forest service northern region, 1906-2010*, Carbon Balance and Management 7:1 (2012).

[194] Att. 40, Skog, Kenneth, S*equestration of carbon in harvested wood products for the United States*, Forest Prod. J. 58(6):56-72 (2008).

[195] *Id*.

landfilled HWP.[196] Carbon in the "discarded" pool is still considered to be part of the overall HWP carbon pool.

While it is not included in the DEIS, the Forest appears to have performed something akin to this analysis previously. In its Assessment Report, the Forest Service calculated the amount of carbon stored in wood products, landfills, and emitted into the atmosphere from a typical timber sale. Assessment Report, 83. According to that analysis, ten years following a timber harvest, 31% of the carbon remained in in-use wood products, 12% was stored in wood products in landfills, and 57% had been emitted to the atmosphere. *Id.*[197] Fifty years following harvest, 12% remained in in-use wood products, 18% was stored in wood products in landfills, and 70% had been emitted to the atmosphere. *Id*. These findings parallel those by Hudiburg which found that 65% of the carbon in biomass removed from Oregon forests over 100 years has been emitted back to the atmosphere.[198]

These emissions from the HWP process are highly significant but are not disclosed in the DEIS. Hudiburg estimates not only that 65% of the carbon removed from Oregon forests over the last 100 years has been emitted to the atmosphere but that the accumulation of that carbon *took over 800 years*.[199]

This best available scientific information calls into question the agency's assertion that the negative effects of reducing carbon stocks will be "offset . . . by facilitating carbon storage in [harvested wood products]." DEIS at 69. When compared to allowing a forest to age passively, regenerating a forested stand to produce HWP results in a net increase in carbon emissions across any relevant timeframes, not an "offset" of those emissions. The contrary conclusions in the DEIS underscore that the agency has not taken a hard look at the effect of harvesting for HWP on carbon flux.

Even adding the increased carbon sequestration rates of younger forests to these considerations, timber harvesting and storage in HWP does not result in any net carbon benefit at timescales relevant for avoiding the worst impacts of climate change. As an example, according to the analysis in the Assessment Report, clearcutting a 100-year old forest would result in emitting 57% of the accumulated carbon to the atmosphere after ten years. According to the Disturbance Report, a 100-year-old forest in North Carolina has been accumulating carbon at a rate of 5 or

[196] Stockman, *supra* note 193. Also important from the greenhouse gas perspective is that HWP stored in landfills tends to generate higher methane emissions. These methane emissions should also be included in the agency's hard look at the effect of harvesting on climate change.

[197] It is unclear but this analysis does not appear to account for carbon lost through harvesting and timber processing. In that case, the analysis would not account for the total carbon lost through harvesting and conversion to HWP.

[198] Hudiburg, *supra* note 189.

[199] *Id.*

more metric tonnes ("T") of carbon per hectare[200] annually for approximately 8 or more decades. Disturbance Report at 67. Conservatively, one hectare of that forest would store 400 or more T of carbon. Clearing that forest would emit 230 T of that carbon to the atmosphere in the first ten years. In that same timeframe, the new forest would not be expected to accumulate more than approximately 35 T of carbon – resulting in a net loss of 195 T carbon at least for the first decade. *Id*. And this does not account for the additional carbon that would have accumulated in the 100-year-old forest had it not been cut down.

Even after fifty years, the math does not add up. Clearing the same hectare discussed above would result in emissions of approximately 280 T of carbon to the atmosphere after fifty years. Discounted for the amount of carbon that would have accumulated in the harvested, 100-year-old forest over those fifty years, the new growth forest would only have sequestered approximately 100 T of carbon – still a net 180 T loss of carbon.[201]

This pattern would continue to play out over time with older forests continuing to accumulate carbon, HWP emitting more carbon over time as it is discarded and decays, but with younger forests slowing their rate of carbon uptake.

Based on the analysis in the DEIS, it is unclear if harvesting would ever result in a net carbon sequestration benefit, but if it did, it would only happen on a very long timescale; far too long to be of use in mitigating the worst impacts of climate change. This was recently explained in a letter to Congress from leading scientists on the issue: "We find no scientific evidence to support increased logging to store more carbon in wood products . . . as a natural climate solution."[202]

For these same reasons, the conclusion that as "more commodities are produced and remain in use, the amount of carbon stored in [harvested wood] products increases, creating a cumulative benefit when considered with forest regrowth" is misplaced. DEIS at 69. The HWP carbon pool only increases if timber harvesting either stays the same or increases. Put another way, if the carbon entering the HWP carbon pool is less than the carbon emitted as HWPs age and are discarded, then the HWP pool is converted from a carbon sink to source – emitting more carbon

[200] The Disturbance Report discloses annual carbon sequestration rates per hectare in teragrams. We assume this is a typo and the correct measurement is metric tonnes. The Forest Service should clarify the correct unit.

[201] This was calculated by assuming that the 100-year-old forest would accumulative 5 T carbon per hectare annually for a total of 250 T over 50 years. The new growth forest was assumed to accumulate 5 T carbon per hectare for the first decade, 6.5 T carbon per hectare for the second decade, 7.5 T carbon per hectare for the third decade, and 8 T carbon per hectare for decades four and five. Disturbance Report at 67. The total carbon sequestered by the new forest would be 350 T. The 250 T that would have accumulated in the older forest over that same period was subtracted from the 350 T that accumulated in the younger forest for a net carbon gain of 100 T. The 100 T gained was then compared with the 280 T lost over the same time period resulting from the original harvest of the 100-year-old forest.

[202] *See* Att. 41, Letter from William Moomaw et al. to Members of Congress (May 13, 2020).

than it is taking in.[203] The only way to keep carbon in the HWP carbon pool is to keep cutting down forests. Simply showing that the HWP carbon pool is growing is not sufficient to show there is a "cumulative benefit" without considering the carbon lost when carbon is transferred from the live-tree pool to the HWP pool.

We do not point out these shortcomings to nitpick. We understand that under the current statutory environment "[m]anaging carbon in a forest is not the same as managing the forest for carbon. Carbon management is one part of sustainable land management." Baseline Report at 3. Under other statutory obligations, there may be reasons to continue or even increase logging despite the increases in greenhouse gas emissions this may cause. But the DEIS puts more weight on HWP to paint a rosy picture of the impact of logging on carbon flux than it can hold. On any timescale relevant for stemming the worst and immediate impacts of climate change, logging to create HWP will result in net increases of carbon emission from our forests. As the agency acknowledges, there are "tradeoffs between carbon and other services." *Id*. **The tradeoff between sequestering and storing carbon or pursuing other services is one the agency must clearly and forthrightly disclose in improved analysis.** The DEIS widely misses the mark.

3. The DEIS masks carbon emission differences between alternatives

The DEIS concludes that because each action alternative "include[s] the same number of acres to be treated . . . they are projected to have similar effects on carbon" but this ignores the fact that different alternatives focus harvesting in different areas of the forest. DEIS at 72. Harvesting a 50-year-old forest does not have the same effect on carbon storage as harvesting a 100-year-old forest or old growth. Similarly, harvesting intact, unfragmented forests has different carbon effects than harvesting forests with past disturbances. These differences in location must be taken into account when assessing differences in how the alternatives approach carbon storage.

As described by Luyssaert et al: "old-growth forests are usually carbon sinks. Because old-growth forests steadily accumulate carbon for centuries, they contain vast quantities of it. They will lose much of this carbon to the atmosphere if they are disturbed, so carbon-accounting rules for forests should give credit for leaving old-growth forest intact."[204] The same is true of forest planning. Alternatives that allow more harvesting of old growth and older forests generally are likely to emit more carbon to the atmosphere than alternatives that protect those areas. Analysis completed by Talberth reached a similar conclusion, showing that maximum carbon storage per acre of forest was found in old growth forests and, notably, that national forest system lands in

[203] Att. 42, Johnston, Craig and Radeloff, Volker, *Global mitigation potential of carbon stored in harvested wood products*, PNAS 116(29): 14526–14531 (2019).

[204] Att. 43, Luyssaert, Sebastiaan and Knohl, Alexander, *Old-growth forests as global carbon sinks*, Nature 455 (2008).

North Carolina averaged significantly below that threshold.[205] And the DEIS also recognizes this reality: "Older forest stands are desirable because they provide a range of ecosystem services, *including storing more carbon than do younger stands.*" DEIS at 69 (emphasis added). The harvesting of those older stands likewise emits more carbon.

Intact, unfragmented forests are important for carbon storage for at least two reasons. First, these forests are more likely to have larger trees and larger trees sequester significant amounts of carbon. A recent study found that "[e]ach year a single tree that is 100 cm in diameter adds the equivalent biomass of an entire 10–20 cm diameter tree."[206] Second, "[i]ntact forests also may sequester half or more of their carbon as organic soil carbon or in standing and fallen trees that eventually decay and add to soil carbon."[207] Some of this carbon is released when these areas are harvested but remains sequestered absent harvest.

Thus alternatives that allow more harvesting in older, intact forests will result in more carbon emissions because these old, intact forests are significant carbon reservoirs. The locations of these forests have already been documented on the landscape through old-growth surveys and the Mountain Treasures and Forest Block matrix analyses. But the consideration of alternatives in the DEIS masks carbon distinctions between harvesting in these areas and other younger, disturbed areas of the forest. **The agency should rerun its analysis accounting for these differences. Alternatively, the Forests could simply adopt our recommendations for old growth and Mountain Treasure areas.**

4. The Agency must forthrightly disclose the cost of reducing carbon stocks through timber harvest and prescribed burning

The DEIS provides that increased timber harvesting will "achieve a more resilient forest condition that will improve the ability of the Forests to maintain carbon stocks and enhance carbon update" and that increasing the use of prescribed fire will "reduce the risk of more severe wildlife and greater carbon losses in the future." DEIS at 72. While there may be reasons to increase the use of prescribed fire and timber harvesting; increasing carbon storage is not one them. By far the most significant factor affecting carbon storage on the Pisgah-Nantahala is timber harvesting. Between 1990 and 2011, timber harvesting accounted for 71% of the disturbances affecting carbon stocks on the forest. Disturbance Report at 16. The second highest disturbance was fire at 27%. *Id*. The Disturbance Report makes clear that timber harvesting and prescribed burning are detrimental to current carbon stocks and, as explained

[205] Att. 44, Talberth, John, Climate Impacts of Industrial Forest Practices in North Carolina, Center for Sustainable Economy (2019).

[206] Att. 45, Moomaw et al., *Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good*, Frontiers in Forests and Global Change 2(27) (2019). *See also* Att. 46, Stephenson, N.L. et al., *Rate of tree carbon accumulation increases continuously with tree size*, Nature (2014).

[207] *Id*.

above, will remain detrimental for any period of time relevant to mitigating the worst impacts of climate change.

The negative effect on carbon stocks resulting from these disturbances will increase under the revised Plan. All action alternatives propose a five-fold increase in annual timber harvest and a staggering thirty-three-fold increase in prescribed burning. DEIS at 72. This is projected to increase "the annual carbon impact" of timber harvesting and prescribed fire by five and thirty-three times, respectively. *Id*. Combined, timber harvesting and prescribed fire at the upper end of Tier 2 will result in the loss of 465,000 metric tonnes of carbon annually.[208]

The DEIS dismisses these effects as insignificant from a carbon perspective but other agency documents contradict that conclusion. *See* DEIS at 72 (dismissing impacts of harvesting and burning on carbon storage). The Disturbance Report explains that removal of 500,000 metric tonnes of carbon equates to "approximately the amount of CO2 released by burning around 200 million gallons of gasoline." Disturbance Report at 18. The "offset value (amount it would be worth if its continued storage were sold on an open market at a conservative price of $10/tonne)" of removing 465,000 metric tonnes of carbon would be over $17 million.[209] More current estimates place the market price of a metric tonne of carbon closer to $40 – indicating the offset value could be as high as $68 million.[210] As explained by the Disturbance Report, this "represent[s] very large amounts of climate mitigation benefit." Disturbance Report at 18. **To inform the agency and public about the tradeoffs between increasing active management and maximizing carbon storage, and to meet its hard look requirement, the agency must forthrightly disclose the carbon costs of increasing timber harvests and prescribed fire.** They are not as minimal as the DEIS suggests. **To complete this analysis the agency should use to social cost of carbon protocol.**

The social cost of carbon protocol provides the "monetized damages associated with an incremental increase in carbon emissions in a given year."[211] It was created to "allow agencies to incorporate the social benefits of reducing carbon dioxide (CO2) emissions into cost-benefit analyses of regulatory actions" such as forest plan revisions.[212] Consideration of the

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[208] This does not account for carbon in HWP.

[209] This was calculated using a 3.67 conversion ratio for carbon to carbon dioxide as explained in the Disturbance Report at 18.

[210] *See* Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866 (2016) available at https://www.epa.gov/sites/production/files/2016-12/documents/sc_co2_tsd_august_2016.pdf.

[211] Interagency Working Group on Social Cost of Greenhouse Gases, United States Government, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* (2016). Even though the International Working Group on the Social Cost of Carbon has been disbanded by President Trump, the social cost of carbon protocol still represents the best available science.

[212] *Id*.

social cost of carbon is particularly appropriate given that the Forest Service points to the economic benefits of timber harvesting at numerous places in the DEIS. *See*, *e.g.*, DEIS at 32; *see High Country Conservation Advocates v. United States Forest Ser*v., 52 F. Supp. 3d 1174, 1191 (D. Colo. 2014) (faulting agency for considering economic benefits of action but not costs when social cost of carbon was an available tool to complete that analysis); *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 446 (4th Cir. 1996) ("it is essential that the EIS not be based on misleading economic assumptions"). To accurately assess the economic benefits of timber harvesting, the Forest Service must account for the economic cost of emitting carbon through those actions.

Use of the social cost of carbon protocol is also appropriate here because of the landscape-level considerations inherent in forest plans. The Forest Service has previously argued that the social cost of carbon is not an "appropriate tool at the project level."[213] If the Forest Service is going to consider the economic benefits of timber harvesting, it must also consider the costs, including those related to carbon emissions. If that is not an "appropriate" analysis at the project level, it must be completed at the plan level or higher.

5. The Agency must forthrightly disclose the impacts of timber harvesting for biomass electricity generation which should be prohibited in the revised Plan

For all of the reasons discussed above, the agency's consideration of harvesting to generate electricity by burning biomass is flawed. But additional errors also undermine the conclusions in the DEIS related to biomass. One of the "management strategies . . . incorporated into forest plan direction" is "us[ing] harvesting wood . . . [to] substitute for energy-intensive . . . fuels, reducing the net amount of carbon emissions into the atmosphere." DEIS at 69. Elsewhere, the DEIS discusses use of "[w]oody biomass . . . to produce energy both on a residential scale (firewood) and on a commercial scale." *Id*. at 526. Using woody biomass for commercial energy production does not reduce the amount of carbon emitted into the atmosphere. **If the agency intends to pursue harvest for biomass energy purposes, it will not be able to use this flawed assumption. More to the point, the Forest Service should add a plan Standard prohibiting timber harvest for the purpose of biomass energy production.**

As explained by the EPA, "biomass firing in and of itself does not reduce emissions of CO2 emitted from that source. Specifically, when measuring stack emissions, combustion of biomass emits more mass of emissions per Btu than that from combustion of fossil fuels, thereby increasing CO2 emissions at the source."[214]

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[213] *See* Supplemental Draft Environmental Impact Statement, Federal Coal Lease Modifications COC-1362 & COC-67232, 122 (June 2017), available at https://www.fs.usda.gov/nfs/11558/www/nepa/68608_FSPLT3_3992911.pdf.

[214] U.S. Environmental Protection Agency, Repeal of the Clean Power Plan; Emission Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units; Revisions to Emission Guidelines Implementing

Thus any carbon benefit from burning biomass would have to come from increased carbon sequestered in the new forests replacing those harvested for biomass energy. But the science is clear that this is a false assumption along any relevant timeframe. The recent letter to members of Congress discussed above also explains that "[c]urrent science finds that burning trees for energy produces even more CO2 than burning coal, for equal electricity produced . . . and the considerable accumulated carbon debt from the delay in growing a replacement forest is not made up by planting trees or wood substitution."[215] Stated differently in a separate study: "a sound understanding of carbon-cycle dynamics shows that now and for the reasonably foreseeable future, the promotion of bioenergy is ill-premised for climate protection."[216]

Even when a replacement forest is planted immediately after harvest the "payback time" for the initial carbon debt from harvesting for biomass energy production "ranges from 44–104 years" depending on forest type.[217] This has already created a substantial carbon debt in the United States that should not be deepened. If the biomass wood pellet industry stopped growing by 2050, use of woody biomass to replace coal would still cause net increases in carbon emissions at least through 2100.[218]

The agency's assumptions also do not appear to account for carbon emissions resulting from processing timber into fuel for energy production. "For every ton of carbon emitted from logging, an additional 17.2% . . . is emitted from fossil fuel consumption to support transportation, extraction, and processing of wood" on average.[219] This too must be taken into account in any consideration of the carbon benefits of burning biomass to generate electricity. The analysis in the DEIS is insufficient to authorize timber removals from the national forest for that purpose; the agency simply has not taken a hard look. Regardless, there are far better uses of national forest system lands than harvesting timber to generate electricity which will only further exacerbate the effects of climate change for decades to centuries. An evaluation of the ecological importance of the national forest utilizing the "all lands approach" discussed elsewhere in these comments reveals that the majority of old growth forests, pristine streams and wetlands, mountain bogs, core forest habitat and other natural treasures are located on the national forests, while forests managed primarily for maximum production value are already

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Regulations, 84 Fed. Reg. 32,520 (July 8, 2019), available at https://www.govinfo.gov/content/pkg/FR-2019-07-08/pdf/2019-13507.pdf.

[215] *See supra* note 202.

[216] Att. 47, DeCicco, John and Schlesinger, William, *Reconsidering bioenergy given the urgency of climate protection*, PNAS 115(39): 9642-9645 (2018).

[217] Att. 48, Sterman et al., *Does replacing coal with wood lower CO2 emissions? Dynamic lifecycle analysis of wood bioenergy*, Environ. Res. Lett. 13 (2018).

[218] *Id*.

[219] Ingerson, *supra* note 190.

provided on private lands. The lands that constitute the Pisgah-Nantahala are simply too ecologically important to be converted into biomass fuel. **The Forest Plan should prohibit timber harvesting for biomass energy production.**

6. The DEIS does not disclose the cumulative impacts of timber harvesting on climate change

As the Forest Service is aware, NEPA requires consideration of the cumulative impacts of agency actions such as forest plan revisions. Cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." 40 C.F.R. § 1508.7. "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." Id.

As explained by the agency, "[c]onsidering cumulative effects in the context of climate change . . . requires broader bounds of time and space to adequately account for and describe the additive and synergistic effects of climate change." DEIS at 64. But the analysis of the cumulative effects in the DEIS regarding carbon stocks and sequestration fails to carry that acknowledgment through. It concludes simply that at "the global and national scales, each of the plan alternatives direct and indirect contribution to GHGs would be negligible." *Id*. at 73. This conclusion focuses only on "the plan alternatives" and "direct and indirect" effects. To assess cumulative impacts, the agency must assess the impact of those alternatives cumulatively with other actions that contribute to greenhouse gas emissions. From a cumulative impacts perspective the question is not: what are the effects of the plan alternatives on greenhouse gas emissions? As conceded in the DEIS, that question relates more to direct and indirect impacts. The cumulative impacts question is: What are the effects of the plan alternatives on greenhouse gas emissions when considered cumulatively with other sources of greenhouse gas emissions? These "other sources" include the Forest Service's timber program. The agency cannot satisfy its obligation to look at cumulative impacts by stating that localized, direct impacts will not alone be significant; that misses the point of cumulative impacts analysis entirely.

Stated a different way, if the effect of the revised plan on climate change is "negligible," or in NEPA terms "individually minor," the agency still must consider the "collective significance" of other actions on climate change including the agency's timber sale program. *See* 40 C.F.R. § 1508.7 (cumulative impacts analysis considered individually minor but collectively significant actions).

The approach taken so far by the Forest Service to assessing the cumulative impact of the revised Plan on climate change tracks the approach thrown out in *Wildearth Guardians v. U.S. Bureau of Land Mgmt*., No. CV-18-73-GF-BMM, 2020 WL 2104760 (D. Mont. May 1, 2020). There, BLM argued its quantification of greenhouse gas emissions for specific oil and gas leases satisfied the cumulative impacts requirement. But as the court noted, information regarding greenhouse gas emissions for each lease sale was "necessary for BLM to comply with NEPA,

but none of it speaks to whether BLM considered *cumulative* climate impacts." *Id*. at *10. It only spoke to the direct and indirect effects of the lease sales. The Forest Service faces the same problem here. It may have disclosed emissions information regarding the direct and indirect impacts of implementation of the revised plan, but that does not speak to the cumulative climate impact of the plan in conjunction with the *rest of the agency's timber program*.

"The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct." *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1217 (9th Cir. 2008). To conduct that analysis "[a]lthough [the agency] may determine that each [project] individually has a de minimis impact on climate change, the agency must also consider the cumulative impact of GHG emissions generated by past, present, or reasonably foreseeable [projects] in the region and nation." *WildEarth Guardians v. Zinke*, 368 F. Supp. 3d 41, 77 (D.D.C. 2019); *see also Citizens for a Healthy Cmty. v. United States Bureau of Land Mgmt*., 377 F. Supp. 3d 1223, 1239 (D. Colo. 2019) (upholding cumulative impacts assessment of GHG emissions in planning document regarding natural gas wells that relied on "regional cumulative impacts analysis"). To meet that requirement, the Forest Service must consider and disclose the impact of the revised forest plan on greenhouse gas emissions cumulatively with the rest of the agency's timber program.

The agency has ample information about the past, present, and reasonably foreseeable impacts of its nationwide timber program to complete this analysis. First, the agency has completed an assessment of baseline carbon stocks for each region and each national forest.[220] The agency has also completed region-specific and forest-specific assessments of disturbances that affect those carbon stocks including its timber harvest program.[221] Collectively, this provides a broad-stroke picture of the past effects of the timber harvesting program on climate change.

The agency tracks the timber sold on each national forest and in each region on a quarterly basis through its Periodic Timber Sale Accomplishment Reports.[222] The agency also tracks timber and prescribed fire projects approved through the NEPA process. This provides a snapshot of the "present" actions that influence carbon stocks and sequestration on the forest (and also provides additional information related to past actions).

The agency also has information about the reasonably foreseeable effects of its timber program on carbon stocks and sequestration. For instance, the agency's 2021 Budget Justification explains that it plans to "increase capacity to reach the output goal of 4.0 billion board feet of timber in FY 2021."[223] This is an approximately 18% increase over the amount of timber

[220] *See* https://www.fs.usda.gov/managing-land/sc/carbon.

[221] *Id*.

[222] *See* https://www.fs.fed.us/forestmanagement/products/cut-sold/index.shtml.

[223] Forest Service 2021 Budget Justification, available at https://www.fs.usda.gov/sites/default/files/2020-02/usfs-fy-2021-budget-justification.pdf.

harvests in fiscal year 2019. It is reasonably foreseeable that the agency is going to expand its timber program – and that expansion will have expanded effects on climate change – but at a bare minimum, the agency could easily complete this analysis assuming, based on agency statements, that the timber program will not decrease in the foreseeable future.

With these basic building blocks, the agency can complete at the national level the same general analysis it performed for the Pisgah-Nantahala National Forest specifically. Admittedly, this is a high-level analysis but it is necessary as a first step to assessing the cumulative impact of the actions proposed in the Draft Plan on climate change. To complete the analysis at the forest-plan level, the agency used data underlying the Disturbance Report to calculate current annual average timber harvesting. DEIS, 71. That was converted to metric tonnes of carbon lost per acre and eventually metric tonnes of carbon lost annually on the forest. *Id*. The agency then assumed that a five-fold increase in the timber program would result in a concomitant five-fold increase in carbon lost. Cumulative impacts consideration requires this same basic analysis at the national level.

The "large-scale nature of environmental issues like climate change show why cumulative impacts analysis proves vital to the overall NEPA analysis. The cumulative impacts analysis was designed precisely to determine whether 'a small amount here, a small amount there, and still more at another point could add up to something with a much greater impact.'" *Wildearth Guardians v. U.S. Bureau of Land Mgmt.*, 2020 WL 2104760, at *11 (citation omitted). The Forest Service has taken the position that the overall revised plan, and therefore projects implemented under that plan will only have a "negligible" impact on climate change. But if the Forest Service "ever hopes to determine the true impact of its projects on climate change, it can do so only by looking at projects in combination with each other." *Id*. "Without doing so, the relevant 'decisionmaker' cannot determine 'whether, or how, to alter the program to lessen cumulative impacts' on climate change." *Id*. (citation omitted). Because the Forest Service has not completed that analysis here, the decisionmaker and the pubic are lacking that information. **To meet its obligations under NEPA, the agency must take a hard look at the effect of timber harvesting under the revised plan cumulatively with effects from the rest of the agency's timber program.**

G. The Agency Must Commit to Monitoring Changes Related to Climate Change

The Forest's June 2014 Need for Change Statement disclosed that there "is a need to include plan direction regarding potential climate change impacts such as increases in storm events, flooding, and other extreme weather. The 2012 Planning Rule requires monitoring for measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area. Effective measures for monitoring these stressors will need to be identified." The Draft Plan includes monitoring questions related to climate change but suggests that they will be "addressed through the R8 Broad Scale Strategy." Draft Plan at 280. It is unclear to us if this Broad Scale Strategy is being implemented. We note here that the agency is obligated to monitor for changes in the plan area related to climate change regardless of the status of the R8 Broad Scale Strategy.

This monitoring need relates back to one of the biggest problems with the DEIS—the failure to make a defensible prediction of future natural disturbance. The Forest Service knows that disturbance will increase in the future, but instead the agency predicts that it will decrease by 73% (from 13,000 acres, which is already much too low, to 3,500 acres). Even after the Forest Service adjusts this prediction in the FEIS (which, to be clear, it must), some uncertainty will likely remain. To the extent that the Forest Service hopes to achieve harvest levels beyond the low end of the needed range, it *must* monitor the effects of increased natural disturbance and adapt its objectives accordingly.

H. Conclusion

In summary, there are multiple deficiencies in the agency's analysis regarding climate change that have prevented it from meeting obligations under NEPA and NFMA. Specifically,

- The DEIS recognizes that climate change is likely to make storm events more intense which risks impacts to water quality and various species. Nevertheless, the Draft Plan does not sufficiently account for this likelihood when designing standards to protect water quality. To remedy this shortcoming, and to protect species diversity, water quality, and ecological sustainability, TA-S-04 should be amended to include a new forest-wide standard requiring that all infrastructure (e.g. stream crossings and culverts) be designed and maintained to accommodate the 100-year storm event at a minimum.

- Barriers to aquatic organism passage are a significant problem on the forest. Those barriers will become more problematic if species are prevented from migrating to adapt to changing environmental conditions resulting from climate change. To maintain species diversity, the Forest Service should commit to for replacing of a minimum of two large impaired stream crossings annually, one in Pisgah and one in Nantahala NF and replacement of a minimum of three small impaired stream crossings annually, making an effort to locate the projects across both Forests. If the Forests move into Tier 2 goals, this objective should be increased to replacing three large and six small (one in each Ranger

District) impaired stream crossings annually across both Nantahala and Pisgah National Forests.

- As air temperatures warm, water temperatures will follow. This is a particularly acute threat for cold water-dependent species. To mitigate against this harm as much as possible, the Forest Service should strive to keep streams shaded by adding a forest-wide standard prohibiting in Streamside Zones management actions that are intended create open forest conditions unless the action is necessary to fulfill a restoration objective that can only be met in that particular location.

- To ensure that climate change is adequately considered in project planning, we join the Pisgah-Nantahala Forest Partnership's call for the Forest Service to develop a climate-informed adaptation framework. This framework must account for disturbance trends across all lands in the planning area (not just national forest system lands).

- The Resilient Sites Model is an excellent tool but is ineffective at documenting climate resilient sites comparatively across the national forest only, as opposed to comparatively across the region. Identification of climate resilient areas is critical to the Forest Service maintaining ecological integrity and species diversity and to taking a hard look at those issues. To fix this analytical problem, the agency must also complete an assessment of resilient sites within the boundaries of the forest. Sites identified in this forest-specific analysis as having above average climate resiliency should be placed into Management Areas with no timber or road building objectives (e.g., backcountry). One of the orders of animals most impacted by the current gap in analysis is salamanders. To protect salamander diversity, the agency should adopt a forest-wide standard prohibiting timber harvest and road construction from creating barriers to the movement of groups of salamanders at the individual or population level.

- The agency must complete an assessment of the impacts of the alternatives on carbon stored in soils using the best available scientific information. Given the high amount of carbon stored in soils, and critical need to preserve that carbon in soil, the Forest Plan should include an objective to use timber harvesting techniques that minimize the release of soil carbon.

- The agency has not accurately disclosed the role of harvested wood products in sequestering carbon. That analysis must be revised. The revision should include a life-cycle analysis of wood products coming off the forest.

- The agency's conclusion that each alternative will have the same overall effect on carbon storage and sequestration is unfounded because it ignores differences in where timber harvesting will occur in each alternative. The agency should either re-run that analysis accounting for differences in location or sidestep those concerns by fully adopting our recommendations for old growth and Mountain Treasure area allocations.

- To inform the agency and public about the tradeoffs between increasing active management and maximizing carbon storage, and to meet its hard look requirement, the agency must forthrightly disclose the carbon costs of increasing timber harvests and prescribed fire. They are not as minimal as the DEIS suggests. To complete this analysis the agency should use to social cost of carbon protocol.

- The agency's assessment of the impacts of biomass harvesting to generate electricity is insufficient to authorize biomass-for-electricity harvests. More to the point, those harvests are an inappropriate use of national forest land and needlessly threaten forest diversity and ecological integrity. The agency should add a plan standard prohibiting timber removal for biomass energy production.

- The DEIS does not disclose the cumulative impacts of timber harvesting under the revised plan on climate change. To fix this error, the Forest Service must complete an assessment of the overall impact of its timber program on greenhouse gas emissions.

XVI. Special Uses

Special uses span a wide range of impacts, from the minimal to the extraordinary. We understand that it is difficult to assess the environmental effects of special uses that may be approved under the revised Plan when those special uses have not yet been proposed. We note however that this means there will be very little to tier to in the Plan when project-specific special uses are proposed. This may require more substantial analysis for some special uses and, to the extent those uses include environmental impacts beyond those considered in the revised Plan's Final EIS, may require supplementation of the Plan EIS.

The DEIS does note that the "Forests had a 44 percent increase in proposals for recreation events on the Forests from 2011 to 2012 and an additional 20 percent increase from 2012 to 2018." DEIS at 403. We ask the agency to consider whether the environmental effects of these activities could be better considered in a programmatic analysis rather than project by project. Special use authorizations must consider the cumulative effect on the environment of other special uses and this analysis seems more efficient to perform at the programmatic level. This would be consistent with the Partnership's recommendations to use programmatic analysis to consider streamlining some permits through programmatic analysis. The agency could delineate categories of permits based on type of use, Geographic Area or other location factors, number of guests or participants, time of year, and other relevant factors to determine which categories are likely to have only de minimis effect. Such permits could be issued without difficult case-by-case analyses. This approach would require some level of validation monitoring and adaptive management to ensure that the effects remain de minimis in light of other trends.

We support LSU-DC-02: "Special uses serve a local, regional, or national public benefit and need that cannot be accommodated on non-Federal land." Approval of special uses however is at the Forest Service's discretion so there is no reason this should not be a Plan Standard instead of only a desired condition. The only thing preventing achievement of the Desired Condition would be the actions of the Forest Service. To that end, the Desired Condition should be reframed as a Plan Standard: "Special uses are prohibited unless the Forest Service finds that they serve a local, regional, or national public benefit and need that cannot be accommodated on non-Federal land."

One type of possible permitting decision epitomizes the need for plan-level standards. Linear rights of way (ROWs) for major projects such as highways or energy transmission have the potential to seriously undermine the plan analysis, making it useless to support the Forest Service's own future projects. This is especially true with respect to maintenance and restoration of connectivity, which is one of the cornerstones of ecological sustainability.

The 1982 Planning Rule required the designation of corridors appropriate for linear ROWs and confinement of new ROWs to designated corridors to the extent practicable. 36 C.F.R. § 219.27(a)(9) (1982). The new Planning Rule does not contain a similar requirement, but instead requires the Forest Service to maintain and restore connectivity as one of the four dimensions of ecological integrity. 36 C.F.R. §§ 219.8; 219.19. This new requirement is at the same time more

flexible and more demanding. It requires the Forest Service to understand what areas of the landscape are important to meet connectivity needs and determine what kinds of features would fragment those areas for the reasons they are important.

There may be some gray areas in such a determination, but it is clear that major linear ROWs have no place in some Management Areas, such as the Group 3 and 4 MAs and EIA. *See*, *e.g.*, DEIS at E-24, E-62, E-100, E-187 (noting transmission corridor as a fragmenting features that bound several WIAs). The Forest Service should prohibit new linear ROWs in these MAs. This would be an addition to LSU-S-03, and it would be consistent with LSU-G-09.

XVII. Energy and Minerals

Under the Planning Rule, energy and mineral resources are among multiple uses that could be provided for in the plan area, but only to the extent compatible with over-arching requirements of achieving ecological integrity, including maintenance of water quality and diversity of ecosystems. *See* 36 CFR 219.10 (a)(2). In our prior comments we noted the Plan should prepare for potential demand for mineral resources and renewable and nonrenewable energy in the Plan area. We also noted the Plan should provide adequate direction for recreational mineral collection and acid-producing rock; both of these are addressed separately by the Draft Plan under recreational uses and geologic hazards.

Here we focus on commercial mineral extraction and possible energy infrastructure or extraction. As to these, the Draft Plan provides little direction, and certainly does not provide enforceable Standards and Guidelines that would protect the multiple uses of the Forest in connection with commercial mineral extraction and energy development. Draft Plan at 132-133. Although the Draft Plan includes Desired Conditions for "minerals and energy production in an environmentally sound manner" (MIN-DC-02**)** and consideration of "[r]enewable energy opportunities" (MIN-DC-06)**,** it does not provide guidelines and standards to achieve those desired conditions *and* comport with the Planning Rule's requirement to maintain ecological integrity and sustainability in the Plan area. Nor do the Standards attempt to navigate the tradeoffs between energy development, commercial mineral extraction, and the multiple other uses on the forest (recreation, timber, watershed conditions).

The DEIS also does not grapple with these issues. Instead it defers to future environmental analysis. For commercial mineral action: "Prior to any leases occurring, the FS and BLM would conduct environmental analysis for proposals for prospecting or exploration activities, such as trenching and drilling, or for mineral development (including production) of a surface mine or an underground mine." DEIS at 517. For "large-scale renewable energy," where compatible with the general area desired conditions, "prior to any activity, future project level NEPA analysis must consider forestwide and management area resource standards, such as those for scenery, wildlife, botany, cultural resources, recreation, or old growth, to evaluate the feasibility of an individual project." *Id*. at 527. For possible oil or gas extraction, the DEIS correctly notes "low potential for commercial deposits of oil and gas or coal during the life of the plan." *Id*. at 517.[224]

Because environmental analysis is deferred to future projects, at the very least, the Plan should make clear that robust analysis will be necessary to analyze the impacts, both at the site level and cumulatively at the forest-scale. Furthermore, adding these resource-intensive uses that create tradeoffs, inflict large-scale environmental impacts, and threaten ecosystem integrity, would necessitate plan-level amendments.

[224] As such, the Draft Plan does not provide any specific Standards and Guidelines for oil, gas, or coal extraction. *See also* DEIS at H-16 ("We are not making an oil and gas availability decision in this forest plan.").

The Nantahala and Pisgah National Forests are already subject to multiple stressors and competing multiple uses, described throughout these comments. The lands surrounding the Nantahala-Pisgah have become increasingly developed, and the ecosystem services provided by the Forest are among the most important contributions of the Forests to the Plan area. The Forests are also subject to far more intense outdoor-recreational uses than private lands and are foundational to the region's tourism-based economy. In this context, the Plan must provide for ecological integrity and climate resiliency on the Forest. For all of these reasons, and in the absence of additional analysis, it remains unclear whether adding intensive extractive uses, like commercial-scale hardrock mining, would be compatible with other higher value uses.

Any future effort to analyze these issue must consider the following issues we have raised previously, which remain un-analyzed in the DEIS.

A. Future Commercial-Scale Leasing and Extraction of Hardrock Minerals on the Forests.

The DEIS states, "the current plan provides opportunities for leasable mineral exploration and development and thus potential discovery and production of minerals to meet 21st century demands." DEIS at 518. However, the Draft Plan does not provide any limits or guidance for meeting those demands. Industrial-scale mining on these Forests would be counter to achieving ecosystem integrity and a host of related goals, and is likely to be met with very significant public opposition. The fundamental question is whether these public lands should be subject to commercial-scale mining, or whether surrounding private lands serve this demand. If private lands better serve that demand, public forested lands should be conserved and protected for other higher value uses to the region. Neither the DEIS nor the Draft Plan attempt to answer this question or many others. The DEIS does not focus on the effects of mining on the landscape itself, nor does it evaluate the economic viability of mineral extraction on the Forest. Apart from a brief mention of potential ground disturbance, the DEIS primarily focuses on the effects of making acres unavailable for mineral lasing through designations. DEIS at 517-518. Unanalyzed are the potential direct, indirect, and cumulative impacts of commercial scale hard rock mining on particular ecosystems, connectivity, biological diversity, soil, water, and geologic resources. The presently un-analyzed impacts would be significant.

The DEIS discusses high-purity quartz as an example of leasable minerals on the Forest, noting "Western North Carolina is the only producer of high-purity quartz in the world, amounting to 90 percent of all mined and processed quartz for use in the electronics industries . . .." DEIS at 514. Although Western North Carolina is not the *only* supplier of high-purity quartz,[225] it is a leading supplier. To meet this demand, two multinational corporations headquartered in the European Union, Sibelco and the Quartz Corps, operate industrial-scale mining operations around Spruce

[225] *See* Geological Survey of Norway, Quartz Resources in Norway (2015), available at https://www.ngu.no/sites/default/files/quartz_focus11.pdf.

Pine, North Carolina, on non-national forest lands. The consequences of hard rock mining are not just to the surface of the land, or ground disturbance, but include the fill and sedimentation in streams (removing the earth and placement of overburden), as well as problems created by tailings dust blowing off and mine runoff into streams during storm events. In addition, mine management practices would almost certainly introduce pollutants into streams in the forest, as experience from quartz mining around Spruce Mine shows. And these pollutants would not necessarily be limited to tailings and fine sands contributing to sedimentation. As quartz mines disclosed in recent NPDES permit applications, their processing facilities have been treating residuals, or sludge, from their wastewater treatment process as tailings, and disposing of them in the mines. EPA, according to the fact sheets, has already expressed concern over potential pollutants in stormwater from the mines because of these practices, including metals.[226]

These are among the broad range of potential environmental impacts that would need strong analysis in the future for hard rock mineral extraction, since they are not provided now. Without the guarantee of future robust analysis, commercial-scale leasing and extraction of hardrock minerals has the potential to devastate other important uses of the Forests.

B. Biomass Energy Production is Not Renewable Energy and Timber Harvests for Biomass Purposes Should Not be Allowed Under the Revised Plan.

As explained above, an all-lands analysis confirms that the majority of old growth forests, pristine streams and wetlands, mountain bogs, core forest habitat and other natural treasures in the Plan area are located on the Forests. The lands that constitute the Pisgah-Nantahala are simply too important – ecologically, socially, and economically – to be converted into biomass fuel. The Forest Plan should prohibit timber harvesting for biomass energy production.

Nevertheless, the DEIS, which does not consider the potential impacts of biomass extraction at all, is insufficient to analyze the effects of that activity. The only mention of biomass in the Draft Plan ("renewable energy opportunities are considered, such as biomass...") is cursory and offers no assurance that harvesting biomass will not conflict with other uses of the Forests violating NFMA and the agency's multiple-use mandate. Draft Plan at 138. This is especially true in light of the baseline requirement for ecological integrity when there are already existing stressors from other multiple uses of the Forests.

Furthermore, climate change mitigation should not be a basis for promoting biomass supply in the Plan. Even though biomass is considered in some contexts to be "renewable," the climate change impacts (and tradeoffs) once the bioenergy is consumed are not, on net, beneficial. As stated in our previous comments, the greatest demand for biomass from the Southeast has been driven by power companies in Europe. If the agency were to pursue biomass-driven harvests,

[226] *See, e.g.*, Fact Sheet, NPDES Permit No. NC0000353 (Sept. 19, 2018) at 2 (on file with DEQ, laserfiche documents are available at https://edocs.deq.nc.gov/WaterResources/Browse.aspx?id=533162&dbid=0&repo=WaterResources)

environmental analysis must account for the carbon footprint of shipping southern Appalachian trees to U.S. ports, then European ports, before further distribution. In our region, soils account for a significant percentage of carbon sequestration potential of a forested stand. Even-age management substantially alters soil carbon levels and any climate change "benefit" from biomass extraction must also account for carbon lost from soils.

The DEIS notes that, at present "[t]he primary obstacle to the utilization of woody biomass in western NC is the lack of biomass purchasing plants in the 18-county area of western NC." DEIS at 526. If the Forest Service, however, reasonably anticipates potential timber harvest for the purpose of biomass fuel, it must conduct a robust analysis of the impacts, and consider the development of plan Standards addressing multiple issues, including the ecological value of leaving dead, dying, and damaged trees as a natural part of the ecosystem. [227] If that analysis is not included in the Final EIS, it will have to be supplemented, and the Plan may potentially have to be amended, before authorizing harvests for biomass energy purposes.

Finally, we note that there are environmental impact-related issues that extend beyond these depending on the energy/mineral proposed to be developed or extracted, and many we have discussed in prior comments. We do not repeat them all here, but note that in the absence of specific plan standards and proper environmental analyses, those concerns remain relevant.

[227] George Washington National Forest Revised LRMP at 4-5, *supra* note 42, at 2-33 ("DC-TIM-04: The ecological value of leaving dead, dying and damaged trees as a natural part of the ecosystem is balanced with aesthetic desires and economic values of the timber resource that can be used for fuelwood, wood biomass energy, pulpwood, or sawtimber if removed prior to deterioration or its value being lost.").

XVIII. Management Area Framework

In general, we support the MA framework in the Draft, with the following exceptions:

A. Inconsistencies Between Overlapping MAs

One problem with the MA framework stands out: The DEIS is inconsistent with how it says it will assign Management Areas and how these are actually assigned or mapped. The DEIS states that it will display Management Areas a certain way, but the mapping of these areas and GIS layers are inconsistent with this.

The DEIS creates confusion in mapping and GIS layers where the Appalachian Trail Corridor, the Heritage Trail Corridor, and National Scenic Byways overlap with Backcountry and Inventoried Roadless Areas. Presumably, areas where IRAs and the AT overlap are both Backcountry and AT corridor with both sets of Management Area components applying to these lands. However, there are questions about how the Forest is accounting for these overlap areas and how the plan components would be applied in practice. Similar issues arise where National Scenic Byways and Backcountry/IRAs overlap.

The DEIS groups Management Areas into "management area groups" that reflect "intensity and duration of management"; *see* DEIS at 157. The least restrictive/least protective is MA Group 1 (Matrix and Interface); the most protective is MA group 4 Designated Wilderness and recommended wilderness, WSAs, and Research Natural Areas. MA group 3 is next in protective level including Backcountry, Special Interest Areas, and Roan Mtn management. MA group 2 is the next level in protection and includes the AT Corridor, Ecological Interest Areas, Appalachian Trail Corridor, National Scenic Byways, Heritage Corridors, Wild & Scenic Rivers, Experimental Forests, and Cradle of Forestry in America. Management levels vary quite a bit between these different Management Areas within Group 2, with the AT probably being the one with some of the strictest guidelines. However, it is clear from this that the FS considers the AT corridor less protective or having management that is "more intense and longer duration" than Backcountry.

Backcountry desired conditions, standards and guidelines are in 2 tiers; one tier applies to all Backcountry; a more stringent tier applies to IRAs in Backcountry. The more stringent IRA standards and guidelines reflect provisions in the Roadless Rule, which include very strict limits on any timber harvest or road building. In addition, these standards and guidelines would be enforced not just by the Forest Plan but by the Roadless Rule itself.

The DEIS is inconsistent in what it says it will do and what it actually does. The DEIS says that it will display Management Areas this way:

> The following Management Area allocations are consistent across alternatives. See the map of areas that do not change by alternative at the end of this chapter. Exceptions to consistency occur only when more restrictive management is specified in an alternative, such as when a Research Natural Area is

> recommended for Wilderness. **In those cases, the more restrictive Management Area is shown on the map**.

DEIS at 19 (emphasis added). Backcountry is in MA Group 3 vs AT Corridor, National Scenic Byway, and Heritage Corridor in MA Group 2. And IRA Plan components in Backcountry are even more restrictive than other Backcountry Plan components and more restrictive than these other Management Areas. If the Forest were being consistent with what they specified, these overlapping AT/Backcountry/IRA areas would be displayed as Backcountry. That does not occur.

The AT Corridor should be recognized along its full length, and Plan Components for the AT should be applied in addition to Backcountry/IRA Plan components. However, just as is the case when the AT passes through wilderness areas, the Backcountry/IRA Plan components will provide additional protection beyond AT Corridor protection.

This should be clarified because the mapping (and GIS layers) for the Plan are fundamental for guiding development of projects at the Ranger District level. If the Backcountry/IRA designation is not explicit in maps and GIS layers, it could be overlooked and project planning could get started without this critical information that should guide project development from the very start of project planning. Even if these more restrictive management allocations came out during project development, this could be after the District has started developing project plans. It could waste a lot of everyone's time including that of Forest Service staff developing project components that cannot happen.

B. Ambiguity in the Ecological Interest Area

In general, we compliment the development of the Ecological Interest Area (EIA), and we ask the Forest Service to spend more time in the FEIS explaining its comparative advantages, as discussed elsewhere in these comments. However, we are concerned about some ambiguity in the MA direction. To be fair, the relevant language appears clear on its face:

> In Ecological Interest Areas, timber harvest is allowed only when it does not result in departure from the desired community composition. Even-aged and two-aged regeneration harvests shall only be used to restore species composition.

ECO-S-02. We read this as clearly prohibiting regeneration harvest for the purpose of meeting landscape-level goals, whether economic/production or structural restoration. Instead, regeneration harvest in this area would be sited based on stand-level need, and in particular the need to improve species composition in a stand, based on potential natural vegetation. Such harvests will often have the same kinds of structural or economic benefits as scheduled harvest, but they will be primarily driven by need. The well-worded standard would also allow thinnings to create open canopy conditions so long as composition is not degraded, which we agree is appropriate.

Although this language seems clear, the Tusquitee District has created some ambiguity about what activities may occur in the EIA because of its decision in the Buck project. If the Forest Service chooses Alternative C, then several stands that have been selected for harvest would be mapped into the Ecological Interest Area (104/13, 104/18, 104/19, 109/7, 110/7, and 110/22). As a result, the Tusquitee District is indicating *either* that it knows that the Forests will not choose Alternative C *or* that it believes it can implement these stands consistent with the revised plan even if they are within the EIA. Because of this ambiguity, it is incumbent on the Forests to clarify in the FEIS whether that the actions authorized in these stands would not be consistent with MA direction for the EIA. If not, then the FEIS should explain how the Buck project decision, which forecloses the selection of Alternative C, does not prejudice the planning decision.

XIX. Wilderness Inventory Areas

Under NFMA, the Forest Plan must balance multiple uses, including wilderness. 16 U.S.C. §1604(e)(1). Likewise, the 2012 Planning Rule requires that in developing a plan that provides for integrated resource management for multiple use, the responsible official must consider wilderness. 36 C.F.R. §219.10(a)(1). This consideration includes both identifying and evaluating lands that may be suitable for inclusion in the National Wilderness Preservation System, 36 C.F.R. §219.7(c)(2), as well as including plan components which are designed to protect Congressionally designated wilderness and recommended wilderness. 36 C.F.R. §219.10(b)(1)(iv).

The process for identifying and evaluating the lands that may be suitable for inclusion in the National Wilderness Preservation System is set forth in the Forest Service Handbook. FSH 1909.12 Ch. 70. This Chapter 70 process has been conceptualized as a funnel, and we realize that there is some measure of professional judgment inherent in that funneling process. In applying that judgment, however, the Forest Service must show fidelity to the applicable statutory standards, including the definition of wilderness as a location which is (1) generally naturally appearing, (2) provides outstanding opportunities for solitude or primitive and unconfined recreation, (3) is of sufficient size to make practicable its preservation and use in an unimpaired condition (i.e. manageability), and (4) possesses geological, or other features of scientific, educational, scenic, or historical value. 16 U.S.C. § 1131(c).

The undersigned organizations have participated in and submitted comments at each step of the Chapter 70 process for the Nantahala-Pisgah Forest Plan revision. As we have made clear during this process, wilderness designation is not merely for pristine areas where wilderness character can be preserved; it is also for areas that are on a trajectory to resume a natural equilibrium. In other words, wilderness designation is a tool either to preserve or to “promote” wilderness character. NFMA and the Wilderness Act therefore assume that it will be reasonable to recommend areas that are recuperating from human impacts. Of course, not all qualified areas are required to be recommended, FSH 1909.12 Ch. 73, but most (if not all) inventoried areas have sufficient wilderness values to be recommended in an alternative

The agency’s discretion to disregard an area’s wilderness qualifications is limited by the statutory definition of wilderness, and that definition is clarified by the examples that Congress has previously designated. As we have previously explained, even North Carolina’s oldest and most iconic wilderness areas were recovering from prior disturbance and even ongoing logging when they were designated. Indeed, our WIAs are more fully recovered from prior land uses than existing wilderness areas were when they were designated.

In the Eastern Wilderness Areas Act (EWAA) and successive enactments, Congress deliberately and explicitly designated areas recovering from past harvest and road construction. P.L. 93-622 (1975). In the EWAA, Congress rebuked the Forest Service for its failure to recommend areas that met its own standards. Congress explained that there are areas with wilderness character in

the East which are *threatened* by the Forest Service's failure to properly manage and recommend them for designation:

> Additional areas of wilderness in the more populous eastern half of the United States are increasingly threatened by the pressures of a growing and more mobile population, large-scale industrial and economic growth, and development and uses inconsistent with the protection, maintenance, and enhancement of the areas' wilderness character.

Id. Congress explicitly instructed the Forest Service to consider the examples it has designated in the East when considering additional areas:

> Congress finds and declares that it is in the national interest that these *and similar areas* in the eastern half of the United States be *promptly* designated as wilderness within the National Wilderness Preservation System, in order to preserve such areas as an enduring resource of wilderness which shall be managed to promote and perpetuate the wilderness character of the land and its specific values of solitude, physical and mental challenge, scientific study, inspiration, and primitive recreation for the benefit of all of the American people of present and future generations.

Id. (emphases added). Most if not all of the Wilderness Inventory Areas on the Nantahala and Pisgah National Forests are able to provide "solitude, physical and mental challenge, scientific study, inspiration, and primitive recreation" for a population that continues to grow faster than any other region of the country. We address the values and character of each of these areas below.

The undeveloped backcountry areas of the Nantahala-Pisgah are irreplaceable, and, as we explained in previous comments, they fill needs and demands that have continued to grow since the last plan revision. Not all inventoried areas will be recommended for wilderness, but each of them possesses values that Congress and even a sometimes-reluctant agency has long recognized as important. These values are front and center during landscape-scale planning, and they must be considered in light of the needs and demands on forest resources.

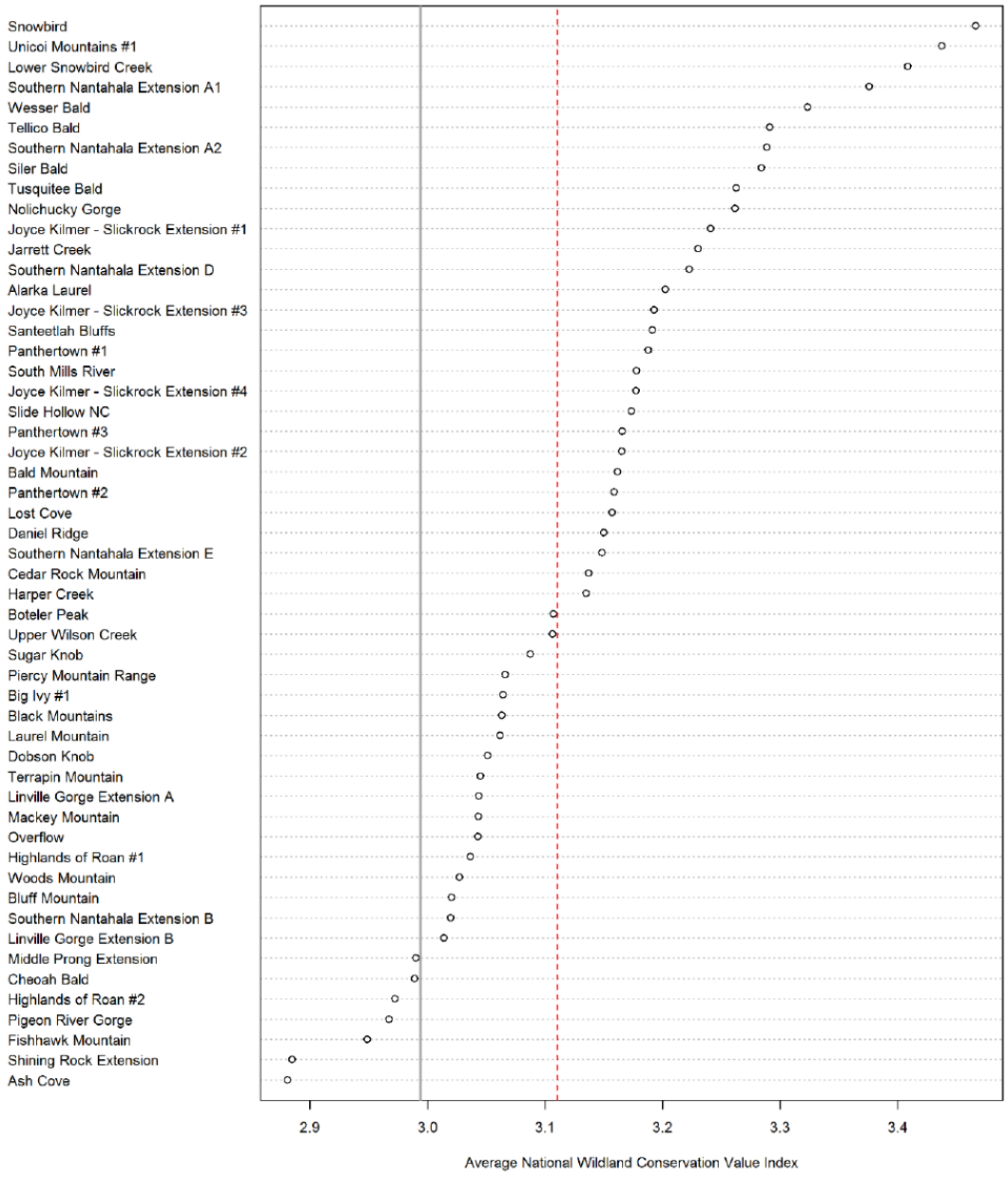
First, during inventory and evaluation, the agency must take stock of the undeveloped-area resources available on the Nantahala-Pisgah. We are comfortable that the final version of the Chapter 70 inventory approximates the unroaded and undeveloped areas on our forests, except as noted below. The potential wilderness inventory areas (WIAs) identified by the Forest Service include the vast majority of areas identified by the Wilderness Society as North Carolina's "Mountain Treasures." Att. 49 (NC Mountain Treasures). The evaluation, however, continues to suffer from many flaws that must be corrected before the DEIS can be relied on to inform a final decision. Below we provide facts about these areas that should be reflected in the final EIS.

After evaluation but before analysis, the Forest Service must decide which areas will advance as a wilderness recommendation in one or more alternatives. Here, too, we are generally comfortable with the Forests' work, although we continue to disagree strongly with the decision to exclude Terrapin Mountain from consideration in any alternative. Just as important as the decision to advance an area as a potential wilderness recommendation is the responsibility to consider an appropriate range of alternative allocations for the other WIAs that will not be recommended in any alternative. In other words, considering areas' suitability as wilderness is the "primary function" of the Chapter 70 process, it is not the *only* function. FSH 1909.12, § 72. The wilderness inventory, evaluation and analysis processes highlight unique characteristics of an area which make it deserving of special administrative designations, apart from wilderness, or which suggest that an area should be allocated to one management area versus another.

When deciding which areas to recommend as wilderness in the final plan, and how to manage unrecommended areas in other MA allocations, the agency must consider the best available science regarding the ecological significance of WIA areas, both individually and in the broader landscape context. North Carolina's Mountain Treasures (and the NPNF's Wilderness Inventory Areas) "represent some of the most important lands in the U.S. to establish a protected areas system that is intact, connected, representative of ecological diversity and hotspots of range-limited species."[228] When ranked among roadless areas nationwide, more than half of these areas rank in the top 95th percentile; all but 7 rank in the top 90th percentile.

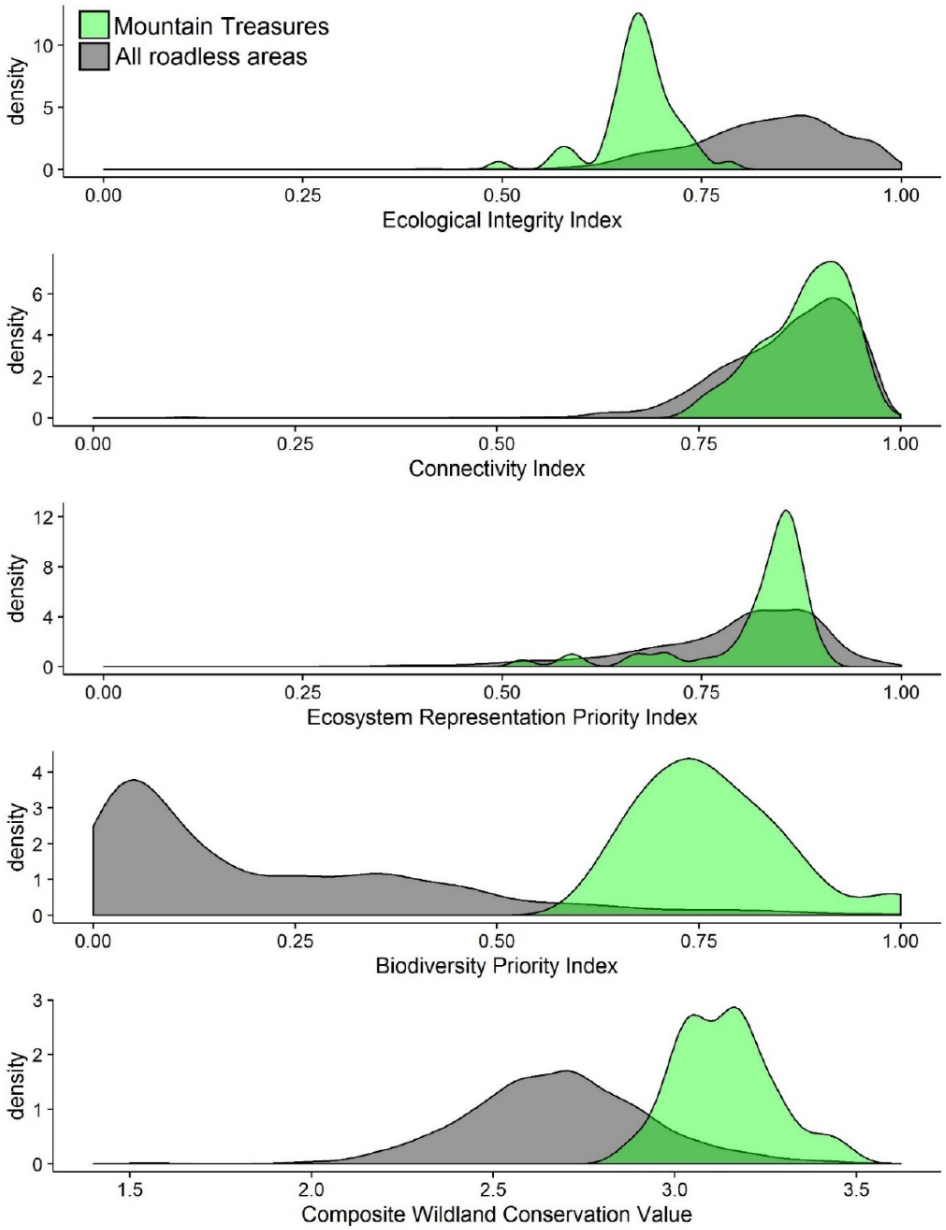
[228] Att. 49, Belote and Irwin, Quantifying the National Significance of Local Areas for Regional Conservation Planning: North Carolina's Mountain Treasures, Land 2017, 6(2), 35 (May 27, 2017) (available at https://www.mdpi.com/2073-445X/6/2/35/htm).

Chart: Conservation Significance of NC Mountain Treasures

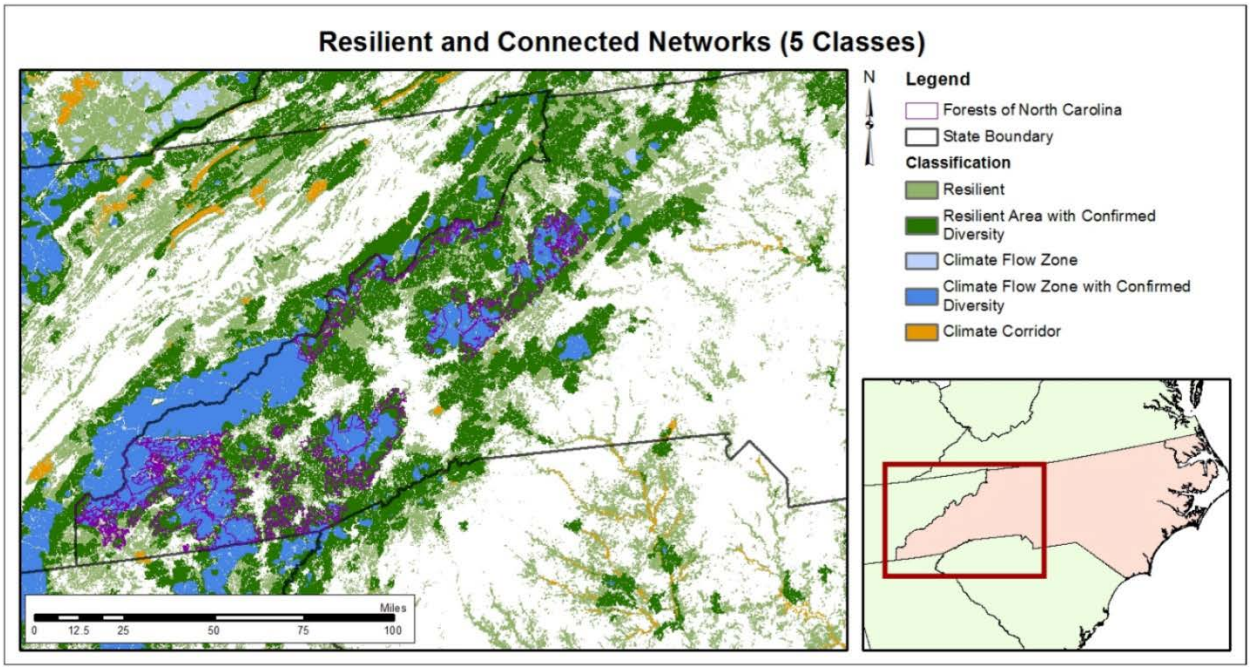


In this figure, the red-dashed line represents the 95th percentile for all roadless areas in the continental United States. The gray line represents the 90th percentile for those areas. These rankings are a composite of scores for ecological integrity, connectivity, ecosystem representation, and biodiversity. The Mountain Treasures are similar to roadless areas nationally for connectivity and ecosystem representation. They rank slightly lower than other roadless areas in terms of ecological integrity, which is not surprising given the different histories of eastern and western roadless areas. However, the Mountain Treasures' biodiversity scores are superlative, which accounts for their exceptional composite rankings at the national level.

Figure: Individual and Composite Indices - NC Mountain Treasures



The importance of Mountain Treasures areas is further shown by data that the Forest Service is already using in the DEIS. While this information was not considered in the comparison of land allocations by alternative or in the wilderness evaluation, the Forest Service's own analysis shows that the Mountain Treasures are vital to a resilient and connected network of protected lands, especially for the movement of species in areas of high diversity.

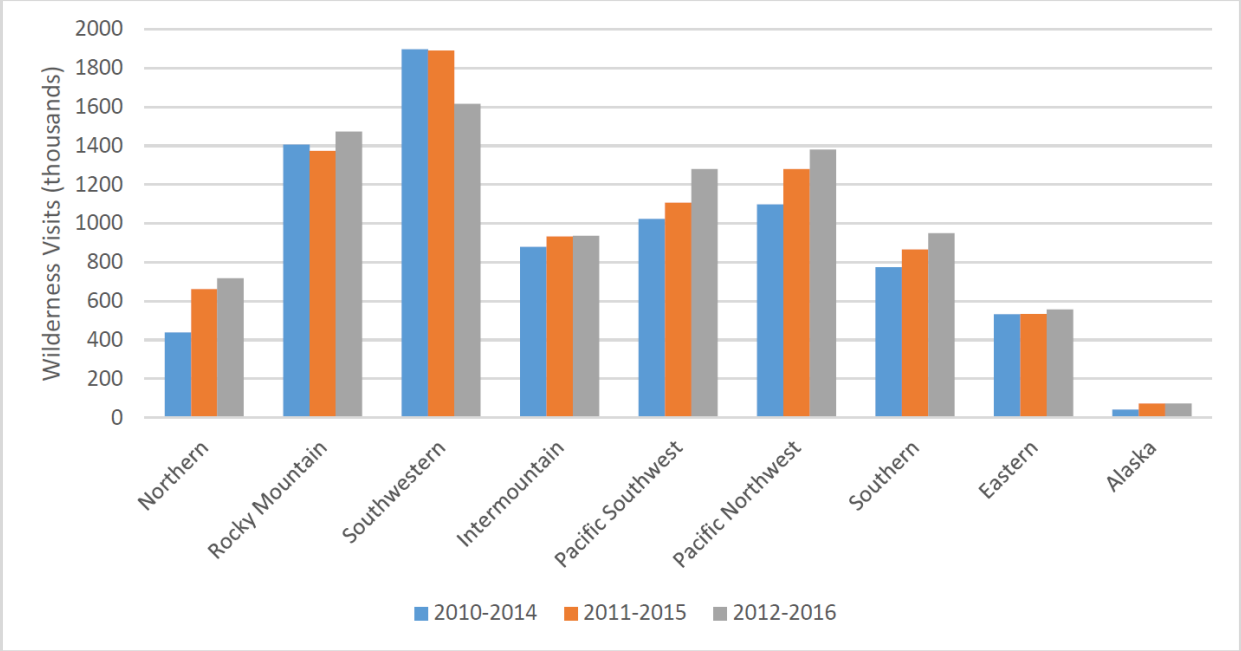


DEIS at 61. The national and regional conservation significance of the Mountain Treasures, in an all-lands context, *must* be considered when comparing alternative land allocations in the DEIS. The Chapter 70 process was not intended to exist in a procedural silo; it was meant to inform land allocations and assist the Forest Service in meeting its obligations, including the responsibility to maintain and restore connectivity in light of the likely stressors caused by climate change.

The North Carolina Mountain Treasure (Wilderness Inventory) areas represent some of the most intact and wildest places in the Southeastern United States, and many of them are nationally significant in terms of their biological and geological uniqueness. *Id.* Furthermore, many of these areas lie between existing protected areas; they therefore represent important priorities for maintaining connections between existing these conservation reserves. *Id.*

The agency must also consider the best available science related to the overall need and demand for wilderness. As in many areas of the country, visitation to wilderness in the Southeast is steadily increasing. Between 2010 and 2016, visitation to wilderness areas in the United States roughly increased by 900,000 visitors per year, while the Southern Region saw an increase of almost 200,000 visitors in that same time frame—22% of the total increase.

Chart: Wilderness Visitation Trends by Region



Regional annual visitation estimates (in thousands) for wilderness areas in the National Forest System, for FY2010 - FY2016. Adapted from USDA Forest Service (2014, 2015, 2016).

In 2018, the Warnell School of Forestry and Natural Resources at the University of Georgia conducted a survey to assess the use and attitudes about wilderness of people living in and around the Nantahala-Pisgah National Forests. The results showed that 88.9% of likely public lands visitors support the preservation of wilderness areas so that they will always exist in their natural condition (n=1,250).[229] In addition, 88.4% of those who had visited wilderness in the past 5 years supported the protection of additional wilderness areas (n=844).[230] The study also showed that respondents had a good understanding of what wilderness is, with 87.8% agreeing that wilderness is a place where natural conditions, or forces, dominate (n=1,250).[231] Support for wilderness was also strong across demographic and political lines.[232]

[229] Att. 50, Woosnam et al., Examining resident's perceptions and use of Southern Appalachian Region wilderness areas, University of Georgia and The Wilderness Society, at 7 (Dec. 2018).

[230] *Id.* at 15.

[231] *Id.* at 8.

[232] *Id.* at 16.

Table: Responses to Selected Survey Questions

Survey Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Wilderness is a place where natural conditions, or forces, dominate.	1.0%	1.1%	10.2%	34.6%	53.2%
In general, I support the preservation of wilderness areas so they will always exist in their natural condition.	2.5%	1.1%	7.5%	24.8%	64.1%
More wilderness areas should be protected.	0.6%	3.8%	25.0%	29.7%	40.9%

According to the best available science, ecological importance meets social need and demand in the Mountain Treasures. Additional wildland protections, including wilderness designation, are needed to meet ecological and social needs.

A. Recommendations

Except as specifically noted below, all North Carolina Mountain Treasures (MTs) should be managed to maintain or restore their wildland values, be found "unsuitable for timber production, and should be off limits for the construction of new linear rights of way, like utilities or highways. Further, backcountry, wilderness, and other similar areas should be included in the old growth patch network.

In these comments, we have organized our feedback on individual areas by "conservation areas" or clusters. Within each conservation area, individual Mountain Treasures are separately discussed with respect to their wilderness characteristics: naturalness, opportunities for solitude, ecological values, and manageability. We also include a specific recommended MA allocation.

B. Bald Mountain Conservation Area

1. Bald Mountains MT

In the Draft Plan alternatives, Alternative B would designate this area as Recommended Wilderness, while Alternatives C and D would allocate it to Backcountry and Appalachian Trail Corridor Management.

We recommend that the entire Bald Mountains MT area be in Backcountry. The overlap of the Appalachian Trail with Inventoried Roadless Area here requires stronger standards and guidelines for management that will protect its roadless characteristics. The Plan must clarify that the stricter standards applicable to IRAs will control.

As we have mentioned previously, during its 2004 planning process the Cherokee National Forest deferred the evaluation of this area's wilderness character to the Nantahala and Pisgah's next plan revision, because more acres in the contiguous area lie in North Carolina. The Forests have failed to consider that contiguous area in this evaluation, and have focused exclusively on the portion in North Carolina. This error should be corrected in the FEIS.

Naturalness: The Bald Mountain area lies on both sides of the main ridge of the Appalachian Mountain chain and the North Carolina–Tennessee state line. The acreage in both states adds up to make this the largest Mountain Treasure area and largest inventoried roadless area in the two states. It is the second largest IRA in the Southern Appalachian Mountains. Years ago portions of the high elevations were cleared to provide summer pasture for cattle. Outlines of the pastures are still identifiable in some places. There were skirmishes here and in the adjacent valleys during the Civil War, and gravesites of those who lost their lives are still visible. However, the areas also contain tracts of existing old growth forest. Rock outcrops give expansive views, particularly near Camp Creek Bald and at Big Butt.

Opportunities for Solitude/Backcountry Recreation: With the second largest acreage of any IRA in the Southern Appalachians, the Bald Mountain area has excellent opportunity for solitude with areas that are seldom used and difficult to access. The Appalachian Trail (AT) follows the ridge crest for over 15 miles, with three shelters along the route. Rock outcrops give expansive views, particularly near Camp Creek Bald and at Big Butt. Several side trails provide access to the AT from both North Carolina and Tennessee.

Ecological and other values: The Bald Mountain area is one of the most significant natural areas in the Southern Appalachians. It also is part of a crucial wildlife corridor along the main Appalachian Mountain chain. The area provides a route for adaptation from south to north, but it also provides essential elevation gradients from low elevation to high elevation. As such the area plays a key role in any coherent climate adaptation strategy. The hemlock boulderfield between Whiterock and Baxter Cliffs, though declining due to hemlock wooly adelgid, is one of the most spectacular in the region; peregrine falcons nest on the cliffs above. Two SNHAs are located wholly or partly within the extensions: Whiterock Cliffs and Black Pine Ridge.

Manageability: The Bald Mountain area is defined by its dominant, bold ridgeline. Road infrastructure approaches the area from lowlands on both the NC and TN sides, but the rugged landscape has limited road access to the higher elevations. One road (FSR 42) does provide access to the NC/TN ridge to the south.

2. Pigeon River Gorge MT

In the Draft Plan, Alternatives B and D allocate Pigeon River Gorge to Backcountry, Appalachian Trail Corridor, and Matrix MAs, while Alternative C allocates it to Backcountry and Appalachian Trail Corridor.

We have recommended that most of the Pigeon River Gorge MT be allocated to Backcountry, with a small portion of Ecological Interest Area. However, we note that the Nantahala-Pisgah Forest Partnership proposal would allocate approximately 1,871 acres of Backcountry and 229 acres of EIA within this Mountain Treasure to Matrix. *See* Att. 51 (map of

2020 Partnership allocations proposal)[233]. This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: This area contains recovering forest and a large designated old growth patch.

Opportunities for Solitude: The rough terrain and vegetation screening provides ample opportunities for solitude.

Opportunities for Recreation: This area is the first one a hiker enters after leaving the Smokies, heading north on the Appalachian Trail. The northern boundary is the North Carolina–Tennessee state line, and the AT follows the boundary here. There is an AT shelter in this tract. A scenic trail runs south from the shelter along Groundhog Creek, then bears east on an old logging railroad grade to Rube Rock Branch. After crossing that branch, the trail turns north to rejoin the AT. There is a trailhead on I-40, and this makes a good day-hike loop trip.

Ecological and other values: The Pigeon River Gorge Area provides a crucial wildlife corridor from Great Smoky Mountain National Park to areas of Pisgah and Cherokee National Forest. A ridge over tunnels above I-40 provides access for wildlife to cross I-40. The corridor over I-40 and through the Pigeon River Gorge Area is a critical wildlife corridor for the Appalachian Mountains in an area that is otherwise dissected by I-40, which was not designed with wildlife crossing in mind. The topography from the ridge down to the river is exceptionally steep. Thanks to this natural protective feature, the lower slopes host a large amount of old growth forest. The area includes a Significant Natural Heritage Area: Snowbird Creek/Cedar Cliff.

Manageability: The area is manageable as backcountry, and is critical as an essential wildlife corridor. Immediately to the north is the recently acquired Gulf tract, which has potential for addition to this area.

3. Bluff Mountain (aka Deerpark Mountain)

In the Draft Plan, Alternative B would allocate this MT to Appalachian Trail Corridor, Matrix and Interface MAs. Alternative C would allocate it to Appalachian Trail Corridor, Backcountry,

[233] Available at: https://www.dropbox.com/sh/britqryekum0yre/AADvACR9KYCXx8X2PqU8nRMta?dl=0.

and Ecological Interest Area with small amounts of Matrix and Interface MAs included. Alternative D would allocate this area to Appalachian Trail Corridor, Ecological Interest Area, Matrix, and Interface MAs. In each alternative, a Special Interest Area overlaps the eastern edge of this area.

We recommend that the entire Bluff Mountains MT area be recognized as Backcountry. The overlap of the Appalachian Trail with Backcountry here requires stronger standards and guidelines for management that will protect its roadless characteristics. The Plan must clarify that the stricter standards applicable to IRAs will control.

As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate most of the area to Backcountry and Appalachian Trail Corridor with 39 acres in Special Interest Area management. *See* Att. 51 (map of 2020 Partnership allocations proposal). Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: Bluff Mountain lies along the state line between North Carolina and Tennessee and is a prominent landmark for both Madison County, North Carolina and Cocke County, Tennessee. The Appalachian Trail (AT) works its way across the top of Bluff Mountain and descends the mountain into Hot Springs. AT hikers know Bluff Mountain well and refer to it as the "Gardens of Bluff" for its profusion of wildflowers.

The Mountain Treasure area includes most of the mountain in North Carolina. The smaller Walnut Mountain, an adjacent Tennessee Mountain Treasure, includes portions of the western flank of the mountain. There are no roads to the top of Bluff Mountain, and the area never experienced industrial logging so the mountain remains remote and a haven for wildlife. Secluded coves on all sides of the mountain provide rich plant and wildlife habitat.

The mountain features striking rock outcrops, clear pristine streams, and waterfalls that add interesting highlights to the area. Bluff Mountain is very popular with hikers, nature enthusiasts, and hunters.

Opportunities for Solitude/Backcountry Recreation: The area is rich in trail access with the AT winding from southwest to northeast across the long dimension of the area. Other trails intersect the AT from both directions providing opportunities for shorter hikes.

Ecological and other values: The area hosts rare species, notably excellent populations of Largeleaf Waterleaf. North Carolina recognizes a Natural Heritage area near Big Rock Springs. Steep slopes and cliff environments on the eastern side of the Mountain Treasure area could support rare plants dependent on this habitat. A verified old-growth site and at least four candidate old growth sites are within the area. A Forest Service large old-growth patch covers

much of the northern sections of the area, and small old growth patches are dispersed throughout the Big Rock Springs area. This area contains the following State Natural Heritage Areas: Spring Creek Gorge and Big Rock Spring.

Manageability: A large timber sale was proposed in the area in the mid-1990's. The proposal sparked the formation of a broad coalition of groups and individuals who opposed this project under the "Don't Cut Bluff" campaign. As a result of this effort, including a petition, wide press coverage and considerable citizen involvement, the Forest Service drastically revised the timber sale. In the end, it targeted only 10 acres in the pristine portion of the mountain and the scope of the logging was designed to benefit wildlife and recreation, with a parking area and trailhead to provide better trail access in the Shut-In portion of the area.

C. Balsam Mountains Conservation Area

1. Middle Prong Wilderness Extension

In the Draft Plan, Alternatives B and D allocate the portion of this area which is an Inventoried Roadless Area as Recommended Wilderness, while the remainder is allocated to Matrix. In Alternative C, most of this area is allocated to Backcountry, with the eastern edge in the Ecological Interest Area MA.

We recommend that the existing Inventoried Roadless Area portion be recommended for Wilderness, and the remainder of the Middle Prong Extension MT area should be in Backcountry with Ecological Interest Area management on the eastern edge where accessible from FS 97. However, as compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate approximately 787 acres of the Lickstone Ridge area within the Middle Prong Extension from EIA to Matrix. *See* Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

We also note that the Wildlife Resources Commission (WRC) is opposing the recommendation of the Middle Prong Extension as wilderness based on the assertion that some acreage in this area has a high chestnut restoration potential, and that there is need for spruce-fir restoration.

As for chestnut restoration, the Middle Prong Extension WIA would be among the most difficult, expensive, and inefficient locations to pursue this work given the difficulty of access and

steepness of terrain. There are hundreds of thousands of acres across the landscape where chestnut restoration could occur, and the availability of this area would not result in the loss of any meaningful opportunity to pursue American chestnut restoration.

As for spruce fir restoration, there is very little of this restoration that is actually needed in this WIA. Moreover, the spruce-fir ecozone is more than 90% occupied by spruce forest inside the IRA, and there is very little practical access to accomplish planting where it could occur. In the lone area within this WIA where there is a combination of potential access and need—near Cold Springs Gap—slight boundary modifications could be made to accommodate this management activity, and we would be pleased to work with the Commission to refine those boundaries in a bill to designate the area.

Naturalness: The Middle Prong Wilderness is separated from Shining Rock Wilderness on the east only by a state road, NC 215. The area consists of the valley of the Middle Prong of the Pigeon River, together with its dividing ridges, Fork Ridge on the east, and Lickstone Ridge on the west, all running north from the Blue Ridge Parkway down to the Sunburst Campground. The community of Waynesville's watershed lies just west of Lickstone Ridge. The area contains recovering forest in good condition as rare species and excellent examples of ecological types in excellent condition.

Opportunities for Solitude: To the south of the Middle Prong Wilderness, and separated from it only by the Blue Ridge Parkway corridor, is the Roy Taylor Forest, also an essentially unroaded area. Seen in a proper conservation context, Middle Prong is important as one corner of a very large wild area interrupted only by one north-south state highway and the Blue Ridge Parkway, which runs east and west. On the northwest is Middle Prong. Shining Rock lies to the northeast, Daniel Ridge to the southeast, the Roy Taylor Forest to the southwest, and the Waynesville watershed to the west. Adding the Middle Prong extension to the current Wilderness Area will increase the opportunity or solitude north along Lickstone Ridge.

Opportunities for Recreation: While there is little developed recreation access on Lickstone Ridge, manways, old trailbeds, and open forests friendly to bushwhackers provide a remarkable opportunity for primitive recreation for the adventurous hiker and wildlife watcher.

Ecological and other values: The Lickstone Ridge area is a bear sanctuary. Numerous animal species inhabit and migrate through these areas, including the cerulean warbler. Middle Prong is part of a number of closely associated wildland areas including Middle Prong, Shining Rock, Roy Taylor, and Daniel Ridge that have tremendous wildlife and biodiversity values. The 587 acre Richland Balsam/Beartrail Ridge State Natural Heritage Area lies within the Inventoried Roadless Area and Potential Wilderness Area and has been proposed for a new priority Special Interest Area by the NC Natural Heritage Program.

Manageability: It would be logical to extend the wilderness, and manage as such. The community of Waynesville's watershed lies just west of Lickstone Ridge, and Shining Rock Wilderness lies just east across NC 215, arguing further for carrying protection of the Middle

Prong Wilderness farther north to protect the watershed and wildlife habitat. The broader area has a good trail system, including a portion of the Mountains-to-Sea Trail, and this area provides continuous primitive and unconfined recreational opportunities extending north from the current Middle Prong Wilderness Area. This area is within the viewshed of the Fork Ridge Trail, the Mountains-to-Sea Trail, and the Blue Ridge Parkway.

2. Shining Rock Wilderness Extension

In the Draft Plan, Alternatives B and D would recommend 1,658 acres of the Shining Rock extension for wilderness, excluding areas along Flat Laurel Creek Trail and Graveyard Ridge to the Blue Ridge Parkway. The remainder of the extension would be allocated to Backcountry and National Scenic Byway. Under Alternative C, nearly the entire area would be allocated to Backcountry. Under all alternatives there is a small portion of Interface MA around the Black Balsam Knob and Ivestor Gap Trail.

We recommend that 1,658 acres of the Shining Rock Extension MT be recommended for wilderness, excluding areas along Flat Laurel Creek Trail and Graveyard Ridge to the Blue Ridge Parkway. These areas should be in Backcountry management. We also support changing the eligible Wild & Scenic River classification of the West Fork Pigeon River from *Recreational* to *Scenic*.

Naturalness: Like other areas of the Shining Rock Wilderness the extensions are recovering from industrial logging early in the 20th century and catastrophic fires following logging. Although the areas are altered, they nonetheless "generally appear to be affected primarily by the forces of nature." Portions of the extensions are excluded so that some ecological restoration activities such as spruce restoration and prescribed burns can occur. Elk reintroduction should also be explored for the area so that natural disturbance dynamics could possibly replace management for maintaining the open balds.

Opportunities for Solitude: Solitude can be easily found in portions of the Shining Rock Wilderness area, and the extensions also offer excellent opportunities for solitude. Because of its popularity, portions of the Shining Rock wilderness and adjacent areas are heavily overused. This should be a solid reminder that there is considerable public demand for wilderness recreation and not enough wilderness to satisfy it without compromising wilderness values, the wilderness experience, or both. Expanding the wilderness area while enforcing wilderness use constraints, creating additional wilderness areas, and creating additional opportunities for wilderness type activities in backcountry areas could help create additional opportunities and ensure maintenance of wilderness values.

Opportunities for Recreation: Sam Knob is an excellent recreational destination in this area, with an iconic overlook. Sam Branch is an incredible off-trail excursion for the adventurous hiker, with scalloped bedrock creekbed and waterfalls. Flat Laurel Creek is a much better known creek destination with summertime swimming holes and trout fishing.

Ecological and other values: The Shining Rock area and its extensions offer the opportunity to study and document the long term recovery of high elevation ecosystems in the southern Appalachians. The unique heath and grassy balds created by past fires in the area offer unique habitats and opportunities for recreation not found elsewhere. The mixture of wilderness and backcountry/ecological restoration proposed for the extensions offers the opportunity to restore natural plant communities altered in the past (spruce forest) while also creating stable ecological systems that would depend on natural disturbance patterns. This environment could be an ideal site for reintroduction of elk that could maintain the open balds that are valued for both wildlife habitat and for recreation. Two State Natural Heritage Areas are located within the extensions (mostly within portions not recommended for wilderness): Chestnut Bald-Flat Laurel Creek-Sam Knob and Graveyard Fields IRA/PWA.

Opportunities to increase the representation of ecological types that are currently under-represented in the Wilderness Preservation system include a variety of ecological types especially Appalachian Montane Oak, Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; Appalachian Bog and Fen, and Small Stream and Riparian.

Manageability: The addition of the proposed portions of the extensions would increase the manageability of the wilderness while retaining flexibility for needed ecological restoration.

3. South Mills River

In the Draft Plan, Alternative B allocates the roadless core of this area to Backcountry, with the outer portions in Matrix and Interface. Alternative C allocates the roadless core to Backcountry, with some areas on the edge allocated to Ecological Interest Area. Alternative D allocates the roadless core to Backcountry with outer portions in Matrix, Interface, and Ecological Interest Area.

We recommend that the South Mills River MT be allocated to Backcountry, with some small edge portions of the area in Ecological Interest Area. However, as compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate approximately 811 acres of Backcountry to Matrix, and an additional 239 acres of Backcountry to EIA. *See* Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: The South Mills River Mountain Treasure is a remarkable transect of mountain scenery including ridgeline views, deep valleys with clear water trout streams and one of the biggest mountain bogs in the Southeast. It encompasses an area of roughly 17,120 acres, from the congressionally-designated Cradle of Forestry and the Pink Beds near US 276 on the west; the Blue Ridge Parkway and the Pisgah Inn on the spine of the Blue Ridge Mountains on the north; then it falls southward through the long ridges of the Laurel Mountain Roadless Area to the drainage basin of the South Mills River Roadless Area. Only the Yellow Gap Road, a dirt connector between US 276 and the North Mills River Recreation Area, separates the South Mills River and the Pink Beds from the Laurel Mountain Roadless Area to the north.

Opportunities for Solitude/Backcountry Recreation: The area includes an extensive trail system, including the Black Mountain trail, with its incredible views of Looking Glass Rock, Turkeypen Gap, which is considered by many to be Pisgah's toughest trail, Squirrel Gap, a favorite with mountain bikers, and many others. The area is one of few that supports backcountry camping for equestrians. The trail network is used heavily but sustainably by hikers, campers, mountain bikers, horse riders, and hunters, not to mention anglers in the cool waters of the South Mills River.

Much loved for a broad range of outdoor experiences, the South Mills River Area should be recognized primarily for its recreational use.

Ecological and other values: The State of North Carolina gave the South Mills River an Outstanding Resource Waters classification in 1988. Congress designated the South Mills River a National Wild and Scenic Study River in 1990. The Forest Service concluded in 1996 that several river segments are all eligible for National Wild and Scenic status: 20.1 miles of the South Fork Mills River within the Pisgah National Forest (beginning in the Cradle of Forestry and going to the junction with the North Fork); 5.3 miles outside the forest boundaries, plus 5.9 miles of the North Fork (from the Hendersonville Reservoir); and, 2.2 miles of the Mills River below their junction. If Congress were to designate all these qualifying sections, they would become the longest wild river in North Carolina.

There is a wealth of biodiversity in this area, including rare aquatic species like the hellbender and the Appalachian elktoe. The following State Natural Heritage Areas have been identified: South Fork Mills River Riparian Area and Clawhammer Mountain/Black Mountain. Historically this area is of interest because it was once part of the Biltmore Forest, owned by George Vanderbilt in 1900 and where Gifford Pinchot established the nation's first forestry school. The remnants of Pinchot's first management experiments can still be seen along Big Creek in the Laurel Mountain Area.

Manageability: The South Mills River is noted as one of the top trout fishing, turkey hunting, horseback riding and mountain biking areas in the Pisgah National Forest. This area's size, beauty, popularity and diversity suggest that it, along with other similarly unspoiled and popular nearby areas (Cedar Rock and Daniel Ridge, plus Sliding Rock, the Cradle of Forestry Visitor Center, the Trout Hatchery and North Carolina Wildlife Resources Education Center, and the

Davidson River, Kuykendahl, North Mills River and Cove Creek campgrounds) would logically qualify the entire Pisgah Ranger District for designation as a national recreation area (NRA), prioritizing management for the area to focus on these outstanding recreational assets and the natural qualities that provide the experiences that visitors desire. Management should strive to maintain and enhance this outstanding recreational area, because it may well be designated as an NRA in the future.

4. Laurel Mountain

In the Draft Plan, Alternatives B and D would allocate this area's roadless core to Backcountry, with outer portions in Matrix, Interface, National Scenic Byway, and Cradle of Forestry Management. Alternative C would allocate the core to Backcountry with edge portions in Ecological Interest Area, National Scenic Byway, and Cradle of Forestry Management.

We recommend that the Forest Service allocate the roadless core of the Laurel Mountain MT to Backcountry, with the western portion in Special Interest Area and eastern portions in Ecological Interest Area. However, as compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate approximately 744 acres of Backcountry to EIA. *See* Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: Forests in the Laurel Mountain Area are recovering and mostly mature forest. The area contains 245 acres of existing old growth.

Opportunities for Solitude: The Laurel Mountain Area shares much with the South Mills Area to its south, from which it is separated only by the dirt Yellow Gap Road as noted above providing ample opportunities for solitude. Despite its popularity with mountain bikers and hikers, encounters with other users are infrequent.

Opportunity for Recreation: Extensive trail systems, including part of the Mountains-to-Sea Trail, Big Creek, Laurel Mountain, and Pilot Rock serve both areas and are popular with hikers, campers, mountain bikers, horse riders, and hunters. Both areas were part of the Biltmore Forest.

Ecological and other values: Two of the outstanding features of the Laurel Mountain area are the granite domes on the Pilot Cove and Pilot Rock trails. Natural communities found here are incredibly scenic and biologically unique to the southern Blue Ridge Mountains. The area

includes three Significant Natural Heritage Areas: Pilot Rock/Pilot Cove, Mt Pisgah, and Frying Pan Gap.

Manageability: The Laurel Mountain Area shares much with the South Mills Area to its south, from which it is separated only by the dirt Yellow Gap Road as noted above providing ample opportunities for solitude, while also allowing limited motorized access to trailheads and dispersed camping.

5. Daniel Ridge

In the Draft Plan, Alternative B and D would allocate this area to Matrix and Interface MAs, with small amounts of Wild and Scenic River Corridor and Special Interest Area. Alternative C would allocate most of this area to Backcountry, with smaller areas of EIA and SIA.

We recommend that the Daniel Ridge MT be allocated to Backcountry and Ecological Interest Area, as in Alternative C.

Naturalness: The Daniel Ridge Area lies along the Blue Ridge Parkway just across the Parkway from Shining Rock Wilderness. Devil's Courthouse, a prominent rock outcrop, which is very significant in Native American stories, looms over the area. Courthouse Falls is a dramatic 45 foot waterfall in the southwest portion of the area. The lower portions of the Daniel Ridge area have seen some logging in the past few decades, and some of these areas have maintained road access. These areas with existing maintained road access would be good candidates for ecological restoration. However, the core of this area fully qualifies as a potential wilderness area and should be maintained to conserve its roadless and backcountry values.

Opportunities for Solitude: The ruggedness of this area lends itself to solitude. For example, mountain bikers and hikers are able to find solitude on trails like Farlow Gap, and hikers can find it on the Art Loeb trail.

Opportunities for Primitive Recreation: Numerous trails provide opportunity for hiking and mountain biking in the area. The Art Loeb Trail, which runs from Cold Mountain in Shining rock Wilderness to the Davidson River campground traverses the area. The Mountains to Sea Trail follows the upper portion of the area near the Blue Ridge Parkway. The area is used extensively for backcountry use and forms an important backdrop for the Blue Ridge Parkway and the Devils Backbone observation area. Courthouse Falls in the southwest portion of the area is a very popular destination for many visitors.

Ecological and other values: Old growth and the rare Pinkshell azalea (Rhododendron vaseyi) are found in the area. The area contains existing old growth and part of the area is a large patch old growth area under the existing Plan. The area includes two Significant Natural Heritage Areas that should be fully protected for their biological values: Devils Courthouse and Pisgah Ridge/Pilot Mountain.

Manageability: The Daniel Ridge area adjoins the Blue Ridge Parkway and forms a critical portion of its viewshed, and the viewshed of Highway 215. Much of the area is unroaded or contains only unmaintained roads. These roads within the core of the area are also on steep slopes and slopes prone to landslides (at least two historical landslides are documented in the area). Protection of the core of this area for its ecological and recreation values within backcountry or similar management is the only management option that makes fiscal, and environmental sense.

6. Cedar Rock Mountain

In the Draft Plan, Alternatives B and D would allocate a small core of this MT to Special Interest Area around John Rock, with the remainder in Matrix and Interface. Alternative C would allocate this area to Backcountry and Ecological Interest Area.

We recommend that the Cedar Rock Mountain MT be allocated to Backcountry and Ecological Interest Area. As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate approximately 1,029 acres of EIA to Interface. *See* Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: Cedar Rock Mountain itself is a massif with spectacular bare rock faces, much used by climbers. It offers wonderful views of the Blue Ridge, the Davidson River Valley and its companion mountains, Looking Glass Rock and the John Rock Scenic Area. Visitors standing here on these billion-year-old granite rock faces, rounded by exfoliation from millions of years of weathering can appreciate that these are but the stubs of ancient mountains worn down after being thrust up by massive tectonic plate collisions some 300 million years ago.

Opportunities for Solitude: The Cedar Rock Area provides ample opportunity for solitude. Trails travel around the steep terrain through dense forest providing innumerable sites that are remote and away from any sights and sounds.

Opportunities for Primitive Recreation: This area, and the mountain of the same name lie on the south side of the Davidson River, south of the Daniel Ridge area. It is part of a very popular hiking and camping complex. The major trail terminus for the complex is at the Davidson River Fish Hatchery and North Carolina Wildlife Resources Commission Education Center on FR 475 just west of the very popular Looking Glass Falls on US 276.

An extensive trail system includes the Art Loeb Trail which winds completely around the base of Cedar Rock, with connections to the Fish Hatchery area, to Cathey's Creek and the Kuykendahl Group Campground, and to Brevard via the Bracken Mountain trail. There is a shelter near Butter Gap. The Art Loeb National Recreation Trail is a memorial to a Carolina Mountain Club activist and runs from Cold Mountain at the north end of Shining Rock Wilderness south over the balds, crossing the Parkway and then easterly to Brevard, for a distance of about 30 miles. A summit trail traverses from Butter Gap to Sandy Gap, but it is not for the faint of heart.

Ecological and other values: The Cedar Rock Area hosts unique geologic features (high elevation granitic domes) that are also habitat for rare species. It also has excellent examples of chestnut oak forest in good ecological condition. The area includes 123 acres of existing old growth. The area includes a Significant Natural Heritage Area: John Rock/Cedar Rock Mountain.

Manageability: The Cedar Rock Area stands by itself as an isolated pluton so it has manageable boundaries and approaches as a backcountry area.

D. Black Mountains Conservation Area

1. Craggy Mountains (Big Ivy)

In the Draft Plan, Alternative B would recommend 8,715 acres of this area as wilderness, and most of the remainder would be in in Matrix and Interface. A small Research Natural Area is proposed to be embedded in the Interface portion on Walker Ridge, and a small Special Interest Area is proposed around Snowball Mountain.

Alternative C would recommended 2,639 acres of Wilderness Study Area for wilderness designation and allocate most of the remainder in Ecological Interest Area Management. A small Research Natural Area is proposed to be embedded in the Ecological Interest Area portion on Walker Ridge, and small Special Interest Areas are proposed around Snowball Mountain and the eastern ridge of the MTA.

Alternative D would recommend a slight expansion of the Wilderness Study Area for wilderness designation and allocate most of the remainder in Ecological Interest Area, Matrix, and Interface. A small Research Natural Area is proposed to be embedded in the Interface portion on Walker Ridge, and small Special Interest Areas are proposed around Snowball Mountain and the eastern ridge of the MTA.

All Alternatives have a corridor of National Scenic Byway Management along the Blue Ridge Parkway outside of the Recommended Wilderness areas.

We recommend that the Wilderness and National Scenic Area Recommendation for the Expanded Craggy Mountains MT area that has been proposed by the Friends of Big Ivy be included in the plan, as described in the 2020 Partnership recommendations. The RNSA

should include the Coxcombe, Snowball, Shope Creek, and upper Ox Creek areas, and it should have an embedded wilderness core consisting of 8,728 acres.

We further recommend that the RNSA be described as its own GA or MA in the final plan, with a set of plan components that apply specifically to this area. The wilderness core, of course, would be governed by plan components applicable to the recommended wilderness MA, and the existing Research Natural Area would continue to be governed by plan components applicable to that MA. The GA or MA plan components for the remainder of the area should include the following:

> *(a) PURPOSES.—The purposes of the Recommended Scenic Area are—*
>
> *(1) to ensure the protection and preservation of scenic quality, water quality, natural characteristics, and water resources of the scenic areas;*
>
> *(2) consistent with paragraph (1), to protect wildlife and fish habitat in the scenic areas;*
>
> *(3) to protect areas in the scenic areas that have or may develop characteristics of old-growth forests; and*
>
> *(4) consistent with paragraphs (1), (2), and (3), to provide a variety of recreation opportunities in the Recommended Scenic Area.*
>
> *(b) SPECIAL USES.—*
>
> *Special uses of the Recommended Scenic Area may be allowed only where those uses will further the purposes of the scenic area.*
>
> *(c) ROADS.—*
>
> *No new roads shall be established or constructed within the Recommended Scenic Area. This does not prohibit minor relocation or realignment of existing roads in order to further the purposes for which the scenic area is established.*
>
> *(d) TIMBER HARVEST.—*
>
> *No timber harvest is allowed within the scenic area except for the following limited purposes:*
>
> *(A) to conduct ecological restoration treatments that are intended to and likely to improve the ecological trajectory of the stand(s);*
>
> *(B) to control fire, unless the fire can be managed to provide ecological benefit without undue risk to public safety or private land;*

(C) to provide for public safety or trail access;

(D) to control insect and disease outbreaks, if such control is necessary to maintain scenic quality, to prevent tree mortality, to reduce hazards to visitors, or to protect private land; or

(E) to gather firewood along roads open to motorized vehicles and dispersed camping, subject to local orders and restrictions.

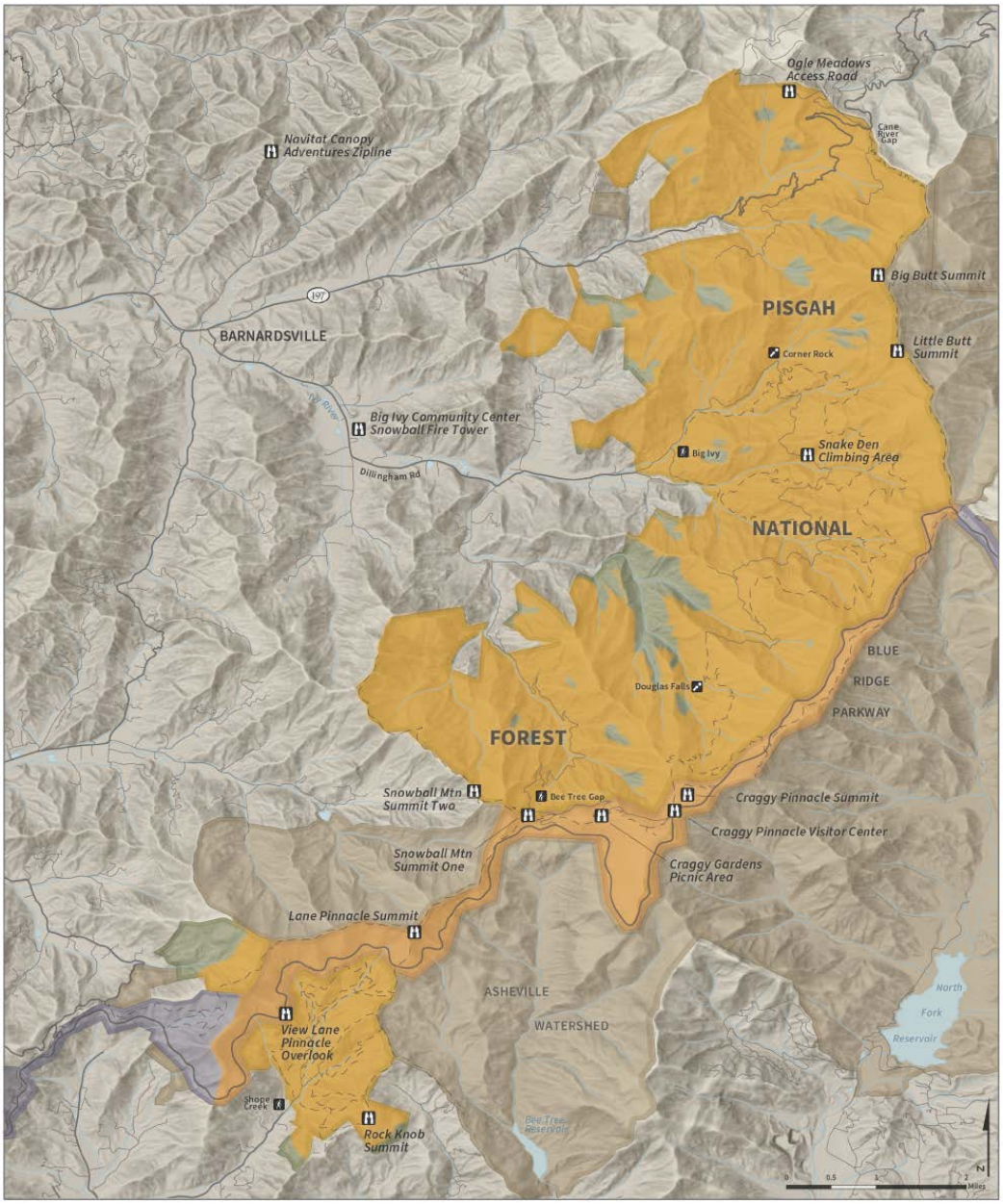
(e) WILDLIFE OPENINGS.—Openings may be maintained for scenic quality and wildlife benefits. New or expanded openings may be authorized if they would further the purposes of the Recommended Scenic Area and be consistent with all limitations, including the limitation on road construction.

(f) MOTORIZED VEHICLES.—

(1) Except where specifically allowed, public use of motorized vehicles, including electric bicycles, is not allowed in the Recommended Scenic Area.

(2) Public use of motorized vehicles, including electric bicycles, is allowed on the following roads, subject to any closure orders and other requirements of law: Forest Roads 74, 231, and 63, and roads open to the public under the jurisdiction of other state and federal entities.

Scenic Values: In addition to the wilderness-caliber characteristics described below, the proposed Craggy Mountains National Scenic Area has superlative scenic character and integrity with recreational, economic, and spiritual importance. Most people experience the Craggies without ever setting foot on a trail. Around a half-million visitors per year enjoy this area's scenic grandeur from the Blue Ridge Parkway. Around 5,000 drivers each day are greeted by the Craggy viewshed as they travel to Buncombe and Madison Counties from the north. As shown by the map below, 92% of the proposed Scenic and Wilderness areas are visible from just a few popular and close-by vantage points and the immediate quarter-mile foreground of roads and trails. The proposed designation would permanently protect this incomparable scenic viewshed.



Craggy Mountains Viewshed Analysis

This visibility analysis identifies vantage points and respective combined viewsheds for the Craggy area of Pisgah National Forest. Also referred to as Big Ivy or Coleman Boundary, the region is home to the proposed Craggy Wilderness & National Scenic Area. When secured, this designation will permanently protect 16,000 acres of old-growth forest, pristine watersheds, trout streams, world-class trails, and panoramic vistas less than 15 miles from Asheville, North Carolina.

A geospatial viewshed analysis visualizes visible areas from one or more vantage point. For this analysis, publicly-accessible vantage points were selected based on known ability to see the Craggies, and their respective viewsheds have been accurately modeled on this map. Landscapes and features within the orange Comprehensive Viewshed symbology are visible from the labeled Vantage Points. This reveals how much of the proposed Craggy Wilderness & Scenic Area is visible from several commonly-visited places within the region, supporting its need for protection. For sake of private landowners' privacy, the results of this analysis have been clipped to appear only within U.S. Forest Service and Blue Ridge Parkway lands. Select landmarks and points of interest have been added and labeled to orient viewers to places they may have visited before.

Viewshed Analysis

- Vantage Points
- Comprehensive Viewshed

From identified vantage points and 1/4 mile road and trail foreground, 32% of federal lands within focus area are visible.

Public Land

- Blue Ridge Parkway - National Park Service
- Pisgah National Forest - U.S. Forest Service
- Municipal & Private Protected Lands

Naturalness: The Craggy Mountains form the western edge of the larger Black Mountains Conservation Area, extending from the high elevations of the Blue Ridge Parkway at 6,000 feet down to lower elevation rich coves at 3,000 feet. The area, also known as Big Ivy, includes the Craggy Mountain Wilderness Study Area, Big Butt Ridge and much of the land in between, including the Walker Cove Natural Area. This area is extremely important for its biological diversity and scenic and recreational values. It is well connected to the rest of the Black Mountains through protected conservation lands, the Asheville Watershed and the Big Tom Wilson Preserve. This area contains several Natural Heritage Areas and significant biological habitat, including robust black bear, brook trout, and songbird populations. The combination of extensive old-growth forests, high elevation peaks and the rich soils derived from magnesium-rich mafic rock make the Craggy Mountains an incomparable natural area.

A botanist working with the NCNHP documented 40 locations of 32 rare plant species. A large designated Forest Service old growth patch stands within this area, and there are four verified sites containing 3,064 acres of old growth forest.

Congress designated the 2,380-acre Craggy Mountain Wilderness Study Area in 1984 and the Forest Service recommended it for wilderness designation in 1987. Legislation to designate the area passed the U.S. House of Representatives in 1990 but did not clear the Senate. A new effort to designate a larger Craggy National Scenic Area with an embedded Craggy Wilderness is underway and support is growing, including unanimous bipartisan resolutions from both the City of Asheville and Buncombe County.[234]

Opportunities for Solitude: This area provides exceptional opportunities for solitude. Though it is not the largest wilderness candidate area in the Nantahala-Pisgah, this area's ruggedness and remoteness are exceptional. Users accessing the area from the Parkway or Dillingham road are likely not to encounter any other visitors. The openness of the forest lends itself to off-trail exploration, where a visitor can truly feel like the first explorers to this area must have felt. The wilderness core is isolated from the frontcountry by the remainder of the Big Ivy area, which is accessed by a single dead-end forest road and strenuous multi-use trails. The farther into the area a user travels from Corner Rock, the greater the solitude that can be found. The character of the broader area should be managed consistent with the plan components suggested above, providing a backcountry experience in the area as a whole, providing a solitude gradient that so many users value. Indeed, Big Ivy has been managed as de facto backcountry under the current plan, and the public strongly supports continuing that management.

Opportunities for Recreation: For many of the same reasons, this area also offers outstanding primitive and unconfined recreational opportunities. The Mountains-to-Sea Trail flanks the southeastern side of the area and connects to the Douglass Falls Trail. The Big Butt Trail, Corner

[234]Att. 52, Resolution Supporting the Recommendation and Designation of Craggy Mountain Wilderness and National Scenic Area in Buncombe County. Resolution #20-04-13 (Apr. 21, 2020).

Rock and Walker Creek areas offer additional recreation and nature study areas. Little Snowball Mountain, Douglas Falls and Carter Falls are outstanding landscape features. Off-trail recreation is unmatched; this forest is open and welcoming for a genuinely unconfined recreation experience. Adventurous hikers will find hidden wildflower coves and gnarled old-growth trees. Big Ivy contains spectacular trails including those leading from the popular Craggy Gardens Visitor Center through virgin stands of hemlock and oak to the lovely Douglas Falls and Carter Falls. This area offers outstanding opportunities for non-motorized recreation of all types.

Ecological and other values: The Big Ivy area contains some of the world's best examples of Rich Cove Forest, Hemlock Forest, Northern Hardwoods Forest, High Elevation Red Oak Forest, Montane Mafic Cliff, Montane Cedar-Hardwood Woodland, and High Elevation Rocky Summit Natural Communities. The area contains approximately 3,055 acres of old growth and virgin forest. There are 4,752 acres of State Natural Heritage Areas within the Mountain Treasure area: Walker Cove, Brush Fence Ridge/Point Misery, High Knob/Sugar House Cove, Cedar Cliff Knob, and the Craggies.

Opportunities to increase the ecological representation of ecological types that are currently under-represented in the Wilderness Preservation system include a variety of ecological types especially Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; Appalachian Montane Oak, and Small Stream and Riparian.

Manageability: In the prior planning process, the Forest Service found the Craggy WSA of "sufficient size as to make practicable its preservation and use as wilderness in an unimpaired condition". The area was recommended for wilderness designation in the current Forest Plan. The expanded Recommended Wilderness boundaries (with FSR 74 cherry stemmed into the area for access) lend themselves to management. It is important to consider the area in the context of surrounding conservation lands (Park Service, private conservation easements, and additional Forest Service lands). Management of the core of the Big Ivy area is much more appropriate as wilderness than other management.

Strong local support for hands-off management indicates that this area should be considered for wilderness recommendation. The Forest Service's last attempt to conduct a timber project in Big Ivy was met with such local resistance that the Forest Service stated as follows:

> I have decided to postpone timber harvesting and associated road construction until further study of the Big Ivy area is completed. Approximately 6690 acres (48 percent) are designated in MAs that allow timber sale proposals. Timber sales will not be scheduled on these lands until further study of Big Ivy is completed and recommendations for management direction are cited. . . . I expect the timing of the study's results and recommendations to coincide with the plan revision. I intend to revisit the MA allocation of Big Ivy, including the determination of lands suitable for timber production, when more information is available.

Amendment 5 ROD at 7-8 (1994). Even in 1994, therefore, the writing was on the wall: Big Ivy is not manageable for scheduled harvest, but it is manageable for its special ecological, recreational, and above all its scenic values. A National Scenic Area and embedded Wilderness Area would provide the greatest possible permanent protection while also offering the flexibility to emphasize existing recreational and traditional uses, including world-class mountain biking, rock climbing, horseback riding, dispersed camping, hunting and fishing, edible plant gathering, and hiking through old-growth forests and alongside waterfalls.

2. Black Mountains

In the Draft Plan, Alternatives B and D would recommend 11,976 acres of this MT for Wilderness, with small Special Interest Areas on the eastern edge, and Backcountry Management for the Bearwallow area.

Alternative C would allocate Backcountry management for the entire Black Mountains and Bearwallow areas, maintaining the Middle Creek Research Natural Area in the center of this MT.

We recommend that the Black Mountains MT area be recommended for Wilderness, excluding the Ray Mine area and other small sections around the edges that should go to Backcountry. The Bearwallow portion of this MT should be placed into Backcountry, which would allow for some spruce restoration.

We note that the Wildlife Resources Commission has indicated they have concerns about recommending the Black Mountains as wilderness, including concerns that this area includes a significant amount of spruce-fir forest with potential for restoration work, some uncharacteristic yellow poplar stands, and potential chestnut restoration. These concerns are not realistic. The Black Mountains are not an appropriate or practical location for chestnut restoration due to difficulty of access and the steepness of terrain. The assertion that there is uncharacteristic yellow poplar in this area is speculative—individual stands of yellow poplar have not been ground-truthed. And as for spruce-fir restoration, our recommendation already excludes the highest priority area for spruce restoration on the Black Mountain Crest. This exclusion would provide nearly 1,000 acres of potential spruce restoration inside the Black Mountains WIA, and more than 2,000 acres of spruce restoration opportunities exist in the adjacent Bearwallow IRA. This amount of available spruce restoration present in the Black Mountains would take more than a century to accomplish if 300 acres were planted or restored per decade. For reference, less than 50 acres of spruce forest have been restored forest-wide in the past 20 years.

Naturalness: The Black Mountains Area is one of the premier wildland areas in the East. It is adjacent to Mount Mitchell State Park and includes the peaks and slopes of the Black Mountain Crest. Although portions of the area were logged during the same period when Mount Mitchell was logged, it has significant remaining old growth, including old growth recognized by the Forest Service within the Middle Creek Research Natural Area. Numerous outstanding landscape features (high mountain peaks, views, unique ecosystems and geological features, beautiful

waterfalls) makes this area an exceptional resource. The landscape context of the Black Mountain area with adjacent and nearby lands (additional national forest wildland areas including Big Ivy, the Big Tom Wilson Preserve, the Blue Ridge Parkway, Mt Mitchell State Park, and the Asheville Watershed) places the Black Mountains WIA in one of the most remote areas in the southern Appalachians, with the natural character that accompanies such a remote setting.

Opportunities for Solitude: The Black Mountain Crest Trail is the highest in the Appalachian Mountains and is considered one of the most rugged and difficult hikes in the East. Several side trails from the South Toe River Valley and the Mount Mitchell area make numerous circuit hikes possible. Hiking the Crest Trail and difficult side trails requires commitment and ability beyond that of the casual day hiker, and the area therefore offers exceptional opportunities for solitude. Off-trail experiences are relatively well known, but not often undertaken. For example, the "wishbone" hikes are committing scrambles on the paths of historical landslides, offering breathtaking views and sometimes terrifying solitude.

Opportunities for Primitive Recreation: The primitive recreation experience available in the Blacks is unmatched in the East. The elevation and ruggedness force visitors to rely on their own skills in inclement and fast-changing weather. Hikers are treated to iconic views of the East's greatest peaks. The Blacks provide an unforgettable and authentic wilderness recreation experience. Seven main peaks (16 if you count subpeaks) are over 6,000 feet in elevation along the Black Mountain Ridge, and the ridge drops below 5,800 feet only once along its 12-mile length. The challenging Black Mountain Crest Trail traversing the crest of this ridge is the highest trail in the entire Appalachian Mountains. Precipitous side trails are memorable in their own right.

Ecological and other values: Extensive spruce-fir forests along the high elevations of the area represent one of the most extensive reserves of this ecological type in the Southern Appalachians. A number of rare species and rare habitats are found in the area. The Middle Creek Research Natural Area within the area recognizes unique old growth forest and important ecological communities. There is a total of approximately 3,064 acres of existing old growth forest within the area. Part of the South Toe River basin, the area has unique high-elevation communities including virgin spruce-fir forest at upper elevations. The State of North Carolina has identified three Natural Heritage areas within the Black Mountains area. Numerous rare species occur, including disjunct species typically found hundreds of miles further north. The Black Mountain/Celo Knob and the Upper Bolens Creek Significant Natural Heritage areas lie within this area (7,524 acres of State Natural Heritage Areas within this PWA). Opportunities to increase the ecological representation of ecological types that are currently under-represented in the Wilderness Preservation system include a variety of ecological types especially Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; Appalachian Montane Oak, and Small Stream and Riparian. Because the Blacks were formed by a younger upthrust (compared to the rest of the Blue Ridge), they offer a unique geology.

3. Jarrett Creek

In the Draft Plan, Alternatives B, C, and D would allocate this MT to Backcountry. **We agree with this allocation and recommend the Jarrett Creek MT area be allocated to Backcountry.**

Naturalness: The Jarrett Creek area lies in the heart of a complex of wildlands that are either currently protected, such as the privately owned Montreat Wilderness and Asheville municipal watershed, and Mountain Treasure Areas within the Pisgah National Forest that are prime candidates for Wilderness designation—the Black Mountains and Mackey Mountain Potential Wilderness Areas. As recreational use on the Pisgah District has increased, Jarrett Creek has provided an outlet for users who seek greater solitude. The beauty of Jarrett Creek places it in the top 10 of all creeks on the Pisgah/Nantahala National Forest. In the remote and steeper northeastern part of this area, the creeks are much more difficult to reach, and course down over low falls and cascades. Many of the high coves have old-growth stands of timber, bypassed because of the steep topography. In fact, the largest known tree on Pisgah National Forest, a yellow poplar 18 feet around and 122 feet tall, grows on an unnamed stream on the slopes of Laurel Knob.

This area can be viewed from the Blue Ridge Parkway, which acts as its northern boundary. The Curtis Creek Road forms its eastern boundary. Pritchard Creek, Jarrett Creek, Newberry Creek, and Curtis Creek drain from the ridges below the parkway and into the rugged coves below. Part of this area was included in the first National Forest acquisition under the Weeks Act, adding historical interest and value to this tract.

Opportunities for Solitude: The rugged terrain of Jarrett Creek provides abundant opportunities for solitude that are also accessible from Asheville and the Blue Ridge Parkway.

Opportunities for Primitive Recreation: Trails once crisscrossed the area. They followed gentle gradients and opened the area to full exploration. Regrettably, the Forest Service has abandoned most of them. This is an ideal place for volunteer maintenance crews to restore the old trails. The usual route into Jarrett Creek is by a trail that leads east from the Heartbreak Ridge Trail. After crossing a timber harvest road it deteriorates badly. Beyond Jarrett Creek, this now-unmaintained trail leads up a beautiful hollow to Star Gap, and from there down to Newberry Creek. Also at Star Gap, the old Iron Mountain trail could provide a hiking alternative to Heartbreak Ridge, which has become popular with mountain bikers. The area has also recently become known as a world-class trail running destination because of its many difficult and long loop options.

The most-used trail here is the Heartbreak Ridge Trail which follows a long ridge from the Blue Ridge Parkway to a turn onto 21 switchbacks that lead down to Pritchard Creek and out to a road on Mill Creek. The steepest trail is that up Snooks Nose, which leads from the Curtis Creek Campground to the Blue Ridge Parkway and across to the fire tower on Green Knob. The Deep Gap trail leads from upper Newberry Creek through ancient forest to the Parkway. These trails,

some highly used and some in need of maintenance, provide excellent connectors between the Blue Ridge Parkway, the Mountains-to-Sea Trail, and the Curtis Creek Campground area.

Ecological and other values: Within the Jarrett Creek Mountain Treasure Area 4180 acres of existing old-growth forest is found. Other important biological resources include Carolina Hemlock Bluffs, extensive Table Mountain pine stands, and high quality cove forests. The area includes one State Natural Heritage Area: Newberry Creek Gorge.

Manageability: Within the 8,975 acres of this area there are 7,500 Inventoried Roadless acres and 4,180 acres of existing old growth forest. The entire watershed is protected from future road construction, though inappropriate road improvements to Newberry Creek Road have been made since this area was inventoried as an IRA. This road should be reclassified to be consistent with IRA status and the area placed in a Backcountry. The road has recently been damaged in storms, and it is likely to deteriorate further and become more expensive, while offering little benefit to management.

4. Mackey Mountain

In the Draft Plan, Alternative B would recommend 13,509 acres of this MT for wilderness, with some portions allocated to Matrix on the eastern side of the area and to Interface on the western side. Alternative C would allocate this MT to Backcountry, with some portions of Ecological Interest Area on the eastern side of the area and small portions of Matrix and Interface on the west edge. Alternative D would recommended 7,872 core acres for Wilderness, with the remainder in Ecological Interest Area and small portions of Matrix and Interface on the west edge.

We recommend that most of the Mackey Mountain MT area be recommended for wilderness, with some portions of Ecological Interest Area on the eastern side of the area.

The Wildlife Resources Commission has expressed concerns about recommending Mackey Mountain as wilderness because of a supposed need for increased prescribed fire, because there are uncharacteristic yellow poplar stands, and because this area is needed for chestnut restoration.

As noted in connection with other WIAs above, hundreds of thousands of acres across the landscape are available for chestnut restoration, and this area is generally too steep and inaccessible to make it a good candidate, and the need to remove yellow poplar stands has not been verified—it is merely speculative. In any case, such restoration would likely be prohibited by the Roadless Rule. As for prescribed fire, constructing fire lines around the perimeter of the area is not physically possible on public land due to steep slopes, and on private land, the Forest Service lacks necessary rights-of-way.

Naturalness: Portions of Mackey Mountain were part of the first purchase of national forest lands under the Weeks Act (Burke-McDowell Tract). Mackey Mountain and the valley of Mackey Creek contain the largest unbroken tract of old-growth forest on the Pisgah National

Forest with 5,476 acres of existing old growth. Many of the ridges hold fragments of old-growth hardwood forest and some of these are accessible by trail. The Clear Creek drainage provides water for the town of Marion and also grows some of the largest trees on Mackey Mountain. Much of the old-growth is in dry, non-productive forest types that were not attractive, nor accessible, to loggers in the early 20th century.

However, the 1912 purchase date did save thousands of acres of old-growth here and in the nearby Jarrett Creek area that provide a glimpse of what the forests of the area were originally. A major portion of the area is protected bear habitat. It sustains a large population of black bear and hikers often see well-worn bear trails and trees marked by clawing.

Opportunities for Solitude: The Mackey Mountain area provides excellent opportunities for solitude. Ridges isolate the area from Forest Service roads and the Blue Ridge Parkway. As a result the area is strikingly absent from human caused sounds. On the other hand, the area is accessible to recreation users. Leaving Curtis Creek Campground or the upper trailhead, visitors will almost immediately find an uncommon solitude and quietness.

Opportunities for Recreation: The Curtis Creek Campground is adjacent to the Mackey Mountain area, and the Hickory Branch Trail leads out of the campground up to the Buckeye Knob Trail. The Mackey Mountain Trail traverses the area through several areas of old growth. Several other routes provide the potential for a great trail system.

Ecological and other values: This area represents significant ecological value with extensive remnant old growth (5,476 acres). Most of the forest that was logged in the early 20th century is recovering mature forest with good ecological integrity. Opportunities to increase the ecological representation of ecological types that are currently under-represented in the Wilderness Preservation system include a variety of ecological types especially Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; Appalachian Montane Oak, and Small Stream and Riparian Forest. Stands of Carolina hemlock are found within the Mackey Mountain Significant Natural Heritage Area. There are 1,944 acres of State Natural Heritage Areas within the Mackey Mountain Area: Mackey Mountain and Beartree Ridge.

Manageability: Consisting of Mackey Mountain and its intersecting ridges, the area contains the entire upper drainage of Mackey Creek. The area is geographically well defined and configured for management as a wilderness area.

5. Woods Mountain

In the Draft Plan, Alternatives B, C, and D would allocate this area to Backcountry, with a very small portion of the southeast corner of the area in Matrix and Interface.

We recommend that the Woods Mountain MT area be in Backcountry, with a very small portion of the southeast corner of the area in Ecological Interest Area. As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate this Mountain

Treasure area in accordance with Alternative C. This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: This is a major roadless area with 9,316 IRA acres, giving protection to a long segment of the Blue Ridge Parkway and its viewshed. Many of the steep, narrow valleys contain old-growth forest. The high percentage of untouched forest makes hikes here a pleasant experience. Woods Mountain provides high quality black bear habitat and is prized by local hunters.

Opportunities for Solitude/Backcountry Recreation: Hiking, mountain biking, and equestrian use are all important in this area. The main trail through the area is a segment of the North Carolina Mountains-to-Sea Trail. Where the trail leaves the Blue Ridge Parkway, it follows a stunning and unforgettable knife-edge ridge, eventually reaching a point near the top of Woods Mountain itself, from which there is a side trail to an old tower site. The trail then descends to a crossing of U.S. 221 near the Woodlawn Work Center. As in so many other areas, the Forest Service has abandoned a large percentage of the trails here. Although the Armstrong Creek Trail has been resurrected, hikers have lost the Singecat Creek Trail. Neglect has claimed many other significant trails. Renewed interest in the area is apparent, however, and volunteer maintenance should be allowed to restore the trail system and make this area more available for backcountry recreation.

Ecological and other values: The rare turkey beard and the unusual chinquapin are common in the area. Woods Mountain has the only population of mountain golden heather outside of Linville Gorge. This species is islanded on treeless, rocky summits that are maintained by fire. Other areas of botanical interest include the rich cove forests at Bee Rock Creek and "Nettle Patch." This area has 1,727 acres of old growth forest. This area contains one State Natural Area.

Manageability: The area is bordered by the Blue ridge parkway and other roads that make management as Backcountry feasible.

E. Blue Ridge Escarpment Conservation Area

1. Fishhawk Mountain

In the Draft Plan, Alternatives B and D would allocate this MT area to Matrix and Interface, with Special Interest Area allocation on a portion of the west side and two small central areas.

Alternative C would allocate this MT area to Ecological Interest Area with Special Interest Area management on a portion of the west side and two small central areas, and Interface on the southeastern edge.

We recommend that the Fishhawk Mountain MT area be allocated to Special Interest Area with an Ecological Interest Area portion in the center.

Naturalness: The outstanding feature of this gem is its cliffs. A dozen or more rock faces afford the hiker an abundance of long-distance views, at least one in every direction.

Opportunities for Solitude/Backcountry Recreation: At Jones Gap the springtime blossoms of trillium and other ephemerals make a dazzling display of color. It's worth a trip just to see them. There is much private land surrounding Fish-hawk, and it is being hemmed in by development. That makes protection of this area even more critical.

The North Carolina Bartram Trail bisects this Mountain Treasure, running generally along the crest of a long ridgeline. It is well marked and a corps of volunteers fully maintains it. There are several good camping sites with plentiful water along the trail.

Ecological and other values: This area contains the following State Natural Heritage Areas: Cedar Cliff/The Pinnacle and Jones Knob/Whiterock Mountain.

The cliffs provide excellent nesting habitat for peregrine falcons. Cedar Cliff, on the western end of the area, is a rock face on which cedar trees have gained a toehold, pushing their roots into fissures on the cliff's hot, southern exposure. These ancients have clung there for over a century in one of the most adverse environments imaginable.

Botanists consider Cedar Cliff among the best examples of a mountain cedar glade because of its size, diversity and the rare plants it harbors.

2. Overflow Creek

Currently, the Overflow Wilderness Study Area within this area is acknowledged as such, with the remainder of this Mountain Treasure area allocated to the Blue Valley Experimental Forest Management with some small portions at the east and southwest ends placed in Interface and Matrix management.

In the Draft Plan, Alternative B would recommend Wilderness for 3,725 acres, with the remaining portion in Blue Valley Experimental Forest Management on the southeast side.

Alternative C would continue Wilderness Study Area Management in this MT with Backcountry management on the southwest side and Blue Valley Experimental Forest management on the southeast side.

Alternative D would continue Wilderness Study Area Management in this MT with Matrix management on the southwest side and Blue Valley Experimental Forest management on the southeast side.

We recommend that the Overflow Creek MT area be recommended for Wilderness designation, excluding the internal road. Both the west and east forks of Overflow Creek should be found eligible for Wild and Scenic River designation.

Naturalness: Overflow Creek, within the congressionally designated wilderness study area, is one of the three chief tributaries that join to make the West Fork of the Chattooga River, which is protected within the National Wild and Scenic Rivers System. This area, which adjoins the Three Forks Mountain Treasures Area in Georgia, provides important watershed protection to the downstream designated Wild and Scenic Chattooga River. An overlook, south of Highlands, from NC HWY 106 highlights Blue Valley and is a popular scenic view as well as an access point to the Bartram Trail.

Opportunities for Solitude: Wilderness designation for this WSA would permanently safeguard the existing opportunity for solitude in this area. Protecting this area as Wilderness while ensuring access via USFS Rd 79 would maintain the historical use of the area, with a gradient of solitude providing higher use along the road corridor and greatest solitude around the Bartram Trail to the west, while also protecting the water quality and recreation so enjoyed within the area.

Opportunities for Recreation: The Bartram Trail crosses from south to north along the western side of the area, and Overflow Creek is a popular local fishing and hunting destination. The Bartram Trail connects this area to other excellent recreational and scenic resources.

Ecological and other values: This Mountain Treasure Area has 315 acres of old growth forest. Glen Falls creates a “spray cliff” habitat important for several species of mosses and liverworts. The Blue Valley Experimental Forest was established in 1964 to provide a focal area for silviculture research of eastern white pine and associated hardwoods, the 1200-acre Blue Valley Experimental Forest is located near Highlands, North Carolina. Blue Valley typifies white pine-dominated portions of the southern highlands escarpment. The experimental forest area receives more than 70 inches of precipitation annually, but has infertile soils derived from decomposed granite. The NC Natural Heritage Program has identified three State Natural Heritage Areas in this area: Little Scaly Mountain, Glen Falls, and Brushy Face Mountain/Brooks Creek Waterfall.

Manageability: This Wilderness Study Area and WIA lie immediately below the intensely developed Highlands, NC area. There is much local interest in permanently protecting this area from development. There are numerous communities of old-growth timber in this area, especially in the isolated coves. The proposed Bob Zahner Wilderness Area for this area in 2010 excluded the popular Glen Falls scenic hiking destination, a buffer along NC Hwy 106 to allow for overlook maintenance, as well as the exclusion of USFS Rd 79 that follows a portion of Overflow Creek and has roadside camping sites. The NC Bartram Trail Society is the

maintaining trail club for the Bartram Trail, and has pledged to maintain the portion of the trail that runs through this area according to Wilderness tool standards. As the principal drainage of Overflow Creek, this area is geographically well defined and configured for management as a wilderness area.

3. Terrapin Mountain

In the Draft Plan, Alternatives B and D would designate Backcountry management for the north-central portion, Wild and Scenic River Corridor management through the western side, and the remainder in Matrix.

Alternative C would designate Backcountry management, Wild and Scenic River Corridor Management through the western side, with a center portion in Matrix and a small area in Ecological Interest Area.

We recommend that the Terrapin Mountain MT be in Backcountry, with a center portion in Matrix, Interface, and a small area in Ecological Interest Area. Although we recommend this area for Backcountry, we again remind the agency that it should have been included in at least one alternative as recommended wilderness. This recommendation was strongly urged by a significant portion of the local public, and it is qualified to be designated as wilderness.

Naturalness: This rock-sided haystack is one of the most prominent features of the area between the resort towns of Highlands and Cashiers, NC. Precipitous rock faces rising 500 to 800 feet encompass both the south and west sides of Terrapin. Fowler Creek has its origin in the southeast part of this area. Its headwaters gather in a U-shaped amphitheater of rock cliffs, difficult of access, and isolated and remote in feeling.

The Chattooga Wild and Scenic River flows along the western boundary of this Mountain Treasure through the rugged, remote and biologically important Chattooga Cliffs reach. From the top of Terrapin's western cliffs, hikers have a direct and unimpeded view of Whiteside Mountain, looking directly across the river valley and the vale of Grimshawes. To the north is Little Terrapin, which repeats the cliffs of the main peak. If anything, Little Terrapin is steeper, and demands considerable technical ability from climbers. To the northwest is Bear Pen Mountain. The rounded top of this high point is clothed in old-growth hardwood forest.

Opportunities for Solitude/Backcountry Recreation: There are no trails in the Terrapin Mountain Treasure. The hiker here needs either local knowledge or well developed map navigation skills, but the rewards are well worth the effort. An old logging road approaches the base of Bear Pen Mountain.

Ecological and other values: The biological values present in the Terrapin Mountain Treasure equal the scenic and recreational values. Rare plants include numerous bryophytes, like *Plagiochila shapii*, and vascular plants like granite dome goldenrod. Many rare animals and the high quality water of the Chattooga River are attractions for those inclined to wildlife watching and fishing. This area contains the following State Natural Heritage Area: Terrapin Mountain.

Manageability: The rugged nature of the area and the presence of the Wild and Scenic River Corridor make the area best suited to management as a backcountry area. As a single mountain, this area could effectively be managed for the special values described above.

4. Ellicot Rock Wilderness Extension

In the Draft Plan, Alternative B would recommend 570 acres for Wilderness. Alternative C would allocate this MT to Backcountry, and Alternative D would allocate this area to Matrix.

We recommend that the entire Ellicott Rock Wilderness Extension MT area be recommended for Wilderness designation.

Naturalness: This area is roadless and contiguous with the existing designated Ellicott Rock Wilderness Area. It is also in close proximity to the Chattooga Wild and Scenic River corridor. The addition adds to the natural integrity and solitude of the existing wilderness area.

Opportunities for Solitude: The addition would add to the opportunities for solitude of the existing wilderness area.

Opportunities for Recreation: The addition would protect the recreation corridor from Ammons Branch trailhead into the wilderness, expanding recreational opportunity and providing consistency of management and continuity of experience for visitors. Currently, a short trail is open to mountain biking. However, the mountain biking community has indicated that losing access to this trail would not be problematic. (See Partnership 2020 Agreement.)

Ecological and other values: The extension would add to the ecological integrity of the existing wilderness area. There is one State Natural Heritage Area within the extension: Hawkins Rockhouse.

Manageability: The extension would add to the manageability of the existing wilderness boundaries by eliminating a sliver of incongruent management adjacent to the existing wilderness at the edge of Forest Service ownership. Approximately 27 acres of old growth are documented in the area.

5. Panthertown Valley

In the Draft Plan, Alternative B would allocate the core of this MT to Special Interest Area with the remainder in Backcountry. Alternative C would allocate the core of this MT to Special Interest Area with the remainder in Ecological Interest Area. Alternative D would allocate the core of this MT to Special Interest Area with the remainder in Ecological Interest Area, and Matrix on the eastern portion.

We recommend that the Panthertown MT area have a Special Interest Area core and Backcountry management for the remainder. Both Panthertown and Greenland Creeks should be found eligible for Wild and Scenic River designation. As compared to this

recommendation, the Nantahala-Pisgah Forest Partnership proposal would start with Alternative C but shift approximately 2,132 acres from Matrix to EIA. *See* Att. 51 (map of 2020 Partnership allocations proposal). This would result in less protection that we would otherwise support. However, we can support this compromise among Partnership members, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: Panthertown Valley, is often referred to as the "Yosemite of the East" because of the massive rock outcrops soaring up to 800 feet high to surround the level valley floor. This 8,765-acre Mountain Treasure is the unspoiled headwaters of the Tuckasegee River, which begins where Greenland and Panthertown Creeks join in the valley and then drops through the nearly inaccessible Devil's Elbow gorge. Other tannic streams tumble into the valley as well. The valley is geologically unusual in having a flat, sandy bottom bordered by the big rock knobs.

There is a very unusual large bog bordered by a pine forest lying along Panthertown Creek between Big and Little Green Mountains. Among the scenic delights of the area are its waterfalls, with a large one on Greenland Creek east of the Little Green. Panthertown Creek cascades just northeast of the bog and again upstream, northwest of Big Green Mountain. The Mountain Treasure runs all the way to the Bonas Defeat Gorge of the Tuckasegee River and there is a 250-foot waterfall on Flat Creek in this area.

Opportunities for Solitude/Backcountry Recreation: This exquisite piece of wild land, once severely clear cut, is today a place of outstanding recreational value, with its exceptional trout streams and a wide variety of exploring possibilities on trails that follow old logging roads. Panthertown attracts many outdoor enthusiasts including hikers, mountain bikers, equestrians, rock climbers, photographers, anglers and birders. Panthertown is contiguous with the essentially trackless Big Pisgah area, with its rocky outcrops and the extraordinary Dismal Falls. Many hikers still follow the unofficial "Carlton" trails.

Ecological and other values: Biologically, Panthertown is noted for its extensive mountain bog and high quality grantite domes, all of which have several rare species. This areas has 246 acres of old growth forest. This area contains the following State Natural Heritage Areas: Panthertown Valley and Big Pisgah Mountain/Dismal Falls.

F. Highlands of Roan Conservation Area

1. Nolichucky Gorge

In the Draft Plan, Alternatives B and D allocate the core of this MT area to Backcountry with the remainder in Matrix and Appalachian Trail Corridor. Alternative C allocates the core of this area to Backcountry with the remainder in Ecological Interest Area, Matrix, and Appalachian Trail Corridor.

We recommend that the Nolichucky Gorge MT area have a Backcountry core, with the remainder in Ecological Interest Area, Special Interest Area on the south side, and Matrix on the north side, as in Alternative C.

Naturalness: The 5,646-acre Nolichucky Gorge Mountain Treasure lies within the steep, scenic gorge along both sides of the Nolichucky River as it winds from North Carolina into Tennessee. A companion Mountain Treasure area is in Tennessee, with the Nolichucky Gorge forming the boundary of this area. A railroad line runs along the river in the gorge. The best form of protection is probably National Wild and Scenic River designation in combination with protection for the upper slopes of the gorge.

Opportunities for Solitude/Backcountry Recreation: The Nolichucky River through the gorge in North Carolina and Tennessee is very popular for rafting, kayaking, and other white water sports. The Appalachian Trail runs through the Tennessee portion of the Nolichucky Gorge area.

Ecological and other values: A North Carolina Natural Heritage area includes most of the gorge and extends to the rim. This wildland area is home to the very rare Virginia spiraea, a federally listed threatened plant, as well as other unusual plants such as necklace sedge and rock skullcap. A large area of verified old-growth (460 acres) stands on the slopes of the north side of the gorge. The Forest Service recognizes almost the entire area as a large old-growth patch. There are 746 total acres of Old Growth forest. This area contains a State Natural Heritage Area: Nolichucky River Gorge.

Manageability: The Forest Service recommended National Wild and Scenic River designation in March of 1994. Surrounding lands outside the wild and scenic study corridor complement the lands closer to the Nolichucky River. Some of these lands have been logged in the past, but are contiguous to the core wild area and deserve protection.

2. Highlands of Roan

In the Draft Plan, Alternatives B, C, and D designate this area to Roan Mountain MA, with a small Heritage Corridor bisecting the area.

We recommend that the Highlands of Roan MT area be allocated to Roan Mountain MA and be managed consistent with adjacent Cherokee National Forest management in Tennessee.

Naturalness: The Highlands of Roan are biologically, geologically and geographically unique. Old Growth is known in the area but specific surveys are lacking. Great extensive natural balds, expanses of spruce-fir forest, high elevation seeps, rock outcrop communities, dwarfed northern hardwood forest, and extensive rhododendron gardens comprise some of the exceptional mix of unique habitats on the Highlands of Roan.

Opportunities for Solitude: The extensive balds provide unique and valuable opportunities for solitude not often found on other grassy balds that have less open acreage.

Opportunities for Recreation: The Appalachian Trail climbs over the steep and beautiful mountains of this wildland for over 19 miles. Scenic North Carolina Route 261 (Tennessee Route 143) crosses the area at Carver's Gap, where the Appalachian Trail also crosses the area. A Forest Service road takes visitors to the nearby rhododendron gardens.

Ecological and other values: See Naturalness, above.

The balds themselves lie between 5,400 feet and 6,100 feet in elevation and cover hundreds of acres. Vegetation includes sedges, grasses, and wildflowers, many of which are globally rare or endemic species. Heath shrubs, including flame azaleas and Catawba rhododendron, cover the margins of the balds. Atop massive 6,285-foot Roan Mountain, rhododendron gardens cover an area of 600 acres in three natural masses. The display of blooming Catawba rhododendron in this area is the finest and most extensive in the world.

The Highlands of Roan are world renowned for their biotic diversity. The area is listed as a biological hotspot and North Carolina includes the entire Mountain Treasure as a state Natural Heritage area. Over 800 species of plants grow here. More nationally or regionally ranked plant species are found on Roan Mountain than on any other site in the mountains of the Southern Appalachians. And between them, North Carolina and Tennessee recognize as rare 250 species of plants found on the Highlands. Rare animal species here include Appalachian cottontail, Southern Appalachian saw-whet owl, alder flycatcher, hermit thrush, least weasel, and Carolina northern flying squirrel. Many of the plants and animals are disjunct species whose typical range is hundreds of miles to the north up the Appalachian chain. This highlights the important role Roan Mountain has played as a refuge for plants and animals.

The forests around the bald are also unique. Northern hardwood communities reach possibly their best expression of any in the Southern Appalachians in the forests on the slopes of Roan Mountain, where old-growth stands also occur on the mountain. The slopes around the balds are recognized in a Forest Service old-growth patch. Forests around the edge of the bald contain dwarfed beeches 250 years old but only a scant 12 inches in diameter.

G. Nantahala Mountains Conservation Area

1. Ash Cove

In the Draft Plan, Alternative B would allocate this MT to Matrix, Alternative C would allocate it to Backcountry with a small area in Ecological Interest Area, and Alternative D would allocate it to Backcountry, Matrix, and Ecological Interest Area.

We recommend that the entire Ash Cove MT be allocated in Backcountry.

The Ash Cove Mountain Treasure is on the eastern end of the Snowbird Mountains that rise above Andrews, NC. The Snowbird ridgeline carries the old western extension of the Bartram Trail. With completion of the Bartram Trail to Cheoah Bald, the Forest Service abandoned the western extension. The Cheoah Ranger District now refers to this old trail as the Valley River Trail. There is strong interest in reclaiming this as a system trail.

Teyahalee Bald is the prominent summit on the ridgeline, which frames the pastoral valley from a hiker's vantage point on the Fires Creek Rim Trail. The Piercy Bald Mountain Treasure is close to Ash Cove on the northeast end and the Ash Cove Mountain Treasure should be considered together with the Piercy Bald unit as a smaller but representative sample of a primitive area in need of protection.

2. Cheoah Bald

In the Draft Plan, Alternatives B, C, and D would allocate this MT area to Backcountry and Appalachian Trail Corridor, with a small area in Special Interest Area on the southeastern side bordering the Nantahala River.

We recommend that the entire Cheoah Bald MT area be in Backcountry. The overlap of the Appalachian Trail with Inventoried Roadless Area here requires stronger standards and guidelines for management that will protect its roadless characteristics. The Plan must clarify that the stricter standards applicable to IRAs will control.

Naturalness: The Cheoah Bald Area contains forest with exceptional ecological integrity. Almost 5,000 acres of the forest is existing old-growth that has been documented in the area. The Cheoah Bald roadless area once encompassed over 21,000 acres. But logging and road building during the 1980s and 1990s reduced the size of the inventoried roadless area to 7,810 acres. However, most of the forest within the Mountain Treasure Area is in natural condition and the larger area is still exceptionally wild, with tremendous biological, scenic, and recreational values. Conservationists urge the protection and restoration of the larger area through, among other things, the decommissioning of some of the logging roads which are not being maintained.

Opportunities for Solitude: The Cheoah Bald Area provides excellent opportunities for solitude. Rugged terrain, innumerable coves, and the rich forest with large trees provide many

places where sights and sounds of development are absent. The deep crevices of Ledbetter Creek are at most a mile away from Highway 74, but it is a mile that takes many hours to traverse.

Opportunities for Recreation: Almost 10 rugged miles of the Appalachian Trail traverse the area. The Trail runs over Cheoah Bald, at 5,062 feet the "grandstand of the Appalachians," offering expansive views toward the Nantahala gorge and, from a nearby rock outcrop, Stecoah Valley. The Bartram Trail also traverses and ends at its intersection with the Appalachian Trail, providing the opportunity for long hiking adventures. The Appalachian Trail's Sassafras Gap shelter stands near the center of the area. The Nantahala River runs through the spectacular Nantahala Gorge along the southeast border. The Forest Service plans to study the Nantahala River for suitability for National Wild and Scenic designation.

Ecological and other values: The Cheoah Bald Area is believed to be the northern endpoint of William Bartram's travels through the Southern Appalachians and is the current terminus of the Bartram Trail. The mountain is home to the endemic Cheoah bald salamander, which has not been fully studied, other rare species like the cerulean warbler, and globally rare plant species like sweet white trillium and mountain catchfly. The bald offers sweeping views northward of the Smokies, Stecoah Valley, the site of a Cherokee town, and portions of Lake Fontana. To the northwest are views of the Yellow Mountains, Joyce Kilmer and Snowbird, and to the south the Wesser / Tellico / Wayah Ridge, Piercy Bald, Ash Cove, and Tusquitee. The area includes three Significant Natural Heritage Areas: Cheoah Bald, Tyre Knob/Bert Creek, and Stecoah Gap Cove Forests.

Manageability: The Cheoah Bald Area includes Cheoah Bald and its slopes. It is bordered by the Nantahala Gorge and other features that would make its management as backcountry feasible and desirable.

3. Tusquitee Bald

In the Draft Plan, Alternative B recommends 19,230 acres for wilderness, with Matrix at the core, with a small Heritage Corridor on the northeast side and Backcountry on the southeast side.

Alternative C allocates this area to Backcountry, with Ecological Interest Area at the core, with a small Heritage Corridor on the northeast side. Alternative D recommends 15,984 acres for wilderness with Matrix at the core, with a small Heritage Corridor on the northeast side and Backcountry on the southeast side.

We recommend that 19,431 acres of the Tusquitee Bald MT area be recommended for wilderness, with Backcountry and Ecological Interest Area management for the remainder of the area. Nine miles should be added to Fires Creek for Wild and Scenic River designation.

The Wildlife Resources Commission has suggested that this Mountain Treasure should not be recommended for wilderness due to the fact that much of the proposed wilderness area is fire adapted and in need of restoration activities that would include prescribed fire. However, this

ignores the fact that within the Tusquitee Bald WIA, there is very little access or potential for creating fire lines due to a lack of Forest Service access across private land and the extremely steep terrain in Forest Service ownership. In addition, acid-bearing rocks are common in the Valley River and Tusquitee Mountains, and road or fire line construction could expose rocks that would harm water quality in this Outstanding Resource Water (ORW) watershed.

In addition, the Commission suggest that the area includes acreage of uncharacteristic white pine and yellow poplar that require vegetation treatments, and that this area contains acreage that is appropriate for potential chestnut restoration opportunities.

As for the uncharacteristic stands, the reported acreages of uncharacteristic poplar and white pine are speculative and are based on GIS analysis only; they are not ground-truthed. But more importantly, timber harvest to accomplish restoration of these stands in the Tusquitee Bald area would be prohibited by the Roadless Rule across the majority of acreage in this area.

As for chestnut restoration, while we support these efforts across the landscape, Tusquitee Bald would be among the most difficult, expensive, and inefficient locations to pursue this work given the difficulty of access and steepness of terrain. Furthermore, there are hundreds of thousands of acres across the landscape where chestnut restoration could occur. The availability of the Tusquitee Bald WIA would not result in the loss of any meaningful opportunity to pursue American chestnut restoration.

Naturalness: The entire Fires Creek Watershed is included within the Tusquitee Bald Mountain Treasure Area. The watershed is designated by the state of NC as Outstanding Resource Waters, trout waters, and water supply watershed. The area is one of the largest, unprotected primitive areas in the Nantahala National Forest. Over 13,000 acres have been inventoried as roadless. The area consists of a horseshoe-shaped rim of mountains rising from 1,900 feet on the southwest end of the horseshoe to 5,200 feet on the northeast end. Fires Creek drains the 15,000 acre interior basin, which is a bear sanctuary, a wildlife management area, and a North Carolina State Natural Heritage Area. The only road access from outside the basin is from the southwest near Leatherwood Falls. To the northeast is the adjoining Piercy Bald Mountain Treasure area. To the southeast, the Boteler Peak area joins at Big Tuni Creek and the Bob Allison Campground.

Opportunities for Solitude: The area is accessed from a road along Fires creek, but it is easy to find solitude within the area. The rugged rim of this area provides an authentic wilderness experience. The trail network provides many different options for loops and point-to-point excursions, making it possible to use the area without encountering other visitors. The Forest Service's evaluation suggests that portions of the rim do not offer solitude because of outside sights and sounds, but those observations are based only on topographic "desktop" analysis; they do not reflect the actual experience of a hiker on the trail. Hikers who have been to these areas, including the authors of these comments, report little or any intrusion from sights and sounds outside the area. In fact the area is known for its natural sights and sounds.

Opportunities for Recreation: The area is rich with hiking trails. The principal trail, and one of the premier backpacking trails in western North Carolina, is the 26-mile Rim Trail which circles the basin on the sometimes knife-edged ridge, affording excellent views.

Chunky Gal Trail leaves the Tusquitee Bald area and runs southeast down Big Tuni Creek to the Boteler Peak Mountain Treasure area and on to join the Appalachian Trail at White Oak Stamp in the Southern Nantahala Wilderness. The Old Road Gap Trail runs northeast from the Tusquitee Bald Area to the Piercy Bald Mountain Treasure Area, providing access here to the North Carolina sections of the Bartram Trail and the Appalachian Trail. Trout fishing in Fires Creek and several other streams in the basin is excellent. Equestrian users value this area highly.

Ecological and other values: The pristine waters of Fires Creek support several rare aquatic species including Hiwassee Headwaters Crayfish and Hellbender. The rare southern water shrew inhabits the streamside zone as does one of the largest and most robust populations of the rare mountain camellia. The area has at least 4,007 acres of existing old growth forest. With an elevation gradient extending from 1,600 feet to 5,200 feet in one of the most southern natural areas and intact watersheds in Western NC, it offers excellent opportunity for climate adaptation through species adapting through movement along this gradient. The area also ties in with the greater network of natural areas in the Nantahala Mountains connecting from the east with Boteler Peak, Chunky Gal and Southern Nantahala Wilderness and to the north with other areas of the Nantahala Mountains and the Unicoi Mountains.

Opportunities to increase the ecological representation of ecological types that are currently under-represented in the Wilderness Preservation system include a variety of ecological types especially Appalachian Montane Oak, Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; and Small Stream and Riparian.

Two State Natural Heritage Areas are located wholly or partly within the extensions: Fires Creek Rim /Fires Creek Gorge and Western Valley River Mountains.

Manageability: As a self-contained watershed within a defined horseshoe mountain structure, the Tusquitee Bald area is extremely manageable. Road and other infrastructure along the main Fires Creek corridor provides access for maintenance and recreation, while the rugged slopes and mountains above the valley provide opportunities for solitude and primitive recreation.

4. Boteler Peak

In the Draft Plan, Alternatives B and D allocate this area to Backcountry and Matrix. Alternative C allocates this area to Backcountry and Ecological Interest Area.

We recommend that the Boteler Peak MT be in Backcountry and Ecological Interest Area. As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate approximately 1,306 acres of this Mountain Treasure to Matrix. *See* Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA

allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: The Boteler Peak Mountain Treasure area connects to the Tusquitee Bald area to the northwest and the Southern Nantahala Wilderness area to the southeast. The area around Boteler Peak and the Upper Perry Creek area both contain verified old growth totaling over 900 acres. The value of this area is enhanced by its habitat connectivity, biological diversity, and long-distance backpacking opportunities.

Opportunities for Solitude/Backcountry Recreation: The Chunky Gal Trail traverses the Boteler Peak area and passes beside Boteler Peak. An overlook on Boteler Peak affords a splendid view of the wild lands to the north. The Chunky Gal Trail connects southeast to the Appalachian Trail near White Oak Stamp and going northwest, extends 22 miles to Tusquitee Bald. Hikers can take the Old Road Gap Trail out of the Tusquitee Bald area to connect to the trails in the Piercy Bald unit and then to the North Carolina Bartram Trail near Sutherland Gap. The Bartram Trail also leads north to intersect the Appalachian Trail again at Cheoah Bald. A 135-mile hike south on the Appalachian Trail returns hikers to the eastern starting point of the Chunky Gal Trail at White Oak Stamp. This exceptional long-distance hiking loop affords a high-quality backcountry recreational experience.

Ecological and other values: The Boteler Peak Mountain Treasure area serves as a vital corridor for bear to travel between the sanctuary in the Tusquitee Mountain Treasure area and the Southern Nantahala Wilderness. The eastern side of this Mountain Treasure area has outcrops of serpentine rocks which result in very unusual and rare plant association and is noted for its abundance of rare species and one-of-a-kind serpentine barren. At least 17 rare species have been reported from the serpentine barrens, including Rhiannon's aster, found nowhere else. The area contains over 900 acres of verified old growth forest.

Two NC Significant Natural Heritage Areas are found within the Boteler Peak Mountain Treasure area: Glade Gap Slopes and Buck Creek Serpentinized Olivine Barrens.

Manageability: The Forest Service dates some stands in this area from the 1700s–and these are truly primeval forest–while other portions of the Boteler Peak area are recovering from extensive logging and should be allowed to continue to heal. There is some need for restoration management in this area, such as continued fire restoration at Buck Creek.

5. Southern Nantahala Wilderness Extensions

In Draft Plan, Alternative B: recommends Wilderness for 9,700 acres, with the remainder in Backcountry and Appalachian Trail Corridor. Alternative C allocates the whole area to Backcountry and Appalachian Trail Corridor. And Alternative D recommends wilderness for 6,170 acres, with the remainder in Backcountry and Matrix.

We recommend 11,207 acres of the Southern Nantahala Wilderness Extension MT be recommended for Wilderness.

Naturalness: Congress designated the Southern Nantahala Wilderness in 1984. Its 24,500 acres straddle the border of North Carolina and Georgia. Standing Indian Mountain, part of a south-facing horseshoe-shaped massif that forms the Tallulah River basin, dominates the area. To the north, ridges radiate from the closed end toward the upper Nantahala River. All of the logical wilderness extensions involve these ridges and all would add to the value and integrity of the existing wilderness. Most of the included forest is well-developed recovering mature forest fed by rich amphibolite soils or actual remnant old growth forest.

Opportunities for Solitude: This extension of the existing Southern Nantahala Wilderness is a key in creating a primitive backpacking corridor between the Southern Nantahala and areas to the north and west. Numerous trails provide access to the Southern Nantahala Wilderness area, many originating or traveling through the proposed extensions. The Appalachian Trail runs along the east boundary of the area coming north from Georgia. Chunky Gal Mountain is a major spur of Boteler Peak to the northwest, and provides a trail corridor to the Boteler Peak Roadless Area and beyond to the Tusquittee Roadless Area. The heart of the largest western segment is Chunky Gal Mountain which stretches from the Tennessee Valley Divide to Boteler Peak. Chunky Gal Mountain contains 1,523 acres of old-growth. The area connects to the Boteler Peak unit at Glade Gap and allows hikers and game to move freely into Tusquitee Bald and Cheoah Bald further north. It contains the Appalachian Trail, the Chunky Gal Trail and other day hiking trails that get extensive use. The hike along Chunky Gal Mountain on the namesake trail passes by wonderful old-growth oaks. Forest visitors also use the trails near the Standing Indian campground extensively.

Opportunities for Recreation: It is hard to separate the solitude and recreational experiences in this area. Southern Nantahala, with these extensions, forms a hub for long-distance, primitive use, connecting other intact natural areas.

Ecological and other values: The extensions include 1,715 acres of existing old growth forest. Whiteoak Stamp within the proposed Chunky Gal extension contains a rare high elevation mountain bog. Muskrat Cove contains additional likely existing old growth forest as well as nutrient rich amphibolite rock that produces a lush diversity of plant life. The extensions also include rare Montane Cedar-Hardwood Woodland communities. Another important biological site is Riley Knob, which is influenced by nutrient-rich amphibolite rock and is home to one of the largest populations of the globally rare glade spurge. Falls Branch, Barkers Creek, and

Commissioner Creek are beautiful mountain streams that flow south into Betty Creek. Like much of the Nantahala Mountains, nutrient rich amphibolite rock produces a lush diversity of plant life and this section of the Mountain Treasures supports five occurrences of Montane Cedar-Hardwood Woodland, a natural community that is habitat for many rare plants and animals. This extension of the existing Southern Nantahala Wilderness is a keystone in creating a wildlife corridor between the Southern Nantahala and areas to the north.

Opportunities to increase the ecological representation of ecological types that are currently under-represented in the Wilderness Preservation system include a variety of ecological types especially Appalachian Montane Oak, Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; Appalachian Bog and Fen, and Small Stream and Riparian. Five State Natural Heritage Areas are located wholly or partly within the extensions: Doubletop Mountain/Cedar Cliff Mountain, Pickens Nose/Little Ridgepole Mountain, Standing Indian Mountain, White Oak Stamp, and Chunky Gal/Riley Knob.

Manageability: Originally proposed as a 40,000-acre wilderness area, the undesignated portions of this area have maintained their wilderness character. The proposed extensions would make more logical and manageable boundaries than the existing boundaries. An example of this is Little Indian, essentially the basin of Little Indian Creek that feeds into the Nantahala River to the north-northeast. Congress arbitrarily set the north and east boundaries of the Southern Nantahala Wilderness to follow the 4,400-foot contour line rather than to the logical physical boundary of the Nantahala River. Protection of the Little Indian unit would correct the problem. Notably, the inholding in the Chunky Gal area does not preclude wilderness recommendation because it will soon be in National Forest ownership. We also note that the Buck project decision included logging within the area we are recommending as wilderness. It was highly inappropriate to include these stands in the project. Even though the decision defers implementation until after plan revision, the agency's investments in the project threaten to prejudice the planning decision. Still, the final plan decision can correct this mistake.

6. Tellico Bald

In the Draft Plan, Alternatives B and D allocate the core of this area to Backcountry with the rest in Appalachian Trail Corridor and Matrix. Alternative C allocates this area to Backcountry and Appalachian Trail Corridor with portions of Ecological Interest Area on the outer edges.

We recommend that the Tellico Bald MT area be in Backcountry with portions of Ecological Interest Area on the outer edges. As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate 913 acres of the Mountain Treasure from EIA and Backcountry to Matrix. *See* Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of

remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: This 12,522 acre high altitude area is characterized by dense, high elevation old-growth forest. FS 7114 penetrates the area from Kyle to the west, and ends at the ridge crest. The eastern portion of this road, down Burningtown Creek, has been closed and abandoned. The Tellico Bald Mountain Treasure is at the heart of one of the largest expanses of public land in the region. The special places in this mountain area are too numerous to name; however, the outcrops of Cliff Ridge and the Rich Cove Forest of DeWeese Creek are two examples.

Burningtown Creek, a tributary of the Little Tennessee River, drains the east side of the area. Several small streams run off the west slopes, all adding their waters to the Nantahala River. Four central peaks–Burningtown Bald, Copper Ridge Bald, Tellico Bald and Black Bald, all over 5,000 feet in elevation–were probably large cattle pastures in pioneer days. Additional historical values date back to Cherokee history. The bed of FS 7114 is the most likely route of the Cherokee trading path from Cowee Town, diplomatic capital of the Middle Cherokee, to Tellico, largest town of the Overhill Cherokee.

Opportunities for Solitude/Backcountry Recreation: The Appalachian Trail bisects the area on a north-south axis. The Cold Spring Trail Shelter serves hikers along this portion of the Trail. The Nantahala Hiking Club, the local maintaining Club of the Appalachian Trail, has expressed their support for all of the Mountain Treasure Areas along the AT to be recommended for Wilderness and are prepared to maintain the trail according to Wilderness standards. The Bartram Trail runs east-west and crosses the Appalachian Trail near the very southern end of this Mountain Treasure area at Wayah Bald. This is a key junction that allows for long-distance hiking loop opportunities in this region.

Ecological and other values: The Tellico Bald Mountain Treasure Area contains 1,846 acres of Old growth acreage. This area contains the following State Natural Heritage Areas: Wayah Bald and Wine Spring Bald and Burningtown Bald/Cliff Ridge.

Manageability: as part of the Appalachian Trail corridor as well as an important piece of the connective corridor along the ridge of the Nantahala Mountains, this area requires a protective designation that would assure its roadless and natural character. Unfortunately, much of this Mountain Treasure is zoned for timber production under the current Forest Plan and the area was impacted by the Horseshoe Timber Sale, which logged over 500 acres.

7. Wesser Bald

In the Draft Plan, Alternative B would recommend 4,093 acres for Wilderness with the remainder in Backcountry. Alternatives C and D would allocate this area to Backcountry, Heritage Corridor, and Appalachian Trail Corridor.

We recommend that the Wesser Bald MT area be in Backcountry, Heritage Corridor and Appalachian Trail Corridor. The overlap of the Heritage Corridor and Appalachian Trail with Inventoried Roadless Area here requires stronger standards and guidelines for management that will protect its roadless characteristics. The Plan must clarify that the Backcountry MA components will control when stricter than other overlapping MA components.

Naturalness: The Wesser Bald Area contains recovering forest in good condition with 1,339 acres of existing old growth. This area recently experienced wildfires that created patches of young forest; it is large enough to support the resumption of natural disturbance dynamics.

Opportunities for Solitude: The area has exceptional opportunities for solitude. The Wesser Creek trailhead is well known, but never crowded. The ascent along Wesser Creek to the AT provides ample solitude, both on the trail and off.

Opportunities for Recreation: This area is a key recreational point, providing access to the Appalachian Trail from the Nantahala River Corridor. The AT runs north to south through this area along the main ridge, with an AT shelter in the center. North of the shelter the Trail descends quickly to a bridge over the Nantahala River at Wesser. This is the location of the Nantahala Outdoor Center and a place for AT through hikers to get mail, showers and supplies. Advocacy by the Nantahala Hiking Club has resulted in the U.S. Forest Service installation of a viewing platform on the old Wesser Bald fire tower which provides outstanding 360-degree views. There is another outstanding view toward Cheoah Bald and the Nantahala Gorge from the "Jump Up" where the AT makes its first real plunge downward into the Gorge over a rocky spine several miles north of Wesser Bald.

The Wesser Creek Trail (the old AT) splits from the AT just north of Wesser Bald and drops very steeply via switchbacks into a deep cove with cliff headwalls. This area is good for spring wildflowers and big trees. There is a closed road north from Tellico Gap and its new parking area to Wesser Bald. The AT takes a much longer route from Tellico Gap to the top to achieve gentler grades.

Ecological and other values: This area contains 1,339 acres of Old-Growth forest, and one State Natural Heritage Area: Wesser Bald.

Manageability: Of 6,655 acres in the Wesser Bald Mountain Treasure Area, 4,094 acres are Inventoried Roadless. As part of the Appalachian Trail corridor as well as an important piece of the connective corridor along the ridge of the Nantahala Mountains, this area requires a protective designation that would assure its roadless and natural character.

8. Piercy Mountain Range

In the Draft Plan, Alternative B would allocate this area to Matrix, with small Interface, Heritage Corridor, and Special Interest Area areas on the eastern edge. Alternative C would allocate this area to Backcountry and Ecological Interest Area, with small Heritage Corridor and Special Interest Area areas on the eastern edge. Alternative D would allocate this area to Matrix and Ecological Interest Area, with small Interface, Heritage Corridor, and Special Interest Area areas on the eastern edge.

We recommend that the Piercy Mountain Range MT area should be in Backcountry and Ecological Interest Area. As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate approximately 1,597 acres of this Mountain Treasure from EIA and Backcountry to Matrix and Interface. See Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: This area is an important corridor for both game and recreationists, providing a continuous, wild corridor between the Southern Nantahala Wilderness and the Cheoah Bald Mountain Treasures areas.

Opportunities for Solitude/Backcountry Recreation: There are 26 miles of developed trails in this area, including a section of the North Carolina Bartram Trail. Clusters of old growth oak are visible from the some of the ridgeline trails. The London Bald Trail travels from Junaluska Gap on the southeast end to the Bartram Trail near Sutherland Gap and stays near the ridgeline with views of the Nantahala Ridge spine and Nantahala Lake. Its many hiking loops offer great day-hiking. The North Carolina Bartram Trail crosses the northern side of the area. A long ridge trail

begins near Junaluska Gap and winds along the high ridge almost the full length of the area. Intersecting this ridge trail are many side trails that offer short loop trips. Another trail along Piercy Creek leads to a trailhead on the Nantahala River and the road which parallels it.

The Appletree Group Camp near the eastern corner of the area is an important destination for larger groups. Campers here can hike out of the campground or by short drives reach a variety of other trails in the western mountains.

Ecological and other values: This area is a significant wildlife corridor, with 2,519 acres of old growth forest. There are 3,054 acres of State Natural Heritage Areas identified: Upper Nantahala Gorge, Piercy Bald/London Bald, and Piercy Range/Kennedy Top.

Manageability: The old-growth forests, high mountains and clear streams of the Piercy Mountains provide first-rate hunting, fishing, and hiking opportunities and habitat for several rare plants and animals, but the wilderness quality of this area is compromised by a network of logging roads and recent logging. This area provides an important opportunity to restore natural values during this planning cycle.

9. Siler Bald

In the Draft Plan, Alternatives B and D would allocate this area to Matrix and Appalachian Trail Corridor. Alternative C would allocate this area to Backcountry and Appalachian Trail Corridor with portions of Ecological Interest Area on the outer edges.

We recommend that the Siler Bald MT area be in Backcountry, Ecological Interest Area, and Appalachian Trail Corridor, as in Alternative C. Where backcountry and Appalachian Trail overlap, this portion of Siler Bald MT area should be in Backcountry. The overlap of the Appalachian Trail with Inventoried Roadless Area here requires stronger standards and guidelines for management that will protect its roadless characteristics. The Plan must clarify that the stricter standards applicable to IRAs will control.

Naturalness: 6,282 Acre Siler Bald, named for the same Siler family that gave its name to a bald in the Smokies, is most important because it protects a long corridor of large areas that the Appalachian Trail strings together. The bald itself is open and planted in grass which the Forest Service maintains by mowing. The Right Prong of Rough Fork drainage on the northeast side of the area is an intriguing deep forest, and relatively untouched. There is no trail into this woodland dell, so caution is advised for those who try to penetrate it, though the successful will be rewarded with a lovely waterfall.

Spring flowers are abundant in the coves around Siler Bald. In the fall, there is usually a bumper crop of grapes and blueberries.

Opportunities for Solitude/Backcountry Recreation: The Appalachian Trail crosses this area from Winding Stairs Gap on U.S. Highway 64 in the south to Wayah Gap in the north. A shelter on the AT provides overnight facilities for through hikers.

Ecological and other values: This area contains the following State Natural Heritage Areas: Roaring Fork/Fire Gap Ridge. The scenic and cultural values of the bald area are exceptional.

Manageability: The presence of outstanding backcountry resources and the Appalachian Trail through the area makes this area suitable for Backcountry management.

10. Alarka Laurel

In the Draft Plan, Alternatives B and D allocate the core of this area to Special Interest Area and the rest in Matrix. Alternative C would allocate the core of this area to Special Interest Area and the rest in Ecological Interest Area. This area was wrongly excluded from the Chapter 70 Inventory and should be evaluated in the Final EIS.

We recommend that the Alarka Laurel MT area be in Special Interest Area management, as in Alternative C.

Naturalness: Alarka Laurel is an unusual high-elevation, flat-bottomed, "hanging" valley located in the Cowee Mountain range. The Walton Smith Interpretive Trail leads the traveler deep into the forest. There are definite changes in the surroundings as one travels along the trail. Laurel and rhododendron thickets cover the initial stretch, then open into hardwood patches with oak and tulip poplar. Soon the path side turns to ferns and moss-covered logs. Fragments of white quartz rock occasionally litter the ground along the path. Many wildflowers also cluster along the way in patches that are mostly labeled. There are trillium patches near the beginning of the trail and fire pink in the last half.

About halfway along the trail large trees that look like hemlocks begin to appear. On closer inspection the large "hemlocks" are actually red spruce. Sadly, the same insect that has devastated pine has been infesting the red spruce as well. The southern pine beetle has caused considerable damage to this old-growth red-spruce, but young red spruce are growing to replace their elders. A boardwalk leads the traveler into the red spruce bog.

With the loss of some of the red spruce the bog has become overgrown with smaller plant species like laurel and rhododendron. The ground level of the bog is not visible from the boardwalk. The main road intersects the end of Walton's Trail and leads directly back to the trailhead.

Opportunities for Solitude/Backcountry Recreation: the Walton Interpretive Trailhead. It includes an open area that is ideal for camping.

Ecological and other values: The Alarka Laurel Mountain Treasure Area is 2,486 acres, with 2,226 acres of State Natural Heritage Areas. The State Natural Heritage Program has recognized the Alarka Laurel SNHA. Native brook trout populate the area's streams. The spruce bog at Alarka is considered biologically unique and irreplaceable.

H. Unicoi Mountains Conservation Area

1. Unicoi Mountains

In the Draft Plan, Alternative B would recommend 8,413 acres for wilderness with the remainder in Matrix. Alternative C would allocate this area to Backcountry and Ecological Interest Area. Alternative D would allocate this area to Backcountry and Matrix.

We recommend that the entire Unicoi Mountains and Cantrell Top MT area be recommended for Wilderness, with Ecological Interest Area management along the USFS roads separating the two areas. This area should also be recognized as part of a much larger contiguous area with the Upper Bald Wilderness Area in Tennessee. As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate 2,491 acres of this Mountain Treasure as recommended wilderness, with the remainder in Backcountry and EIA. *See* Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: The Unicoi Mountain area is contiguous to the Upper Bald River Wilderness Study Area in adjacent Cherokee National Forest in Tennessee, which was recommended for wilderness in the Cherokee National Forest Management Plan and recently designated by Congress. The Unicoi Mountains area would be a sensible, natural addition for wilderness, forming with Upper Bald river a large area in both states of approximately 18,000 acres. On both sides of the state line the forest has recovered from past logging, and now supports a recovering northern hardwood forest among other ecozone types. There are old-growth sites within both the Unicoi Mountain Area and the Upper Bald River Area. Left undisturbed for a few more years, the forest will become awe-inspiring. The Forest Service has placed the Unicoi Mountain area in a large patch for future Old Growth Area.

Opportunities for Solitude: A high ridge marks the North Carolina–Tennessee state line west from Beaverdam Bald to the terminus of Forest Road 50 at Sandy Gap. Sandy Gap is also the trailhead of the Kirkland Creek Trail which goes through the adjacent Upper Bald River Area in Tennessee. The Benton MacKaye Trail, considered an Appalachian Trail alternate trail, follows the state line dividing the Unicoi Mountain Area from the Upper Bald River Wilderness Study Area. Solitude along this nationally significant trail depends on wilderness management of both areas.

Opportunities for Recreation: The Benton MacKaye Trail is a national-caliber long distance recreation trail. Just as the Upper Bald River area protects the northern slopes in Tennessee, the Unicoi Mountains area should protect the southern slope in North Carolina, safeguarding the integrity of the primitive wilderness experience for hikers along the mountain spine. The Benton MacKaye trail generally follows the state line between these two areas. A spur trail to Waucheesi Bald makes a worthy side trip or provides alternate access.

Ecological and other values: This area of the mountains has historical significance. On the west of Forest Road (FSR) 50 the ridge continues to Cantrell Top. Unicoi Gap at the lower end of Cantrell Top is a gap on the old trading trail between the Cherokee town of Tellico and Cowee Town of the Middle Cherokee. This Unicoi Trail crossed from the Hiwassee River drainage into the Tellico River drainage at Unicoi Gap. The Joe Brown Highway today roughly follows the route of the trading route, from Murphy through Unicoi Gap to Tellico Plains. This old trail was recently designated a section of the "Trail of Tears" by Congress as one of the routes by which the Cherokee were removed from the Southern Appalachians and relocated to Oklahoma. Legend holds that a Cherokee chief is buried in the area.

There are old-growth sites within both the Unicoi Mountain Area and the Upper Bald River Area. There is 227 acres of documented old growth within the Unicoi Mountain area. Opportunities to increase the ecological representation of ecological types that are currently under-represented in the Wilderness Preservation system include a variety of ecological types especially Appalachian Montane Oak, Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; and Small Stream and Riparian.

Three SNHAs are located within the Unicoi Mountains area: Long Ridge/Unicoi Mountains, Turner Top, and Peels High Top/Cantrell Top.

Manageability: The area consisting of the Upper Bald River and Unicoi Mountains should be considered one area for its roadless and wilderness characteristics. This is the case for other areas (e.g. the Bald Mountain area that stretches between Pisgah National Forest and Cherokee National Forest). The wilderness characteristics of the two combined areas are greater than the two areas considered separately.

2. Snowbird Creek

In the Draft Plan, Alternatives B, C, and D recommend 8,481 acres of this area for wilderness designation.

We recommend that the Snowbird Creek MT area be recommended for Wilderness, with Ecological Interest Area management for the Lower Snowbird area to the east.

Naturalness: Among many exceptionally significant areas, Snowbird is superlative. It ranks highest of all North Carolina's Mountain Treasures for its conservation significance (see chart above at page 258). The Snowbird Creek watershed is extremely important for its scenic and recreational values as well as its biodiversity and landscape connectivity. After studying Snowbird Creek, the U.S. Forest Service in 1994 found it qualified for protection as a National Wild and Scenic River. The roadless area encompasses the entire upper watershed of the creek, including major tributaries Sassafras Branch and Meadow Branch. The Snowbird Creek watershed is well-known for its trout fishing. The Bemis Hardwood Lumber Company logged the valley in the early 1940s using a logging railroad that changed from standard to narrow gauge at Junction. Because of its low value at the time, most of the hemlock was left, and magnificent

specimens, though dying, are scattered throughout the watershed. Some large American chestnut trees remain at the upper end of the valley. The forest that was logged is recovering well. Above High Falls the creek supports a reproducing population of native brook trout. Hooper Bald, one of the largest balds in the Southeast, lies adjacent to the upper boundary of the area. Near the top of the area is McGuires, site of an old hunting lodge. The pens still stand from which Russian wild boars escaped into the neighboring mountains. Sycamore Creek roadless area adjoins Snowbird Creek on the Tennessee side of the divide to the west, creating a larger contiguous natural area connecting with other wildland areas across the mountain divide in Tennessee.

Opportunities for Solitude: The area is served by an extensive network of trails. A main trail runs up Snowbird Creek using the old logging railroad bed. Several other trails provide access to the tributary streams and the ridges. The area is very isolated and provides one of the best primitive wilderness experiences in Western North Carolina.

Opportunities for Recreation: The recreation experience in Snowbird is of a different character than most places on the Nantahala-Pisgah. Trails here are difficult to follow and strenuous. For a certain type of user, this is an incomparable, highly valued resource. Trekking through Snowbird allows the visitor to experience the past in a unique way. The distant past, with primeval forest character, is juxtaposed with the more recent past, and a visitor is left with the overwhelming and humbling feeling that this forest is reclaiming its former sovereignty. Exploring the area is likely to prompt tears, laughter, or both. Unlike many areas where man has left his imprint, this area is erasing those impacts on a human time scale.

Ecological and other values: The Snowbird Mountain Treasure Area is important and irreplaceable habitat for rare organisms like the Junaluska Salamander, found only in the Unicoi Mountains, the hellbender, and the Federally Endangered Carolina northern flying squirrel. The Snowbird area is well connected to other wilderness and roadless areas in the Unicoi Mountains, providing habitat for animals needing isolation from human influence as well as landscape connectivity across a wide area. This network of wildlands in the Unicoi Mountains constitutes one of the most intact and least fragmented wildland areas in the east outside Great Smoky Mountains National Park. Opportunities to increase the ecological representation of ecological types that are currently under-represented in the Wilderness Preservation system include a variety of ecological types especially Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; Appalachian Montane Oak, and Small Stream and Riparian Forest. One State Natural Heritage Area is located within the Snowbird area: Snowbird Creek/Hooper Bald Ridge.

Manageability: The upper Snowbird Watershed is completely included within the Mountain Treasure Area. As such the area is manageable as a unit. The inaccessibility of the area and the high wilderness values of the area dictate that the management should be as wilderness.

3. Joyce Kilmer-Slickrock Extensions

In the Draft Plan, Alternative B would recommend wilderness for Extensions #2 & #4 totaling 2,681 acres. Extension #1 would be allocated to Matrix with a small portion of Interface. Extension #3 would be allocated to Backcountry.

Alternative C would allocate Extensions #2, #3, and #4 to Backcountry. Extension #1 would be allocated to Matrix and Ecological Interest Area with a small portion of Interface.

Alternative D would recommend wilderness designation for Extensions #2, #3, and #4 totaling 3,953 acres. Extension #1 would be allocated to Matrix and Ecological Interest Area management with a small portion of Interface.

We recommend that the Joyce Kilmer-Slickrock Extensions #2 and #4, Deep Creek-Avery Creek and Sugar Cove Branch be recommended for Wilderness, for a total of 2,681 acres. Extension #3, Yellowhammer Branch, should be allocated to Backcountry. Extension #1, Southern Addition, should be in Special Interest Area and Ecological Interest Area. As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate the Southern Addition to Matrix and Ecological Interest Area consistent with Alternative C. See Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but only if all other management area allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in any Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

The Wildlife Resources Commission has opposed recommendation here because of the supposed potential for American chestnut restoration. As stated elsewhere in these comments, there are more than have a million acres across the landscape where chestnut restoration may be appropriate. A very small number of acres in this Mountain Treasure area is not a legitimate justification for not designating it as recommended wilderness.

Naturalness: The JK-Slickrock Wilderness additions are contiguous to the existing 33,727-acre Wilderness complex consisting of the Joyce Kilmer-Slickrock Wilderness in North Carolina and Citico Creek Wilderness in Tennessee. This is one of the largest Forest Service wilderness areas in the southeast and one of the most significant for its natural values. The existing wilderness contains one of the most intact and significant reserves of remnant old growth in the east.

These proposed additions are found along the southern and northeastern boundary of one of the largest and most significant wilderness areas in the Eastern United States. Along with other lands in Tennessee, they complement the existing 33,727-acre wilderness expanse that includes the Joyce Kilmer-Slickrock Wilderness in North Carolina and Citico Creek Wilderness in Tennessee. The extensions are an integral part of and indistinguishable from the designated wilderness.

Protecting parcels to the northeast and south of the Joyce Kilmer-Slickrock Wilderness will expand the wilderness and safeguard views from nearby roads. These areas are highly visible from the scenic Cherohala Skyway.

The wilderness and roadless lands in high quality natural condition are also unparalleled except for Great Smoky Mountains National Park, which lies close by to the northeast. The northeast extensions along with a Wilderness Study Area extension in Tennessee also form a close link to 10,000 acres of Tapoco conservation lands, which have been acquired by the Forest Service, the National Park Service, and the state of Tennessee with deed restrictions that require protection of primitive character. The proposed wilderness additions include important corridors crucial for wildlife that connect National Forest and National Park lands.

Opportunities for Solitude: The Joyce Kilmer-Slickrock-Citico Wilderness areas form one of the most important and most remote wilderness areas in the southeast. The proposed wilderness extensions would both extend and bolster this opportunity for solitude.

Opportunities for Recreation: The extensive trail network throughout this wilderness complex provides exceptional opportunities for primitive recreation. Extending the Wilderness Area will better provide continuity of experience for the outstanding recreational opportunities available through the trail system in the current wilderness area, including the Benton Mackaye Trail. Backcountry management for the Yellowhammer Branch extension would create a gradient from the Tapoco Lodge to the Wilderness boundary.

Ecological and other values: The existing wilderness contains one of the most intact and significant reserves of remnant old growth in the east. The additions contain approximately 974 acres of additional old growth. The Joyce-Kilmer-Slickrock-Citico Wilderness has served as home for a wide variety of scientific research, being especially valuable as reference sites for natural conditions and for sites relatively unaffected by human influences. The larger area is also extremely important because it forms a corridor that connects National Forest and National Park lands and is a part of a large conservation network extending along the main Appalachian Mountain chain. This conservation network and corridor is crucial for wildlife and for adaptation. The elevation gradient captured within wilderness and other protected lands in this area is also critical for adaptation to climate change as species can adapt through movement along this gradient. Tributary streams in the southern extensions flow into Santeetlah Creek, home to rare salamanders, Southern Appalachian Brook Trout and other sensitive species.

Several NC Significant Natural Heritage Areas are found within the extensions: Rock Creek Knob, Joyce Kilmer Wilderness Area, Tapoco/Calderwood Lake Slopes, Horse Cove Ridge, and Bob Bald. Opportunities to increase the ecological representation of ecological types that are currently under-represented in the Wilderness Preservation system include a variety of ecological types especially Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; Appalachian Montane Oak, and Small Stream and Riparian.

In addition, the scenic value of this area cannot be overstated, both from within the area looking outward and from the Skyway looking into the wilderness.

Manageability: Adding the proposed wilderness extensions would provide greater manageability to the area as a whole and provide better guidance for management of the area for its natural and untrammeled values. Management of the southern extensions focused on preservation and ecological restoration for species of conservation concern would preserve natural values while enhancing habitat for important species found in the area.

4. Santeetlah Headwaters (or Santeelah Bluffs)

In the Draft Plan, Alternative B would allocate this area to Special Interest Area, Matrix, and National Scenic Byway. Alternatives C and D would allocate this area to Special Interest Area, Ecological Interest Area, and National Scenic Byway Management.

We recommend that the Santeetlah Headwaters MT area be in Special Interest Area, Ecological Interest Area, and National Scenic Byway management.

Naturalness: The centerpiece of the Santeetlah Headwaters area is the 5565’ Huckleberry Knob, the tallest mountain in the Unicoi Range and the source of the clear, bold waters of Santeetlah Creek. Extending northeast from its summit are Doc Stewart and Art Stewart Ridges, which form the perimeter of the Indian Creek watershed. Also included in the Mountain Treasure are the Santeetlah Bluffs, recognized as a special area of virgin forest by the Forest Service and the coves around the little known and beautiful Wright Creek Falls, an impressive 80’ drop. Much of the area is visible in sweeping panoramas from the Cherohala Skyway.

The area includes what is arguably the most important collection of old-growth on Nantahala National Forest outside of Joyce Kilmer in a variety of forest types including Northern Hardwoods, Boulderfield Forest, High Elevation Red Oak Forest, Acidic Cove Forest, Rich Cove Forest and what was one of the world’s finest examples of Hemlock Forest before it was devastated by the hemlock wooly adelgid. There are 1531 acres of Old Growth forest in this Mountain Treasure area.

Opportunities for Solitude: The Santeetlah Bluffs area has ample opportunities for Solitude in some of the best examples of diverse forests in the southern Appalachians.

Opportunities for Recreation: The Santeetlah bluffs area also provides recreation including off-trail hiking, fishing and nature study.

Ecological and other values: The Santeetlah Headwaters Mountain Treasure includes what is arguably the most important collection of old-growth on Nantahala National Forest outside of Joyce Kilmer in a variety of forest types including Northern Hardwoods, Boulderfield Forest, High Elevation Red Oak Forest, Acidic Cove Forest, Rich Cove Forest and what was one of the world's finest examples of Hemlock Forest before it was devastated by the hemlock wooly adelgid. There are 1531 acres of old growth forest in this Mountain Treasure area. These forests contain some of the largest specimens of a number of trees on Nantahala National Forest including an 80" poplar, a 66" red oak, a 64" sycamore, a 52" sugar maple, a 49" black cherry, and many other individuals of various species over 4 ft. in diameter at breast height. Hot spots for big trees include the Santeetlah Bluffs, all sections of Indian Creek not logged in the 1970s and 80s and the coves around the falls on Wright Creek.

A large area of old-growth Northern Hardwoods west of Huckleberry Knob remains undelineated. The human-maintained grassy balds on the summit of Huckleberry Knob are also important wildlife habitat and accessible via trail from the Cherohala Skyway. This area contains two State Natural Heritage Areas: Huckleberry Bald and Santeetlah Bluffs/Wright Cove.

5. Yellow Creek Mountains

In the Draft Plan, Alternatives B and D would allocate this area to Appalachian Trail Corridor and Matrix. Alternative C would allocate this area to Appalachian Trail Corridor and Ecological Interest Area.

We recommend that the Yellow Creek Mountains MT area be in Backcountry and Ecological Interest Area. As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate this Mountain Treasure in accordance with Alternative C. *See* Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

The Yellow Creek Mountains lie along a ridge paralleling Fontana Lake and the Tennessee River. The area is above Fontana Village, a recreational development on TVA land acquired when the lake was developed during WWII. The Appalachian Trail travels through the Yellow Creek Mountain area before crossing Fontana Dam and entering Great Smoky Mountains National Park. The Yellow Creek Mountain Trail travels the spine of the Yellow Creek Mountain ridge, intersecting the Appalachian Trail at Walker Gap. Several hiking and nature trails also leave from Fontana Village and lead into the area.

The rugged area includes deep coves and valleys leading up to the main ridge of the Yellow Creek Mountains. The forests in the area are characterized by basic soils, which leads to high botanical diversity, characterized by rich cove forests with abundant herbaceous species including spring ephemerals. The area also boasts some of the best birding spots in the region. A mosaic of habitats support populations of both Cerulean Warblers and Golden -winged Warblers.

Besides almost 100 acres of old growth in the area, the Forest Service has 274 acres of small old growth patch designations.

I. Linville / Grandfather Mountain Conservation Area

1. Dobson Knob

In the Draft Plan, Alternatives B and D would allocate this area to Backcountry for roadless acreage, Matrix, Interface, Heritage Corridor, and a small Special Interest Area on the north end. Alternative C would allocate this area to Backcountry and Heritage Corridor.

We recommend that the Dobson Knob MT area be in Backcountry. The overlap of the Heritage Trail with Inventoried Roadless Area here requires stronger standards and guidelines for management that will protect its roadless characteristics. The Plan must clarify that the stricter Backcountry MA components will apply.

Naturalness: Dobson Knob is an extremely rugged area. Much of the area has never been logged, containing at least 5,002 acres of existing old growth. The rugged outcrops are covered with some of the best remaining stands of Carolina Hemlock. Table Mountain Pine, a Southern Appalachian endemic species is found throughout the area.

Dobson Knob is a massif with a double top at 3680 feet, from which ridges and valleys fall off in all directions. It is a key connector between Woods Mountain and the Linville Gorge Wilderness. Because of dense undergrowth, most of this Mountain Treasure is in old growth forest.

Opportunities for Solitude: The Dobson Knob Area is extremely rugged. The interior of the area, a very difficult place to navigate to, would offer ample solitude. A majority of this area is inaccessible and likely to remain so. The hollows drained by Black Fork and Yellow Fork, and below their confluence, Paddy Creek, are laurel and rhododendron “hells.”

Opportunities for Recreation: A recently constructed portion of the North Carolina Mountains-to-Sea Trail that climbs the western slope of the area gives access to it for the first time. In addition to the Mountains-to-Sea Trail, a segment of the Overmountain Victory Trail goes through the area.

Ecological and other values: Tennessee Volunteers used this historic trail to reach the Revolutionary War battlegrounds at Kings Mountain and at Cowpens. Dobson Knob has several high-quality Carolina Hemlock Bluffs that are excellent rattlesnake habitat. At the writing of this document, the Carolina hemlock, a species endemic to the Southern Appalachians, has suffered

because of hemlock wooly adelgid, but many of the stands have now been treated. The Carolina hemlocks at Dobson Knob remain some of the healthiest in the region and are prime candidates for preservation. The area includes a Significant Natural Heritage Area: Linville Mtn Dolomite Areas.

Manageability: The ruggedness and inaccessibility of the area as well as its important species and backcountry value argue strongly for backcountry management.

2. Linville Gorge Wilderness Extensions

In the Draft Plan, Alternative B would recommend wilderness designation for the 2,920-acre southeastern extension (the Chimneys Extension), and allocate Matrix, Interface, and Heritage Corridor management for the Pinnacle Extension. Alternatives C and D would allocate Backcountry management for the southeastern extension, and Matrix, Interface, and Heritage Corridor for the Pinnacle Extension.

We recommend that the southeast Linville Gorge Wilderness Extension (the Chimneys Extension) be in Backcountry and the Pinnacle Extension to the south be in Ecological Interest Area. As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate this Mountain Treasure in accordance with Alternative C. *See* Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

a. Chimneys Extension

Naturalness: The Chimneys Extension, which is inventoried roadless and on the southeast side of the existing wilderness, contains recovering forest and also has 129 acres of existing old growth forest. The headwater branches of Irish and Russell Creeks are included in the extension.

Opportunities for Solitude: The extension east of Short off Mountain creates greater opportunities for solitude in this area and in portions of the wilderness adjacent to this area.

Opportunities for Recreation: The Mountains to Sea trail is located in this area, on both sides of the existing wilderness boundary. This trail from Shortoff to Table Rock is one of the most special recreation trails in the National Forest system, not just the Nantahala-Pisgah. The extension would help to protect the integrity of the recreational user's experience. In general,

Linville is one of the most beloved wilderness areas (and consequently one of the highest used). The recreational pressure on this area puts pressure on its ability to provide solitude.

Ecological and other values: A large designated Forest Service old growth patch centered on Linville Gorge extends into most of the southeast addition. Opportunities to increase the ecological representation of ecological types that are currently underrepresented in the Wilderness Preservation system include a variety of ecological types especially Southern Appalachian Low Mountain Pine, Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; Appalachian Montane Oak, and Small Stream and Riparian Forest.

b. Pinnacle Extension

Naturalness: Although some of the extensive old growth found in the currently designated wilderness extends into the Pinnacle Extension, this area has been heavily impacted by wildfires and may need restoration efforts including control of invasive species.

Opportunities for Recreation: In general, Linville is one of the most beloved wilderness areas (and consequently one of the highest used). The recreational pressure on this area puts pressure on its ability to provide solitude.

Ecological and other values: The Pinnacle extension is an integral part of the larger Linville Gorge area. In 2007 the Shortoff and Pinnacle Fires burned thousands of acres on the southern end of Linville Gorge and its extensions. These fires leveled hundreds of acres of forest which are re-vegetating as woodlands with a diverse herb layer of grasses and wildflowers. Fires and their effects should be viewed as a part of the natural disturbance patterns in this area which has some ecozones that are fire dependent. Any management in this area should be focused on ecological restoration and limiting alterations to natural conditions such as invasion of exotic species.

3. Upper Wilson Creek

In the Draft Plan, Alternatives B and D would allocate the core of this area to Wild and Scenic River Corridor and Backcountry, with Matrix and Interface on the west edge, and National Scenic Byway Management along the Blue Ridge Parkway to the north.

Alternative C would allocate the core of this area to Wild and Scenic River Corridor and Backcountry, with smaller Matrix and Interface areas on the west edge, and National Scenic Byway Management along the Blue Ridge Parkway to the north.

We recommend that the Upper Wilson Creek MT area have a Wild and Scenic River Corridor and Backcountry core, with Matrix and Interface on the west edge. As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate approximately 1,289 acres of this Mountain Treasure from Backcountry to EIA. *See* Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among

Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

Naturalness: The northwest boundary of Upper Wilson Creek adjoins the Grandfather Mountain section of the Blue Ridge Parkway. Wilson Creek and its tributaries–Little Wilson, Stackrock and Andrews Creeks–are all designated as part of the National Wild and Scenic Rivers System.

The headwaters of Little Wilson Creek, north of the Gragg Road (SR 1514), extend to the Blue Ridge Parkway. The stream falls in a nearly continuous cascade. Upper Wilson Creek is a Forest Service-designated roadless area, which gives it some protection from logging and roadbuilding.

Opportunities for Solitude: The Wilson Creek Area has ample opportunity for solitude. Much of its current use as a Wild and Scenic River takes advantage of this opportunity.

Opportunities for Recreation: Wilson Creek is a magnet for anglers because of its world-class trout fishery, and for kayakers because of its challenging white water. Wilson Creek and its tributaries–Little Wilson, Stackrock and Andrews Creeks–are all designated as part of the National Wild and Scenic Rivers System.

Ecological and other values: This area has 1,095 acres of old growth forest and Upper Wilson Creek is classified as an Outstanding Resource Water by the North Carolina Division of Water Quality. This area contains the following State Natural Heritage Areas: Wilson Creek Slopes/Lost Cove Creek/Thorps Creek and Grandfather Mountain.

Manageability: The Wilson Creek area is very manageable as a Wild and Scenic River Corridor.

4. Lost Cove

In the Draft Plan, Alternatives B and D recommend 5,706 acres for wilderness designation. In Alternative C, the existing Wilderness Study Area management would be maintained with no wilderness recommendation.

We recommend that the Lost Cove Wilderness Study Area be recommended for wilderness designation. In addition to Wilderness Recommendation for this area, we also support increased trail opportunities and connectivity for mountain bikers and equestrians in the Eastern Escarpment Geographic Area, consistent with the agreements of the Partnership.

Naturalness: Forest in the Lost Cove Area consists mostly of recovering mature forest in good ecological condition, and there are 1,098 acres of existing old growth in the area. The Upper Wilson Creek, Lost Cove, Harper Creek, Sugar Knob complex of areas are clustered to the northeast of the Linville Gorge Wilderness Area and to the south-east of the Blue Ridge Parkway. Each is separated from its neighbor only by an unpaved forest road. The four areas share natural features and values and for conservation purposes should be considered as a single, essentially unbroken wild area. The areas compose a unique natural feature dominating the ridges and valleys that fall from lands along the Blue Ridge Parkway along the side ridges to Wilson Creek.

Opportunities for Solitude: The area is isolated by side ridges and deep valleys stretching from the Blue ridge Parkway to Wilson Creek. This area has both exceptional opportunities for solitude and exceptional opportunities for primitive recreation. The greatest opportunities for recreation are found lower in the watershed along the creeks Lost Cove lies south of adjacent Upper Wilson Creek and its northwest boundary also reaches to the Blue Ridge Parkway along its Grandfather Mountain section. Lost Cove is a wilderness study area, meaning the Forest Service is required to manage it to protect its wilderness values until Congress acts. The 1994 Forest Plan recommends it for wilderness designation. The area is also a black bear sanctuary. There is a good and well-used trail system in the area, also served by a portion of the Mountains-to-Sea Trail.

Opportunities for Recreation: There are trails that access much of the area and, also served by a portion of the Mountains-to-Sea Trail. Big Lost Cove Cliffs rewards hikers to Beacon Heights with stunning views. The trackless upper part of the watershed, containing Sassafras Creek and Breakneck Ridge, offers some of the Pisgah's best bushwhacking. Rock climbing is an important recreational activity here; the Big Lost Cove Cliffs has a climbing ethic that is compatible with wilderness designation.

Currently, some trails in Lost Cove are used illegally by mountain bikes, which is evidence of unmet demand for mountain bike access in the Grandfather District.

Ecological and other values: Geologically, Lost Cove is within the Grandfather Mountain Window, an erosion feature that exposes ancient rocks where the once overlying Blue Ridge Thrust Sheet has eroded away. Erosion has been at work here for over 300 million years. Big Lost Cove Cliffs rewards hikers to Beacon Heights with stunning views. The area is a black bear sanctuary. Peregrine falcons nest in the Big Lost Cove Cliffs**.** 1,098 acres of old growth are found in the area. Opportunities to increase the ecological representation of ecological types that are currently under-represented in the Wilderness Preservation system include a variety of ecological types especially Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; Appalachian Montane Oak, and Small Stream and Riparian. Three Significant Natural Heritage Areas are found within Lost Cove:

Lost Cove Cliffs, Sassafras Creek, and Forests Wilson Creek Slopes/Lost Cove Creek/Thorps Creek.

Manageability: Lost Cove lies south of the adjacent Upper Wilson Creek area and its northwest boundary also reaches to the Blue Ridge Parkway along its Grandfather Mountain section. The 1994 Forest Plan recommends it for wilderness designation, reflecting its unquestionable wilderness character. The Upper Wilson Creek, Lost Cove, Harper Creek, Sugar Knob complex of areas are clustered to the northeast of the Linville Gorge Wilderness Area and to the south-east of the Blue Ridge Parkway.

5. Harper Creek

In the Draft Plan, Alternatives B and D would recommend 7,042 acres for wilderness designation. Alternative C would not make a wilderness recommendation and instead Wilderness Study Area management would be maintained.

We recommend that the Harper Creek Wilderness Study Area be recommended for Wilderness. In addition to Wilderness Recommendation for this area, we also support increased trail opportunities and connectivity for mountain bikers and equestrians in the Eastern Escarpment Geographic Area, consistent with the agreements of the Partnership.

Naturalness: Forest in the area consists mostly of recovering mature forest in good ecological condition, and there are 224 acres of existing old growth. The Upper Wilson Creek, Lost Cove, Harper Creek, Sugar Knob complex of areas are clustered to the northeast of the Linville Gorge Wilderness Area and to the south-east of the Blue Ridge Parkway. Each is separated from its neighbor only by an unpaved forest road. The four areas share natural features and values and for conservation purposes should be considered as a single, essentially unbroken wild area. The areas compose a unique natural feature dominating the ridges and valleys that fall from lands along the Blue Ridge Parkway along the side ridges to Wilson Creek.

Opportunities for Solitude: The area is isolated by side ridges and deep valleys stretching from the Blue Ridge Parkway to Wilson Creek. Like Lost Cove, the lower-lying areas along the creeks have the greatest recreational opportunities, and excellent solitude is found higher in the watersheds.

Opportunities for Recreation: The trail system in Harper Creek/Sugar Knob, is well developed and very popular, offering a fine variety of loops for camping and backpacking. The Mountains-to-Sea Trail runs through both wild areas. One of the prime attractions of Harper Creek and its neighbors are their streams, full of trout and waterfalls large and small. Trails access most of the area and provide access to impressive destinations including North Harper Creek Falls and South Harper Creek Falls. A portion of the Mountains-to-Sea Trail also travels through the area. Currently, some trails in Harper Creek are illegally used by mountain bikes, which is evidence of an unmet demand for mountain bike access in the Grandfather District.

Ecological and other values: Geologically, Harper Creek/Sugar Knob is within the Grandfather Mountain Window, an erosion feature that exposes ancient rocks where the once-overlying Blue Ridge Thrust Sheet has eroded away. Erosion has been at work here for over 300 million years.

The area is a black bear sanctuary. 224 acres of old growth are found in the area. Opportunities to increase the ecological representation of ecological types that are currently under-represented in the Wilderness Preservation system include a variety of ecological types especially Appalachian Cove Hardwood, Appalachian Hemlock-Hardwood; Appalachian Oak, Appalachian Oak –xeric; Appalachian Montane Oak, and Small Stream and Riparian. Four Significant Natural Heritage Areas are found wholly or partly within Harper Creek/Sugar Knob: Wilson Creek Gorge, Harper Creek/Little Buck Mountain, Lost Cove Cliffs and Upper Creek Falls Forest.

Manageability: Harper Creek/Sugar Knob lies just south of Lost Cove. The 1994 Forest Plan recommended Harper Creek it for wilderness designation, reflecting its unquestionable wilderness character. The contiguous Sugar Knob area, although not recommended in the previous plan, is a logical and ecologically appropriate addition to this area. The Upper Wilson Creek, Lost Cove, Harper Creek, Sugar Knob complex of areas are clustered to the northeast of the Linville Gorge Wilderness Area and to the south-east of the Blue Ridge Parkway.

6. Sugar Knob

In the Draft Plan, Alternatives B and D allocate the core of this area to Backcountry with Matrix and Interface on the edges. Alternative C allocates this area to Backcountry with a small area of Ecological Interest Area.

We recommend that the Sugar Knob MT area be in Backcountry and Ecological Interest Area management.

Sugar Knob is a large extension of the Harper Creek area. (See description above.) It is connected to the Harper Creek Roadless area (and WSA) via a roadless corridor, and the Sugar Knob area also is largely roadless except for a few low level road spurs. The area should have been inventoried as roadless, but was not. As a result of not being included as a roadless area, it is not protected by the Roadless Rule. Its protection will depend on what MA it is assigned in the Forest Plan.

The Sugar Knob area does include a large old growth patch designation that stretches across both Sugar Knob and Harper Creek. 2,101 acres of this large patch is within Sugar Cove. This large patch designation overlaps with extensive old growth sites totaling more than 1,000 acres documented in the area.

The Greentown Trail cuts across the area from west to east, and Greetown sShotcut Trail travels southeast to northwest in the area. There is a short trail to Upper Creek Falls within the area. Much of the area is currently not accessed by trails including prominent and interesting features such as Sugar Knob, Cold Mountain, and the headwaters of Harper Creek, so there is potential for more trails within the area.

7. Steels Creek

In the Draft Plan, Alternatives B and D allocate this area to Interface and Matrix. Alternative C allocates this area to Backcountry and Ecological Interest Area.

We recommend that the Steels Creek MT area be in Backcountry and Ecological Interest Area. As compared to this recommendation, the Nantahala-Pisgah Forest Partnership proposal would allocate 1,673 acres from EIA to Matrix and 4,072 acres from Backcountry to EIA. *See* Att. 51 (map of 2020 Partnership allocations proposal). This allocation represents a compromise among Partnership members. We can support this compromise position, but *only if* all other MA allocations in the Partnership proposal are adopted by the Forest Service in the Forest Plan. Because the Partnership proposal represents a careful balance among uses, if the Forest Service adopts some but not all of the Partnership's proposed allocations, landscape-level values such as connectivity and the undisturbed quality of remote areas of the forest will not be adequately represented in the final Plan. If the final Plan fails to provide for these landscape level values as provided in the full Partnership agreement, we will vigorously oppose any incompatible management (including scheduled harvest and road construction) in *any* Mountain Treasure area, including areas that we are conditionally supporting for other uses here.

The Steels Creek area includes the watershed of Steels Creek with the impressive Steels Creek Gorge along the creek. Several notable waterfalls are found along Steels Creek and its tributaries, including Steels Creek Falls. The Mountain to Sea Trail travels across the area entering along Buck Creek and providing access to much of Steels Creek and the gorge. The topography of the gorge contains tiered shelves of rock that contribute to the Falls in the area as well as swimming holes and potholes where erosion has worn circular pools in the rock. Teacup Falls has a number of these pothole pools.

Steels Creek Gorge has a USFS designated Large Old Growth Patch of 604 acres. Existing old growth of 1,440 acres is also documented in the area. The designated old growth patch overlaps a portion of this existing old growth. Forest communities in the area include acidic cove, rich cove, submesic oak, dry oak, and dry oak-pine. The area contains very inaccessible sections particularly along the gorge, contributing to it being able to retail old growth forest. Pawpaw, American elm, and tall pignut hickory trees are present in the gorge, and pileated woodpeckers, sapsuckers, and red-eyed vireos can be heard in here.

The Steels Creek area provides unique topography, important old growth, and opportunities for recreation on the Mountain to Sea Trail and along streams in the area.

J. Conclusion

As discussed in the comments above, we recommend that the following areas be recommended for wilderness designation: Middle Prong Wilderness Extensions; Shining Rock Extensions; Craggy Mountains; Black Mountains; Mackey Mountain; Overflow Creek; Ellicott Creek

Wilderness Extension; Tusquitee Bald; Southern Nantahala Wilderness Extension; Unicoi Mountains; Snowbird Creek; Joyce Kilmer Slickrock Extensions; Lost Cove; and Harper Creek.

In addition, it is our position that all Mountain Treasures (Wilderness Inventory Areas) should be managed to maintain or restore their wildland values, be found "unsuitable for timber production, and should be off limits for the construction of new linear rights of way, like utilities or highways.

However, as discussed in connection with individual areas above, we are nonetheless supporting the management allocations for WIA areas as set forth in the 2020 Nantahala Pisgah Partnership agreement, *if and only if* the Forest Service adopts all of the other management allocations in the Partnership proposal. Again, the Partnership proposal is a careful balancing of multiple uses, and if the Forest Service adopts some but not all of the Partnership recommendations, important landscape-level values will not be adequately represented in the final Plan. If that were the case, we would vigorously oppose any incompatible management (including scheduled harvest and road construction) in any Mountain Treasure area, even where we have indicated conditional support for other uses in these comments.

XX. Monitoring

In these comments, we have noted a number of needs for monitoring and adaptive management. In general, we note that the more conservative the agency's assumptions and the stronger its protective standards, the lower the burden on monitoring. Most of our recommendations are geared toward making implementation easier in this way.

At the same time, the Forests have developed a set of stretch goals, with our support, that will push the limits of their capacity and test planning assumptions. For that reason, monitoring and adaptive management will be critical to ensuring that pursuit of stretch goals does not cause neglect or ancillary harm to other resource values.

We realize that the Forests' initial draft monitoring plan will receive a great deal more work between draft and final, and we look forward to assisting you with that. Our work together on the monitoring questions will help to refine the objectives, and vice versa. For example, if the Forests include condition based objectives, monitoring for progress toward NRV becomes a matter of simple implementation monitoring. Without condition-based objectives, the Forests would need to develop a much more robust monitoring strategy to determine if management actions are cumulatively moving the forest toward NRV along all dimensions and at all relevant scales.

We encourage you to involve collaborative partners closely during the development of the monitoring plan. It is important that all partners be on the same page as the agency about monitoring, because otherwise there may be a need to republish the plan in draft for a supplemental comment period.

XXI. Collaboration and Consent

We began these comments with a question: Can we have it all? Can we increase the Forests' outputs for young forest and local economies, improve its outcomes for conservation priorities and biological diversity, and create the conditions for social sustainability, working together both to implement well-planned projects and accomplish congressional designations? Either answer, affirmative or negative, is a self-fulfilling prophecy.

If you answer "no," then plan revision is a contest—a zero-sum game to advance your priorities and to exclude others' priorities whenever they could possibly interfere with your own. We all, the Forest Service and its many constituencies, know from hard experience that these zero-sum conflicts linger during implementation. Even if the agency strives for balance in projects, every project will include a risk of harm to *someone's* interest. And, since stakeholders have learned how to pull political or legal levers to prevent those harms, management of our public lands collapses into "vetocracy."[235]

If you answer "yes," then plan revision is an opportunity to work together to help others meet their goals without interfering with your own. You draft a plan in which everyone has "skin in the game," creating incentives to work together during implementation to achieve a common vision. In a plan to manage a million-acre forest, there is room for everyone to see their priorities advanced, if we make the right choices and provide assurances that we will stick to them.

"No" is the status quo. With timber outputs at less than ¼ of ASQ, economic interests have essentially written off the national forests as a predictable source of wood products, and it has been 36 years since we were able to collectively decide, through the legislative process, that any of the most intact wildlands in the East should be set aside as wilderness. Public confidence—social license and consent—have deteriorated, along with staff morale.

The impulse to answer "no" is relatively recent. It is the legacy of an erstwhile, unsustainable approach to management that most in the Forest Service now acknowledge was a mistake. But farther back in the agency's history, staff and the public alike believed that the agency could and must manage and preserve, maintain and restore. That's why so many different stakeholders today can trace their lineages to influential thinkers like Aldo Leopold, who believed both that "*our job is to sharpen our tools and make them cut the right way*," and that "*to keep every cog and wheel is the first precaution of intelligent tinkering*."

For those of us who see the results of an outdated plan play out in every project, the impulse to answer "yes" is strong. And that is where the work of collaboration begins. Collaboration has a strong foundation and track record in Region 8. Consider the Bankhead National Forest's 2004

[235] Att. 53, Maier, Carolin and Abrams, Jesse, *Navigating social forestry – A street-level perspective on National Forest management in the US Pacific Northwest*, Land Use Policy 70: 432-441, at 433, 439 (2019), available at https://andrewsforest.oregonstate.edu/sites/default/files/lter/pubs/pdf/pub5028.pdf.

plan revision, which overcame "adversarial relationships between residents, loggers, and environmentalists" to create a restoration-focused forest plan that has been on autopilot ever since, with almost no conflict.[236] More recently, the George Washington National Forest won the praise of both environmental groups and game wildlife advocates by adopting the recommendations of their stakeholders' group.[237]

Collaboration is powerful, but only if agency action actually reflects the collaborative insights and "takes into account the partners' concerns."[238] It requires both bold leadership and humility to share decision space with partners, recognizing, as Gifford Pinchot counseled, that "[p]ublic support for acts affecting public rights is absolutely required." Describing the zone of consent is hard enough; it has taken us 7 years. Overcoming a forest plan that does not reflect that zone of consent would be nearly impossible. It is now the Forest Service's responsibility to incorporate its partners' work into the final plan. To quote Pinchot again, "Your job is to promote unity."

We realize that the Forest Service will be trying to make sense of recommendations from two collaborative groups, with overlap in their memberships. One is a consensus document; the other is not. They both could be viewed as successes, because one goal of collaboration is to illustrate the range of opinion. It is rare, however, to have two collaborative processes with such different illustrations of the same decision space. By definition, the "middle" is the same in both, but the documents are profoundly different.

How can two groups of people who represent the same needs answer the same questions so differently? In one group, at least some members answered "no." Without a shared belief that the new plan can work better for everyone, the best we could do was to document the range of disagreement. In the other group, however, everyone answered "yes." The shared belief that a better Plan can accomplish more for everyone enabled diverse stakeholders to translate their concerns into consent. For each specific concern, stakeholders have crafted a specific solution, assembling a set of recommendations that create the largest possible zone of consent.

To reflect that zone of consent, it is the Forest Service's responsibility to integrate the entire set of solutions into the final plan. Without these interrelated solutions, the zone of consent shrinks and collapses. We realize it will be tempting to pick and choose—to accept the benefits of consent without giving up the flexibility to go beyond it. In other words, agency decisionmakers may ask, "Why can't we adopt a flexible plan and then design projects to stay within the zone of

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[236] Udall Foundation John S. McCain III National Center for Environmental Conflict Resolution, Bankhead National Forest Health and Restoration Plan, available at https://www.udall.gov/SupportFiles/CaseBriefings/pdf/Bankhead.pdf).

[237] Wayne Thacker, Virginia Wildlife Habitat Coalition, "Virginia Hunting Conservation Groups Support Restoration Plan on GWNF," available at https://healthyforests.org/2017/04/wayne-thacker-virginia-hunting-conservation-groups-support-restoration-plan-on-george-washington-national-forest/.

[238] Maier, *supra* note 234, at 435.

consent during implementation?" We caution you in the strongest terms that such an approach will fail.

Here we are again: flexibility versus certainty.

As we noted at the top, a forest plan is a deal between the agency and the public. The agency cannot keep its end of the deal unless it is spelled out clearly in the plan. Understanding of the zone of consent may be strong immediately after plan revision is finished, but it will decay with every staff departure or retirement. Even with continuity of staff, the agency's culture of autonomy at the District level would make it challenging, if not impossible, to effectively keep projects within the zone of consent. Remember: the Buck project developers had the benefit of the 2017 Partnership recommendations, if only they had chosen to use them.

Most importantly, however, the forest plan must provide certainty that conservation priorities will be adequately protected over time. Nearly every project will have some impact to the conservation values that are important to many stakeholders and the vast majority of the public. With a plan that commits to maintain and restore those values over time, minor impacts are tolerable. Without that certainty, however, even minor impacts cannot go unopposed, because they may add up to a major impact over time. As a community, conservationists have learned hard lessons about small impacts; the most important values are lost one acre at a time.

Unless the plan itself provides the vision and the commitment to maintain and restore conservation values in the long term, the undersigned groups will remain the backstop to protect them, hopefully through project-level collaboration, although experience teaches us that process will be time-intensive and inefficient, or through conflict and resolution. Either way, all of the problems we have described in the preceding pages must be addressed at the plan level or they will resurface at the project level. We are comfortable that the Partnership agreements do adequately address them, but only with the balance of that full package.

No doubt, some will be skeptical of the premise that setting explicit priorities and strong sideboards in the plan will help to get more, better work done, and they may oppose a plan that adopts such strategies. Implementation is the only way to overcome that kind of skepticism, and we hope that, like us, you are ready to prove them wrong.

Thank you for your careful consideration of these comments, and we look forward to working with you through the next phase of the process.

Sincerely,

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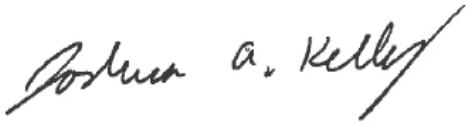

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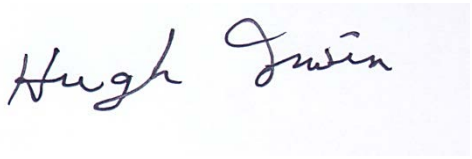

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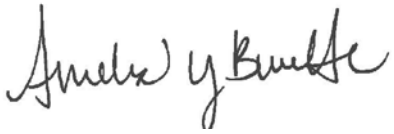

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