Forest Service Deep Dive Q and A – Timber Calculations
May 1, 2020

Q: Regarding estimated acres of land for timber management (commercially viable currently) - why is the range between upper and lower limits so large? Which management areas are included?

A: Estimated acres of land operable for timber management is described in Appendix B on p. B-3. The range represents what could be accessed with the current road system (low #) versus what could be accessed with new road construction (high #), based on FSVeg and what is likely to be commercially viable in the next 10 to 20 years.

Management Areas that allow for timber harvest are Matrix, Interface, Backcountry, EIAs, SIAs, Administrative Sites, Experimental Forests, AT corridor, National Scenic Byways, Heritage Corridors, Wild and Scenic Rivers, Roan Mountain, Cradle of Forestry. In many of these management areas, timber harvest is confined to specific purposes as defined in management area direction.

We updated the operable land calculations for Alternative B in May 2020. The Feb 2020 calculations of available acres for this alternative appeared to contain several pieces of designated old growth. These were removed and new shapefiles produced. They are published on our website.

Q: When it comes to implementation, what additional resources does the FS need in order to move toward tier 2 timber goals? Without those additional resources ($), what sort of collaborative work can be done to aid in reaching those goals. More basically, what help does the FS need to get to tier 2, or even tier 1 for that matter? How can industry folks or private citizens help develop harvest plans or help put together timber sales on the forest? If industry folks or private citizens can't help, who can? NGOs? How?

A: This is a broader topic than the timber analysis and part of the answer will come through conversation with stakeholders and partners. Though having this answer now would aid in comments regarding the tiers of the draft plan, this questions also speaks to the implementation phase. Some tools for bringing in more capacity include the Good Neighbor Authority through which the NC Forest Service can contribute resources, such as inventory of stand conditions in the current Lickstone Project on the Pisgah Ranger District. The Nature Conservancy has also helped with inventory work in projects under the Collaborative Forest Landscape Restoration project on the Grandfather Ranger District. Additionally, taking an all lands approach that crosses national forest boundaries could also add efficiencies.

Q: How many acres of site index of 80 or more are found in the Matrix management area? And how many have been regenerated since the 1960s? How about for the Interface management area?

A: Please see the table (acres are estimates):

	Alt B			**Alt C**			**Alt C**		
	NAN	PSG	Total	NAN	PSG	Total	NAN	PSG	Total
Matrix/age<55	61,164	36,049	97,213	51,948	30,512	82,460	62,487	35,627	98,114
Matrix/SI>80	155,178	102,710	257,888	125,917	78,477	204,394	157,096	100,842	257,938
Interface/age<55	4,410	5,829	10,239	3,969	5,284	9,253	4,409	5,792	10,201
Interface/SI>80	14,350	15,505	29,855	11,946	12,415	24,361	14,356	15,416	29,772

Q: Why does the species/product mix vary so much with alternatives for forest products? Considering the proposed acreages for timber harvest are so similar, where are those differences coming from?
A: Our interpretation of the variation is that it occurs between Alternative A and the action alternatives and then again between Tier 1 and Tier 2 of the action alternatives. We agree that the objectives are similar across all alternatives. The differences come from the FVS vegetation model and the Spectrum model. For Alterative A we used historical sale information to connect actual product mixes to sale acres for different treatments and then used GIS to connect these numbers to management areas and geographic areas. This allowed the Alternative A Spectrum model to closely approximate what has been done on the forest in recent years. For the action alternatives, there was an increase in the proposed harvest levels, these new harvest levels would be implemented under a restoration focused management plan that used the Natural Range of Variation to guide early age class creation in a variety of ecozones, ones that may not have been prioritized for harvest under the current plan. These approximations resulted in an increase in the harvest in the intermediate and dry oak types and a decrease in the harvest in the even aged harvest in the cove types. This is all in Tier 1. Under Tier 2 objectives, with the increase in the harvest acres we anticipate increased harvest in cove ecozones. This along with the increase in overall harvest levels drove the species mix proportions back to ratios more closely approximating Alternative A, albeit at higher harvest levels overall. There are also some changes in management area allocation that occurs across alternatives but given the size of the forest changes in management area allocations, this is likely a lower level contributor to the product mixes estimated in the DEIS.

Q: Can we have a map of the operable base as well as the commercially viable base?
A: These layers are now available on the forest plan revision website. Go to https://www.fs.usda.gov/detail/nfsnc/home/?cid=FSEPRD709554, scroll down towards bottom for spatial data links and the operability and suitability data will be there. An important caveat with this dataset is that the operability maps were designed for land management planning analysis only and does not take the place of project specific analysis. This dataset is not expected to be directly used for project level planning.

Q: What is the sustained yield for the operable base?
A: This was not calculated. Sustained yield was calculated for the potentially suitable base as required by the 2012 Planning Rule. This totals 45 million cubic feet based on roughly 700,000 acres and shows the high level yield limits and is not meant to be a target or objective. We did not constrain the Spectrum model for vegetation treatments only on the operable base, and therefore, have not calculated a long term sustained yield on only that portion of the forests. However, the current plan analysis based the Allowable Sale Quantity on active management on about 276,000 acres, which approximates the amounts in the operable base (Nantahala and Pisgah Forest Plan Amendment Five, E-7).

Q: Could you please clarify whether Tables 5-7 in the Appendix B (Timber Calculations) if Tier 2 includes acres treated in Tier 1 (cumulative) or if its additional stand-alone acres?
A: For each alternative and for each tier a separate SPECTRUM model was built and run. The outputs that are presented in the tables are the model outputs based on the objectives and management area allocations for that alternative and tier. If an alternative and Tier was selected then we would work towards those objectives (Tier) and the numbers presented for that tier are estimates of what the outputs would be (i.e. you would not add tier 1 to tier 2 for a given alternative).

Q: On the table on p. 80 of the consolidated objectives, the reforestation acres generally match up with the acres for regeneration and intermediate harvests. Do those acres account for natural reforestation or are those artificially reforested acres or both?
A: It is combined natural and artificial reforestation, including actions to improve composition in an area. A lot of the work on the Nantahala and Pisgah NFs historically is natural reforestation. Depending on seed produced by the canopy and other factors, some areas are better suited for natural or artificial reforestation, but it is primarily natural reforestation in western NC. But if we're engaging in more restoration, and if restoration is looking at changes in composition of what is currently growing to community types that are more appropriate for that site ecologically or in the context of climate change, there may be an increase in the amount of acres for artificial reforestation and actions to improve composition and structure.

For the reforestation, in most cases in western NC, a harvested stand will regenerate to a young forest naturally that fully occupies the site at the time of canopy closure. On Nantahala and Pisgah NFs lands, most regenerated stands require some level of site preparation to begin the process of guiding species composition towards desired conditions. At the early stages of stand development treatments may include reducing stump sprouts of undesirable species or removing low shade from non-merchantable and undesirable midstory trees that remained after the regeneration harvest. Under the new forest plan many of the “undesirable” species removed or reduced would be those that do not fit in with what the natural range of variation calls for on the site or those that will have a lower chance of survival in the long-term under a changing climate. A percentage of the sites regenerated might also receive tree planting. When tree planting is included in a regeneration sequence, site preparation assumes the additional burden of ensuring that planted investment are maintained and survive to contribute to the stand composition in the future. Examples of this might include planting shortleaf pine in a recently harvested white pine plantation or adding cluster planting of mesic hardwoods to group selection harvests in a cove. All of these examples and more would contribute to the acres in table 10.

Q: Objective ECO-O-4: to restore 1,500- 4,000 acres over 10 years under tier 1 seems low compared to the desired condition for open woodlands is 360-480,000. While reaching this DC maybe the most difficult of all the structural conditions to achieve and will take multiple planning cycles to move towards, 1,500-4,000 acres barely puts a dent in that if a dent at all. Especially if you consider using

fire and timber harvest as the two main drivers to get there. I think many were hoping for at least that number annually as opposed to over the 10-year timeframe.
A: It is going to take work and time to get woodlands established. Because of this, movement towards desired conditions will be a ramping up effect, getting conditions started in that direction but not necessarily getting to fully restored woodlands over the planning period. It will likely take multiple burns over decades to get to the maintenance phase for woodlands, and the numbers in the objective indicate the number of acres anticipated to be in the maintenance phase even while there may be a lot more acres moving that direction. Based on experience at Buck Creek serpentine woodlands, it will require multiple burns to restore the understory. In some places it took 15 years to restore the habitat.

Q: Can commercial treatments potentially be included in the stand improvement category or if those are considered all non-commercial treatments. Specifically, I'm thinking about uneven-aged harvests (single entry thinnings) directed to develop open forest/ woodland structure. Would all those types of harvests fall into the regeneration and intermediate thinning categories or could those contribute to the stand Improvement acres?
A: Stand improvement acres are much higher than regeneration or thinning. For the stand improvement, those acres were set after internal discussion regarding additional treatments that may need to be complete on the landscape in areas that may not have access or be in areas where we would not want to build access. Several examples may include release treatments around red spruce, noncommercial slash down treatments in the backcountry, or noncommercial thinning to create woodland structure in stands of timber with low commercial value. It was assumed that these types of treatments would need to occur and be above the normal stand improvement treatments that occur within our commercially treated stands. Additionally, it was determined that there may be a need to increase the frequency of entry into regenerated stands in order to meet the Plan's desired conditions regarding compositional restoration. This may include additional entries in stands that typically require those treatments or adding those treatments to stands that may not have received a stand improvement treatment in the past. All of these activities that might not result in a commercial product are included in the numbers and could fall into stand improvement.

Generally speaking, stand improvement is a prescription applied to stands that are even-aged or multi-aged where the size of the trees being cut are not merchantable in size. This would commonly occur in the regenerated portions of the stands as they begin to close canopy. For group selection this would occur in the young gaps, in two-age treatments it would be in the large open areas, etc. Even with the above portions of the answer, there would still be opportunities to expand how we used the stand improvement treatment. Some of these expanded treatment options could produce some commercial sized products especially since our forests are aging and we are regenerating so few of them. Whether they were actually removed as a product is another question. For example, doing stand improvement in northern hardwood/spruce fir ecozone ecotone is likely to result in merchantable sized trees, but if we were in norther flying squirrel/spruce-fir moss spider habitat it is likely that we would not remove trees. If we did a stand improvement in a dry oak community to create a woodland, we might cut merchantable trees but they would likely not be desirable for a timber purchaser (other than firewood). Other places where we could mix stand improvement and woodland creation includes where we are burning. Burning alone does not create a good woodland structure but if we burn several times and then apply stand improvement treatments to improve the stand structure, that would likely not result in commercial products. Incidentally, the Spectrum model includes a thinning and burn prescription that is used across all alternatives, albeit maybe at a lower degree then desired, that was designed to go after creating woodland structure. The model also includes a significant number of burning acres that was intended to open up the forests where it was applied by itself. In table 10, we inflated the stand

improvement numbers above what equates to the sum of the thinning and regeneration harvests to account for repeated stand improvement entries on young forest areas to better manage composition as they transition into mid seral classes but also to address those treatments that were in areas that would not result in a commercial harvest (due to MA direction, remoteness, or non-merchantability, etc). Some of those acres could certainly be used to generate woodland structure.

Q: The FS is predicting an increased volume of low-quality hardwoods and pine to be harvested, how do you plan on achieving this when demand for those products is so low? With so much low quality/value timber, how will you avoid projects that result in no-sale? How will you take into consideration local markets/industry needs when designing projects?
A: The answer to this question varies regionally. In some places around the Canton Mill, for example, there may be a market for low quality hardwoods. It will be important to work together to try to add value to those products when possible, and at the district level there could be strategic packaging of timber sale units that include both higher and lower quality products. The mix of stands as well as expense of road maintenance and other issues are all put together to appraise the sale value. This question also gets at the larger understanding that "we" the FS and its partners need to develop surrounding a land management plan that includes timber harvest for restoration objectives and wildlife benefits.

Q: If we find out through monitoring that we are meeting woodland objectives through fire and we are moving towards desired conditions faster than expected, does it become a problem to overshoot the woodlands objective?
A: The objectives generally are a snapshot or tactic to achieve desired conditions, but they are not considered caps or constraints on management, which are found in the standards and guidelines. The objectives should be seen as a guidepost on the way towards desired conditions. Objectives could be exceeded when there is a need to increase the pace and scale toward achieving desired conditions, and only if, no other plan components would be compromised with the expansion of those objectives.

Q: I'm a bit confused with the notion that the Forest Service can overshoot the objectives in the Forest Plan without a plan amendment. Can you explain why exceeding some objectives might create problems for an "integrated" plan? Or for your effects analysis and other legal requirements?
A. The planning team has been innovative in creating Tier 1 and 2 objectives where Tier 1 are the objectives required by the 2012 Planning Rule that are fiscally constrained, but there is no guidance on Tier 2 objectives. Typically, objectives can be exceeded as long as other plan components continue to be achieved. However, any project or activity on the ground must demonstrate consistency with the plan's desired conditions, standards, and guidelines, and if plan components conflict, a plan amendment could be needed. It is the role of the environmental analysis to evaluate how proposed management relates to effects on multiple resources areas. See the answer above for more information.

Q: Are there are no numerical caps in the plan?
A: The sustained yield limit of 45 MMCF may be viewed as a limit. Other limitations on projects are captured in plan standards. Some standards have numerical requirements, such as "within 100 feet of perennial springs, bogs and other wetlands" (SZ-S-01). The standards regarding silviculture and timber management have specific numerical constraints. Other standards restrict certain project activities from occurring. Guidelines may also have numerical requirements on project activities.

Q: If the average production has been about 1.7mmcf/yr what has to happen to reach about 3.8 in Tier 1 of alternatives B, C, and D?
A: Reaching Tier 1 requires that we are productive in the use of current resources and bring in more resources to our projects, including through collaboration with partners for resources and community support. Efficient NEPA will be a part of reaching these goals, as will prepping and advertising sales and creating a reasonable market for those sales. The issue is larger for the jump from Tier 1 to Tier 2. Much of Tier 2 would require partners to have a collaborative understanding of the program and would depend on resources contributed by partners to reach those goals.

Q: Have you taken into account all the sawmills that have gone out of business? How to get work done when so many mills are out of business? To stay in business, mills need a steady flow of projects. Start/stop is not economical.
A: The last five or six years have been tough on the wood products industry for many reasons. The economic conditions that affect the timber industry are beyond the control of the agency. However, we can collaborate with other federal, state, local agencies as well as adjacent landowners to help build the markets needed to meet the needs of all our stakeholders. If restoration work can be done consistently (the planned district projects flow through the NEPA process smoothly) and with a steady flow of certain types of products, there is the possibility for working together and for businesses to adapt or grow. Having diverse collaborative groups engaged in project planning will facilitate an understanding of restoration opportunities and the outputs that are possible.

Q: Under Table 1 of Appendix B, lands not suited for timber production due to technical or legal reasons, there is no entry for alternatives B, C, and D. Rows D and E show totals based on suitability because timber production is compatible with desired conditions and objectives - or not compatible. But what is compatibility defined as? Are you referring to compatibility only to what's written in the plan or is this a consideration of project level factors like steepness of slopes, exclusion for archeological sites, etc.
A: For Table 1, the values for Alternatives B, C, and D are the same as Alternative A for the first three rows.
Compatibility with timber is defined in Chapter 60 of the 2012 Planning Rule and the management intent for different areas (FSH 1909.12 Ch. 61.2). Matrix and Interface management areas are compatible with timber production as a primary or secondary use of land, and other MAs are not. Within Matrix and Interface management areas, there are parts of the landscape that are not suitable for timber production including riparian areas, critical habitat, and designated old growth.

Q: What (and where) are the other trade-offs between operable/viable acres and designations across alternatives? Does the decreased operable and viable acreage in alternative C directly relate to the larger designated old growth network?
A: The variability in operable acreage across alternatives is largely due to differences in backcountry, matrix, and interface management area allocations. The current road system does not change by alternative (physically). The distances that equipment can harvest also do not change, leaving the management areas as the primary driver of differences. Alternative C has more backcountry, as well as EIA acres, so that plays a larger a factor in the operability calculation than the designated old growth network.

Q: How does the order of entry change across the different alternatives?
A: Order of entry is a concept that sits more on the implementation side of the forest plan. It is anticipated that the forest and each district will need to evaluate the forest plan management area assignments for their district, the objectives of the plan, the most pressing needs for restoration and habitat, and partner's interests on the surrounding landscape. They would then need to decide the best strategy for implementing the revised plan and how their district projects would look. Implementation could take many forms. Examples include larger landscape project areas that address many needs in the same area at once (Twelve Mile Project for example) or restoration focused projects like those that have developed most recently on the Grandfather Ranger District.

The order of entry concept arose during the forest service era when timber production was a large goal within the Forest Service, in many arenas these two concepts have remained paired (unfortunate). The order of entry concept is actually very beneficial for restoration and can be utilized to ensure that the majority of a district's lands are examined for needs over the full planning horizon and that certain parts of the district are not overlooked or neglected allowing problems worsen.

Q: I am interested in seeing reports referred to in the DEIS, especially Lewis et al, 2017 and the process paper for NRV analysis. Is there any process paper specifically on the use of the Spectrum model?
A: The Lewis et al and process paper for NRV referenced in this question have been posted on our website. Appendix D of the DEIS was meant to serve as a process paper for the Spectrum model.

Q: During building the Spectrum Model was there too much acidic cove assigned to the white pine forest type groups?
A: There are several factors involved in answering this question: The crosswalk between USDA Forest Types (EV Code) and Ecozones started in 2012 when the Forest set up a meeting with several research (Southern Research Station) and state agencies including the NC Natural Heritage Program to discuss how to best connect the two community classifications. The most noted result of the meeting was the consensus that there was significant overlap and a lack of a one to one relationship between EV code and ecozone. The results of this 2012 meeting were the starting point for the 2014 FVS analysis that attempted to link FIA forest type groups (FTG) to FSVeg forest types and ecozones. During this effort the crosswalk was expanded using the examples and estimates typified from the 2012 meeting results. Each FIA plot used was assigned an ecozone value based on the 3rd approximation of the ecozone model. Each plot was assigned a forest type group code based on the FIA plot data. Based on the results, out of the 211 FIA plots that were identified in the acidic cove ecozone 26 (12%) were assigned a white pine/ white pine hardwood FTG which could have included the hemlock FTG based on the crosswalk. It is assumed that there would be a subset of the 26 plots that were typed as the hemlock FTG based on the plot data. Of those 26 plots: 8 were EWP (103), 2 plots were EWP/EH (104), 3 plots were EH (105), and 13 plots were EWP/NRO/WA (401).

When the Spectrum analysis units were built for each alternative, each stand's EV code was assigned to a FTG from the FVS work in order to help link an FVS yield profile within the model. Again the same crosswalk was used. Based on GIS outputs we estimate that roughly 10% of the white pine and white pine hardwood FTGs in the Spectrum dataset were originally a Hemlock (05) or hemlock hardwood (08). When the cove hardwood-white pine-hemlock forest type (41) is included the percent increases to 29% but the 41 could include a significant amount of white pine and hardwood owing to the fact that hemlock trees have been in such a decline over the last decade due to hemlock woolly adelgid. As is the

case with all the EV codes in the NFsNC FSVeg dataset, they were likely assigned earlier then the onset of Hemlock Woolly Adelgid. As a final discussion point, it was important for the best estimate of the current conditions to be the starting point of the Spectrum model for each alternative. This included attempting to portray those situations where white pine has become more aggressive on the landscape and we felt that in the case of acidic coves given the presence of white pine as a minor component and with the legacy of HWA that these sites (along with dry oak types) are the best locations to expect a departed compositional condition related to increased white pine presence.

Q: How was Tier 2 for young forest and mechanical harvest calculated?
A: The upper end on the Tier 2 for young forest was influenced by the acres in the current forest plan EIS. We did not want to exceed what was planned in the current plan, because it has not been able to be accomplished, so exceeding the expected mechanical treatment in the current plan wouldn't be realistic. For that upper end for mechanical harvest, there is a typo in a Chapter 2 table that refers to the upper end as 3,600 acres, but it's actually 3,800 acres in the plan and analysis, which equates to 3,200 acre of regeneration harvest and 600 acres of intermediate thinnings.

Q: I want to understand better how the species and rare habitat analysis is dependent on and built around the Spectrum model. 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; 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?
A: 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.