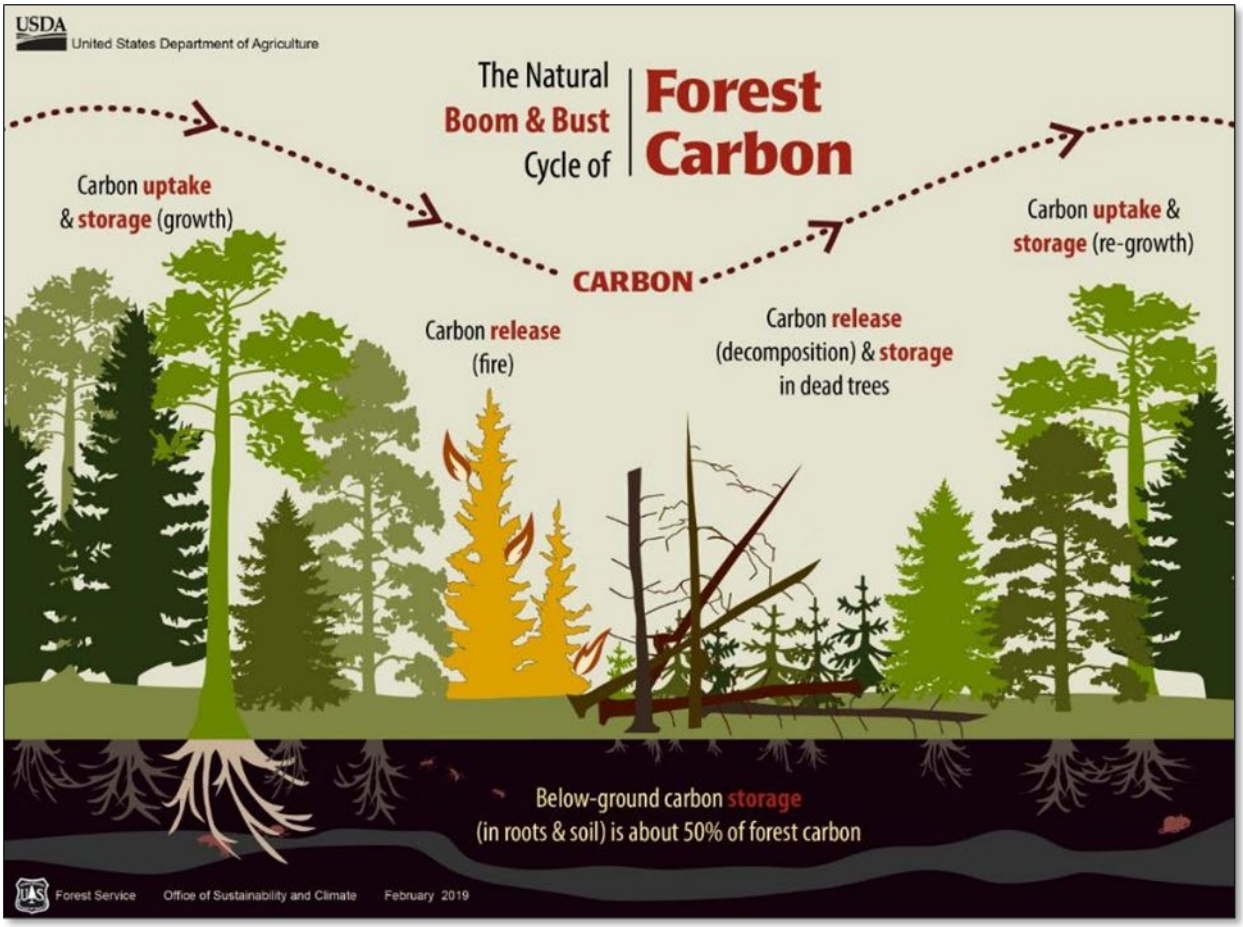
Carbon

Comments and Responses on Draft Assessment



Introduction: Assessment Response to Comments

The Black Hills National Forest received a variety of public comments on draft assessments published in June 2022. Some commenters have expressed support for the draft assessments, while others have expressed concerns.

Those who express concern about the draft assessments often state that they believe the assessments do not go far enough in addressing the challenges facing the Black Hills; do not address the needs of local communities; or do not utilize the best available scientific information. Those that support the draft assessments often state that they are pleased with the level of detail and analysis that went into the assessments. They believe it will provide a good foundation for the need to revise the land management plan.

The Forest Service has reviewed all public comment received on the draft assessments and used this feedback to revise assessments where appropriate. The table below is a detailed summary of public comment received related to carbon as well as the agency's response to each item. Many responses indicate where the revised assessment has been modified to better explain each item, or incorporate new information as provided by cooperators or the public.

Each comment and response table is provided not as a matter of regulatory compliance, but as an effort to demonstrate the Black Hills National Forest's committment to transparency early in the plan revision process. Some comments below have been generalized or combined with similar comments to provide a more efficient response. No attempt has been made to retain a link between each comment and individual, organization, or entity that provided it.

Response to Comments

Comment	Responses
Consider composite index for ecological value for incorporation into assessment.	The Forest Supervisor will set the scope and scale of the analysis during the plan revision stage and the composite index of ecological value may be considered as a method for comparing management alternatives if it addresses key issues identified at that time.
The Carbon assessment should be focused on the potential for increased carbon storage in the future.	The assessments are intended to represent the current condition with existing datasets. Carbon storage trends by forest management alternatives may be assessed during the development phase of forest plan revision.
The agency should move beyond analyzing the carbon stored in the ecosystem and consider the total carbon sequestration vs. emission created by forest management and recreation. As an example of the kind of data that needs to be tracked and collected, consider this suggestion for carbon reporting on timber sales and timber stand improvement (TSI) projects. Similar protocols could be adopted for motorized recreation permits.	The objective of the Carbon Assessment was to evaluate change in carbon storage due to change in forest vegetation conditions, including forest management, by comparing standard Forest Inventory and Analysis carbon storage pool estimates. Carbon storage trends per changes in forest vegetation driven by forest management and other drivers and stressors such as mountain pine beetle epidemic and wildlife will be assessed during the development phase of forest plan revision. The Forest Supervisor will set the scope and scale of the analysis and identify key issues for plan revision.
It is unclear what the purpose of this assessment is supposed to accomplish. The document needs to include a more thorough analysis with citations to support its findings for current conditions along with a section focused on the potential for increased carbon storage in the future. In addition, it should include a Chapter 3 (Public Participation in the Planning Process), a Chapter 4 (Conclusions) along with a section that identifies potential needs for change.	The goal of the Carbon Assessment was to evaluate change in carbon storage trends associated with changes in forest vegetation conditions due to the major forest drivers and stressors, mountain pine beetles, wildfire, and forest management, using standard Forest Inventory and Analysis carbon storage pool estimates. Desired forest carbon storage levels must balance storage potential with other considerations such as mountain pine beetle (MPB) risk and hazardous fuels.
Was Forest Inventory Analysis (FIA) data limited to only Black Hills National Forest Data?	Yes, the FIA data was limited to the Black Hills National Forest.

Comment	Responses
In reference to the Carbon Calculation Tool, the literature says that data is only available from 2007 until 2020, from where is the 1990 – 2007 data derived?	The carbon storage data, for the measurement periods of 1990 and 2020, was produced by the Forest Inventory and Analysis group at the request of the Forest. Carbon storage data is derived from forest inventories. The original draft of the carbon assessment utilized carbon storage data derived from 1990 and 2013 FIA inventory data. The 1990 inventory was selected as a baseline to assess trends for the longest time possible prior to the request to use the latest inventory data. The original baseline data of 1990 was retained for the comparison.
Which allometric models are being referenced in paragraph 2?	See Smith, J.E.; Heath, L.S.; Jenkins, J.C. 2003. Forest volume-to-biomass models and estimates of mass for live and standing dead trees of U.S. forests. Gen. Tech. Rep. NE-298. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 57 p. for more detail regarding modeling methods.
In paragraph 3, SD FIA plots are resampled every seven years, not ten.	The statement regarding the frequency of FIA inventories by state has been updated.
Chapter 2 in paragraph 1, in reference to mountain pine beetle, it should be Forest Health Epidemics…. Example it might be Ips beetles instead of MPB causing death in a tree.	The mountain pine beetle is considered one of the major ecosystem drivers and stressors for the Black Hills National Forest along with forest management and wildfire. There are many other damage agents causing tree mortality however the scale of these impacts has historically been much lower than mortality caused by these major drivers and stressors. This assessment and other assessments have focused on impacts caused by the major drivers and stressors.
Impacts would suggest the assessment has been completed. Recommendation is areas affected from the periodic large wildfires are shown in table 1 separated by district.	Table 1 present acres affected by wildfire by district.

Comment	Responses
In paragraph 1, reference to table 2: How was the acreage determined and what was the method? Needs an explanation for what they determined was affected 9 by MPB specifically instead of areas that might have been affected by other forest health concerns such as Ips.	Affected acres and mountain pine beetle mortality acres from 1996 to 2009 for the Black Hills National Forest were derived from the USDA Forest Service Forest Health Protection Aerial Detection Survey (ADS) program. These surveys are conducted by observers in small aircraft who map areas of forest insect and disease activity using a digital aerial sketch mapping system. Mountain pine beetle affected acres are gross acres that contain both mortality trees that were attacked by beetles the previous year and live trees that were unaffected at the time of each survey. Mortality trees per acre are then estimated for each activity area. Affected acres often contain overlap between survey years. From 1996 to 2009 mortality acres were typically estimated by dividing gross ADS affected acres by mortality trees per acre. Starting in 2010 a more accurate method was implemented. High resolution aerial photography was assessed in GIS software to delineate areas of annual mortality.
In reference to annual average of table 3: How was this determined? The Forest Service re-entered the same harvest units multiple times in that time period so this could be mis-representation depending on how they are calculating acres. Is this based on FIA calculations or others? One dataset could affect the other. There are concerns that the programs are calculating new areas being affected rather than the same acreage which affects the outcome.	The Forest Activity Tracking System (FACTS) database is the source for the area total presented in Table 3. The acres include overlapping acres for forest stands that have been treated multiple times during this period. A statement regarding overlap and the source of the data has been added to Table 3. This data was not incorporated into the FIA carbon storage calculations but is presented as a reference for the scale of forest management during the implementation of the 1997 Forest Plan.

Comment	Responses
In Table 4: How was understory calculated? Needs citation. We suggest Forest Service consider using the equations in Charterjee, Vance & Tinker (2009) that were developed in Wyoming. Description of Table 4: how was the dead biomass calculated? FIA data, FS Veg Data, other source? Lacking citation. Description of Table 4: Regarding, "Timber harvest transfers carbon out of the forest…" line, it might be better to reference that there is a net negative impact on carbon timber harvesting activities. Description of Table 4: How was the corresponding decrease in the belowground live carbon pool calculated? The roots are not removed during timber harvesting activities so there is no additional carbon being placed into soil, but neither is it removed. Description of Table 4: What formulas and data was used for the calculations?	A citation has been added to Table 4 regarding the source of the estimates presented. Information regarding FIA carbon storage estimate protocols can be found on the following public website: Forest Inventory and Analysis National Program - Forest Carbon (usda.gov) The assessment states that "timber harvesting in the Black Hills National Forest was the primary disturbance influencing carbon stocks from 1990 to 2020, contributing to the more than 25-percent decrease in the above-ground live carbon pool" before the referenced sentence. This statement indicates that there is a net negative trend regarding carbon stored in forest biomass associated with timber harvest.
Description of Figure 1, first paragraph, last sentence: If understanding past trends is not sufficient, what is? Description of Figure 1, second paragraph, how would greater precipitation be addressed? More trees result in less water production available?	The comparison data presented in Figure 1 is based on carbon storage in forest vegetation derived from existing forest inventories from measurement 1-1990 to Measurement 2-2020. Understanding future trends is less precise as these estimates require a set of assumptions regarding future disturbance and weather conditions that are not incorporated into historical data comparisons. Scenarios based on different precipitation levels are beyond the scope of the assessment.

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We appreciate the author attempting to describe the methodology of the data presented. However, we recommend being more precise in the description of the limitations of the two sample years selected by the authors. We recommend the assessment describe the differences in FIA protocols between 1990 and 2020. We recommend the assessment describe what lands (forestlands, timberlands, Black Hills National Forest, Custer National Forest, other ownerships etc.).	Information regarding FIA carbon storage estimate protocols can be found on the following public website: Forest Inventory and Analysis National Program - Forest Carbon (usda.gov) The assessment presents carbon storage estimates for forestlands, Black Hills National Forest. The table title has been updated to specify the applicable area for the estimates.
Table 1-We recommend clarifying if the acres presented in the table are total acres burned, or do they reflect only high severity acres. In low and mix-severity acres, tree mortality is not 100% and reflects very different carbon releases compared to high-severity acres burned.	Thank you for the suggestion. A description has been added to Table 1. Table 1 acres represent total acres burned.
Table 2-We recommend using the information produced by the Black Hills National Forest 1997 Forest Plan Monitoring table showing 221,343 acres of MPB.	Total MPB mortality acres have been added to the description for Table 2. Associated text in Chapter 2, paragraph 1 has been updated.
Paragraph between Table 3 and 4 contains leading statements intended to skew the readers perception. We recommend stating whether the change is statistically significant and removing the last sentence. Changes in carbon stocks do not represent an equivalent change in emissions. As stated in the very next paragraph, carbon removed through timber harvesting "most is not lost or emitted directly to the atmosphere."	Based on public comment, the context statement has been revised to allow a comparison between the estimated change in carbon stored in forest vegetation on the Black Hills National Forest, 1990 to 2020, with total carbon emissions removed by forests in the United States.