Spruce Beetle Epidemic-Aspen Decline Management Response project on the Grand Mesa, Uncompahgre, and Gunnison National Forest (GMUG)



Adaptive Implementation Annual Report for 2021

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# Introduction and background

The Record of Decision (ROD) accompanying the Final Environmental Impact Statement (FEIS) for the Spruce Beetle Epidemic-Aspen Decline Management Response (SBEADMR) project commits the US Forest Service’s Grand Mesa, Uncompahgre, and Gunnison National Forest (GMUG) to utilize an adaptive implementation process through continuous public involvement:

“*The Forest Service cannot significantly alter the current infestation or rate of decline in spruce stands, but management of associated hazards, economic opportunities, and resilience, as detailed in the purpose and need, are the core of this project. Nor can it accurately project the ultimate location and scale of eventual beetle activity. To achieve the purpose and need in the context of rapidly changing conditions in spruce and aspen stands across the landscape, SBEADMR relies on an adaptive implementation framework to prioritize the sequence and determine precise layout of successive treatments within the analyzed PTAs. Treatment design, incorporating additional monitoring questions, reviewing the effects of previous treatments, and adjusting management towards desired conditions and away from undesirable conditions would also be conducted via the adaptive implementation approach*” (SBEADMR FEIS, Chapter 2, pp. 36-37).

# Why this document?

The purpose of this report is to serve as a public record of the annual adaptive management decisions for the SBEADMR project pursuant to the FEIS and ROD. The document explicitly defines the linkages between monitoring and other applied research results, the public engagement process, and the adaptive management decisions made by the GMUG National Forest.

# Who is involved?

The adaptive implementation approach involves three groups: 1) the Adaptive Management Group (AMG) originally convened by the Public Lands Partnership; 2) a “Science Team” composed of researchers from Colorado Parks and Wildlife, Colorado State University, the US Forest Service’s Rocky Mountain Research Station, and Western Colorado University; and 3) the GMUG Forest Leadership Team (FLT) composed of US Forest Service line officers vested with decision authority (e.g., forest supervisor, deputy forest supervisor, district rangers) and resource specialists.

The AMG’s purpose is to assist the GMUG National Forest in applying the adaptive management framework over a multi-year timeframe in accordance with the SBEADMR FEIS and ROD (SBEADMR Adaptive Management Group Operations Manual, version 1, June 2017). The AMG is composed of individuals representing a broad diversity of local and regional interests and perspectives regarding the SBEADMR project’s effects on ecological, economic, and social values. The AMG serves as the primary convener and coordinator of continuous public engagement.

The Science Team’s activities are supported by funds from the SBEADMR project through cooperative agreements between the GMUG and the team member’s institutions. The Science Team’s monitoring and applied research activities are based on: SBEADMR goals and desired conditions described in the FEIS and ROD, “Decision Triggers” described in Table 6, p. 44-48 in the FEIS, and additional objectives and questions defined by public stakeholders. Data collection, analysis, and reporting occurs annually.

GMUG FLT makes final decisions about changes in SBEADMR implementation utilizing a “Management Review” process. The Management Review draws on annual AMG field reviews, annual FLT field reviews with and input from GMUG resource specialists, results from the Science Team and other relevant research, and input from the AMG based on results from the Science Team and other relevant research.

# What happened this year?

This table displays linkages between Goals or Decision Triggers identified in the SBEADMR Record of Decision (ROD) or Final Environmental Impact Statement (FEIS), Science Team and GMUG staff monitoring activities and results, the SBEADMR Adaptive Management Group’s (AMG) interpretations and recommendations, and the GMUG Forest Leadership Team’s Management Review conclusions for 2021

*Table 1. Goals and Decision Triggers from the SBEADMR Final Environmental Impact Statement and Record of Decision*

| **Goal or Decision Trigger** | **Monitoring Actors and Activities** | **Results and Interpretation to Date** | **AMG Recommendation** | **FLT Management Review Conclusion** | **Comments** |
| --- | --- | --- | --- | --- | --- |
| More locations from which firefighters can safely and effectively manage fires  (Public Safety goal #1, ROD, p. 4) | Science Team conduct pre- and post-treatment surveys of fuel loading.  *(1g.,4a)*  GMUG fire/fuels staff GIS data on locations of burned slash piles (*consider adding to StoryMap)* | In the short term, salvage increased fine surface fuel, decreased litter and duff fuel load.  In 2015 sampling, coarse wood fuel loads weren’t different between treatments and non-treated areas and are within normal ranges among the treatments. However, as dead trees begin to fall the areas that were not salvaged will have significant amounts of coarse fuel.  *(This monitoring was completed in 2017)* | Recommend that the GMUG actively seek ways to incorporate Public Safety goal into SBEADMR treatments. | Accept AMG recommendation. GMUG staff will continue to look for opportunities for SBEADMR treatments that contribute to wildfire management. | SBEADMR EIS identified potential locations where treatments could be located to facilitate fire-fighting efforts. These data were used to help identify Priority Treatment Areas. Currently GMUG staff & partners are developing Potential Operational Delineations (PODs) to help guide placement of treatments on the landscape and to facilitate fire management efforts. PODs will be completed in 2021.  GMUG staff will examine results of POD process to identify commonalities with SBEADMR PTAs. |
| Achieve a balance of habitat structural stages, tree species composition, and seral stage distributions appropriate for each vegetation type across the GMUG  (ROD Purpose & Need Desired Condition, p. 3) | Science Team field surveys of tree regeneration in unmanaged vs previously managed stands impacted by spruce beetle *(1a-d, 1f, 3d.)* | Spruce saplings, advanced regeneration, and new regeneration are above stocking standards in salvaged, unmanaged and previously managed areas impacted by the spruce beetle outbreak.  Over the past 3 years, seed production has varied. This annual variability is to be expected as Engelmann spruce seed production is known to vary in space and time. While one year (2018 seed production year) is higher than the other two years, it is important to recognize that the treatments (unmanaged, previously harvested, and salvaged) had similar seeds per plot found. This suggests that Engelmann spruce seeds are still present and dispersing on the landscape. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. |  |
| Maintain 5-15% of vegetation at the HUC 12 watershed scale in structural stages 4A, 4B and 4C where biological feasible.  (Decision Trigger, FEIS, Table 6, p. 44) | GMUG Forest Bio updates annually based on FSVegSpatial data | Based on newly updated FSVegSpatial data, of the HUC12 watersheds on the GMUG with > 10 acres of spruce-fir forest, 11 have <20% in structural stages 4A,B,C (See Appendix A).  Of these 11 watersheds, only Spring Creek has had a SBEADMR treatment activity (Cathedral TS; salvage). There are no pending SBEADMR treatments in the 3 year plan in any of these watersheds | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. | In areas with extensive overstory mortality, Design Feature WFRP-10 requires retention of live trees if they are believed to survive and removal is not needed to achieve public safety or silvicultural objectives. |
| In healthier spruce-fir stands, promote regeneration and create multiple age classes (Resilience Goal 1.a., ROD, p. 4) | Science Team pre- and post-harvest surveys of forest stand structure, tree regeneration, and species composition in green treatments. *(2a.)* | No monitoring results to date. Pre-treatment data was collected in the Rainbow TS area in summer 2020. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. | As SBEADMR activities transition from mainly salvage to mainly green-tree treatments, science team monitoring is changing focus accordingly. |
| Promote aspen regeneration in live stands, with emphasis on those affected by Sudden Aspen Decline  (Resilience Goal 1.c., ROD, p. 4) | Science Team conduct pre- and post- treatment surveys of forest stand structure, tree regeneration, and species composition in aspen treatments | No monitoring results from the Science Team to date. However, biologists from the GMUG have reported aspen regeneration in areas containing remnant aspen stands following salvage logging. | Recommend that GMUG staff find ways to prioritize non-commercial and commercial aspen resiliency treatments within SBEADMR (state funds, partnerships with CSFS, etc). | Accept AMG recommendation. GMUG staff will continue to look for opportunities for aspen resiliency treatments within SBEADMR PTAs using all available instruments for funding and partnerships. | No treatments in aspen stands under the SBEADMR project have been implemented to date, but GMUG staff have initiated planning & preparation in non-commercial Priority Treatment Areas in aspen stands (on the West Zone).  Past efforts to plan aspen treatments through SBEADMR have run into economic and site-specific condition challenges. |
| Provide commercial forest products to local dependent industries at a level commensurate with the GMUG Land and Resource Management Plan direction and in harmony with other Plan goals  (Recovery Goal #1, ROD, p. 4) | Science Team & GMUG staff compile and summarize timber production outputs and associated costs and revenue *(5a-d)* | The GMUG has ramped up timber out-puts in recent years to facilitate removal of salvage material from the landscape. Timber volume sold by fiscal year: 2017 - 69,952 CCF; 2018 - 95,377 CCF; 2019 - 93,152 CCF; 2020 – 76,302 CCF. Commercial Revenue per volume ($/CCF):  2017 $9.16; 2018 $11.14 (2019 and 2020 revenue TBD)  It is not clear at this point how administrative costs have changed over the course of the project. Personnel costs have been identified as the largest issue affecting cost with pre-sale activities being the largest component of cost.  There are few small-scale producers utilizing timber from SBEADMR project. Majority of timber utilization is through sawlogs processed by Montrose Forest Products. SBEADMR has not had a significant impact on local producers’ employment, but is noted as important for local mill supply chain.  All four years met or exceeded assigned targets, were consistent with GMUG Land Management Plan and the SBEADMR EIS. Pre-treatment Design Checklists were completed for all treatments, design features were identified and assigned the appropriate timber sale contract clauses and provisions and implemented on the ground in accordance with the contract. | Science team should continue to look into economic impacts beyond the *number* of producers. Further drill down into impacts of small-scale producers, secondary markets and other topics with assistance of newly formed AMG subcommittee. | Defer to Science Team to decide which elements of this recommendation are feasible to examine within existing SBEADMR Science Team capacity. |  |
| Subsequent to salvage, treat fuels, prepare sites, and re-establish and maintain forest cover via replanting where seed sources are lacking (Recovery Goal #2, ROD, p. 4) | GMUG timber staff perform stocking surveys at 1, 3, and 5 years post-harvest.  Science Team surveys of post-salvage, unmanaged, and previously managed forest structure, tree regeneration, and species composition; seed trap collection *(1b-d,1f)* | The first SBEADMR treatments were completed on the Gunnison Ranger District in 2019 and replanting was initiated in several areas. Stocking surveys will continue to ensure stands are fully stocked within 5 years of sale closure.  Science team monitoring indicates that seedling density in salvaged units is similar to unmanaged and previously managed stands, and seed production is highly variable in both time and space. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. | By law, stocking surveys are required at 1, 3 and 5 years post-harvest. Within 5 years stands must be fully stocked in accordance with the Forest Plan. Stocking survey data will be reported at 5 years; any notable observations will be shared prior to that as applicable. |
| Maintain soil productivity,  minimize human-caused erosion, eliminate or minimize soil damage from machine pile burning, and maintain integrity of associated ecosystems (Decision Trigger, FEIS, Table 6, pp. 44-45) | GMUG resource specialist  conduct spot inspections and post-treatment monitoring | To date, treatment design checklist have been completed for twenty-seven commercial treatments. All checklists indicate treatments are designed commensurate with this requirement.  The first slash piles were burned in the winter of 2019 with rehabilitation of the burn pits occurring in 2020. Future monitoring will be conducted to determine how soils and vegetation recovers. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. |  |
| No more than 30% of lynx habitat in a Lynx Analysis Unit (LAU) is converted to a stand initiation structural stage (>90% loss of tree overstory) due to natural or human- caused disturbance (Southern Rockies Lynx Amendment Standard VEG S1; Decision Trigger, FEIS, Table 6, pp. 44-45) | GMUG Forest Biologist track structural stages in LAU annually based on FS databases (FACTs, FSVegSpatial) | In 2020 the Forest completed a project to up-date the Forest vegetation data using satellite imagery and on-the-ground vegetation plots. These data were used to up-date the amount of lynx habitat converted to unsuitable resulting from tree mortality from spruce beetle and other pathogens.  The analysis indicates increased levels of habitat conversion in several LAUs. Cathedral is at 41%; Stewart Creek LAU is currently at 39%; Los Pinos is 20% and Cochetopa is 19%. No additional management activities that could convert lynx habitat are planned in these LAUs. Other than these LAUs, no other LAUs have reached 20% conversion to unsuitable. The need to discontinue or modify management actions to avoid exceeding the 30% threshold is not needed at this time. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. | Change detection update caused a reset of many lynx metrics that had been measured from 2008. LAUs with habitat conversion greater than 30% have been reported to FWS and will not have future management while they remain above that threshold. |
| No more than 15% of lynx habitat in a Lynx Analysis Unit (LAU) would be regenerated via forest vegetation management over a 10-year period starting in 2009 (Southern Rockies Lynx Amendment  Standard VEG S2; Decision Trigger, FEIS, Table 6, pp. 44-45) | GMUG Forest Biologist tracks annually based on FACTs | With up-dates to the Forest vegetation data, all statistics related to lynx habitat were updated. To accurately determine the amount lynx habitat converted to unsuitable an analysis of all management actions from 1995-2020 (25 years) was completed. The SBEADMR EIS assumed a 25 percent incidental loss to lynx habitat resulting from salvage treatments and a 15 percent loss from resiliency treatments. All new road construction in lynx habitat was considered a 100 percent loss.  All LAU across the Forest are less than 5 percent unsuitable as a result of management actions. See GMUG Lynx Analysis Units Statistics spreadsheet for details. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. | The 25-year window was used because a spruce-fir stand will recover following treatment allowing understory trees to grow above average snow-depth and therefore become suitable once again.  In some instances, beetle induced tree mortality converted stands to unsuitable with or without treatment. If a treatment occurred in a stand that was already considered unsuitable for beetle mortality, logging would not make a stand more unsuitable since it is already unsuitable. |
| No more than 3% of lynx habitat on the GMUG NF will be thinned (Southern Rockies Lynx Amendment Standard VEG S5, Decision Trigger, FEIS, Table 6, pp. 44-45) | GMUG Forest Biologist track thinning activities annually in FACTS. | Little thinning is anticipated under SBEADMR treatments. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. | Under Veg S5, up to 42,293 acres of lynx habitat on the GMUG can be thinned. We do not expect to approach this threshold with the SBEADMR project.  Thinning will increase under Upper Taylor project; will be reported out as part of SBEADMR reporting. |
| Wildfire and cumulative management activities will not exceed 25% of HUC12 watershed as determined by weighted acres of mechanical harvest, roads, and severe fire. (Decision Trigger, FEIS, Table 6, pp. 44-45) | GMUG staff track acres of management in FACTS and INFRA | In 2020, a total of 4,884 acres of additional disturbance occurred in 29 watersheds across the GMUG. Watersheds where timber management is occurring received the highest level of disturbance.  Part of one watershed (Little Blue Creek; 27%) on the Alpine Plateau exceeds the 25% threshold, due to recent commercial harvest. However, the Forest Service only administers 2,479 acres of the 22,327-acre watershed (11%). Most of the watershed is administered by Bureau of Land Management or is private land. A second watershed (Willow Creek; 23%) exceeds the 20% yellow trigger in the EIS but again the Forest Service only administers 13 percent of the 14,784 acre watershed. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. | Watershed impacts are tracked annually through the Forest Service Activities Database – FACTS. All activities, not just those associated with SBEADMR are tracked, including natural disturbances such as wildfire. The Equivalent Roaded Acre methodology was used – 1 acre of road impact is one acre of watershed impact; 4 acres of vegetation treatment or wildfire equals 1-acre of watershed impact (25 percent). |
| Document that treatments are being implemented as planned; identify relevant improvements to procedures or exemplary practices to benefit future treatments (Annual IDT Treatment Review, Appendix D. FEIS) | Annual treatment review field trip with GMUG staff, subject matter specialists, and stakeholders.  Annual review of administrative processes and procedures (including SBEADMR checklist) by GMUG staff. | Due to COVID-19 concerns a treatment review did not occur in 2020. As of the writing of this report approximately 20 percent of the US population has been vaccinated for COVID-19. If condition related to COVID-19 continue to improve a treatment review will be scheduled for summer 2021. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. |  |
| Continue the public participation and collaborative learning that occurred during the  planning phase, encourage and support the continuation of collaborative workgroup  efforts throughout implementation (FEIS Appendix E, Public Engagement in Adaptive Implementation, Goal p. 2) | Science team questionnaire and AMG participation tracking (6a-b) | No results as of January 2021 Science Matrix update. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. | Tyler will present on initial plans for this at April meeting. |
| Ensure implementation of treatments is responsive to…new scientific information. (FEIS Appendix E, Public Engagement in Adaptive Implementation, Goal p. 2) | Science team questions not specifically linked to in earlier goals – lynx focus *(1e,3b-c)* | *(1e)* From 2018-2020, monitoring of hare pellets in the Engelmann spruce dominated stands has demonstrated that snowshoe hares continue to utilize areas that were impacted by the spruce beetle. However, this past year, field data suggested that salvage areas had lower hare density. Hare pellet counts in the salvage areas were always lower in the previous years, but not statistically significant.  In contrast to the Engelmann spruce dominated stands, areas that had a mix of Engelmann spruce and Aspen showed that initially hares favored the unmanaged and previously managed stands. However, in 2020, salvaged stands had higher hare pellet counts (I.e. higher hare use), although the variability did not detect significant differences among treatments.  Based on these variable results, exploration of options to mitigate impacts to dense horizontal cover during salvage is should be considered. It is critical to continue to steer salvage away from high-quality Canada lynx habitat. A significant outstanding question at this time is the longevity of salvage impacts on hare density and why it varies from year to year.  *(3b)* 53 of 68 plots in Elks/West Elks study area from 2019 were revisited in 2020 to change temperature sensors and count hare pellets.  Based on data from 2019 and 2020:   * As expected, hare pellet densities in spruce-fir dominated forests that have not been impacted by spruce beetle, tend to increase with increasing DHC. However, pellet counts do not increase linearly but instead increase rapidly at 20% DHC and stay high. The 20% threshold is lower than expected. * DHC is extremely heterogeneous on the landscape, with close plots (200m) with similar slope, aspect, elevation and fire history often having large differences in DHC measurements. This is hypothesized to reflect fine scale variability in soils, soil water availability and canopy closure. * DHC and hare pellet densities are heterogeneous at fine scales (100-200m).   The increase in pellet counts at 20% suggests that lower levels of DHC could provide valuable hare habitat in spruce-fir forests that have not been impacted by spruce beetle. The heterogeneous nature of DHC at relatively fine scales (<100-200m) stresses the challenges of quantifying DHC within treatment areas. Fine-scale heterogeneity in DHC and hare pellet counts means that it is challenging to identify large areas that are key for Canada lynx conservation. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. | Get feedback from AMG group on how best to track these questions. |
| Ensure implementation of treatments is responsive to…new scientific information. (FEIS Appendix E, Public Engagement in Adaptive Implementation, Goal p. 2) | Science team questions not specifically linked to in earlier goals – climate focus *(3a, 3c)* | *(3c)* Results of modeling future patterns of spruce forest distribution under different climate scenarios show that there is a very large range of potential future spruce cover scenarios – from a rapid decline to almost no spruce cover by 2060 and basically no cover in 2090 in the A1 climate scenario to relatively modest declines in the B1/B2 scenario. These models also show where on the landscape efforts to maintain spruce forests for habitat for Canada lynx and other subalpine species will most likely be successful.  Models of landscape connectivity for Canada lynx for the A1, and B1/B2 models for 2060 and 2090 continue to identify the eastern portion of the Gunnison basin as a critical area for connectivity for Canada lynx between the San Juan Mountains and northern Ranges in Colorado.  These model results could be used to identify locations on the landscape where spruce would be anticipated to persist into the future or where management should focus on maintaining spruce on the landscape (corridors). This information can be used to identify appropriate treatments, exclusion of treatment or post-treatment management including reforestation. | No changes to SBEADMR are needed at this time. | Accept AMG recommendation. |  |
| Ensure implementation of treatments is responsive to… public input. (FEIS Appendix E, Public Engagement in Adaptive Implementation, Goal p. 2) | Public comments from stakeholders & GMUG response |  | Suggest that local ranger districts need additional outreach as each new project is firmed up with specific silviculture, design, and timelines. | FLT encourages AMG members and the public to make use of the SBEADMR StoryMap platform, and encourages anyone with questions about specific sales to contact District TMAs or Rangers for further information or field visits. | This row will be used to track any *adaptations* made as a result of public comments; Comments and responses will not be noted in this document otherwise.  AMG recognizes that this recommendation is fairly broad – would like to hear input from District Rangers on what type of outreach is feasible on their end. |

# Appendix A.

Table 2. HUC12 Watersheds on the GMUG with 20% or less of Spruce-fir (Local Type = TSF) forest area in habitat structural stage 4A, 4B, or 4C

|  |  |  |  |
| --- | --- | --- | --- |
| **HUC 12 Name** | **Spruce-fir Total Acres (TSF)** | **Spruce Fir Acres 4A/B/C (TSF)** | **Percent of Spruce-fir in 4A/B/C** |
| McKee Draw | 38 | 0 | 0 |
| Calamity Creek | 38 | 0 | 0 |
| Blue Creek | 354 | 0 | 0 |
| Little Henderson Creek-East Muddy Creek | 3,210 | 4 | <1 |
| Wells Gulch-Gunnison River | 112 | 0 | 0 |
| Texas Creek | 5,538 | 362 | 7 |
| Outlet Cochetopa Creek | 139 | 13 | 9 |
| Long Branch Creek | 309 | 30 | 10 |
| Spring Creek | 7,513 | 1,229 | 16 |
| North Lobe Creek-West Creek | 47 | 8 | 17 |
| Deer Creek | 113 | 23 | 20 |