



United States Department of Agriculture

GRAND MESA, UNCOMPAHGRE AND GUNNISON NATIONAL FORESTS



Spruce Beetle Epidemic Aspen Decline Management Response (SBEADMR) **ANNUAL REPORT**



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1 History of SBEADMR and Adaptive Management Group (AMG)

In the Grand Mesa, Uncompahgre and Gunnison (GMUG) National Forests, approximately 40 percent of spruce and aspen forests are currently affected by insects and disease. The Spruce Beetle Aspen Decline Management Response (SBEADMR) Environmental Impact Statement (EIS) was created to address a decade of disturbance issues and improve forest health for roughly 120,000 acres on the GMUG.

The purpose of SBEADMR is three-fold: minimize threats from falling, dead trees and better manage wildfires (safety); improve the resiliency of stands at risk to insects and disease (resiliency); and treat affected stands via recovery of salvageable timber and re-establishment of desired forest conditions (recovery).

Launched by the GMUG in 2016, SBEADMR is designed to allow a more nimble “adaptive management” response to rapidly changing forest conditions associated with insect and disease outbreaks than is typically allowed under U.S. Forest Service’s (USFS) planning process. Conventional planning processes for forest treatments like timber harvesting can take years to complete. Although insect and disease outbreaks are part of natural disturbance cycles, the epidemic level outbreaks occurring over the last decade have produced significant mortality in the time it can take to complete the planning and analysis process for a forest treatment. With this significant change, a resiliency treatment needs to be redesigned into a salvage treatment, which traditionally would require restarting the entire process. SBEADMR avoids this problem by using an adaptive management

approach that allows the USFS to designate large swaths of land as priority treatment areas and then zero in on specific stands of trees year by year, based on current conditions.

This novel approach, however, generated concerns from local stakeholders who thought SBEADMR lacked specificity about the proposed projects and the areas that would be treated. Stakeholders wanted to see more science-driven management decisions and had concerns about the impacts of temporary logging roads, disruption to recreational users, impacts on wildlife and lack of public input on specific projects. To address these concerns the USFS agreed to fund an independent science advisory team to inform the adaptive approach and established the SBEADMR Adaptive Management Group (AMG).

The AMG is a citizen-based working group composed of individuals representing diverse local and regional interests and perspectives. Members are self-selected by stakeholder category except for the community at-large representatives, who are appointed by their respective county commissioners. Stakeholder categories include county commissioners, forestry processors, forestry loggers, conservation groups, water resources, recreation, wildlife and fish, education, Colorado State Forest Service and at-large members. The primary purpose of the AMG is to assist the GMUG in applying the adaptive management framework over a multi-year timeframe in accordance with the SBEADMR Record of Decision.

The goals of the AMG are to:

- Provide comments on proposed treatment sites.
- Help with articulating monitoring questions.
- Participate in post-treatment evaluations.
- Review monitoring to make recommendations for adaptive management for future projects.
- Anticipate local roadblocks that may arise and work to resolve them.
- Strive for consensus of diverse interests on recommendations submitted to the GMUG.

In addition, the AMG appointed a Monitoring Committee to identify, organize, observe and monitor the following:

- Community understanding and engagement.
- Socio-economic data and impacts.
- Collaborative adaptive management process and outcomes.
- Tracking science studies and monitoring efforts.

Epidemic levels of spruce beetle have caused widespread mortality in Engelmann spruce-dominated forests on the GMUG NF.

The AMG also works directly with the SBEADMR Science Team to determine questions that need to be answered using the best available science. Comprised of researchers with expertise in forest ecology, silviculture, wildlife biology and natural resource socioeconomics, the Science Team designs rigorous studies and collects and analyzes data. The results of these scientific studies can then be used to guide management policies and projects on the ground.



The SBEADMR Adaptive Management Group circles up at a pre-treatment review field trip for the Big Park Timber sale.

2 SBEADMR Science Team Updates

The Science Team presented the 2018 monitoring results at the April 2019 SBEADMR Annual Meeting. Presentation summaries are listed below by project title.

2.1 Impacts of spruce bark beetle and subsequent salvage in Engelmann spruce and Engelmann spruce-aspen forests in the GMUG on forest structure and tree regeneration.

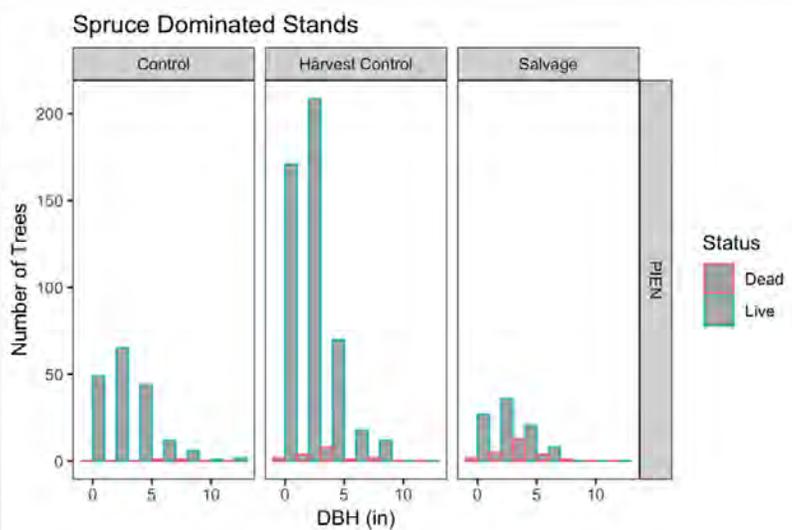
Lead: Dr. Mike Battaglia, U.S. Forest Service Rocky Mountain Research Station

Background

A major concern raised by stakeholders in the initial stages of SBEADMR was the impact of spruce beetle and salvage treatments on forest regeneration. Would salvage treatments have a detrimental impact on existing advanced regeneration (i.e. seedlings and saplings) in spruce-dominated stands? To address this concern and improve understanding of the legacies of previous management in spruce beetle-affected stands on current forests, the science team established 117 forest inventory plots in spruce and spruce-aspen forests in the Gunnison Basin on the GMUG National Forests. Forty-five plots are sampled annually.

2018 Monitoring

Variables measured in 2018 include tree regeneration, regeneration survival, and seed production. In addition, field crews collected hare scat (feces) to measure snowshoe hare density in the monitoring plots, and collected temperature data from sensors placed below ground, ground-level and above-ground.



2018 Results

The aftermath of the spruce-beetle epidemic in the sampled stands showed high mortality (>90%) in spruce overstory trees. Survival rates of overstory spruce and saplings were slightly lower in the stands managed to harvest recent mortality (salvaged stands) than the controls (unmanaged and previously managed stands). Salvaged stands had an average spruce overstory survival rate of 64% (vs 91% in controls) and an average spruce sapling survival rate of 80% (vs 100% in control plots). Spruce seedling survival did not vary significantly between salvaged (88%) and unsalvaged (94%) plots.

Survival rates of overstory spruce and saplings were slightly lower in the stands managed to harvest recent mortality (salvaged stands) than the controls.

While spruce overstory and sapling survival in salvaged stands was lower than in the unmanaged and previously managed stands, salvage stands still retain saplings and new regeneration densities that exceed USFS stocking guidelines, indicating that salvage logging activities are adequately protecting advanced regeneration.

Snowshoe hare abundance, an indicator of viable Canada lynx habitat was highest in unmanaged spruce and spruce-aspen stands, followed by previously managed stands and lowest in salvaged stands.

Engelmann spruce seedlings in long-term monitoring plots are tagged so that field crews can track survival.

Survival rates of overstory spruce and saplings were slightly lower in the stands managed to harvest recent mortality (salvaged stands) than the controls.

Engelmann spruce seedlings in long-term monitoring plots are tagged so that field crews can track survival.



2.2 Impact of Bark Beetle Outbreaks on Canada Lynx and their Prey

Lead: Dr. Jake Ivan, Colorado Parks and Wildlife

Background

The Canada lynx is an endangered species that was extirpated from and then re-introduced into Colorado's San Juan Mountains in the 1990s. This study was developed to understand how the spruce beetle outbreak is impacting lynx and their prey. Scientists monitored snowshoe hare and red squirrel populations in spruce-beetle-affected forest across Colorado and analyzed this prey data in conjunction with GPS data from radio-collared lynx.

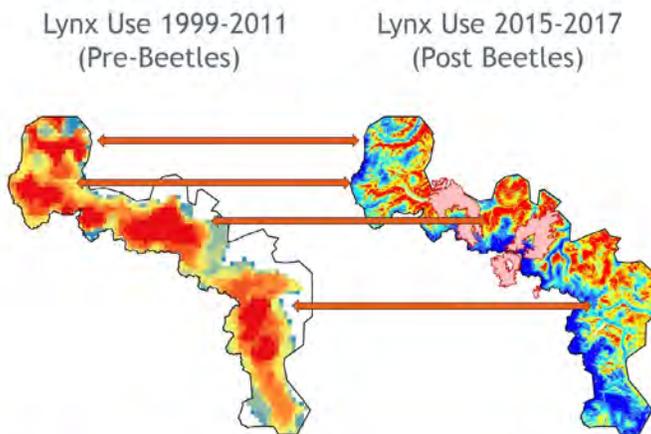
2018 Monitoring

Work focused on analysis of lynx GPS collar data as well as snowshoe hare mark-recapture data, and red squirrel distance sampling data. Data for each species was related to habitat metrics, including horizontal cover, subalpine fir and spruce cover, and spruce mortality.

2018 Results

Lynx distribution and snowshoe hare occupancy and density has remained largely unchanged by the beetle epidemic in Colorado. Red squirrel occupancy and density has declined overall. Snowshoe hare density, and therefore lynx density, may be more strongly driven by the stem density of young subalpine fir in comparison to young spruce. The protection of regenerating spruce and subalpine fir saplings and large patches of connected subalpine forest is important for the preservation of lynx habitat.

A snowshoe hare captured on a CPW wildlife camera.



Lynx use has remained largely unchanged after the spruce beetle outbreak in SW Colorado. (Solid pink polygons on the right denote areas impacted by recent forest fire, which lynx have generally avoided)

2.3

Landscape-scale Impacts of Spruce Bark Beetle and Climate on Forest Change

Lead: Dr. Jason Sibold, Colorado State University

Background

2017/2018 was an exceptional drought year, with Colorado experiencing the warmest annual temperatures on record, while average low temperatures continue to increase (warmer low temperatures). Climate conditions are acting in concert with the ongoing spruce beetle outbreak to shape patterns of forest change in Engelmann-spruce-dominated landscapes on the GMUG.

Understanding how the Engelmann spruce is reacting to changing temperatures and snowpack conditions and identifying specific landforms that may be suitable for more successful regeneration in the future will be critical to guide treatment site selection. This data can tell us which areas on our landscape are more resilient to climate change and where spruce forests are more likely to persist in the coming decades. It also has implications for wildlife, like the Canada lynx. This project utilizes LiDAR (Light Detection and Ranging), a remote-sensing technology to model how high-quality lynx habitat has changed due to spruce beetle outbreaks. This habitat model can then be used in conjunction with GPS data from radio collared lynx to see how lynx are using these new landscapes.

The results of this project will help inform management priorities. For example, results might emphasize the importance of leaving connected pockets of spruce within certain treatment areas to preserve lynx corridors.

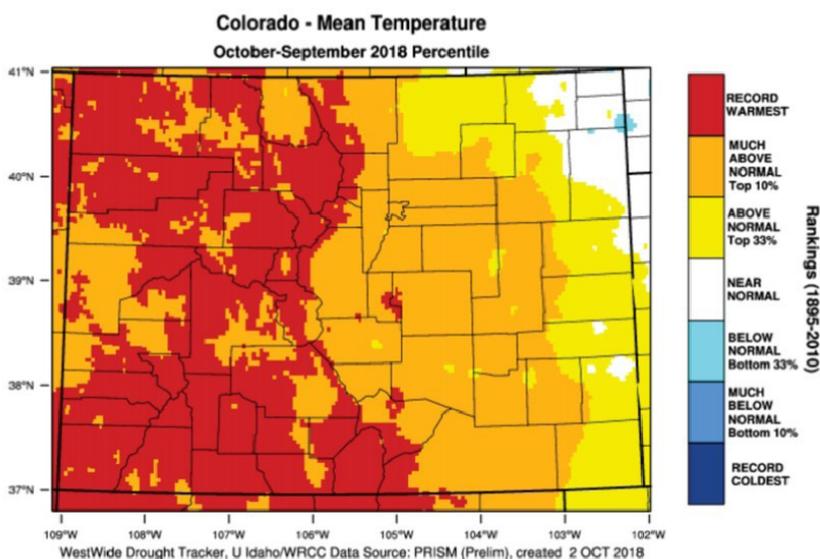
2018 Monitoring

Field crews installed temperature sensors on different aspects, slopes and elevations in untreated areas and in salvaged areas where beetle-kill trees had been removed. Sensors were also deployed at Forest Inventory and Analysis (FIA) plot locations on the GMUG to provide landscape-scale context for temperature data. FIA is a nationwide “forest census” run by the USFS Research & Development branch that collects data on extent, condition, volume, growth, and health of forest resources across the nation.

Additionally, field monitoring that will be used to validate remotely-sensed LiDAR data began in the West Elks. Field crews located and re-sampled plots that were originally established in 2015. These plots will be used to ground-truth LiDAR data and to apply this knowledge to track forest change across spruce-dominated forests on the GMUG.

2018 Results

Monitoring and analysis will continue in 2019. No results are available at this time.



Colorado experienced the warmest annual temperatures on record during the water year from October 2017 through September 2018. Image: Western Regional Climate Center

2.4

Assessing the Socioeconomic Impacts of SBEADMR

Lead: Dr. Tony Cheng, Colorado Forest Restoration Institute

Background

One of the project's goals described in the SBEADMR Record of Decision (ROD) is to "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). In order to evaluate achievement of this goal and potential increased efficiencies found in SBEADMR's adaptive approach, the SBEADMR Science Team is looking at the following questions:

- To what extent do the USFS administrative costs change over the SBEADMR Project timeframe? What issues affect costs?
- To what extent does timber output and revenue change over the SBEADMR project timeframe?
- In what ways does the SBEADMR project contribute wood volume to the wood products industry that sustains the interdependence of producers?
- What are the direct non-governmental employment impacts on wood producers from the SBEADMR implementation?

2018 Monitoring

Data collection for these questions began in 2018. As of this writing, the team has collected data for one sale completed from 2018 contracts.

2018 Results

No results to report.

A skidder operating on the Big Willow Good Neighbor Authority Sale



A skidder operating on the Big Willow Good Neighbor Authority Sale.

3 Adaptive Management

The GMUG's Annual Management Reviews consider input from AMG recommendations, GMUG resource specialists, SBEADMR Science Team and other relevant research in order to make adaptive management decisions for the design and implementation of SBEADMR projects. Management Reviews are conducted by the GMUG Forest Leadership Team who make final decisions on changes to SBEADMR implementation. The following changes were made in 2019.

3.1 2019 SBEADMR Treatment Checklist Changes

- Slash pile size and shape was modified to reduce the footprint of the piles and therefore reduce impacts to soils when burned.
- Added the words "within 5 years of harvest" to the silvicultural design feature ("All regeneration cutting will meet stocking standards as defined in the Forest Plan"). This change was made in order to be in compliance with the National Forest Management Act.
- Additional review required by the Timber Contracting Officer prior to review of the District Ranger to ensure a thorough review of the design features before final approval.
- Modified the recreation objectives to improve coordination of potential conflicts between recreation and timber management activities.

Other Changes

- Timber sale contracts will be changed to specify that temporary roads should be ripped (decompacted using specialized machinery) to a 4 - 8" depth upon sale closeout (modified from an 8 - 12" depth), and that areas with greater than 40% surface rock (fragments >3") should not be ripped. At an 8-12" depth, the subsoil (B horizon) is mixed with the surface soil (A horizon) which reduces overall soil productivity. The 40% surface rock provision was added because areas with high rock content typically do not compact, so ripping is not necessary and can cause large rocks to be pulled to the surface creating an undesirable "boulder field" effect.

AMG Suggestions from August 2019 Management Review

- Develop a recording process to track and respond to comments submitted through informal project specific scoping and field trips.
- Place more seed traps in monitoring plots and leave more seed trees in treatment areas.



Dr. Jason Sibold speaks to field trip participants at the Big Park pre-treatment review.

Log deck on the Big Willow Good Neighbor Authority timber sale.

Remeasuring a control plot (BATTAGLIA).

**GMUG National Forests SBEADMR Treatments
Sales awarded from Fiscal Year 2016 through Fiscal Year 2019**

Treatment Name	FY Awarded	Resource Zone*	Treatment Type	Acres Treated	Timber Volume Produced (CCF)	Miles of Temporary Road	Treatment Status
Horse Mountain	2016	North	Resiliency	110	1,449	0	Complete
Cathedral	2017	East	Salvage	640	13,497	10	Complete
Nutras	2017	East	Salvage	210	5,835	1.8	Complete
Pauline	2017	East	Salvage	1,874	18,615	9.7	Complete
Skeleton	2017	East	Salvage	610	12,777	8.4	Complete
Willow Mesa	2017	East	Salvage	440	5,800	6.4	Complete
Moore Knots	2017	North	Sanitation	15	70	0	Complete
Little Cone	2017	West	Resiliency	86	1,775	0	Complete
Cooler	2018	East	Salvage	244	2,167	0.8	Complete
Divide Salvage	2018	East	Salvage	160	2,545	1	Complete
Last Tree	2018	East	Salvage	466	6,270	3.7	Active
Millswitch	2018	East	Salvage	885	18,516	2.6	Active
Quill	2018	East	Salvage	569	6,708	0	Active
Sargents Mesa	2018	East	Salvage	1,468	14,195	9.7	Active
Crane	2018	North	Resiliency	475	8,552	1.6	Active
High Mesa	2018	West	Salvage	320	13,178	3	Complete
Big Willow-GNA	2019	East	Salvage	2177	41,224	12	Active
Buffalo Forks - NWTF	2019	East	Salvage/Resiliency	100	1,441	2	Sold
Ridgestock - GNA	2019	East	Salvage	1,300	28,858	12	Active
Sage Park	2019	East	Salvage	14	130	0	Sold
Jackson	2019	West	Salvage/Resiliency	321	10,789	3	Active
Telski	2019	West	Resiliency	50	500	0	Sold
Totals				12,534	214,891	87.7	



Contact Information

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970-874-6600

Clay Speas, Renewable Resource Staff Officer- clay.speas@usda.gov

Carlyn Perovich, Ecologist - carlyn.perovich@usda.gov
Nicole Hutt, Timber Program Manager - nicole.hutt@usda.gov

For specific treatments contact your USFS District Timber Management Assistant (TMA)

www.fs.usda.gov/detail/gmug/about-forest/offices

East Zone (Gunnison Ranger District) – Arthur Haines, art.haines@usda.gov

North Zone (Grand Valley and Paonia Ranger Districts)

– Cari Johnson, cariajohnson@usda.gov

West Zone (Norwood and Ouray Ranger Districts)

– Joseph Gonzalez, joseph.f.gonzales@usda.gov

GMUG's SBEADMR page

www.fs.usda.gov/goto/SBEADMRimplementation

SBEADMR Facilitator

Susan Hansen - shansen42@gmail.com

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