Grasshopper Fire Burned Area Summary

Burned Area Report

Fire Background

The lightning-caused Grasshopper Fire started the evening of July 23, 2026, about 14 miles southwest of Dufur, Oregon in Wasco County. It burned just under 94,000 acres as high temperature, low humidity, and strong winds created extreme fire behavior over the fire's first few weeks. The BAER team began its assessment of the burned area on September 14 to evaluate critical values, associated threats, risk level, and identify where a BAER emergency exists that warrants treatment. The risk assessment focused on the most probable damaging storm events.

Soils

Soils in the western portion of the fire primarily consist of coarse, glacially altered materials mixed with volcanic ash, while in the eastern portion soils formed from both volcanic ash and weathered bedrock and tend to be finer textured.

Soil burn severity (SBS) is an integration of vegetation loss, changes in soil structure and infiltration capacity, remaining vegetation, duff, or ash, and soil color, all of which may indicate relative degrees of soil heating.

The final soil burn severity maps were developed using satellite imagery and field survey data. Field work included assessment of ash characteristics, ground cover, root condition, soil structure and color, water infiltration, and burned vegetation. High soil burn severity is characterized by a complete consumption of litter and duff layers on the forest floor, degradation of soil structure, reddening of the soil color, and charred or volatized fine roots. The highest-severity areas often have a loose, dusty appearance, and no longer have any cohesion or soil strength. Generally, there will be less destruction of soil organic matter, roots, and soil structure in an area mapped as moderate compared to high. In areas mapped as moderate SBS, soil structure, roots, and litter layer may remain intact beneath a thin ash layer. Low soil burn severity results in very little alteration of soil organic matter and little or no change in soil structural stability and water infiltration.



Figure 1: BAER team members hike on a burnt trail along a slope within the Grasshopper Fire area.

The fire had periods of extreme activity during hot, dry, and windy afternoons, followed by periods of slower burning and smoldering, which caused a mix of soil burn severities. About 70% of the fire had low, very low, or unburned soil burn severity, while about 30% had moderate or high severity (see map on page 6).

Developed areas (both rural and urban) were not mapped for soil burn severity. This method has been developed for wildland vegetation and landscapes rather than describing effects of fire on developed lands and burned structures. As such, these areas were not evaluated by the BAER team.

Post-fire Erosion

About 80% of the fire area has been classified as low to moderate erosion potential and 20% as

high to very high potential. Erosion is expected to increase after the fire, but most watersheds are projected to lose on average less than 1 ton of soil per acre each year. Some isolated steep slopes where soil burn severity was high are expected to experience increased soil loss up to 5.7 tons per acre per year.

The team evaluated fire effects on steep slopes and potential geologic hazards that could affect downstream critical values. Using the distribution of geologic hazards helps predict how steep slopes and drainages might respond to and be impacted by upcoming storms. Steep, narrow channels with loose debris, rocks, and sediment are more likely to experience debris flows when heavy rain creates heavy runoff.

Terrain most prone to debris flows/slides occurs on the steeper, wetter western half of the fire. Fifteenmile Creek, Badger Creek, and East Fork Hood River have channels with the greatest potential for debris flows during intense rainfall. Some steep upper areas of Tygh and Pen Creek watersheds also have increased risk.



Figure 2: A BAER team engineer evaluates a bridge within the Grasshopper Fire perimeter.

Using the soil burn severity map, the USGS assessed the probability of post-fire debris flows. Their estimates indicate that most of the burned area has less than a 50% chance of debris flows if rainfall intensity is less than about one inch per hour.

Hydrology

Primary watershed response is expected to include an initial flush of ash and burned materials, erosion in drainages from steep slopes, amplified peak flows and increases of sediment transport, deposition, and debris flows. Watershed response is dependent on the occurrence of rainstorms and rain-on-snow events and will likely be greatest with the first storm events after the fire. Increased watershed response is most likely in areas with high to moderate soil burn severity. Disturbances will become less evident as vegetation is reestablished, providing ground cover that reduces erosion and increases surface roughness, which slows water accumulation and increases infiltration.

Headwater watersheds with a sufficient portion of moderate to high soil burn severity may experience amplified peak flows up to 11 times greater than before the fire. Initial storms may wash ash and debris into streams, temporarily impacting water quality by increasing water cloudiness and sediment levels. Steep slopes and drainage channels may experience increased erosion, sediment buildup, and debris flows.

Downstream communities, including Dufur, Wamic, and Tygh Valley, may be affected by increased runoff and sediment from burned watersheds. The greatest impacts are expected during rain and rain-on-snow events from January through March, especially during the first post-fire storms. Risks should gradually decrease as vegetation regrows and helps hold soil in place. Watershed conditions are expected to improve to pre-fire conditions within 3–5 years.

Critical Values

The first critical value BAER teams assess is always human life and safety on National Forest System lands. During and after heavy rainstorms, Forest employees and visitors could be threatened by accelerated erosion, floodwaters and debris flows. In addition, users of roads within and downstream of the burned areas may be affected by

road washouts during and after heavy rainstorms. The National Weather Service can establish an early warning alert plan for areas that are potentially at risk from these events.

"Entering Burned Area" signs will be installed at areas with high visitor use and warning signs will be installed at major road junctions leading into the fire footprint to alert drivers to hazards such as falling trees, flooding, rockfall, and debris flows.

Dangerous burned trees will be removed near campgrounds, trailheads, and the High Prairie Shelter to protect infrastructure from falling trees.

Roads and Bridges

Roads in and downstream of burned areas are at risk of damage due to post-fire conditions. The most likely threat due to the fire is clogged culverts, bridges, and other in-channel infrastructure from increased debris (especially fallen trees) in burned watersheds. Once blocked by debris, road drainage structures no longer function and the stream flows over the road, often causing considerable damage and limiting access. Various measures can reduce this risk, including protecting culvert inlets with debris racks, removing large floatable debris from channels upstream of structures before floods, and making heavy equipment available and readily mobilized during storm events to keep structures clear of debris.

Debris flows are less likely than debris-laden flood flows, but they pose a greater threat to roads when they do occur and are difficult to mitigate.

Critical values addressed in the BAER report include Forest Service roads and related drainage features. About 34 miles of roads in Mt. Hood National Forest face high risks of erosion, flooding, rockfall, runoff, falling trees, and debris flows. Undersized or clogged culverts may cause road failures, especially along Forest Road 44 and Engineer's Creek. A destroyed plastic culvert on Forest Road 4421 also threatens access to infrastructure and private property. Weakened guardrails along a sharp curve on Forest Road 27 has created a safety hazard. BAER specialists recommend replacing the destroyed culvert with metal, removing the Engineer's Creek culvert, cleaning other culverts and ditches, improving drainage along 33 miles of road, removing hazardous trees near bridges, and repairing guardrails along Forest Road 27. Gates may be installed on roads leading to areas to keep visitors out of areas threatened by falling trees, flooding, and debris flows (see map on page 7).

Recreation

Forest recreation infrastructure includes campgrounds, trails, and day use areas. About 19 miles of trail are at high risk of damage from erosion, flooding, rockfall, and debris flows. These hazards could wash out trail sections, posing high risk to users. Fire-weakened trees could fall onto campgrounds, bridges and damage or destroy them. Hikers may encounter falling trees or rockfall and could experience unsafe conditions from flooding and debris flows during rain, especially near steep slopes and streams.

Campground infrastructure at Fifteenmile Campground and dispersed camping areas are also threatened by post-fire weather events. Fire-damaged trees could fall on buildings, signs, picnic tables, kiosks, and other facilities at developed campground locations. A burned toilet left an exposed waste tank that could expose visitors to harmful bacteria and disease.

Drainage improvement and trail structure repair is planned along high-risk trails to identify drainage problems and erosion early and prioritize repairs before damage worsens. "Entering Burned Area" signs will be installed at areas with high visitor use, like trailheads, and warning signs will be installed at major road junctions leading into the fire footprint to alert drivers to hazards such as falling trees, flooding, and debris flows.

Botany

Mt. Hood's eastern foothills feature dry shrublands, oak, pine, and fir forests, grasslands, and seasonal meadows, where fires were historically frequent but low in severity. Invasive

grasses have increased fuel buildup and altered fire patterns. Middle elevations contain moist forests with varying fire severity, while higher elevations feature wet fir and hemlock forests, meadows, and wetlands that historically experienced infrequent, high-severity fires.

Invasive plants adversely affect native plant communities through allelopathy- the suppression of growth of a native plant by release of a toxin from a nearby invasive plant. They also directly compete for water and resources. Over time, native plant diversity decreases as invasive plants expand, reducing habitat for native plant species and wildlife. Shifts from diverse native plant communities to non-native invasive plant dominance could alter future fire behavior, intensity, extent, and season of burning.

Damage from fire and firefighting activities increases the risk of invasive plants establishing in burned areas that have historically hosted diverse native plant communities. Existing invasive populations nearby make new invasions more likely and invasive annual grasses may spread more quickly after the fire, potentially outcompeting native plants. Crews will survey 950 acres of burned native plant communities near existing invasive plant populations to detect and control invasive species before they spread.

Minimal whitebark pine mortality was observed, though surviving trees may die later from fire stress, storm damage, falling trees, or mountain pine beetle attacks. Surviving pines in the Badger Creek Wilderness will be treated with verbenone and monitored to protect them from mountain pine beetles.

Cultural Resources

Fire-weakened trees, falling rocks, and increased exposure could threaten culturally significant sites. Falling trees, erosion, and increased runoff could damage resource gathering sites that may contain important information about past Indigenous resource use and history. Fire-weakened trees, soil erosion, and increased runoff threaten seasonal use sites that may hold important evidence of past human activity. Loss of ground cover and changes in water flow increase these risks. Qualified crews, archaeologists, and tribal monitors will remove hazardous trees in affected areas and spread woody debris at cultural sites to prevent loss of irreplaceable artifacts.



Figure 3: A BAER team member surveys trees and a stream in a high severity burn area within the Grasshopper Fire footprint.

Federally Listed Species - Wildlife and Fisheries

The Grasshopper Fire is within the range of the Northern Spotted Owl. Remaining suitable habitat for the Northern Spotted Owl may be affected by post-fire tree mortality and dead trees falling. Reduced numbers of surviving trees could make habitat recovery more difficult.

Critical habitat for federally listed steelhead (*Oncorhynchus mykiss*) occurs in select river drainages. Impacts to aquatic systems are directly related to the anticipated increases to runoff, erosion, and sedimentation in streams. Habitat may also be affected by warmer stream temperatures and loss of streamside vegetation that provides shade. The level of risk varies by watershed.

Anticipated Vegetation Recovery

Post-fire recovery varies greatly based on climate, vegetation types and burn severity. It is typical for recovery to take between 3-5 years for reestablishment of ground cover. The persistence of

drought in the years following wildfires also delays the recovery time frame. Even with only a short period of time since fire containment, resprouting of trees and shrubs as well as emergence of forbs have been noted within the burned area.

Vegetation is expected to recover to about 60% ground cover within 3 years at higher elevations and 2 years in drier, lower areas, helping reduce runoff and erosion. Shrubs, grasses, sedges, and wildflowers are already regrowing, while burned meadows may support huckleberry and manzanita. Over the longer term, some Oregon white oaks may also recover, but severely burned areas could experience long-term changes in forest composition. Ponderosa pine may continue to decline due to drought.

Non-Forest Service Values

Since wildfire burns across administrative boundaries, additional threats exist for land not owned or managed by the Forest Service. Post-fire emergency response is a shared responsibility. There are several Federal, State, and local agencies that have emergency response responsibilities or authorities in the post-fire environment. The BAER team and local unit BAER coordinator have engaged with these partners to facilitate consideration of off-Forest values covered through other programs with the relevant responsible parties.

Water quality may temporarily decrease within Dog River and The Dalles municipal watersheds due to increased sediment, ash, and nutrients from burned areas. Crow Creek Reservoir can trap some sediment.

Conclusion

There are multiple phases of post-fire actions after a wildfire covering suppression repair through long-term recovery. The BAER team has identified imminent threats to critical values based on a rapid assessment of the area burned by the Grasshopper Fire. The assessment was conducted using the best available methods to analyze the potential for damage from post-fire threats, including flooding and debris flows. The findings provide the information needed to prepare and protect National Forest System critical values against post-fire threats.

BAER treatments cannot prevent all the potential flooding or soil erosion impacts, especially after a wildfire-changed landscape. It is important to stay informed and prepared for potentially dramatic increased run-off events. The Forest will continue to provide information and participate in interagency efforts to address threats to public and private values resulting from the Grasshopper Fire. Information can be found at: https://www.fs.usda.gov/r06/mthood/fire/fire-recovery.

The Forest Service will continue to work towards long-term recovery and restoration of the burned area in coordination with efforts to rebuild and restore the communities affected.

References:

Parson, Annette; Robichaud, Peter R.; Lewis, Sarah A.; Napper, Carolyn; Clark, Jess T. 2010. Field guide for mapping post-fire soil burn severity. Gen. Tech. Rep. RMRS-GTR-243. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 49 p. (https://www.fs.usda.gov/rm/pubs/rmrs_gtr243.pdf)

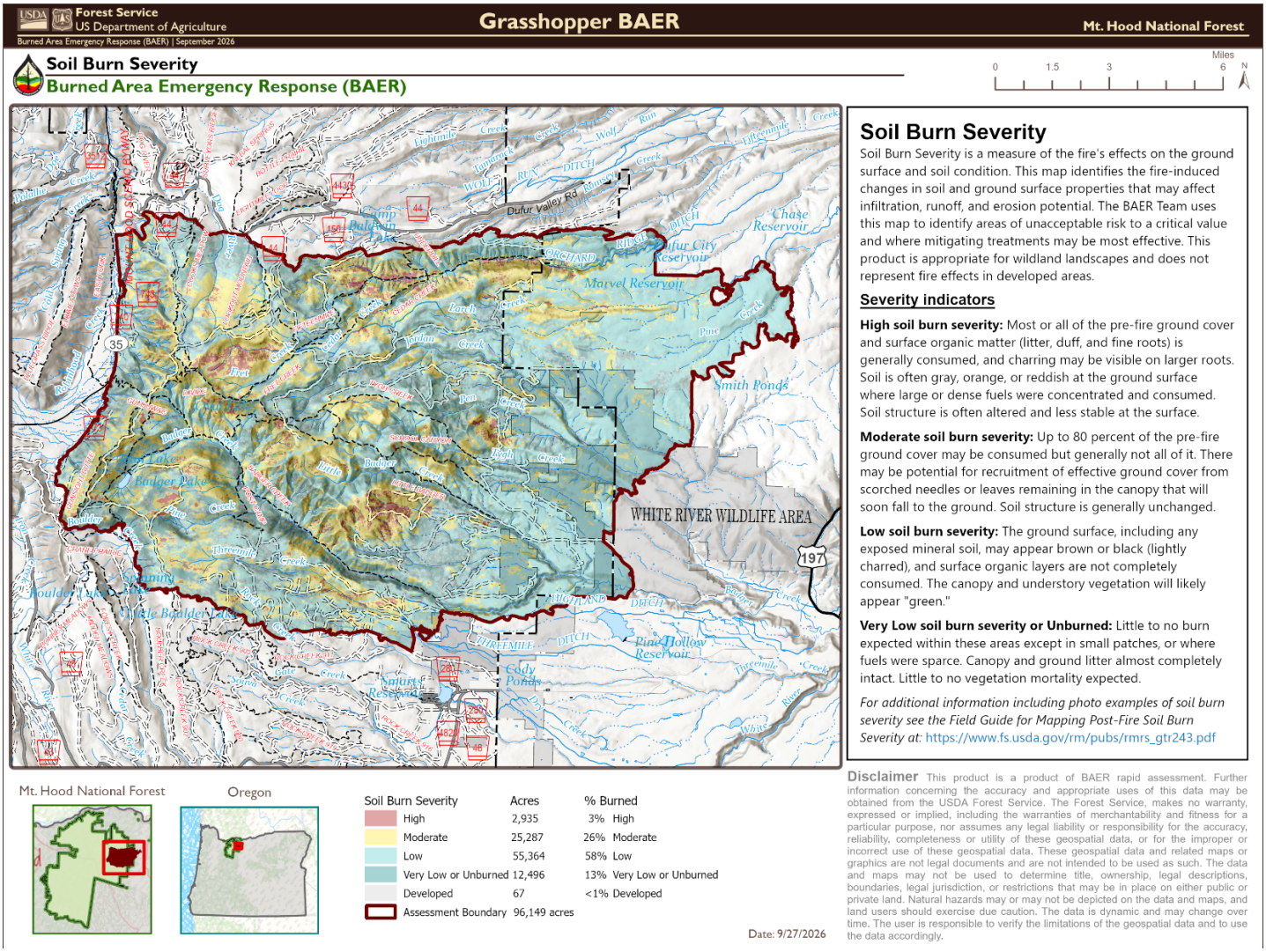


Figure 4: Soil Burn Severity map of the Grasshopper Fire perimeter.

A soil burn severity (SBS) map shows the degree to which a wildfire has changed the soil in different parts of the fire perimeter. SBS measures how much the soil changed, not how hot the fire burned. Burned Area Emergency Response scientists estimate the level of soil damage using satellite images taken before and after the fire and field observations. This map helps Forest managers identify areas that may need protection from erosion and runoff or recovery work.

Very Low or Unburned Severity: The soil experienced little or no change from the fire. It will likely continue to support plant life and absorb water well.

Low Severity: The fire caused limited changes to the soil. Some plant cover may be lost, but the soil will likely continue to absorb water as it did before the fire.

Moderate Severity: The fire caused more noticeable changes to the soil. More plant cover and organic material may be gone and the soil may absorb less water, increasing the risk of erosion.

High Severity: The fire caused major changes to the soil. Much of the protective plant litter and organic matter likely burned, leaving the soil less able to absorb water. This can increase the risk of erosion, flooding, debris flows, and the spread of invasive plants.

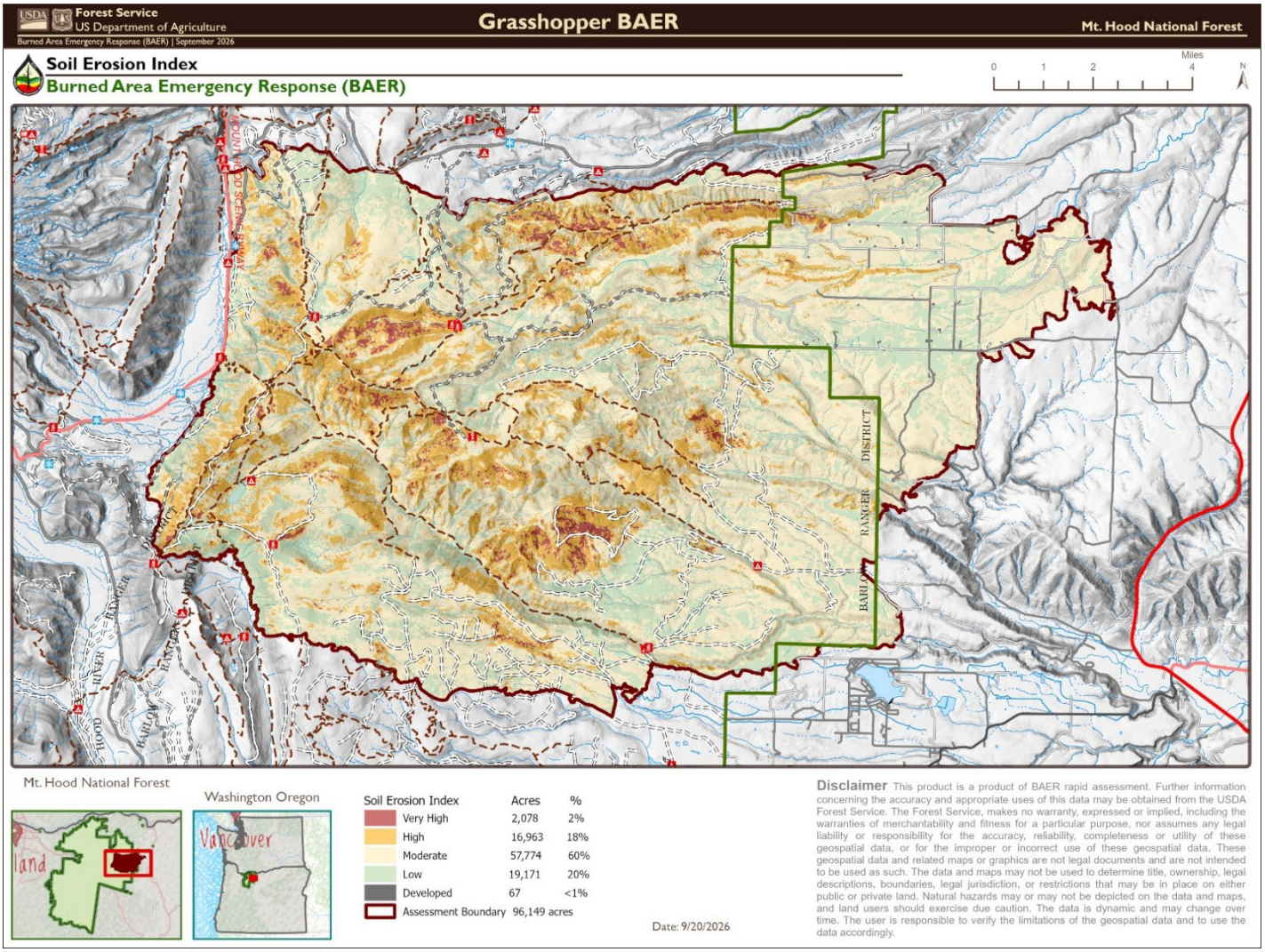


Figure 5: Soil Erosion Index map of the Grasshopper Fire perimeter.

A soil erosion index map identifies areas that may be more likely to lose soil after a wildfire, especially during a rain event. Runoff may carry soil, ash, and debris into streams, roads, and nearby areas. The map's results depend on factors including soil conditions, slope, vegetation, and expected rainfall. It helps Forest managers predict where rainfall could cause erosion and where stabilization actions may be needed.

Low Soil Erosion Index: These areas are expected to have a lower risk of soil erosion after the fire. More ground cover likely remains to help protect the soil from rain and runoff.

Moderate Soil Erosion Index: These areas may be more vulnerable to erosion because some protective vegetation and ground cover have been lost. Rain can carry soil downhill, especially on steep slopes.

High Soil Erosion Index: These areas are more likely to lose soil during rainfall because less ground cover remains to hold it in place.

Very High Soil Erosion Index: These areas are most likely to lose soil during rainfall. The loss of protective ground cover combined with factors, including steep slopes and soil conditions, can allow rainfall to carry large amounts of soil and debris downhill.

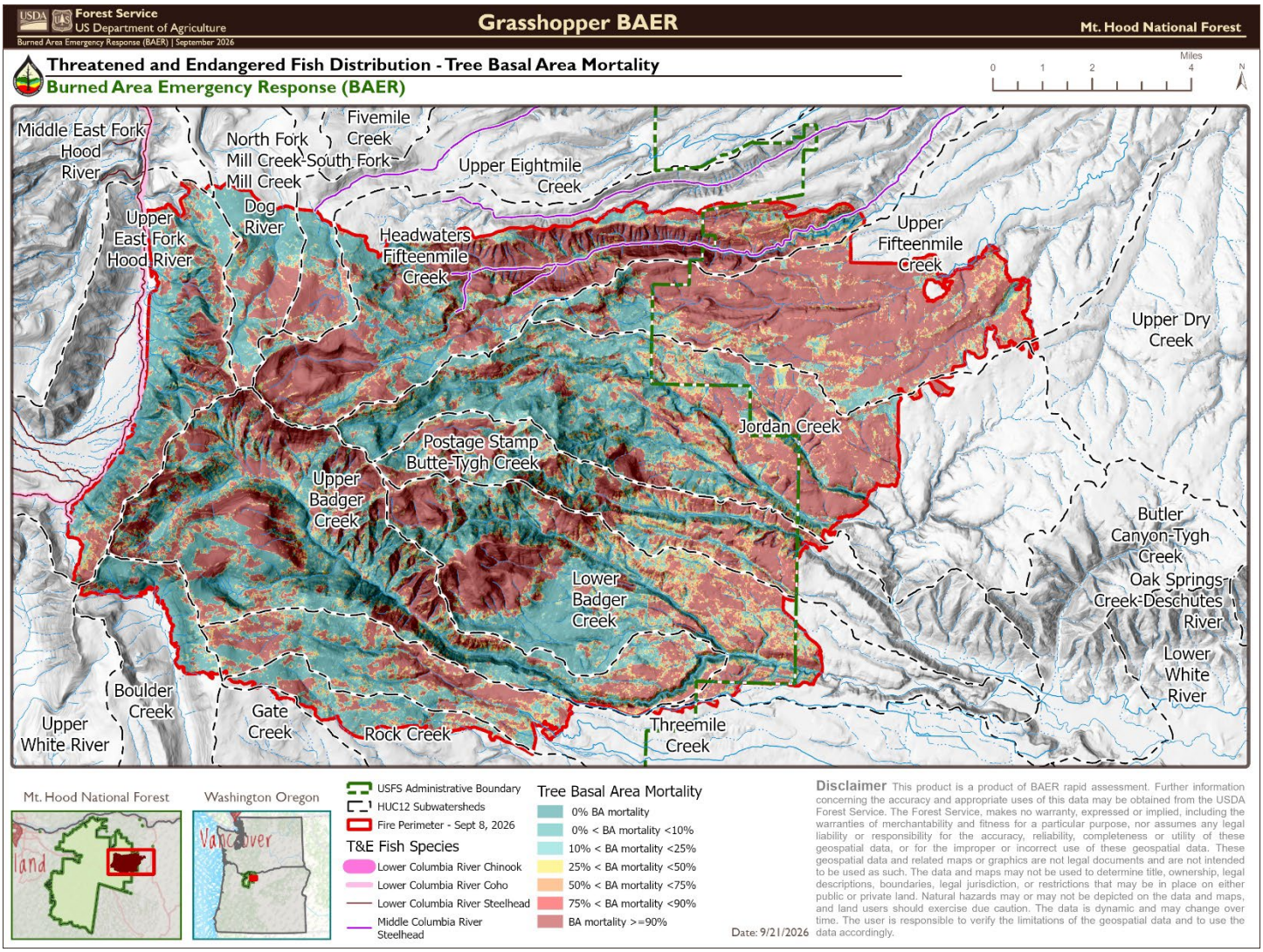


Figure 6: Tree Basal Area Mortality map of the Grasshopper Fire perimeter.

A tree basal area mortality map estimates the percentage of trees killed by a wildfire in the map area. Basal area is the total cross-sectional area of tree trunks, indicating how much total space trees take up. The map shows how much of that total tree trunk area was killed. If an area had 1,000 square acres of basal area before the fire and 500 square acres belonged to trees that died, the basal area mortality would be 50%. The higher the tree basal area mortality, the higher likelihood of negative impacts on the ecosystem. The map helps Forest managers identify areas where trees suffered the most damage or died, which can help guide recovery projects.

The map also shows the streams used by threatened and endangered (T&E) fish species. Trees support fish habitat in many ways. Tree roots hold streambanks in place to reduce erosion, while fallen logs and branches create pools where fish can rest and escape predators. Tree shade keeps streams cool, which is especially important for the survival of young fish and eggs. When a wildfire kills trees near streams, water temperatures and erosion can increase. Rain may carry more soil and ash into waterways, which can reduce water quality and kill fish eggs. These changes can put additional stress on threatened and endangered fish, though the effects depend on the fish species, the stream, and the percent of tree basal area mortality.