USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Rogue River-Siskiyou National Forest | November 2025

Moon Complex Fire Burned Area Summary

Burned Area Report

Fire Background

The Moon Complex Fire is located on the Gold Beach, Powers, and Wild Rivers Ranger Districts on the Rogue River-Siskiyou National Forest, approximately 11 miles NE of Agness, Oregon. On September 3rd, a lightning event caused several fires in the vicinity of the Rogue River. Five fires fully merged into the Moon Complex Fire on September 26th. These included: Paradise, Stair, Brushy, Backbone, and Pinnacle Fires totaling 19,520 acres. The Tate Fire is part of the complex but never merged and was contained at 26 acres.

While many wildfires cause minimal damage to the land and pose few threats to the land or people downstream, some fires result in damage that requires special efforts to reduce impacts afterwards. The Burned Area Emergency Response (BAER) program is designed to identify and manage potential risks to resources on National Forest System lands and reduce these threats through appropriate emergency measures to protect human life and safety, property, and critical natural and cultural resources. BAER is an emergency program for stabilization work that involves time critical activities to be completed before damaging events to meet program objectives.

The Forest Service assembled the soil, hydrology, and geology ("mud team") BAER team on October 16th, 2025, with the full BAER team starting on October 20th, 2025, for the Moon Complex Fire. This team of experts in various resource disciplines began assessing the post-fire effects to critical values on Forest Service lands. Impacts to the soil are the primary indicator of potential post-fire changes in watershed response, as well as watershed recovery. The team developed a soil burn severity (SBS) map to document the degree to which the fire had changed soil properties. Using the SBS map, physical scientists can predict erosion potential, changes to runoff and flood flows, and increased geologic hazards. Field evaluations and modeling results are used to determine relative increases in post-fire risk to different critical values and inform recommendations to address these increased risks.

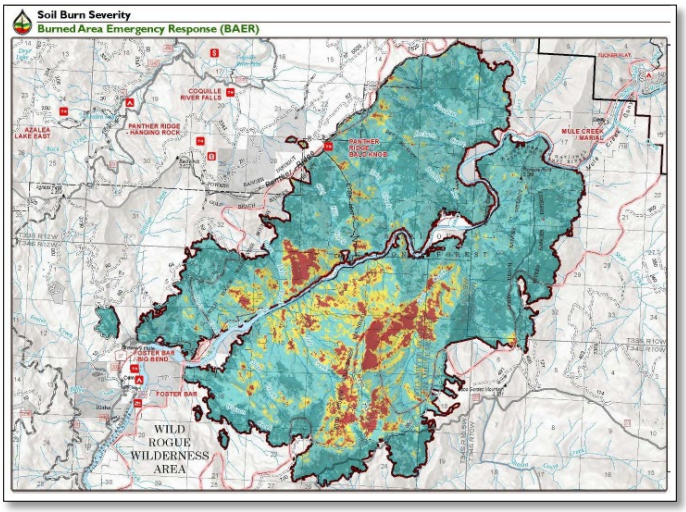

Figure 1. Soil burn severity within the Moon Complex Fire.

Soils

Soil burn severity is not an assessment of vegetation consumption, but rather 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 map was developed with ESRI ArcGIS software using satellite-imagery-derived Burned Area Reflectance Classification (BARC) and field survey data. Field work included assessment of ash characteristics, ground cover, root condition, soil structure, soil water-repellency, and vegetation burn severity as described in the Field Guide for Mapping Post-fire Soil Burn Severity (Parsons et al. 2010). High burn severity is characterized by a complete consumption of organic

material with the surface layers of the soil resulting in a change to single-grain structure. Fine roots are commonly charred or consumed 3-5 cm deep. 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 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.

Mapped and validated SBS for the burned area is High (6%), Moderate (13%), Low (50%), and Very Low/Unburned (31%) (see map on page 8). The more severe a fire's effects are on the soil, the more likely those soils will erode in subsequent rainstorms – especially in locations with steep slopes. Erosion after fires can cause tremendous damage to homes and other structures in the years after a fire.

Geology

The team identified the geologic conditions and processes that have shaped and altered the watersheds and landscapes and assessed the impacts from the fire on those conditions and processes that could affect downstream critical values. Using the understanding of rock types and characteristics, geomorphic processes, and distribution of geologic hazards helps predict how the watersheds will respond to and be impacted by upcoming storms. The Moon Complex Fire lies in the Siskiyou Mountains of southwestern Oregon, within the tectonically active Klamath Mountains province. Rock units underlying the Moon Complex Fire area include thinly bedded marine sandstones, siltstones, and mudstones; conglomerates; diorite; and metamorphosed basaltic greenstone.

The team provided soil burn severity field data to the US Geological Survey Landslide Hazard Program to assist in forecasting the probability, potential volumes, and hazards of debris flows through their developed empirical models. The USGS Post-fire Debris Flow Combined Hazard Model estimates the Moon Fire Complex burn area falls under a Moderate to High combined hazard, with few exceptions. Notably, drainages feeding into East Creek, Fall Creek, and the unnamed segment between Flora Dell and Clay Hill Creek are mapped as High hazard zones (see map on page 9).

Hydrology

Primary watershed response is expected to include an initial flush of ash and burned materials, erosion in drainages and on steep slopes in the burned area, increased peak flows and sediment transport and deposition, and debris flows. Watershed response is dependent on the occurrence of rainstorms and rain-on-snow events and will likely be greatest with initial storm events. 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 flow accumulation and increases infiltration.

A rapid hydrologic assessment suggests that for a 2-year peak flow event (50% annual exceedance probability) there will be an increase 1.0 - 2.1 times the pre-fire peak flow conditions at modelled poursheds. This will likely lead to an initial flush of ash and burned materials, rill and gully erosion in steep drainages, and higher potential for debris slides and debris flows. Changes in water quality may impact water used for recreation, municipal, agricultural, and other uses downstream of the burned area, as well as aquatic resources and habitat.

Figure 2. Mosaic burn pattern showing unburned, low, moderate, and high soil burn intensities looking down into East Creek drainage from the 712-spur road.

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 Service employees and visitors to National Forest System Lands could be threatened by 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. The BAER team recommends hazard warning signs and communications to travelers on any National Forest System roads, trails, and developed river access areas within or directly adjacent to the fire. Road hazard signs are to be installed on Forest Service Roads 23, 37, and 3730. Recreation and Trail hazard signs are to be installed at trailheads, trail junctions, as well as boat launches, and river camps accessing or inside the fire area.

In addition to specific treatments, the BAER team recommends the removal of burnt hazard trees in areas where crews will be working to implement identified treatments.

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 fires is clogging of culverts, bridges, and other in-channel infrastructure from the higher levels of floatable debris (especially burned 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 System Roads and related drainage features. Treatments for the protection of these roads include storm proofing existing drainage features (i.e., culverts, ditches, and catch basins) and storm inspection and response.

Recreation

National Forest System recreation infrastructure includes campgrounds, trails, and day use areas. Most of the recreation assets within the Moon Complex Fire burned area relate to trails and related infrastructure (i.e., pit toilets, trail bridges, and crib walls) and river recreation on the Rogue River. Furthermore, the fire burned through a popular recreation corridor on the Wild and Scenic section of the Rogue River National Recreation Trail (NRT) #1160, which is a highly developed and heavily used trail system. Similar to roads, recreation infrastructure could be damaged in post-fire storm events.

Figure 3. Recreationists, private landowners, and Outfitters and Guides use the river year-round. A jet boat travels up the Rogue River in this photo providing an example of the river use and business occurring on the Rogue River.

The team proposes trail drainage stabilization treatments, which include armoring and/or cleaning existing water control features and adding additional drainage features to provide additional capacity for elevated sediment laden post-fire runoff. Other trail treatments include trail structure stabilization, trail storm inspection and response, tree felling of fire-weakened or dead trees to protect trail tread, trail bridge infrastructure protection, recreation site-human waste containment and infrastructure removal, and continued public information sharing during the first year of BAER implementation to alert users of potential hazards or impassible trail conditions.

Figure 4. BAER Recreation Specialist assessing burned crib walls along the Rogue River NRT #1160.

Botany

Invasive plants adversely affect native plant communities through allelopathy (suppression of growth of a native plant by release of a toxin from a nearby invasive plant) and direct competition 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.

Fourteen species of non-native invasive plants are documented or mapped weed infestations within the burned area and are primarily located along hand line, dozer line, landings and log decks, fire camp, heli-spot and base, and dozer pushouts adjacent to roads that created new soil disturbance beyond the existing road features. However, the burned area creates conditions for invasive species to outcompete native plants. The team recommends a treatment of Early Detection, Rapid Response (EDRR) to monitor noxious weed infestation and expansion in areas disturbed due to mechanical suppression activity and burned areas prone to new noxious weed infestations.

Figure 5. Ground disturbance caused by fire suppression activities along FSR 2300-700 potentially expanding the infestation of Yellow-Star Thistle (Centaurea solstitialis CESO3).

Additionally, early detection of Port Orford Cedar Root Disease treatments are recommended to mitigate the threat of the pathogen to currently uninfested watersheds as a result of suppression activities. Detection surveys for Port Orford root disease (Phytophthora lateralis) include soil and water bait traps that involve anchoring seedlings in or near waterways in the first year from fire containment. If the disease is discovered in previously uninfected areas, local specialists will work closely with the Southwest Oregon pathologist to mitigate further spread.

Cultural Resources

The most typical post-fire threats to cultural sites are physical threats such as erosion or damage from (now dead) falling trees. In some cases, newly exposed artifacts are threatened by human damaging activities such as looting or vandalism. Cultural resources were evaluated by the team and treatments proposed as necessary to protect these values from post-fire threats.

Federally Listed Species - Wildlife and Fisheries

The Moon Complex Fire is within the current range of Northern Spotted Owl, Coastal marten, and Marbled murrelet. Threats include additional loss of habitat in the fire area due to blowdown, mass soil movement, flooding, and insects and disease. The effects to habitat will require long-term natural recovery.

Critical habitat for Federally listed Southern Oregon Northern California Coho (SONCC) occurs in the Stair Creek- Rogue River and Shasta Costa Creek-Rogue River drainages. Impacts to aquatic systems are directly related to the anticipated increases to runoff, erosion, and sedimentation in streams. Wildfire is a natural disturbance process that has historically provided structural inputs of large wood and gravel to stream channels. The watershed response is anticipated to cause short-term and limited localized effects that are within the natural range of fire disturbance processes for SONCC critical habitat.

Anticipated Vegetation Recovery

Post-fire recovery varies greatly based on climate, soil type, vegetation types, and burn severity. The persistence of drought in the years following wildfires can also delay the recovery time frame. Reestablishment of ground cover within the Moon Complex is expected to occur within a 1-to-3-year timeframe over the majority of the burned area; high severity areas may take longer. 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.

Non-Forest Service Values

Since fire effects know no administrative boundaries, additional threats exist for assets 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 local unit BAER Coordinator has engaged with interagency partners to facilitate consideration of off-Forest values covered through other programs with the relevant responsible entities. In particular, working with the National Weather Service in Medford through sharing of BAER assessment information with area weather forecasters.

Conclusion

There are multiple phases of post-fire actions after a wildfire covering suppression repair through long-term recovery. BAER is the rapid assessment of burned watersheds by a BAER team to identify imminent post-wildfire threats to human life and safety, property, and critical natural or cultural resources on National Forest System lands and take immediate actions to implement emergency stabilization measures before the first major storms. The BAER team has identified imminent threats to critical values based on a rapid assessment of the area burned by the Moon Complex 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. The recommended BAER treatments in this report have been funded to mitigate unacceptable risks to the identified BAER critical values. Because of the emergency nature of BAER, initial requests for funding of proposed BAER treatments are supposed to be submitted by the Forest Supervisor to the Regional Office within 7 days of total containment of the fire. The Regional BAER Program Coordinator worked with the Forest BAER Coordinator and Team Leader to evaluate the request and obtain Regional Office authorization.

BAER treatments cannot prevent all the potential flooding or soil erosion impacts, especially after a wildfire-changed landscape. It is important for the public to stay informed and prepared for potentially dramatic increased run-off events. Many burned-area watersheds were already hydrologically responsive to rainfall and prone to erosion and sediment transport prior to the fire and will likely be even more responsive due to post-fire conditions. However, vegetation recovery is anticipated to be rapid with ground cover approaching pre-fire conditions within 1-3 years over the majority of the burned area, which will attenuate any post-fire effects on watershed processes. The Forest Service will continue to provide information and participate in interagency efforts to address threats to public and private values resulting from the Moon Complex Fire. Information can be found on-line at InciWeb for the Moon Complex at https://inciweb.wildfire.gov/.

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. A vegetation burn severity map, or mortality map, may be produced as a part of the recovery efforts to help other scientists, such as wildlife biologists, botanists, and silviculturists understand what to

expect from this changed landscape for wildlife habitat, invasive weeds, timber salvage, and reforestation needs.

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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)

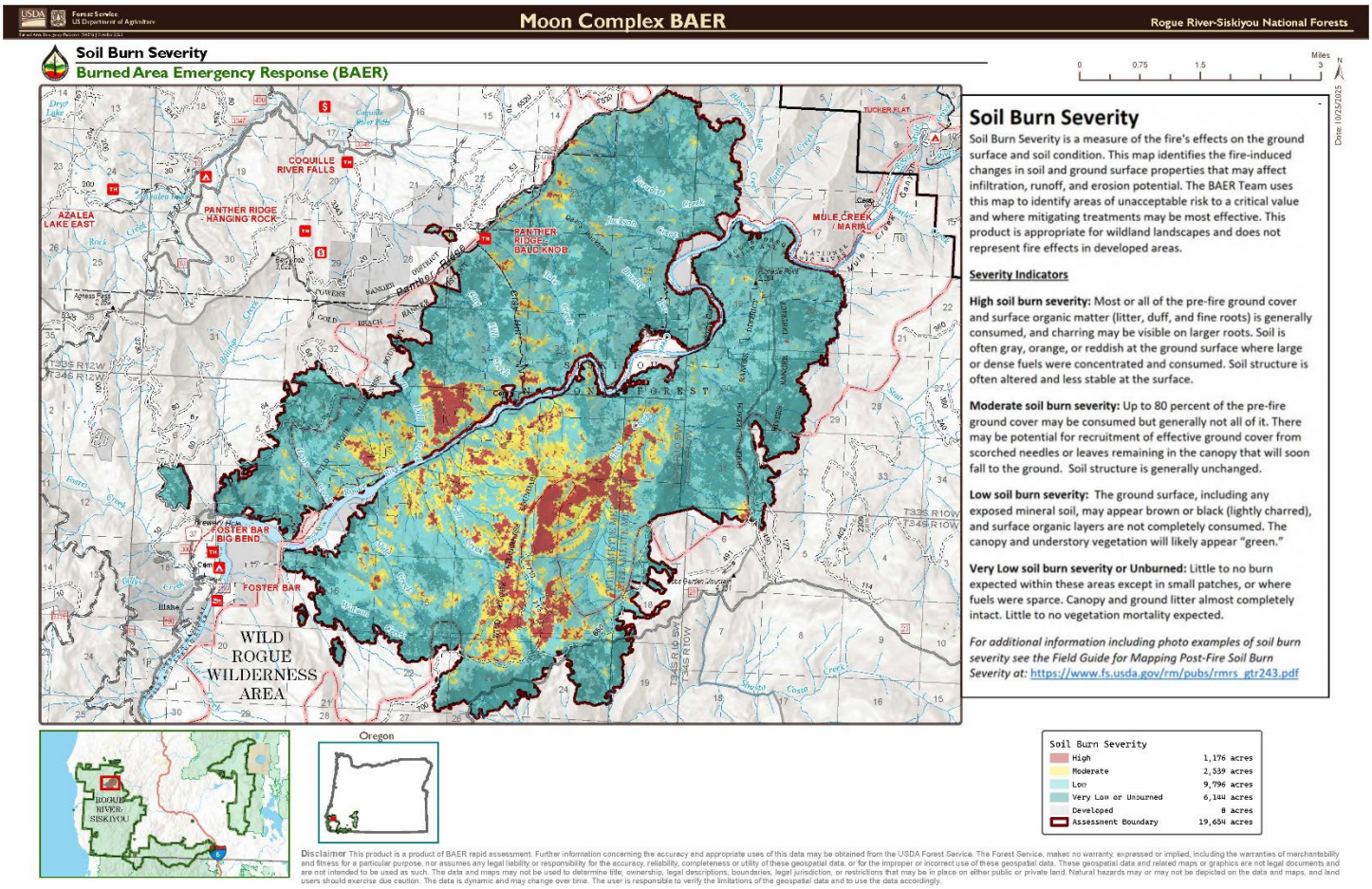

Figure 6. Soil burn severity within the Moon Complex Fire.

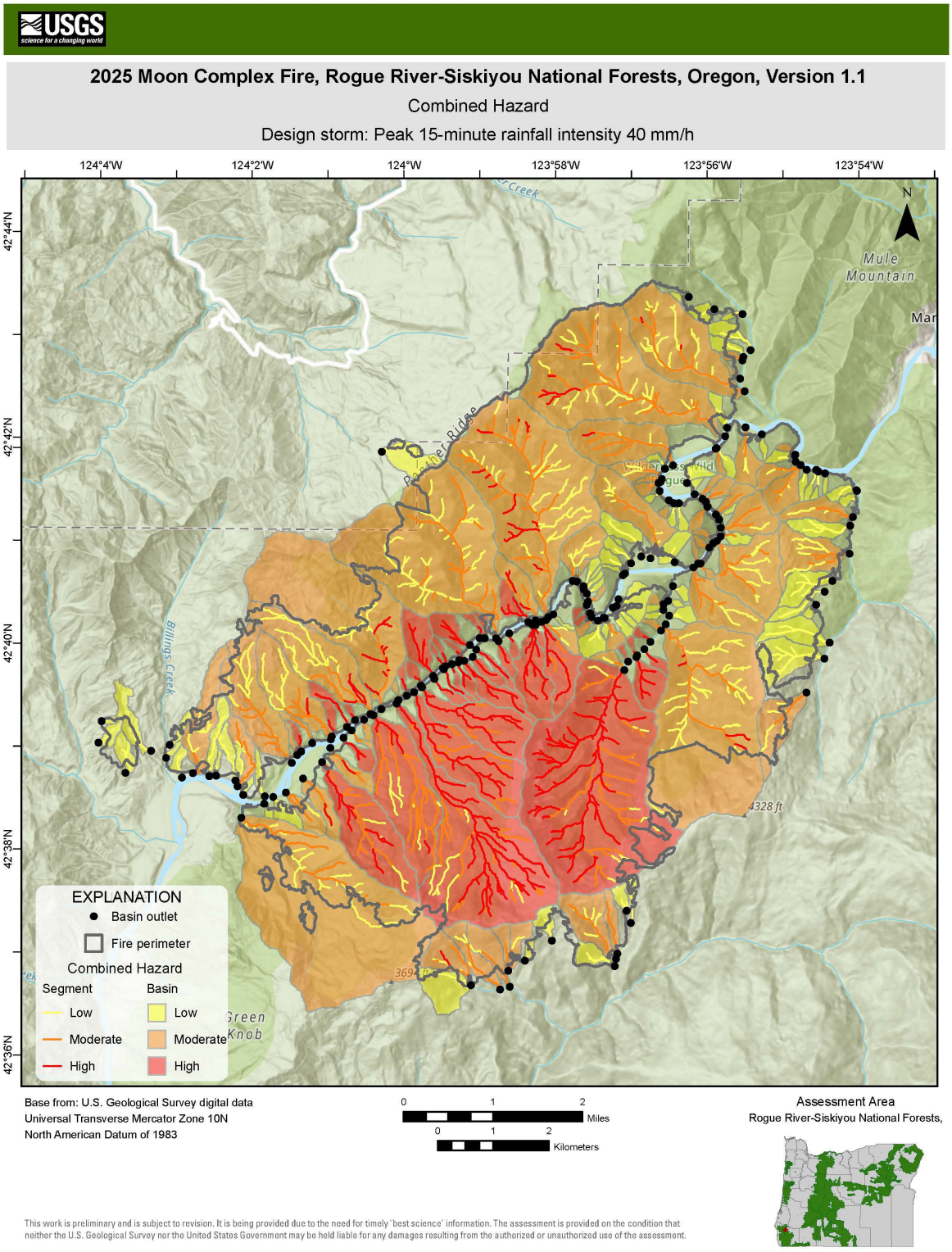

Figure 7. Debris flow combined hazard (risk) based on the peak 15-minute 40 mm/h design storm in the Moon Complex Fire burned area.