



Post-Fire BAER Assessment

Burned Area Emergency Response (BAER)

Information Brief

CentralWashingtonFireRecovery.info



Cougar Creek Fire – Values at Risk Matrix and Treatments

September 2018

EMERGENCY DETERMINATION

The BAER team began assessing the area for post-fire emergencies in September 2018. In that time the team has identified the following values at risk to post-fire threats. Interim reports may be submitted as additional assessments are completed. The risk matrix below, Exhibit 2 of Interim Directive No.: 2520-2014-1 was used to evaluate the Risk Level for each value identified during Assessment.

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very high	Very High	Low
Likely	Very High	High	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

The table on the following pages is a summary of the values within and adjacent to the Cougar Creek fire area, the threats to those values, the probability of damage or loss, magnitude of consequences and the resulting level of risk. In summary, the burned area includes an extensive and heavily used road and trail network, critical habitat for ESA-listed bull trout and chinook salmon and steelhead habitat, as well as sensitive plant communities.

Critical Value at Risk	Description of Threat	Probability Magnitude Risk	Risk Reduction Treatments/ Management Actions	Notes
Human Life and Safety Campground visitor	Pine Flats Campground flooding	<p>Unlikely: Campground is over 10 feet above bankful elevation, and seasonal closure already in place</p> <p>Major: a flood in an occupied campground could result in loss of life</p> <p>Intermediate</p>	Extend seasonal closure, post warning signs	Breach hydrology from wood jams a potential factor that is difficult to model
Human Life and Safety Campground and trailhead visitor	Pine Flats Campground and trailhead hazard trees	<p>Likely: campground and trailheads are heavily used and in timber stands partly burned in the fire</p> <p>Major: falling trees could result in loss of life or injury</p> <p>Very High</p>	Assess and remove hazard trees	Trailheads and gathering areas to be treated include: Mad River Trailhead, Maverick Saddle, Tyee Ridge Trailhead, Tyee Ridge Trail at fire edge, Billy Creek Trailhead, Billy Ridge Trailhead, Cougar Ridge Trailhead, Cougar Ridge Trail at fire edge and French Corral
Human Life and Safety Open system roads intersecting fire boundary	Potential of falling snags or rocks, flooding, or other unforeseen timing of hazards	<p>Likely: roads within moderate/high burn severity with longer duration of travel timed due to potential delays</p> <p>Major: longer duration of transit in hazardous areas could result in severe injury or loss of life</p> <p>Very High</p>	Burned area warning sign installation (11)	Signs will be placed at road and fire boundary intersections. Roads include FSR: 5700, 5200, 5270, 5320, 5380 (both entrances), 5385, 5808, 6101-300, 6104, 5320-118

Critical Value at Risk	Description of Threat	Probability Magnitude Risk	Risk Reduction Treatments/ Management Actions	Notes
<p>Human Life and Safety Open system trails intersecting fire boundary</p>	<p>Potential of falling snags or rocks, flooding, or other unforeseen timing of hazards</p>	<p>Likely: trails within moderate/high burn severity with longer duration of travel timed due to potential delays</p> <p>Major: longer duration of transit in hazardous areas could result in severe injury or loss of life</p> <p>Very High</p>	<p>Burned area warning sign installation (25)</p>	<p>Signs will be placed at trailheads and fire boundary intersections.</p>
<p>Human Life and Safety FSR 5700 user</p>	<p>Steep drop at unprotected curves due to burned-out guard rails</p>	<p>Possible: twisting mountain roads, icy conditions, and history of accidents that motivated the original installation of guardrails</p> <p>Major: a vehicle plunging over a steep, high embankment could lead to severe injury or loss of life</p> <p>High</p>	<p>Warning signs at road start, replace guard rails</p>	<p>Primary administrative and public access to entire Mad River drainage, as well as access to Tyee lookout and communication site</p>
<p>Human Life and Safety Pine Flats trailhead infrastructure (Toilet CXT)</p>	<p>Flooding and sediment/debris from Mad River</p>	<p>Possible: structure is on adjacent floodplain</p> <p>Moderate: reduction in water quality due to sewage contamination and damage to or loss of infrastructure investment</p> <p>Intermediate</p>	<p>Pump and sanitize CXT</p>	

Critical Value at Risk	Description of Threat	Probability Magnitude Risk	Risk Reduction Treatments/ Management Actions	Notes
<p>Property FSR 5700 road prism (ML4, 1.4 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Likely: flood modeling in representative drainages shows a substantial post-fire increase in response</p> <p>Major: loss of paved road prism on primary administrative and public access road</p> <p>Very High</p>	<p>Storm inspection and response (1.4 miles) in moderate to high burn areas</p>	<p>Primary administrative and public access to entire Mad River drainage, as well as access to Tye lookout and communication site</p>
<p>Property FSR 5700 road prism (ML3, 3.1 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Likely: flood modeling in representative drainages shows a substantial post-fire increase in response</p> <p>Major: loss of road prism on primary administrative and public access road</p> <p>Very High</p>	<p>Storm inspection and response (0.4 mi), drainage dip (3), armored relief dip (1) at stream crossings in moderate to high burn areas</p>	<p>Primary administrative and public access to entire Mad River drainage, as well as access to Tye lookout and communication site</p>
<p>Property FSR 5700 road prism (ML2, 3.20 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Likely: flood modeling in representative drainages shows a substantial post-fire increase in response</p> <p>Major: loss of road prism on primary administrative and public access road</p> <p>Very High</p>	<p>Storm inspection and response (3.20 miles), drainage dips (10), armored relief dips (9) at stream crossings in moderate to high burn areas</p>	<p>Primary access to Mad River drainage. Post-burn predicted flows were predicted to be high (see Hydro report). 19 of 37 drainage crossings that were evaluated for treatment were recommended. Prioritization rationale described in engineering report.</p>

Critical Value at Risk	Description of Threat	Probability Magnitude Risk	Risk Reduction Treatments/ Management Actions	Notes
<p>Property FSR 5700 road prism (ML2, 6.85 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Possible: segments of road not in or below large areas of moderate-high SBS, and with generally adequate drainage</p> <p>Moderate: damage in these sections is not as likely to be severe as in higher-risk segments</p> <p>High</p>	<p>No treatment recommended</p>	<p>Although this is the highest priority road in the burned area, these sections of road do not pass through or below extensive areas burned at moderate to high SBS.</p>
<p>Property FSR 5380 road prism (ML2, 0.4 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Likely: flood modeling in representative drainages shows a substantial post-fire increase in response</p> <p>Moderate: damage or loss of road prism</p> <p>High</p>	<p>Storm inspection and response (0.4 mi)</p>	<p>0.4 miles in moderate to high burn severity. Main stem Potato Creek which provides sole access to North Fork Potato Creek and USFS aggregate pit which is critical to FSR road work, including BAER implementation. Road access to important fire suppression line.</p>
<p>Property FSR 5385 road prism (ML2, 0.1 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Likely: flood modeling in representative drainages shows a substantial post-fire increase in response</p> <p>Moderate: damage or loss of road prism</p> <p>High</p>	<p>Storm inspection and response (0.1 mi)</p>	

Critical Value at Risk	Description of Threat	Probability Magnitude Risk	Risk Reduction Treatments/ Management Actions	Notes
<p>Property FSR 5390 road prism (ML2, 0.6 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Likely: flood modeling in representative drainages shows a substantial post-fire increase in response</p> <p>Moderate: damage or loss of road prism</p> <p>High</p>	<p>Storm inspection and response (0.6 mi)</p>	<p>25 drainage structures evaluated for treatment and 0 recommended. Potato Creek drainage, stream on/near roadway elevation. Dips are being recontoured under fire suppression repair.</p>
<p>Property FSR 5701-300 road prism (ML 2, 0.2 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Likely: flood modeling in representative drainages shows a substantial post-fire increase in response</p> <p>Moderate: damage or loss of road prism</p> <p>High</p>	<p>No treatment</p>	<p>7 drainage structures evaluated for treatment and 0 recommended. Road does not warrant treatment as it does not access a significant critical value.</p>
<p>Property FSR 5702 road prism (ML 2, 1.0 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Likely: flood modeling in representative drainages shows a substantial post-fire increase in response</p> <p>Moderate: damage or loss of road prism</p> <p>High</p>	<p>Storm inspection and response (1 mi), armored relief dips (4) at stream crossings in moderate to high burn areas</p>	<p>Post burn predicted flow is high (see Hydro report). Only access to Tye drainage (neighboring drainage) with high recreation use. Road access to historically significant fire suppression dozer line (including 2 fires in 2018). Very steep grades - 60% + 13 drainage crossings evaluated for treatment, 4 recommended.</p>

Critical Value at Risk	Description of Threat	Probability Magnitude Risk	Risk Reduction Treatments/ Management Actions	Notes
<p>Property FSR 5702-710 road prism (ML 2, 0.8 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Likely: flood modeling in representative drainages shows a substantial post-fire increase in response</p> <p>Moderate: damage or loss of road prism</p> <p>High</p>	<p>Storm Inspection & response (0.8 miles), (6) dips, (5) armored dips in moderate to high burn area.</p>	<p>Stacked road system with 5702 Road. Armored dips protect against cascading road failures. 16 drainage structures evaluated for treatment and 11 recommended. Priority is given to drainage structures with water currently flowing through them. Post burn predicted flow is high in this Shamel Creek drainage (See Hydro report).</p>
<p>Property FSR 5702-720 road prism (ML2, 0.2 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Likely: flood modeling in representative drainages shows a substantial post-fire increase in response</p> <p>Moderate: damage or loss of road prism</p> <p>High</p>	<p>Storm inspection and response (0.2 mi)</p>	<p>9 drainage structures evaluated for treatment and 0 recommended. Priority to is given to drainage structures with water currently flowing through them. Post burn predicted flow is high in this Shamel Creek drainage (See Hydro report).</p>
<p>Property FSR 5710 road prism (ML 2, 0.6 miles)</p>	<p>Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features</p>	<p>Possible: drainages had lower percentages of moderate-high SBS area so post-fire response will less dramatic than in other drainages</p> <p>Moderate: damage or loss of road prism</p> <p>High</p>	<p>No treatment</p>	<p>Road was determined to be high enough in watershed and soil burn severity map did not rate high enough to warrant treatment.</p>

Critical Value at Risk	Description of Threat	Probability Magnitude Risk	Risk Reduction Treatments/ Management Actions	Notes
Property Mad River Bridge	Potential scour and undermining of bridge abutments during high flows	Possible: increased flow and associated debris is very likely, but scour was predicted to occur only at relatively low-probability events Major: loss of bridge investment High	Monitor as part of regular program of work	Bridge is located near entrance to the burn area. Monitor for potential debris pileups, scour or approach embankment erosion. Further treatment may be required if monitoring warrants mitigation or repair work.
Property FSR 5703-300 road prism (ML 2, 2.9 miles)	Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features	Likely: flood modeling in representative drainages shows a substantial post-fire increase in response Moderate: damage or loss of road prism High	Armored relief dips (6) at stream crossings	Entire road is in Moderate/High severity. Road partially observed by UAV only. Post burn predicted flow is high in this Windy Creek drainage (See Hydro report).
Property FSR 5709 road prism (ML 2, 1.70 miles)	Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features	Likely: flood modeling in representative drainages shows a substantial post-fire increase in response Moderate: damage or loss of road prism High	Armored relief dips (3) at stream crossings	Road not observed. 1.7 miles is in Moderate/High severity. Tree blocks roadway near only entrance from the 5700 Rd. Low valley road near Windy Creek. Post burn predicted flow is high in this Windy Creek drainage (See Hydro report).
Property FSR 5711 road prism (ML 2, 2.5 miles)	Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features	Likely: flood modeling in representative drainages shows a substantial post-fire increase in response Moderate: damage or loss of road prism High	Storm inspection and response (2.5 mile)	Road partially observed near 5700 Rd. 2.5 miles is in Moderate/High severity. Tree blocks roadway near only entrance from the 5700 road. Road near ridge. Post burn predicted flow is high in this Windy Creek drainage (See Hydro report).

Critical Value at Risk	Description of Threat	Probability Magnitude Risk	Risk Reduction Treatments/ Management Actions	Notes
Property FSR 5711-410 road prism (ML 2, 0.9 miles)	Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features	Likely: flood modeling in representative drainages shows a substantial post-fire increase in response Moderate: damage or loss of road prism High	No treatment recommended	Road partially observed with UAV. 0.9 miles is in Moderate/ High severity. Post burn predicted flow is high in this Windy Creek drainage (See Hydro report).
Property ML 2 Roads not surveyed, Further assessment required.	Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features	Likely: flood modeling in representative drainages shows a substantial post-fire increase in response Moderate: damage or loss of road prism Intermediate	To be determined	Roads inaccessible, blocked due to various reasons such as fire suppression activity and blow down. Further evaluation necessary.
Property ML 1 Roads not surveyed, Further assessment required.	Elevated runoff and large woody debris in draws could plug culverts and divert flow onto and damage roads; runoff from hillslopes could overwhelm existing drainage features	Possible: drainages had lower percentages of moderate-high SBS area so post-fire response will less dramatic than in other drainages Moderate: damage or loss of road prism Low	To be determined	Roads inaccessible, blocked due to various reasons such as fire suppression activity and blow down. Further evaluation necessary.
Property Trail 1409 (Mad River)	Elevated runoff from burned hillslopes	Very likely: steep slopes, highly erodible soils Moderate: loss of heavily used motorized trail infrastructure High	Restore existing trail drainage, install additional drainage features	

Critical Value at Risk	Description of Threat	Probability Magnitude Risk	Risk Reduction Treatments/ Management Actions	Notes
<p>Property Trails (moderate/high severity)</p>	<p>Elevated runoff from burned hillslopes</p>	<p>Very likely: steep slopes, highly erodible soils</p> <p>Moderate: loss of heavily used motorized trail infrastructure</p> <p>Very High</p>	<p>Restore existing trail drainage, install additional drainage features</p>	
<p>Property Trails (low severity)</p>	<p>Elevated runoff from burned hillslopes</p>	<p>Possible: areas burned at low severity will generally contribute relatively minor increases in runoff</p> <p>Moderate: loss of heavily used motorized trail infrastructure</p> <p>Intermediate</p>	<p>No treatment recommended</p>	
<p>Resource Sensitive native plant populations: long-sepal globemallow</p>	<p>Noxious invasive weeds</p>	<p>Very likely: adjacent to known populations of noxious weeds and within the burn area and exposed mineral soil</p> <p>Moderate: considerable long-term effects to populations of sensitive species</p> <p>Very High</p>	<p>Early Detection and Rapid Response (EDRR)</p>	

Critical Value at Risk	Description of Threat	Probability Magnitude Risk	Risk Reduction Treatments/ Management Actions	Notes
<p>Resource Vulnerable native plant communities</p>	<p>Noxious invasive weeds</p>	<p>Very likely: adjacent to known populations of noxious weeds and within the burn area and exposed mineral soil</p> <p>Moderate: considerable long-term effects to native plant community</p> <p>Very High</p>	<p>Early Detection and Rapid Response (EDRR)</p>	<p>Weed species targets are new to county with limited sites currently. High priority to control spread. Class B designated weeds.</p>
<p>Resource Soil productivity and hydrologic function</p>	<p>Loss of ash cap and surface soil through erosion and debris flows, decreased infiltration, damming and sedimentation of waterways</p>	<p>Very likely: steep slopes, highly erodible soils, loss of canopy and ground cover</p> <p>Moderate: loss of ash cap is not recoverable, short-term recoverable effects to hydrologic function</p> <p>Very High</p>	<p>No treatment recommended — no cost-effective treatment available</p>	
<p>Resource Critical habitat for upper Columbia ESU endangered spring chinook and threatened steelhead and threatened bull trout</p>	<p>Loss of critical habitat due to excess sedimentation and debris flow, increased turbidity, and duration and magnitude of sediment load</p>	<p>Likely: increased flow and highly erodible soils and steep slopes</p> <p>Moderate: genetics, population size and poor habitat quality, spawning habitat</p> <p>High</p>	<p>Treat roads and trails to minimize post-fire erosion and sedimentation of aquatic habitat where multiple values benefit from such treatment</p>	

Critical Value at Risk	Description of Threat	Probability Magnitude Risk	Risk Reduction Treatments/ Management Actions	Notes
<p>Resource Historic irrigation ditch</p>	<p>Increased erosion and sedimentation from burned slopes, channelized water from road</p>	<p>Unlikely: not currently used for irrigation, resource, integrity will remain the same</p> <p>Minor: would not impact qualifications for National Register of Historic Places</p> <p>Very Low</p>	<p>No treatment recommended</p>	