HAPPY CAMP COMPLEX FIRES

Burned Area Emergency Response Assessment

View east in the Head Fire from the Collins Creek Baldy Lookout

September 2023

WHAT IS BAER

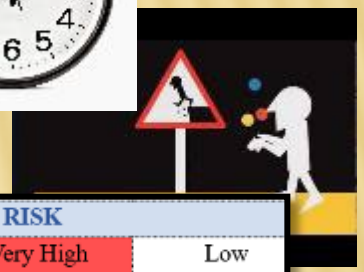
Emergency Assessment and Stabilization

~~Suppression Repair~~

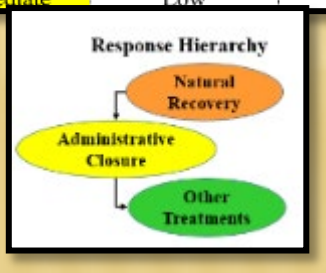
~~Rehabilitation and Restoration~~

~~Does Not Address Pre-Existing Issues~~

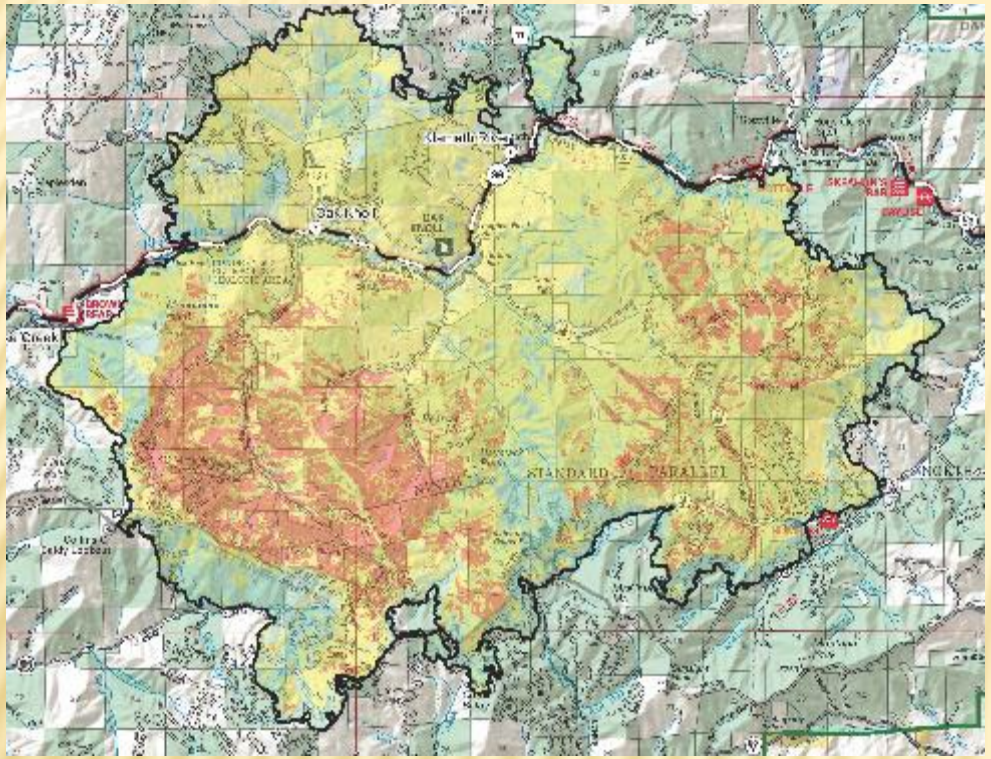
- Rapid Assessment
- Identify Critical Values
- Assess Threats
- Evaluate Risk
- Develop Response
- Implement Strategy



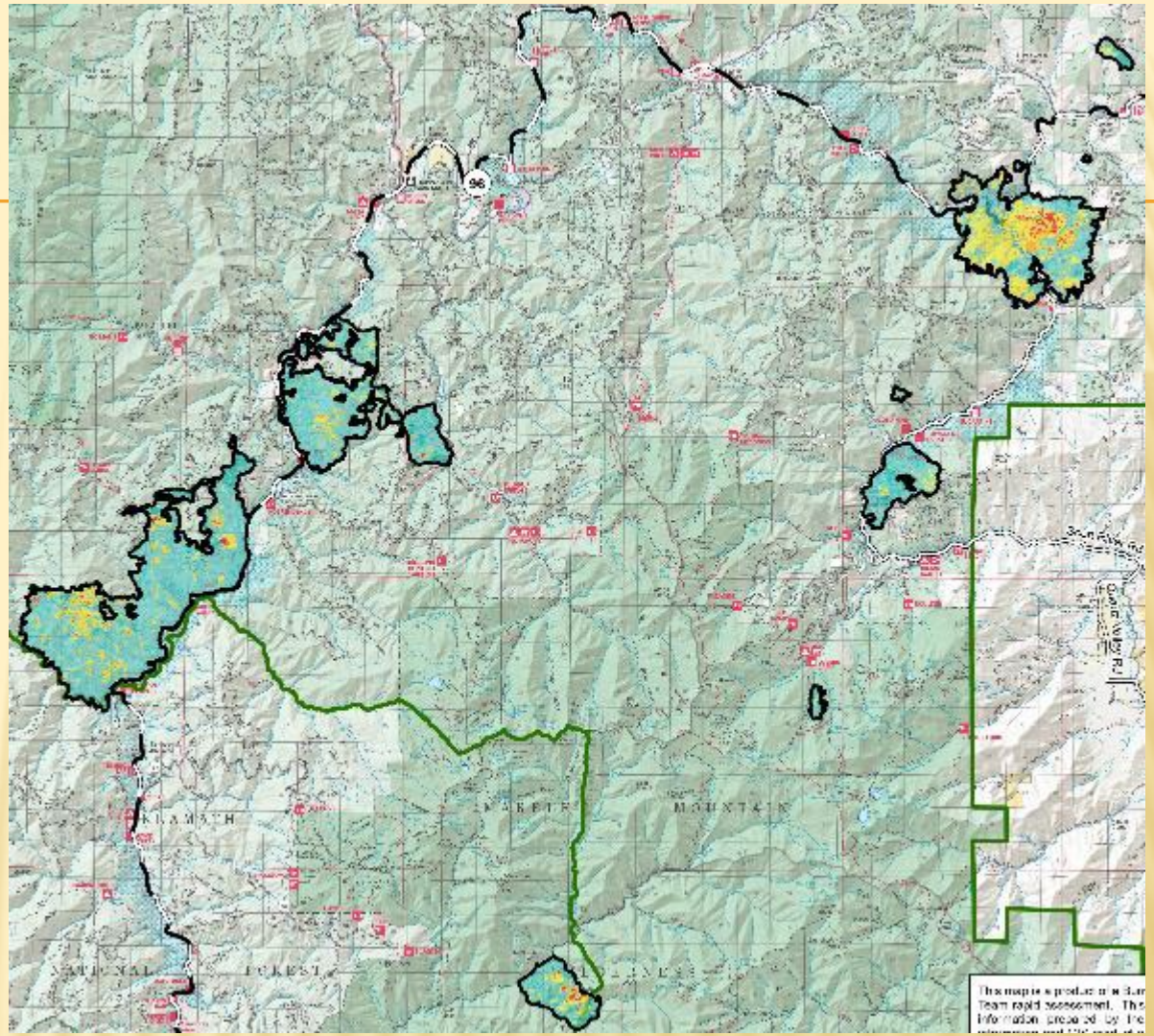
RISK		
Very High	Very High	Low
Very High	High	Low
High	Intermediate	Low
Intermediate	Low	Very Low



HAPPY CAMP COMPLEX



≠



2022 McKinney Fire

~80% High and Moderate Soil Burn Severity

~20% Low and Unburned Soil Burn Severity

2023 Happy Camp Complex Fires

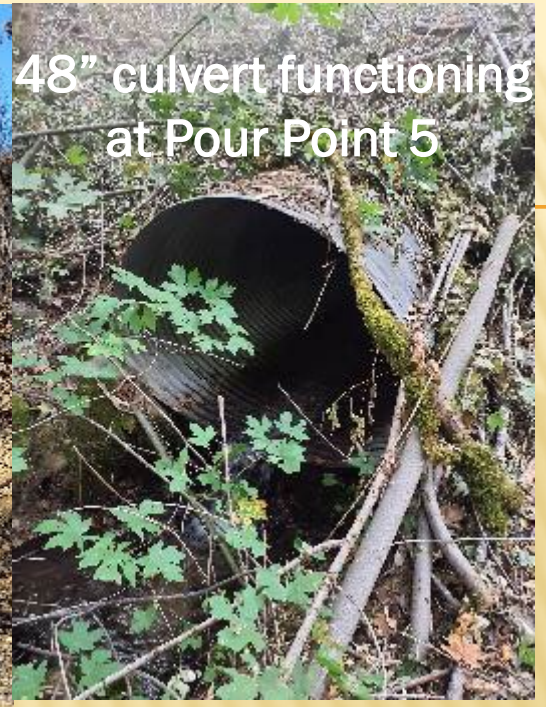
~20% High and Moderate Soil Burn Severity

~80% Low and Unburned Soil Burn Severity

HYDROLOGY

Potential Values at Risk from Flooding and Erosion:

- Life and Safety
  - Injury or loss of life due to flooding, debris flow, and rock fall.
- Property – Roads
- Natural Resources—Water Quality



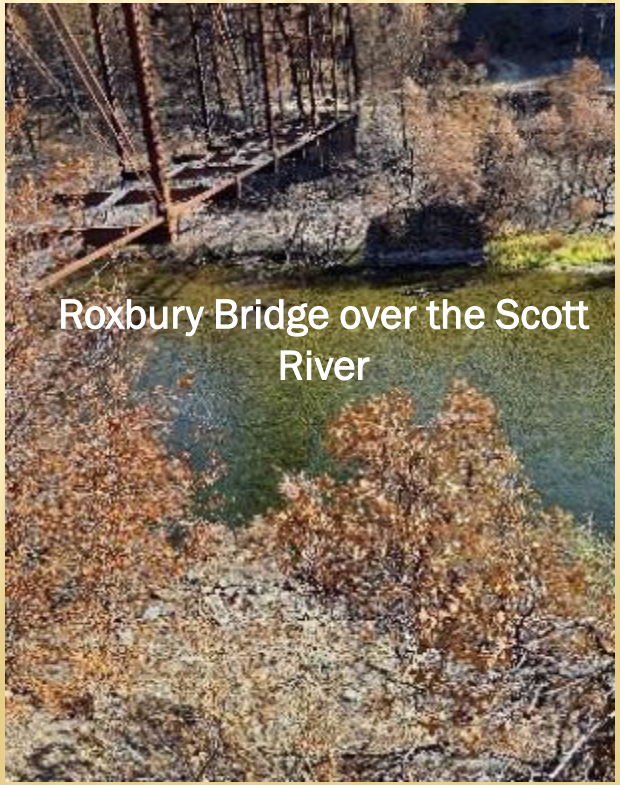
Road and stream interfaces are important to monitor to protect various critical values and value of risk.

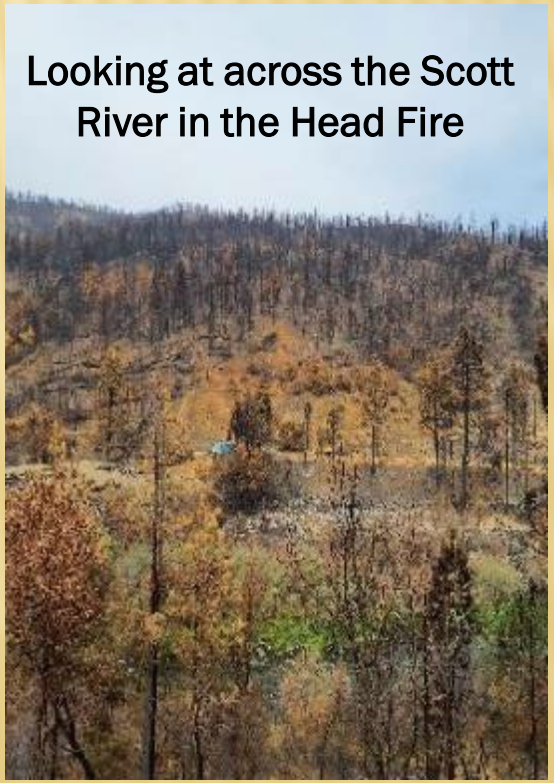
HYDROLOGY

- Happy Camp Complex resulted in a mosaic burn. Pockets of moderate (18%) and high (2%).
- Head Fire impacted 7% of the entire length of the mainstem of the Scott River.


Ufish Fire feeds into Elk Creek


Scott River looking upstream Head Fire


Roxbury Bridge over the Scott River

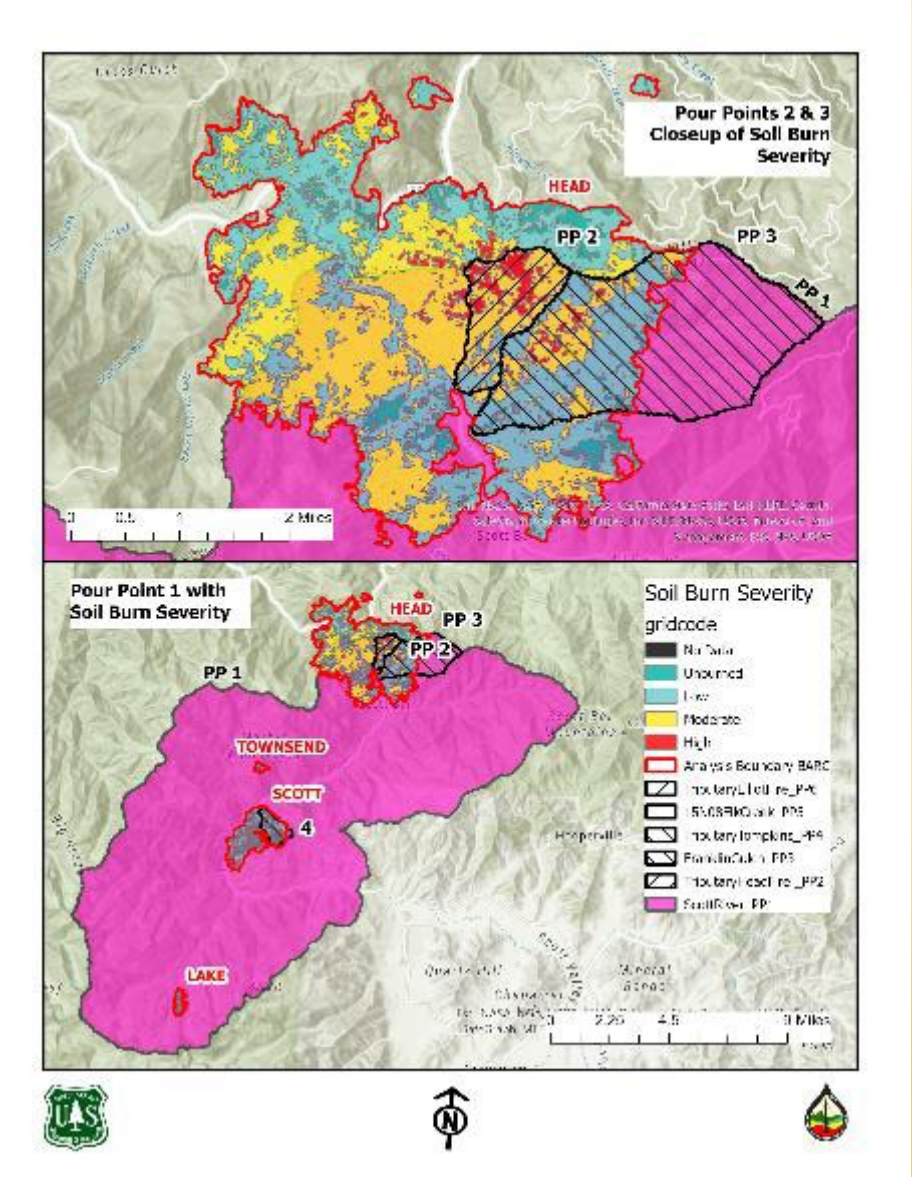

Looking at across the Scott River in the Head Fire

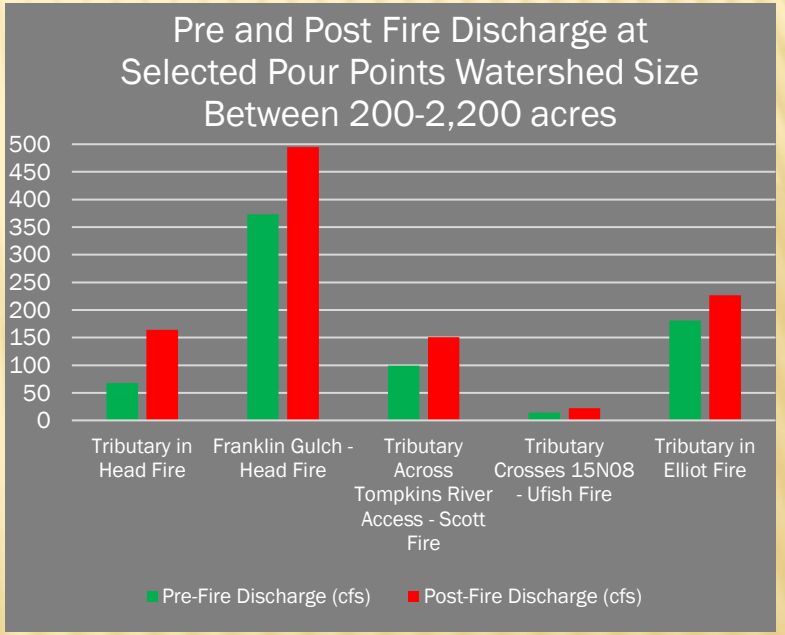
HYDROLOGY

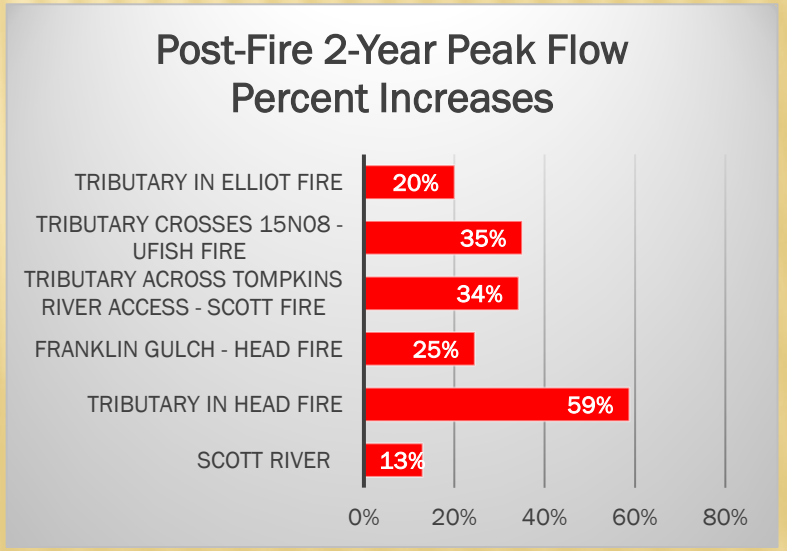
Pour Points generally relate to critical BAER values; property, roads, rec sites, heritage sites, T&E aquatics.

Pour Points identified for this fire primarily related to roads and Coho Salmon and its habitat.

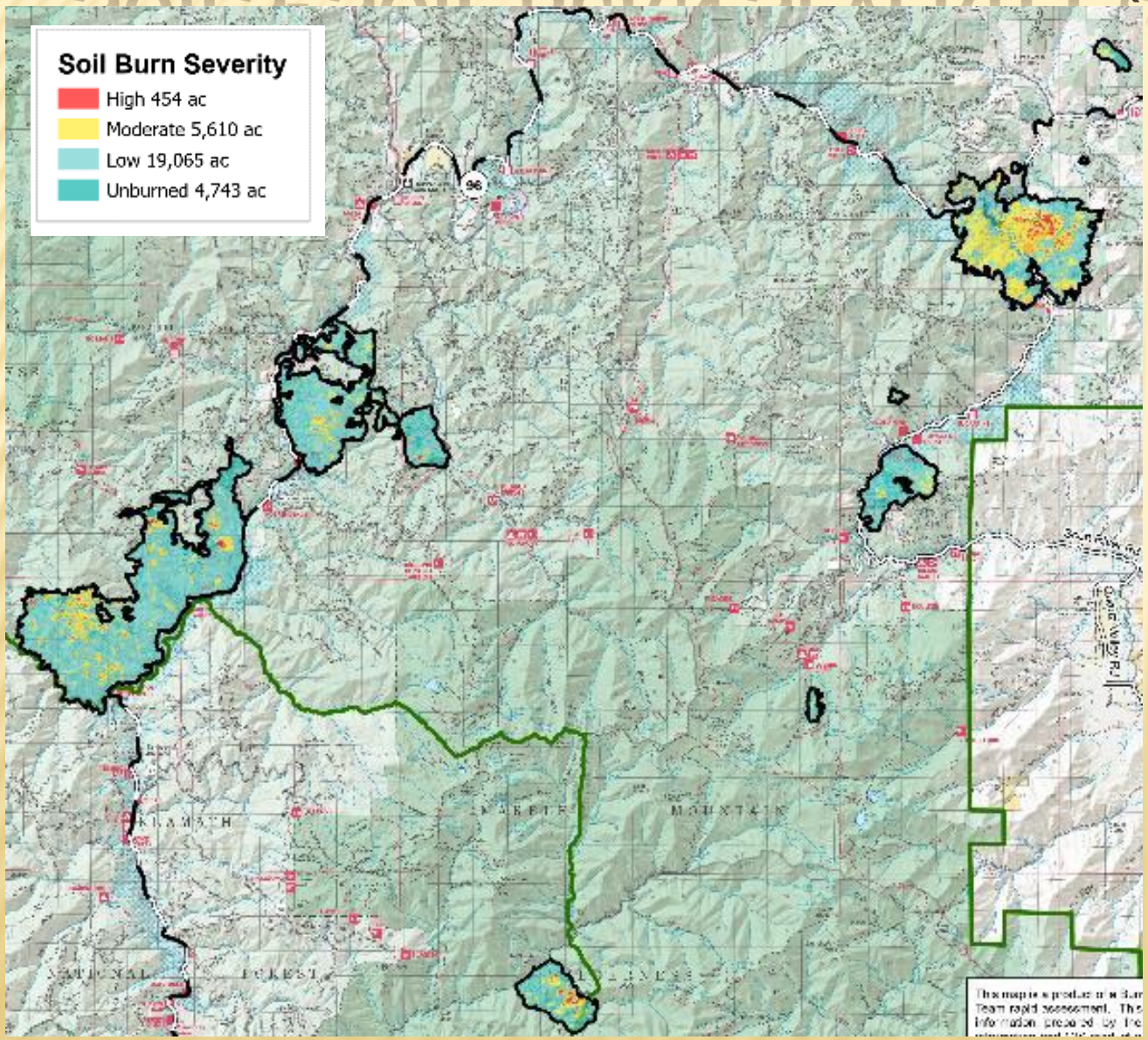
Modeling results show modest gains in flood potential.







SOILS- SOIL BURN SEVERITY (SBS)



	Total Acres	Percent
Unburned	4,742	16%
Low	19,065	64%
Moderate	5,610	18%
High	454	2%
TOTAL	29,872	100%

- Significantly higher erosion, runoff and debris flows are associated with high and moderate SBS.
- Combined moderate and high was 20% which is relatively low compared to recent fires/years.
- Low SBS was the prevalent burn severity and achieves the same fuel reduction as successful prescribed fire.
- High SBS is most prevalent on steep canyon walls; too steep to consider effective land treatments.

HIGH SOIL BURN SEVERITY

MODERATE SOIL BURN SEVERITY

LOW SOIL BURN SEVERITY

UNBURNED

EROSION

ERMiT Hillslope Erosion Potential, Averaged Across Fires

	2-year Runoff Event (tons/acre)	5-year Runoff Event (tons/acre)	10-year Runoff Event (tons/acre)
Burned (Post-fire)	10	22	50
Unburned (Pre-fire)	1	6	18

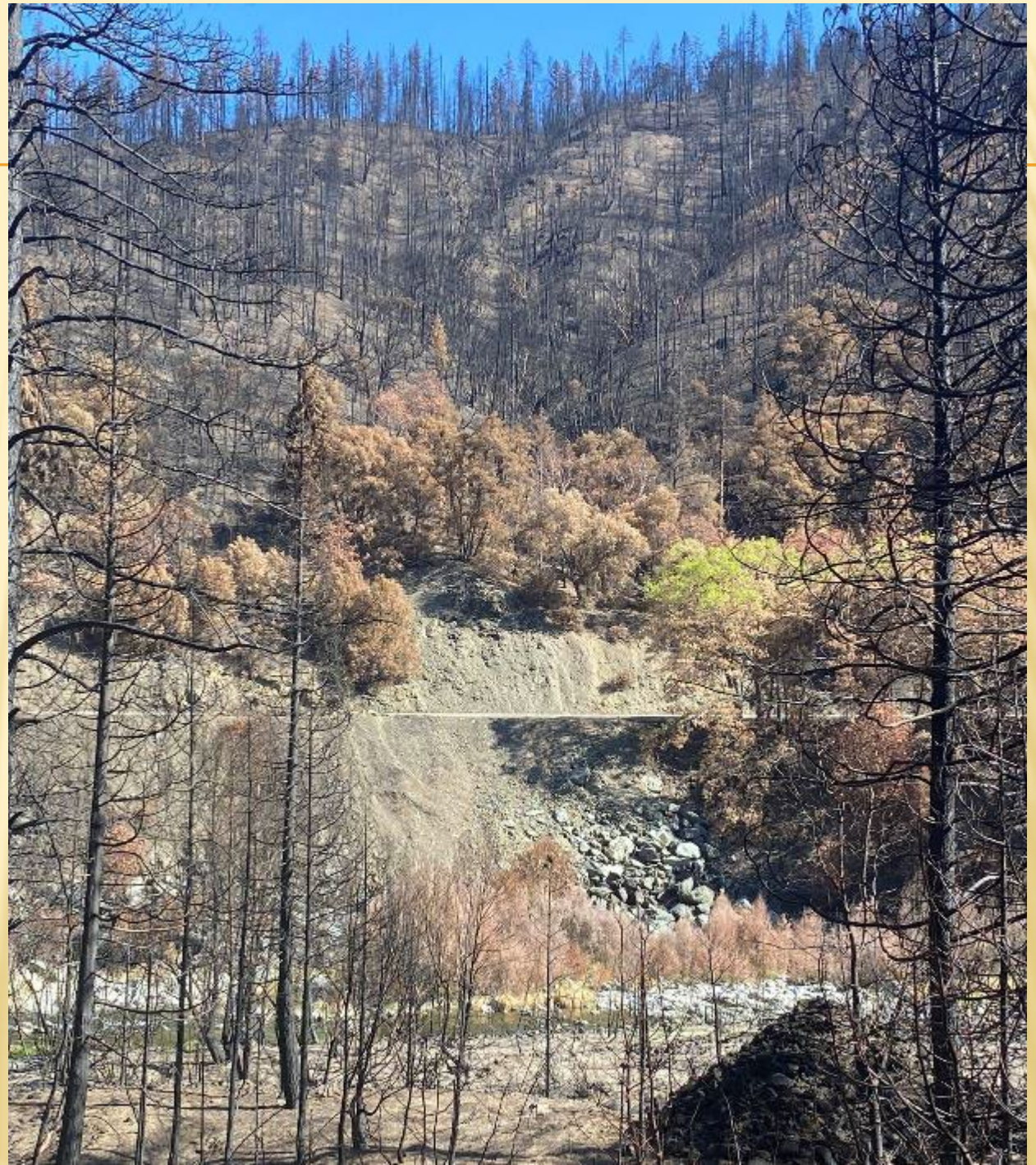
SOIL FINDINGS

- ✓ Much Lower SBS than fires from recent years
- ✓ Steep Slopes
- ✓ Shallow Soils
- ✓ High Rock Fragment Content
- ✓ Natural Recovery
- ✓ **No Emergency for Soil Productivity**

GEOLOGY

Types of Geologic Post-Fire Responses

- Slope failures and landslides
- Sediment-laden flooding
- Rock Fall
- Debris flow



GEOLOGY

Metasedimentary and metavolcanic rock types on steep slopes are prone to landslides and erosion.

Steep, fractured, rocky terrain is naturally prone to rockfall

GEOLOGY

Value at Risk: **Human Life and Safety** along roads and trails

- 46N51
- Highway 96 (Caltrans)
- 7F01, 7F002 (county)

Active landslide along 7F002

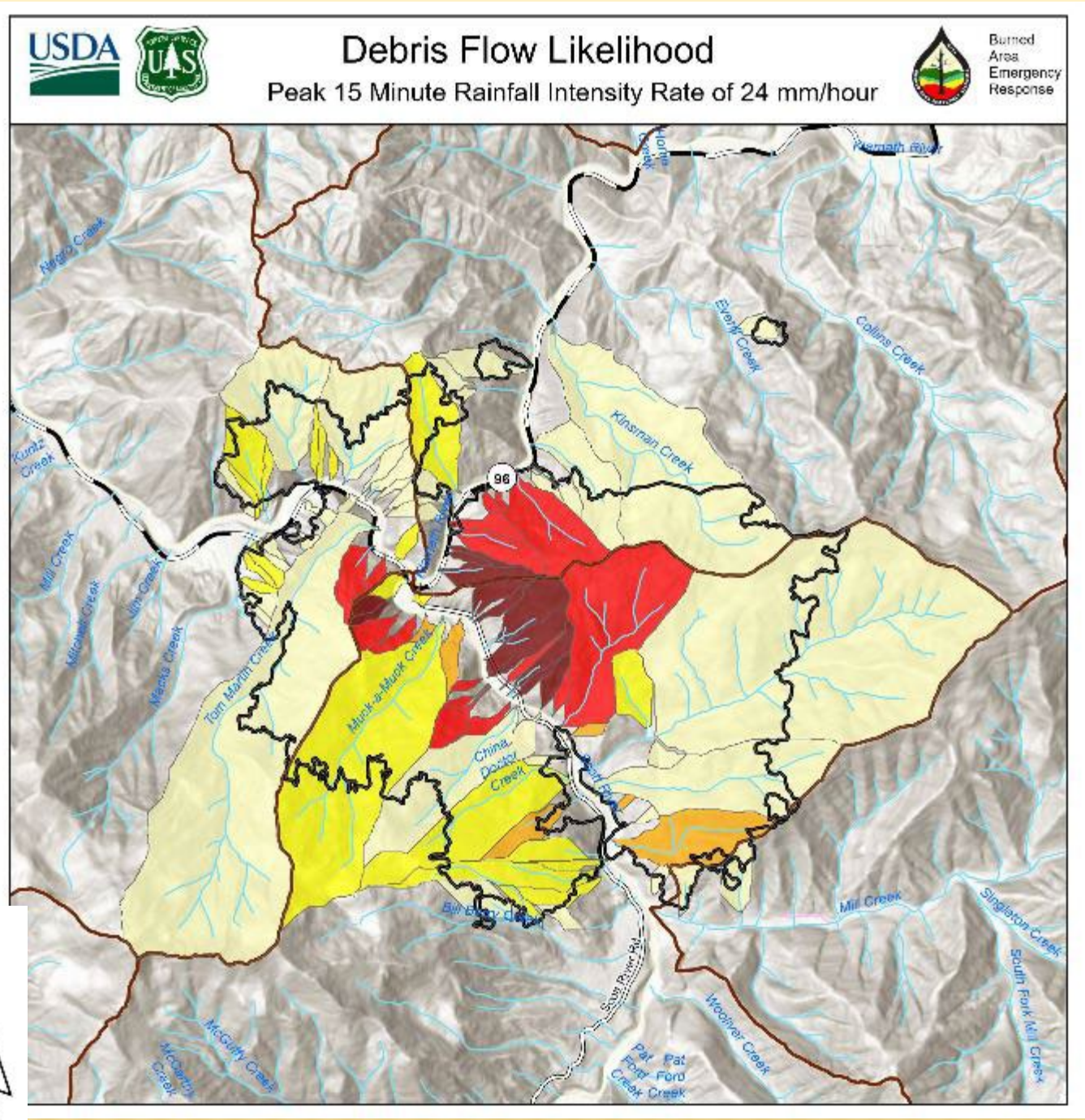
Erosive slopes along highway 96 in the HEAD fire

Burn-area hazard warning signage recommended

GEOLOGY

USGS Debris Flow model – **screening tool for identifying highest *relative* increased watershed response**

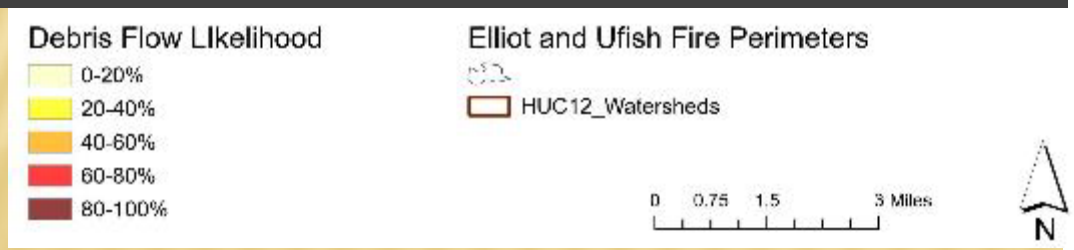
- Highest modeled response in the complex is on the HEAD fire
- Subbasins above Scott and Klamath confluence show high to very high likelihoods (60-100%) of increased sedimentation, landsliding, and instability
- Debris flow generation unlikely in a 1-2 yr storm event due to (1) lack of stored sediments, and (2) limited drainage area

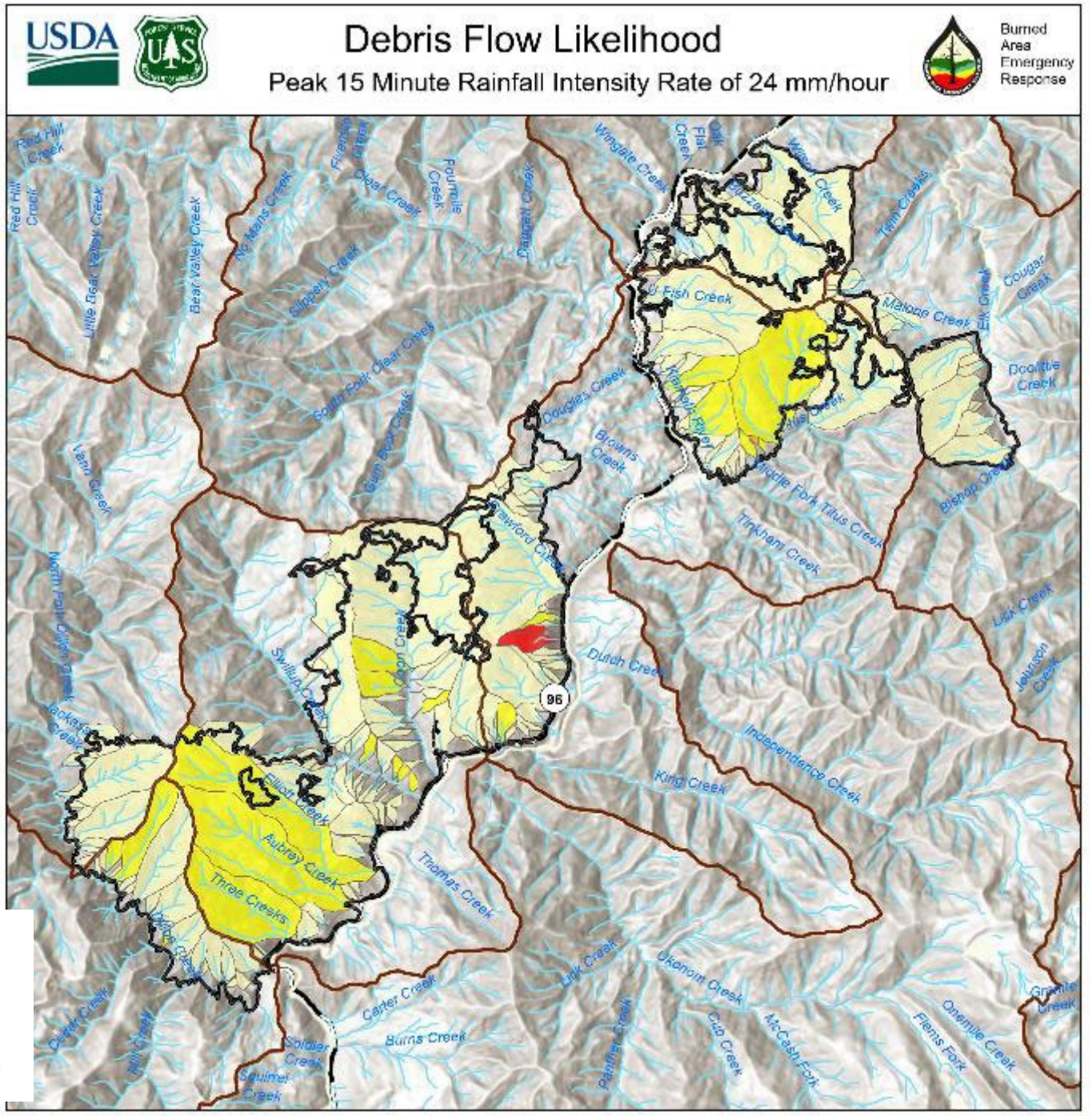


GEOLOGY

- UFISH and ELLIOT fires have very low to low likelihood of increased debris flow

UFISH creek headwaters – limited sediment available





ENGINEERING – VALUE AT RISK

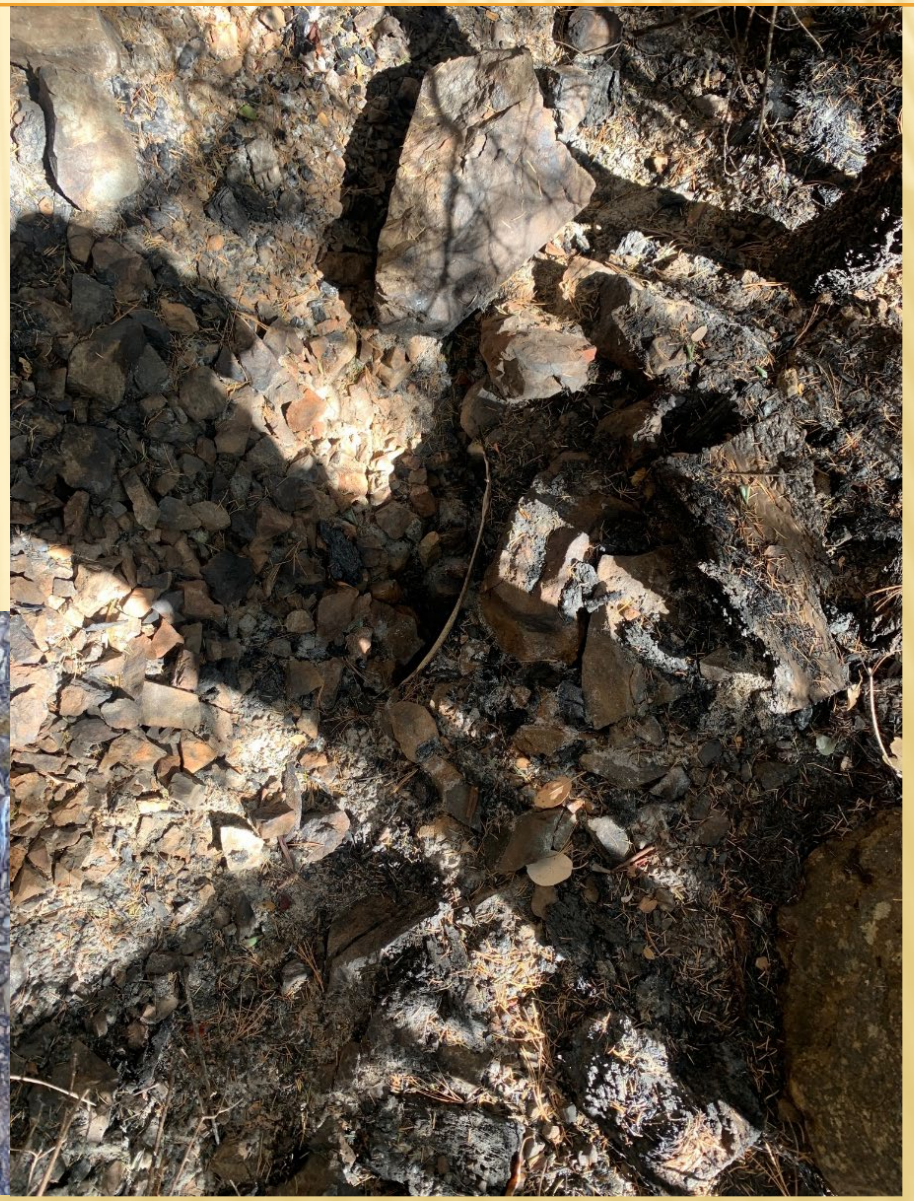
- National Forest System Roads
  - Road Failure or Damage Due to Increased Flow and burned stump holes
  - Rock Fall
  - Overwhelmed Drainage Crossings
- Culvert Crossings
  - Flooding and debris flow leading to drainage structure failure

ENGINEERING – THREAT TO ROAD INFRASTRUCTURE

Photos are NOT from the Happy Camp Complex Fires, but are examples of potential damage.

ENGINEERING – FINDINGS

- National Forest System Roads
  - 48 miles are within the Happy Camp Complex
    - 44 were assessed to be at **Low Risk.**
    - 4 miles of road were assessed to be at **High Risk.**
    - 6 miles of non-system roads were assessed.
- Priority Roads



ENGINEERING– PROPOSED TREATMENTS

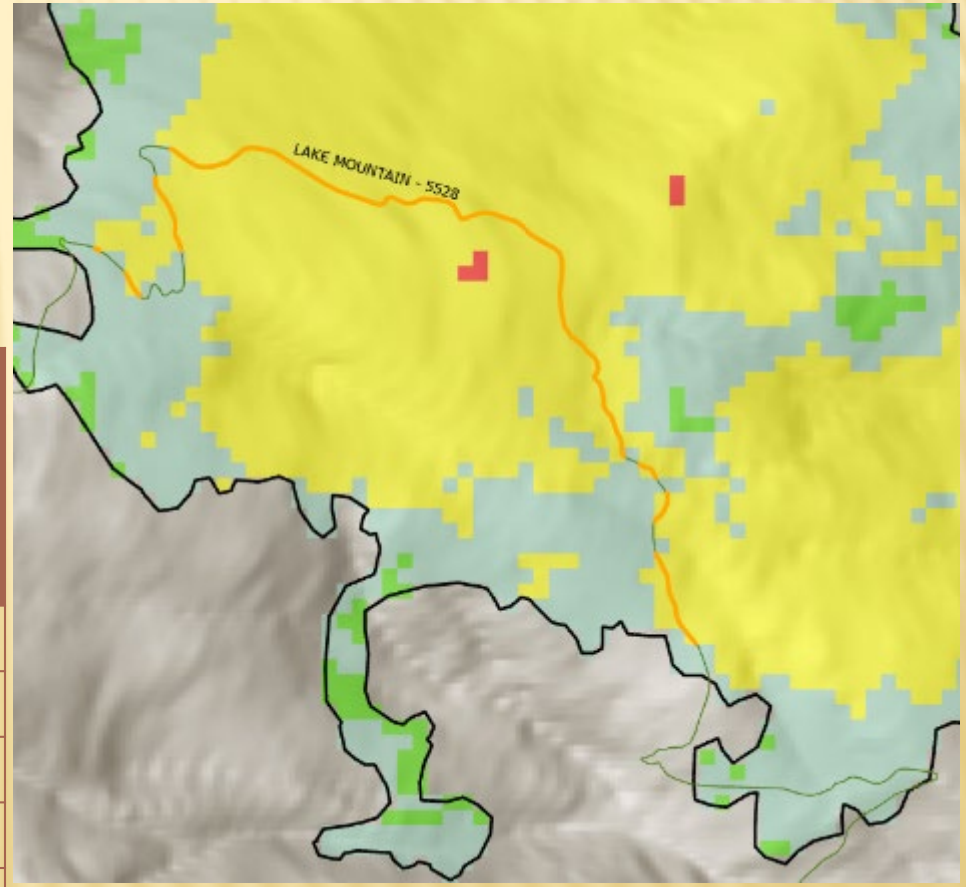
- Restore Drainage
- Repair Burned Stump Hole
  - Life and Safety
  - Threats Road Integrity
- Storm Inspection and Response
- Warning Signage

TRAIL RESOURCES

Values at Risk

- Trails
  - 4.8 Miles of Trail in Happy Camp Complex Fire Burned Area

Trail #	Trail Name	Fire	Mileage of Trail within Fires	Trail within Moderate/ High SBS
5832	Wooley Creek	Hancock	0.05	-
5540	Little Elk Lake	Lake	0.07	-
5240	Dillon Creek (Six Rivers)	Elliot	3.27	0.10
5528	Lake Mountain	Head	1.38	**1.00**
Grand Total:			4.77	



TRAIL RESOURCES

- **Common Threats to Trails**
  - Trail Tread Impacts
  - Sloughing
  - Increased Erosion
  - Stump Hole Burnouts
  - Exasperated in and below High and Moderate Soil Burn Severity, where higher first-year erosion rates are expected

TRAILS– PROPOSED TREATMENTS

- Warning Signs
  - Trails
- Trail Treatments
  - Ensure Functioning Drainage Features
  - Common Methods:
    - Remove side-bars, runoff ditches, and waterbars.

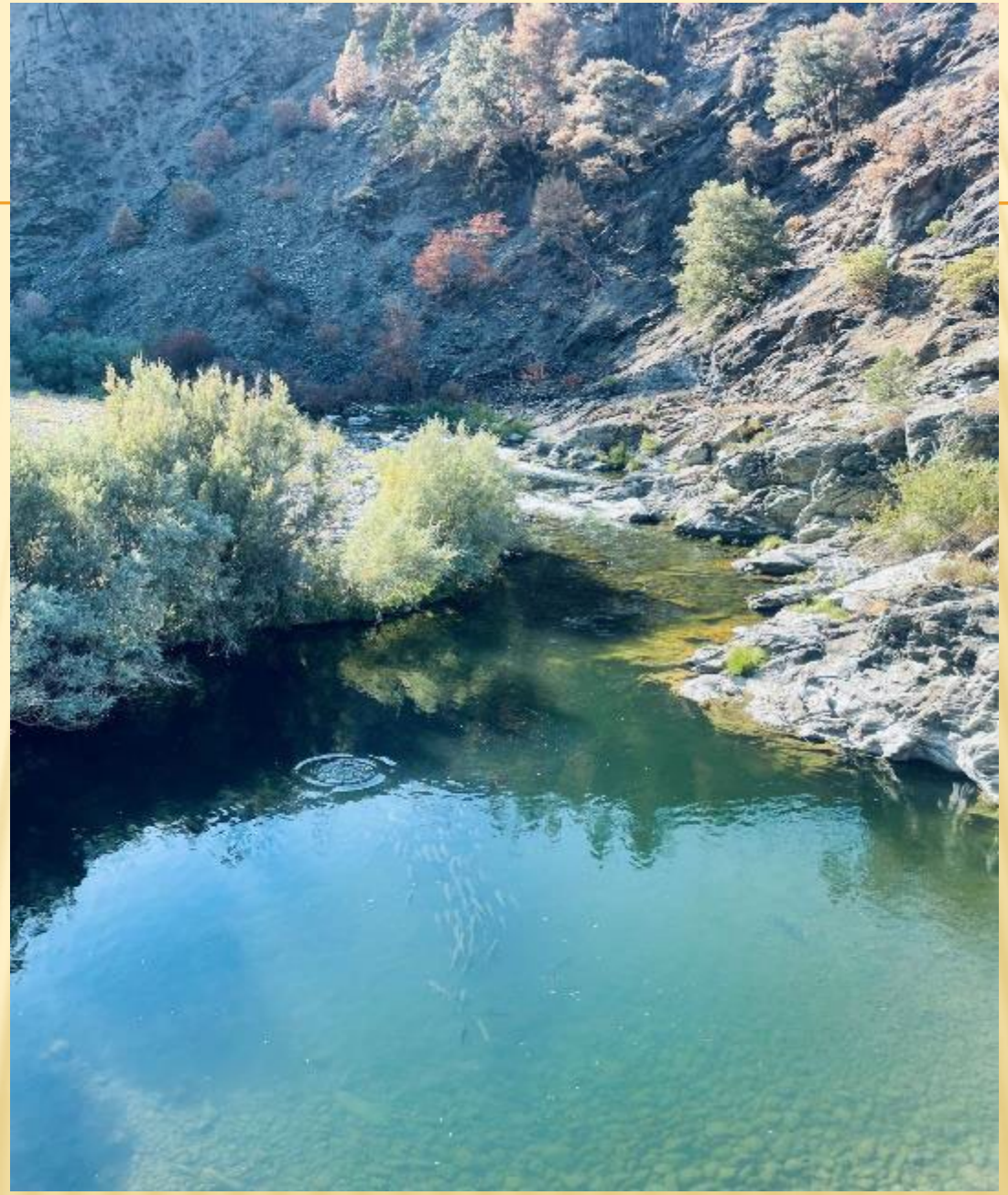
FISHERIES ASSESSMENT

Values at Risk:

- Coho salmon (ESA threatened)
- Designated Critical Habitat

Inside the fire perimeter threatened coho populations occur on:

- Klamath River (Head Fire)
- Scott River (Head Fire)
- Elk Creek (UFISH Fire)
- Dillon Creek and Swillup Creek (Elliot Fire)



Inside the Head Fire approximately 250 fall-run chinook salmon observed in the Scott River on September 19, 2023.

FISHERIES ASSESSMENT

Potential Threats:

- Debris flows (pool filling)
- Sedimentation (impaired spawning)
- Decreased water quality (food web)
- Elevated water temperature (loss of cover).

Treatments:

- Road treatments to improve infrastructure such as drainage restoration, storm inspection and response will reduce sediment and ash input into coho salmon habitat.

- Natural Recovery

Impacts to coho habitat resulting from the Happy Camp Complex are expected to be short term, recoverable and localized.

Intact riparian vegetation observed along the Scott River. The riparian area remained largely intact (only 7% impacted) .

Needle cast observed in moderate SBS along the Scott River creating initial ground cover.

RECOMMENDATIONS:

- If post fire damage does occur to coho salmon habitat, utilize restoration opportunities developed as part of the **Salmon and Sediment Impact Response Team** developed for the Klamath Basin.

- Work with our tribal, state and federal partners to conduct post-fire monitoring of fish using non-BAER funding. Monitor coho salmon habitat and populations impacted by the fire.

INVASIVE PLANTS

Values at Risk

- Ecosystem heath and the recovery of native vegetation supporting watershed integrity.

Potential Threats:

- Rapid spread of non-native invasive plant species into vulnerable native or naturalized plant communities affected by the disturbance of wildfire.

Common Name	Forest priority
Diffuse knapweed	High
Yellow star-thistle	Moderate
Spotted knapweed	High
Bull thistle	Moderate
Scotch broom	High
Leafy spurge	High
French broom	High
Dyer's woad	Moderate
Broadleaved pepperweed	High

Diffuse knapweed

Spotted knapweed

Dyer’s woad

INVASIVE PLANTS

Risk Assessment:

- Current known invasive plants populations were limited within the fire areas, but prolific along vectors like roads and streams surrounding the burns.
- Unwashed equipment and nearby infested areas make invasive introduction likely.
- Invasive plants introduced into susceptible post-fire environment will likely cause long-term habitat degradation

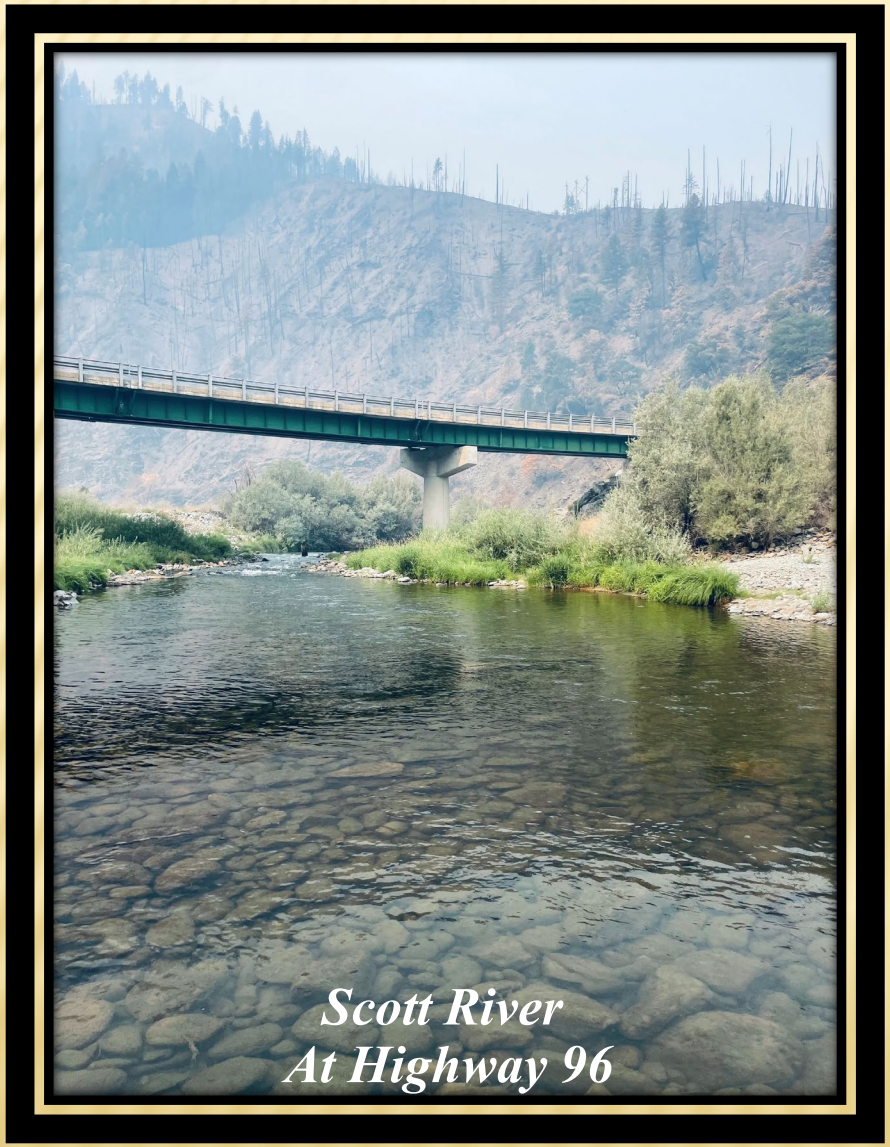
One of the base camps on the incident was located on a large infestation of Yellow Star Thistle example seen above.

INVASIVE PLANTS

Recommended Treatments

- Early detection, rapid response (EDRR) surveys are proposed on areas disturbed by suppression activities (~80 miles) on Forest Service lands and 230 acres within fire perimeter near known infestations.
  - EDRR is a combination of early surveys combined with immediate treatment of new infestations.
  - This is the most effective and cost-efficient treatment to mitigate establishment of infestations.

RESOURCES ASSESSED BY BAER SPECIALISTS



Interagency Coordination