

# Shasta-Trinity National Forest

## 2018 Post Fire Effects

Presented by  
Marcus Nova, Shasta-Trinity Forest



Carr Fire, 2018



**THE GOOD THE BAD AND THE UGLY**



**“THE GOOD”**  
Hirz Fire



**“THE BAD”**  
Carr Fire



**“THE UGLY”**  
Delta Fire

# Carr Fire



## STATS

**Start Date:** July 23, 2018

**Size:** 229,651 acres

**Suppression Costs:** 159 Million

**Damage Costs:** 1.66 Billion

**Fatalities:** 8

**Structures lost:** 1,604

**Burn Severity:** Moderate-High



Carr Fire  
Looking over  
Whiskytown  
Lake



# Carr Fire

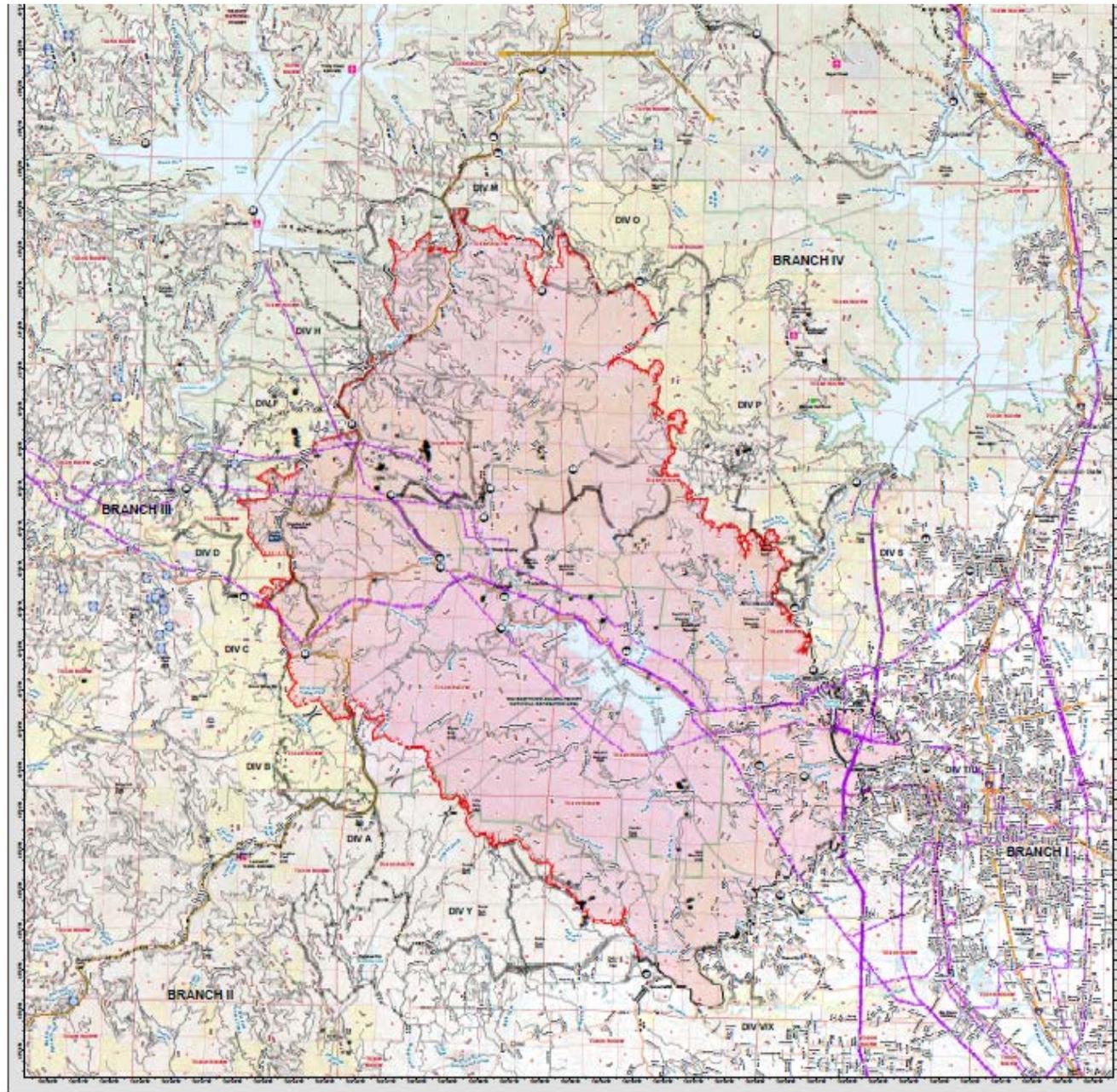


Urban Fire Storm  
From Mercy Medical  
Center. Redding, CA  
July 27<sup>th</sup>.



Lake Redding  
Subdivision





- 1 Fire Area
- 2 Branch
- 3 Division
- 4 Incident
- 5 Road
- 6 Utility
- 7 Containment Line
- 8 Evacuation Route
- 9 Fire Line
- 10 Fire Line
- 11 Fire Line
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- 50 Fire Line

**OPERATIONS MAP**  
**CARR INCIDENT**  
 CA CHY 00-000

- 1 Fire Line
- 2 Fire Line
- 3 Fire Line
- 4 Fire Line
- 5 Fire Line
- 6 Fire Line
- 7 Fire Line
- 8 Fire Line
- 9 Fire Line
- 10 Fire Line
- 11 Fire Line
- 12 Fire Line
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0 1 Mile

CARR  
 CA0001-00100  
 OPS MAP  
 August 1, 2018

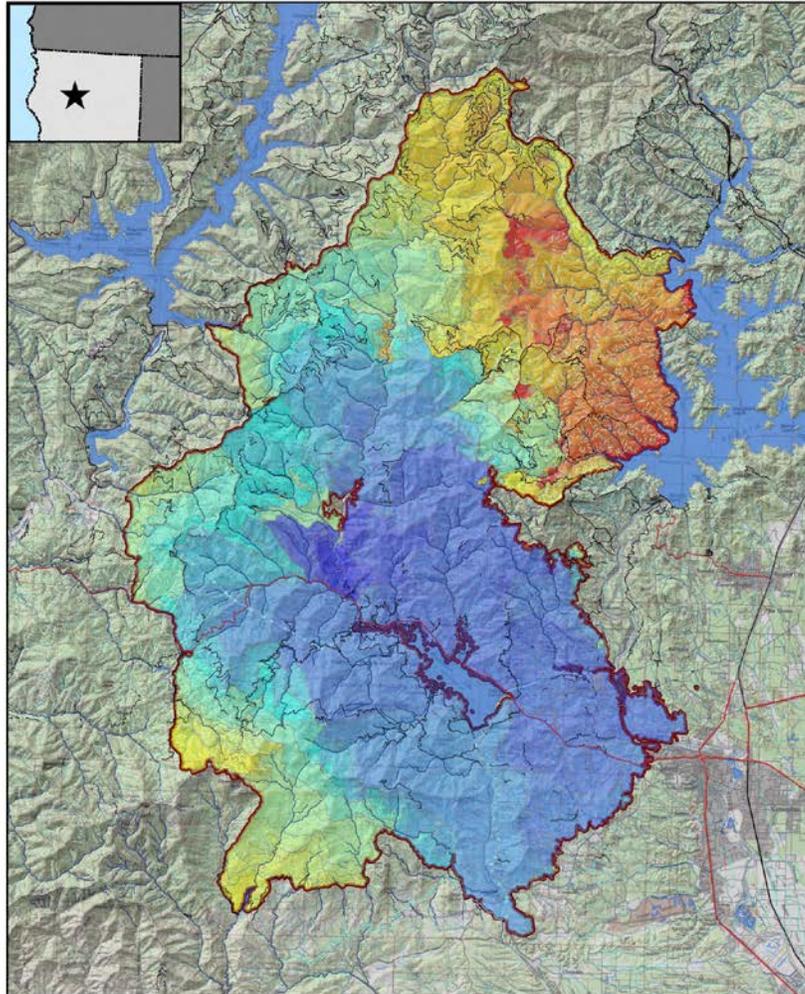


Tying the lakes  
together. Dozer  
line and burn  
out.



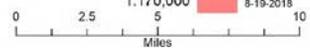


# Carr Fire Progression



| Date      | 7-26-2018 | 7-30-2018 | 8-03-2018 | 8-07-2018 | 8-11-2018 | 8-15-2018 |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 7-23-2018 | 7-27-2018 | 7-31-2018 | 8-04-2018 | 8-08-2018 | 8-12-2018 | 8-16-2018 |
| 7-24-2018 | 7-28-2018 | 8-01-2018 | 8-05-2018 | 8-09-2018 | 8-13-2018 | 8-17-2018 |
| 7-25-2018 | 7-29-2018 | 8-02-2018 | 8-06-2018 | 8-10-2018 | 8-14-2018 | 8-18-2018 |
|           |           |           |           |           |           | 8-19-2018 |

GIS Map Disclaimer: The information used in these applications were derived from digital databases provided to the DOI BAER team. All efforts were made to provide the best aggregated data possible.



# Carr Fire

## SOIL BURN SEVERITY

| Severity | Percent Burned | Acres   |
|----------|----------------|---------|
| High     | 4.8%           | 11,062  |
| Moderate | 39.2%          | 89,949  |
| Low      | 49.9%          | 114,447 |
| Unburned | 6.1%           | 14,003  |

**High and moderate soil burn severity have the greatest impact to watershed response**



## SOIL CONDITION

The majority of the soils within the burn area are highly erosive due to the coarse and sandy surface textures associated with steep slopes.

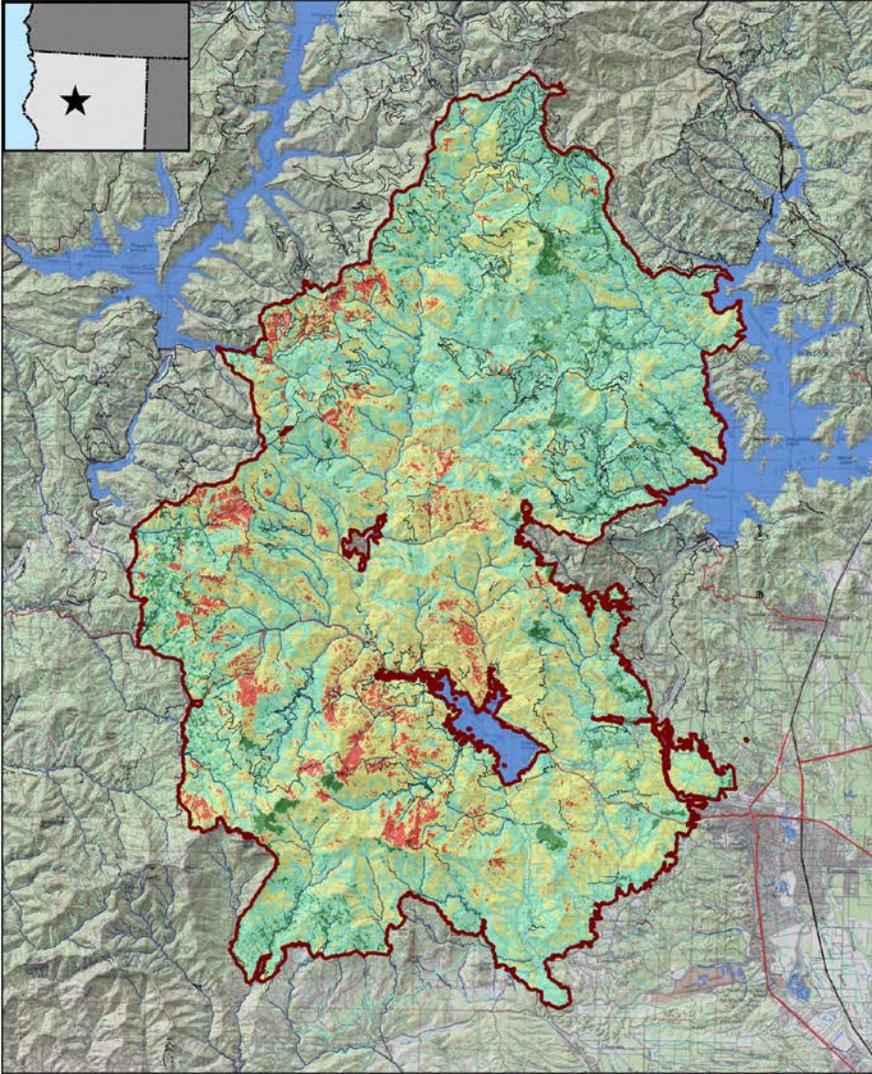
## WATERSHED RESPONSE

Overland flow occurs as a result of rainfall that exceeds soil infiltration capacity and the storage capacity of depressions. Risk of overland flow due water repellency (hydrophobicity) of soils.

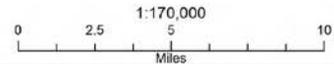


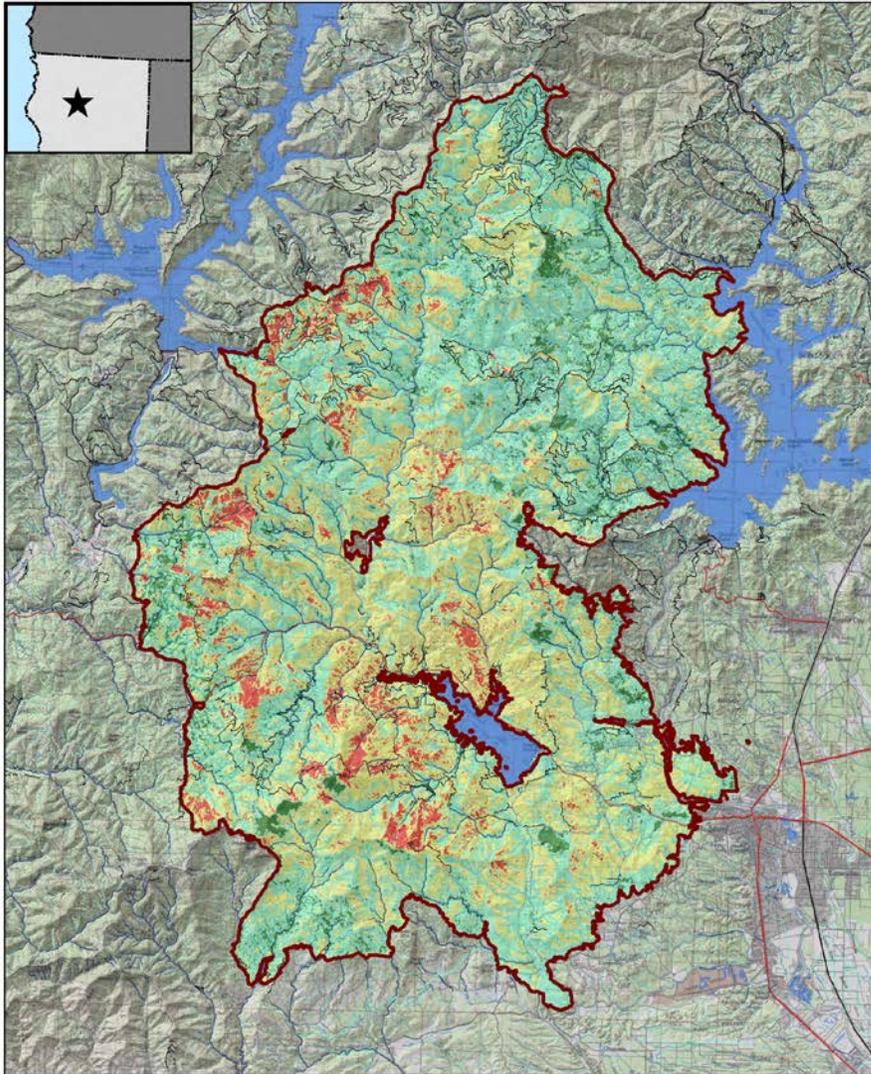
# Carr Fire

## Soil Burn Severity



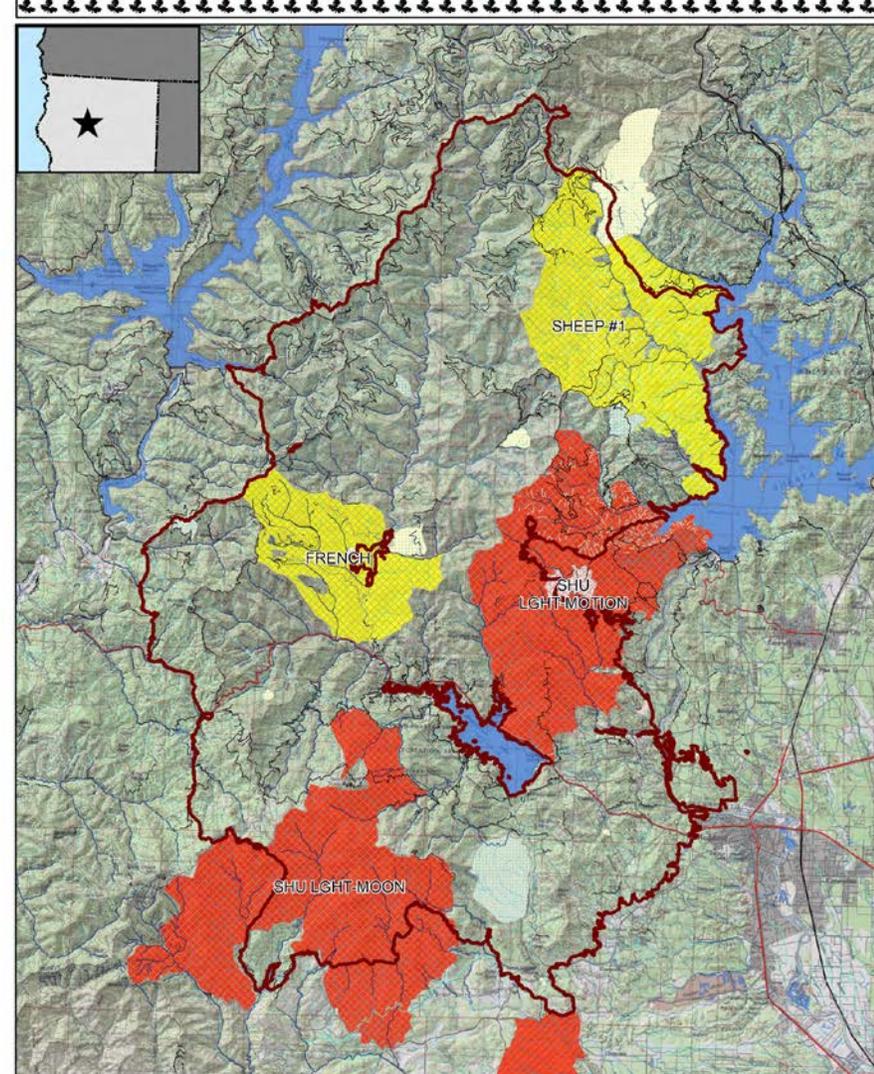
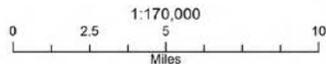
GIS Map Disclaimer: The information used in these applications were derived from digital databases provided to the DOI BAER team. All efforts were made to provide the best aggregated data possible.





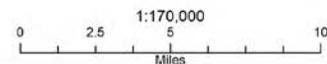
Carr Fire Perimeter
 **Soil Burn Severity**
■ Low  
■ High
■ Unburned/Very Low  
■ Moderate

GIS Map Disclaimer: The information used in these applications were derived from digital databases provided to the DOI BAER team. All efforts were made to provide the best aggregated data possible.



Carr Fire Perimeter
 ▨ 5,001 - 10,000 acres
■ 1998-2007  
▨ > 10,000 acres
▨ < 5,000 acres
■ 1987-1997  
■ 2008-2017

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CARR FIRE - Shasta Bally in the background.



Open Vertical Shaft – Whiskeytown National Park

Burned stair treads and handrail – Whiskeytown National Park

# Carr Fire

## **B.A.E.R. RECOMMENDATIONS**

- Emergency Stabilization
- Storm Patrol/Road Debris Removal
- Structure Protection
- Potable Water Source Protection
- Engineering Evaluation
- Flooding/Evacuation Plan
- Invasive Species, Early Detection Rapid Response
- Tree Hazard Abatement around values

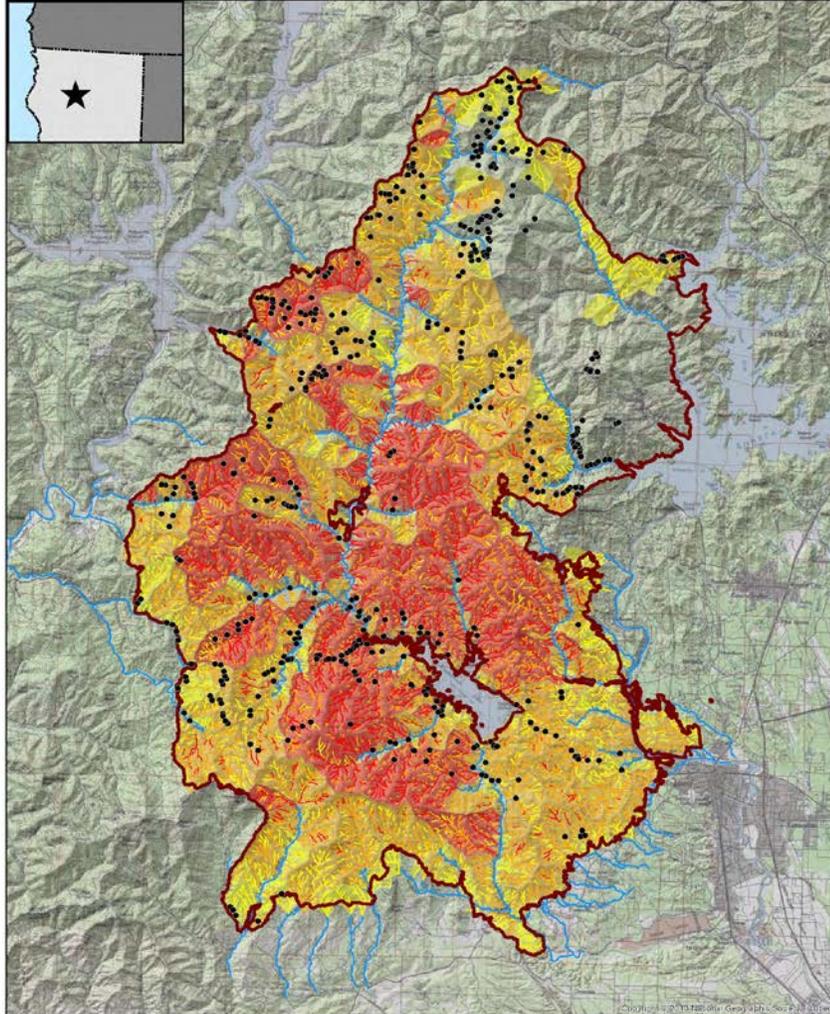


Fire-related debris clogging culvert inlet and need of cleaning prior to storm events.



# Carr Fire

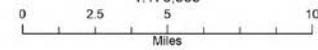
## Debris Flow Hazard and Culverts



### Segment Combined Hazard Basin Combined Hazard



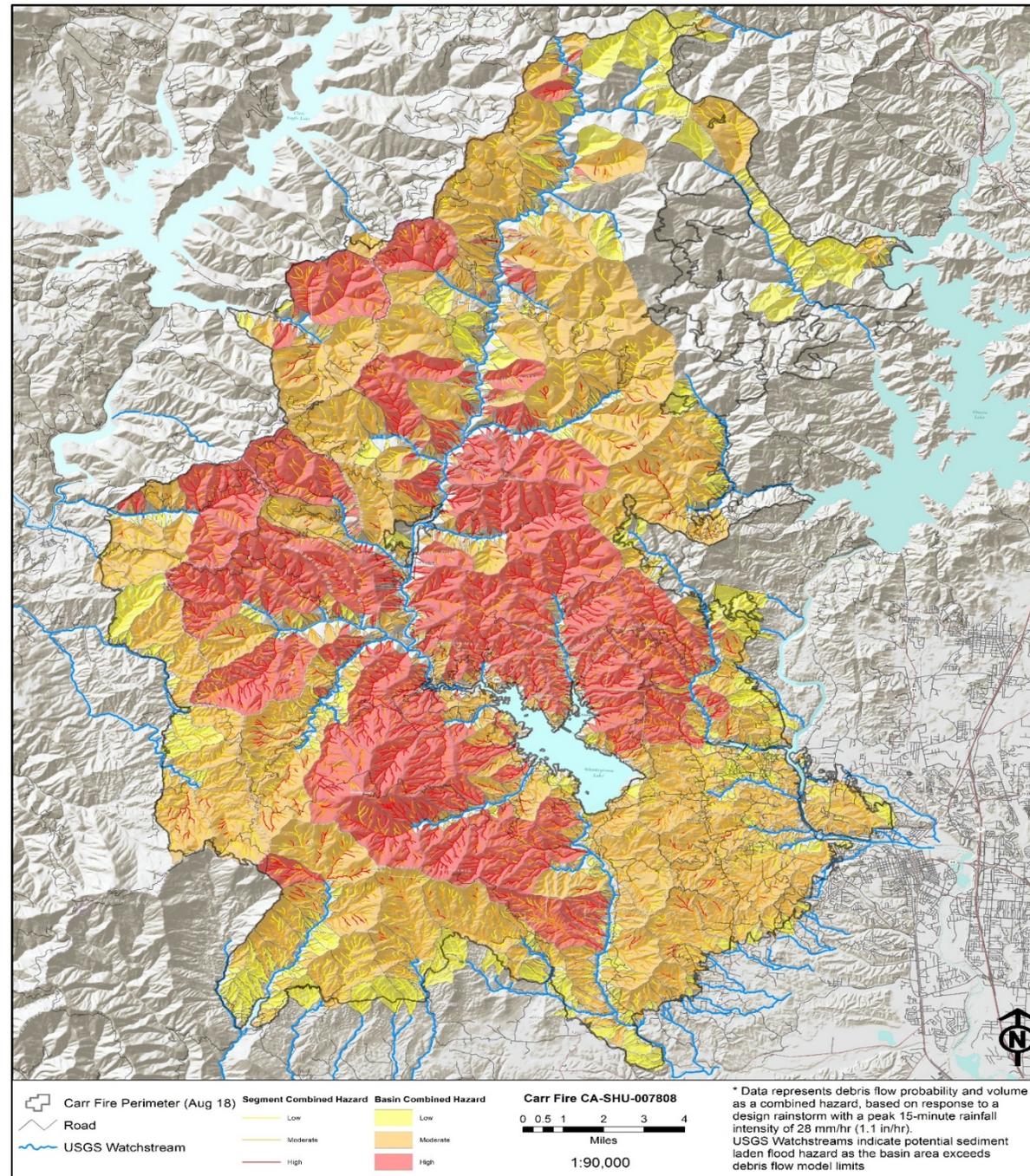
1:170,000



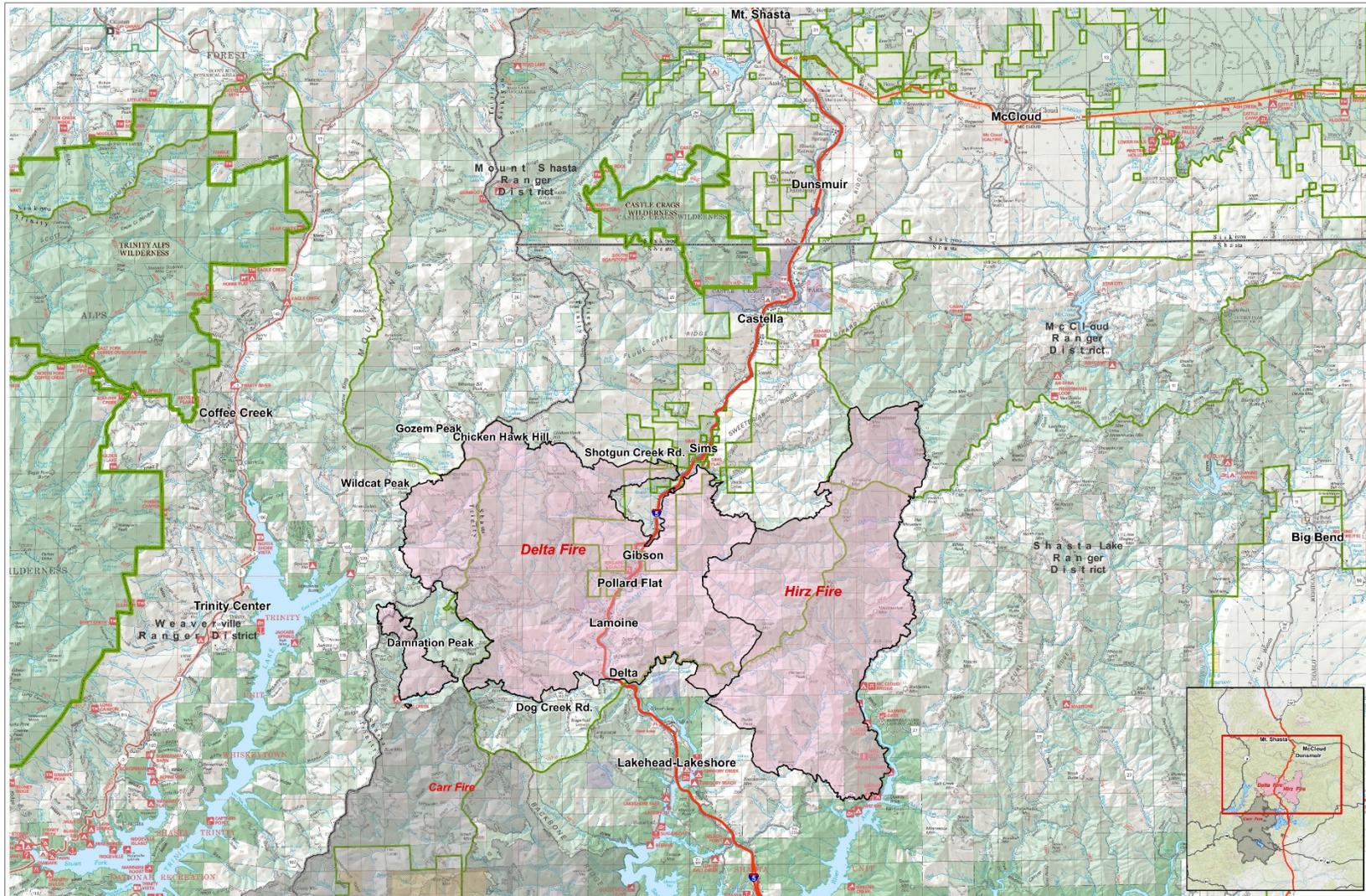
GIS Map Disclaimer: The information used in these applications were derived from digital databases provided to the DOI BAEER team. All efforts were made to provide the best aggregated data possible.



Combined Debris  
Flow Hazard Map  
under 15 min peak  
flow intensity of  
28mm/hr.



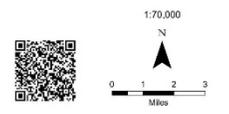
# Hirz and Delta Fires



**Public Information**  
Delta and Hirz Fires  
CA-SHF-001444  
CA-SHF-001223  
Last Updated  
10/7/2018



— Containment Line    ■ Delta and Hirz Fire Perimeter    ■ 2018 Carr Fire





# Hirz Fire

## STATS

**Start Date:** August 9th, 2018

**Size:** 46,150 acres

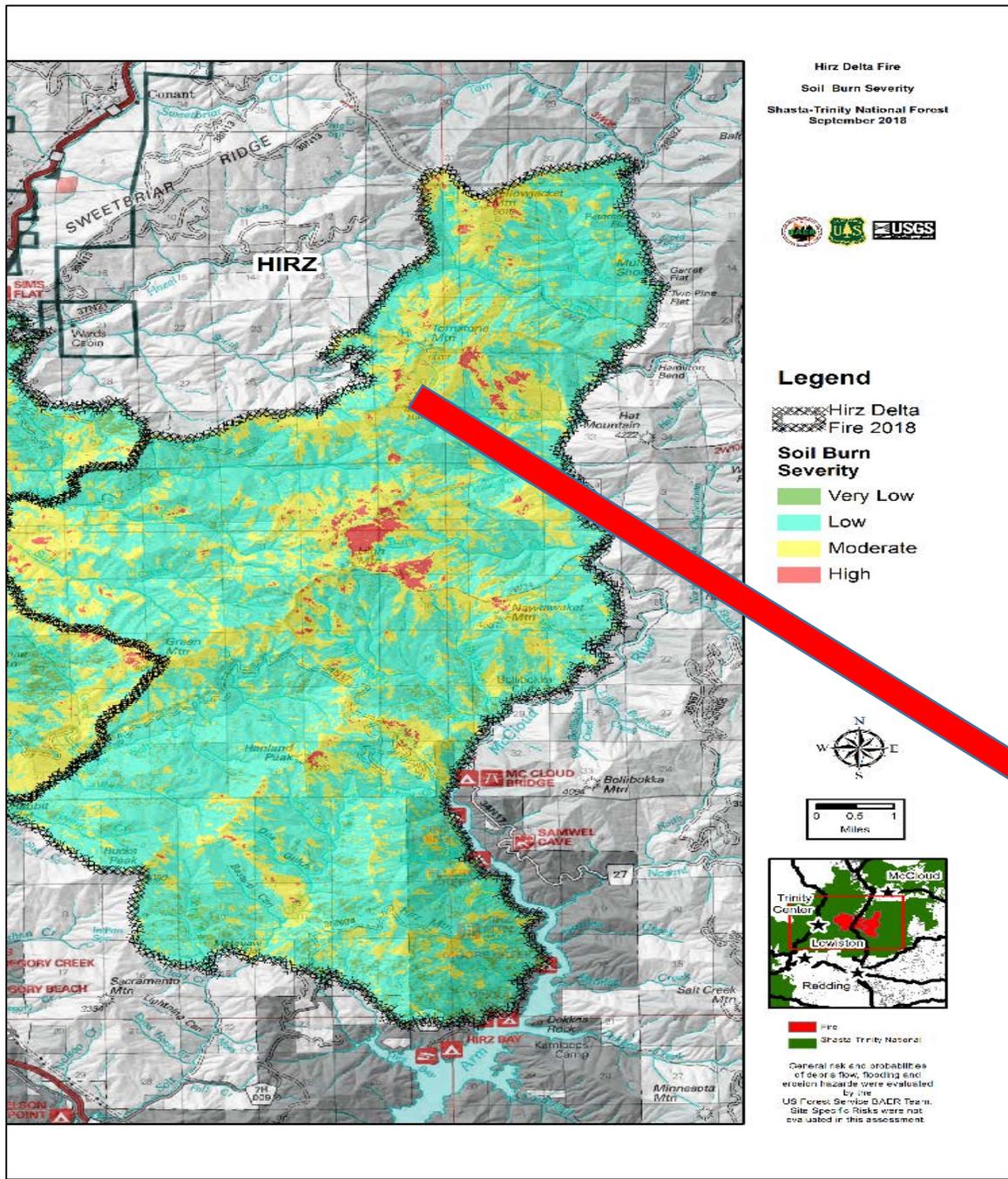
**Suppression Costs:** 47 Million

**Damage Costs:** Unknown

**Fatalities:** 0

**Structures lost:** 0

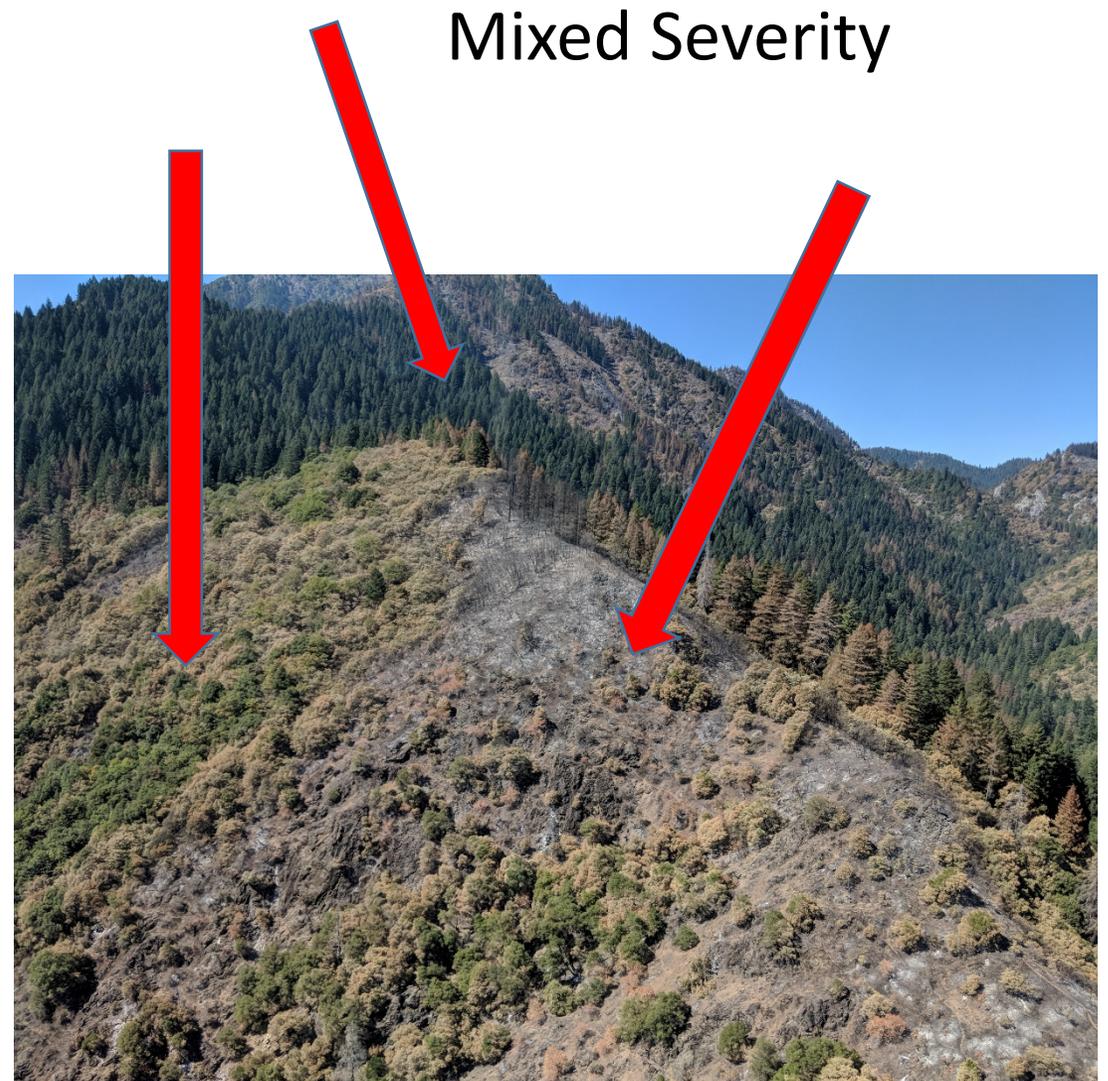
**Burn Severity:** Low-Moderate



Tombstone Mtn. Oak Ck. headwaters high soil burn severity



Low Intensity



# Delta Fire



## STATS

**Start Date:** Sept 5th, 2018

**Size:** 63,311 acres

**Suppression Costs:** 59 Million

**Damage Costs:** Unknown

**Fatalities:** 0

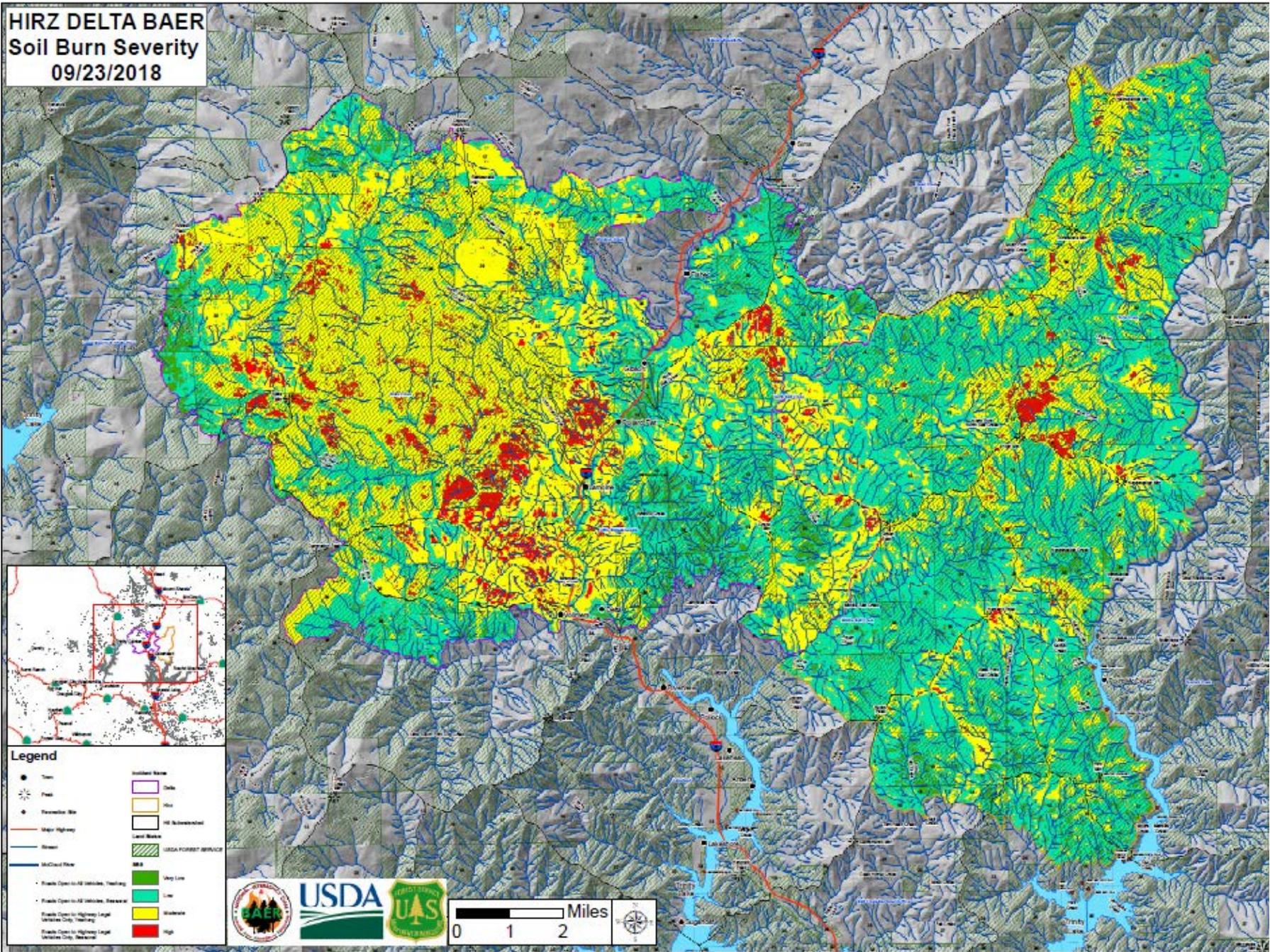
**Structures lost:** 20

**Burn Severity:** Low, Moderate -High





**HIRZ DELTA BAER**  
**Soil Burn Severity**  
**09/23/2018**



**Legend**

|  |                   |                       |
|--|-------------------|-----------------------|
| ● Town   | ○ Well            | ▭ Other               |
| ⊙ Park   | ⊙ Recreation Site | ▭ All Subwatershed    |
| — Major Highway  | — Road            | ▭ Land Use            |
| — Stream   | — Wildland Fire   | ▨ USDA FOREST SERVICE |
| — Wildland Fire  |                   | ■ BAER                |
| • Forest Open to All Vehicles, Trailway                  |                   | ■ Very Low            |
| • Forest Open to All Vehicles, Recreation                |                   | ■ Low                 |
| • Forest Open to Highway Legal Vehicles Only, Trailway   |                   | ■ Moderate            |
| • Forest Open to Highway Legal Vehicles Only, Recreation |                   | ■ High                |

USDA UAS

0 1 2 Miles

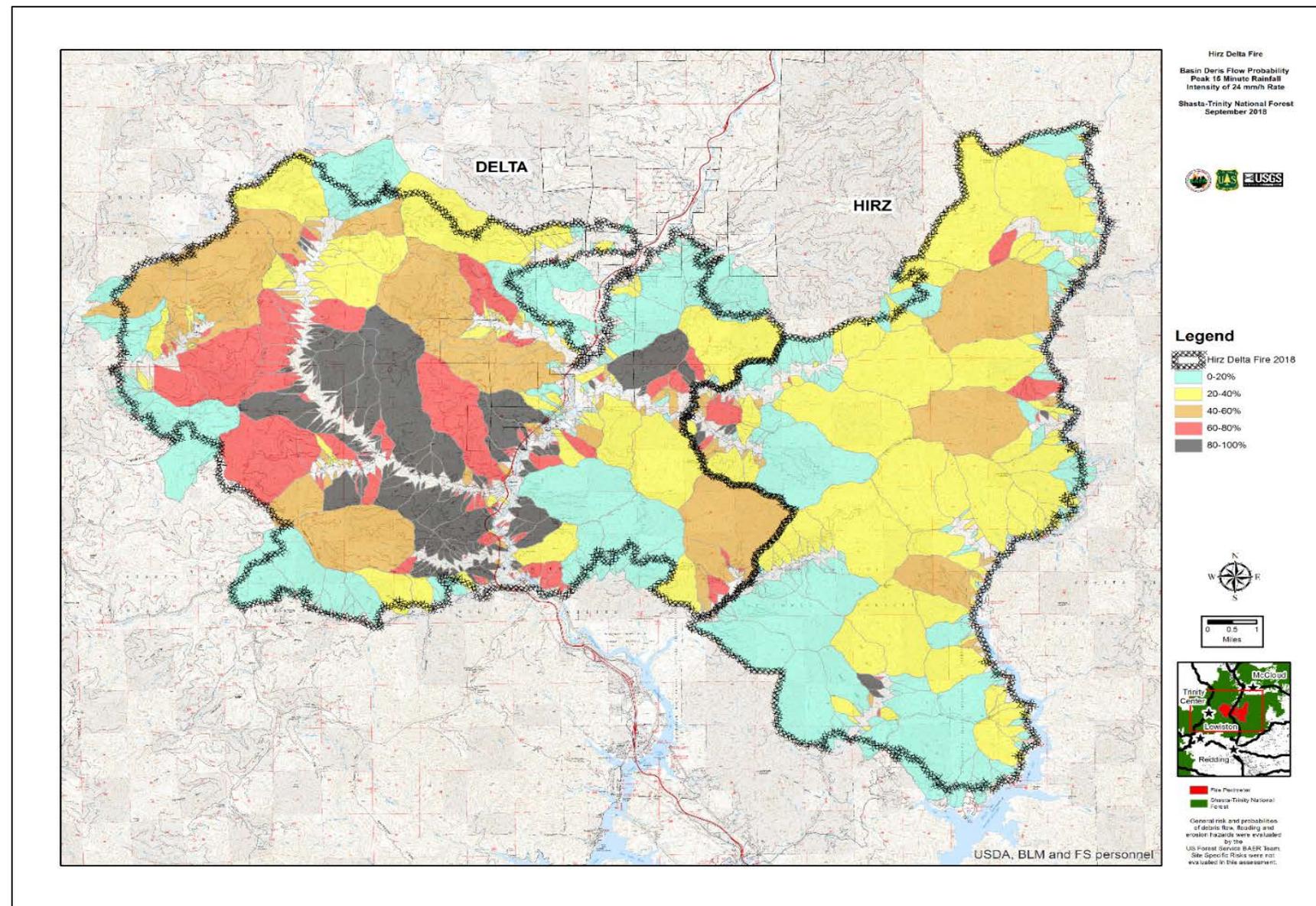


# Delta Fire

| Watershed              | Erosion Rates by Watershed (Tons/Acre) |              |               |
|------------------------|--|--------------|---------------|
|                        | 2 year storm                           | 5 year storm | 10 year storm |
| McCloud Input          | 7.4                                    | 18.0         | 25.5          |
| North Salt Cr          | 8.5                                    | 19.5         | 25.7          |
| Salt Cr                | 5.6                                    | 12.1         | 17.0          |
| Middle Salt Cr         | 7.6                                    | 16.4         | 22.2          |
| Dog Cr                 | 2.3                                    | 5.0          | 6.6           |
| Shotgun Cr             | 2.9                                    | 6.2          | 8.3           |
| Boulder Cr             | 8.8                                    | 18.2         | 23.9          |
| Slate Cr               | 9.8                                    | 20.1         | 25.9          |
| Halls Gulch            | 6.7                                    | 13.6         | 17.9          |
| Hazel Cr               | 0.8                                    | 1.8          | 2.4           |
| Watson Cr              | 5.9                                    | 12.1         | 15.9          |
| China Cr               | 0.6                                    | 1.2          | 1.7           |
| Upper Clear Cr         | 0.6                                    | 1.3          | 1.7           |
| Whitlow Cr             | 5.8                                    | 15.5         | 20.9          |
| Mosquito Cr            | 12.1                                   | 25.0         | 31.7          |
| Campbell Cr            | 3.4                                    | 8.5          | 11.7          |
| Sacramento River Input | 8.1                                    | 17.1         | 22.4          |

Post-fire Batch ERMiT model predictions for the 5-year storm recurrence interval runoff event shows that surface erosion rates are estimated to exceed 100 tons per acre depending on the area in the fire. **The rainfall erosivity over the fire area happens to be the highest in the state of California.**

# Hirz-Delta debris flow probability by basin



## **Values at Risk**

- Recreationalists using lakes and streams.
- Roads
- Structures (flooding/debris flows)
- Potable water sources

What can we do to protect these values?

Fire line  
Rehab.  
Waterbars



Debris casting



Hydro seeding





Shasta Lake  
impacted slips





Bagley fire  
debris flows  
2012/2013





00:00:59 21:22 -00:03:23

What is it?



Slate Mountain  
Snow Survey Site







## Citations

Carr Fire Interagency BAER Team. *2018 Burned Area Response Plan*

Brad Rust, Soil Scientist. U.S. Forest Service, Shasta Trinity National Forest. Interview.

Hirz/Delta BAER Team. *2018 Hirz/Delta Fire Burned Area Report*

Joe Zustak, Fire Resource Advisor. U.S. Forest Service, Shasta Trinity National Forest. Photo Credit.

Nick Meyers, Fire Resource Advisor. U.S. Forest Service, Shasta Trinity National Forest. Photo Credit.

Sarah Nova, Mercy Medical Center. Photo Credit

Steve Bachmann, Hydrologist. U.S. Forest Service, Shasta Trinity National Forest. Interview.

Troy Nichols, Shasta Lake Manager, U.S. Forest Service, Shasta Trinity National Forest. Photo Credit.

Pacific Southwest Region. USDA Forest Service. Photo Credit

# Questions?



New growth already!! Carr Fire August, 2018