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 BAD”
Carr Fire

“THE GOOD”
Hirz 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 27th.
Tying the lakes together. Dozer line and burn out.
SOIL BURN SEVERITY

<table>
<thead>
<tr>
<th>Severity</th>
<th>Percent Burned</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>4.8%</td>
<td>11,062</td>
</tr>
<tr>
<td>Moderate</td>
<td>39.2%</td>
<td>89,949</td>
</tr>
<tr>
<td>Low</td>
<td>49.9%</td>
<td>114,447</td>
</tr>
<tr>
<td>Unburned</td>
<td>6.1%</td>
<td>14,003</td>
</tr>
</tbody>
</table>

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 - Shasta Bally in the background.
Burned stair treads and handrail – Whiskytown National Park

Open Vertical Shaft – Whiskytown National Park
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.
Combined Debris Flow Hazard Map under 15 min peak flow intensity of 28mm/hr.
Hirz and Delta Fires
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
Mixed 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
Delta/Hirz Burn Severity
Types of runoff increases we can expect in each subwatershed for the Hirz/Delta Fire area.
### Watershed Erosion Rates by Watershed (Tons/Acre)

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

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

Photo courtesy: FINN Corp.
Shasta Lake impacted slips
Bagley fire debris flows 2012/2013
What is it?
Slate Mountain
Snow Survey Site
Citations

Carr Fire Interagency BAER Team. *2018 Burned Area Response Plan*
Hirz/Delta BAER Team. *2018 Hirz/Delta Fire Burned Area Report*
Sarah Nova, Mercy Medical Center. Photo Credit
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