Post Wildfire Assessment

Richard Muhl
Senior Environmental Scientist
Central Valley Regional Water Quality Control Board
Richard.Muhl@waterboards.ca.gov
• Typically post fire issues
• Carr Fire Response
• Mendocino Complex Fire Response
CARR FIRE FACTS

- Started at Highway 299 and Carr Powerhouse Road near Whiskeytown NP, west of Redding in Shasta County.
- Caused by sparks from the steel rim of a flat trailer tire.
- Over 5 weeks burned 229,651 acres. 1,077 homes destroyed. Eight deaths.
- Sixth-most destructive fire, and seventh largest in California history.
- Produced “fire whirl” with 143 mph winds, 18,000 feet high.
- State and Federal emergency declarations.
ASSESSMENT ACTIVITIES

- Hazardous Waste
- Facilities (Regulated and Unregulated)
- Municipal Storm Water (City and County)
- Nonpoint Source

- GIS & Data Management
- Other State and Federal teams
• Water Board assessed 346 properties
• Propane canisters, pesticides, asbestos, paint, oil, solvents, and fuels
• California Department of Toxic Substances Control (DTSC) removes hazardous waste from 1,163 properties
• Cal Recycle cleans up burned debris around footprint of burned structures
• Property owners conduct “Opt-Out” private cleanups
• Mandatory cleanup under County authority
• Water Board staff follow up to confirm priority sites get cleaned up
FACILITIES ASSESSMENTS

- Regulated and unregulated facilities in the burned areas:
  - Drinking water treatment plants
  - Wastewater treatment plants
  - Industrial facilities
  - Mobile home parks
  - Schools
  - Electrical substations
  - Marinas
Sewage Treatment System that serves an area of Whiskeytown Lake.
MUNICIPAL STORM SEWER SYSTEMS ASSESSMENT
## Summary of Assessment Data

<table>
<thead>
<tr>
<th>Threat to Water Quality</th>
<th>Facilities</th>
<th>Hazardous Waste</th>
<th>Nonpoint Source</th>
<th>Municipal Storm Water</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>2</td>
<td>64</td>
<td>25</td>
<td>16</td>
<td>98</td>
</tr>
<tr>
<td>Moderate</td>
<td>5</td>
<td>200</td>
<td>80</td>
<td>35</td>
<td>291</td>
</tr>
<tr>
<td>Low</td>
<td>4</td>
<td>74</td>
<td>84</td>
<td>315</td>
<td>462</td>
</tr>
<tr>
<td>No Threat</td>
<td>15</td>
<td>8</td>
<td>5</td>
<td>88</td>
<td>137</td>
</tr>
<tr>
<td><strong>Total Points Observed</strong></td>
<td><strong>26</strong></td>
<td><strong>346</strong></td>
<td><strong>194</strong></td>
<td><strong>454</strong></td>
<td><strong>1,020</strong></td>
</tr>
</tbody>
</table>
## Data Management and GIS

### Carr Fire Initial Assessment Form

**Assessment Type**: Site Walk / Street / Other

**Other Agencies Involved**: Agency, Contact Name, Phone #

**Watershed Name/Planning**

<table>
<thead>
<tr>
<th>Watercourse Name</th>
<th>Recommendation Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>(1) Evaluate/repair</td>
</tr>
<tr>
<td>-</td>
<td>(2) Evaluate/repair</td>
</tr>
<tr>
<td>-</td>
<td>(3) No corrective ac</td>
</tr>
<tr>
<td>-</td>
<td>(4) Debris Removal</td>
</tr>
<tr>
<td>-</td>
<td>(5) Monitor/Manage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feature Type</th>
<th>SYS_ID</th>
<th>Status</th>
<th>Dam.</th>
<th>Del.</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>18694</td>
<td>*</td>
<td>N</td>
<td>M</td>
</tr>
</tbody>
</table>

### M45 Assessment Area #1A

<table>
<thead>
<tr>
<th>Form ID</th>
<th>Date</th>
<th>WQ Threat</th>
<th>Usage</th>
<th>Assessment</th>
<th>Consent to Inspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW-1A</td>
<td>15-Aug</td>
<td>C</td>
<td>2</td>
<td>Street</td>
<td>Yes</td>
</tr>
<tr>
<td>HW-1B</td>
<td>15-Aug</td>
<td>C</td>
<td>2</td>
<td>Street</td>
<td>Yes</td>
</tr>
<tr>
<td>HW-10</td>
<td>15-Aug</td>
<td>A</td>
<td>1</td>
<td>Site Walk</td>
<td>No</td>
</tr>
<tr>
<td>HW-11</td>
<td>15-Aug</td>
<td>B</td>
<td>2</td>
<td>Street</td>
<td>No</td>
</tr>
<tr>
<td>HW-12</td>
<td>15-Aug</td>
<td>B</td>
<td>2</td>
<td>Street</td>
<td>No</td>
</tr>
<tr>
<td>HW-13</td>
<td>15-Aug</td>
<td>B</td>
<td>2</td>
<td>Street</td>
<td>No</td>
</tr>
<tr>
<td>HW-14</td>
<td>15-Aug</td>
<td>B</td>
<td>2</td>
<td>Site Walk</td>
<td>No</td>
</tr>
<tr>
<td>HW-15</td>
<td>15-Aug</td>
<td>C</td>
<td>2</td>
<td>Site Walk</td>
<td>No</td>
</tr>
<tr>
<td>HW-16</td>
<td>15-Aug</td>
<td>C</td>
<td>3</td>
<td>Street</td>
<td>No</td>
</tr>
<tr>
<td>HW-17</td>
<td>15-Aug</td>
<td>B</td>
<td>2</td>
<td>Other</td>
<td>No</td>
</tr>
<tr>
<td>HW-18</td>
<td>15-Aug</td>
<td>C</td>
<td>2</td>
<td>Site Walk</td>
<td>No</td>
</tr>
<tr>
<td>HW-19</td>
<td>15-Aug</td>
<td>B</td>
<td>2</td>
<td>Other</td>
<td>No</td>
</tr>
<tr>
<td>HW-20</td>
<td>15-Aug</td>
<td>C</td>
<td>2</td>
<td>Site Walk</td>
<td>No</td>
</tr>
<tr>
<td>HW-21</td>
<td>15-Aug</td>
<td>C</td>
<td>2</td>
<td>Site Walk</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Residence</th>
<th>Address</th>
<th>ZIP Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>16390 Middle Creek Road</td>
<td>65320010000</td>
<td></td>
</tr>
<tr>
<td>16266 Gold Pan Way</td>
<td>65240030000</td>
<td></td>
</tr>
<tr>
<td>36236 Keswick Dam Road</td>
<td>65700010000</td>
<td></td>
</tr>
<tr>
<td>11258 Iron Mountain Road</td>
<td>65190010000</td>
<td></td>
</tr>
<tr>
<td>11280 Iron Mountain Road</td>
<td>65190011000</td>
<td></td>
</tr>
<tr>
<td>11676 California Street</td>
<td>65110007000</td>
<td></td>
</tr>
<tr>
<td>1060 Sherwood Lane</td>
<td>10710010000</td>
<td></td>
</tr>
</tbody>
</table>
PRIORITIZATION

- Water quality impacts and threats sorted:
  - Geographic area
  - Land ownership
  - Aquatic life value
  - Drinking water intakes
  - Severity of impact
  - Funding
  - Feasibility for mitigation
  - Plans by others
FUNDING

1. Cal-OES/FEMA, Hazard Mitigation Grant Program (HMG P)
2. Western Shasta Resource Conservation District (WS RCD)
3. HMG P application to be submitted
4. State Water Board match
5. Start work end of October with SB funds
6. Follow up with Cal-OES/FEMA funds
IMPLEMENTATION

- Start work Oct 2018, run through Aug 2021
- Run funds through Western Shasta Resource Conservation District (WS RCD)
- WS RCD will contract out and manage work
- Manage contracts and conduct field inspections
- State Board funding first, followed by HMGP grant
WATER QUALITY
MONITORING PROGRAM

• Provide data on post-fire impacts to water quality
• Protect Beneficial Uses (drinking water, aquatic life)
• Assess effectiveness of post-fire mitigation actions
• Guide follow up activities
- Drinking water intakes
- Critical species spawning & rearing habitats
- Burn severity
- Land use
- Potential for BMP Implementation
- Accessibility
WATER QUALITY MONITORING  
TIMING AND PARAMETERS

• Pre-storm “Baseline”
• First flush storm event
• Four or more subsequent storm events

• Nutrients
• Metals
• Organics
• General Chemistry
• Field Parameters
FOLLOW UP

- Manage contract and monitor field work
- Assess effectiveness of response
- Adaptively manage ongoing response
- Provide information for statewide emergency response plan
MENDOCINO COMPLEX FIRE

Largest Fire in CA History

• Complex of two wildfires started on July 27, 2018

• Combined fires burned 459,123 acres or 717 square miles

• Destroyed 157 residences and 123 out buildings
**MENDOCINO COMPLEX FIRE**

## Clear Lake Watershed
### Significant Impacts to Water Quality

<table>
<thead>
<tr>
<th>Historical</th>
<th>Control Program</th>
<th>Fire Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>2006</td>
<td>2018</td>
</tr>
<tr>
<td>• Clear Lake was Added to the 303(d) list</td>
<td>• Basin Plan Amendment</td>
<td>• Mobilization of phosphorus rich soils</td>
</tr>
<tr>
<td>• Nuisance Algae Blooms</td>
<td>• Control program to reduce phosphorus loading to Clear Lake</td>
<td>• Drinking Water Intakes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Disadvantaged community – few resources</td>
</tr>
</tbody>
</table>
• **Burn Area Assessment**
  - Areas tributary to Clear Lake outside federal lands
  - Same protocol as Redding fire
  - Identified areas needing erosion and sediment control BMPs

• **BMP Deployment with Lake County RCD**

• **Water Quality Monitoring**
• Assessment
  – Utilized two field teams to assess impacted areas
    ▪ 5 to 7 days of field time
    ▪ Utilized burn intensity maps
    ▪ Priority given to impacted slopes, burned structures and areas close to water bodies
    ▪ Areas ranked as A, B, or C
**MENDOCINO COMPLEX FIRE POST-FIRE ASSESSMENT**

- **Utilized Scoring Sheets**
  - assessed impacted areas
  - developed a spreadsheet

- **A, B, C Ranking**
Map of Areas Assessed

- Colored dots show areas ranked in scoring sheet
- Dots color-coded by priority
Highway 175 / Manning Creek
Middle Creek/ Structure Ranking A1
Middle Creek/ Slopes Ranking B2
Clover Creek/Slopes Ranking C3
Moderate to High Intensity burn area
MENDOCINO COMPLEX FIRE POST-FIRE CONDITIONS

Structure Destroyed In Fire
Middle Creek Watershed
Hazardous Waste Issues
Preliminary / secondary assessments complete
Obtained $607,000 for BMP installation
Lake County RCD received the funds
Lake County RCD has selected experienced BMP contractor
BMP installation complete in October
Additional $70,000 requested for water quality monitoring
WATER QUALITY MONITORING

- Water temp
- pH
- Conductivity
- Dissolved Oxygen
- Turbidity (collected and analyzed within 24-hrs on a HACH 2100 Q and shared with drinking water folks ASAP)
- Total Nitrogen
- Nitrate + Nitrite
- Kjeldahl Nitrogen
- Total Phosphorous
- Total Suspended Solids
- Dissolved Silica
- Total Organic Carbon
- Metals – CAMS 17 (Ag, As, Ba, Be, Cd, Co, Cr, Cu, Hg, Mo, Ni, Pb, Sb, Se, Tl, V, Zn)
- Additional metals Al, Fe, and Mn
- Hardness if needed.
“I’LL BE BACK”

THE WAVE OF HOPE

11.16.2015
Questions?