

# Post Wildfire Assessment

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- 
- Typically post fire issues
  - Carr Fire Response
  - Mendocino Complex Fire Response













08.14.2018





08.21.2018



11.16.2015

# CARR FIRE FACTS



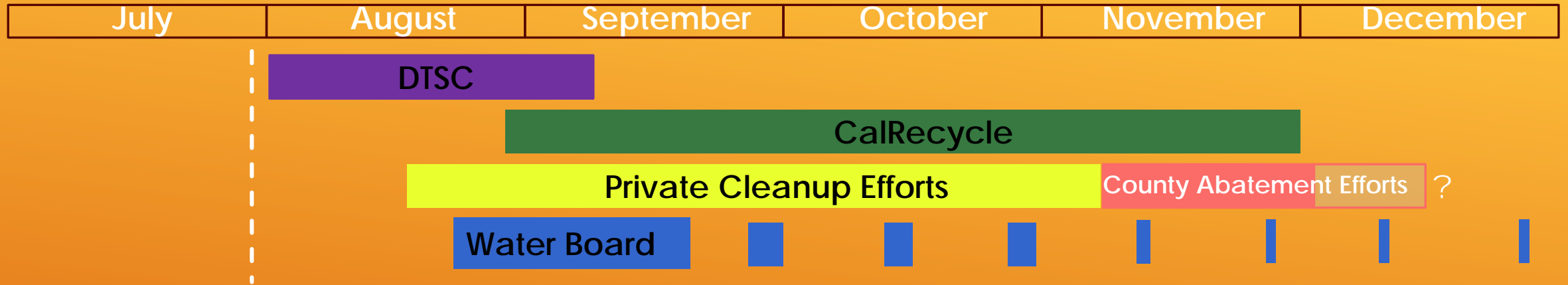
- ▶ Started afternoon of Monday, July 23, 2018, contained August 30, 2018.
- ▶ Started at Highway 299 and Carr Powerhouse Road near Whiskeytown NP, west of Redding in Shasta County.
- ▶ Caused by sparks from the steel rim of a flat trailer tire.
- ▶ Over 5 weeks burned 229,651 acres. 1,077 homes destroyed. 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



# HAZARDOUS WASTE ASSESSMENT




- 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





11.16.2015

# 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
- 



# Buckeye Water Treatment Plant



Shasta CSD Upper Brunswick Pump Station





Shasta CSD Lower Brunswick Pump Station



Whiskeytown NRA CG Well and Tank

Sewage Treatment System that serves an area of Whiskeytown Lake.





08.21.2018

# MUNICIPAL STORM SEWER SYSTEMS ASSESSMENT





# NONPOINT SOURCE ASSESSMENT









08.21.2018

# Summary of Assessment Data

Threat to Water Quality	Facilities	Hazardous Waste	Nonpoint Source	Municipal Storm Water	Totals
High	2	64	25	16	98
Moderate	5	200	80	35	291
Low	4	74	84	315	462
No Threat	15	8	5	88	137
<b>Total Points Observed</b>	<b>26</b>	<b>346</b>	<b>194</b>	<b>454</b>	<b>1,020</b>

# DATA MANAGEMENT AND GIS

Date: \_\_\_\_\_ RANK: \_\_\_\_\_ Group: HW FAC Office Use

**Carr Fire Initial Assessment Form**  
Facilities / Residences / Businesses / Hazardous Waste

Assessment Type:  Site Walk  Street  Other

Consent to Inspection?  Yes  No Name of Person Consenting: \_\_\_\_\_

Feature Assessed:  Permitted Facility  Unpermitted Facility  Residence  Commercial

Facility / Business Name: \_\_\_\_\_

Address or Address Range: \_\_\_\_\_

APN No. \_\_\_\_\_

Reference GPS Coordinates (Decimal Degrees): \_\_\_\_\_

Point of Contact (Name, Phone No.): \_\_\_\_\_

Permit Type:  NPDES  Non-15/WDR  IGP  N/A Permit No. \_\_\_\_\_ WDR # \_\_\_\_\_

Other Agencies Involved (Agency, Contact Name, Phone No.): \_\_\_\_\_

Photographs?  Yes  No File Name/Photo #'s \_\_\_\_\_

GPS Data?  Yes  No File Name/Point #'s \_\_\_\_\_

Evidence that removal activities have been conducted in the area being assessed?  Yes  No

Is there evidence of hazardous waste that may pose a threat to water quality? (check all that apply)

Asbestos  Automotive fluids  Ammunition  Cathodes  
 Solvents  Fuels  Drums  Treatments  
 Chemicals  Paints and thinners  Stained soil  Hg-gold  
 Pesticides  Lead Acid Batteries  Petroleum products  Composites  
 Fertilizers  Household batteries

Other (describe): \_\_\_\_\_

Cal Watershed Name/Planning #: \_\_\_\_\_ Classification:  Class 1  Class 2

Watercourse Name: \_\_\_\_\_

Closest distance from Watercourse:  0-150 ft  150-300 ft  300-450 ft  >450ft

Number of Inlets: \_\_\_\_\_ Distance from burned perimeter to nearest inlet: \_\_\_\_\_

Description of water quality threat (include sketch on back of form)

Water quality threat:  (A)High  (B)Medium  (C)Low

Urgency:  (1) Immediate Attention  (2) Prior to 1st Rain  (3) When Time Allows

Fill out "RANK" above using Letter/Number or NFAR

Date: 8/23/2018 SW Outfall # UNK-

MS4 Assessment Area # 1A

Other Agencies Involved (Agency, Contact Name, Phone No.): \_\_\_\_\_

Cal Watershed Name/Planning #: \_\_\_\_\_

Watercourse Name: \_\_\_\_\_

**Recommendation Legend**

(1) Evaluate/repair  
 (2) Evaluate/repair  
 (3) No corrective action  
 (4) Debris Removal/  
 (5) Monitor/Maintain

Feature Type	SYS_ID	Status	Dam.	Deb
AD	18694	*	N	N

Feature Type = Catch Basin (CB), Maintenance Access Point (MAP), Area  
 GIS # / Dam. = check box if feature is damaged / Deb. = check box if feature  
 BMP = check box if BMP is present / # Burn = indicate how many burned  
 feature

Feature Type	SYS_ID	Status	Dam.	Deb

Form ID	Date	WQ Threat	Urgency	Assessment Type	Assessment Type	Consent to Inspect
HW-1A	15-Aug	C	2	Street		Yes
HW-1B	15-Aug	C	2	Street		Yes
HW-10	15-Aug	A	1	Site Walk		No
HW-11	15-Aug	B	2	Street		No
HW-12	15-Aug	B	2	Street		No
HW-13	15-Aug	B	2	Street		No
HW-14	15-Aug	B	2	Site Walk		No
HW-15	15-Aug	C	2	Site Walk		No
HW-16	15-Aug	C	3	Street		No
HW-17	15-Aug	B	2	Other		No
HW-18	15-Aug	C	2	Site Walk		No
HW-19	15-Aug	B	2	Other		No
HW-20	15-Aug	C	2	Site Walk		No
HW-21	15-Aug	C	2	Site Walk		No

Residence	16390 Middle Creek Road	65320010000	40.594865	-122.45525
Residence	16266 Gold Pan Way	65240030000	40.609966	-122.454322
Residence	16236 Keswick Dam Road	65700019000	40.609161	-122.455953
Residence	11258 Iron Mountain Road	65190015000	40.61557	-122.461448
Residence	11280 Iron Mountain Road	65190011000	40.616177	-122.462469
Residence	11676 California Street	65110007000	40.628217	-122.465091
Residence	1060 Redbud Lane	103570016000	40.585884	-122.426307

# 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

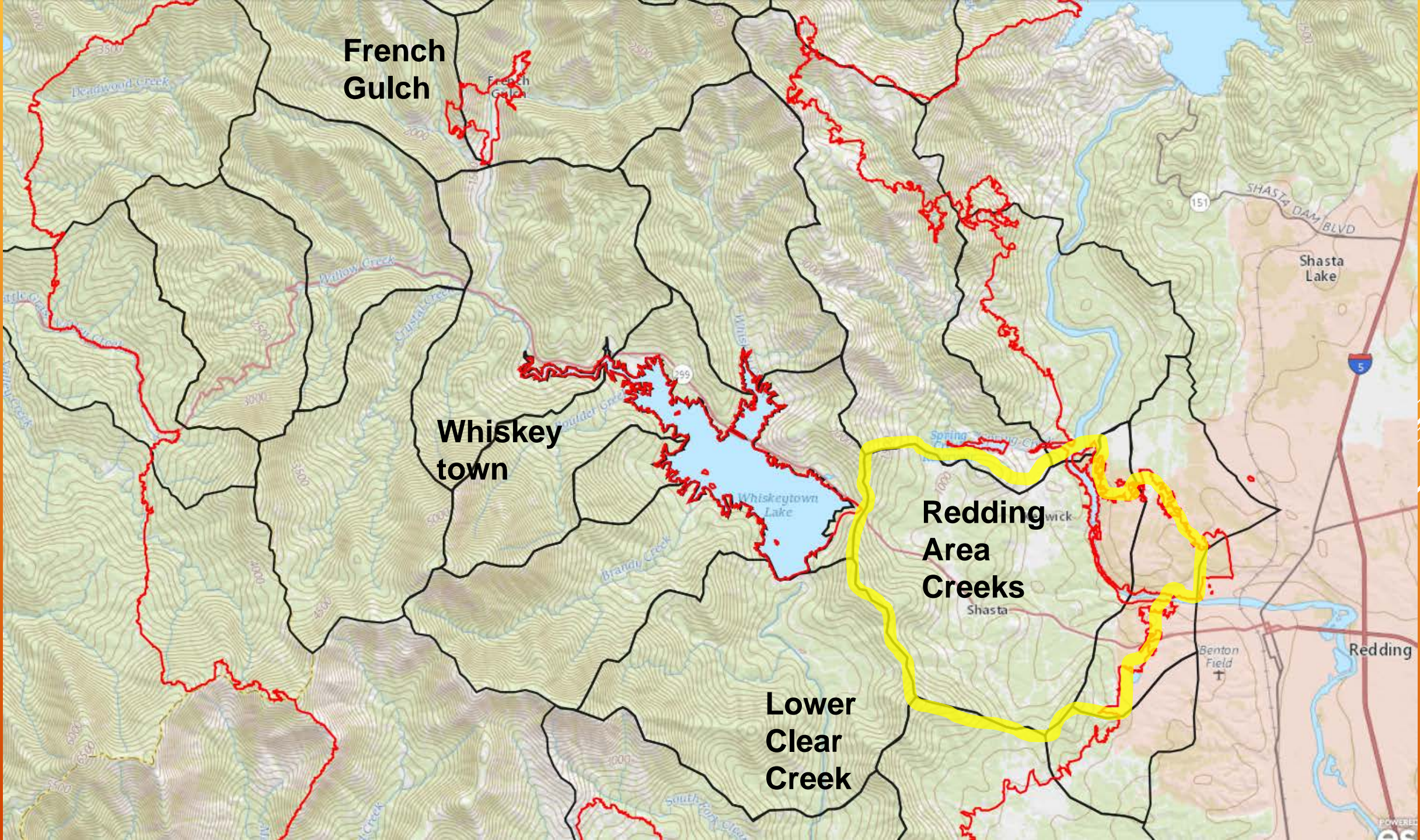


**French Gulch**

**Whiskeytown**

**Redding Area Creeks**

**Lower Clear Creek**



# FUNDING



- Cal-OES/FEMA, Hazard Mitigation Grant Program (HMGP)
- Western Shasta Resource Conservation District (WS RCD)
- HMGP application to be submitted
- State Water Board match
- Start work end of October with SB funds
- 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





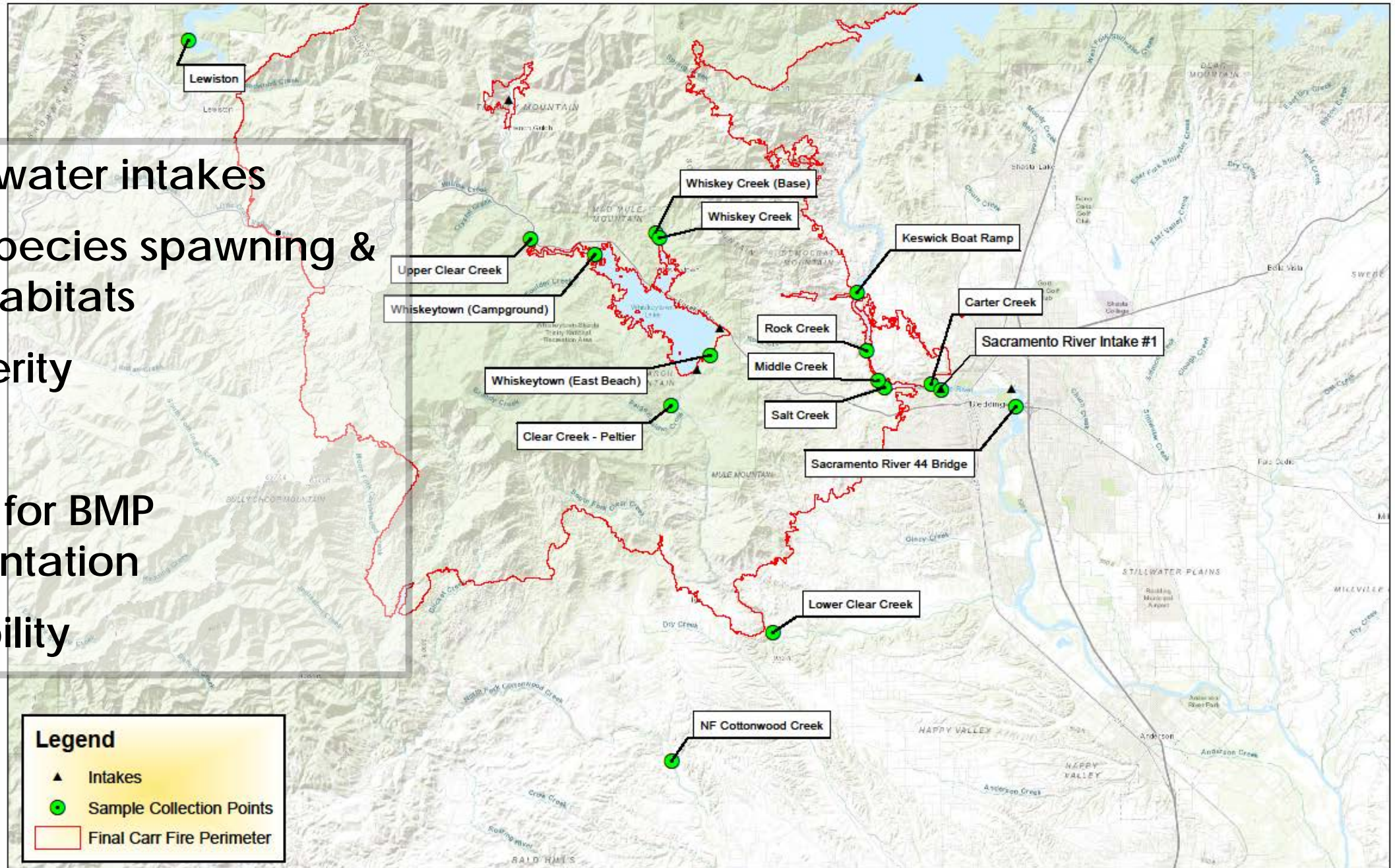
# WATER QUALITY MONITORING PROGRAM

- 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



## Carr Fire Water Quality Sampling

- 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



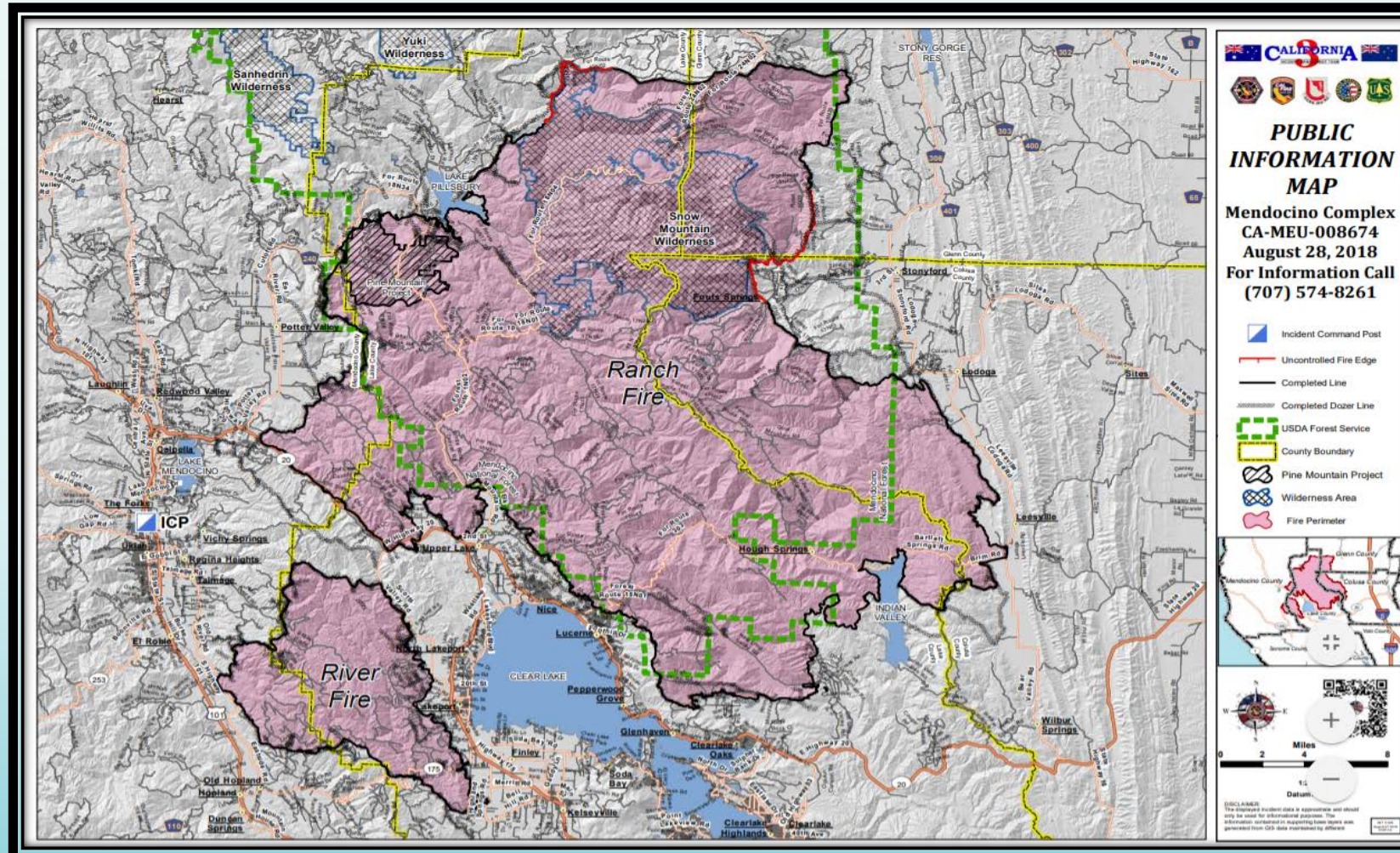
# FOLLOW-UP

- ▶ Manage contract and monitor field work
  - ▶ Assess effectiveness of response
  - ▶ Adaptively manage ongoing response
  - ▶ Provide information for statewide emergency response plan
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- A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, set against the orange background.

# 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

Historical	Control Program	Fire Impacts
1986	2006	2018
<ul style="list-style-type: none"><li>• Clear Lake was Added to the 303(d) list</li><li>• Nuisance Algae Blooms</li></ul>	<ul style="list-style-type: none"><li>• Basin Plan Amendment</li><li>• Control program to reduce phosphorus loading to Clear Lake</li></ul>	<ul style="list-style-type: none"><li>• Mobilization of phosphorus rich soils</li><li>• Drinking Water Intakes</li><li>• Disadvantaged community – few resources</li></ul>

# MENDOCINO COMPLEX FIRE POST-FIRE ASSESSMENT

- **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**



# MENDOCINO COMPLEX FIRE POST-FIRE ASSESSMENT

- **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*





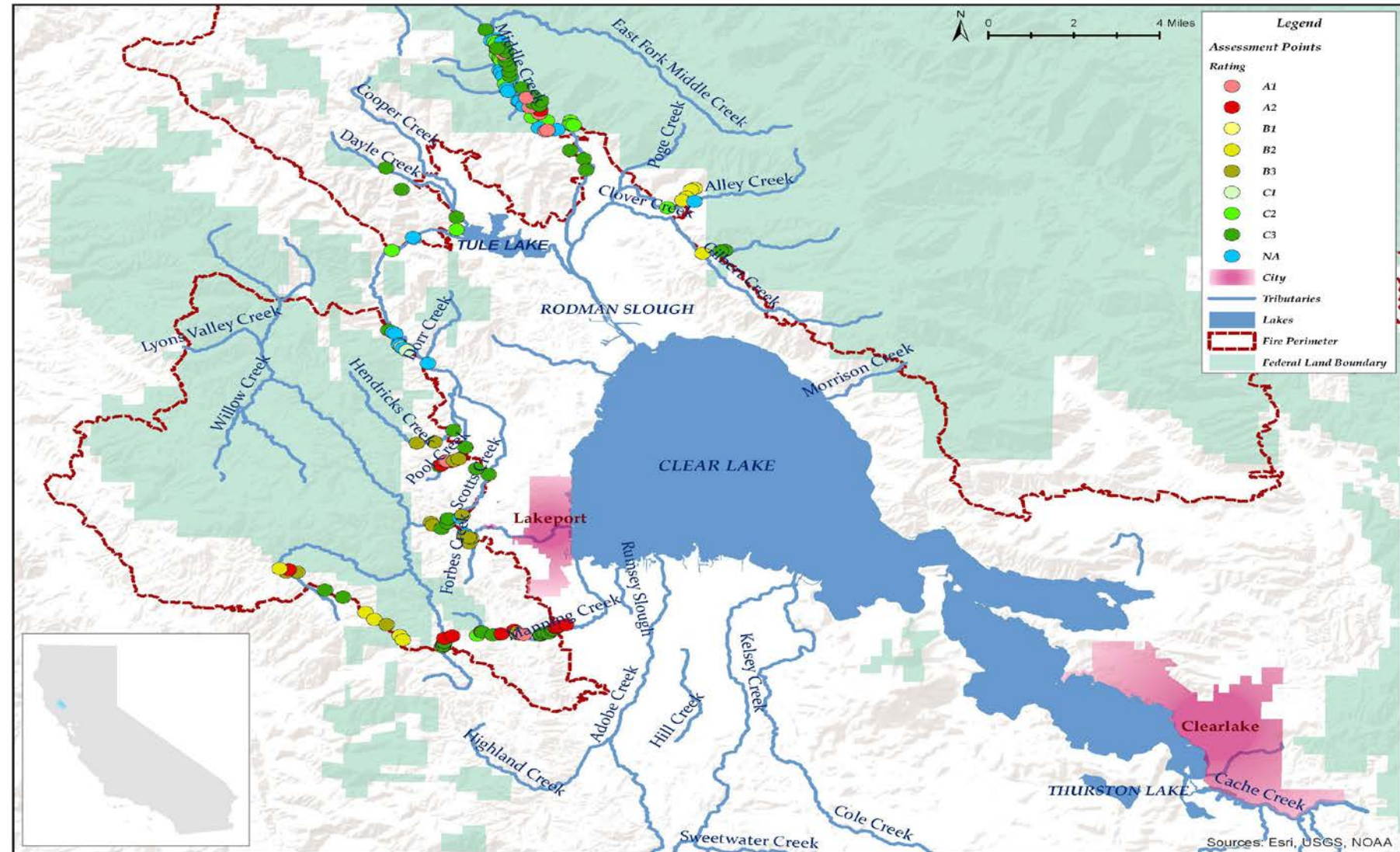
# MENDOCINO COMPLEX FIRE POST-FIRE ASSESSMENT

- Utilized Scoring Sheets
  - assessed impacted areas
  - developed a spreadsheet
- A, B, C Ranking

Form ID	Overall Rank	Feature Being Observed	Watershed Name/Planning	Watercourse Name	Distance from Watercourse	Associated Waypoint Name / Number	Associated Photo Number(s)	Crossing Type	Culvert Length	Culvert Diameter	Crossing Conditions	Fill Conditions	Channel Width Above	Channel Width Below	
1															
2		C3	Hillside	Clover Creek/180201160203	Clover Creek	>450ft	250	1115-1116, 2794-2798							
3		C3	Hillside	Clover Creek/180201160203	Clover Creek	>450ft	251	1117-1124, 2799-2803							
4		C3	Hillside	Clover Creek/180201160203	Clover Creek	>450ft	252	1125-1133, 2804-2809							
5		B2	Hillside	Clover Creek/180201160203	Alley Creek		253	1135-1136, 2810-2812							
6		B2	Hillside	Clover Creek/180201160203	Alley Creek		254	1137, 2813-2816							
7		B2	Hillside	Clover Creek/180201160203	Alley Creek		255	2817-2818							
8		B2	Hillside	Clover Creek/180201160203	Alley Creek		256								
9		B2	Hillside	Clover Creek/180201160203	Alley Creek		257	1142, 2822							
10		B2	Hillside	Clover Creek/180201160203	Alley Creek		258	2823-2825							
11		C2	Hillside	Clover Creek/180201160203	Alley Creek		258	2823-2825							
12		B2	Drainage/Other	Clover Creek/180201160203	Pogue Creek	0-150ft	260	1144-1146, 2826-2830							
13		C2	Crossing	Clover Creek/180201160203	Pogue Creek	0-150ft	261	1147-1151	Culvert	30'	70"x40" Squash, Culvert Diameter < 50% of Watercourse Width, Rusted Out	Voids, Rock Fill	11' 6"	12'	
14					Middle Creek		264	1155							
15		A1	Crossing	Middle Creek/ 180201160204	Middle Creek	0-150ft	265	1156-1161	Culvert	15'	36"	Culvert Diameter < 50% of Watercourse Width	Native Soil Fill, Abundant Debris	7'	15'
16		B2	Hillside	Middle Creek/ 180201160204	Middle Creek	300-450ft	266	1162							
17		B2	Crossing	Middle Creek/ 180201160204	Middle Creek	>450ft	267	2846-2849	Culvert	17'	18"	Hydrologically Connected to Road, Not Currently Plugged, Crushed	Native Soil Fill, Not Armored		
18		B2	Crossing	Middle Creek/ 180201160204	Middle Creek	>450ft	268	1163-1166, 2850-2853	Culvert	15'	24"	Hydrologically Connected to Road	Native Soil Fill, Not Armored, Abundant Debris		
19		B2	Crossing	Middle Creek/ 180201160204	Middle Creek	>450ft	269	1167-1169, 2854-2857	Culvert		24"		Native Soil Fill, Not Armored		
20		B2	Hillside	Middle Creek/ 180201160204	Middle Creek	>450ft	270	1170							
21		C3	Crossing	Middle Creek/ 180201160204	Middle Creek	0-150ft	271	2858-2862	Other	15'	5'x2'				
22		B3	Hillside	Middle Creek/ 180201160204	Middle Creek	>450ft	276	2874-2875							
23		B2	Hillside	Middle Creek/ 180201160204	Middle Creek	300-450ft	277	2878							
24			Crossing	Middle Creek/ 180201160204	Middle Creek		279	2880	Culvert	30'	24" CMP		Native Soil Fill, Not Armored, Abundant Debris	3'	3'
25		C2	Crossing	Middle Creek/ 180201160204	Middle Creek	0-150ft	280	2881-2883	Culvert	40'	8"	Hydrologically Connected to Road, Currently Plugged	Native Soil Fill, Not Armored		
26		C2	Crossing	Middle Creek/ 180201160204	Middle Creek	150-300ft	281	2884-2885	Culvert	40'	18"	Hydrologically Connected to Road, Not Currently Plugged	Native Soil Fill, Not Armored, Abundant Debris	3'	3'
27		B1	Crossing	Middle Creek/ 180201160204	Middle Creek	0-150ft	282	2886-2887	Culvert	40'	24"	Hydrologically Connected to Road, Not Currently Plugged, Crushed	Native Soil Fill, Not Armored	adside Dit	Open Plain
28		B2	Crossing	Middle Creek/ 180201160204	Middle Creek	0-150ft	283	2888-2890	Culvert	40'	18"	Crushed			
29		C2	Crossing	Middle Creek/ 180201160204	Middle Creek	0-150ft	284	2891-2892	Culvert	40'	18"	Hydrologically Connected to Road, Not Currently Plugged	Native Soil Fill, Not Armored, Abundant Debris	2'	4'
30		C2	Crossing	Middle Creek/ 180201160204	Middle Creek	0-150ft	285	2893-2896	Culvert	40'	12"	Not Currently Plugged	Native Soil Fill	2'	2'
31		C2	Crossing	Middle Creek/ 180201160204	Middle Creek	0-150ft	286	2897-2898	Culvert	40'	54"			12'-5"	Open Plain
32		NA	Crossing	Middle Creek/ 180201160204	Middle Creek	0-150ft	287	2899-2900	Culvert	40'	24"				
33		NA	Crossing	Middle Creek/ 180201160204	Middle Creek	150-300ft	288								
34		NA	Crossing	Middle Creek/ 180201160204	Middle Creek	150-300ft	289		Culvert						
35		NA	Crossing	Middle Creek/ 180201160204	Middle Creek		290	2901-2903	Culvert	40'	12"				
36		NA	Crossing	Middle Creek/ 180201160204	Middle Creek		291		Culvert	40'	54"				
37		NA	Crossing	Middle Creek/ 180201160204	Middle Creek		292		Culvert	40'	18"				
38		NA	Crossing	Middle Creek/ 180201160204	Middle Creek		293		Culvert	40'	12"				
39		NA	Crossing	Middle Creek/ 180201160204	Middle Creek	0-150ft	294		Culvert	40'	12"				
40		NA	Crossing	Middle Creek/ 180201160204	Middle Creek		295		Culvert	40'	54"				
41		C2	Crossing	Middle Creek/ 180201160204	Middle Creek	0-150ft	296	2904-2907	Culvert	40'	18"				
42		NA	Crossing	Middle Creek/ 180201160204	Middle Creek		297			40'	54"				
43		A1	Hillside	Middle Creek/ 180201160204	Middle Creek	0-150ft	298	2908-2915							

# MENDOCINO COMPLEX FIRE POST-FIRE ASSESSMENT

- **Map of Areas Assessed**
  - Colored dots show areas ranked in scoring sheet
  - Dots color-coded by priority



# MENDOCINO COMPLEX FIRE POST-FIRE CONDITIONS

**Highway 175 /  
Manning Creek**



27.08.2018

# MENDOCINO COMPLEX FIRE POST-FIRE ASSESSMENT

**Middle Creek/  
Structure  
Ranking A1**



09.05.2018

# MENDOCINO COMPLEX FIRE POST-FIRE ASSESSMENT

**Middle Creek/  
Slopes Ranking  
B2**



08.30.2018

# MENDOCINO COMPLEX FIRE POST-FIRE ASSESSMENT

**Clover Creek/  
Slopes Ranking  
C3**



29.08.2018

# MENDOCINO COMPLEX FIRE POST-FIRE CONDITIONS

**Moderate to  
High Intensity  
burn area**



# MENDOCINO COMPLEX FIRE POST-FIRE CONDITIONS

**Structure  
Destroyed In  
Fire**



09.06.2018



# MENDOCINO COMPLEX FIRE POST-FIRE CONDITIONS

**Middle Creek  
Watershed**



# MENDOCINO COMPLEX FIRE POST-FIRE CONDITIONS

## Hazardous Waste Issues



# MENDOCINO COMPLEX FIRE PROJECT STATUS

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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

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- 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?