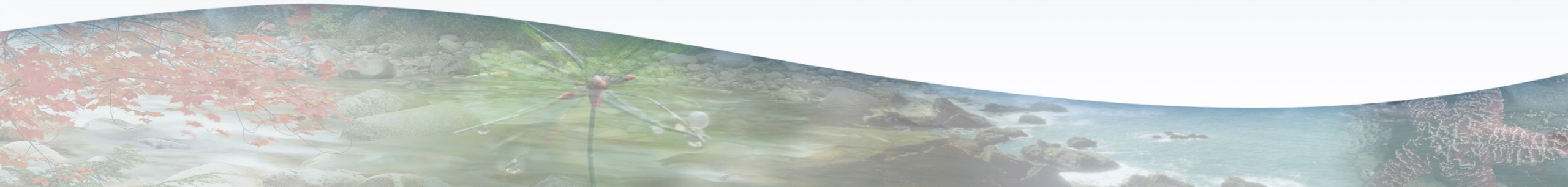


Tubbs and Nuns Post-Fire Surface Water Quality Monitoring Winter 2017/18



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North Coast Regional Water Quality Control Board
October 1, 2018



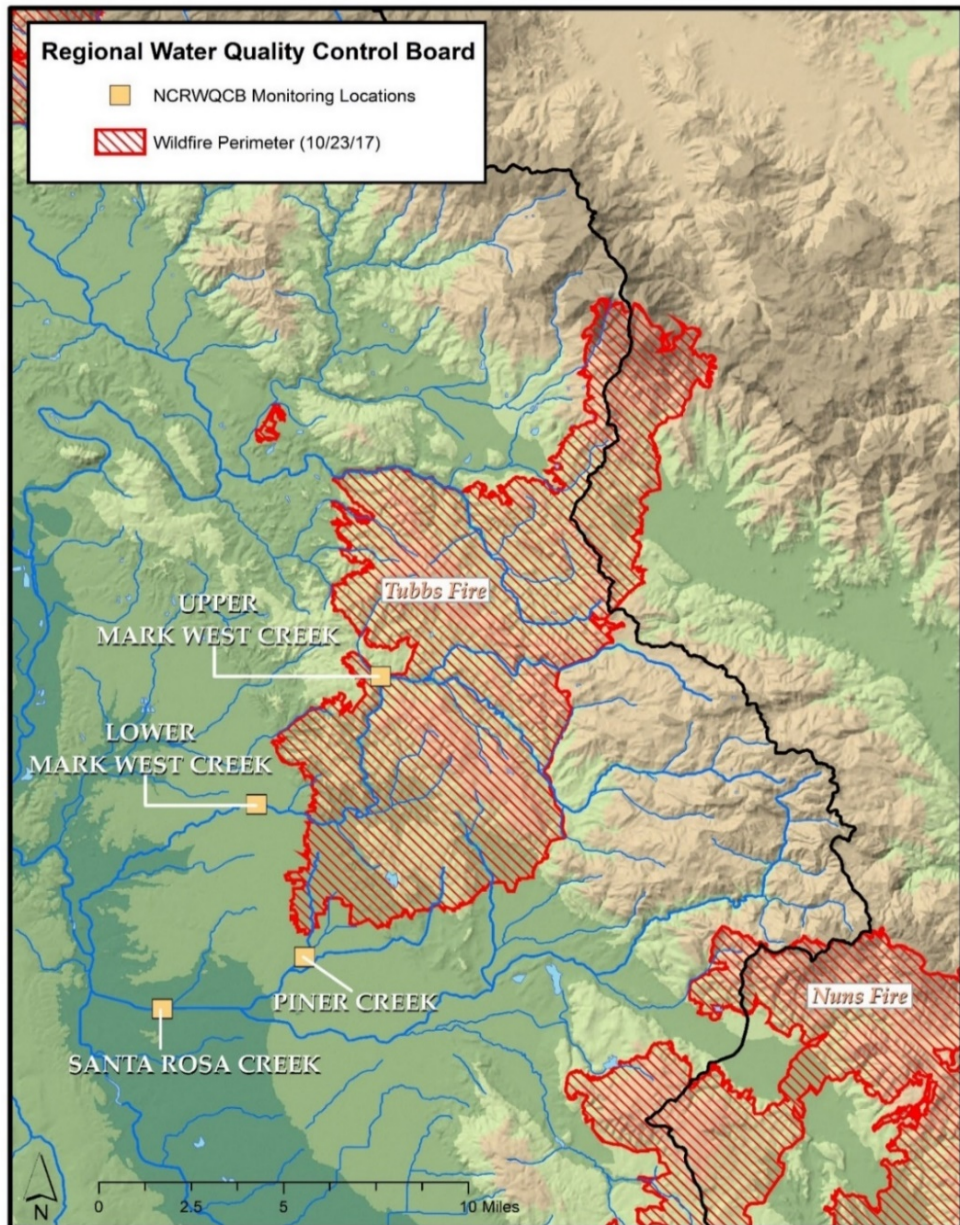
Overview (Winter 17/18)

- Water quality concerns
 - Public Health
 - Aquatic Life
- Primary objectives
 - Surface water characterization
 - Determine stormwater BMP effectiveness



Monitoring Plan

(Winter 17/18)



Monitoring Plan

(Winter 17/18)

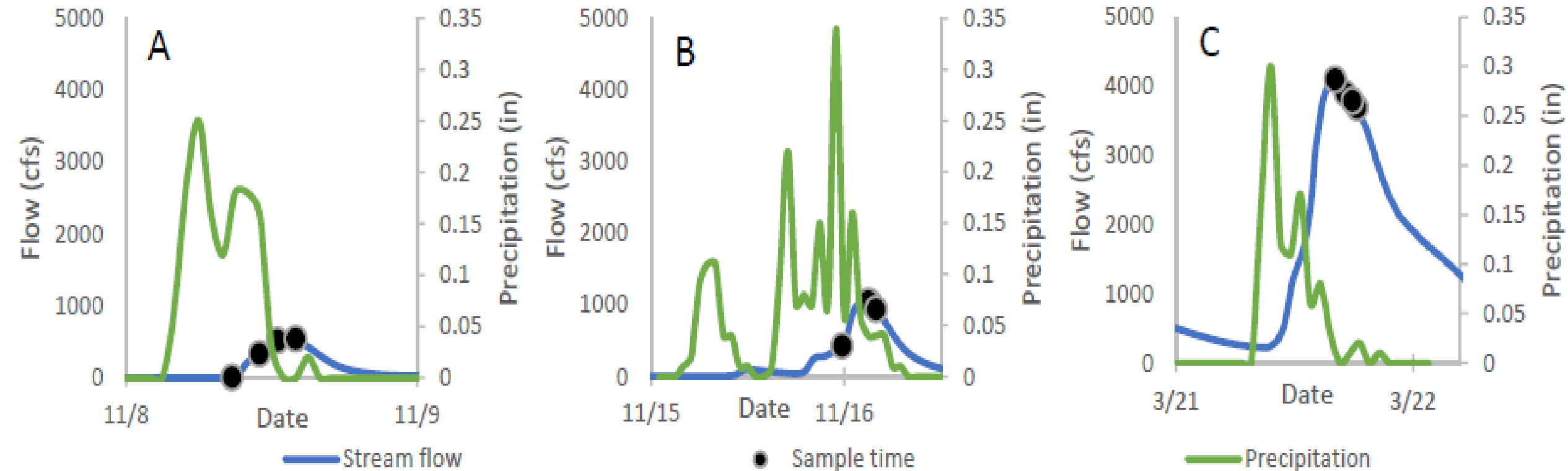


Figure 3. Hydrographs showing stream flow and precipitation vs. sample time for (A), a 1.36" storm on Nov. 8-9, (B), a 1.95" storm on Nov. 15-16, and (C), a 1.21" storm on March 22. Flow data was collected from the USGS flow gauge on Santa Rosa Creek at Willowside Road, USGS Gage #11466320. Precipitation data was collected from the Santa Rosa CalFire weather station.

Surface Water Monitoring Parameters (Winter 17/18)

Temperature	Nitrate	Aluminum	Manganese
Specific Conductance	Ammonia	Arsenic	Mercury
Dissolved Oxygen	Total Phosphorus	Cadmium	Nickel
pH	Total Organic Carbon	Chromium	Selenium
Turbidity	Hardness	Copper	Zinc
Total Suspended Solids	Alkalinity	Iron	PAHs
Total Dissolved Solids	Sulfate	Lead	Water Toxicity

- Nutrients
- Metals
- PAHs
- Water Toxicity

Missing: Sediment Toxicity

X indicates an applicable narrative objective

		<u>Water Quality Objectives</u>		
<u>Monitoring Parameters</u>		<u>Basin Plan Objective</u>	<u>Human Health Objective</u>	<u>Aquatic Life Objective</u>
Temperature		X	***	***
Dissolved Oxygen		6.0-9.0	***	8.0 mg/L
pH		6.5-8.5	6.5-8.5	6.5-9.0
Specific Conductance		250-320 Mho	900 ug/L	***
Turbidity		20% increase	1.0 ug/L	***
Alkalinity		***	***	20 mg/L
Hardness		***	***	***
Total Suspended Solids		X	***	***
Total Dissolved Solids		150-170 mg/L	250 mg/L	***
Total Organic Carbon		***	***	***
Aluminum		X	50 ug/L	87 ug/L
Iron		X	300 ug/L	1000
Cadmium		X	0.04 ug/L	0.80 ug/L
Chromium, Total		X	50 ug/L	57 ug/L
Copper		X	300 ug/L	2.7 ug/L
Lead		X	0.2 ug/L	0.54 ug/L
Manganese		X	50 ug/L	***
Nickel		X	12 ug/L	16 ug/L
Zinc		X	5 mg/L	36 ug/L
Arsenic		X	0.004 ug/L	150 ug/L
Selenium		X	30 ug/L	1.5 ug/L
Mercury		X	12 ng/L	12 ng/L
Nitrate		X	10 mg/L	***
Ammonia		X	30 mg/L	pH & Temp Dependent
Total Phosphorus		X	***	***
Sulfate		X	250 mg/L	***
PAHs		X	<i>varies</i>	<i>varies</i>
Chronic Toxicity - Water	<i>Pimephales promelas</i>	X		
	<i>Ceriodaphnia dubia</i>			
	<i>Capricornutum</i>			

Monitoring Results (Winter 17/18)

Conclusions

- No immediate threat to public health or aquatic life
- Some metals exceeded thresholds for aquatic life but were in historic range of concentrations observed during storm runoff
- No aquatic toxicity exhibited
- BMPs and debris removal prevented pollutants from entering waterways

Caveats

- Only third storm event suggests erosion

North Coast Regional Water Board Fact Sheet Available at:
https://www.waterboards.ca.gov/northcoast/water_issues/programs/swamp/



FACT SHEET

Santa Rosa Post-Fire Water Quality Monitoring

Tubbs and Nuns Fires

In October 2017, the Tubbs and Nuns Fires burned a combined 93,363 acres. This amounted to 8% land coverage of the Russian River watershed and 28.5% of the Laguna-Mark West Creek sub-watershed^{1,2}. More than 8,000 structures were damaged or destroyed, elevating the potential for toxics-laden runoff within these watersheds. Surface waters within and downstream of the Tubbs and Nuns Fires include impaired waterbodies, endangered species habitat, and source water for drinking water systems.



Figure 2. BMP controls installed downslope of a burned structure.

Surface Water Monitoring

Regional Water Board staff assessed potential impacts to surface waters downstream of burned areas by monitoring surface water quality. Samples were collected at four locations within the Mark West Creek watershed (Fig. 1). The first set of samples was collected on November 1st, prior to any storm events as a baseline dataset. Three subsequent sampling events were timed to collect samples in conjunction with storm runoff events on Nov. 8, Nov. 15 and March 22 (Fig. 3).

The State Water Board's Division of Drinking water coordinated with drinking water purveyors to ensure that drinking water was safe to drink. Tests conducted by the Sonoma County Water Agency and others reflected no issues with drinking water after the fire.

Post-Fire Pollutants

During storm events, surface waters may be affected as rain carries pollutants away from burned areas. Research shows that fire affected areas in Southern California contained increased concentrations of contaminants including nutrients (e.g. nitrates and phosphorus), polycyclic aromatic hydrocarbons (PAHs), copper, zinc, mercury, lead, and other metals^{3,4}. Several of these pollutants, especially metals, can be detrimental to human health and toxic to aquatic life. Many pollutants often attach to suspended particles and enter the water as runoff. Therefore, high flows can transport sediment bound pollutants to creeks and downstream to the Russian River. To minimize this transport of pollutants, Regional Water Board staff worked with local partners to implement post-fire best management practices (BMPs) in an effort to mitigate pollutants entering surface water during post-fire storm events (Fig. 2).

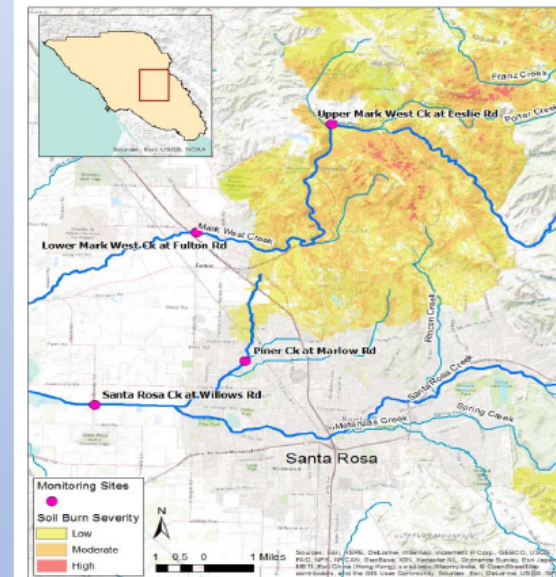
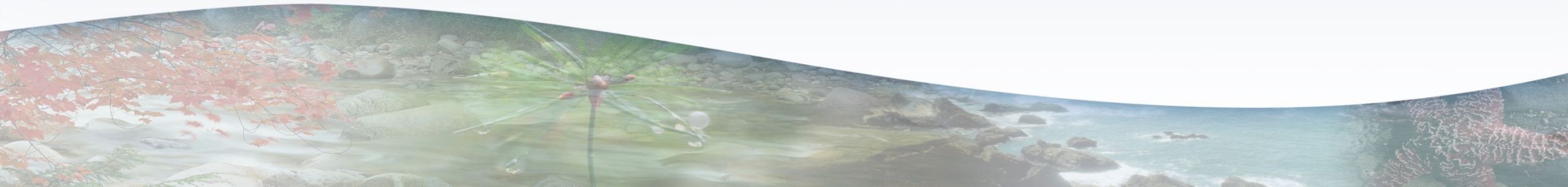


Figure 1. Post-fire water quality monitoring sites on Mark West Creek, Piner Creek, and Santa Rosa Creek.

Winter 18/19 Monitoring plans

- Seeking to secure contract for additional surface water monitoring
- Targeting larger storms
- Adding sediment toxicity monitoring
- Coordinate with federal, state, local, NGO partners





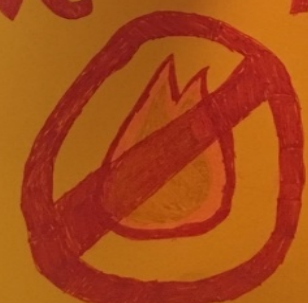
LOVE
W GUNS



THE LOVE
IN THE AIR
IS THICKER
THAN THE
SMOKE

FIREFIGHTERS
♥ KICK ♥
ASH

Thank You ♥ You're
First Responders True
HEROES

We ♥ You

2017 From: Sadie age:10