Camp Fire Water Quality Monitoring Response

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Background

- At the time of the Camp Fire the Central Valley Water Board was in the monitoring and remediation stages for the Carr and Mendocino Complex Fires.

- On November 28th Butte County Public Works & the Central Valley Water Board hosted a meeting to discuss potential post-fire water quality impacts.

- Multiple Federal, State and Local agencies were present at the initial meeting to discuss a rapid response to addressing adverse impacts to water quality.

Camp Fire Emergency Water Quality Monitoring Group

- Shortly after the initial water quality meeting in the end of Nov. 2018 the Central Valley Water Board & Butte County Public Works formed the Camp Fire Emergency Water Quality Monitoring Group.

- Butte County Public Works and NorthStar Engineering initial response provided valuable information in prioritizing monitoring site selection.
  - GIS mapping of known hazardous material storage.
  - Burn Structures and proximity to watercourses.
  - BMP installations around priority sites, such as destroyed trailer parks and commercial buildings.

- Monitoring sites were agreed upon by state and local agencies in regards to public safety, drinking water sources, & fisheries.

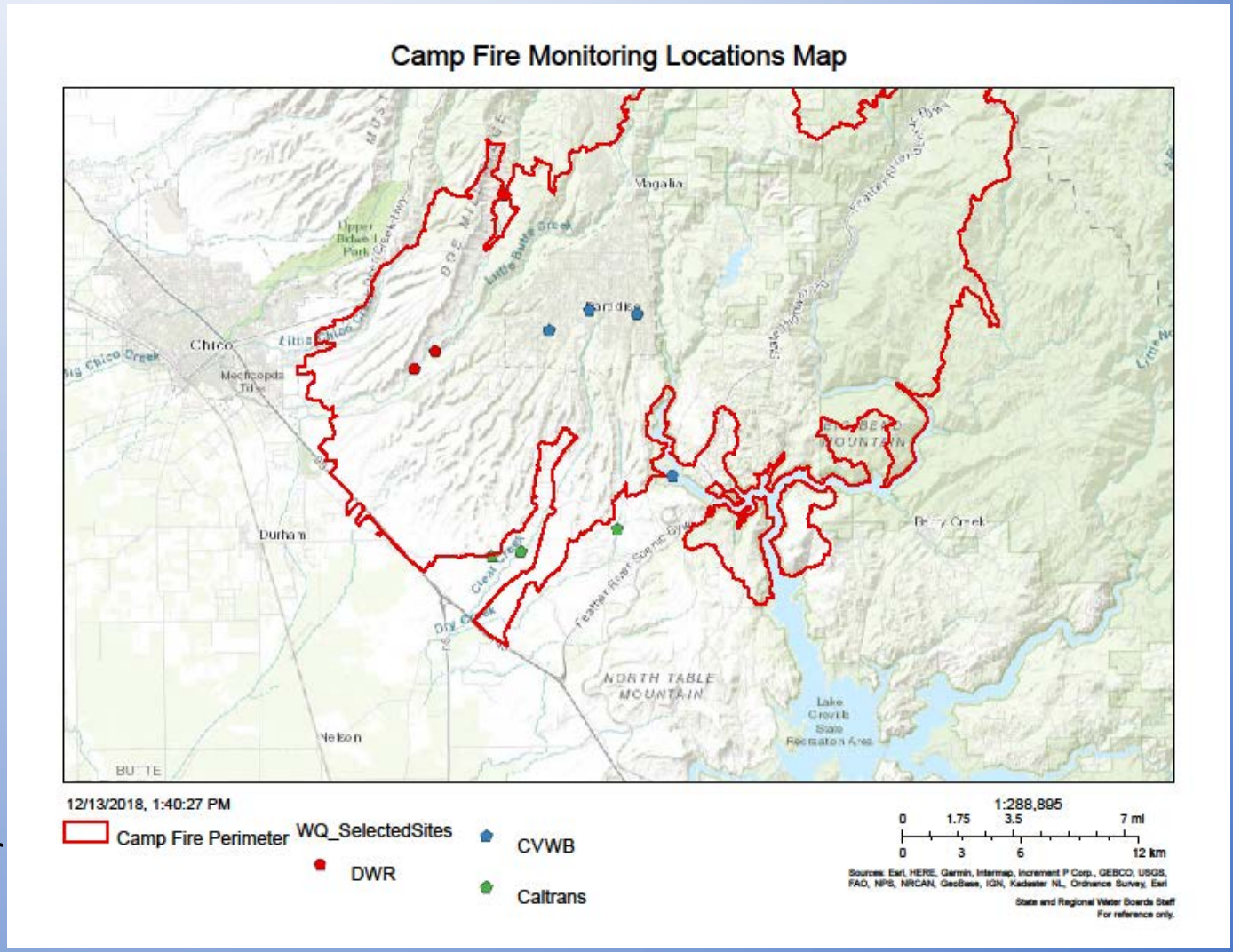
- Central Valley Water Board and the Department of Water Resources teamed up agency resources to fund lab analysis and data collection.
  - Caltrans and NorthStar Engineering also dedicated staff for sampling efforts.

- Department of Water Resources Operations and Maintenance (Lake Oroville) implemented a separate but similar monitoring program on the West Branch & North Fork of the Feather River and Lake Oroville.

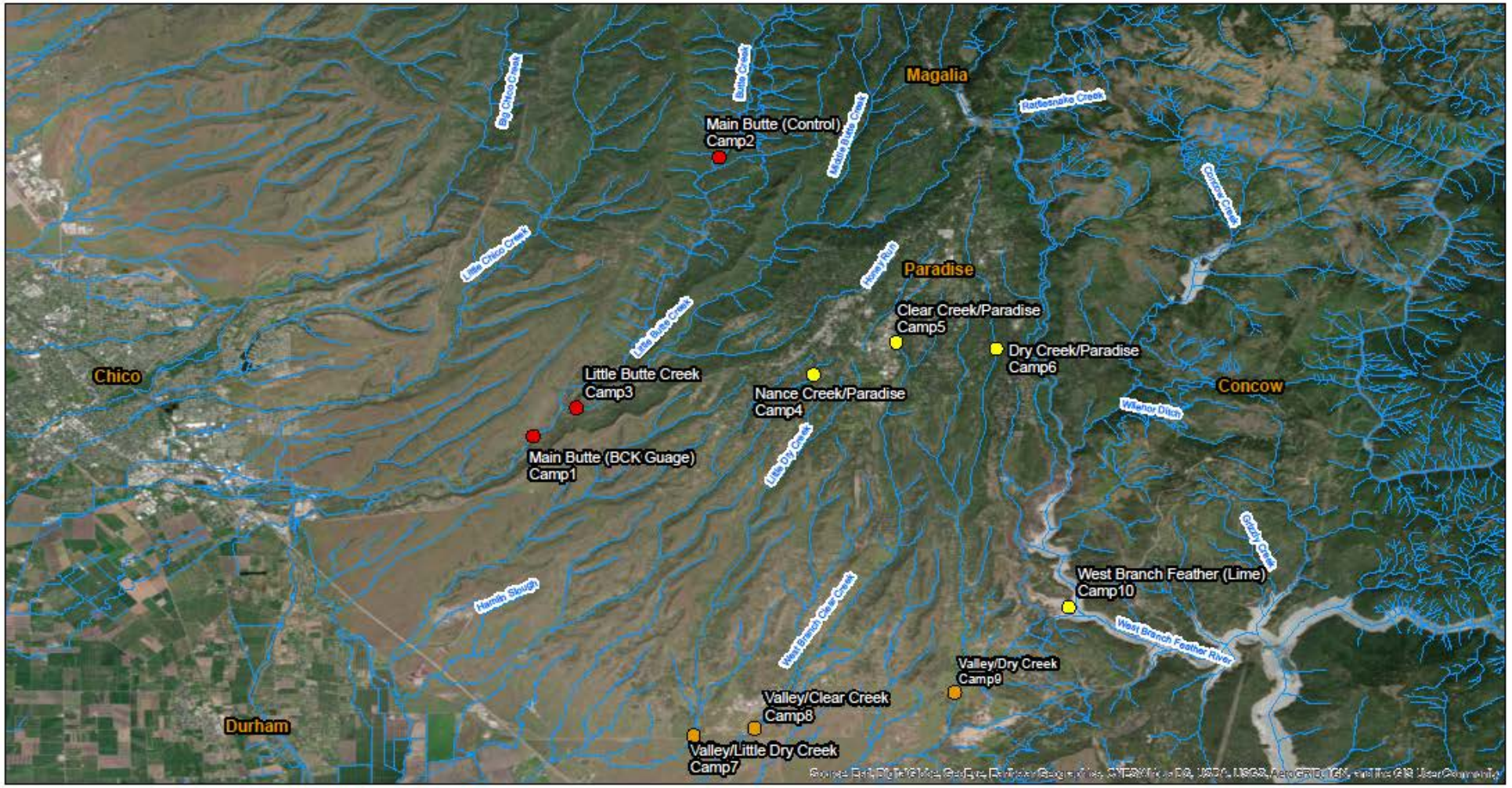
Camp Fire Water Quality Monitoring

10 Sites were established

- Butte Creek
  - 3 sites
    - -Two on Mainstem (one control)
    - -One on Little Butte Creek (Drains Lower Magalia)
- Paradise
  - 3 sites
    - -Hamlin Creek (Industrial/residential)
    - -Clear Creek (Industrial/residential)
    - -Dry Creek (residential)
- Valley
  - 3 sites
    - -Little Dry Creek (Industrial/residential)
    - -Clear Creek (Industrial/residential)
    - -Dry Creek (residential)
- West Branch Feather River
  - Lime Saddle Marina (Del Oro Drinking Water Intake)



CAMP WQSites



Legend

- Team 1-DWR
- Team 2-CVWB SWAMP Rancho
- Team 3-Caltrans

Map Prepared By: Marisol Gonzalez
Engineering Geologist
Central Valley Regional Water Quality Control Board

0 1.25 2.5 5 Miles

Date: 1/17/2019

Constituents Analyzed

- Post-fire WQ sampling constituents were developed during the Carr Fire.
- Same constituents were used for the Camp Fire monitoring.
- Nutrients, Total Metals, Dissolved Metals, & polycyclic aromatic hydrocarbons (PAHs), along with other water quality parameters.

Constituents
Nutrients: Nitrate, Nitrite, ammonia, TKN, orthophosphate (as P), Total P
Metals (total): Cu, Zn, Cd, Hg, Pb, As, Al, Fe, Se, Mn, Ni, Cr
Metals (dissolved): Cu, Zn, Cd, Hg, Pb, As, Al, Fe, Se, Mn, Ni, Cr
PAHs (EPA 8270)
TOC, TSS, TDS, Turbidity, Specific Conductance, Alkalinity, Hardness, Sulfate, Settleable Solids
Field Measurements: pH, turbidity, flow, EC, temperature, DO

Sampling and Results

- 6 total sampling events to date
  - December 12th, 2018
  - January 9th, 2019
  - January 17th, 2019
  - February 26th, 2019 (Heaviest Event)
  - March 27th, 2019
  - May 15th, 2019 (results pending)

- Compared our results to:
  - Primary maximum contaminant levels (MCLs)
  - Secondary MCLs
  - Human Health Threshold (PAHs)
  - Aquatic Life Threshold
  - Agriculture Threshold
- Sampling Events were timed using the Butte Creek USGS gauge downstream of Honey Run Covered Bridge

December 12th, 2019 Event

- Moderate rain event
  - >1 inch/24hrs
  - Sampling occurred after storm event.
- Turbidity
  - Not elevated to a level of concern
- Metals
  - Primarily low concentrations except Aluminum (AL) above primary MCL.
- PAHs
  - Non detect

January 9th, 2019 Event

- Moderate to strong rain event
  - 3 day storm cycle, >1inch/24rs
  - Sampling occurred on the falling limb of the hydrograph.
- Turbidity
  - Not elevated to a level of concern.
- Metals
  - Al and Antimony (Sb) above primary MCL
  - At 4 sites on tributaries located in Paradise and Lake Oroville
- PAHs
  - Detected above Human Health Threshold at all Camp Sites except Clear Creek.

January 17th, 2019 Event

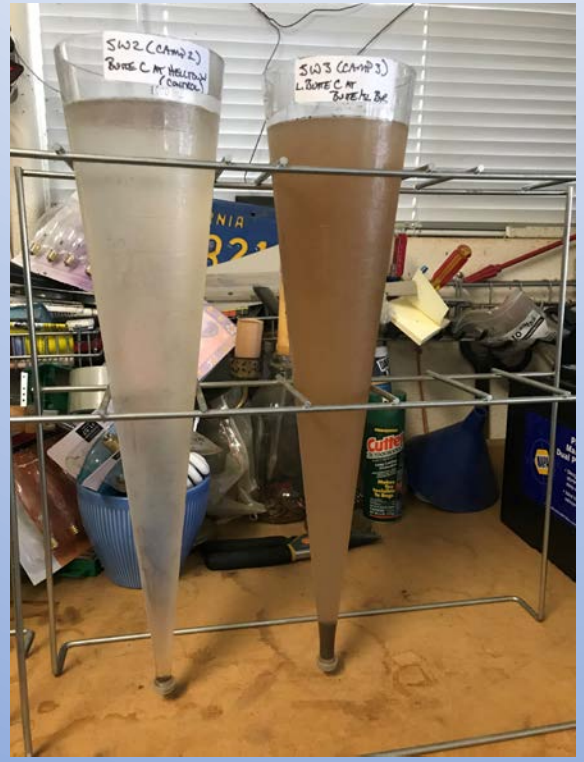
- Strong rain event
  - >1 inch/24hrs
  - Sustained heavy rain event, enough to trigger overland flow
- Turbidity
  - Not elevated to any concern
- Metals
  - Al detected above primary MCL in 5 sites
- PAHs
  - Less numerous in detections and only observed in Butte Creek Sites and Hamlin Creek above the Human Health Thresholds

February 26th, 2019 Event

- Prolonged strong storm event
  - Multiple day event >1-1.5 inch/24hrs
  - Sampling occurred during peak flows.
- Turbidity
  - Elevated turbidity (69.2-970 NTU)
  - Observed overland flow
- Metals
  - Al above primary MCL's
- PAHs
  - No detections at any of the sites
- Dilution likely a factor

Butte Creek Control (Mainstem Butte Creek) Vs. Camp 3 (Little Butte Creek)

- Control Site (Camp 2)
  - 69.2 NTU
- Little Butte Creek (Camp 3)
  - 970 NTU
- Mainstem (Camp 1)
  - 348 NTU



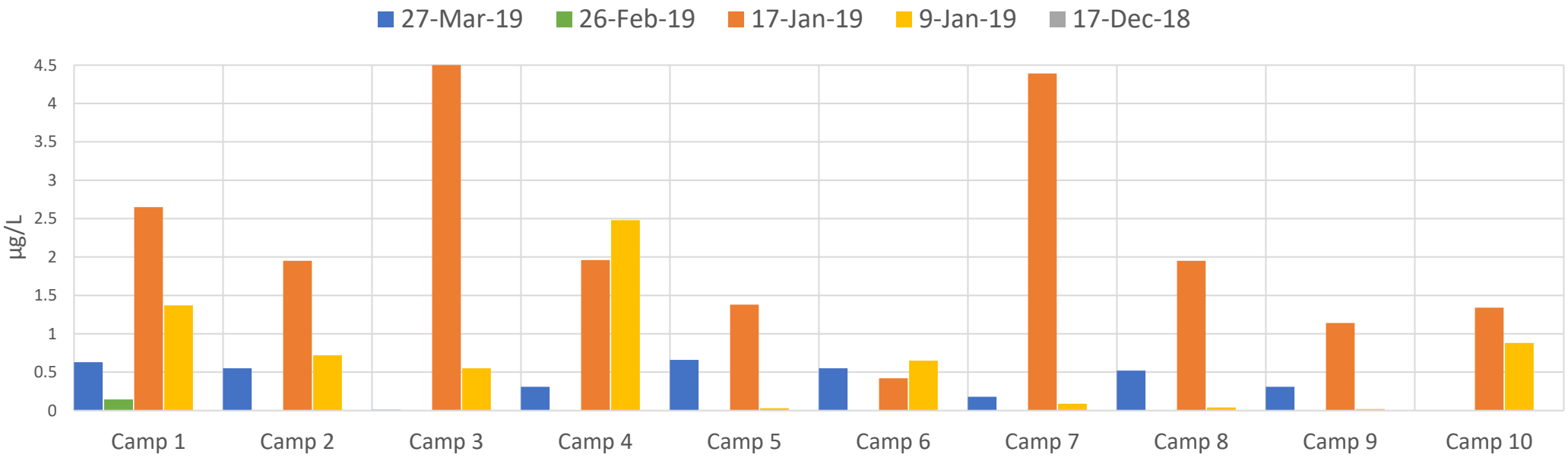
March 27th, 2019 Event

- Moderate to strong storm event
  - 0.5-1inch/24hrs
  - Prolonged storm event (5 days)
  - Sampling occurred on the rising limb of the hydrograph.
- Turbidity
  - Not elevated to concerning levels
- Metals
  - Aluminum, Antimony, Cadmium, Lead, and Selenium were observed over primary MCL's
  - Primarily observed on watercourses that flow out of Paradise
- PAHs
  - Detected above Human Health Threshold at all Camp Sites, except Camp 3 (Little Butte Creek).

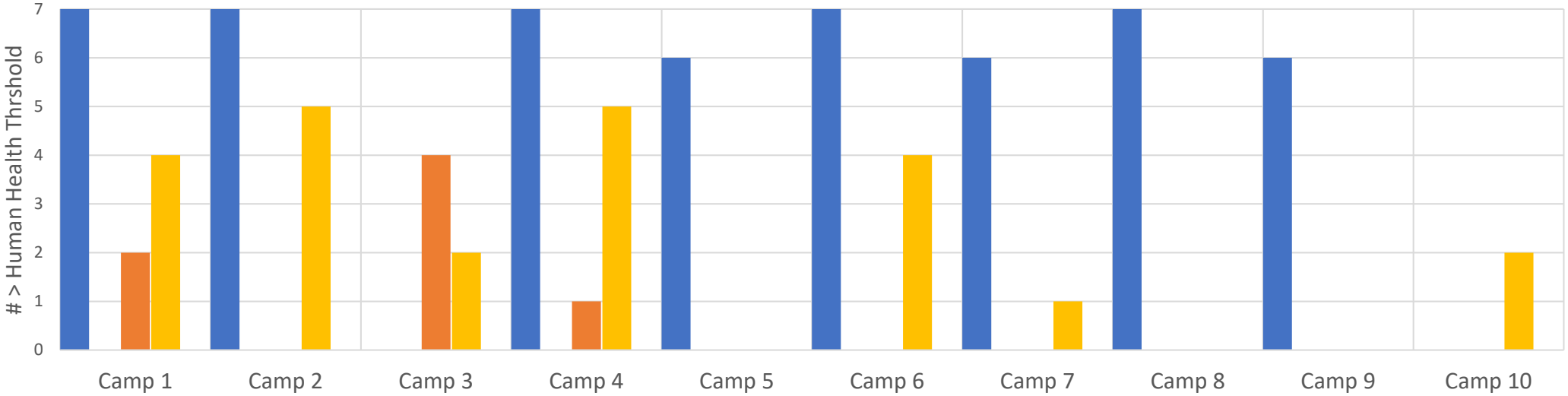
May 15th, 2019 Event

- Goal was to sample on a dry day….
- Weak to moderate storm event
- Collected sediment and water toxicity
  - Mainstem Butte Creek
  - Three sites in Paradise
  - One site in valley (Clear Creek)/(Water Toxicity)
  - Two sites in Concow (Sediment)
- Results are still pending

Camp Fire PAH Results: Sum PAHs



Camp Fire PAH Results: # > Human Health Thresholds



Camp Fire Water Quality Monitoring Future

- Central Valley Water Board and Department of Water Resources, Northern Region are partnering to propose up to two years of additional monitoring.
- Agencies are also looking at potential long term groundwater monitoring.
- Continue to provide the public pertinent information in regards to post-fire water quality.
- Continue to work together with all partnering agencies to address issues within the impacted watersheds.

Discussion/ Questions