

# CAMERON PEAK FIRE WATER QUALITY AND WATERSHED RESPONSE

## LARIMER COUNTY

**Andrew Schwartz**  
Samuel Struthers  
Isabel McPherson  
Anika Pyle  
Chloe Miller  
Kyla M. Davis

Lead Mentor  
Mentor  
Mentor  
External Mentor  
Extension Agent

### What is ROSSyndicate?

The Poudre Watershed supplies water to over 300,000 users and thousands of acres of agricultural land. Historically, the Poudre River has experienced brief episodes of seasonal water quality degradation during the warm summer months. These degradations are suspected to be caused by periodic algal blooms cultivated in high elevation reservoirs.

The 2020 Cameron Peak Fire burned 44% of the headwaters that feed the river's high-elevation reservoirs. **Radical Open Science Syndicate (ROSS)** aims to research the impact of post-fire mobilized nutrients on algal growth in reservoirs and how these changes affect downstream water quality.

ROSS creates decision-making tools to help water managers make informed choices about their water supplies to protect water quality



(Figure 1, 600 series Sonde at Pennock Creek)

### Internship Goals

- 1) Develop technical skills related to water quality monitoring
- 2) Obtain experience using *in situ* water quality data and radio telemetry devices
- 3) Develop wet lab processing skills
- 4) Develop experience using statistical programming languages (R)

### Application

- **Fish, Wildlife, and Conservation Biology**, dual concentrating in Conservation Biology and Fisheries and Aquatic Sciences



(Figure 2, Taking grab samples at Chambers Reservoir)

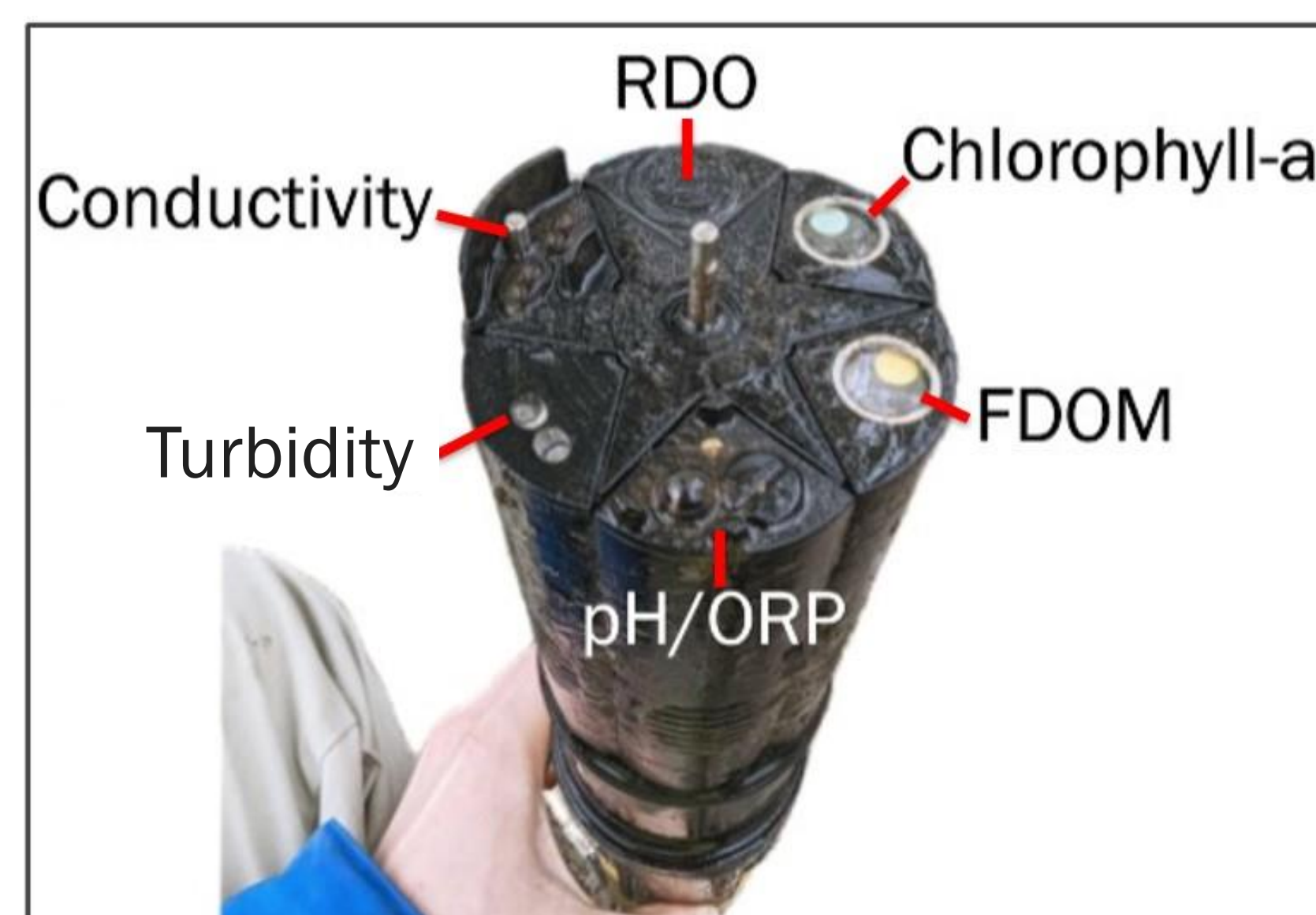
- My ROSS internship offered a deeper understanding of our local watershed systems and provided valuable insight into the behind-the-scenes aspects of water monitoring and treatment.
- I would like to remain involved in research that addresses ongoing environmental threats and changes

### Laboratory/Field Work

**Water Sample Collection:** A significant part of my duties as a ROSS Intern involved collecting grab samples from our upper 29 established sampling sites. These samples are then transported to the USFS RMRS Biogeochemistry Lab for processing. During each site visit, I collected three water samples, each of which is used to measure different water chemistry parameters at the instant of collection:

1. The first bottle is used to measure the total mass of suspended sediment in the stream
2. The second bottle is used to measure how green the water is
3. The third bottle is used to measure the concentrations of dissolved carbon and nitrogen, nutrients, major ions, and other standard chemical constituents

**Sensor Maintenance:** There are 10 sensor units installed in the upper network that continually monitor water conditions 24 hours a day, 7 days a week. These sensor units, known as 'Sondes,' require frequent cleaning, troubleshooting, software updates, and calibrations to log the most accurate data. Each of ROSS's sondes measures multiple parameters:

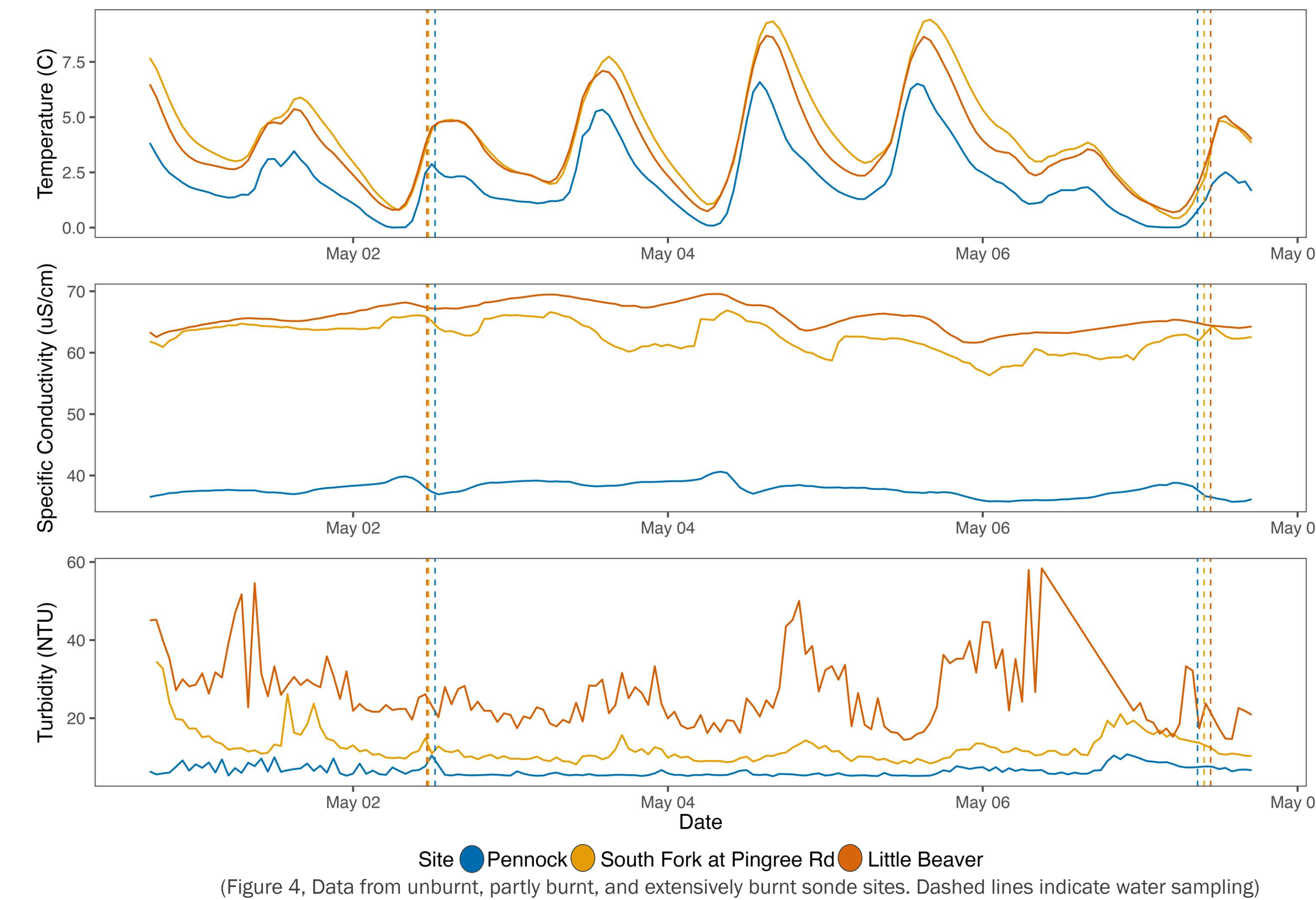


(Figure 3: Aqua Troll 700 series sensor breakdown)

**Wet-Lab:** This internship introduced me to multiple introductory lab duties, primarily revolving around preparing samples through filtration and fluorometry. Samples were then fully analyzed by the USFS RMRS Biogeochemistry lab managers.

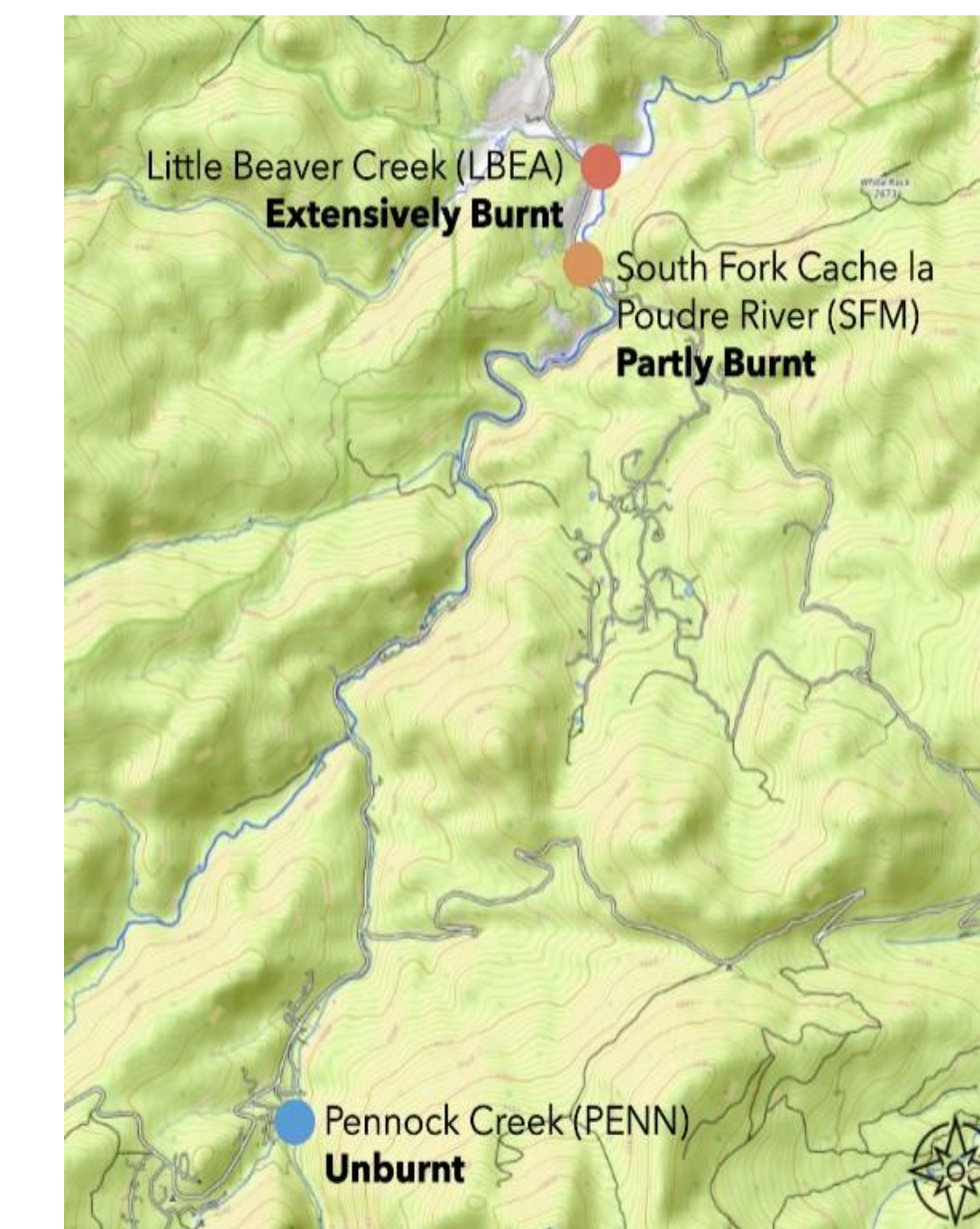
**Data Verification:** To ensure data accuracy from the sondes, we compare each parameter with readings from correlated sensors or nearby sondes.

### Sensor Data Examples



(Figure 4, Data from unburnt, partly burnt, and extensively burnt sonde sites. Dashed lines indicate water sampling)

Shown above in *Figure 4* is data from sondes installed at three proximate streams: Pennock Creek (unburnt), South Fork Cache la Poudre River (partly burnt), and Little Beaver Creek (extensively burnt). The locations of these three sites are shown to the right in *Figure 5*.



(Figure 5, Locations of "Figure 4" sensor data)

A general observation across all three sites is that the more burnt the surrounding environment, the higher the temperature, turbidity, and specific conductivity is within the water.

As shown in *Figure 4*, certain environmental events, such as the one around May 5th, appear to have more significant effects on turbidity in extensively burnt sites than in unburnt sites, with partly burnt sites showing intermediate conditions.

### Acknowledgments

A special thank you to my supervisor, Samuel Struthers, and my coworker, Chloe Miller. They are incredibly knowledgeable about our local watershed, and it is a delight to spend entire days with them and absorb some of their knowledge and experience in the field of watershed science.