

## BACKGROUND

- During the summer of 2018, the 416 Fire burned 54,000 acres in southwest Colorado.



- Ash and sediment delivered from the burn area during storm events and debris flows raised concerns about impacts to water quality and aquatic life in Hermosa Creek and the Animas River.

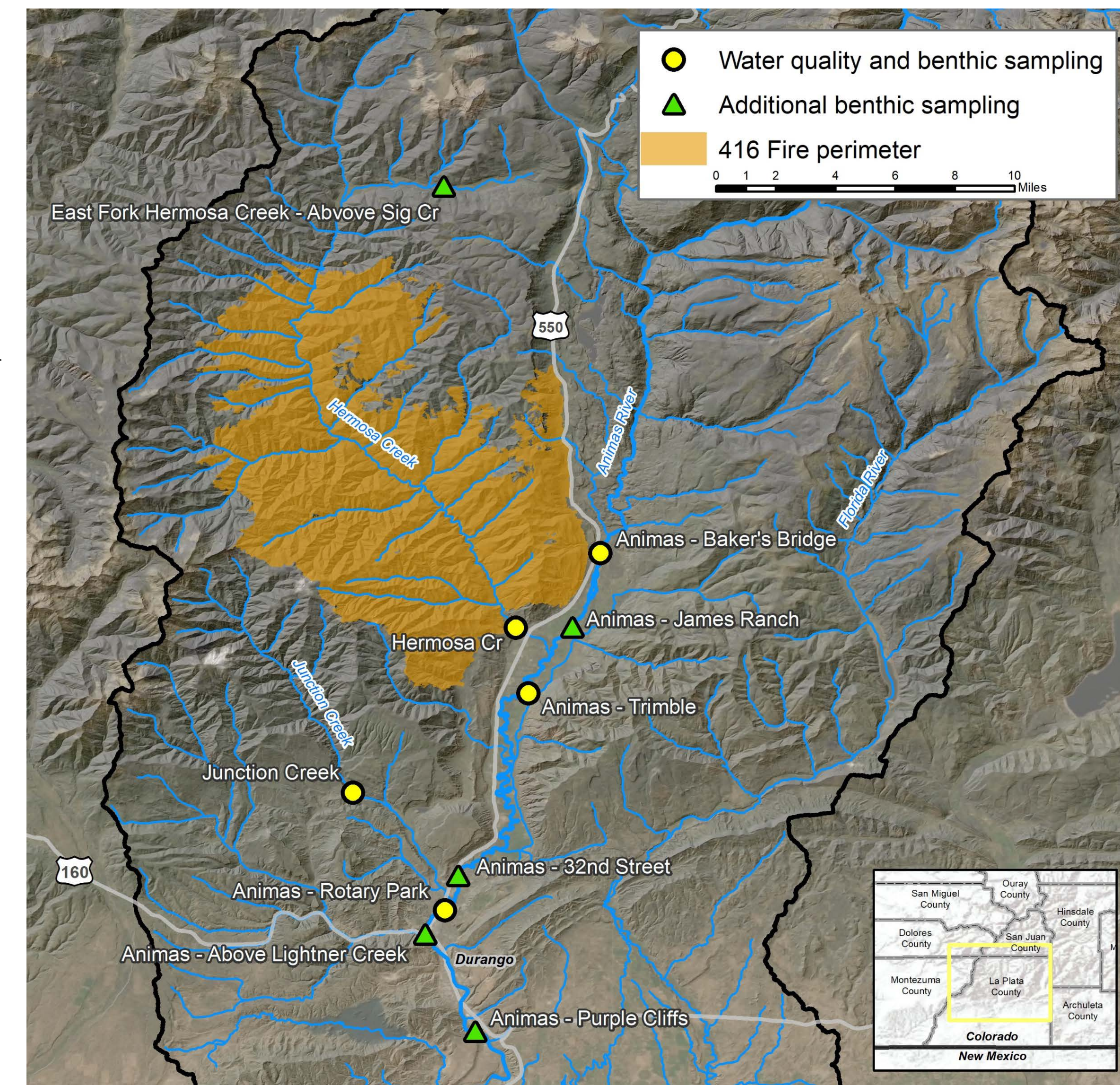


## RESEARCH QUESTIONS

- What impact did the 416-Fire have on Animas River water quality and aquatic life?
- How long will these impacts persist?

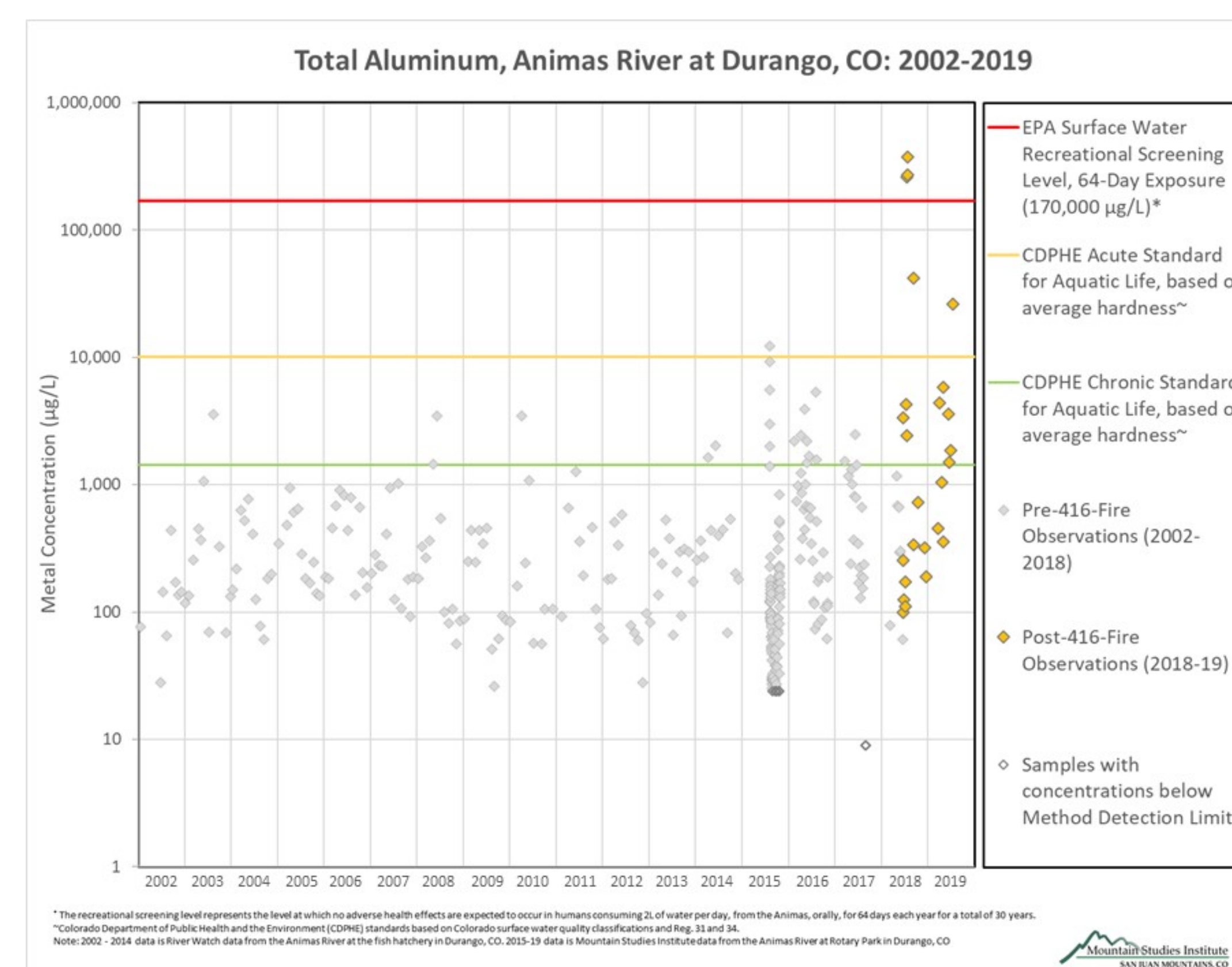
## METHODS

- *Water Quality:* We monitored post-fire water quality at five locations using *in-situ* instruments and grab samples during varying hydrological conditions including low-flow, spring runoff and storm events. Samples were analyzed for trace metals, nutrients, sediment, and dissolved organic carbon.
- *Aquatic Insects:* We collected post-fire benthic macroinvertebrate community samples from locations upstream and downstream of the burn area.
- Post-fire data were compared to pre-fire data.

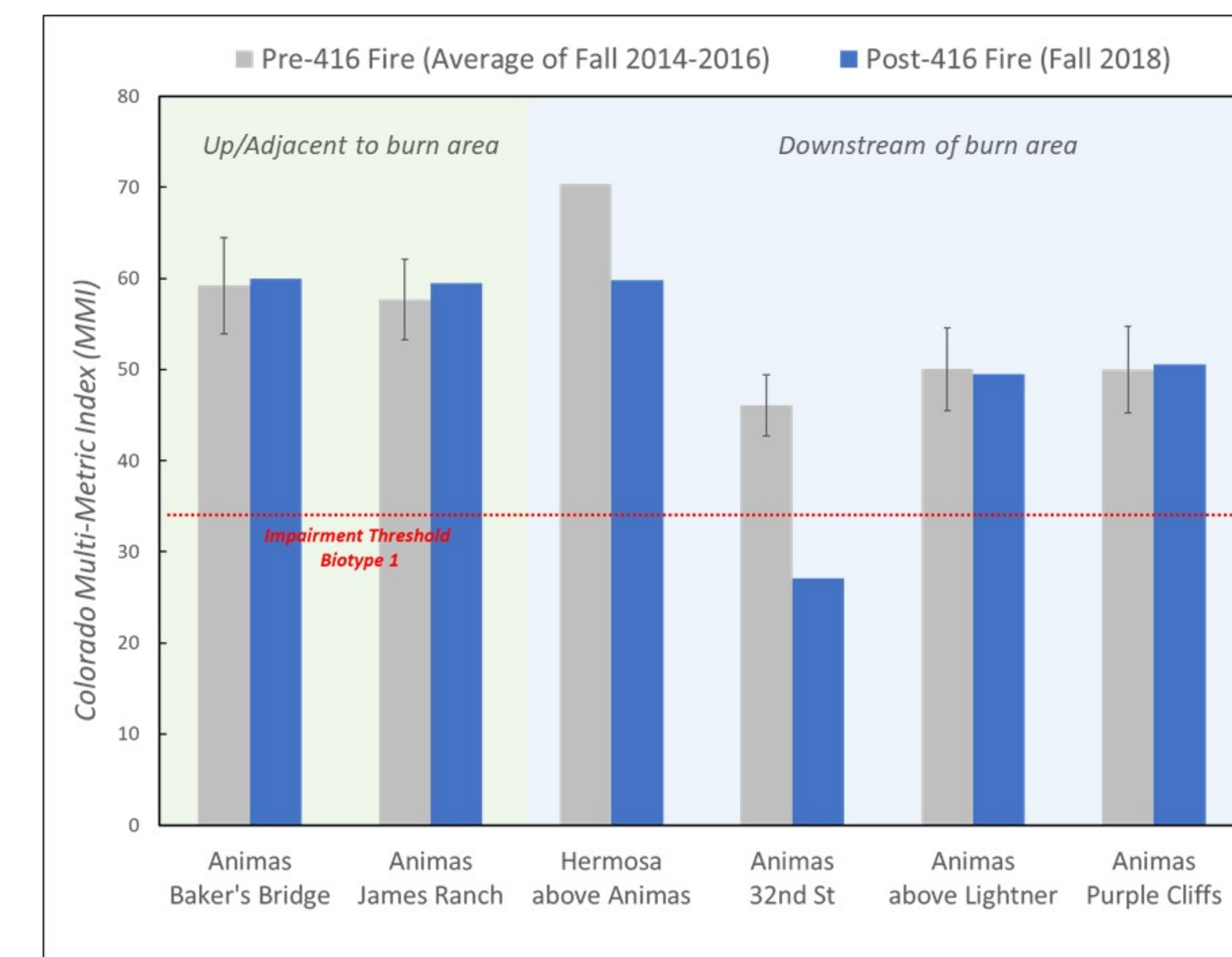


## RESULTS

- Results from one year after the fire demonstrate that:
  - Runoff from the 416-burn scar during storm events caused elevated levels of nutrients, sediment, and metal concentrations. Levels of sediment likely were high enough to inhibit fish and insect gill function and smother habitat. Levels of aluminum, iron, and mercury were high enough to be of concern for aquatic life. Average total aluminum, iron, and lead increased by 54, 38, and 11-fold respectively following the fire.
  - Aquatic insect communities in closest downstream proximity to the burn area had reduced diversity and a shift in community composition toward taxa more tolerant of sediment.



Pre- and Post-fire Aluminum



Pre- and Post-fire benthic macroinvertebrates

## CONCLUSIONS

- During storm events following the 416 Fire, we detected levels of total aluminum, iron, manganese, and mercury that were unprecedented in the almost twenty year water quality record for the Durango reach of the Animas River, including the 2015 Gold King Mine release.



- Signs of recovery are evident one year after the fire. Levels of most contaminants were lower in 2019 compared to immediately after the fire in 2018. The wet winter of 2018/19 resulted in a strong prolonged spring runoff period which flushed sediment and re-exposed cobble/pebble habitat that was present before the fire and is favored by aquatic life.
- Our continued research will focus on recovery and assess potential bioaccumulation of metals in aquatic insects.

## ACKNOWLEDGEMENTS

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