

# THE EFFECT OF LOSS OF BEAVERS AND THEIR PONDS ON FINE SEDIMENT TRANSPORT ALONG THE COLORADO RIVER, ROCKY MOUNTAIN NATIONAL PARK

**Ava Becker-Church**

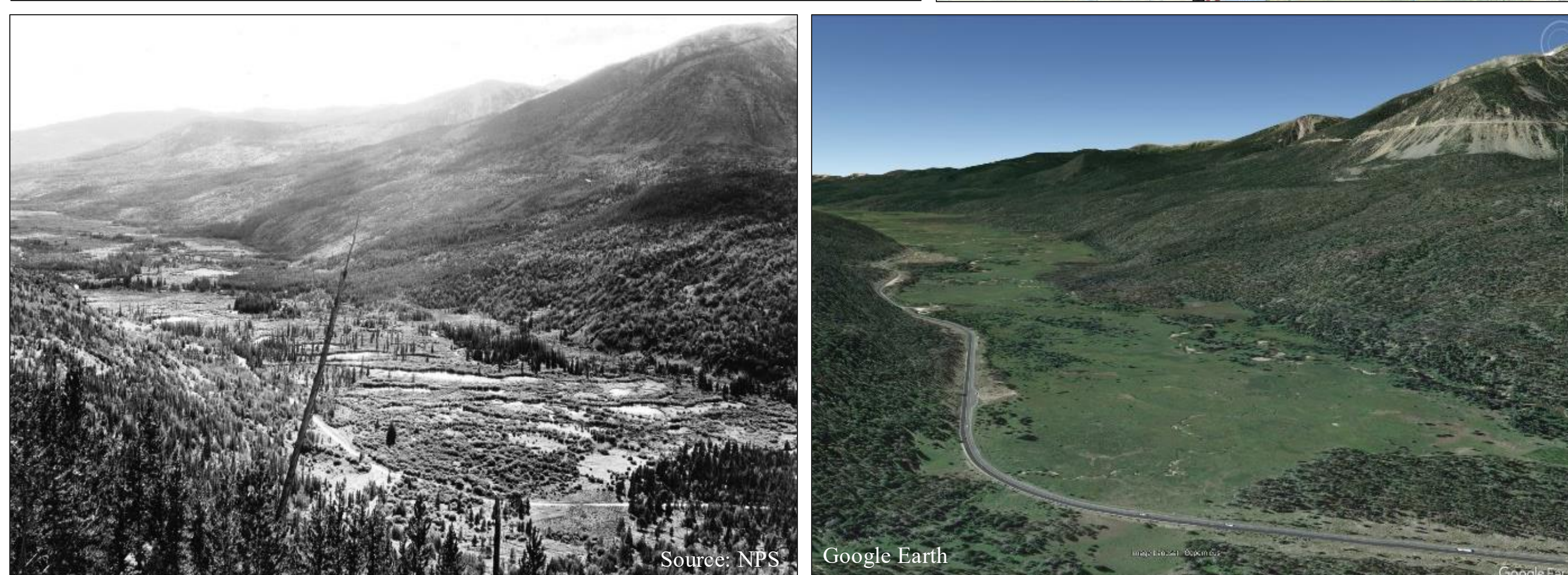
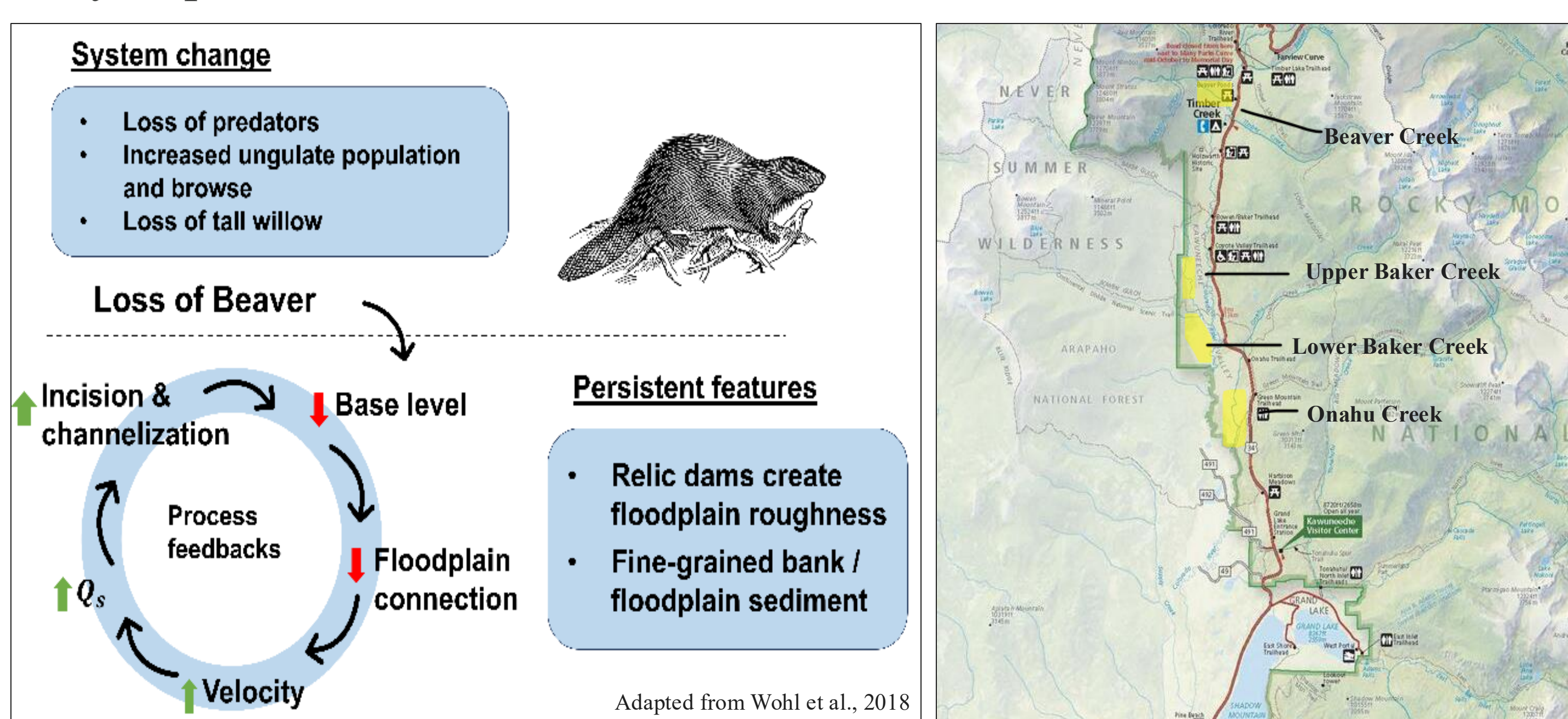
Mentor: Sara Rathburn

Field Partner: Itai Bojdak-Yates

Internship funded by the Spalding Family

## PROJECT INTRODUCTION

High concentrations of nutrients and fine sediment are entering reservoirs in Grand County, CO. It is hypothesized that the fine sediment derives from bank erosion and channel incision upstream on the Colorado River in Rocky Mountain National Park associated with groundwater table declines due to the loss of beaver dams and the ponds they impound.



Upper Colorado River in the Kawuneeche Valley, Left: 1920, Right: 2019

## INTERNSHIP GOALS

Assisting the Kawuneeche Valley Restoration Collaborative (KVRC) in monitoring channel restoration and collecting baseline data on tributaries of the Upper Colorado River to improve ecosystem function and water quality.

## EDUCATION APPLICATION

I am currently pursuing my master's degree in Civil and Environmental Engineering at CSU and want to work on river restoration in the future. Getting experience in the field has been important for me to understand the big picture behind the hydrology, hydraulics, and river mechanics fundamentals I learned in undergrad.

## SUMMER FIELD WORK

- Monitoring the effectiveness of beaver mimicry structures
  - surveying inundation at high and low flow
  - measuring long profiles for pre and post restoration sites
  - gauging the inflow and outflow
  - quantifying volume of trapped sediment
- Collecting data for other streams to prepare for future restoration

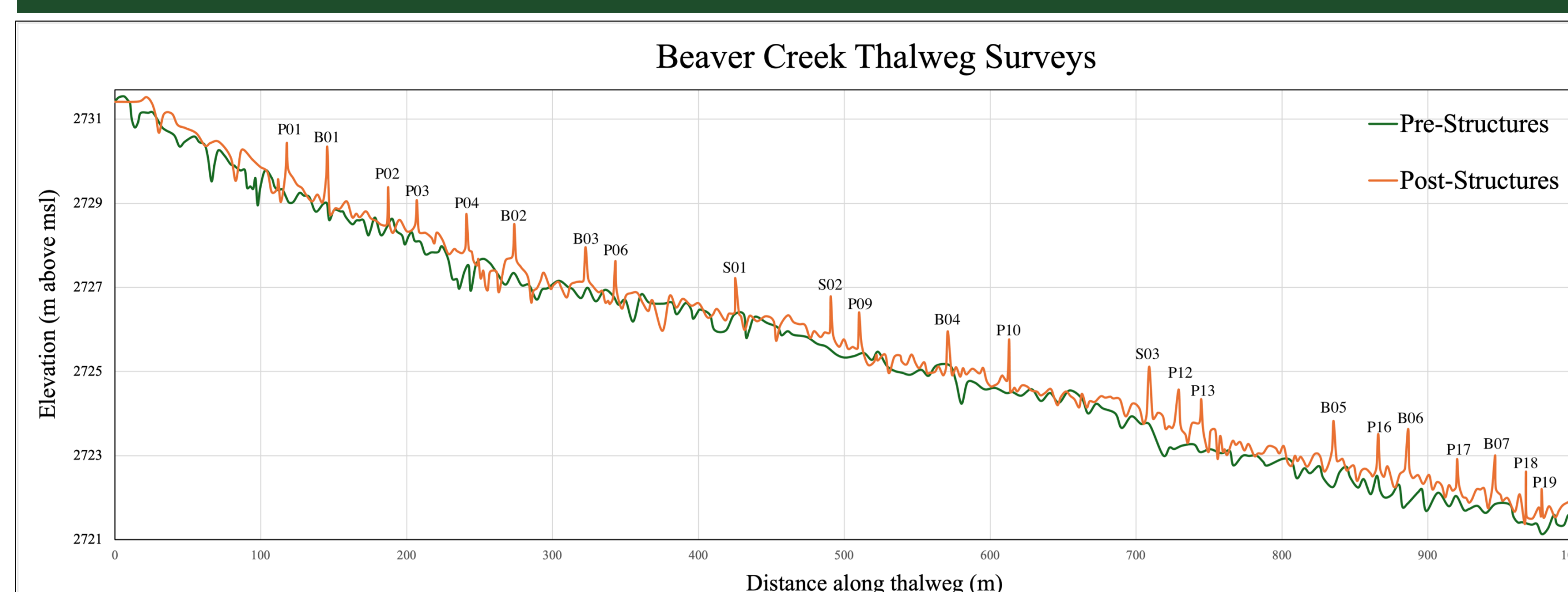
## INUNDATION SURVEY RESULTS



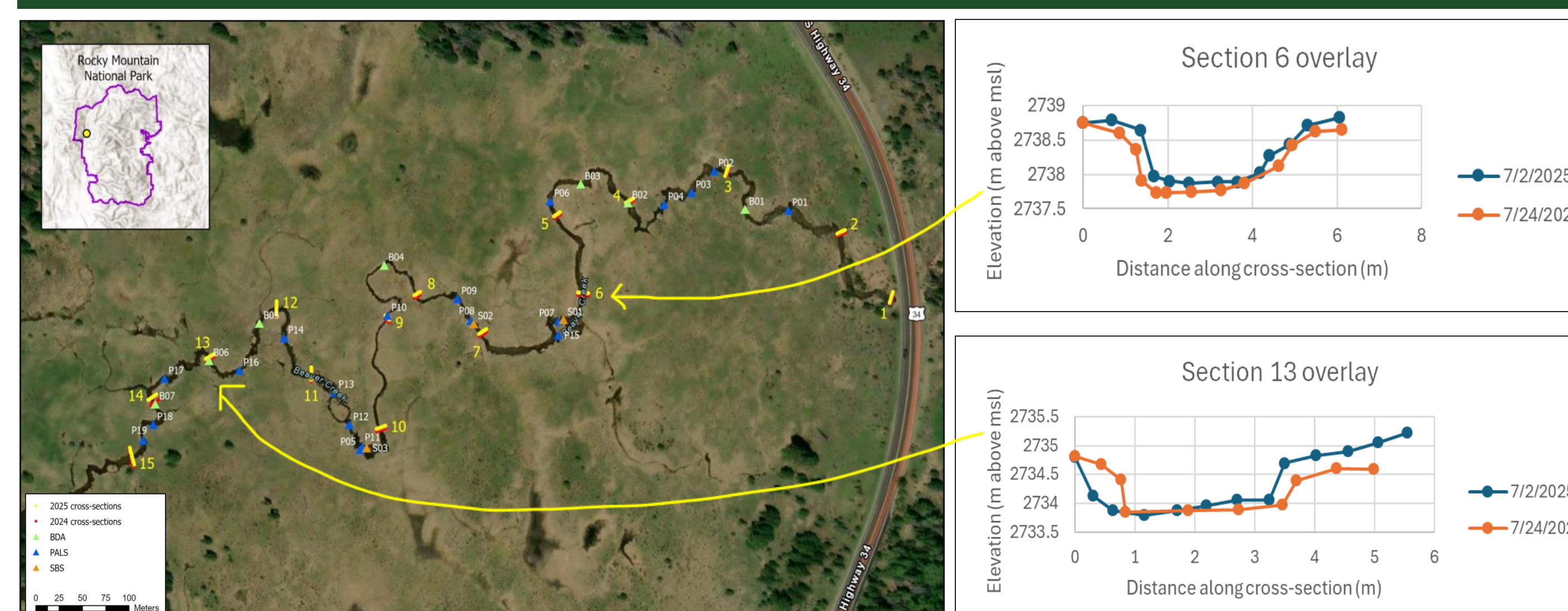
High Flow  $Q = 28.75$  cfs  
Inundated Area: 12875 meters<sup>2</sup>

Low Flow  $Q = 2.05$  cfs  
Inundated Area: 3348 meters<sup>2</sup>

## THALWEG SURVEY RESULTS



## CROSS SECTION SURVEY RESULTS



## TAKEAWAYS

- Structures were successful at pushing water onto the floodplain.
- Post-construction elevations were consistently higher than pre-construction, indicating deposition of sediment upstream from structures on Beaver Creek.
- ~5.00 cm/m of sediment aggradation along the thalweg.

## NEXT STEPS

- Continue monitoring at the Onahu and Baker Creek sites for upcoming restoration.
- Finalize the placement locations for the structures on Onahu Creek and plan for installation in 2026.
- Synthesize summer 2025 data for a monitoring report.

Right: KVRC meeting at Onahu Creek to discuss placement of future structures



## FUN IN THE FIELD



## REFERENCES

Wohl, E., Lininger, K., and Scott, D., 2018, River beads as a conceptual framework for building carbon storage and resilience to extreme climate events into river management: Biogeochemistry 141:365-393.