AG + OPEN SPACE
SONOMA COUNTY

LAND FOR LIFE

Development of Riparian Maps for Sonoma County

Long Term Riparian Corridor Conservation

Mark Tukman & Dylan Loudon | **Tukman Geospatial**

- **Mark**
  - Background on functional riparian mapping
- **Dylan**
  - Data products
  - Methods
  - Challenges
  - Next steps

Functional Riparian Ecosystems

- small % of landscape
- moist environment in Mediterranean climate
- conduit for movement of terrestrial and aquatic organisms
- ¾ of the amphibians and ½ of the reptiles in California
- resident and migratory bird species
- critical for supporting salmonids

Functional Riparian Ecosystems

Multiple benefits

- Biodiversity
- Drought & climate resiliency
- Water quality & supply
- Flood attenuation
- Recreation & scenic value

Floodplain Riparian Forests:
95% Loss
Since European Settlement

Conservation Prioritization | Riparian Corridors

We need to conserve this essential riparian habitat, but first we need to know where it is!

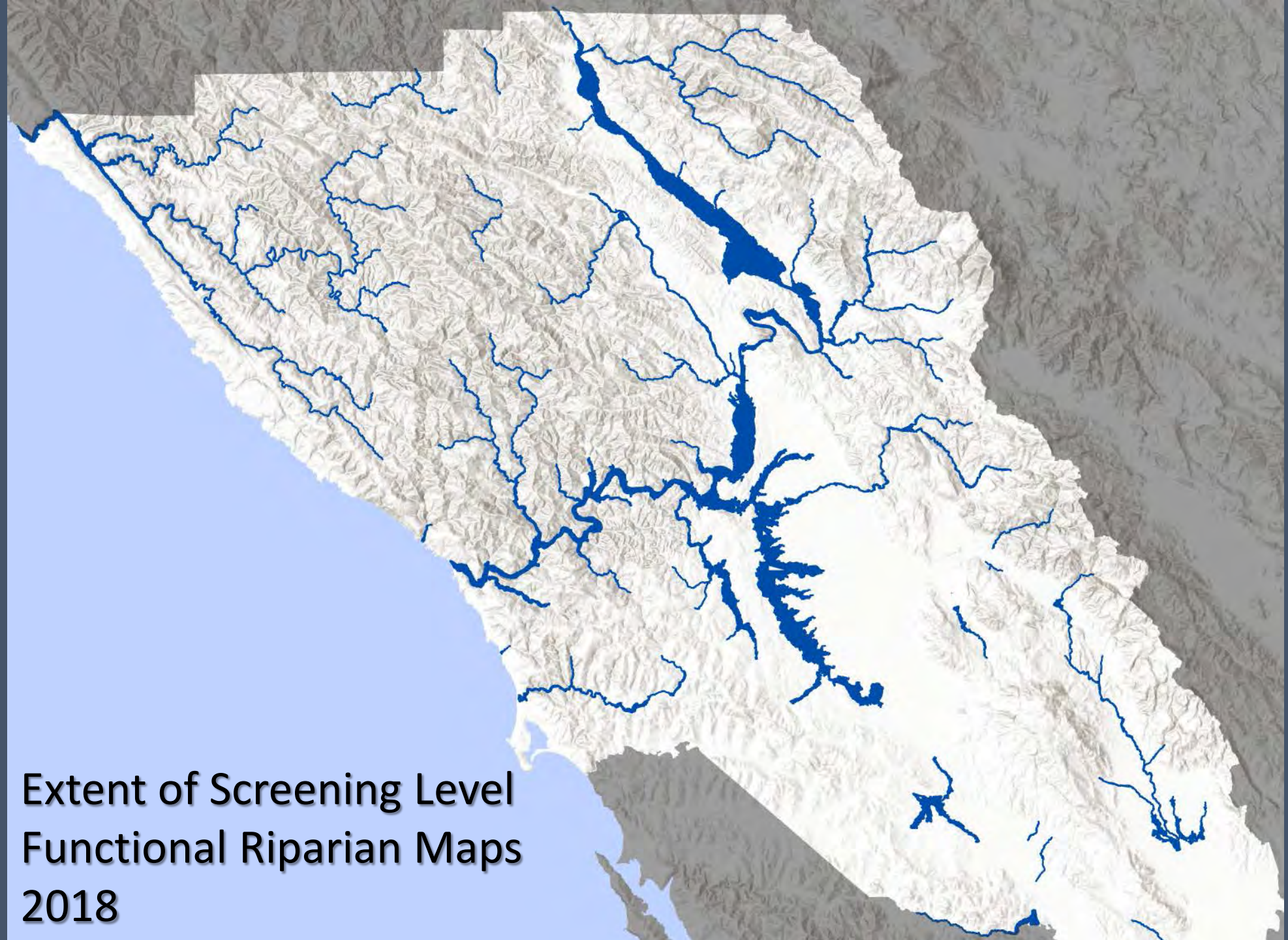
Data Investments | Partnerships

Project | Team

- Mark Tukman, Dylan Loudon, Kass Green – Tukman Geospatial
- Matt O'Connor, Jeremy Kobor – O'Connor Environmental
- Joan Florsheim, UC Santa Barbara
- Karen Gaffney, Allison Schichtel, Alex Roa – Ag + Open Space
- Arthur Dawson
- NASA, University of Maryland, CA Fish & Wildlife
- Sonoma County: Water Agency & Information Services
- Sonoma County Board of Supervisors

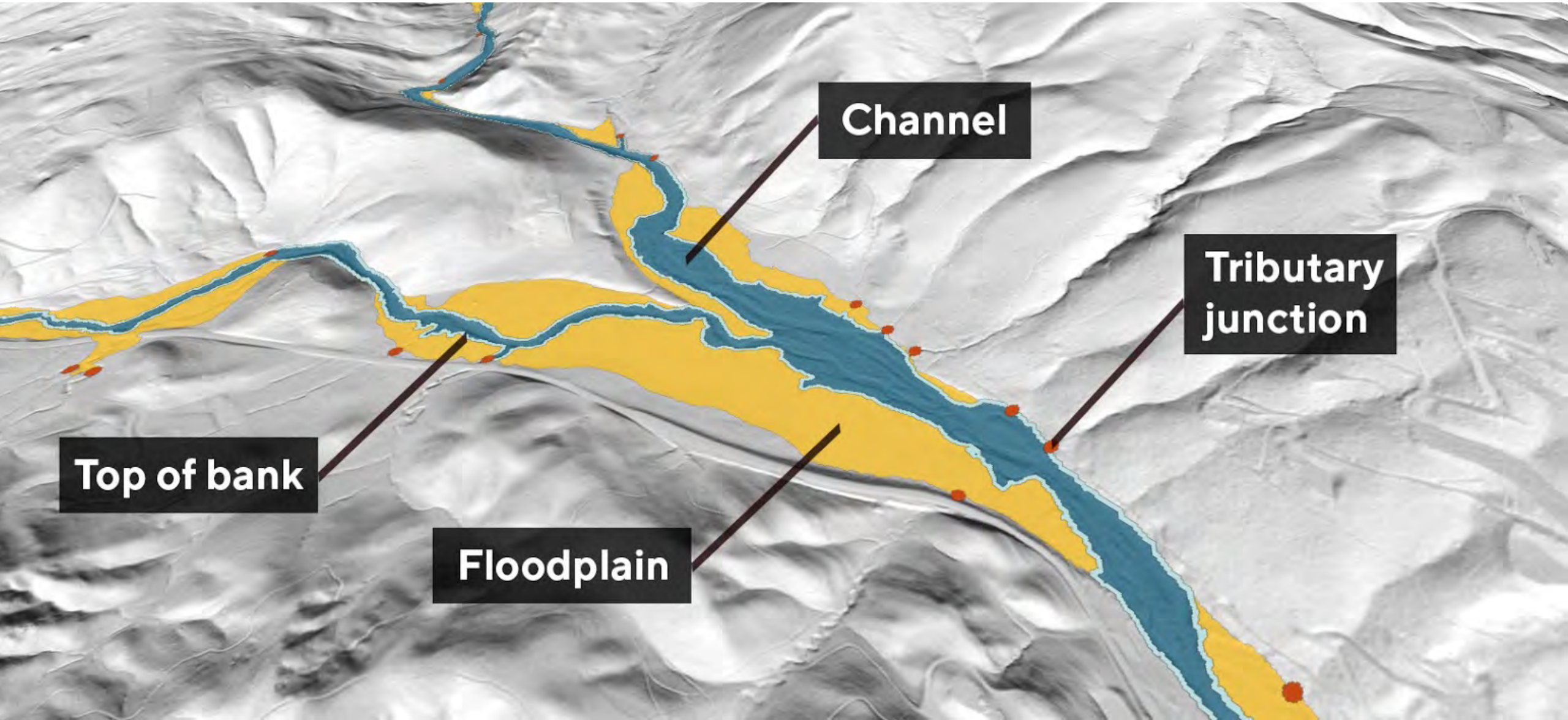
Functional Riparian Mapping - Objectives

- Screening level maps for alluvial reaches countywide
- Channel, floodplain, top of bank and tributary junctions
- Very large systems mapped opportunistically
- Small systems (< 2500 acre upstream catchment area) not mapped



Extent of Screening Level Functional Riparian Maps 2018

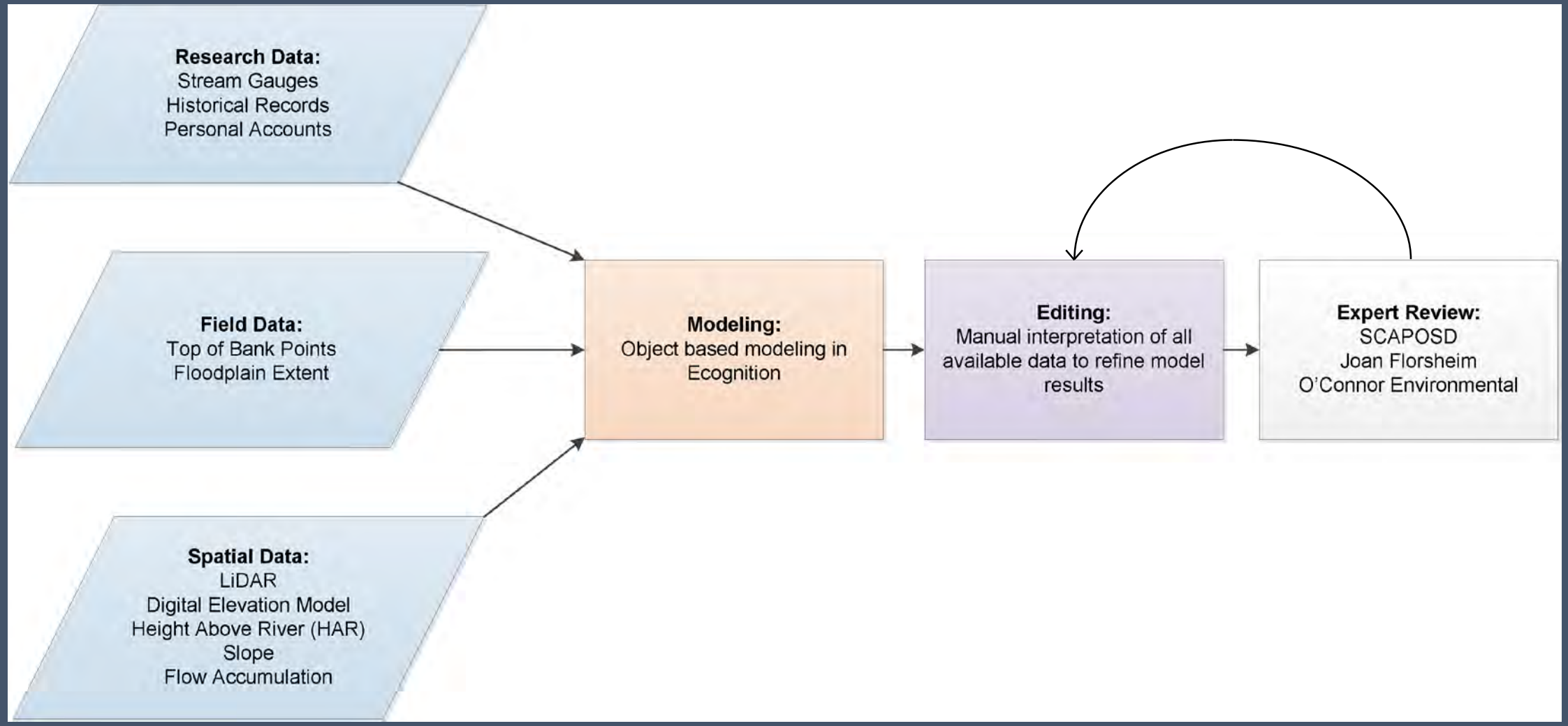
Project | Data



Map Attributes in Final Dataset

- Surface roughness of floodplain & channel polygons
- Height above river statistics for floodplain and channel polygons
- Flow accumulation statistics for floodplain and channel polygons
- Slope of floodplain & channel polygons
- Vegetation map statistics

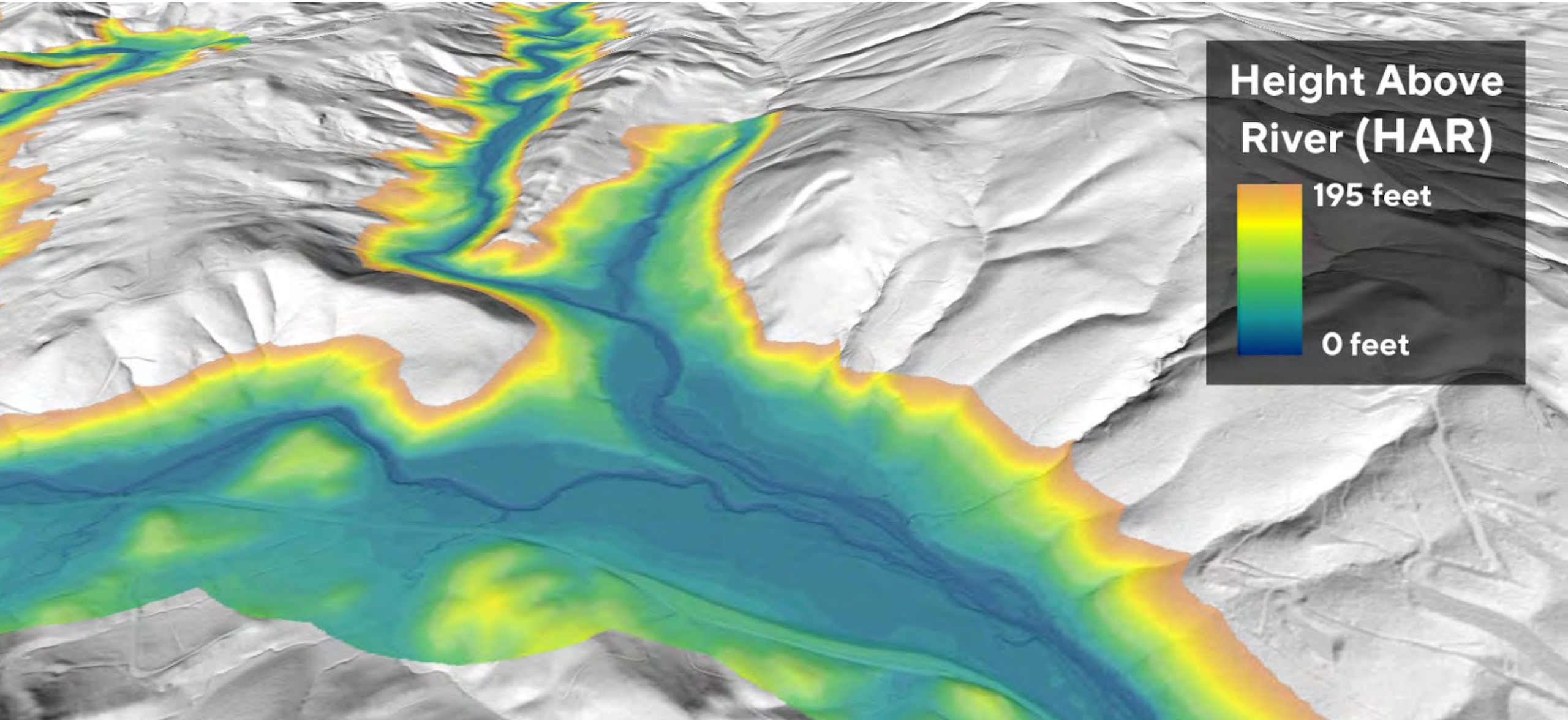
Project | Workflow



Reference Data and Resources

- Field observations
  - Photos
  - Channel/Floodplain Transects
  - Geomorphologic Assessment
- FEMA Flood Elevation Data and USGS Stream Gauges
- O'Connor Environmental, Inc.'s 100 year floodplain hydraulic models
- Historical flood extent data from Arthur Dawson, literature review and landowner interviews

Project | Methods and Modeling



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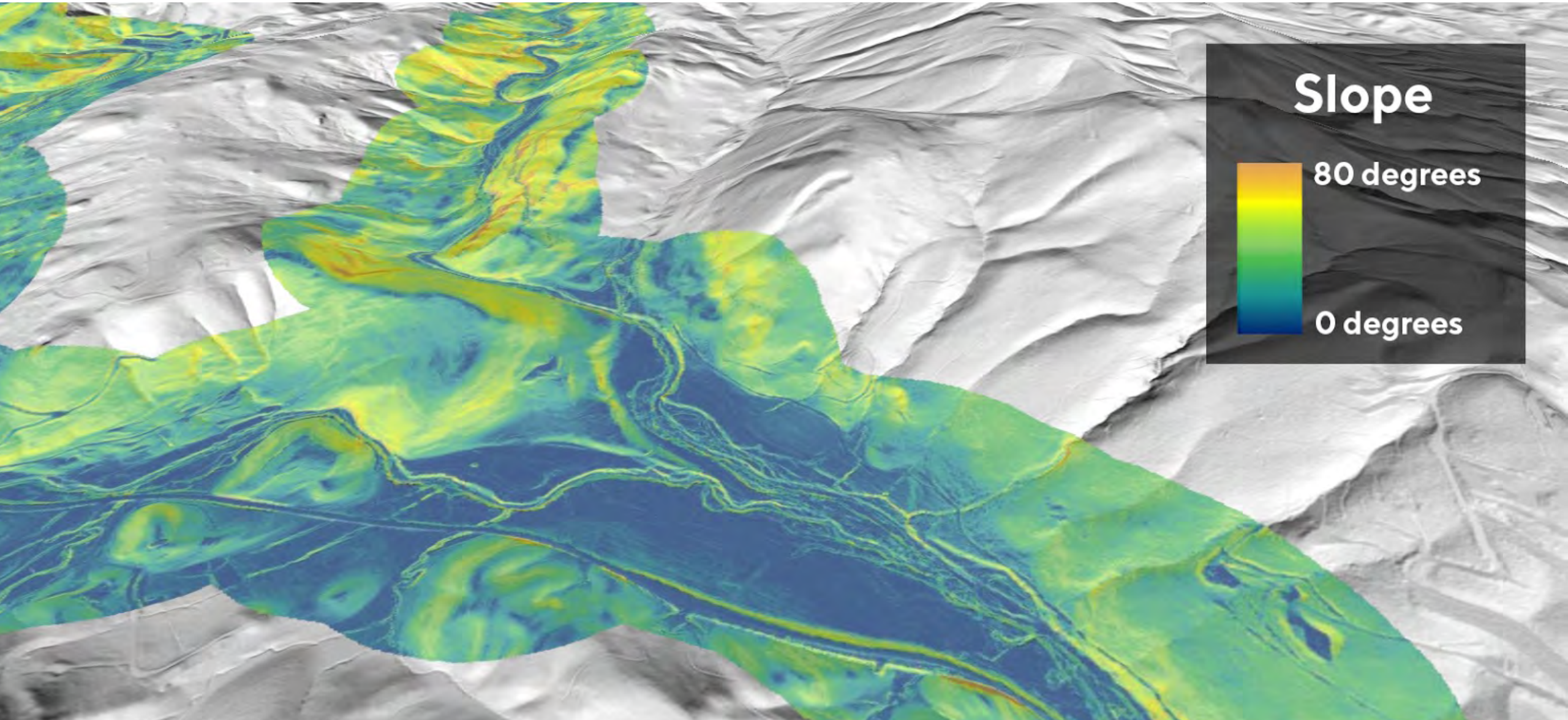
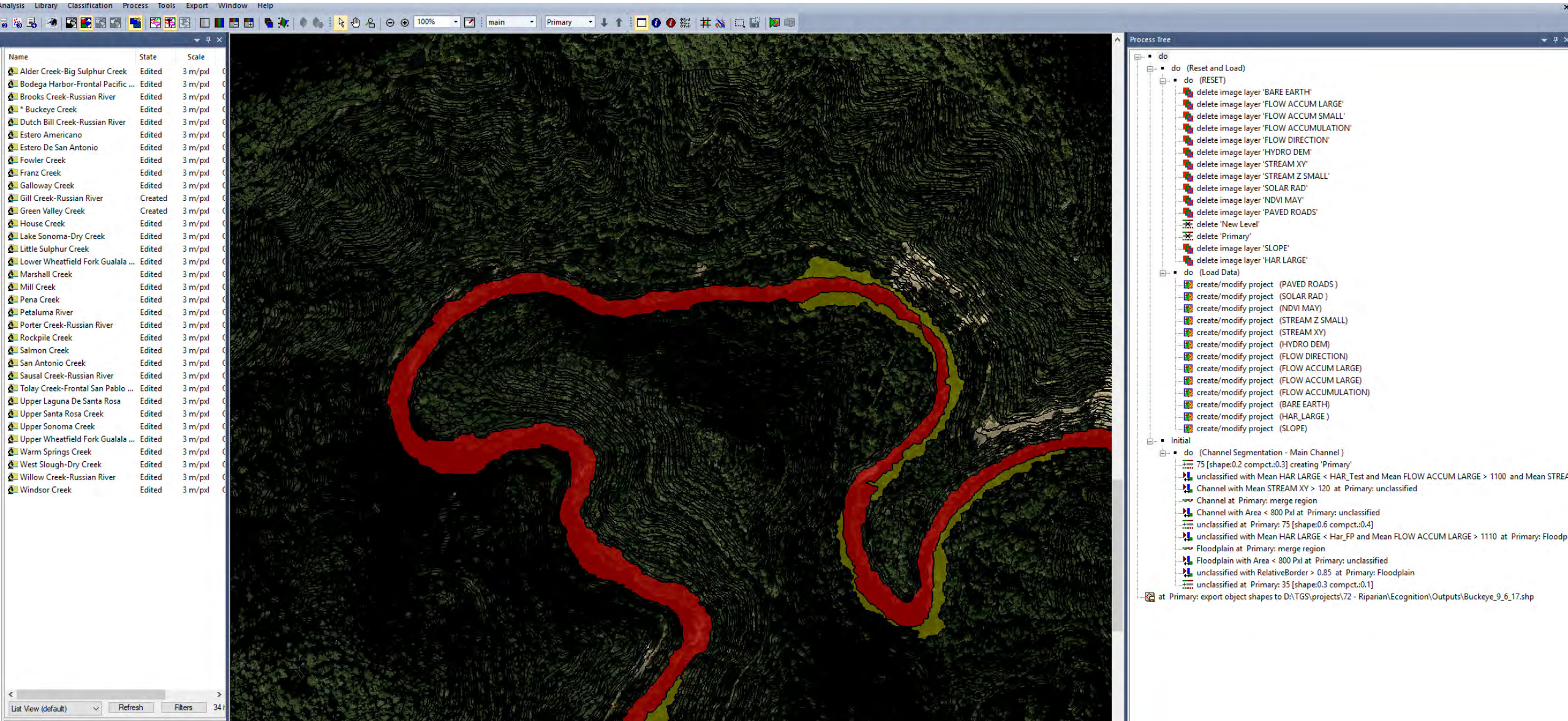


Project | Methods and Modeling



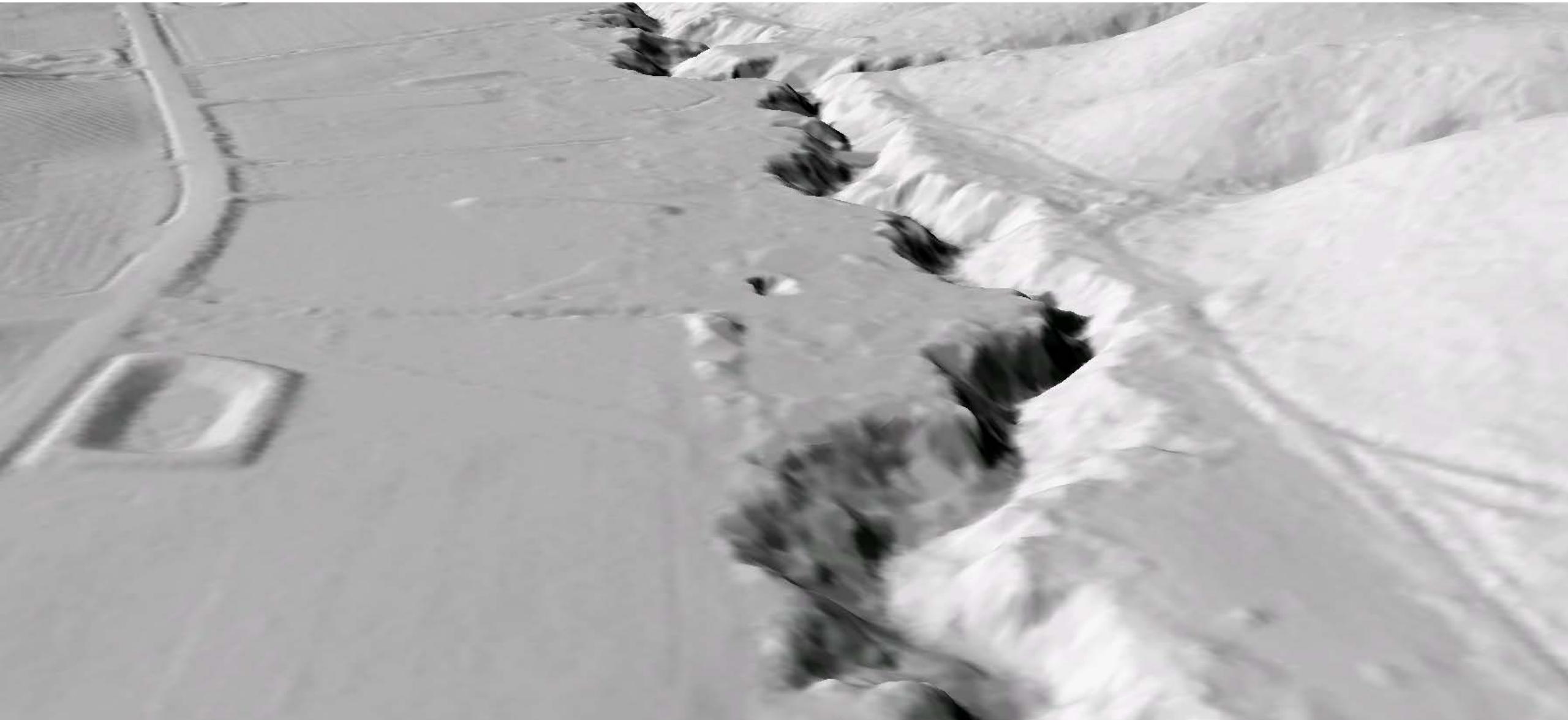
Editing Methods

- Use slope and elevation data to verify top of bank and floodplain boundaries
- Validate FEMA data and merge with riparian model
- O'Connor Environmental, Inc.'s 100 year floodplain hydraulic models to improve floodplain boundaries
- Historical flood extent data from Arthur Dawson, literature review and landowner interviews to validate and improve the data.

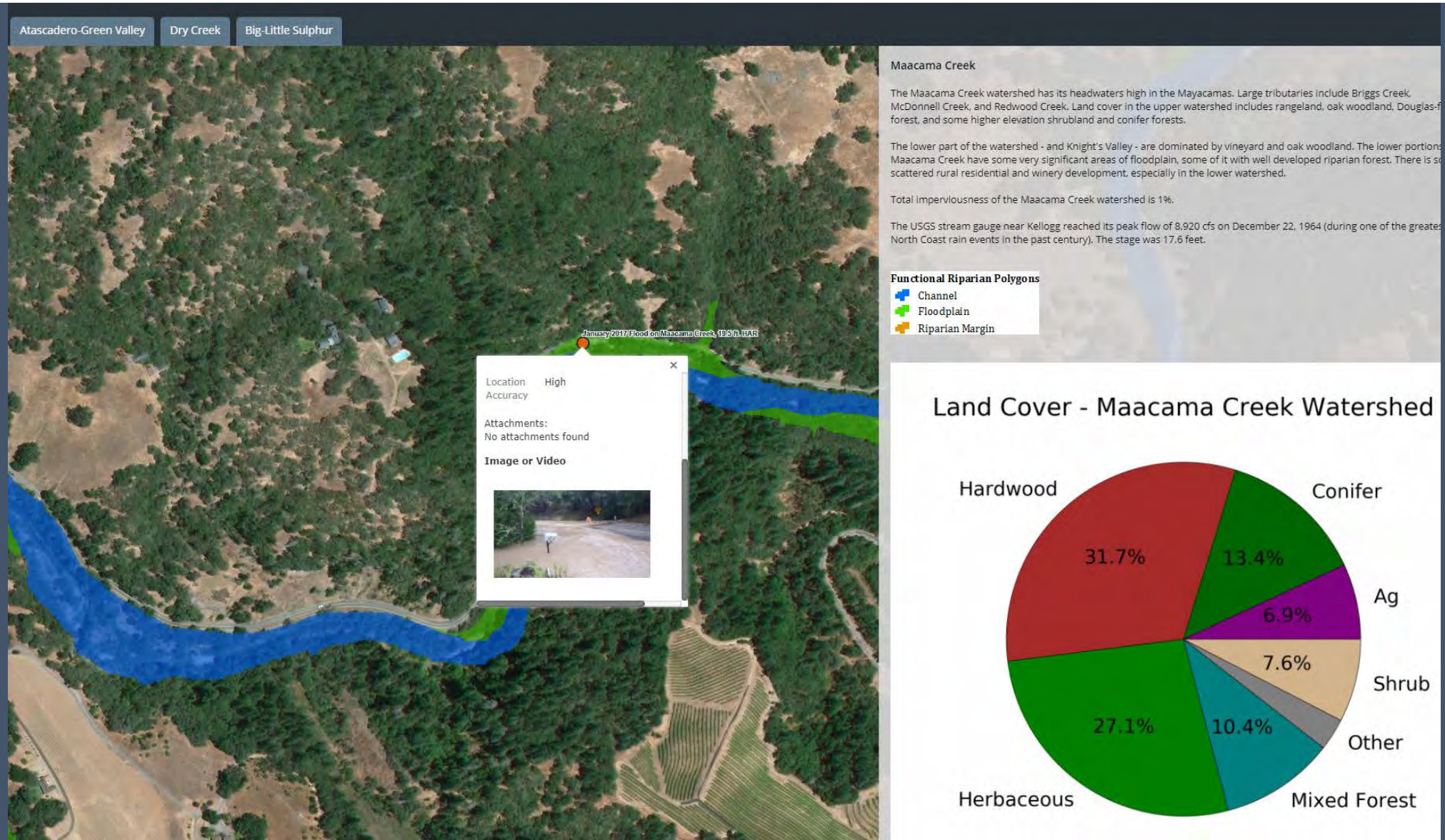
Challenges

- Really flat areas (poor definition between floodplain and hillslopes)
- Areas of heavy human manipulation (e.g., Lower Sonoma Creek and Lower Santa Rosa Creek)
- Highly incised reaches and areas of very dense shrub
- Standing water causing false elevation values

Project | Methods and Modeling



Project | Methods and Modeling



Project | Moving Forward

- Peer review of final draft riparian products
- Development of large woody debris models
- Further down the road?
  - Map riparian in smaller systems
  - Develop habitat quality ratings for each riparian polygon

Discussion

Mark Tukman and Dylan Loudon| Tukman Geospatial