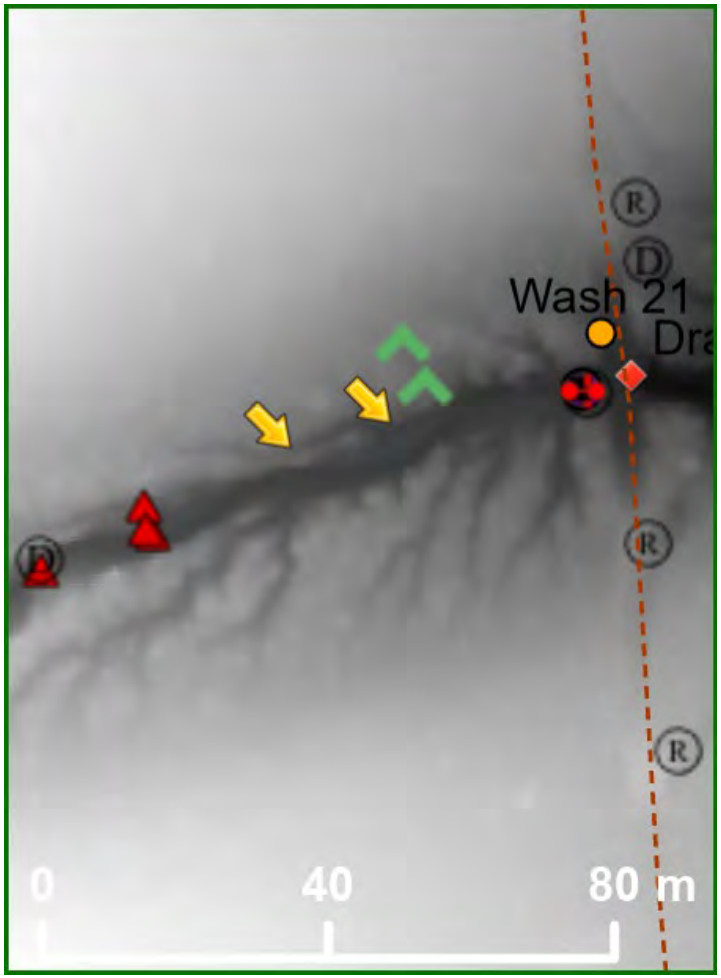
Quiet Creek

Elkhorn / Las Delicias 10 year

Elk/LD 10 years - some remote sensing

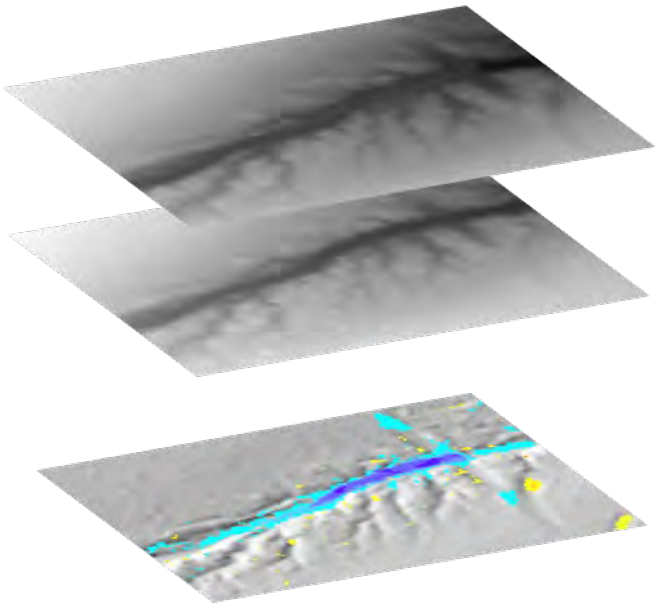
- Surface analysis
- Cross sections
- Edges
- Web interface
- Observations



60 cm resolution elevation model with mitigation structure symbols

Surface analysis

- 0.6 meter pixel resolution* elevation models were developed from the 2011 and 2019 lidar
- Each pixel value from the 2011 surface was subtracted from the corresponding 2019 pixel value
- Differences over 20cm are displayed

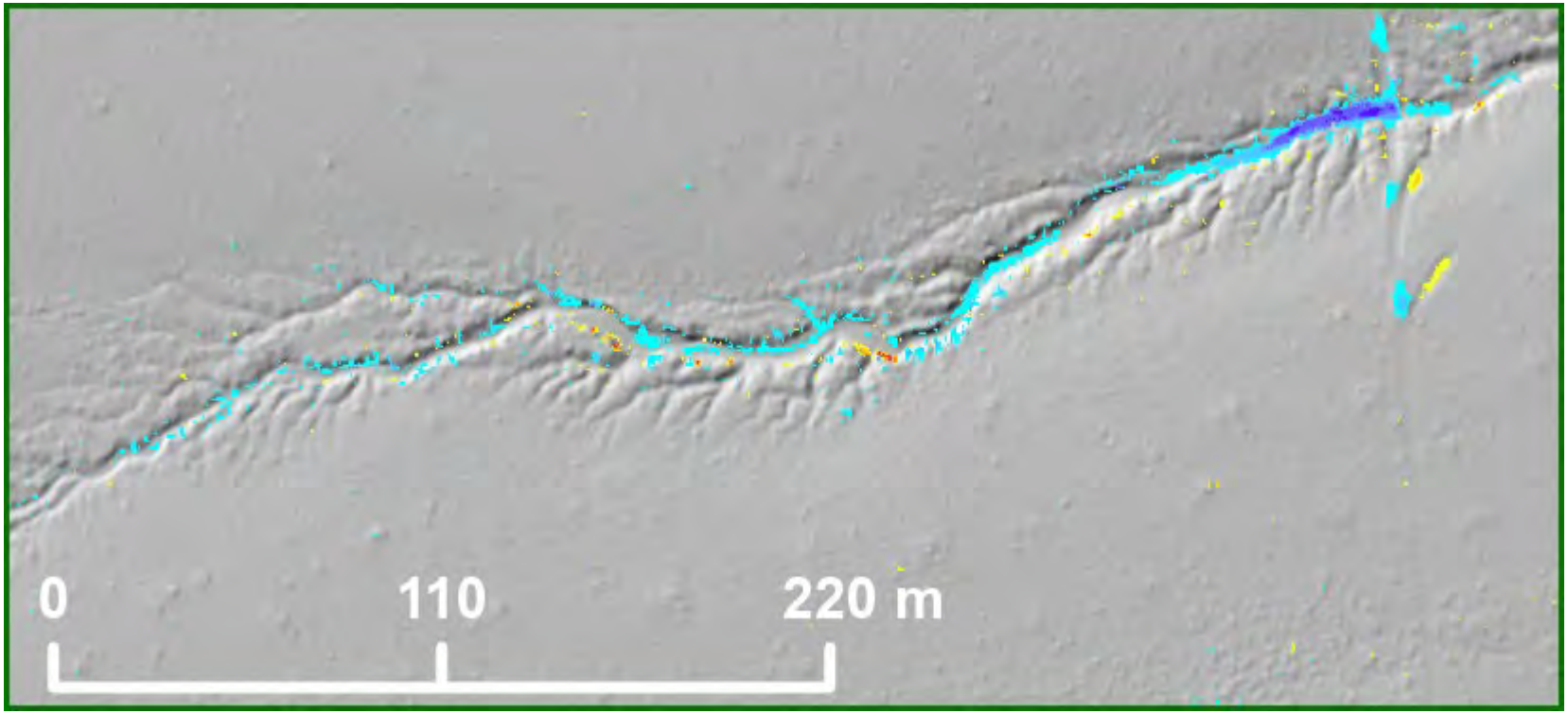


Results of DEM subtraction near the road and channel 21

* The lidars' nominal pulse spacing in this area supports this fine of a resolution (Renslow, 286).

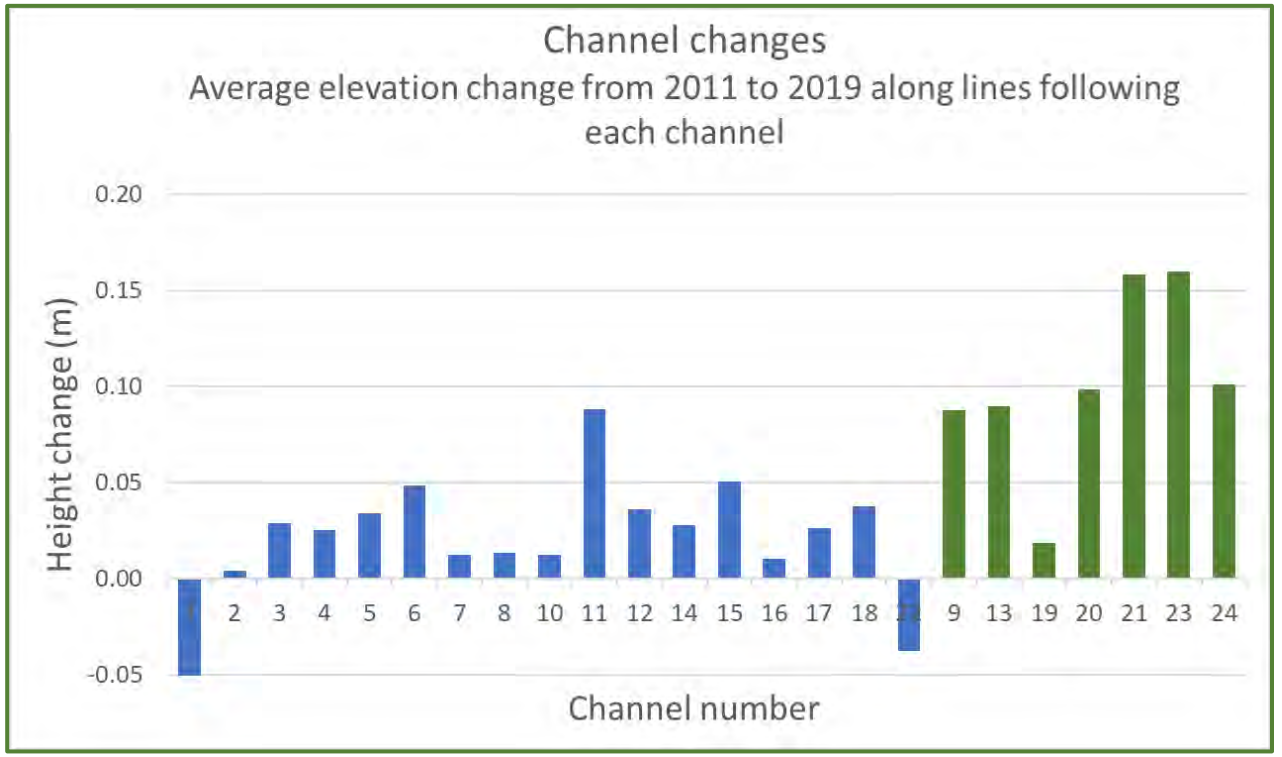
Surface analysis

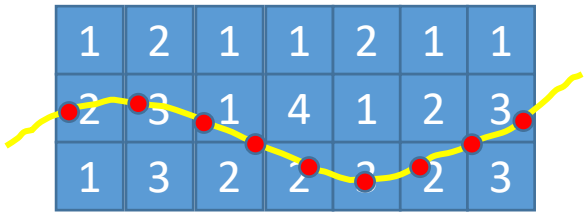
- Areas of blue suggest deposition, orange/red, erosion



Channel 21 along the treated area

Average change in channels





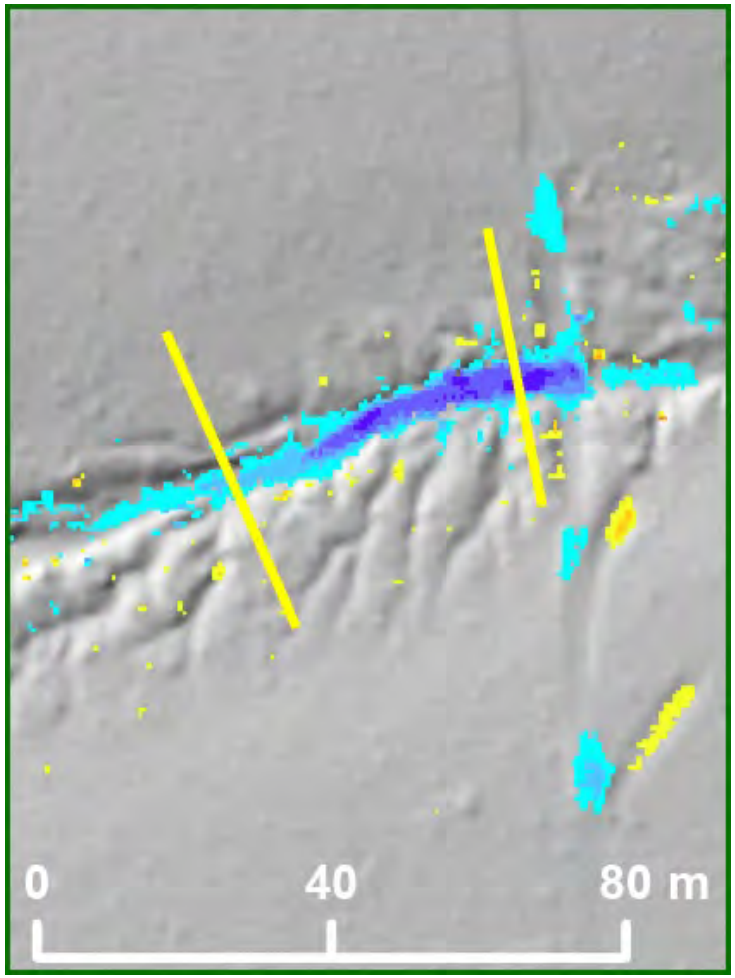
Not treated (ex. Road)

Treated

Combined vertical RMSE of both lidar 14.2 cm

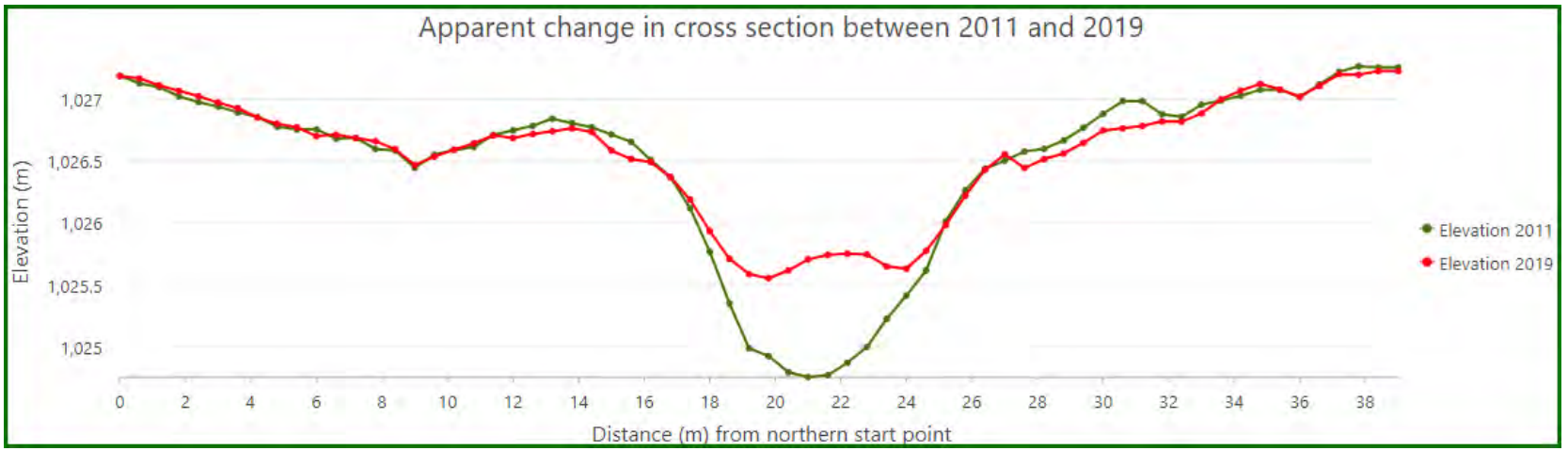
Cross sections

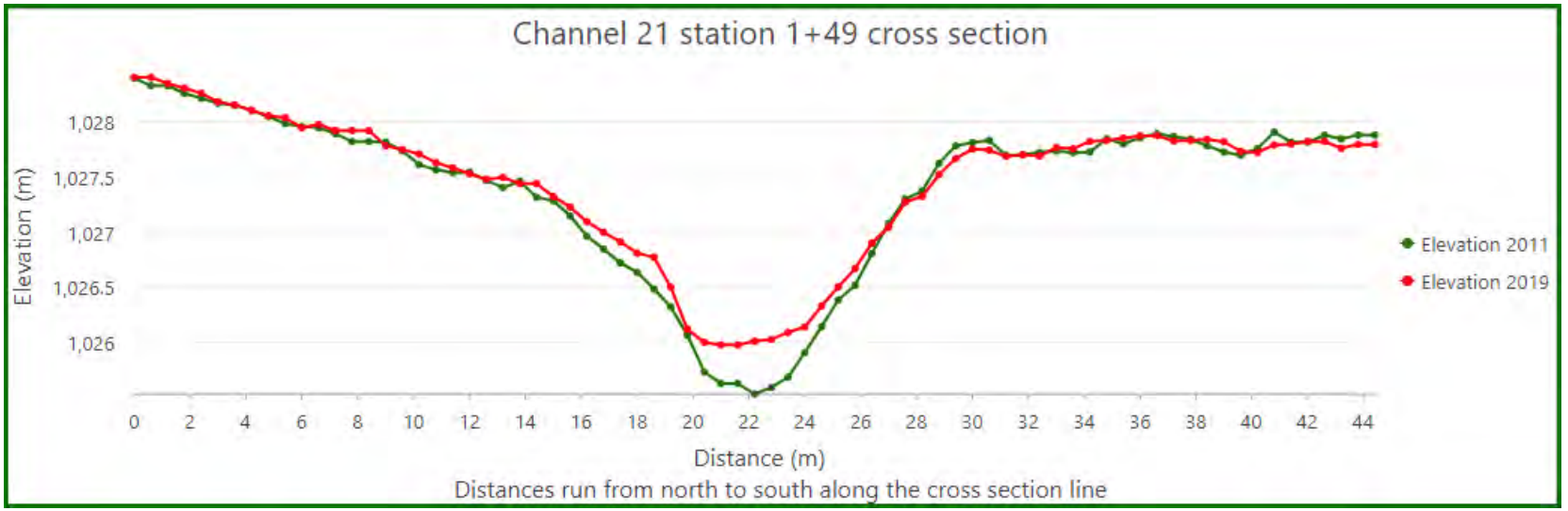
- Using the same two surfaces, it's possible to compare elevations along a line
- A measurement was taken along the line every 60cm
- The results are displayed in graph form



Digital cross sections along Channel 21

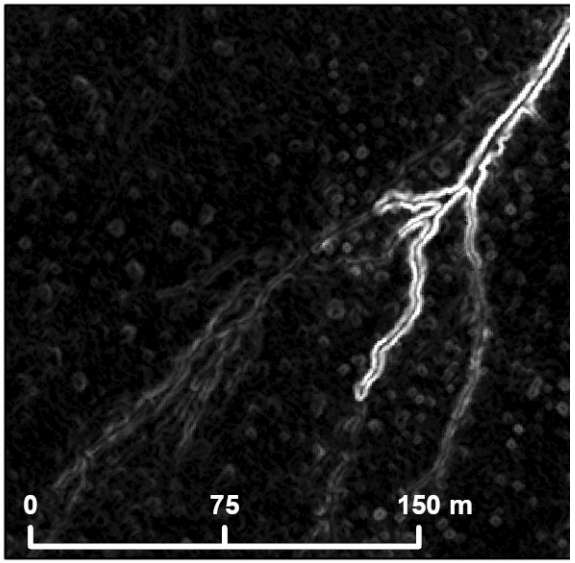
Cross sections





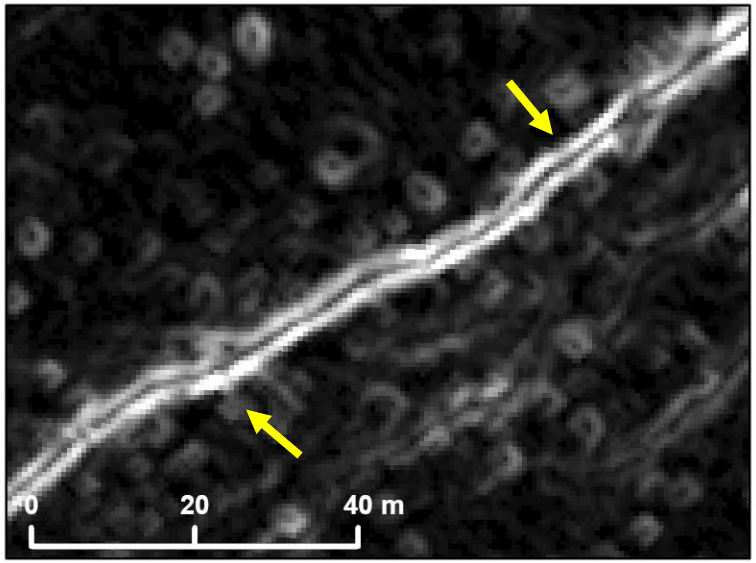
Edges

- Using both surfaces we determined edges along the channels
  - These edges will also alert us to headcuts
- Visually compared the two sets for changes
- Some areas had stark changes
  - Others did not

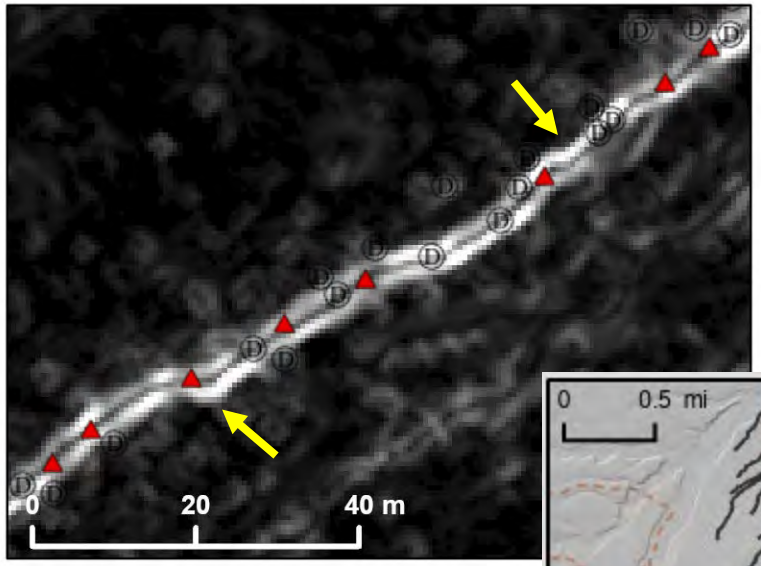


A headcut

Channel 13



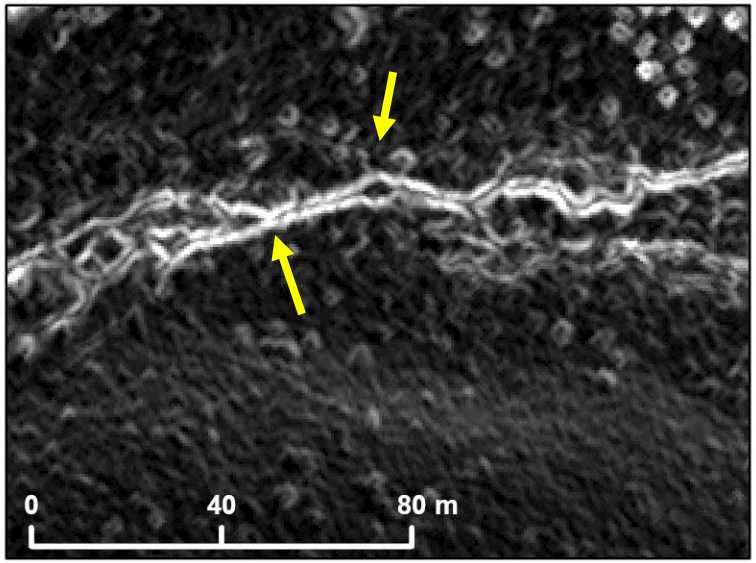
2011



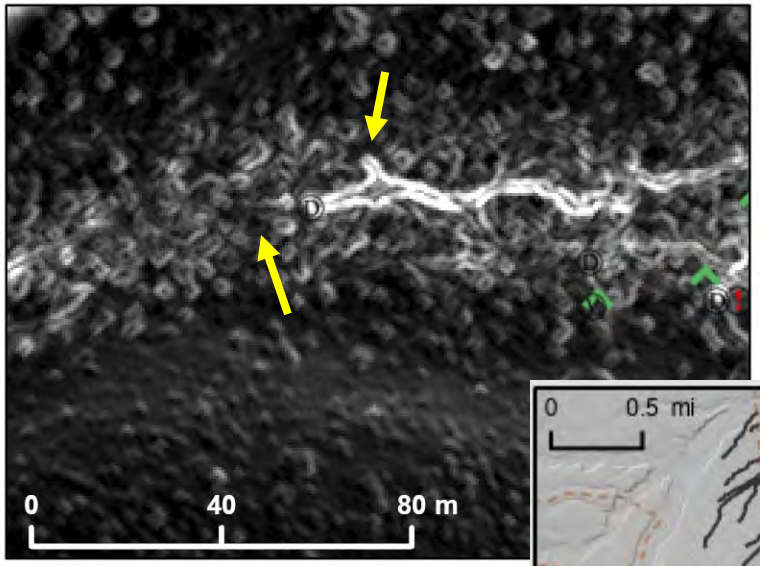
2019

Channel 23 incision

- Incision appears to have reduced
- New headcut forming

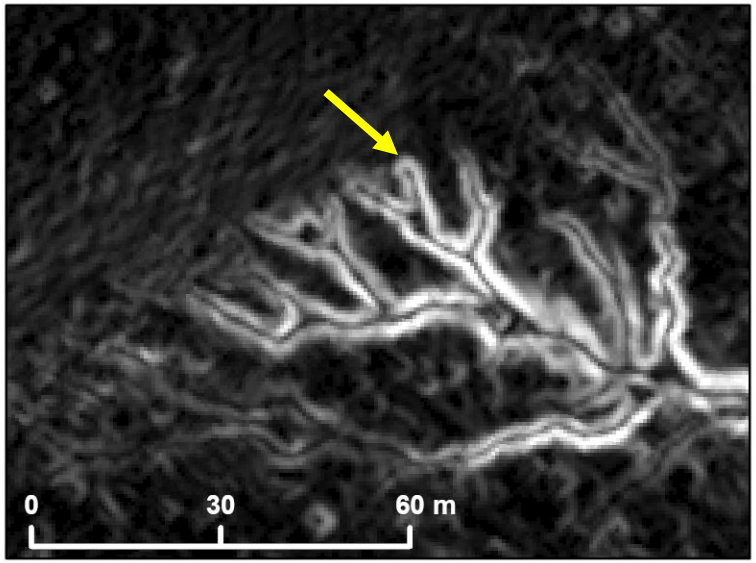


2011

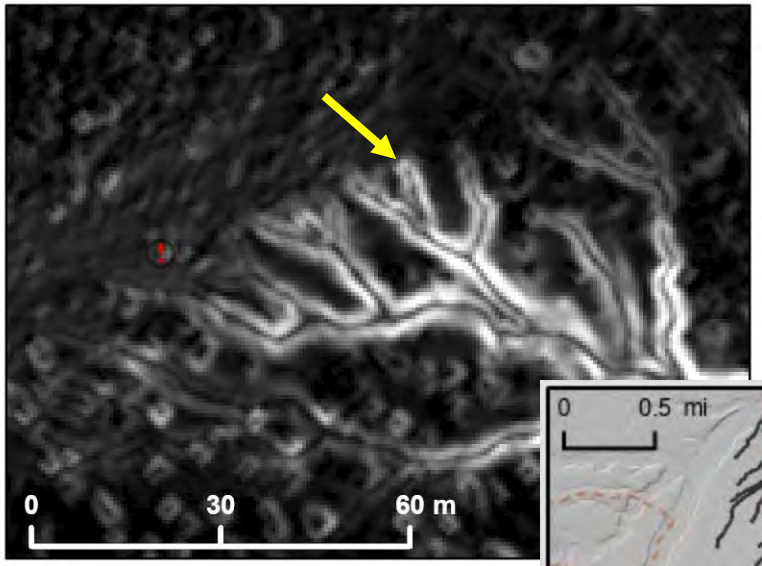


2019

Channel 17 digits



2011

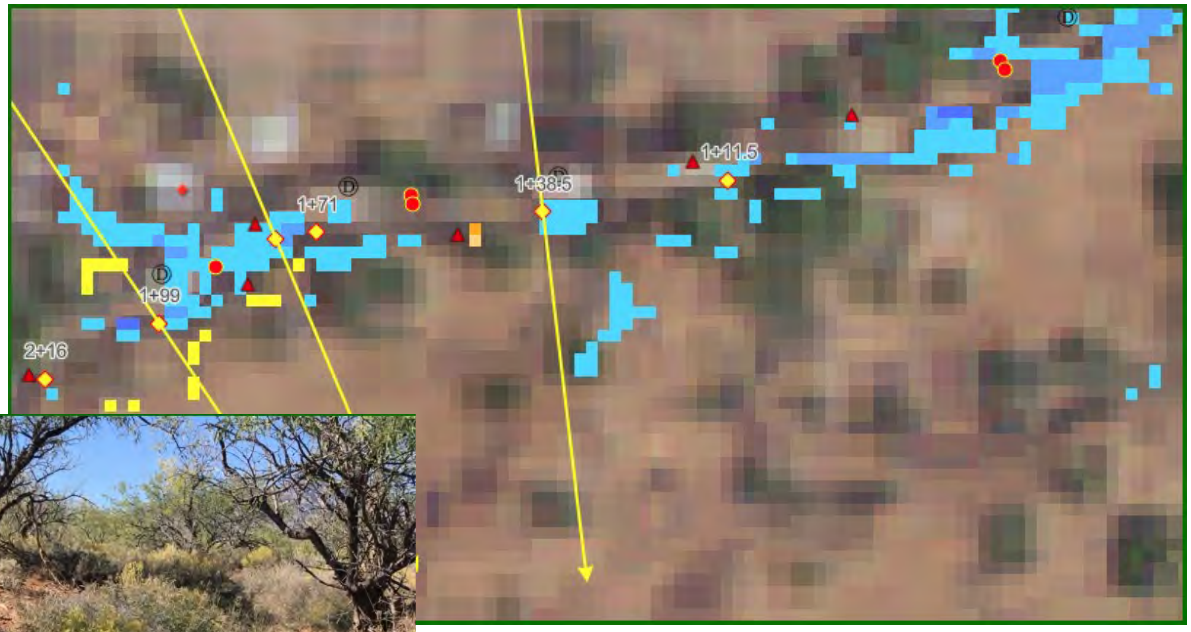


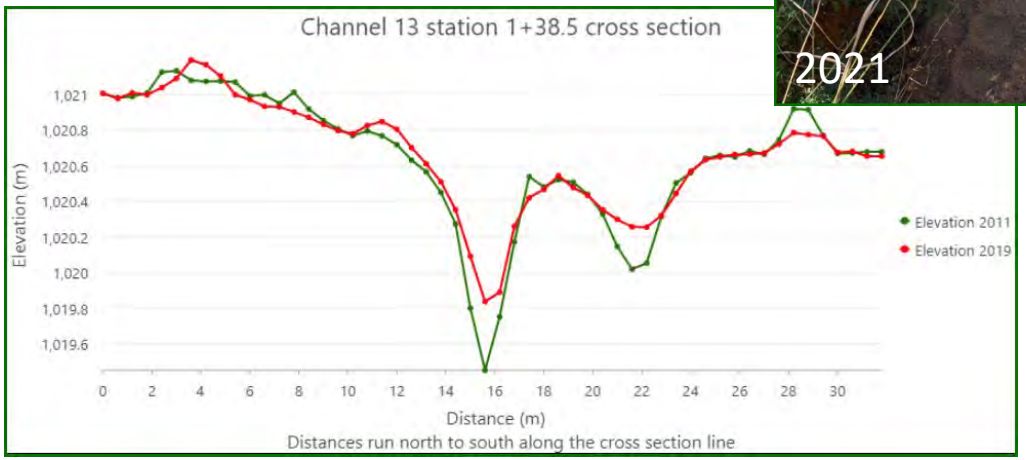
2019

Photo points

- Two sets
  - Spring
  - Fall
- The Fall set correspond to vegetation monitoring plots
  - In channel 13 and 21 some of those plots have a cross section atop
- The photos, extending back to 2012, are stored in the GIS, just click and view

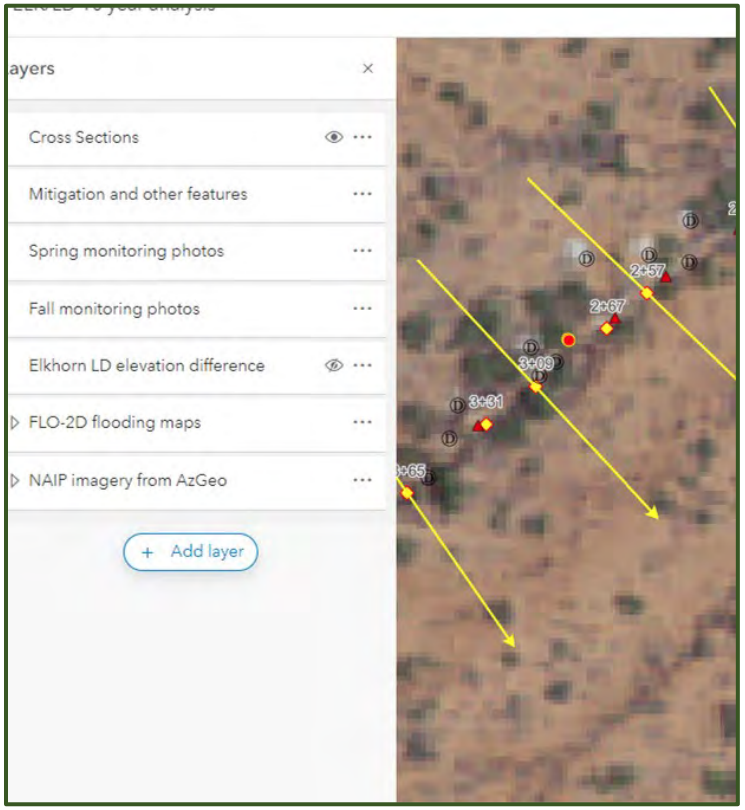
All together





Web interface

- Putting it all together in a publicly available web map
  - Surface changes
  - Cross sections
  - Structures
  - Photo points
  - FLO 2D models
  - Edge imagery
  - NAIP imagery from 2013, 2015, 2017, 2019

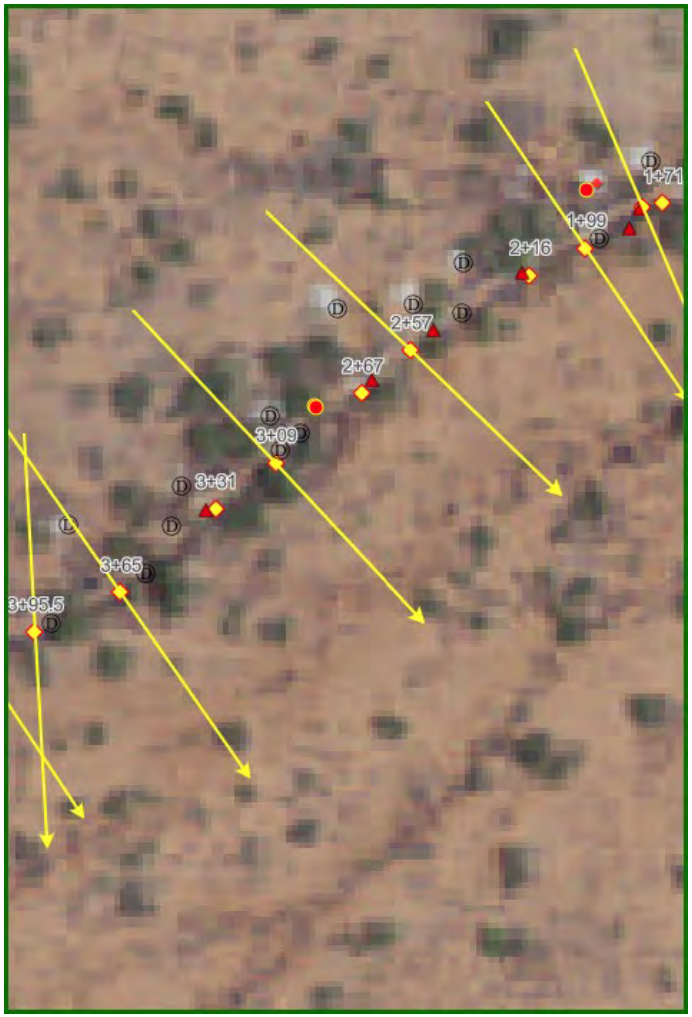


Screen shot of the online map

https://avca-open-data-avca.hub.arcgis.com/

Observations

- Increased sediment was observed upstream of road treatments
- Based on the surfaces and photos, deposition was observed upstream of single rock dams
- Some areas of increased meandering were adjacent to baffles



Sources

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State of Arizona, Arizona State Lands Department, *Hosted Imagery Service*, https://azgeo-open-data-agic.hub.arcgis.com/

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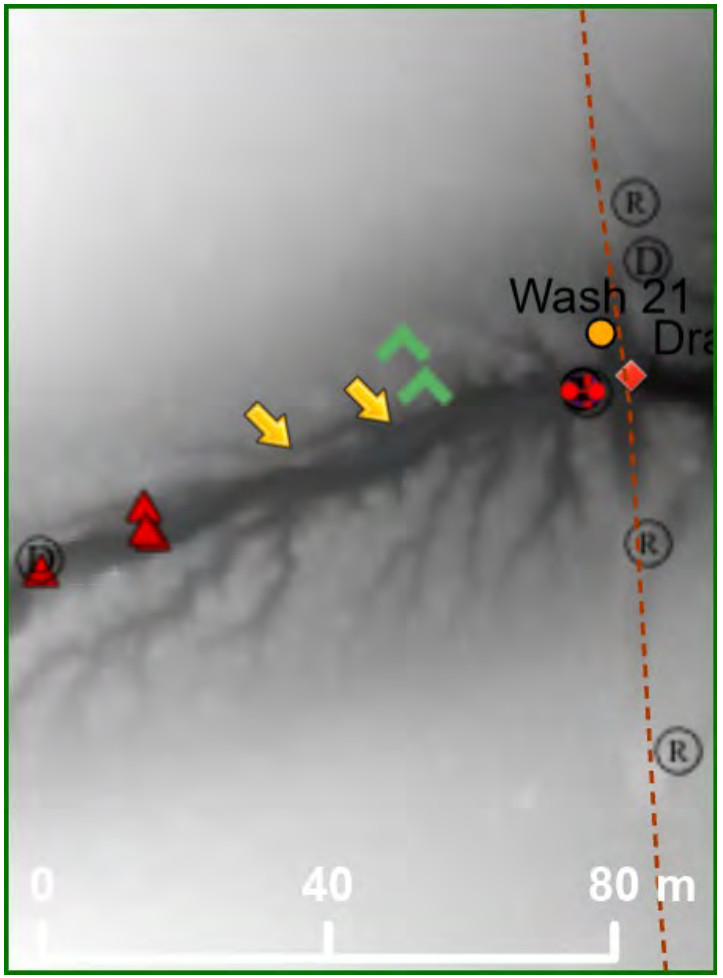
Elk/LD 10 years wrap-up

- Surface analysis
- Cross sections
- Edges
- Web interface
- Observations
- Questions



60 cm resolution elevation model with mitigation structure symbols