EVALUATION OF SEDIMENT DYNAMICS IN HABITAT RESTORATION FEATURES IN ALBUQUERQUE

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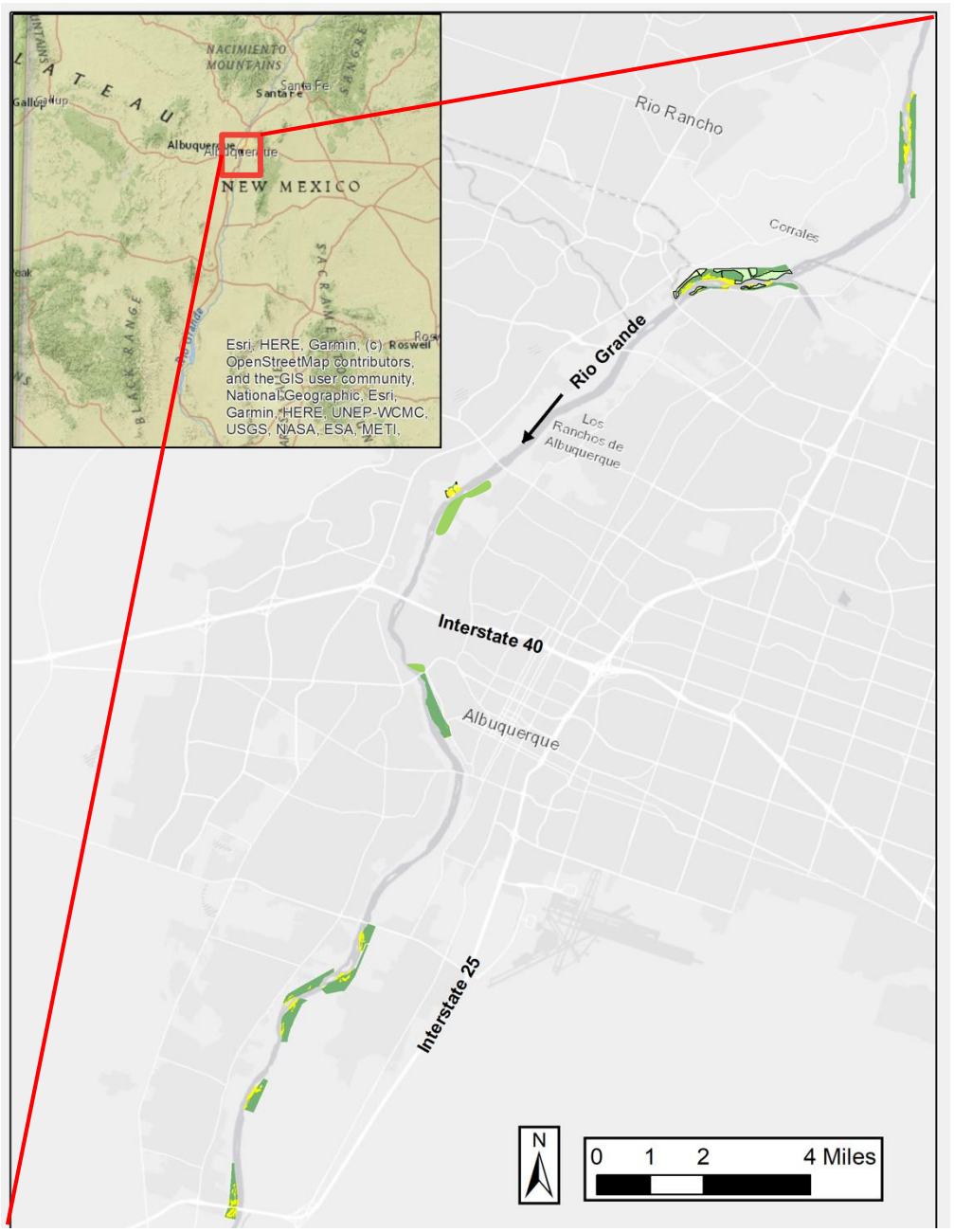
RESTORATION LOCATIONS



In total, 21 restoration sites were constructed along the Rio Grande through Albuquerque.

A variety of techniques were used: connected and unconnected swales, high flow channels, backwater embayments, bankline lowering (terracing), constructed ponds, and non-native vegetation removal.

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GOALS OF THE RESTORATION

- Provide habitat for silvery minnow (*Hybognathus amarus*) and the Southwestern Willow Flycatcher (*Empidonax traillii extimus*)
- Promote Rio Grande connection to surrounding overbank areas
- Remove non-native species and revegetate with native species

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TYPES OF RESTORATION WORK

- Channelize flow
  - high flow channels
  - Backwater embayments
- Create inland depressions
  - Swales
  - Constructed ponds
- Modify banklines through terracing and grading

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ONGOING MONITORING: SEDIMENTATION ISSUES

- During high runoff, the Rio Grande overbanks and deposits sediment into constructed features
- Deposition is observed to varying degrees, depending on the feature and flow
- Survey-grade surface measurements are compared to assess the health of the feature

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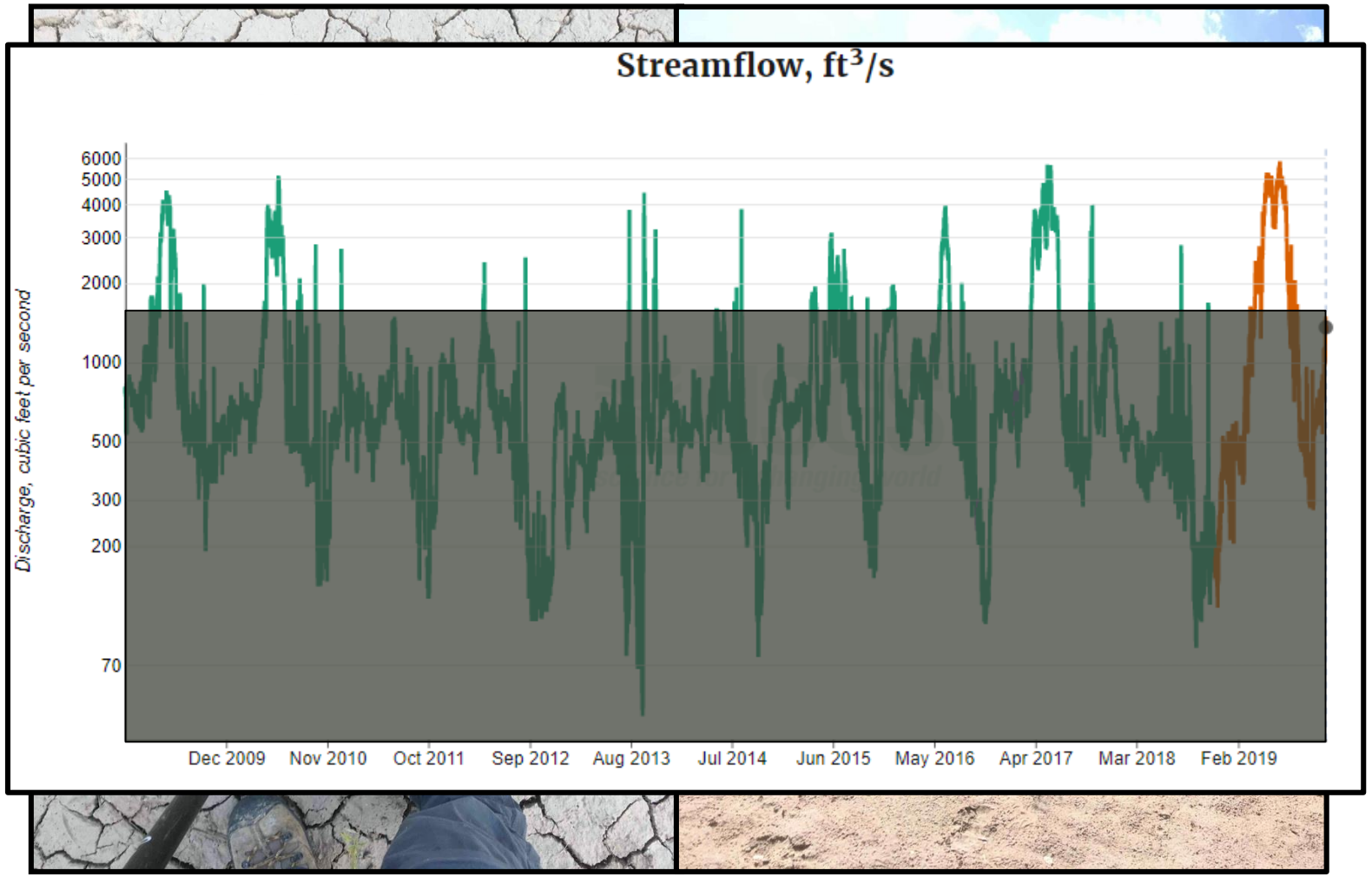

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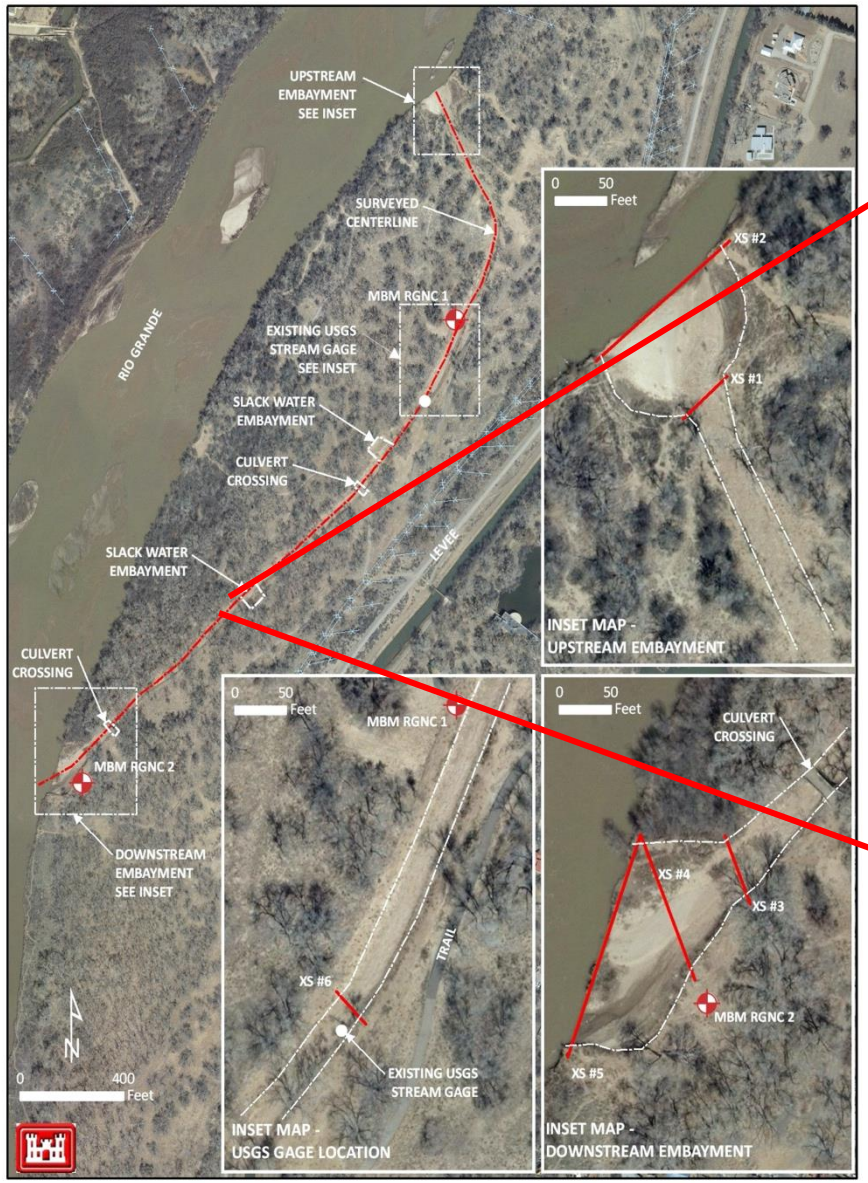
RIO GRANDE NATURE CENTER: HIGH FLOW CHANNEL



- Constructed in 2008
- One of three sites with routine monitoring (2012 – 2019).
- One high-flow channel with backwater embayments constructed
- High foot traffic within restoration feature

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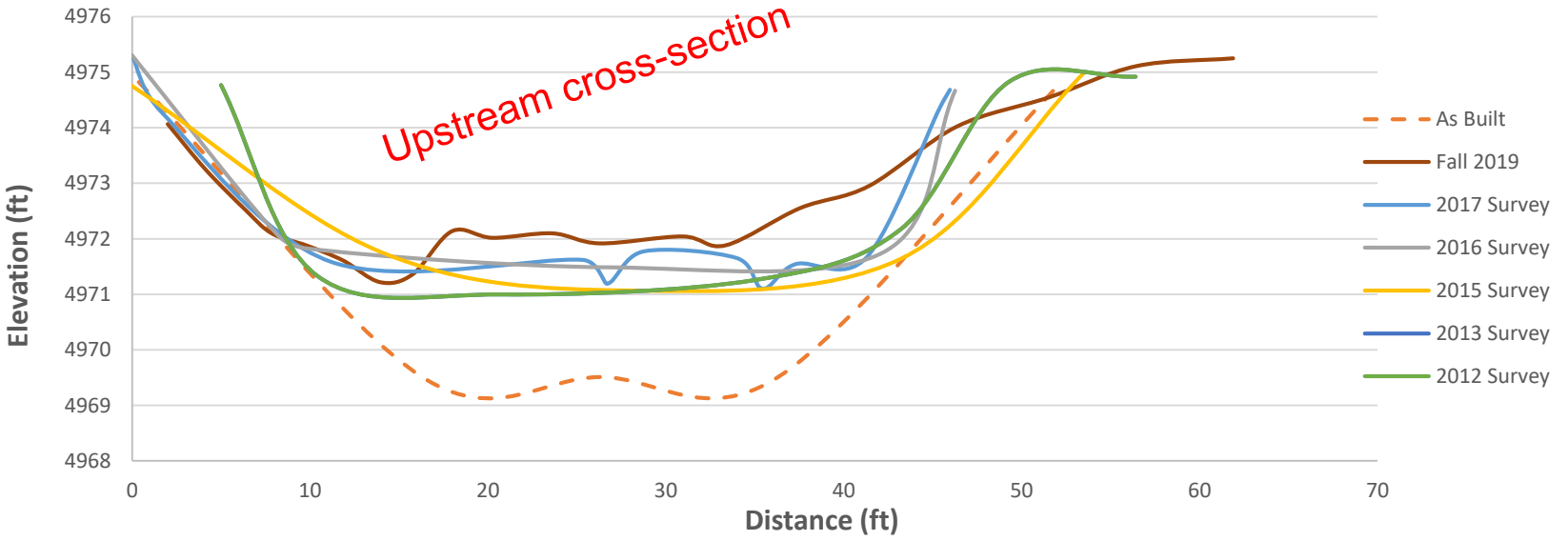

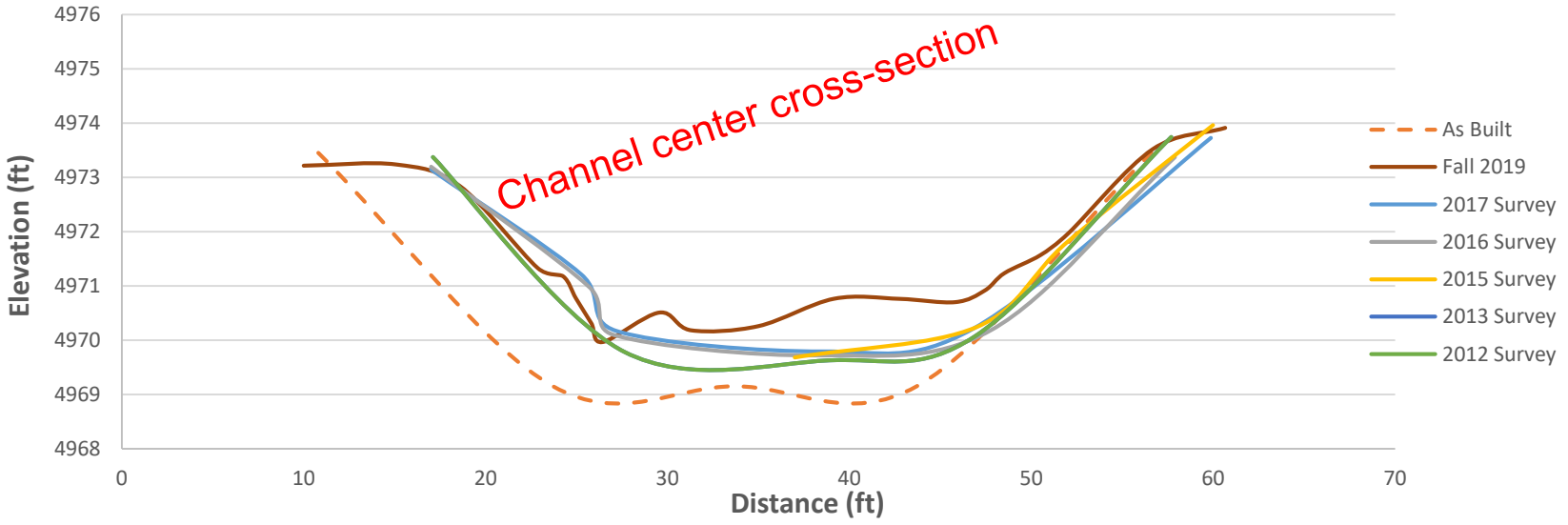

- High flow channel inlet see the most sedimentation (2x as much aggradation when compared to the channel center
- Prevents flows from efficiently entering the channel

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RIO GRANDE NATURE CENTER: HIGH FLOW CHANNEL

Elevation (ft)

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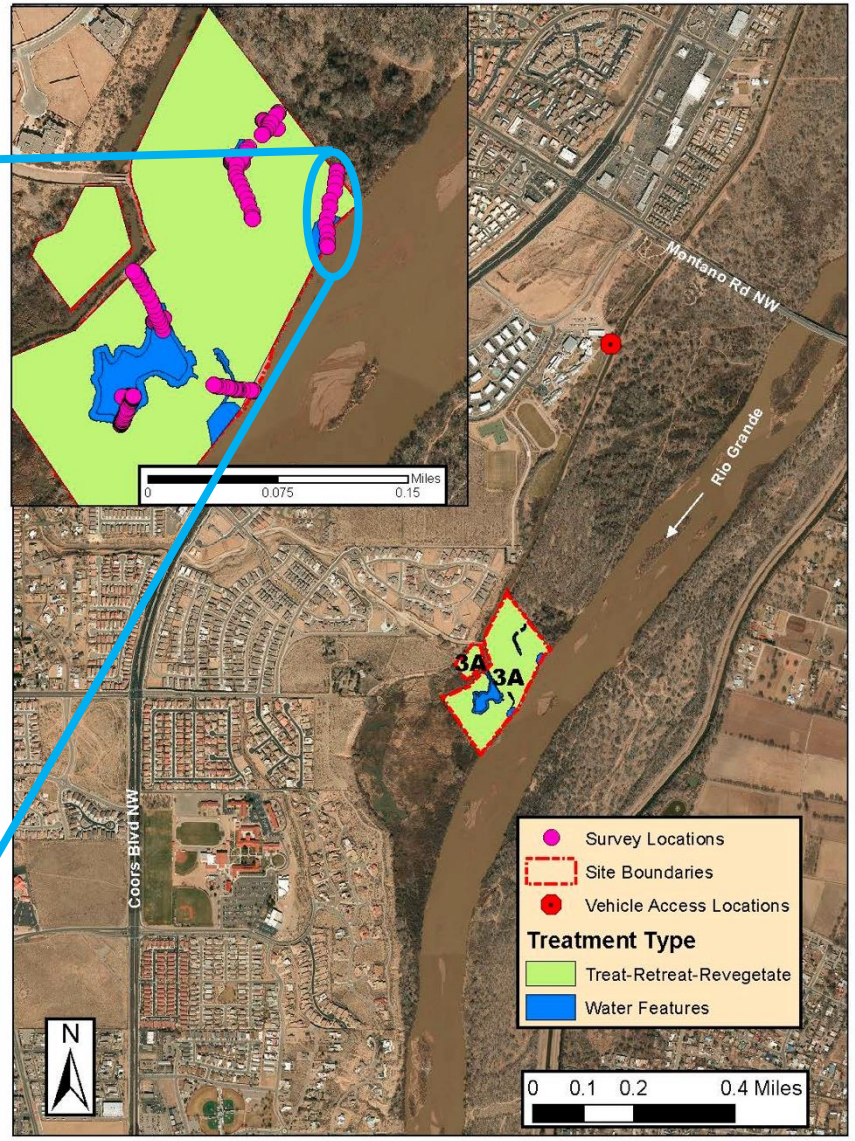
SITE 3A: BANK TERRACING

- Constructed in 2016.
- Many different features used, including bank terracing.
- Limited surveys; only pre and post 2019 floods.



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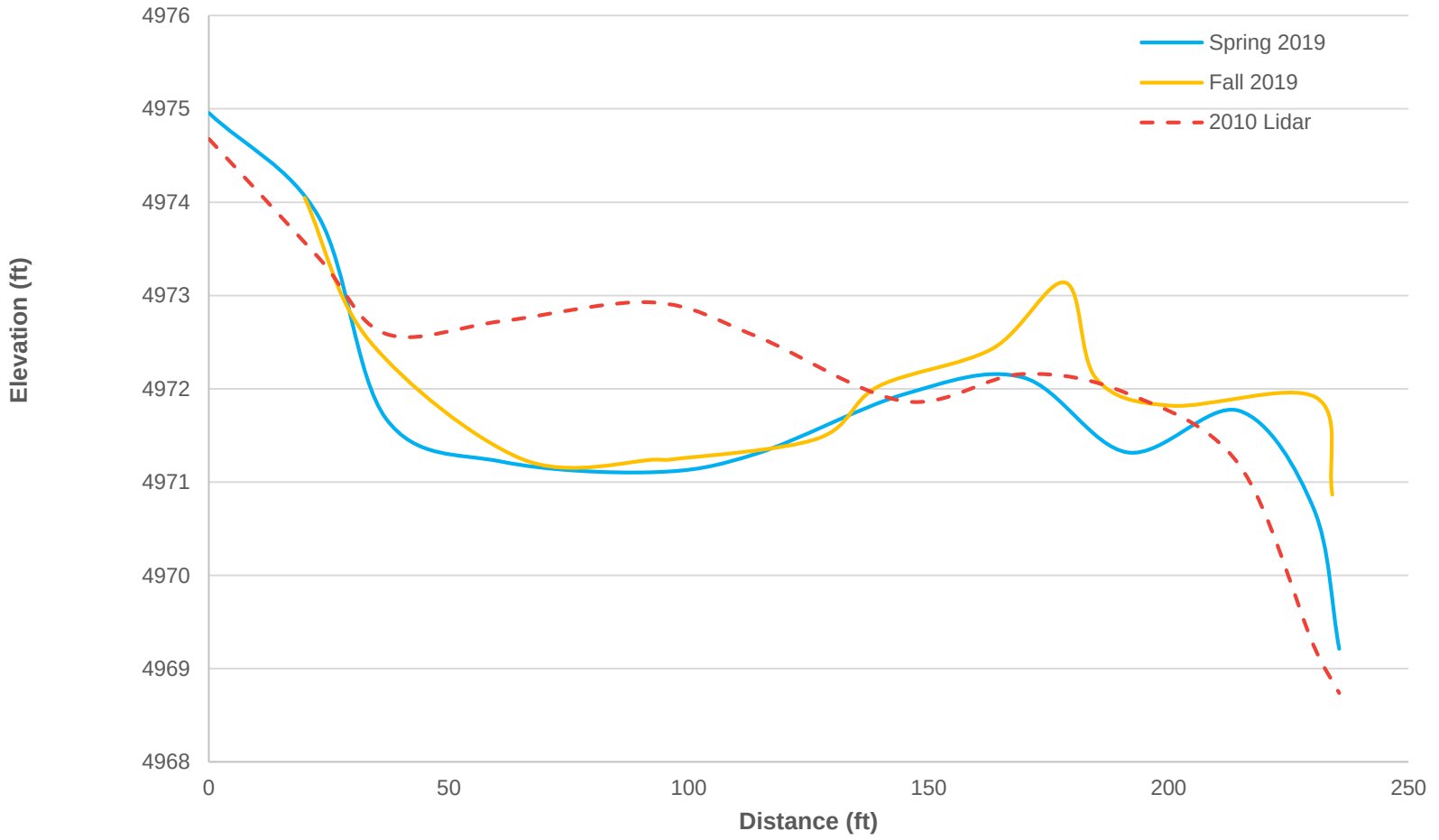
SITE 3A: BANK TERRACING

- Pre construction LiDAR available (2010).
- Small geomorphic changes between spring and fall this year.
- Large amounts of vegetation within terraced area.



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SITE 1H: SWALES

- Ubiquitous throughout restoration sites.
- Two types of swale construction: river-connected and unconnected.
- Often groundwater fed.
- Thought to be more stable flycatcher habitat.

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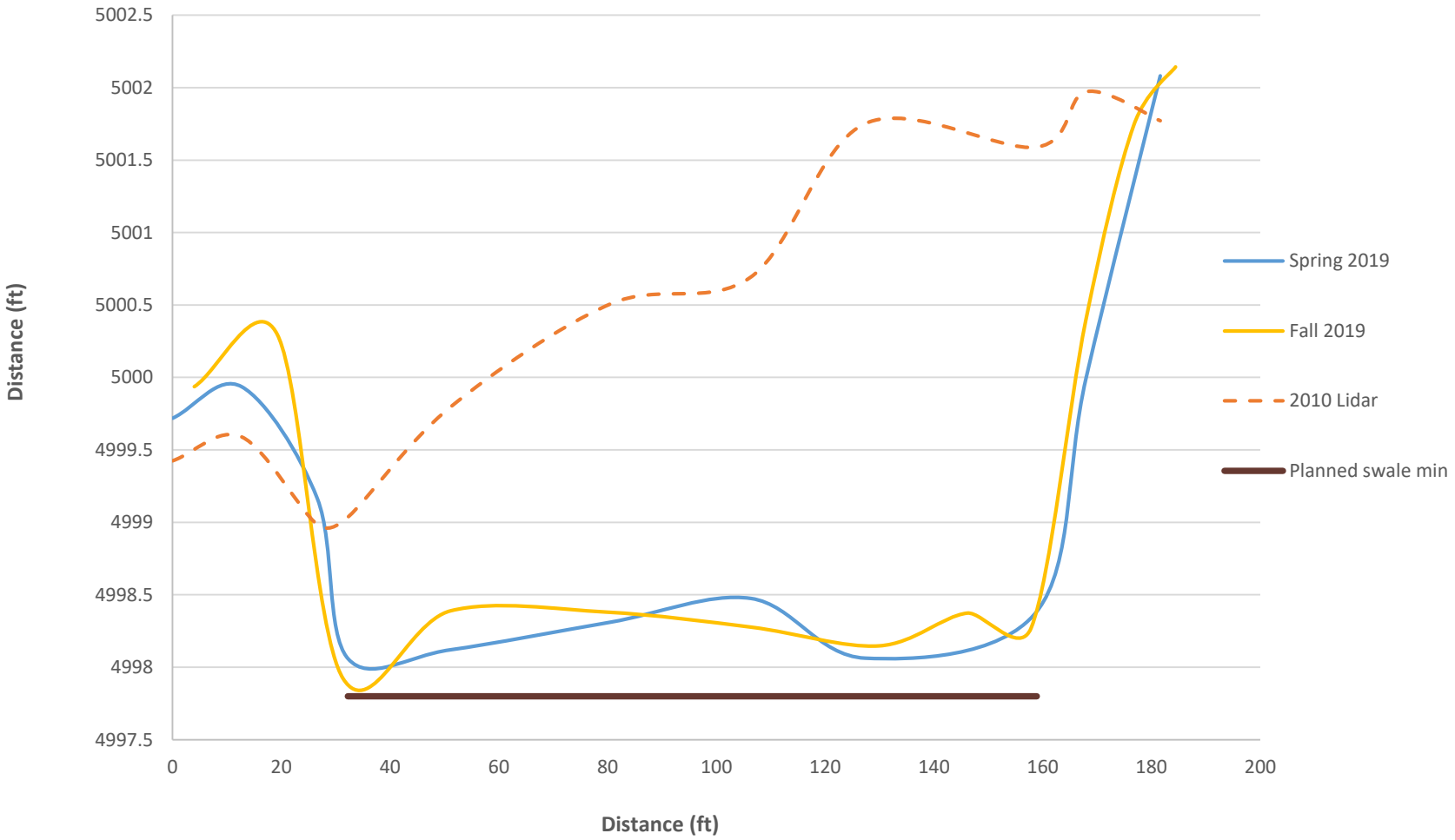
SITE 1H: SWALES



- Minimal aggradation from the design swale
- River-connected swales behave similarly to unconnected swales.
- Significant soil removal and placement to construct.

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CONCLUSIONS

- Sediment accumulation in these restoration features is unavoidable.
- Design must balance needs of endangered species with the long-term maintenance requirements.
- Highest rates of sedimentation observed in directly connected features (e.g. high flow channels).

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