Telling the Story of Place and Impact: Community, Cultural Resources, and Monitoring

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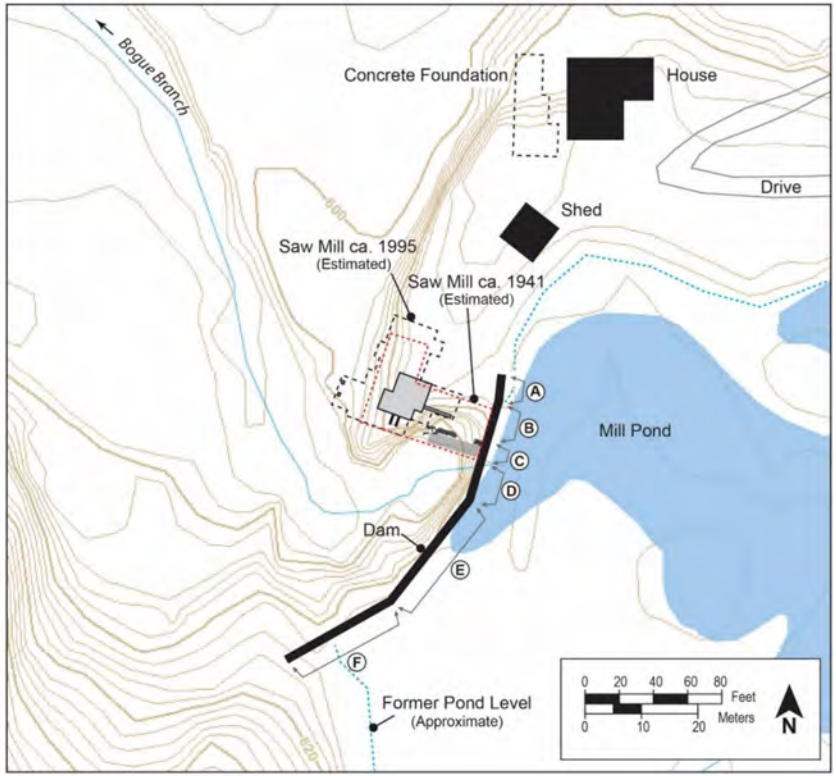
Place: Community Engagement - Local Community



Place: Cultural Resources

- Why is this place the way that it is?
- Who has shaped the decisions made here? Whose work are we undoing/redoing?
- Why did they make those decisions?
- Can we learn how something was built to inform how to take it apart or replace it?
- How does the community feel?
- What lessons can we learn?

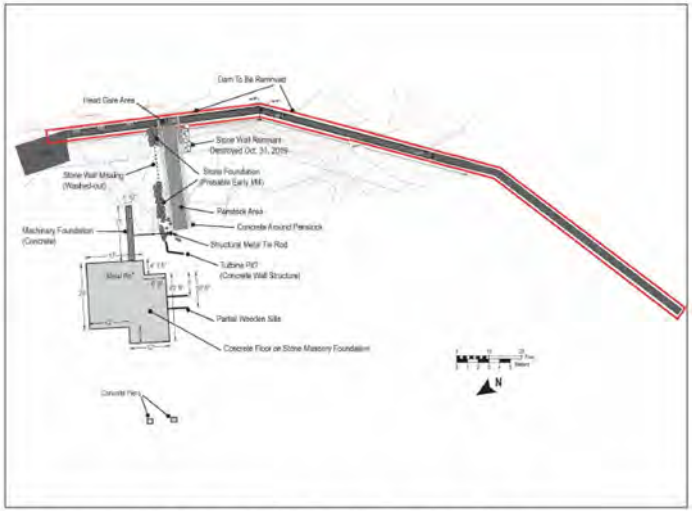


Figure 18. Plan view sketch map of the Johnsons Mill Dam, Bakersfield, Franklin County, Vermont.

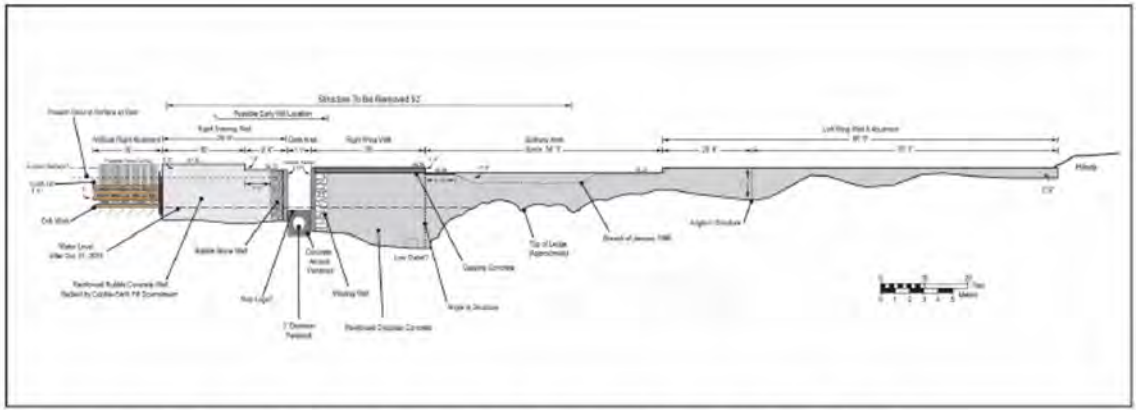


Figure 19. Downstream elevation sketch of the Johnsons Mill Dam, Bakersfield, Franklin County, Vermont.

Place: Cultural Resources - Regulations

Initial Question: Will the proposed undertaking involve any ground disturbance?

Vermont Division of Historic Preservation (VDHP)/ Vermont State Historic Preservation Office (SHPO)

- Project Review Cover Form
- Consultation for the effect of the proposed project on any historic, archaeological, architectural, and cultural resources
- HRR - Historic Resources Review
  - Area of Potential Effect (APE) for standing historic resources, assess the dam's integrity, place the dam and its construction in an historical context, recommendation related to eligibility for inclusion in the State / National Register of Historic Places
- ARA - Archaeological Resources Assessment
  - Gauge the general archaeological sensitivity of the APE
  - Determine if further archaeological studies are needed - maps, town histories, Historic Places, state and local files, field inspection.
- Phase I - Site Identification Survey
- Phase II Investigation: Evaluation Study and Phase III Investigation: Data Recovery Study (Mitigation)
- Army Corps Permit:
  - Project shall be monitored for the first, third, and fifth years following construction to ensure the maintenance, success and stability of the overall dam site - report with recommendations for remedial measures & photographs at specified locations at the same time of year during low flow conditions

Place: Historical Resources

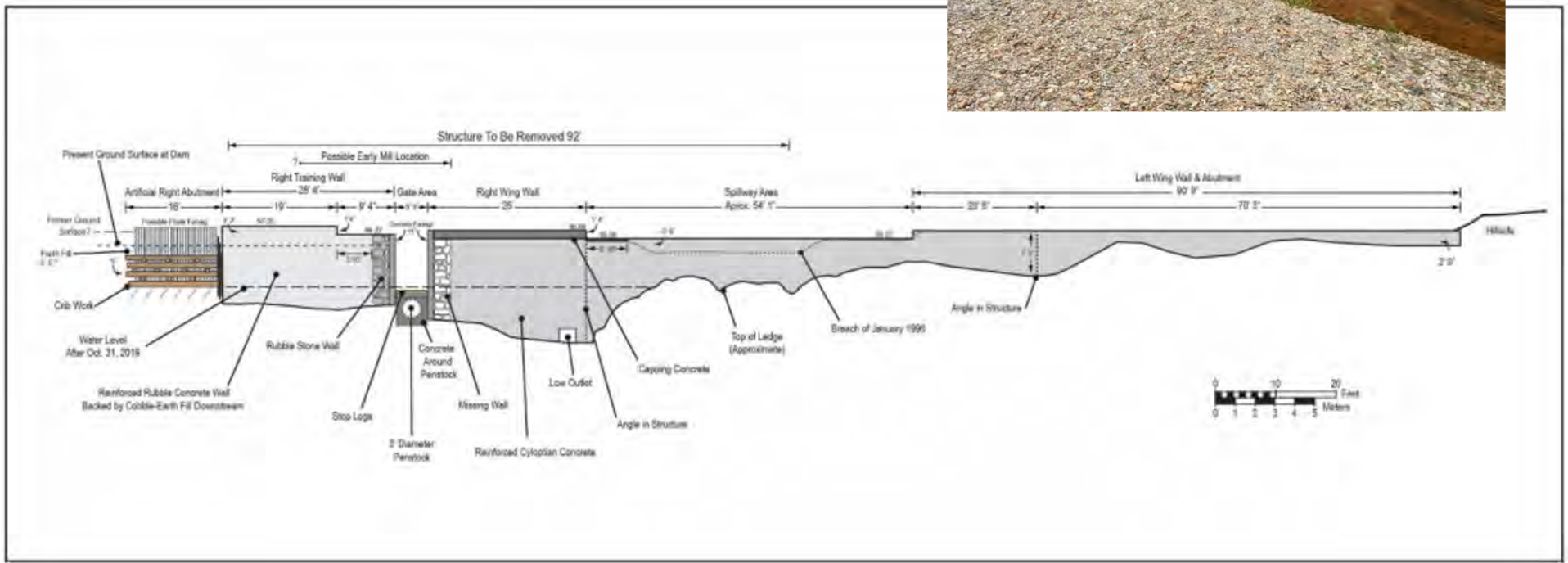
The Town of Bakersfield in the southeastern part of Franklin County, Vermont, was created in the 1790s from miscellaneous tracts including: Knoulton's Gore (a 10,000-acre grant, established in 1787); a part of Fairfield (called "Tomlinson's Square" added in 1794); a part of Smithfield (added in 1794); Knights Gore (added in 1798); a part of Coits Gore (added in 1799); and a piece of land "formerly claimed" by Enosburgh (Figure 8) (Aldrich 1891:513; Dewart 1903). The Johnsons Mill Dam is located in the north central part of Bakersfield about 0.41 mi (0.65 km) south of the present line with Enosburgh, near the former line between Knights Gore and Knoulton's Gore. This area of town later became known as "Bakersfield Hollow" or "Johnson Hollow."

Figure 45. View of the southern side of the mill foundation, looking north. Stone wall may be an extant early mill foundation wall; also note concrete floor on top of stone wall.

Figure 15. Detail of an orthophotograph showing the Johnsons Mill Dam and sawmill in 1995 (Source: Vermont Center for Geographic Information's website at https://vcgi.vermont.gov/).

Figure 16. Satellite imagery of the project area showing the Johnsons Mill Dam in 2015 (Google Earth 2020).

Place: Historical Resources



Place: Archeological Resources

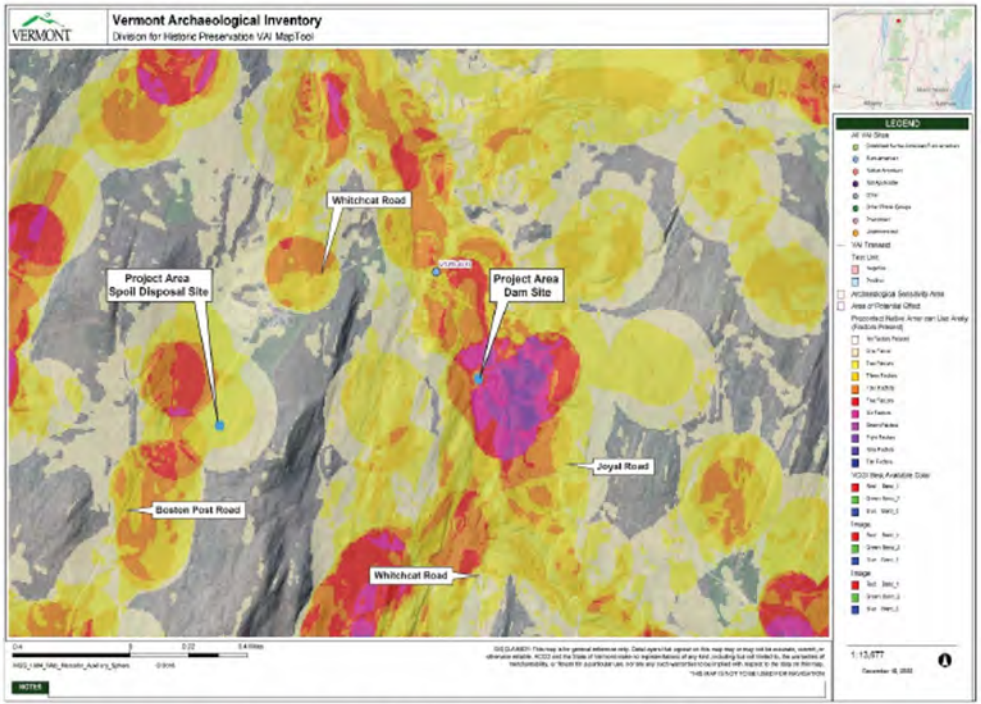


Figure 55. GIS based Archeological Sensitivity Map for the proposed Johnsons Mill Dam Removal Project in Bakersfield, Franklin County, Vermont (VACCD ORC).

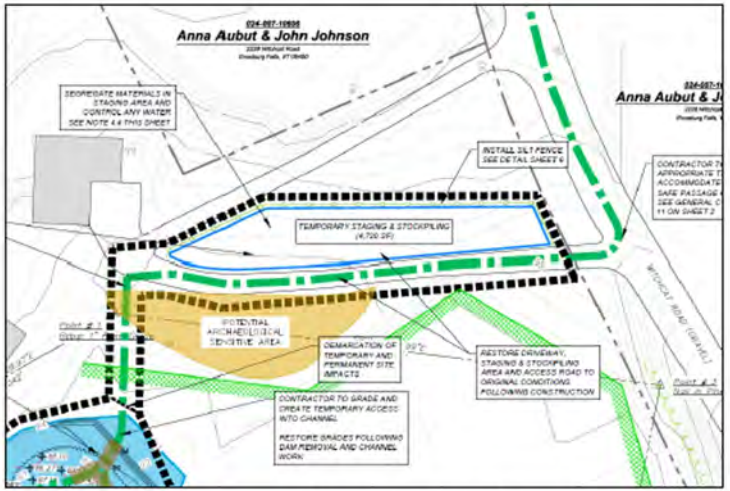


Figure 9. Plan detail showing the proposed temporary staging and stockpiling area within the project area, Bakersfield, Franklin County, Vermont

Place: Archeological Resources

Phase 1

Figure 4. Map showing the location of the Phase I subsurface testing for Johnsons Mill Dam Removal project, Bakersfield, Franklin County, Vermont.

Figure 7. Image of south wall soil profile of Transect 1 Test Pit 2, Phase I subsurface testing for the Johnsons Mill Dam Removal project, Bakersfield, Franklin County, Vermont.

Figure 6. View west along Transect 1 in archaeologically sensitive area, Bakersfield, Franklin County, Vermont; TR1 TP1 in foreground.

Place: Community Engagement - Restoration Community

Place: Community Engagement - Restoration Community

Photo Credit: Karina Dailey
October 20, 2021 - VT Dam Task Force

- Sparked a lot of interest in monitoring
  - Changes over time
  - How to measure ecosystem health and recovery
  - A case study of a dam with relatively little sediment removed in a rural setting
- Led to an LCBP Grant Proposal to Monitor for 4 years

PATRICK LEAHY
Lake Champlain Basin Program

NE IW PCC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Place: Community Engagement

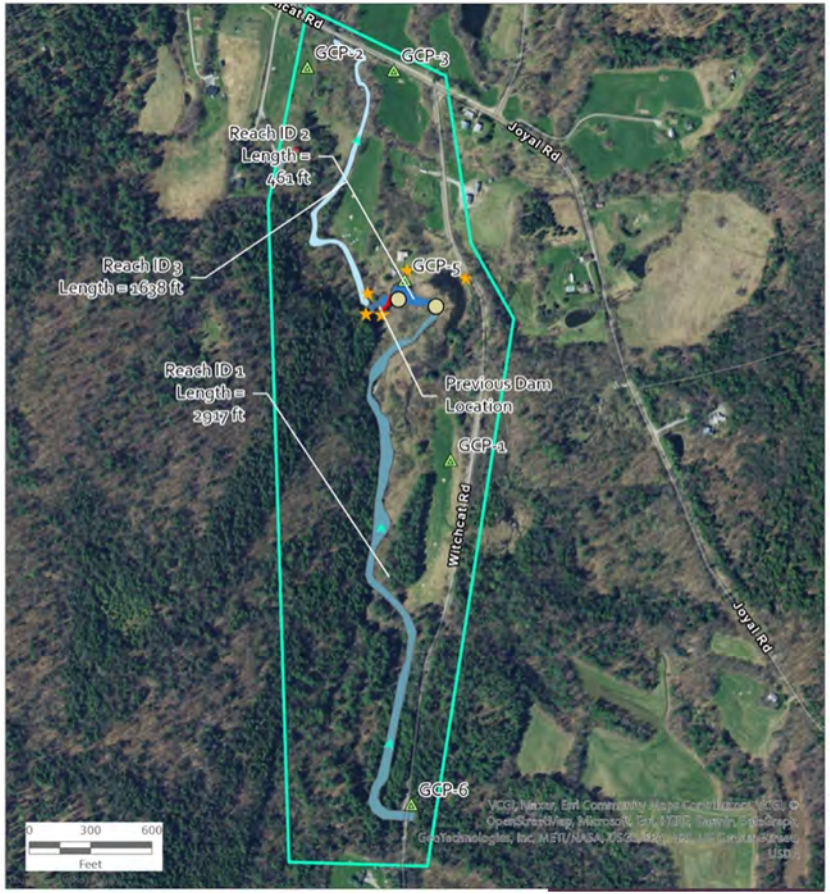
- 2023 - 2 Years Later - Lessons Learned Public Event
- 2024 - Today!
- 2025 - Local media outreach + Press release

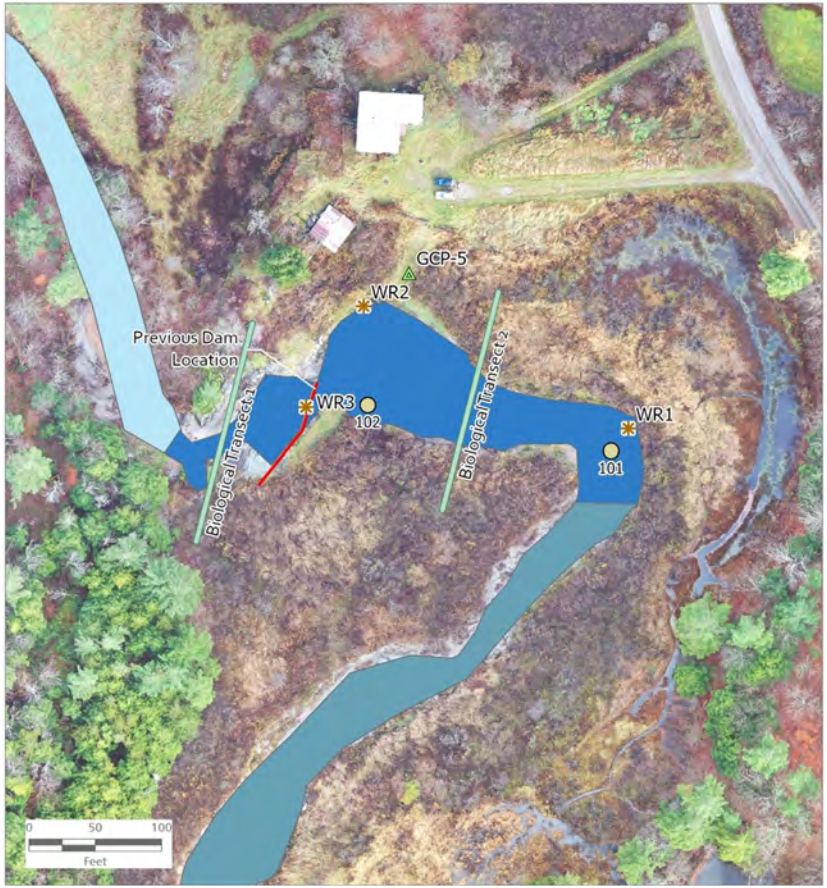
Impact: Monitoring at Johnsons Mill Dam

- Four years (2022, 2023, 2024, and 2025)
- Data Collection
  - Streambed material characterization
  - Wood recruitment
  - Plant survival and coverage
  - Algal analysis
  - Macroinvertebrate analysis
  - Topographic and bathymetric surveying via UAV
  - Aerial imagery
- Reporting
- Public Outreach

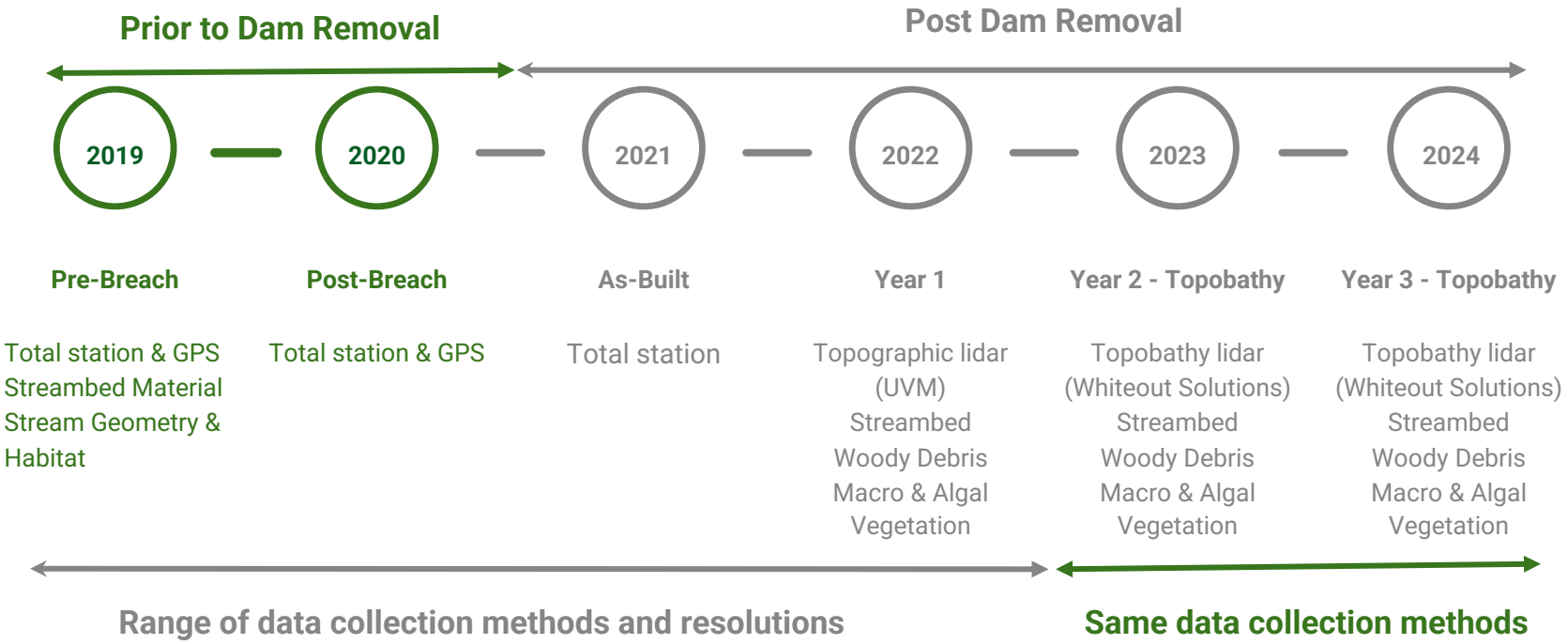
Monitoring: Identification & Removal of Remaining Concrete

Monitoring: Project Extent and Sampling Locations

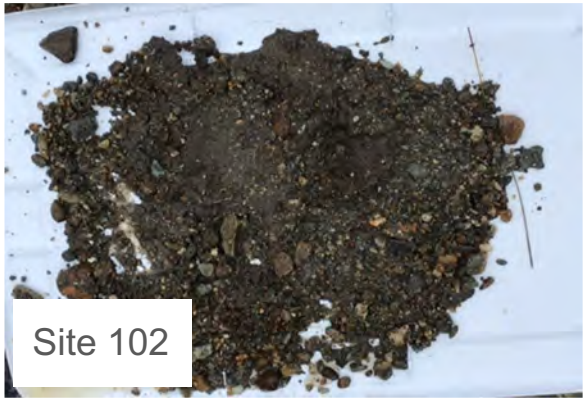


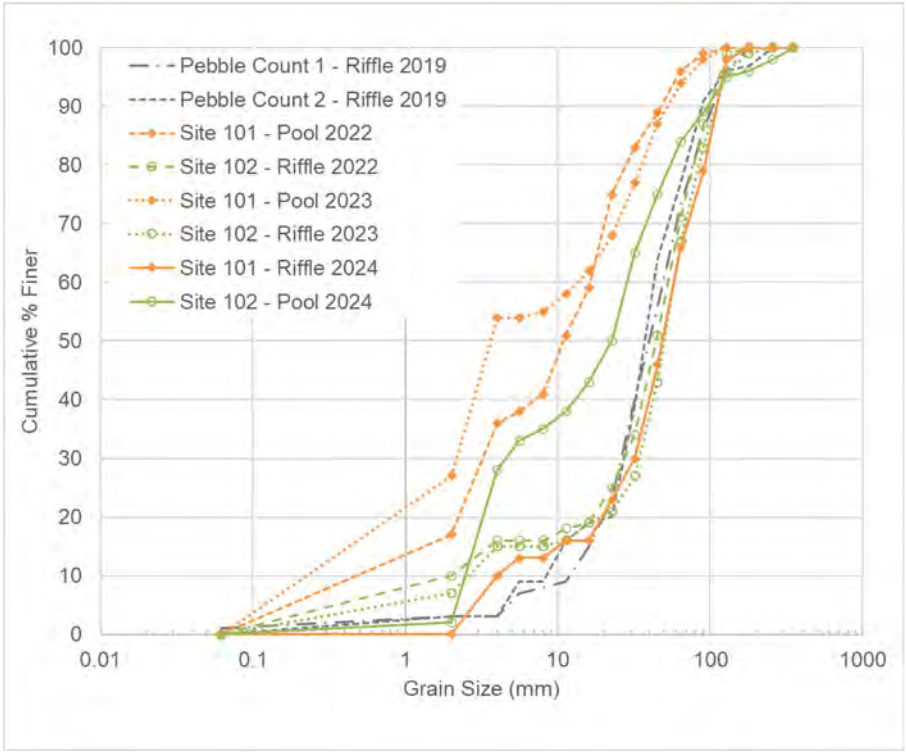


Monitoring: Data Collection Timeline

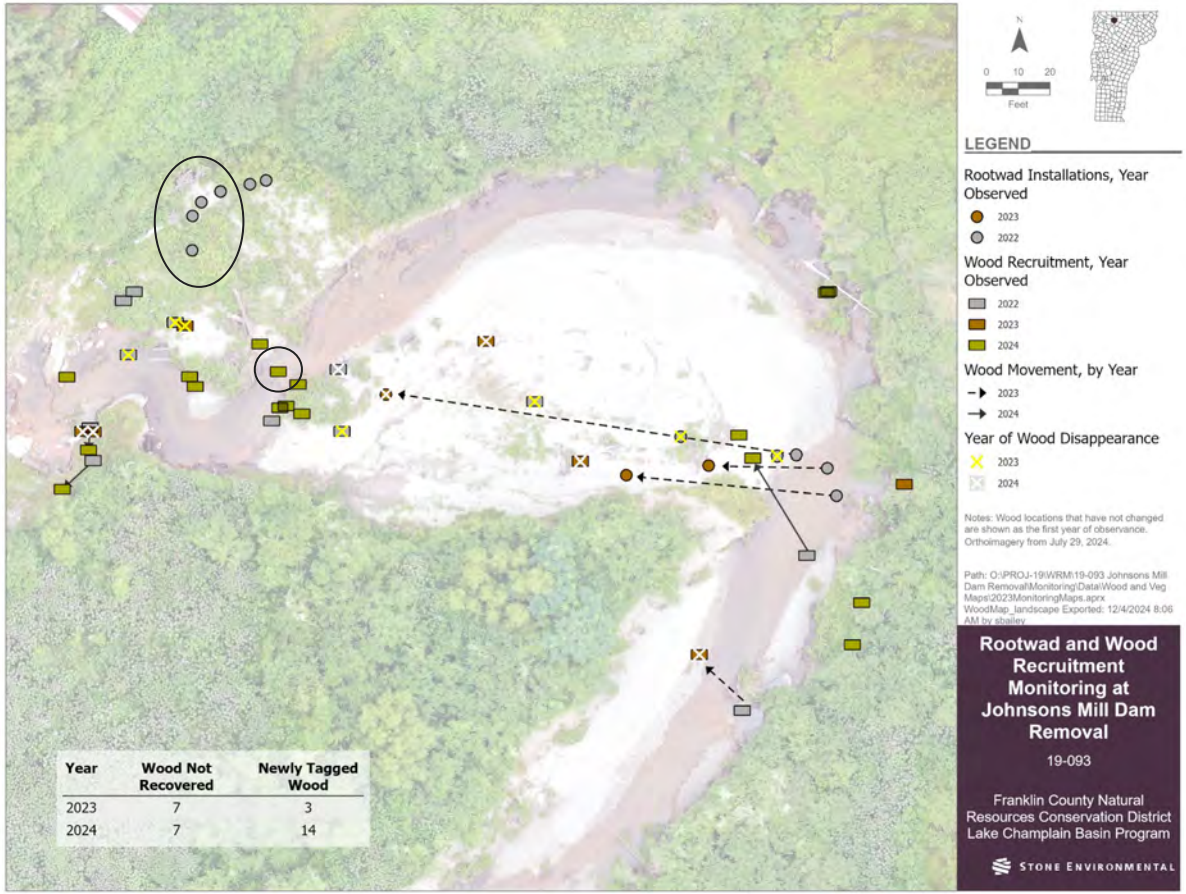


Monitoring: Streambed Material Characterization





Monitoring: Rootwads & Wood Recruitment



Year	Wood Not Recovered	Newly Tagged Wood
2023	7	3
2024	7	14

Monitoring: Rootwads & Wood Recruitment

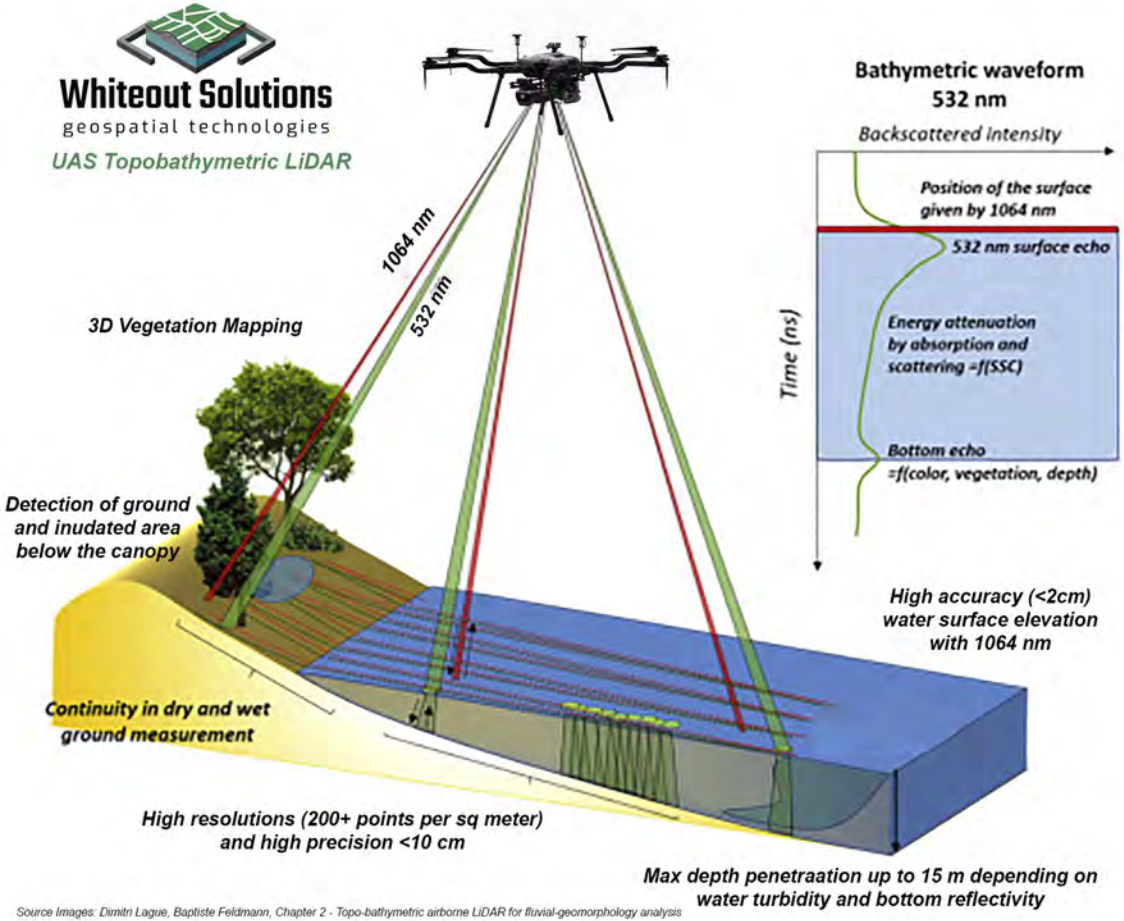
Rootwads in abandoned pilot channel

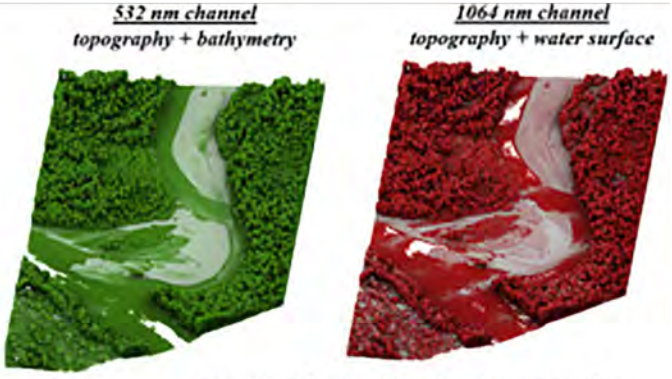
Newly tagged woody debris - 2024

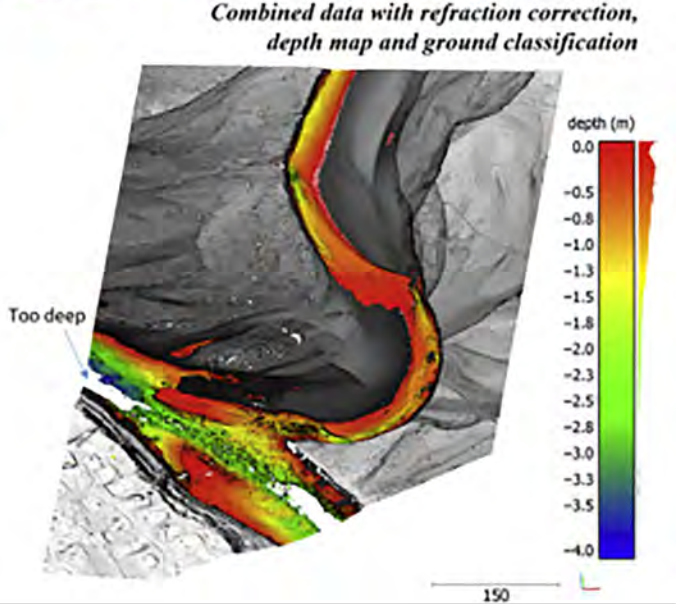
Monitoring: Aerial Imagery and Analyses

July 2023 December 2023

Topobathy LiDAR: Explained



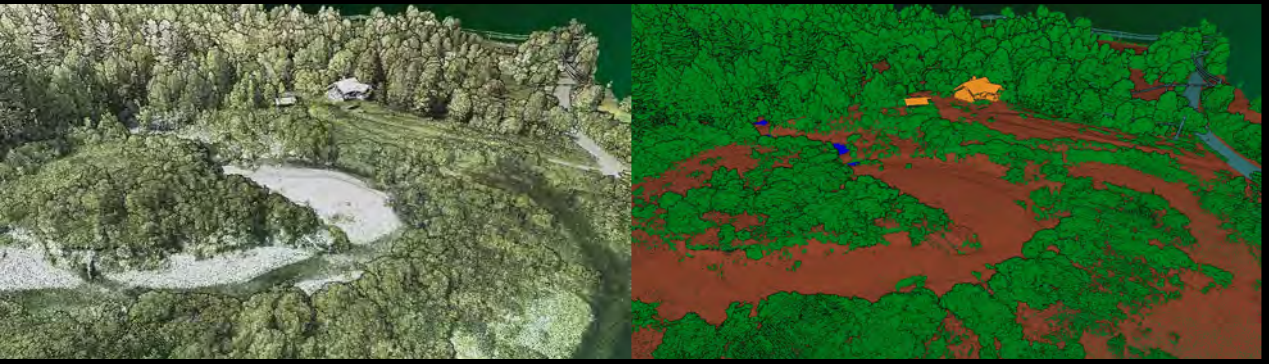




Monitoring: Topobathy LiDAR

LiDAR Point Cloud RGB colorized & ASPRS Classified

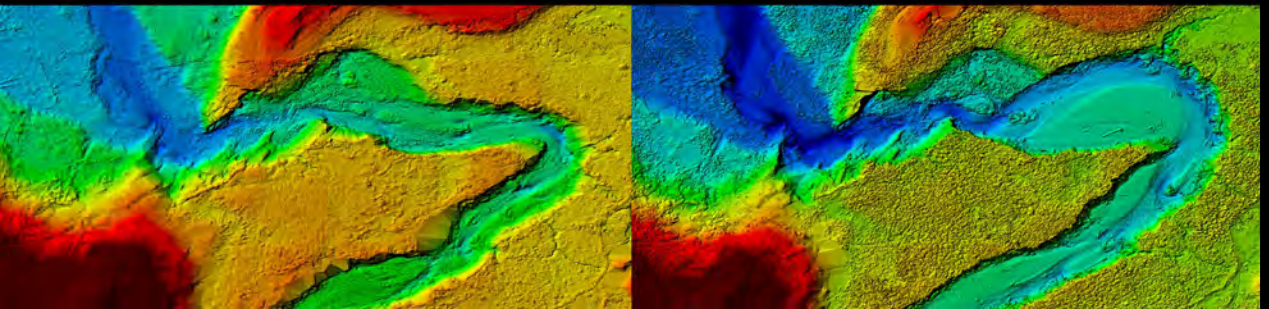
LiDAR collected in June 2023 & 2024

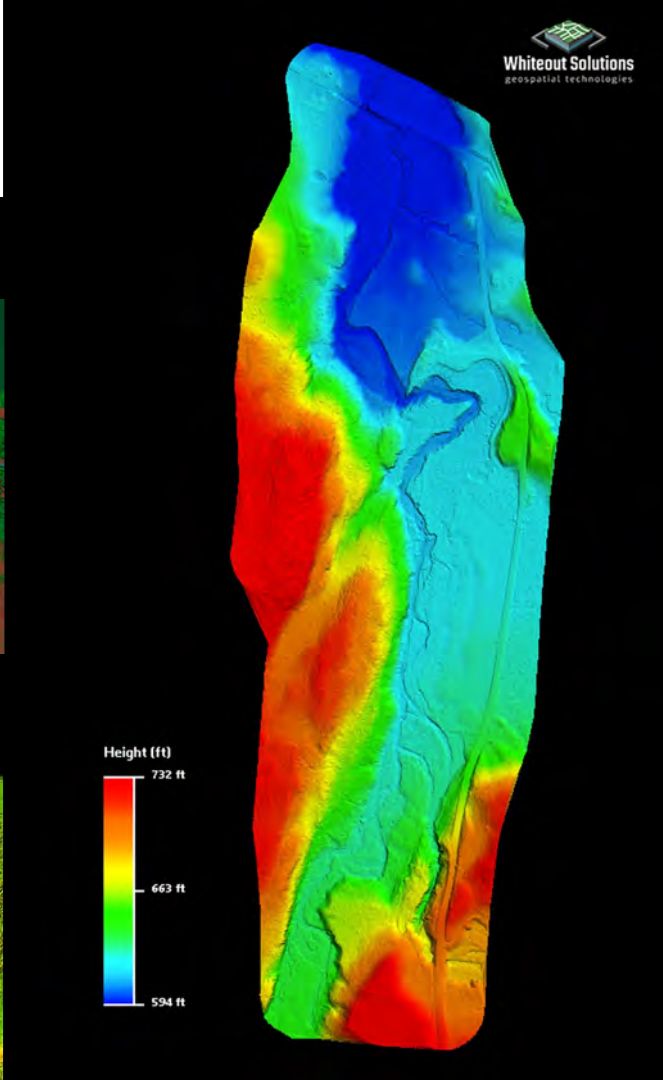


LiDAR derived Digital Terrain Models

2023 Pre-Flood

2024 Post Flood



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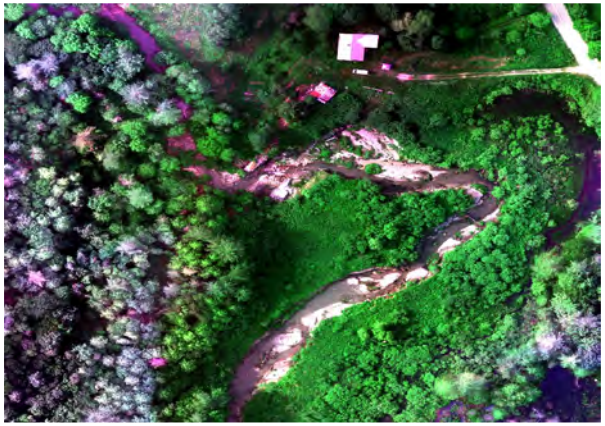
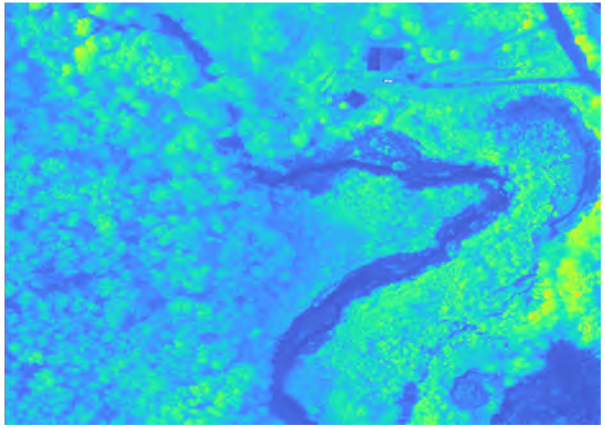
Monitoring: Multispectral Imagery

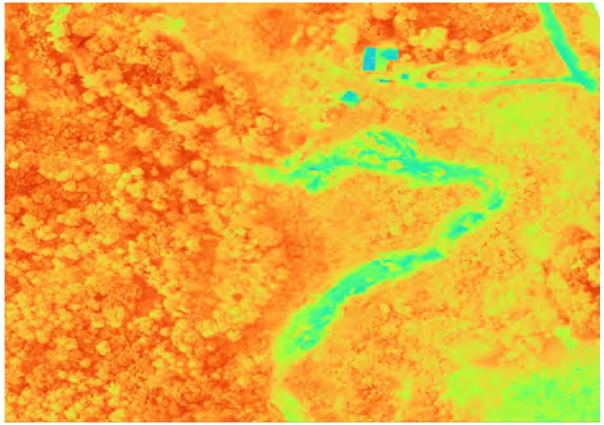
RBG Imagery



RTVIcore



NDVI



Monitoring: To Be Continued…

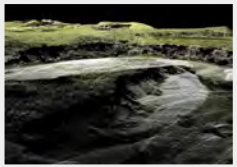
Recurring Annual Survey Pre & Post Removal

Aerial & Vegetation Surveys

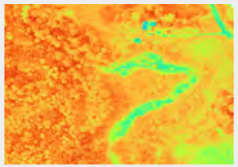
Aerial LiDAR & Imagery Survey

Field Survey of Vegetation

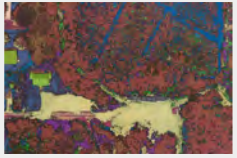
Data Processing



Point Clouds



Spectral Indices



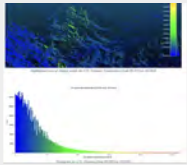
Land Cover Classification

Field Validation

Field Survey

Years 2 & 3

Change Analysis



Volumetric from LiDAR

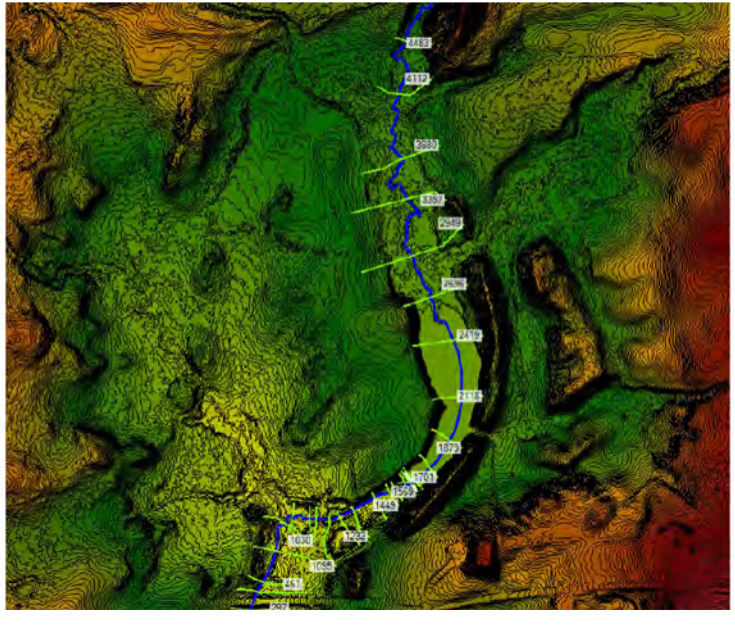
Vegetative from Land Cover

Monitoring: Proposals to Keep Learning

LCBP Research Grant Pre Proposal Submitted Fall 2024: Help increase the collective understanding of the long-term ecological, riparian function, and river dynamics benefits and impacts of dam removals and how to monitor them.

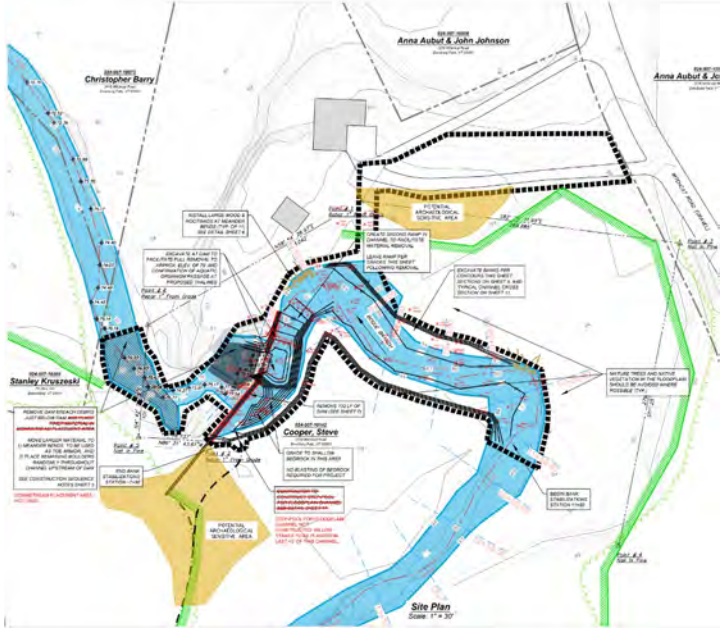
Trout Brook Reservoir Dam

- Pre-removal data collection to match post removal monitoring; refined and expanded metrics
- Comparison to Johnsons Mill (similar watershed setting in LCB)



Johnsons Mill Dam

- Extend timeline & geographic area for monitoring
- Refine and expand metrics



Monitoring: Proposals to Keep Learning

- What type and extent of monitoring data is most useful to collect to understand the impacts of dam removals on stream processes and habitat? (adding in biological - fis, macroinvertebrates, algal - and water quality parameters (pH, temperature, turbidity, DO - in addition to physical)
- How can monitoring data be used to understand differences in sediment movement and changes in vegetation communities under varying levels of impounded sediment removal and pilot channel design?
- What watershed- and reach-scale factors could help determine how much sediment is appropriate to be released during dam removal?
- How does the potential negative impact of phosphorus and sediment release compare to long-term benefits of nutrient balance, ecological health, riparian function, and river dynamics?
- How to reduce terrestrial invasive species colonization/recolonization post dam removal?

Trout Brook Reservoir Dam impoundment area showing reed canary grass and channel prior to larger impoundment area upstream of dam

Outline

20 mins
- Finding Dam Removals
- Public Engagement
  - Why, When, How
- Storytelling
  - Outreach Events
  - Working with Historic Preservation
  - Monitoring Data + Media
- Johnsons Mill Dam Removal Example
  - Project progression - scoping, removal, monitoring, removing additional concrete (2024)

20 mins
- Preliminary Data from Johnsons Mill Dam
  - Deep dive into monitoring + public event in 2023
  - Field data collection, wood recruitment, public event
  - Channel adjustment
  - Sediment transport
  - Plant communities
  - Aerial Imagery
  - Lessons learned + request for more monitoring

5 mins
- Trout Brook Reservoir Dam Removal Example + application to other sites
  - Pre-removal data collection
  - Post removal monitoring goals

10 mins Q&A