Broad Meadow Brook

Wetland Restoration Project

Listening Session 1

08/06/2024

Commonwealth of Massachusetts
Division of Ecological Restoration
Invested in Nature and Community

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Southeast New England Program

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Definitions

- **Climate Change**: long-term changes in temperature and weather that is currently being caused by human activities
- **Wildlife Sanctuary**: a protected area where wild animals and plants can live in their natural habitats
- **Wetland**: area where the land and soil is covered by water and/or full of water
- **Watershed**: area of land where rainwater and melted snow flow downhill into larger bodies of water such as streams, creeks, rivers
- **Restoration**: repairing damaged/destroyed ecosystems

Please reference these definitions when necessary as they are used throughout the presentation.

Vision: A dynamic, diverse, and self-sustaining stream and wetland ecosystem that provides a full suite of ecosystem benefits, and is accessible for the benefit and enjoyment of neighbors, residents, and visitors

Broad Meadow Brook context

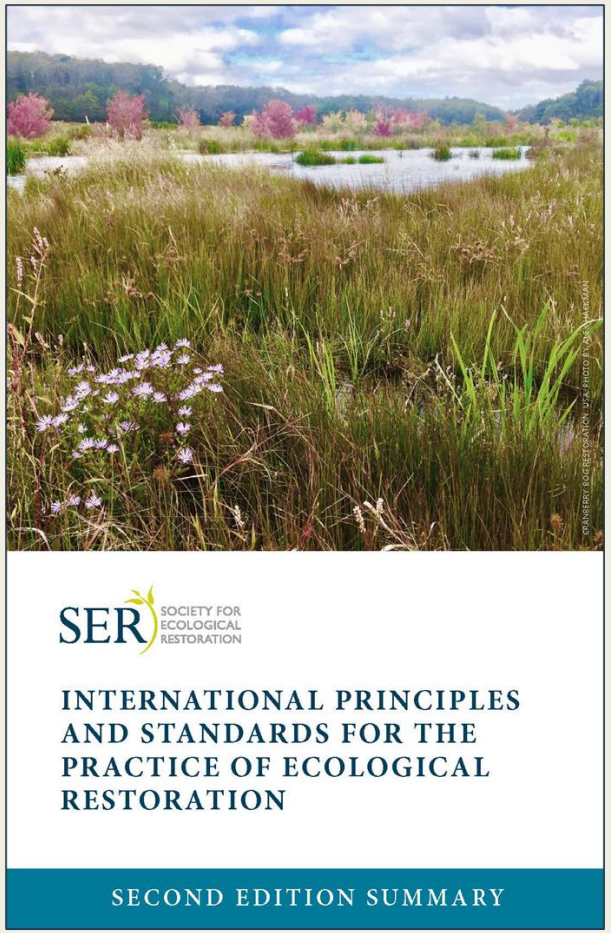
Image courtesy of City of Worcester DPW&P

Ecological Restoration

The process of assisting the recovery of an ecosystem that has been damaged, degraded, or destroyed

Why?

Increase biological diversity, capture and store carbon, improve water quality, store floodwater, purify air, and much more.



Ecological restoration is the process of assisting the recovery of damaged, degraded, or destroyed ecosystem.

Range of Impacts

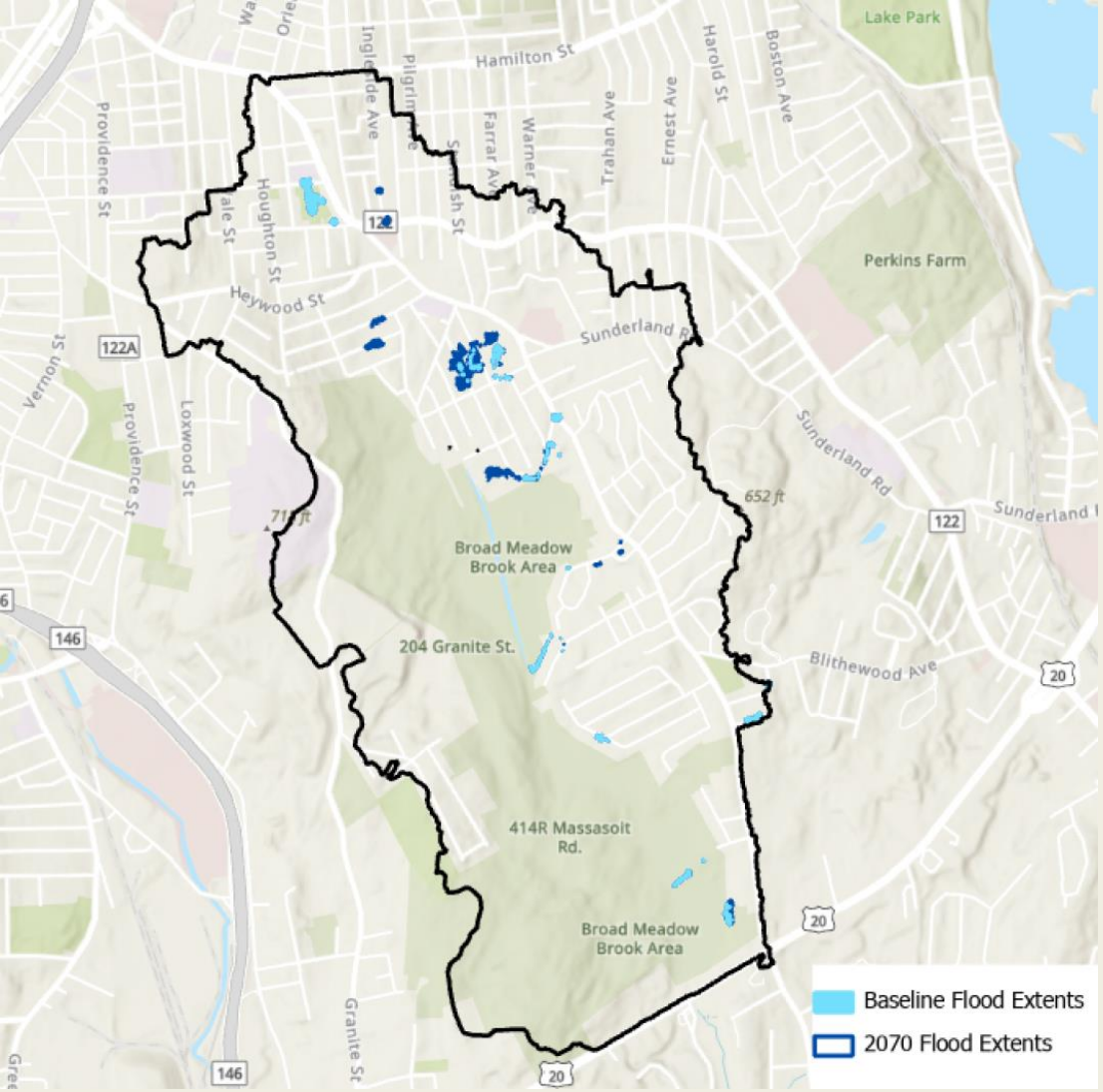
Damage refers to an acute and obvious harmful impact such as invasions of non-native species.

Degradation refers to chronic impacts resulting in the loss of biodiversity and the disruption of ecosystem functions, such as long-term agricultural impacts.

Destruction is the most severe level of impact, when degradation or damage removes all macroscopic life and commonly ruins the physical environment, such as urbanization and mining.

Source: https://ser-rrc.org/what-is-ecological-restoration/

Damage, degradation, and destruction are all range of impacts that determine the level of restoration needed.



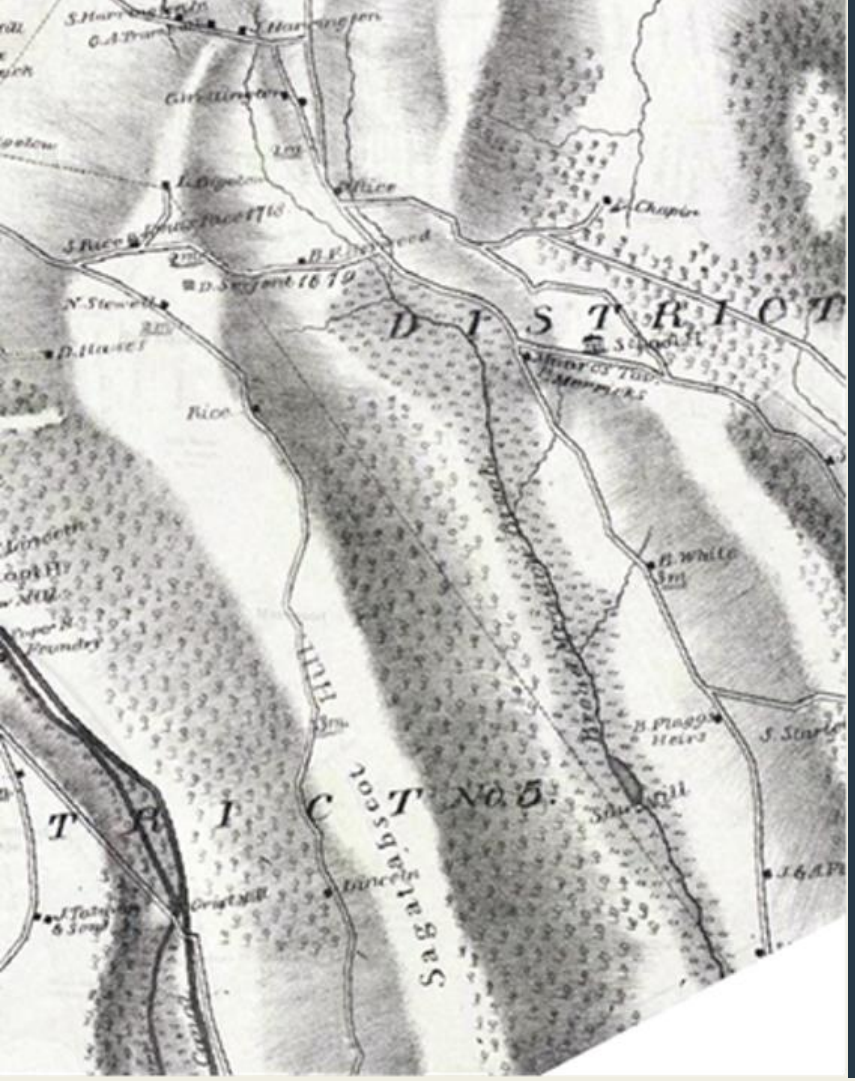
Watershed assessment

Seeking to identify a broad range of gray and green infrastructure projects that could improve water quality and quantity problems in Broad Meadow Brook, anticipated to worsen with climate change

No action
10 year, 24-hour storm event

Weston & Sampson
Princeton Hydro

Recent watershed assessments determined the effects of extreme flooding will worsen if no actions are taken to mitigate the flooding. Constructing natural and man-made systems to drain stormwater also known as green and gray infrastructure, could potentially decrease some of the effects of flooding in the sanctuary and in the neighborhoods around it.



Historic map - 1833

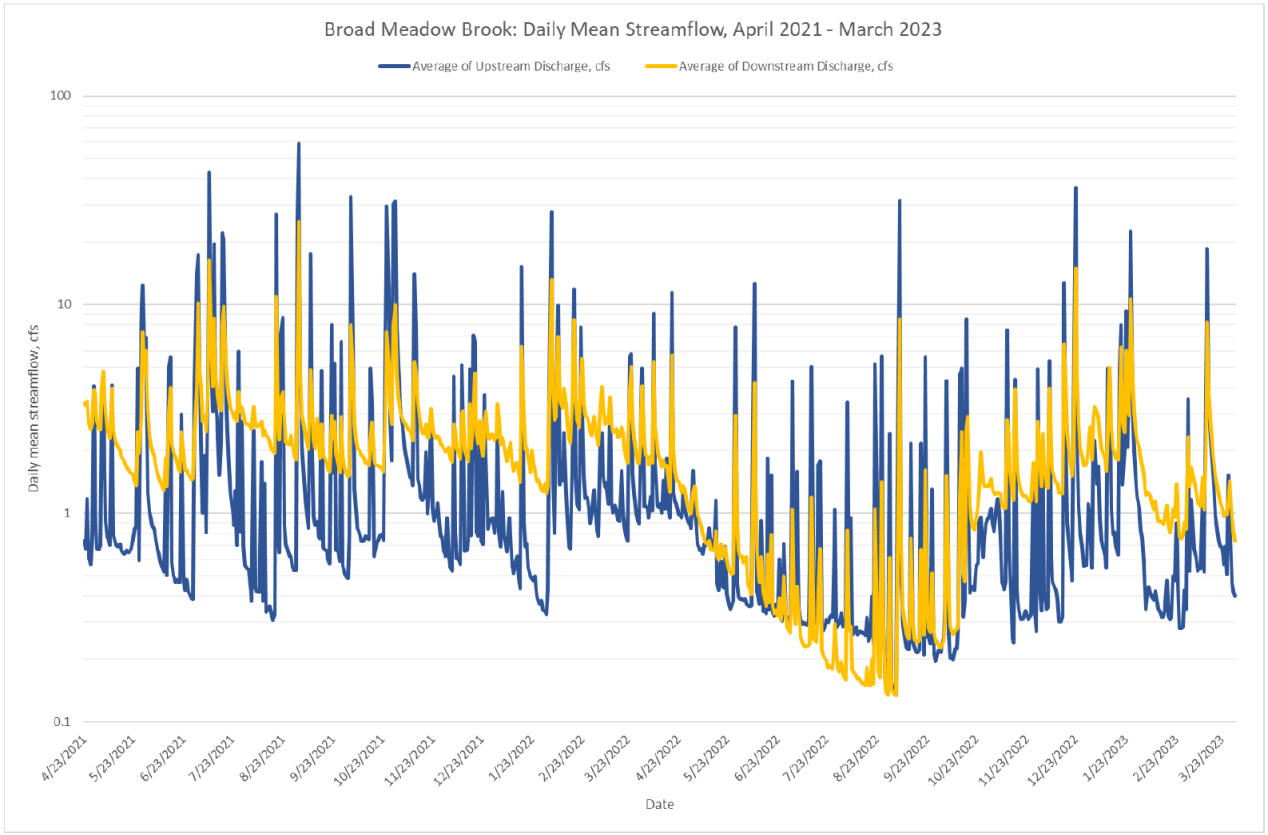
- Main streets exist: Grafton, Massasoit, Heywood, Blithewood, Sunderland
- Entire zone along brook mapped as wetland
- Extensive forests on Sagatabascot Hill and elsewhere
- Sawmill and pond occurs on brook west of Blithewood Ave.
- Two tributaries are mapped in the sanctuary area from east
- Three brooks converge near Massasoit and Heywood

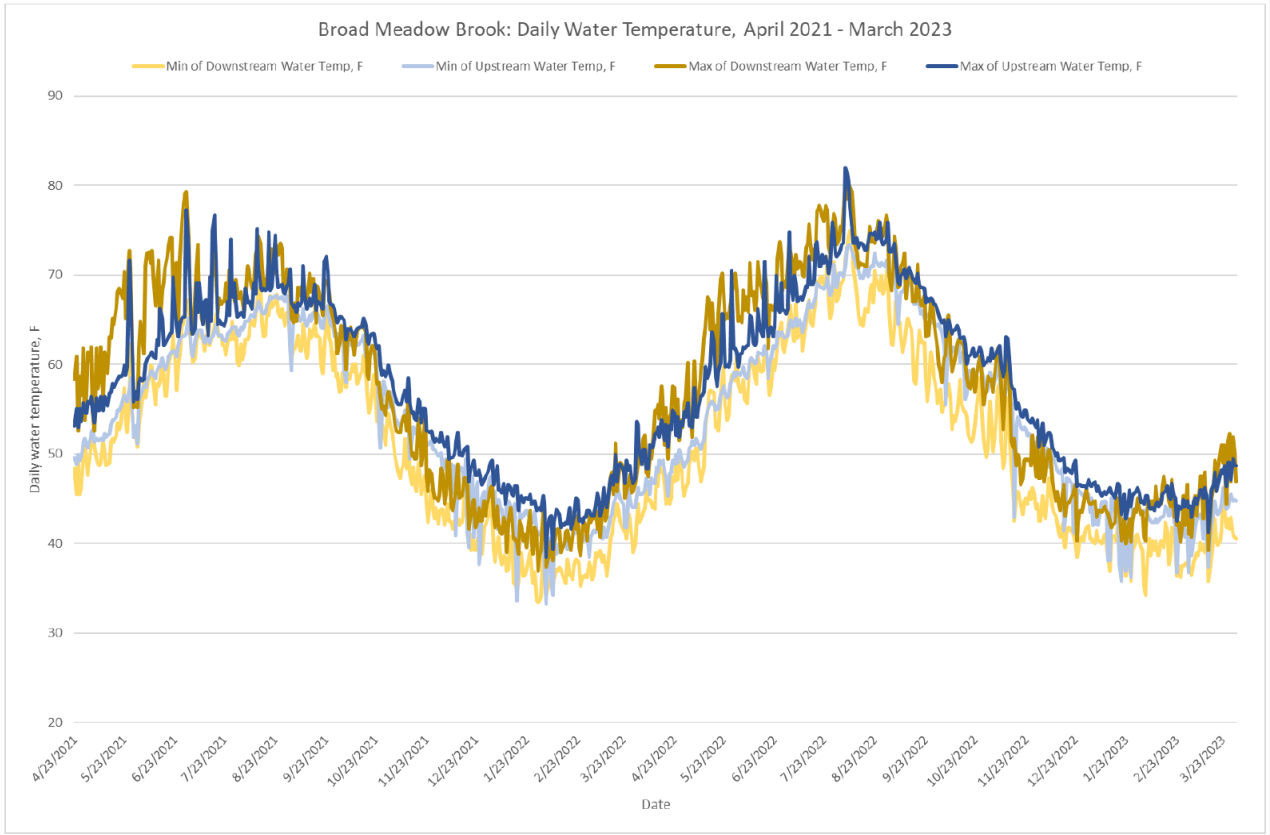
- The Broad Meadow is the largest wetland system remaining in Worcester

Broad Meadow Brook has a diverse history and as of today, is the largest wetland system remaining in Worcester.

Pictures of Division of Ecological Restoration monitoring stream heights and flow speed to determine the intensity of stream flow when it rains.

Stormwater-Driven Streamflow: Flashy and Hot





Data reveals that the stream is very flashy and hot raising concern for the brook's ability to help mitigate some of the flooding.

Other concerns that affect stream flow and ecological function of the brook is the box culvert that was constructed in the 1930s. Removing this culvert will allow organisms, energy, and material to flow freely across the wetland.

Restoration: Tailored to impacts

Assisting recovery can be… as simple as removing an invasive species and planting native vegetation; or, as complex as altering landforms, changing the hydrology, and reintroducing wildlife.

This project will consist of simple and complex restoration strategies. These consist of removing invasive species and changing the hydrology of the brook.

Assisting in recovery means…

- Repairing processes
- Restoring connectivity
- Involving people

1. **Take actions that allow nature to take care of itself**

   Identify stressors that limit recovery, carefully plan and take actions, monitor changes, and help ecosystems heal themselves.

2. **Remove barriers to re-connect ecosystems**

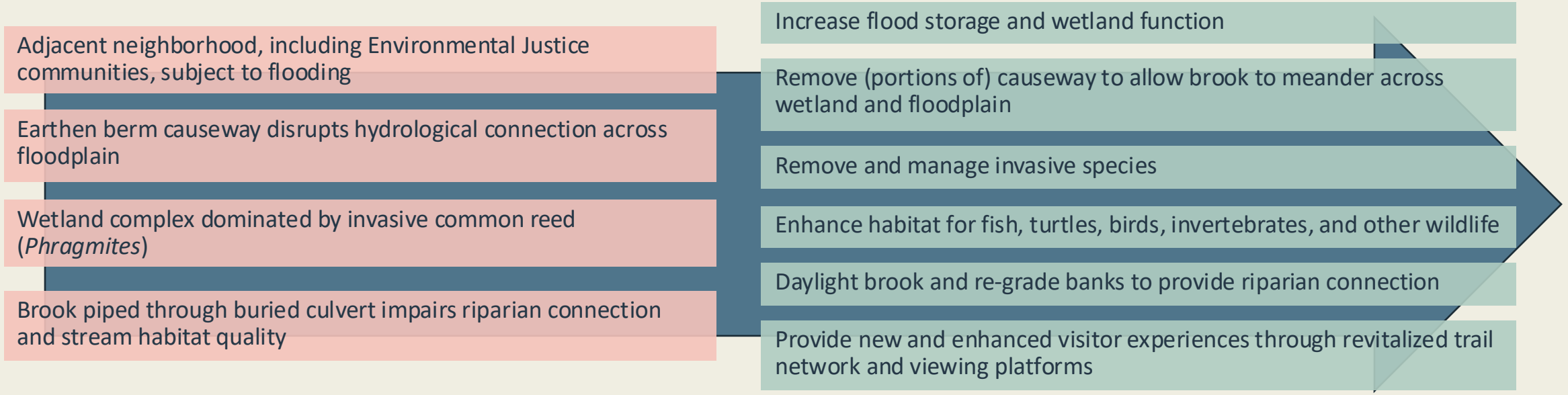
   Well-connected ecosystems allow organisms, energy, and material to flow freely across the landscape within and between different habitats.

3. **Engage people for wisdom and long-term care**

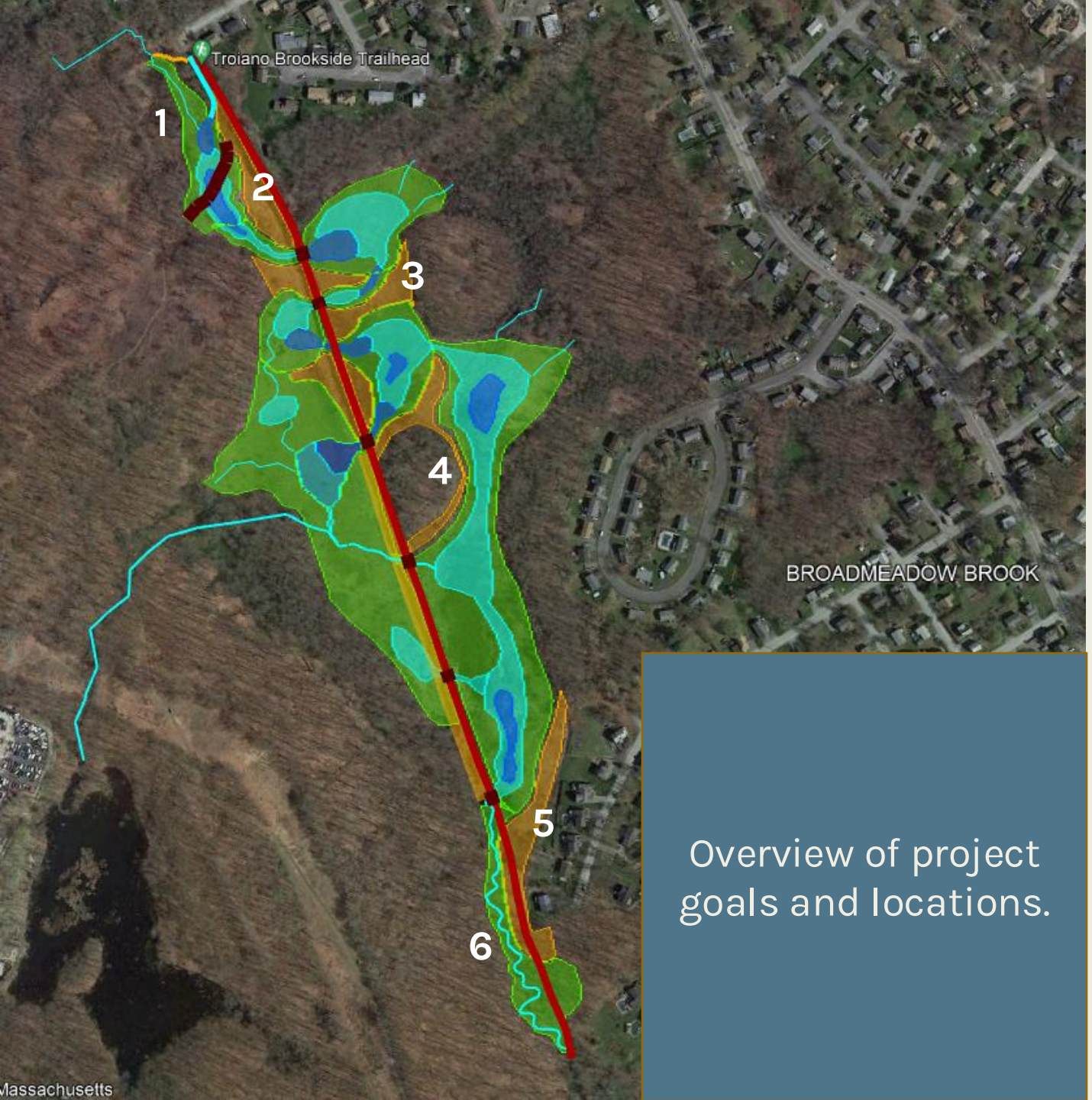
   We succeed by listening to and working with neighbors, farmers, Tribes, watershed groups, politicians, and many others.

Repairing processes, restoring connectivity, and involving people are all critical project components when assisting recovery to a natural area.

From Stressors to Solutions



Flooding, hydrological connection, invasives, and the culvert are all stressors that need to be addressed. Solutions consist of increasing wetland function, removing portions of the causeway, removing invasive species, and removing the culvert. Doing this will improve the ecosystem and provide new and enhanced visitor experiences through revitalized trail network and viewing platforms



Overview of project goals and locations.

Notes

1. Multiple actions to reduce power during storm events
2. Fill entire length of existing canal and cut from the site.
3. Use cut to create topographic feature to guide the movement of water across the valley.
4. Blend fill into existing topography where possible.
5. Place fill to lower concerns about flooding.
6. Fully reconstruct the narrow valley and use in-stream grade controls as needed (e.g., riffles, rock-steps) to reduce downstream peak flow concerns.
7. Improve this design in GIS for next iteration looking at elevations, soils, drainage pathways, and more.

Legend

Green = Wetlands (some cut on eastern side to match west)
Light blue = Shallow cut for marsh (matching the west)
Dark blue = Deep cut for pools
Tan = Fill placed to guide water or reduce flooding risks
Red = trail (mostly on existing causeway)
Maroon = boardwalk

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