

MITIGATION TOOLS TO IMPROVE AQUATIC CONNECTIVITY IN NEW HAMPSHIRE

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Aquatic Resource Mitigation Program

**Wetlands Bureau
New Hampshire Department of
Environmental Services**



NEW HAMPSHIRE THRESHOLDS ON WETLAND IMPACTS

- NHDES Wetlands Bureau
 - Regulatory program that issues permits for unavoidable wetland impacts
- **Mitigation** is required
 - Wetland impacts > 10,000 square feet
 - Any tidal impact
 - Stream impacts > 200 linear LF
 - Temporary and secondary impacts (ACOE) to buffers of streams and vernal pools



FOUR TYPES OF COMPENSATORY MITIGATION IN NEW HAMPSHIRE

- **Permittee-Responsible**

Options to offset unavoidable impacts

1. Land preservation of upland buffer
 2. Wetland/stream restoration or enhancement
 3. Wetland creation (not preferred)
- Mitigation must occur in the same watershed as the impact
 - Projects prioritized by Conservation Commission considered first

- **In-Lieu Fee Program**

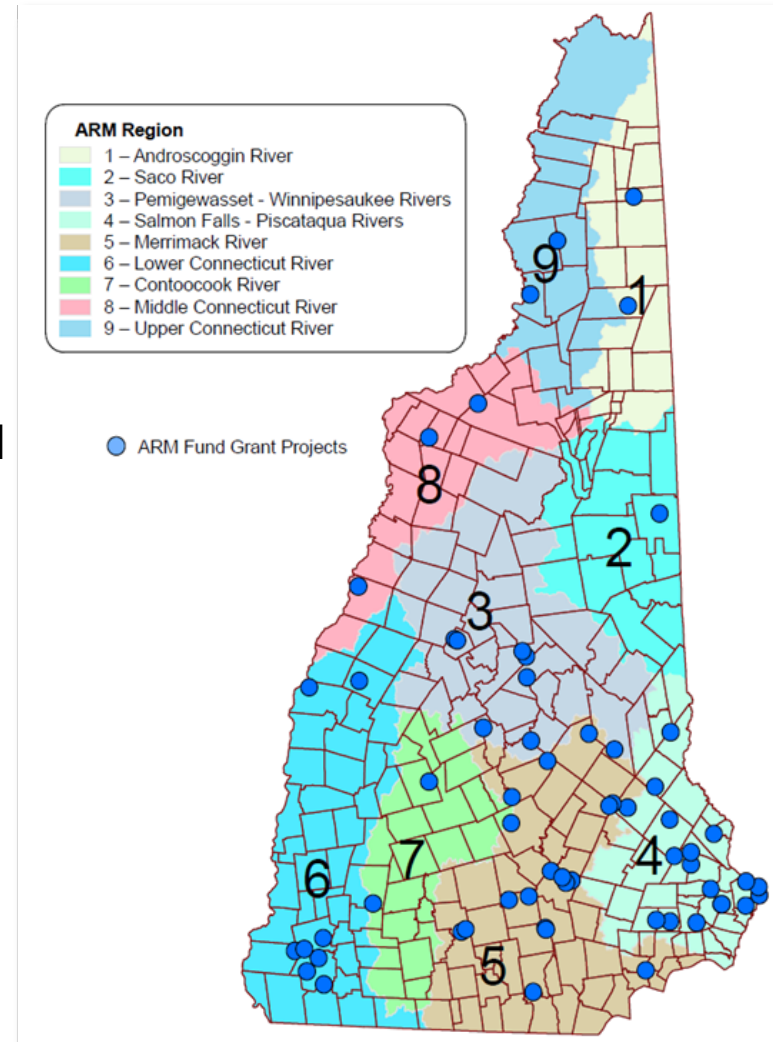
Option when there are no suitable, local mitigation projects

4. Payment into the **Aquatic Resource Mitigation ("ARM") Fund**



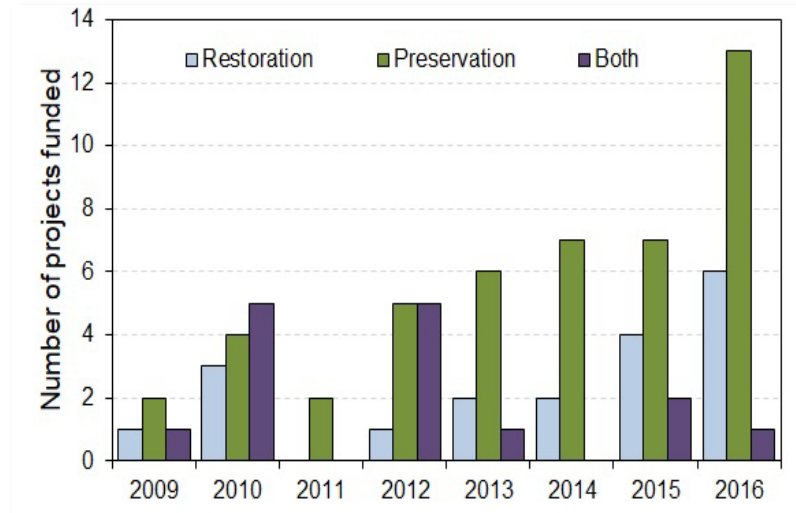
THE AQUATIC RESOURCE MITIGATION FUND

- **NH ILF Program (RSA 482-A:28 – 33)**
 - Option for projects that have difficulty finding good local mitigation
 - Payment made for wetland impacts
 - Funds are pooled by watershed
 - Money is spent where impacts occurred
- **NHDES Wetlands Bureau is the ILF program sponsor**
 - DES assumes mitigation responsibility
 - Administers the program and distributes funds as grants
 - Oversight by Interagency Review Team
 - 9 member Site Selection Committee
 - 80 projects funded since 2007



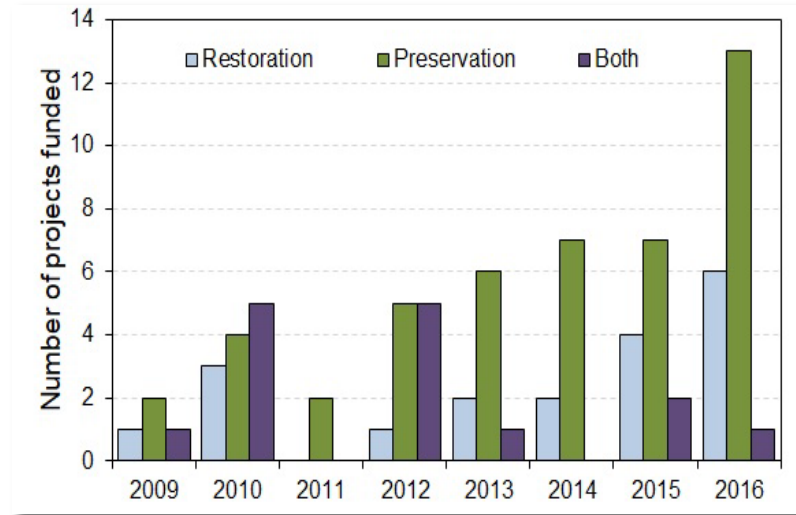
PROJECTS FUNDED BY THE AQUATIC RESOURCE MITIGATION FUND

- Preservation of upland and riparian buffers
 - Acquisition of land, conservation easements, transaction fees, and costs for protection in perpetuity
 - **12,726 acres of land preserved**
 - **29 miles of stream protected**
- Stream and wetland restoration
 - Design, construction costs, plantings, and monitoring
- Tidal improvements
 - living shoreline and coastal stability



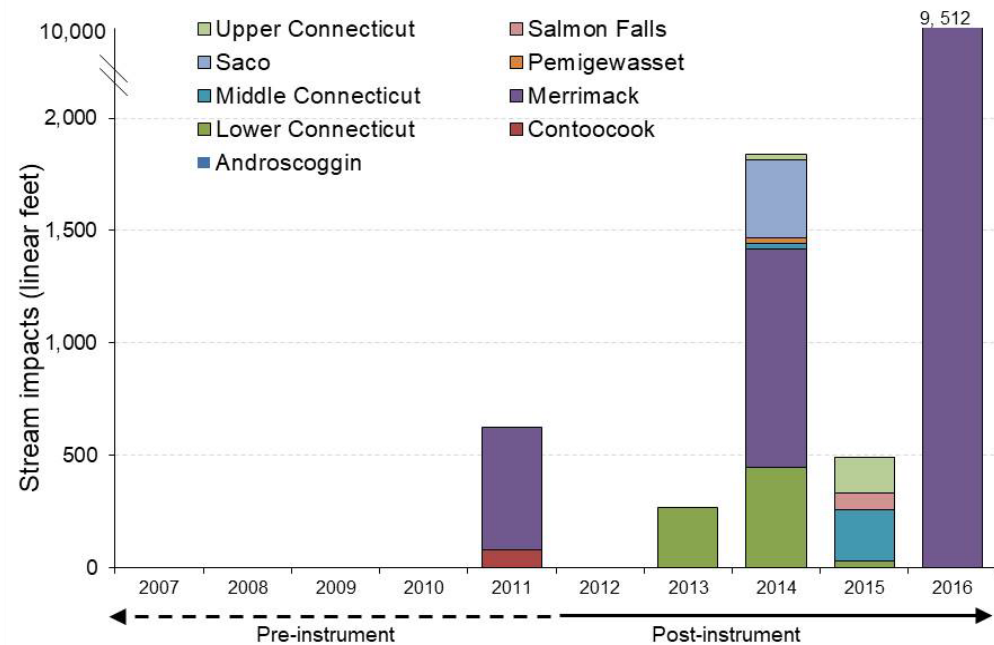
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- Restore aquatic connectivity
 - Dam removals
 - Replace culverts that are barriers
 - Instream habitat modifications



STREAM BARRIER REMOVAL AS COMPENSATORY MITIGATION

- 2010 NHDES adopted rules for stream impacts
 - ARM payment assessed at \$200 LF
 - Funds can be used to offset stream impacts within the same watershed
- Use these funds to remove aquatic barriers
 - ARM site selection committee developed evaluation criteria
 - Target eligible stream crossings



NEW HAMPSHIRE STREAM CROSSING INITIATIVE

- Multi-agency partnership
- Address the complex problem of undersized and deficient crossings

MISSION

Inventory stream crossings throughout the state to inform data-driven decisions on culvert replacement and stream restoration



NEW HAMPSHIRE STREAM CROSSING INITIATIVE

- Stream crossing surveys
- Multiple partners collecting data
- Consistent protocol that meets multiple objectives

- Training and QAQC

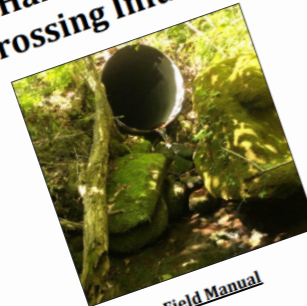
Score culverts

- ✓ Geomorphic compatibility
- ✓ Aquatic organism passage
- ✓ DOT Asset condition
- ✓ Flood vulnerability



Statewide Asset Data Exchange System
(SADES)

New Hampshire Stream Crossing Initiative



Field Manual

In Partnership With:

NH Department of Environmental Services
NH Department of Transportation
NH Fish and Game Department
NH Division of Homeland Security and Emergency Management
NH Regional Planning Commissions
UNH Technology Transfer Center

Version: 6.0

SADES Stream Crossing Assessment 6.0



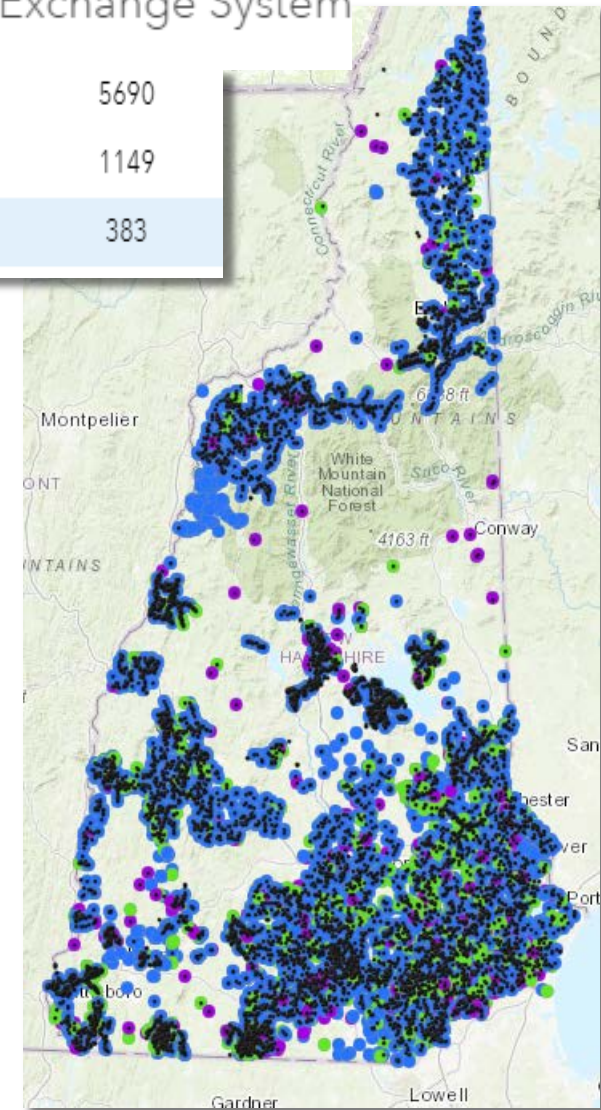
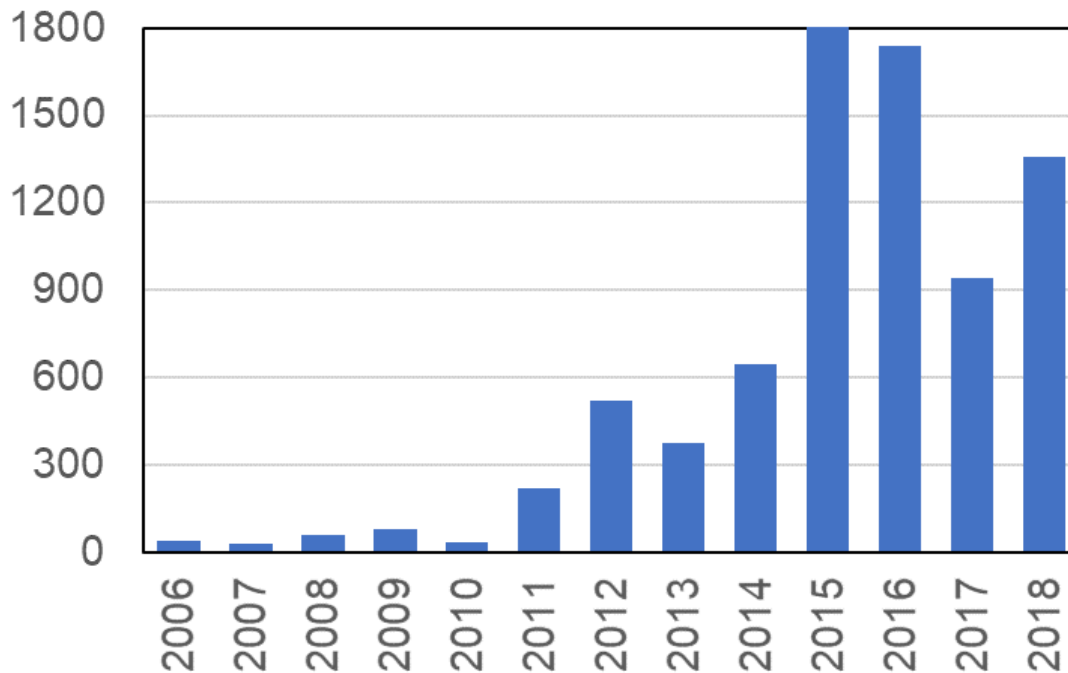
NEW HAMPSHIRE STREAM CROSSING INITIATIVE

NH Statewide Asset Data Exchange System

- Cloud-based data storage and management
- Electronic data collection

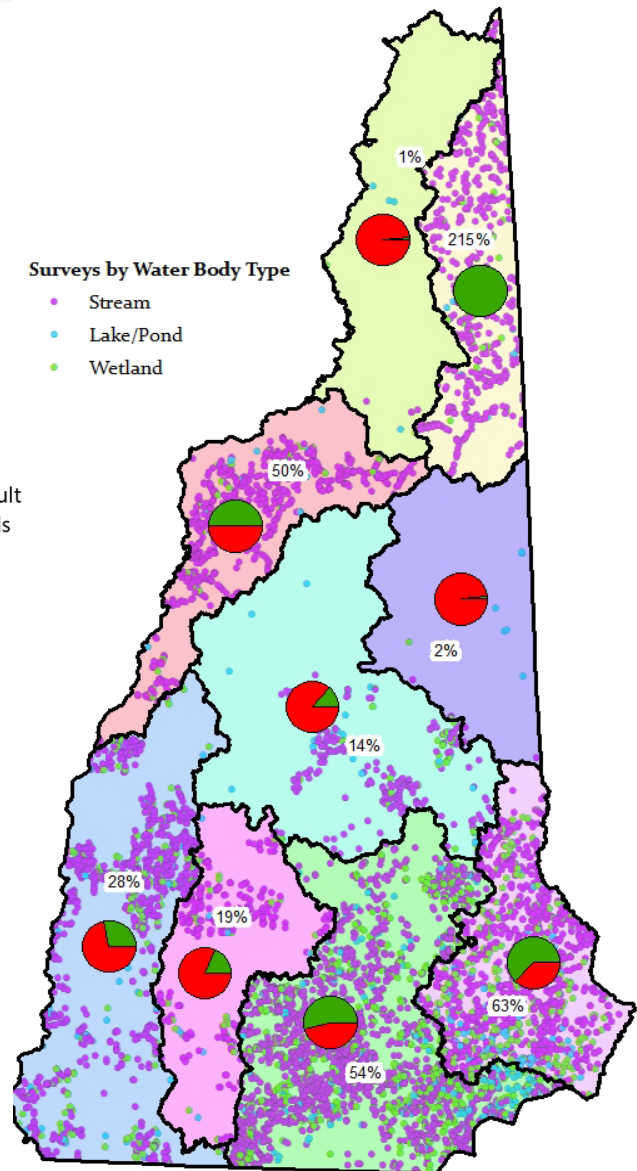
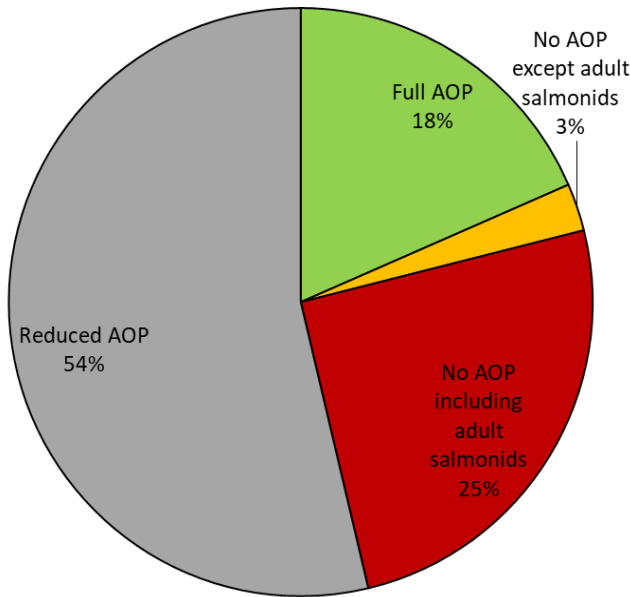
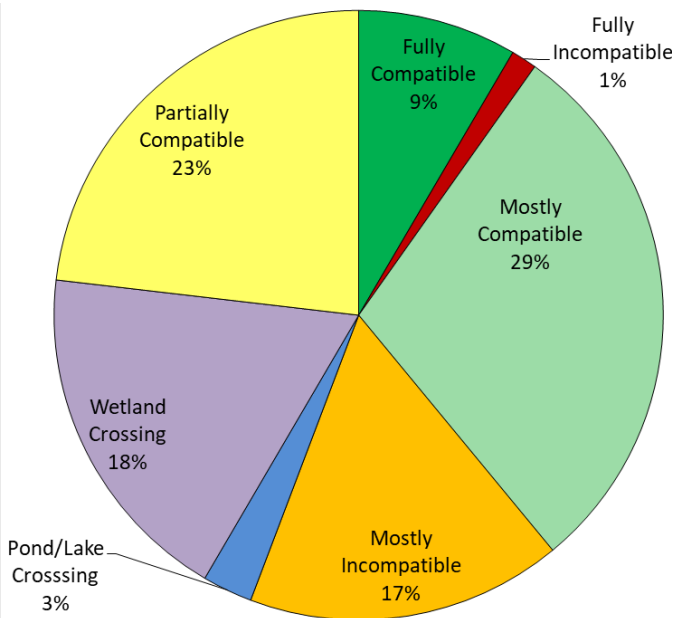
Stream	5690
Wetland	1149
Surface	383

Stream Crossing Surveys



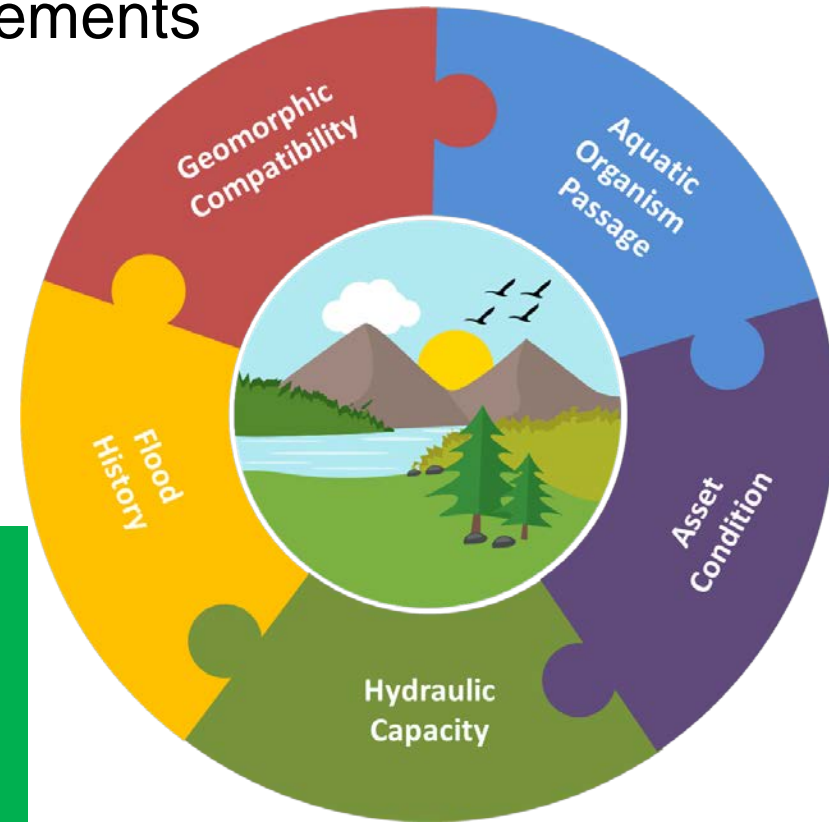
TRYING TO ACHIEVE STATEWIDE COVERAGE IN ASSESSMENTS

- 7,500 crossings surveyed
 - ~20,000 in the state (38%)
- Limited resources \$ for costly replacements → need to prioritize



STREAM BARRIER REMOVAL AS COMPENSATORY MITIGATION

- Many ways to prioritize replacements
 - Based upon program objectives
 - Funding source criteria
 - Town priorities
- ARM funds can be used for stream crossing replacements that meet criteria



Environmental Impact

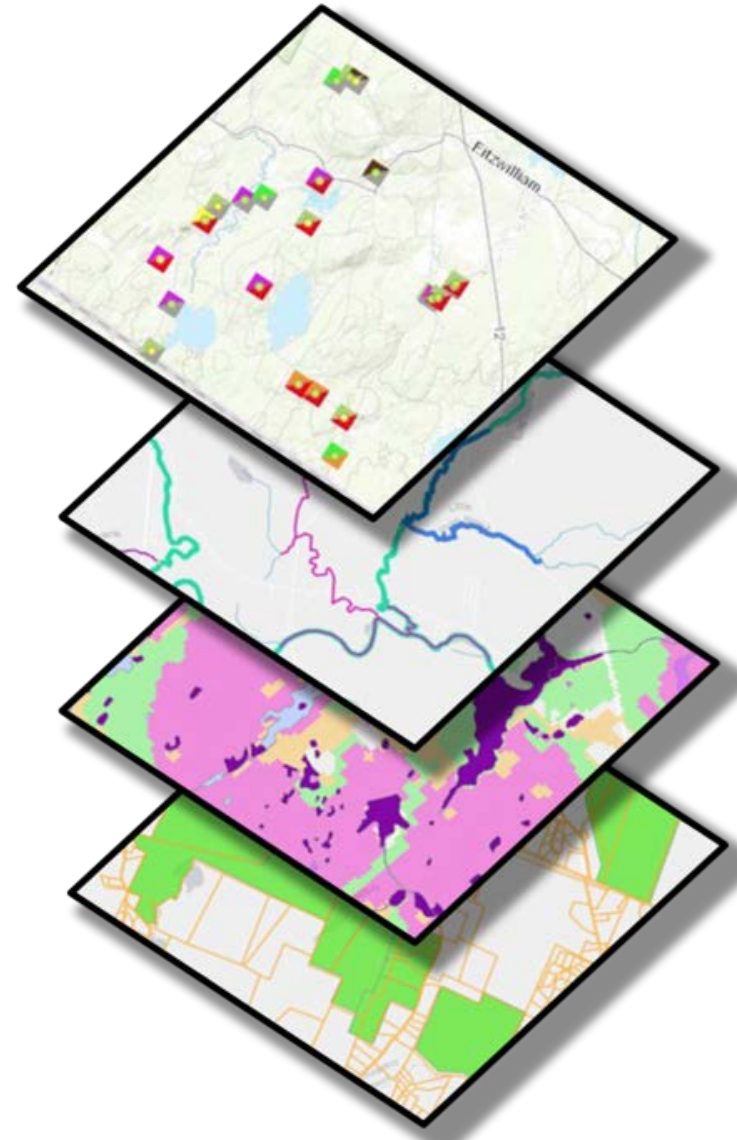
- ✓ Acting as an aquatic barrier
- ✓ Preventing diadromous migration
- ✓ Impeding water and sediment transport
- ✓ Causing bank erosion and scour
- ✓ Flood hazard

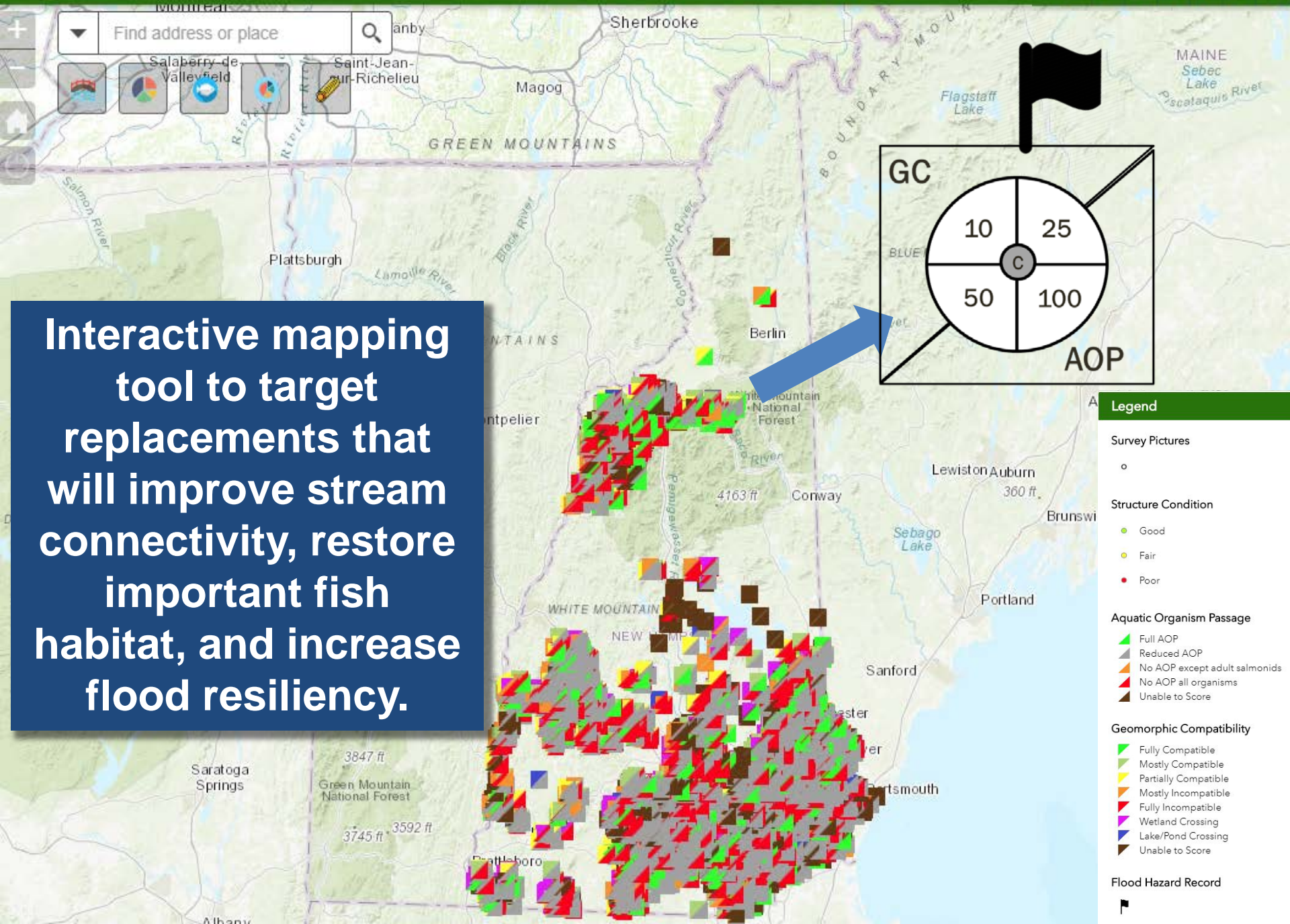
Functions and values gained

- ✓ Presence of species of concern
- ✓ High quality fish or turtle habitat
- ✓ Migration corridors for diadromous fish
- ✓ Reconnect stream in conservation lands
- ✓ Compliant design

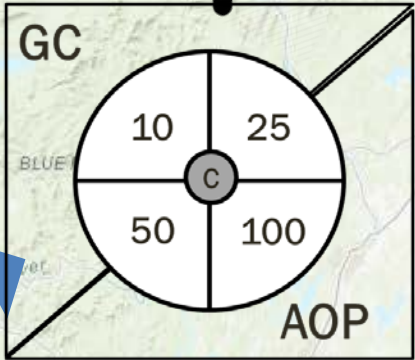
PRIORITIZING CULVERT REPLACEMENTS FOR COMPENSATORY MITIGATION

- Develop a prioritization tool to target culvert replacement projects
 - Make survey data and scores available to the public
- Include information to understand ecological context of a crossing
 - Stream habitat quality for fish and species of concern presence
 - Wildlife habitat
 - Conservation land connectedness
- Include tools to:
 - Query/filter structures on scores
 - View flood vulnerability records
 - Identify projects eligible for the **Aquatic Resource Mitigation Fund**



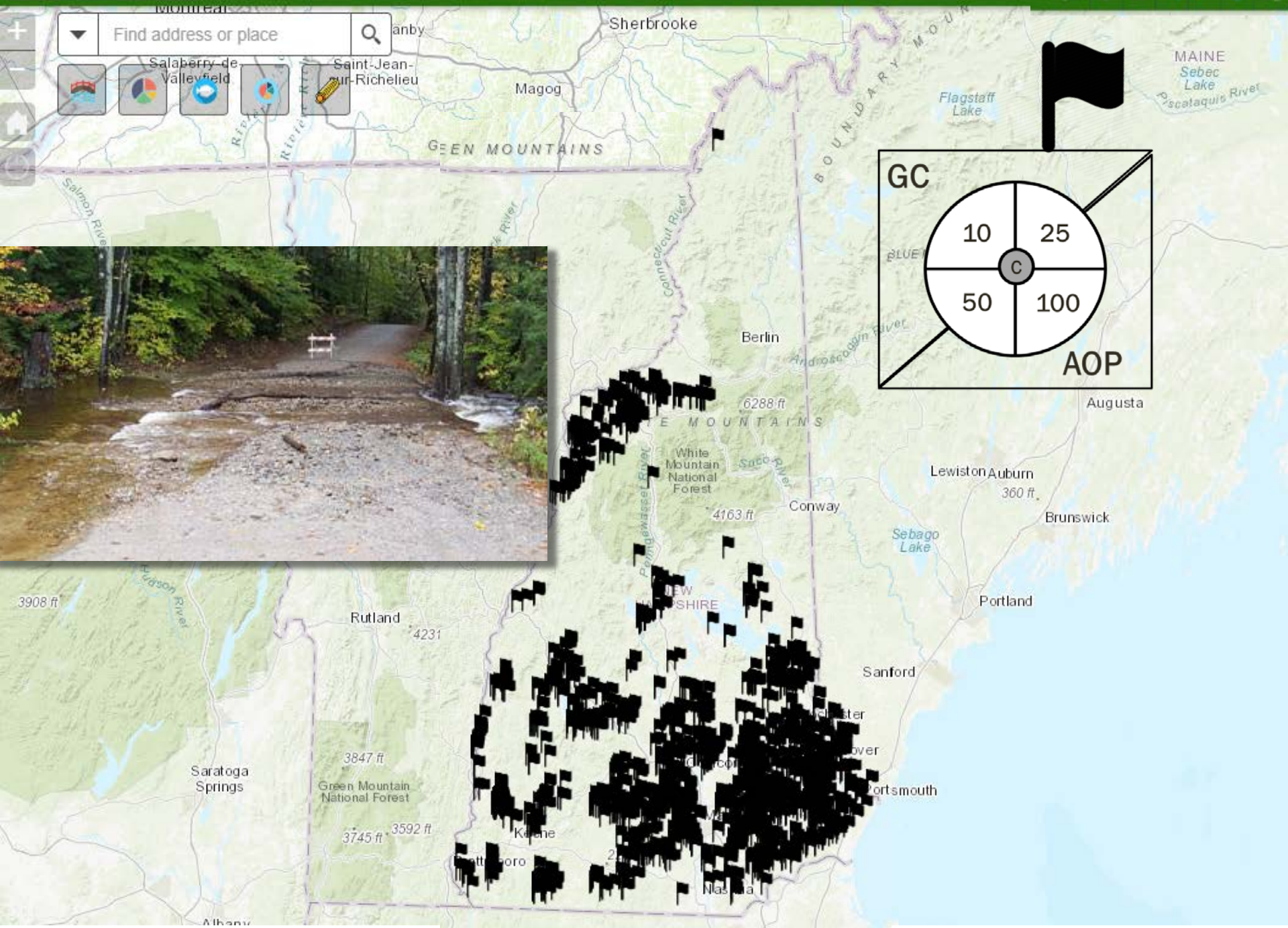


Interactive mapping tool to target replacements that will improve stream connectivity, restore important fish habitat, and increase flood resiliency.

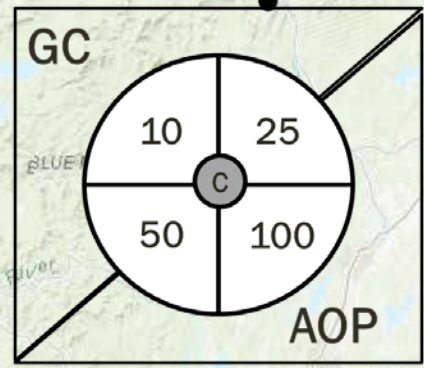


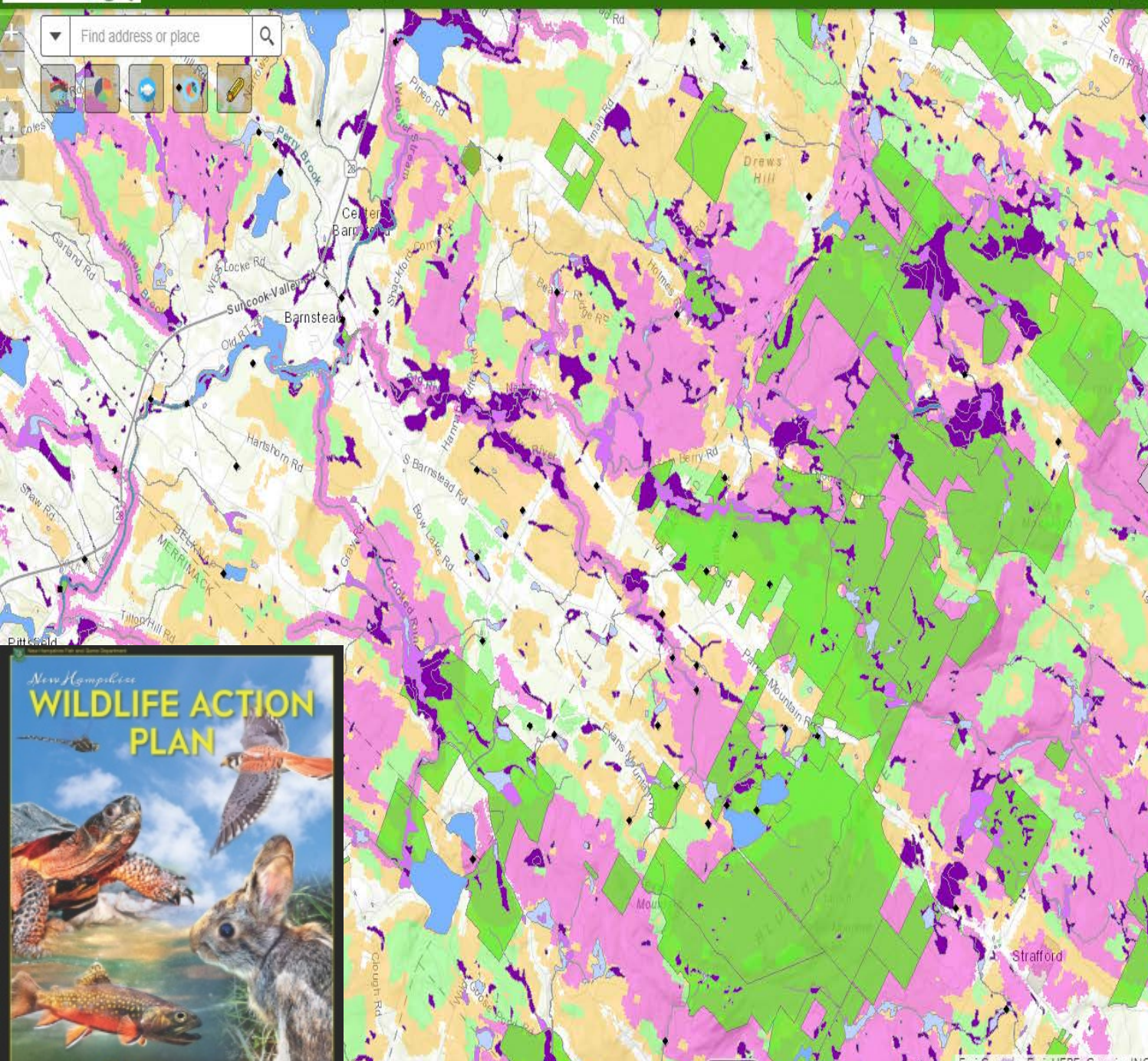
Legend

- Survey Pictures
- o
- Structure Condition
- Good
 - Fair
 - Poor
- Aquatic Organism Passage
- Full AOP
 - Reduced AOP
 - No AOP except adult salmonids
 - No AOP all organisms
 - Unable to Score
- Geomorphic Compatibility
- Fully Compatible
 - Mostly Compatible
 - Partially Compatible
 - Mostly Incompatible
 - Fully Incompatible
 - Wetland Crossing
 - Lake/Pond Crossing
 - Unable to Score
- Flood Hazard Record
-



Find address or place





Legend

Designated Rivers

Designated Rivers

Dams

Dam Inventory

Wetlands Inventory

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Conservation Land Parcels

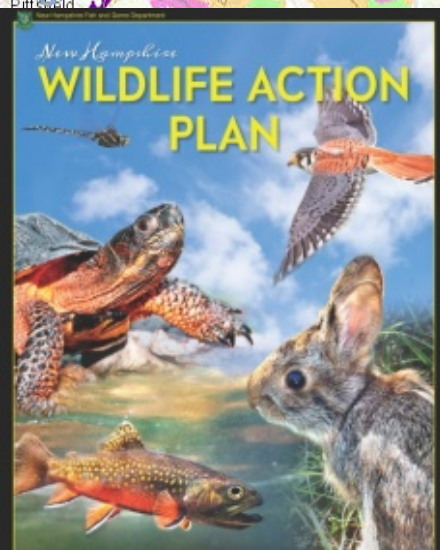
Conservation and Public Lands

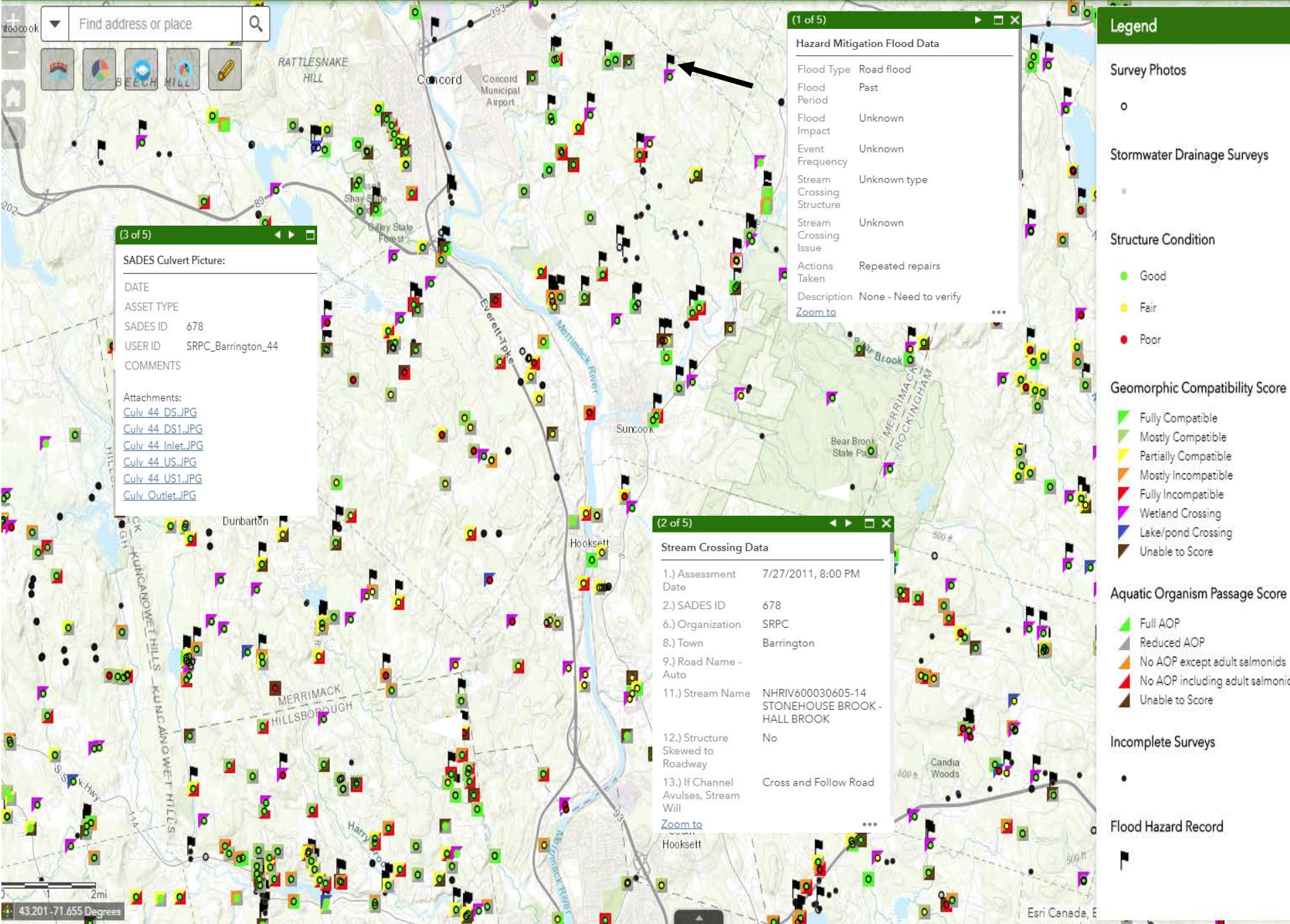
- Permanent conservation land
- Unofficial conservation land
- Unprotected water supply land
- Developed public land
- Unknown

Wildlife Action Plan Habitat Tears

WAP 2015: Highest Ranked Wildlife Habitat

- Not Top Ranked
- Highest Ranked Habitat in NH
- Highest Ranked Habitat in Region
- Supporting Landscape





43.201 -71.655 Degrees

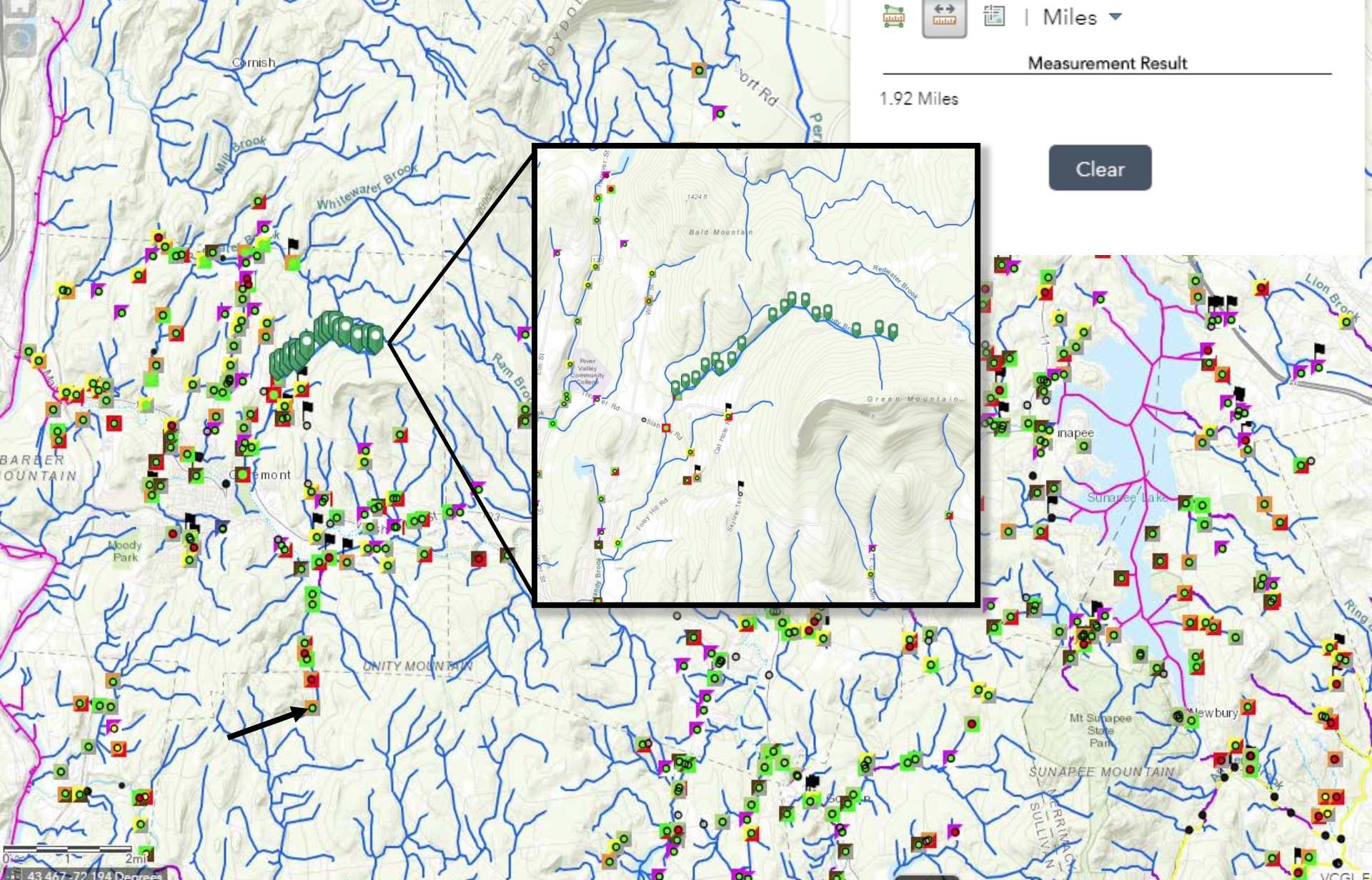
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Find address or place

Windor



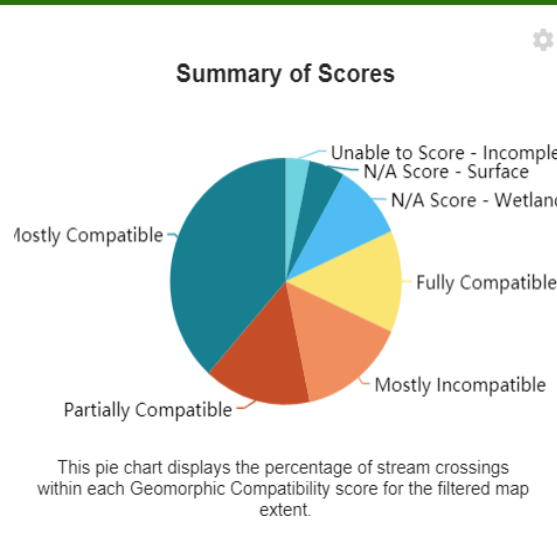
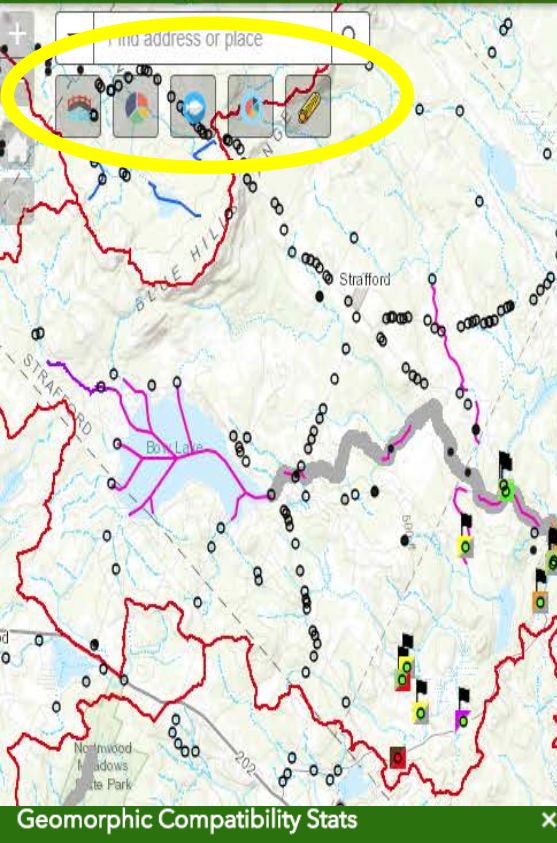
Measure Tool

Miles

Measurement Result

1.92 Miles

Clear



Data Summary

Stream Crossing Summary

Category	Count
Flood Reports Available	33
Flood	12
Road flood	16
Washout	5

Geomorphic Compatibility Summary

Category	Count
Fully Compatible	7
Mostly Compatible	25
Mostly Incompatible	10
N/A Score - Wetland	6
undefined	1
N/A Score - Surface	3
Partially Compatible	9
Unable to Score - Incomplete	2

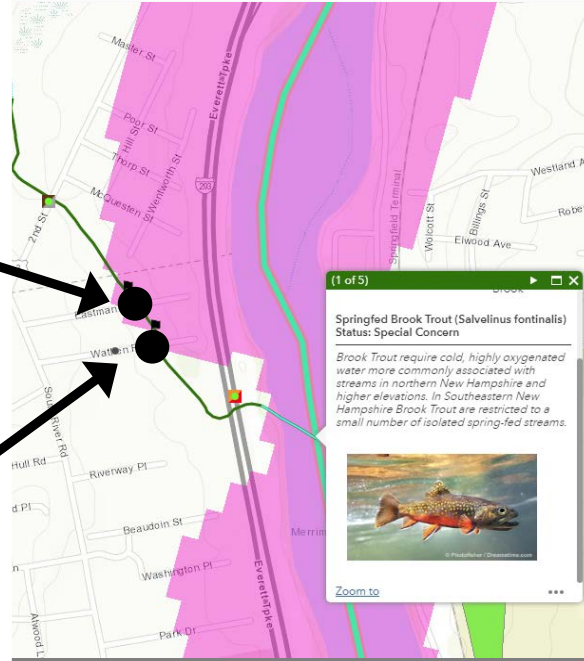
Aquatic Organism Passage Summary

Category	Count
Full AOP	9
No AOP except adult salmonids	1
No AOP including adult salmonids	16

SUCCESSFUL CULVERT REPLACEMENTS

MCQUESTEN BROOK MANCHESTER, NH

- Two undersized, pipe culverts frequently flooded
- Blocked passage for local spring-fed brook trout population
- Bank erosion and bed scour problems
- Poor water quality



ARM Funding: \$354,000

Total Project Cost:
\$800,000

Project Objectives:

- Open access to 1,950 feet of stream
- Reconnect 2.6 acres of wetland habitat
- Floodplain reconnection and stormwater treatment

Project Partners:

NH Rivers Council, Town of Bedford, Fish & Game

SUCCESSFUL CULVERT REPLACEMENTS

MCQUESTEN BROOK MANCHESTER, NH

- Replaced upstream crossing with a 15-foot open-bottom box culvert
- Downstream culvert was completely removed
- Full aquatic organism passage

ARM Funding: \$354,000

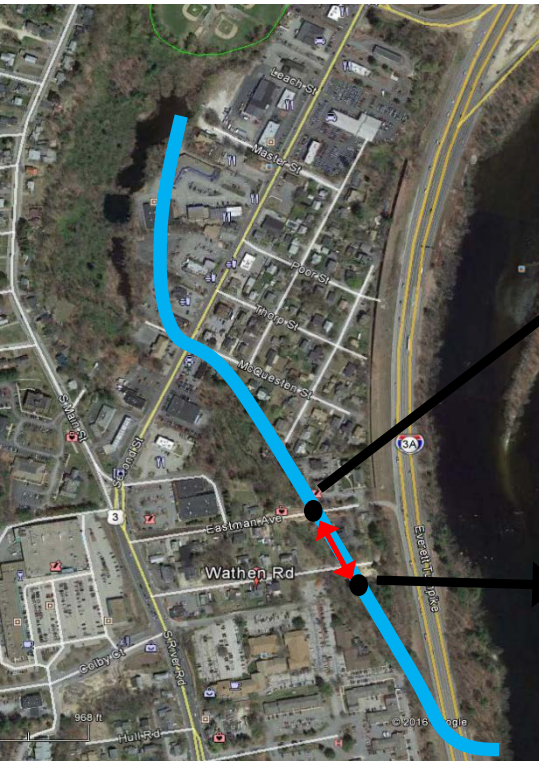
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SUCCESSFUL CULVERT REPLACEMENTS

FALL BROOK CULVERT SWANZEY, NH

- Undersized, 50-foot long metal pipe causing bank and bed erosion
- A barrier to local eastern brook trout



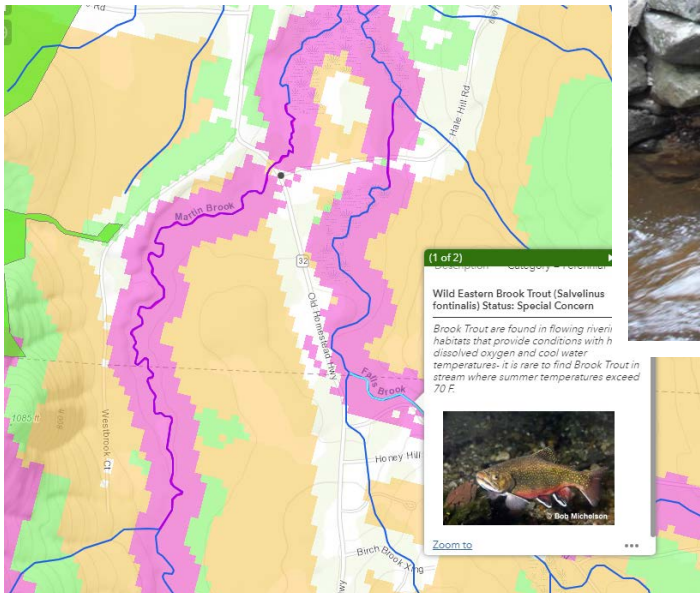
ARM Funding: \$165,000
Total Project Cost:
\$250,572

Project Objectives:

- Restore instream aquatic habitat
- Reconnect coldwater stream for brook trout
- Support high ranked wildlife habitat
- Increase resiliency

Project Partners:

Trout Unlimited, Cheshire County Conservation District, Town of Swanzey, NRCS, Fish & Game, Harris Center



SUCCESSFUL CULVERT REPLACEMENTS

FALL BROOK CULVERT SWANZEY, NH

- Installed 23-foot span open-bottom arch
- Connected ten miles of upstream habitat
- Regained access to coldwater spawning habitat on headwater tributaries

ARM Funding: \$165,000

Total Project Cost:
\$250,572

Project Objectives:

- Restore instream aquatic habitat
- Reconnect coldwater stream for brook trout
- Support high ranked wildlife habitat
- Increase resiliency

Project Partners:

Trout Unlimited, Cheshire County Conservation District, Town of Swanzey, NRCS, Fish & Game, Harris Center



NEXT STEPS IN FURTHER PROGRAM DEVELOPMENT

- **Continue outreach**
 - Promote ARM funds as opportunity to replace eligible culverts
 - Target watersheds with significant stream impacts
 - Merrimack service area 1.3 million for 2019
- Continue active role in *NH Stream Crossing Initiative*
- More stream crossing assessments



THANK YOU!



***Shane Csiki
Thomas Taggart
Mary Ann Tilton
Chis Dowd
Matt Urban
Sarah Large
Timothy Mallete
John Magee
Matt Carpenter
Dianne Timmins
Ben Nugent
Katie Callahan
Whitney Welch***

