

# INTEGRATING STREAM HABITAT, FISH PASSAGE, AND FLOOD VULNERABILITY DATA TO PRIORITIZE CULVERT REPLACEMENTS FOR RESTORATION AND MITIGATION IN NEW HAMPSHIRE



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# PRESENTATION OVERVIEW

- Wetland mitigation overview
- ARM Fund program
- Stream passage improvement examples
- Fisheries Data and Mapper
- Stream Crossing Initiative
- Aquatic Restoration Mapper
- Questions/Discussion



# NH RULES AND THRESHOLDS ON WETLAND IMPACTS

- NHDES Wetlands Bureau is the regulatory program that issues permits for unavoidable wetland impacts

## Mitigation is required for certain projects:

- Wetland impacts > 10,000 square feet
- Any tidal impact
- Stream impacts > 200 linear feet
  - includes banks and channel
- Temporary and secondary impacts (ACOE) to buffers of streams and vernal pools



# FOUR TYPES OF COMPENSATORY MITIGATION IN NEW HAMPSHIRE

- ***Permitee-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
  - Promoting Stream Passage Improvement Program with NHDOT
- **4. *New Hampshire In-Lieu Fee Program***
  - Option when there are no suitable, local mitigation projects
  - Payment into the Aquatic Resource Mitigation ("**ARM**") Fund



# AQUATIC RESOURCE MITIGATION FUND ESTABLISHED IN RSA 482-A:28 - 33

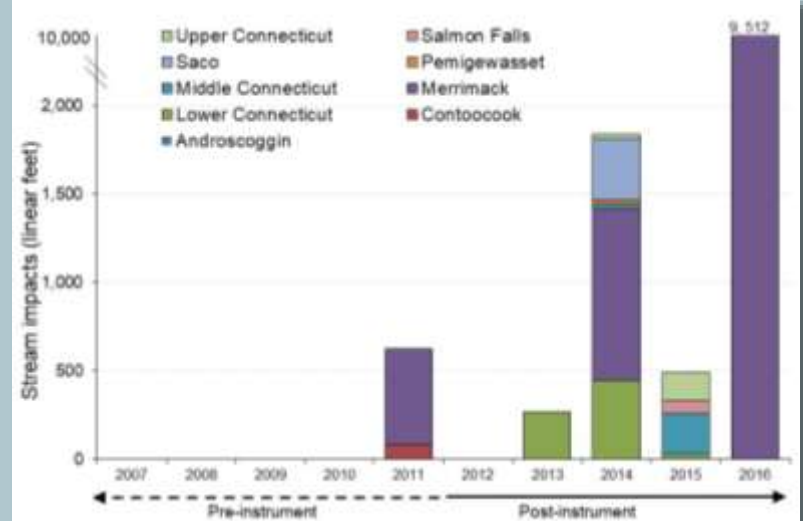
- Option for projects that have difficulty finding good mitigation
- Payments are pooled
  - Watershed approach
  - Money is spent where impacts occurred
- DES administers the program and distributes funds as grants
- Oversight by Interagency Review Team
- 9 member Site Selection Committee



# TIMING IS EVERYTHING

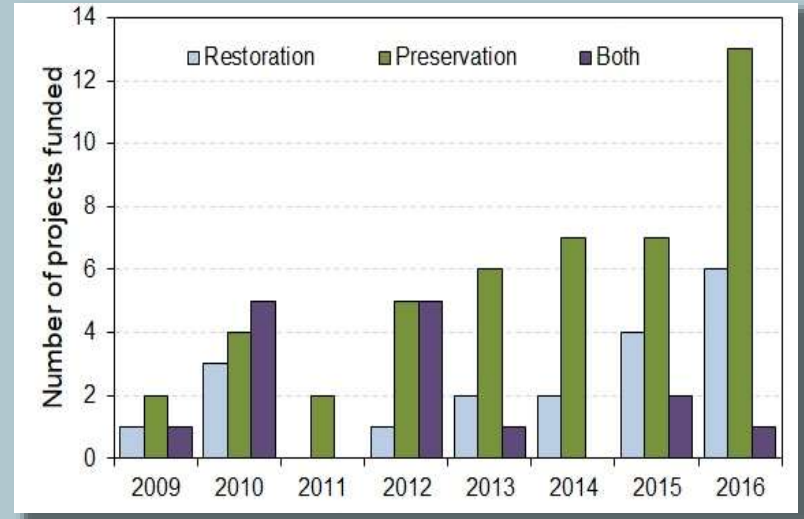
## NEED TO OFFSET STREAM IMPACTS

- Following multiple catastrophic floods a report done by Legislative “Flood Commission”
  - Established rules to offset stream impacts by considering riparian buffers as mitigation options
  - Ensure culvert and bridges adequately are sized
- In 2010 adopted ARM payment option for stream impacts
  - Assessed at \$200 per linear feet of impact
- Established statewide technical workgroup to address issue of undersized stream crossings
  - “State Steering Team”



# TYPES OF PROJECTS THAT MAY APPLY FOR ARM FUNDS

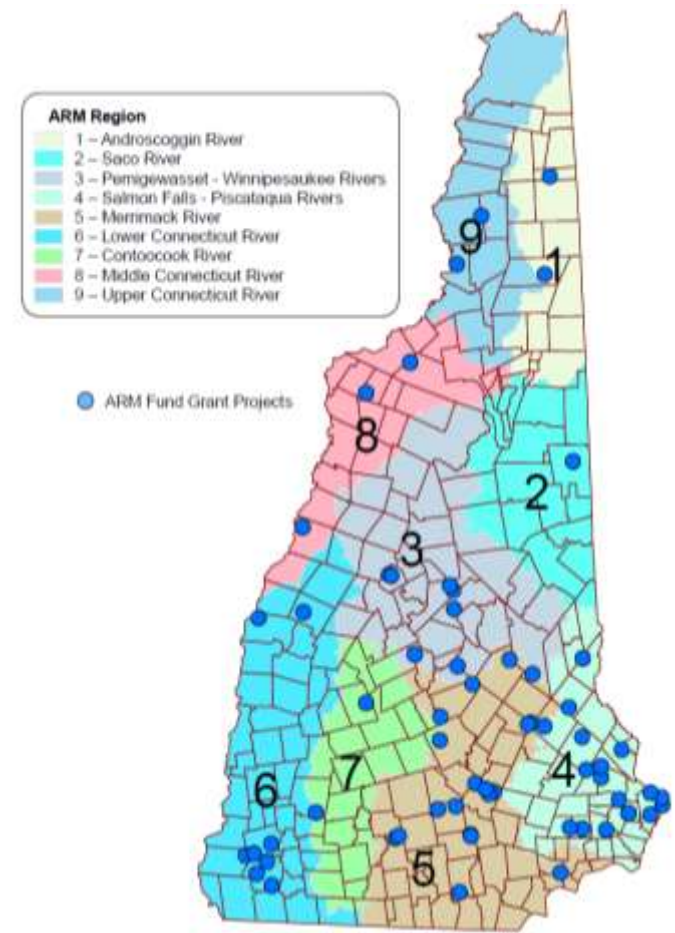
- Preservation of upland buffers
  - Acquisition of land and conservation easements and all transaction fees
  - Costs for protection in perpetuity
- Stream and wetland restoration
  - Construction costs, including design, clearing, planting, and monitoring
  - Tidal improvements and living shoreline projects in coastal areas



- ***Stream passage improvements***
  - Dam removals
  - Culvert and bridge replacements to improve aquatic connectivity
  - Associated stream and restoration

# TARGET PROJECTS THAT IMPROVE OR PROTECT IMPORTANT AQUATIC RESOURCES

- Restore and/or protect aquatic resources and their upland buffers that have regional significance
  - Greatest potential to restore or protect functions and values lost in the watershed
- Important wildlife and fisheries habitats
- *Improve aquatic connectivity*
- Protect significant features
  - Drinking water resources
  - Floodplains
  - Vernal pools



**ARM FUND PROJECT  
AWARD SITES 2009-2016**



# USING ARM FUNDS TO SUPPORT STREAM PASSAGE IMPROVEMENT PROJECTS

- ARM criteria evaluates culvert and bridge replacement projects on:
  - Environmental impacts of structure
    - Acting as an aquatic barrier
    - Impeding water and sediment transport
    - Causing erosion and scour
    - Flood hazard
- Functions and values gained
  - Presence of species of concern/threatened/endangered
  - High quality fish or turtle habitat
  - Migration corridors
- Likelihood of project success
  - Concept design and project partners



# SUCCESSFUL CULVERT REPLACEMENTS

- Undersized, 50-foot long metal pipe was in compatible with geomorphology
- A barrier to local Eastern brook trout
- Causing bank and bed erosion



## FALL BROOK CULVERT REPLACEMENT, SWANZEY, NH

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

### Project Objectives:

- Restore instream aquatic habitat impacted by undersized crossing
- Connect coldwater habitat
- Reconnect Eastern brook trout populations
- Support high ranked wildlife habitat
- Increase flood resiliency

### Project Partners:

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



# SUCCESSFUL CULVERT REPLACEMENTS

- Installed a 23-foot span open-bottom arch
- Connected ten miles of upstream, barrier free, spawning and rearing aquatic habitat
- Access to spawning habitat on tributaries suitable for coldwater fisheries



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# SUCCESSFUL CULVERT REPLACEMENTS

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



## MCQUESTEN BROOK BEDFORD, NH

**ARM Funding: \$354,000**

**Total Project Cost:  
\$800,000**

### Project Objectives:

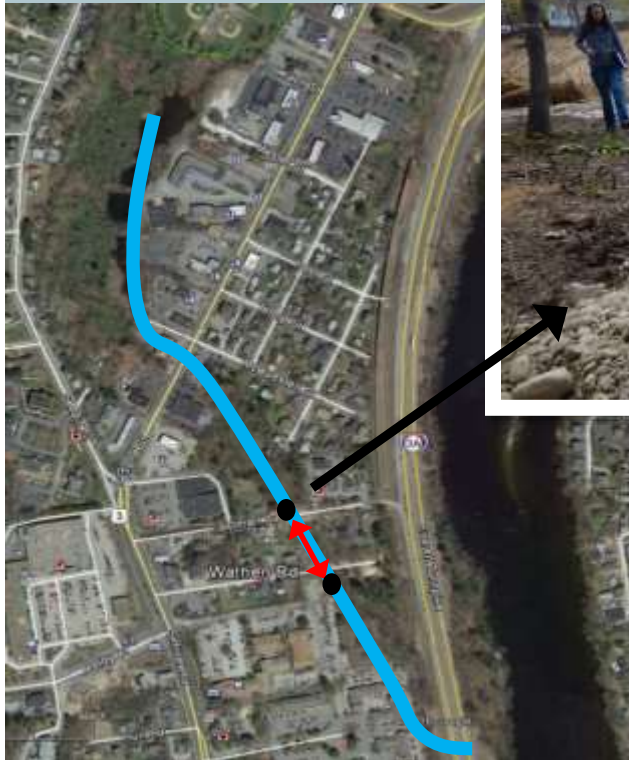
- Open access to 1,950 feet of stream
- Reconnect 2.6 acres of wetland habitat
- Floodplain reconnection and stormwater treatment

### Project Partners:

NH Rivers Council, Town of Bedford, Fish & Game

# SUCCESSFUL CULVERT REPLACEMENTS

- Replaced upstream crossing with a 15-foot open-bottom box culvert
- Full aquatic organism passage allows brook trout to access upstream habitat



## MCQUESTEN BROOK BEDFORD, NH

**ARM Funding: \$354,000**

**Total Project Cost:  
\$800,000**

### **Project Objectives:**

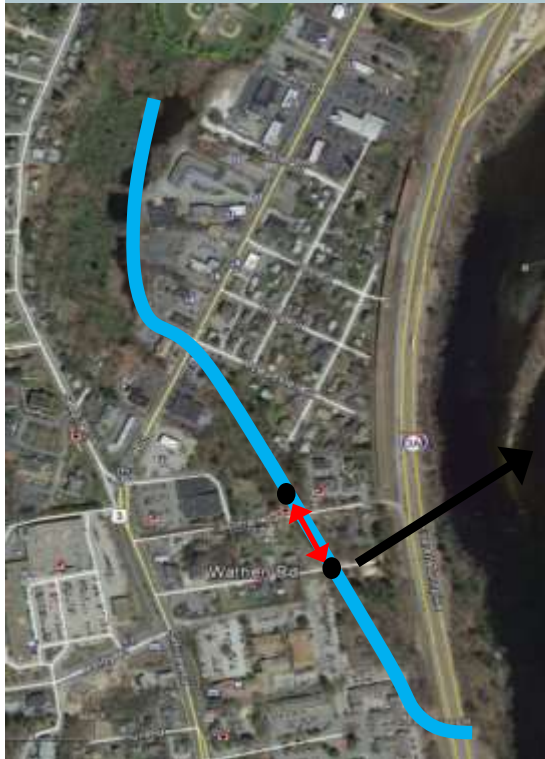
- Open access to 1,950 feet of stream
- Reconnect 2.6 acres of wetland habitat
- Floodplain reconnection and stormwater treatment

### **Project Partners:**

NH Rivers Council, Town of Bedford, Fish & Game

# SUCCESSFUL CULVERT REPLACEMENTS

- With acquisition of adjacent land parcel, the downstream culvert was completely removed
- Restored channel to full passage
- Floodplain restoration



## MCQUESTEN BROOK MANCHESTER, NH

**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**

# PUBLIC DATA TO ADVANCE STREAM RESTORATION AND CULVERT UPGRADES

Survey information and mapping tools  
available for meaningful mitigation projects

