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

Lori Sommer, NHDES
Katie Callahan, NHFG
Cheryl Bondi, NHDES
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

- **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
  - 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
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
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
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

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
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
• 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
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