Preliminary assessment of an Alaska steeppass fishway on a North Carolina blackwater creek

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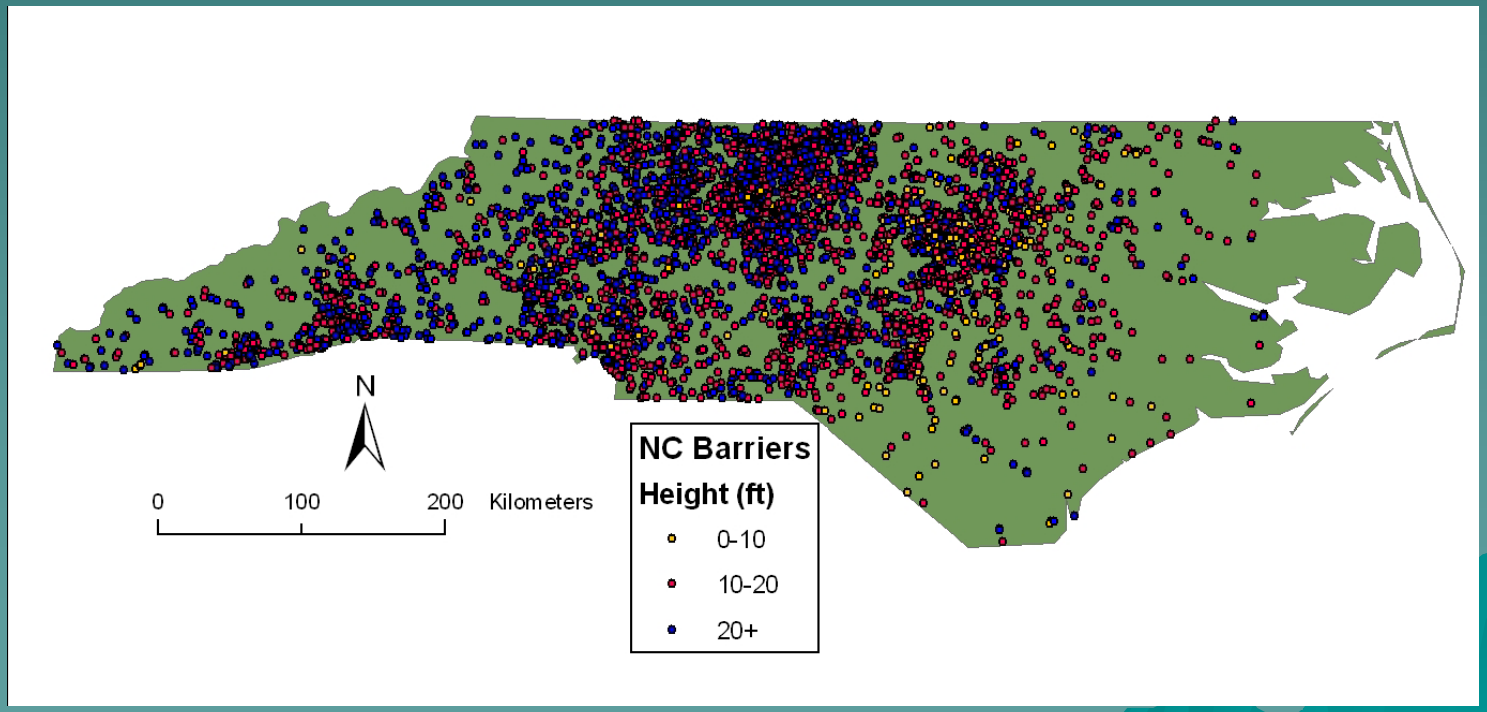
USGS

Dams – a common feature on North Carolina streams

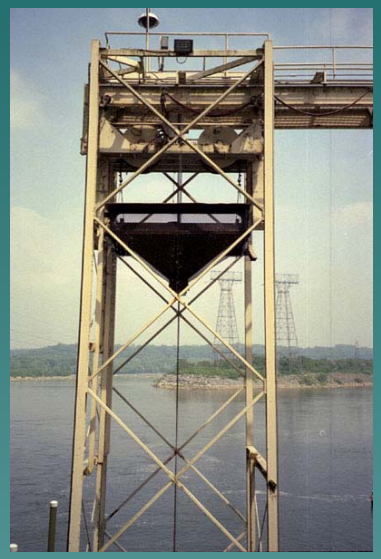
- About 4700 dams in North Carolina
- Essentially none have fish passage



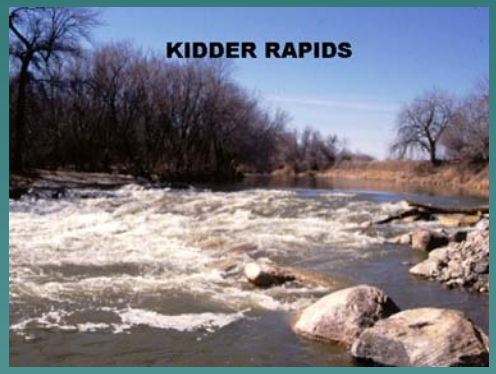
http://fpdss.fws.gov/

Fish passage can restore access to upstream habitats

Ladder



Lift

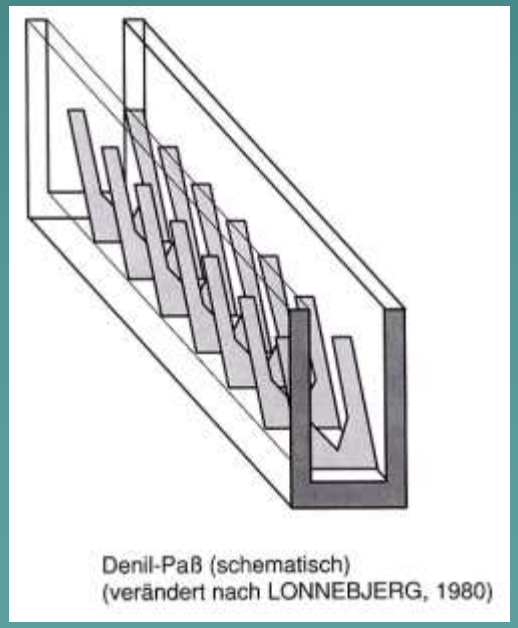


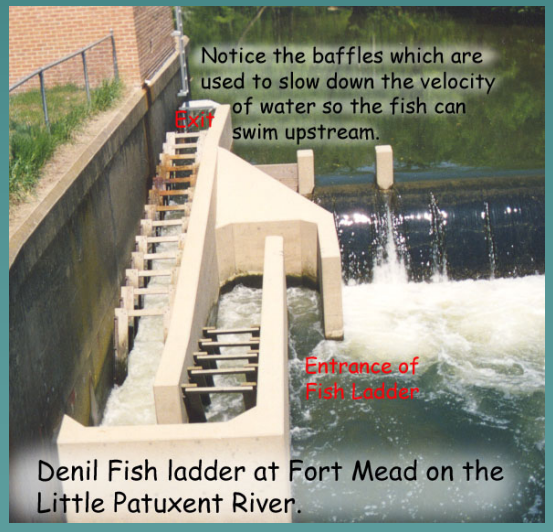
Ramp

Nature-like bypass

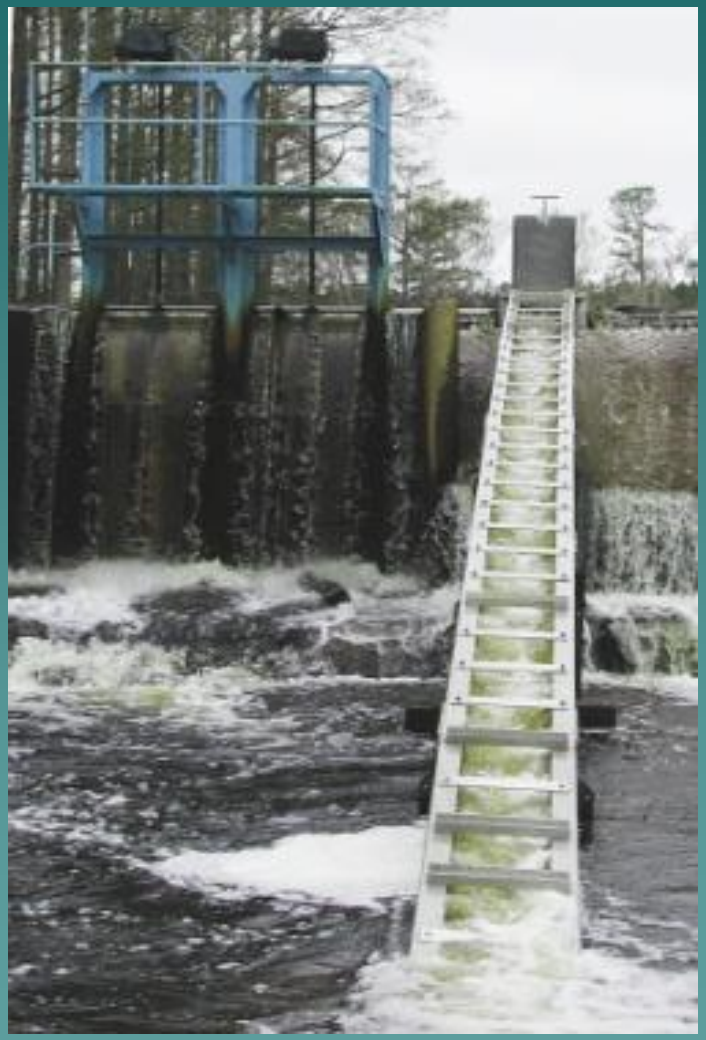
Denil Fishways

- Originally designed for salmonids
- Have proven effective for a wide variety of anadromous and resident species





Alaska steeppass fishways - practical for smaller dams

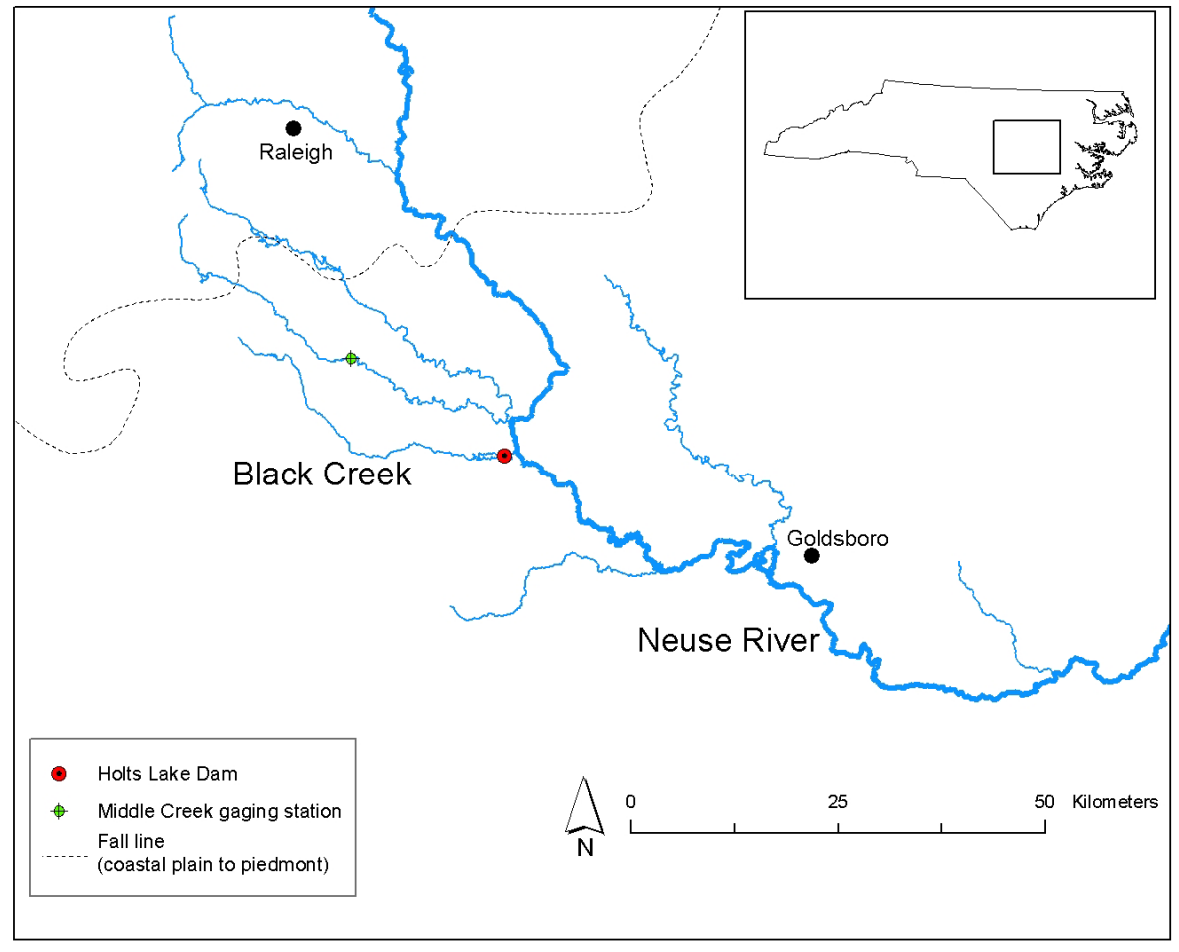


- Inexpensive to construct and maintain
- Effective with steep slopes
- Easily retrofitted to fishways that are not working
- Can be prefabricated and installed in sections

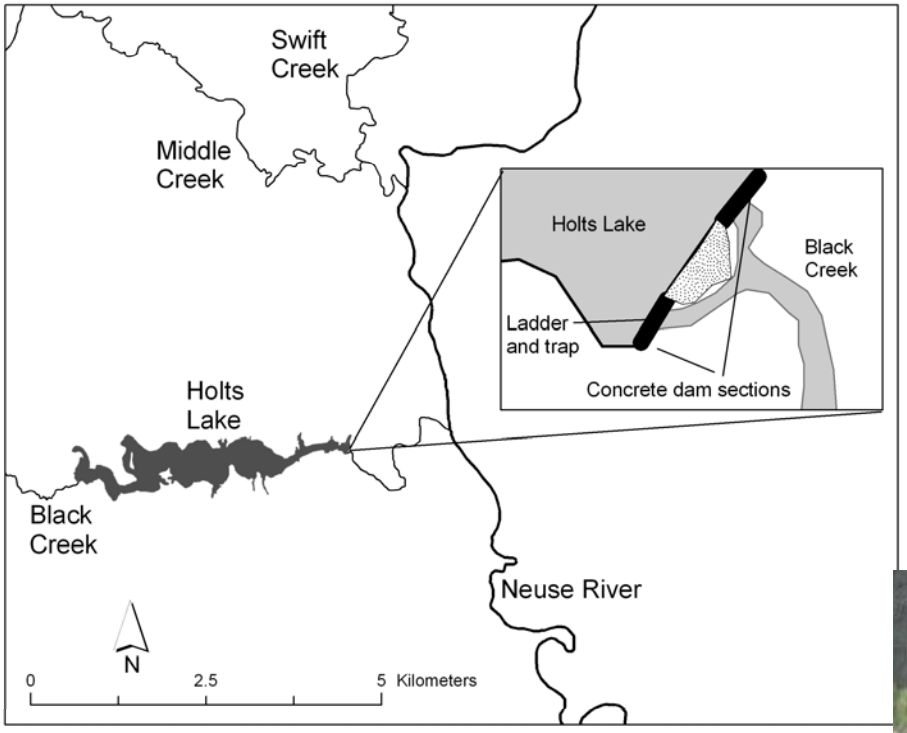
Study Objective

- To evaluate Holts Lake Dam fishway use
  - Species
  - Number
  - Timing of passage

Study Site - Holts Lake Dam



Study Site - Holts Lake Dam



Study Site - Holts Lake Dam

- Steeppass fishway constructed using four prefabricated sections
- Installed by dam owner at a 20% grade
- Rock walls constructed at base of fishway to guide fish towards entrance

Monitoring fish usage

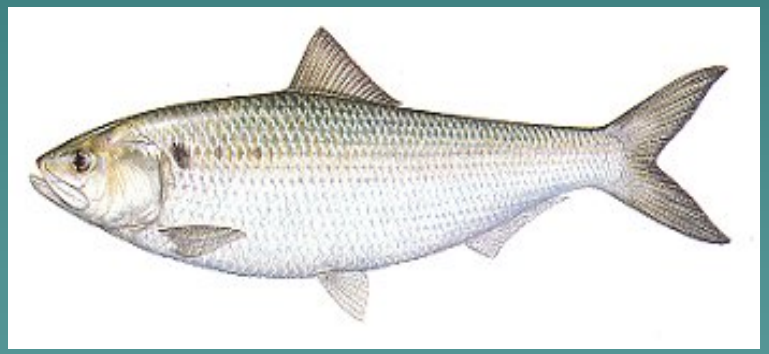
- Trap constructed at fishway exit during winter drawdown
- V-shaped funnel retained fish in trap

Monitoring fish usage

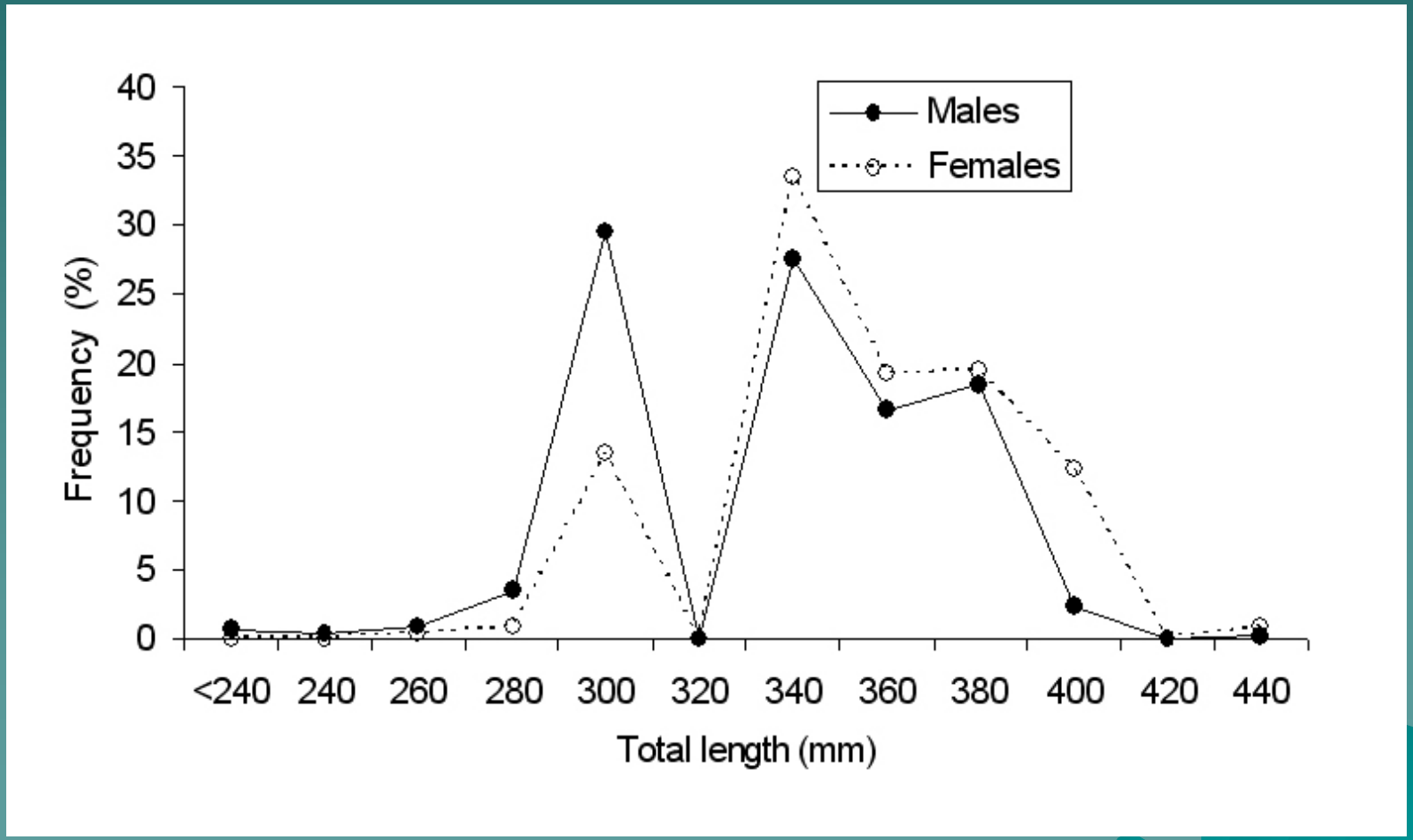
- Trap checked ~ 3 days/wk
- Captured fish identified, measured, fin-clipped
- Lake level recorded as measure of discharge

Results

- Three species detected between February 21 to June 2, 2003:
  - 949 Gizzard Shad
  - 2 American Shad
  - 1 Golden Shiner

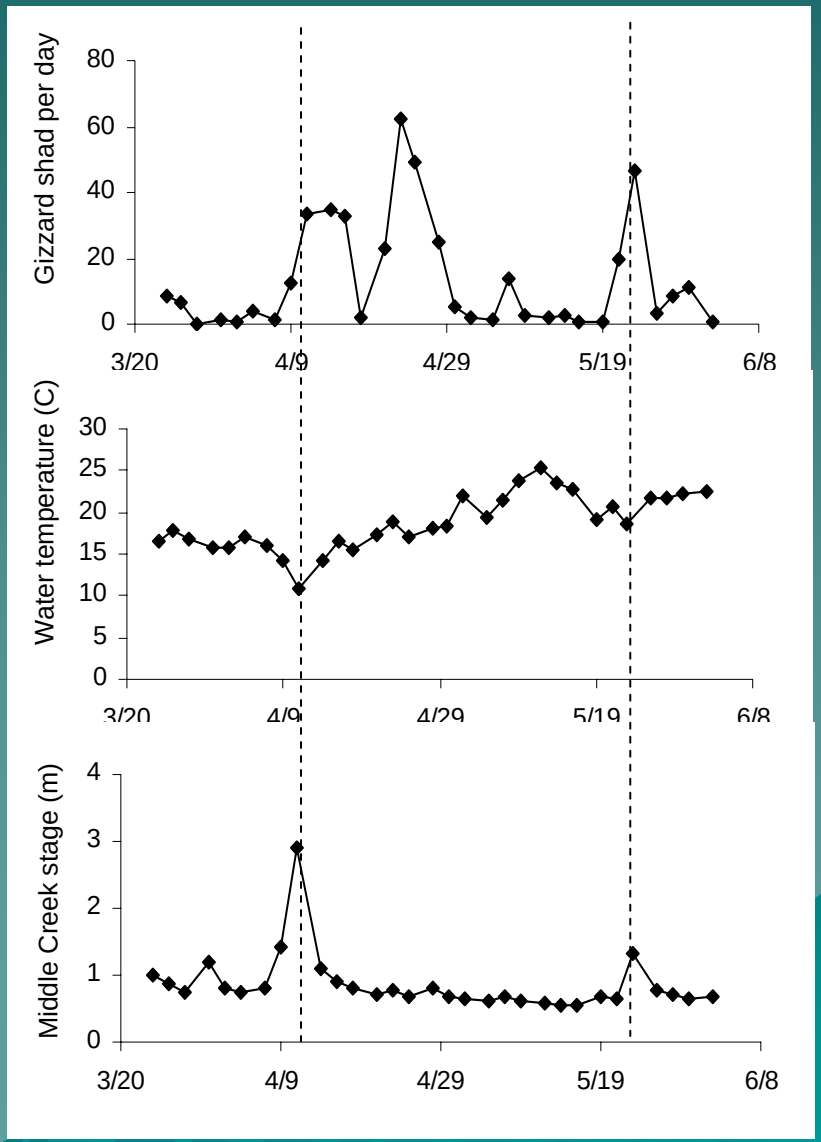


Gizzard shad size composition



Gizzard shad run timing

- Gizzard shad used fishway over temperature range of 15-22 C
- Catch rate correlated with Middle Creek stage height (P=0.06)



Gizzard Shad and Fishways

- The large number of gizzard shad collected in this study is a common occurrence for east coast fishways.
- The Conowingo East lift on the Susquehanna River passed 460,000 gizzard shad in 2003

Additional Sampling for Species Composition

Limited cast-netting established that gizzard shad were in large numbers below the dam

Other species included:

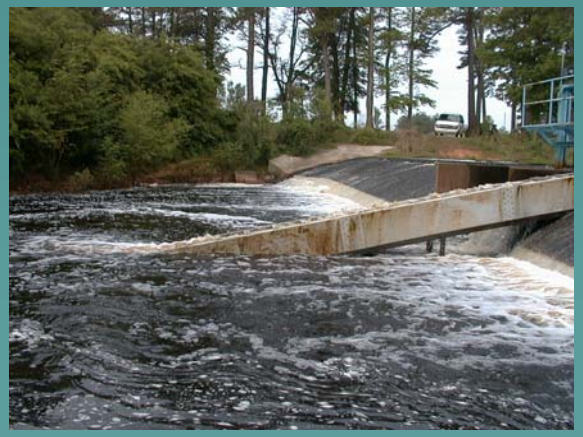
- White perch
- Black crappie
- Largemouth bass
- Warmouth
- Green sunfish
- Bluegill
- Redear sunfish
- Redbreast sunfish

Effectiveness of Holts Lake Dam fishway for riverine species?

- Riverine species often use other fishways
  - Grand River, Ontario (29 species, including suckers, shiners, sunfishes, catfishes, darters, and pikes)
  - James River, Virginia (16+ species, including gizzard shad, suckers, sunfishes, catfishes)

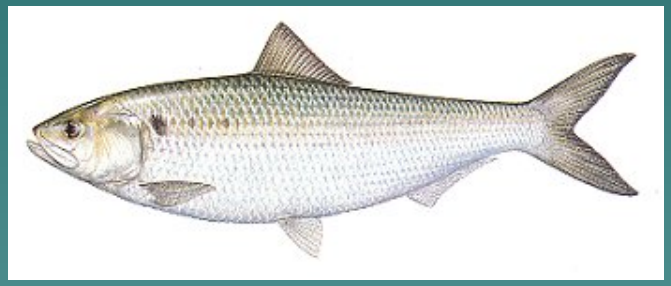
Potential reasons for species selectivity

- Fishway effectiveness may have been reduced by
  - Entrance location away from shoreline
  - Relatively low attraction flow
  - Turbulence



Are fishways on tributaries important for anadromous species?

- Only two American Shad were found in the trap, and none in the cast-netting samples
- Plankton sampling indicates American shad spawning mostly in mainstem Neuse River
- Greater use of tributaries would be expected for hickory shad



Conclusion

- Prefabricated fishways are a valuable management tool
  - restore access to valuable spawning habitat
  - benefit both resident and anadromous fishes
  - are inexpensive to construct and maintain
- Site characteristics are important in passing wide range of species