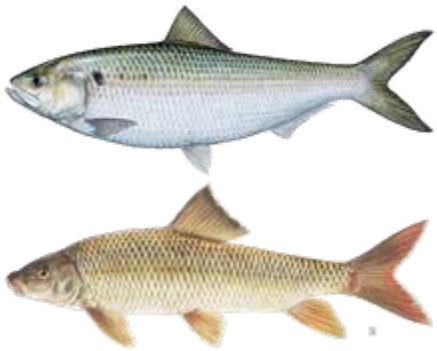
Impacts of dam removals on migratory fishes in the Little River, North Carolina

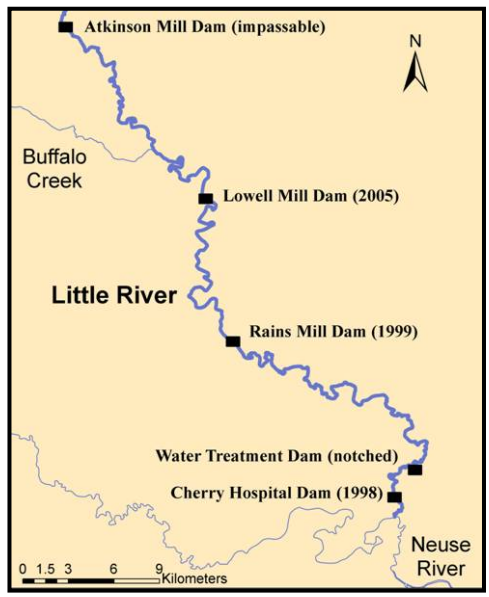


Background

- Dams have been blamed for declines in native fish populations as they alter natural river conditions and functions
- Migratory fishes, including anadromous species that live in the ocean but spawn in coastal rivers, may especially be impacted by dams as they limit access to spawning grounds
- Past studies have shown that fish populations respond positively to dam removals, with increased abundance and recolonization of restored habitat by game fish and intolerant species, and reduced abundance of exotic and tolerant species

Little River

- The Little River originates in Franklin County, North Carolina, and flows into the Neuse River near Goldsboro
- Three dams have been removed since 1998, while a notched and impassable dam still remain (see figure to the right)
- Both anadromous species, such as American shad, and year-round resident species, including suckers and gizzard shad, have annual spawning migrations in the river



The Study

- In the spring of 2007, North Carolina State University researchers set up a resistance board weir (see picture at right) at the former Lowell Mill Dam site to monitor upstream and downstream migrations
- Upstream electrofishing provided additional information on fish locations
- American shad abundance was compared to two “rule-of-thumb” estimates of run size for a restored population (conservative: 7 adults/ha; optimistic: 124 adults/ha)
- Eggs and larvae were collected with plankton nets on the Little River and one Buffalo Creek site.

Results

- Migratory American shad (502), gizzard shad (302), notchlip redhorse (58) were the most abundant fish collected in the weir
- Largemouth bass, sunfishes, channel catfish, and additional species were also sampled
- American & gizzard shad migrated to Atkinson Mill Dam, the maximum extent of restored habitat
- Flow was important for migrations, as species migrated in highest numbers during increased flow periods
- Total American shad abundance (508) was higher than the conservative estimate but drastically lower than the optimistic estimate for the reach below of Atkinson Mill Dam (see table below)
- American shad spawning was confirmed by eggs and larvae collected both downstream and upstream of the weir site

Additional American shad data:

- Sex ratio = 3.7 males : 1 female
  (292 males, 79 females, 122 undetermined)
- Average male = 424 mm
- Average female = 489 mm
- Peak migrations at weir:
  - Upstream = March 3-6 or 17-21 (est.)
  - Downstream = April 24 to May 3

			American shad		
River Reach by Dam Location	Location (rkm)	Area (ha)	2007	7/ha est.	124/ha est.
Cherry Hospital	2.12	5.50	.	39	682
Rains Mill	36.80	83.25	.	583	10323
Lowell Mill	57.07	44.58	.	312	5528
Atkinson Mill	81.69	49.25	508	345	6107
Total	.	182.59	.	1278	22641

Conclusions

- Fish, especially migratory species, are utilizing restored habitat following dam removals on the Little River
- Since dam removals began in 1998, it may be too early to see overall population responses
- River flow may annually influence the extent that fish migrate upstream and use restored habitat
- For 2008, the weir will be moved downstream in order to sample the entire river
- In addition, fish will receive permanent PIT identification tags. Passive and active tracking of these fish will provide detailed information about migration and spawning habitat
- Finally, fish passage or hindrance at the notched dam will also be evaluated

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