

**Pigeon River Recovery Project:
Ten Years and Counting**

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12:20pm, Wednesday - September 22, PBB 160

Pigeon River @ Browns Bridge



Pigeon River Recovery Project

A consortium of federal and state agencies, private organizations and industry in a collaborative effort to improve an aquatic ecosystem.





PRRP Members:

- HAYWOOD WATERWAYS ASSOCIATION
- Tennessee Department of Environment and Conservation - Division of Water Pollution Control
- Tennessee Wildlife Resources Agency
- Tennessee Fish and Wildlife Services
- BLUE RIDGE PAPERS (a division of evergreen)
- TDOT
- Conservation Fisheries, Inc.
- HAYWOOD COMMUNITY COLLEGE
- TVA
- NORTH CAROLINA UNIVERSITY
- FORESTRY WILDLIFE FISHERIES
- UNIVERSITY OF WATERWAYS
- WILDLIFE
- Progress Energy
- USGS (science for a changing world)

Pigeon River



Point Source:



The Situation

- The paper mill began operations in 1908. Its toxic effluent extirpated all snails & mussels, & most fish species.
- Paper mill effluents included:
Coffee colored tannins and lignins, toxics such as dioxin



The Issue –Water Quality

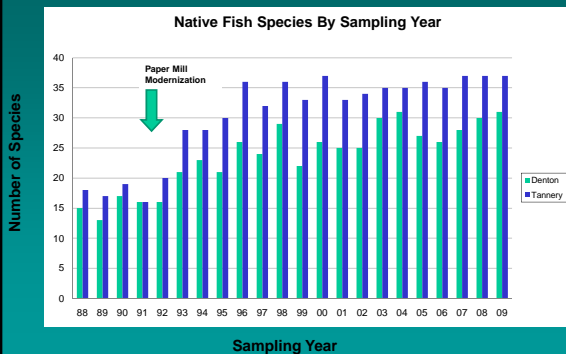


First Step

- Modernization of mill processes drastically reduced waste effluent
- This led to a return of many fish species to the Pigeon; however, 24 non-game species were still missing



Native Fish 1988-2009



Pigeon River 2000: Missing Fish Species?

bluebreast darter
tangerine darter
river darter
stripetail darter
blotchsided logperch

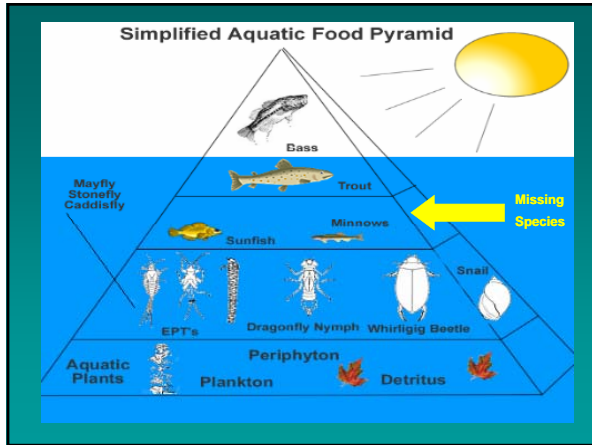
warpaint shiner
mirror shiner
stargazing minnow
bullhead minnow
spotfin chub

northern studfish
American brook lamprey

gilt darter
olive darter
wounded darter
longhead darter
blueside darter

striped shiner
saffron shiner
mimic shiner
blotched chub
mountain madtom

mountain brook lamprey
mooneye



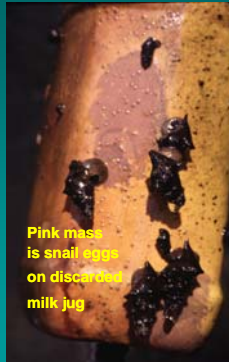
Pigeon River: Other Species Missing?

- All native mollusks extirpated
- Approximately 40 mussel species & 10 snail species inhabited the Pigeon River



Testing the Waters:

- In 1996, common river snails were re-introduced in the TN segment to assess water quality
- Their survival and re-colonization led to the creation of the PRRP in 2001 in TN



PRRP Goal:

To help restore ecosystem health by increasing aquatic biodiversity through the establishment of viable, reproducing populations of native species.



Re-establishing Native Fish

Criteria for selecting candidate species to be relocated to the Pigeon River included:

- Historic range
- Available habitat
- Source of fish within the watershed



Candidates

Silver Shiner

Gilt Darter

Tennessee Shiner

Leptoxis

Mirror Shiner

Pleurocera

Blotched Chub

Stripetail Darter

Mountain Madtom

For



Re-introduction

Gilt Darter



Nolichucky River Treasure

Bluebreast Darter

TDEC, TDOT, UTK, Americorps

Collecting Lampreys Little River, TN



University of Tennessee

Collecting River Snails



Americorps volunteers

Methods

- Collection by seining or electrofishing from streams within the watershed
- Tagging with various colors of Visible Implant Fluorescent Elastomer (VIE)
- Monitoring: Snorkeling/seining surveys; annual Index of Biotic Integrity (IBI)







Minimize Stress - Handling & Temp



Transport



Acclimation Before Release



Acclimation and Release



NCWRC photos

Gilt darters released into the Pigeon River

Monitoring



- Survival of relocated fish & reproduction in TN led to expansion into NC in 2004
- Project made possible by support from UTK (2001-2011) and funding from BRPP (2003-2011)
- In 2004, CFI begins propagation of the tangerine darter

Survival, Reproduction, Propagation



Tangerine Darter

Pigeon River, TN:

Fish Species Still Missing?

bluebreast darter
 tangerine darter
 river darter
 stripetail darter +
 blotchside logperch

warpaint shiner
 mirror shiner
 (stargazing minnow)
 bullhead minnow
 spotfin chub

northern studfish
 (American brook lamprey)

gilt darter +
 olive darter
 wounded darter
 longhead darter
 (blueside darter)

striped shiner
 saffron shiner
 mimic shiner
 blotched chub
 mountain madtom

mountain brook lamprey +
 mooneye

+Denotes established population 2001, 2002, 2003, 2007, 2009 () Denotes suspended re-intro

Pigeon River, NC:

Fish Species Still Missing?

silver shiner +
 (saffron shiner)
 mirror shiner
 brook silverside +
 Tennessee shiner
 gilt darter
 wounded darter
 Swannanoa darter
 tangerine darter
 golden redhorse
 river redhorse
 mottled sculpin

New candidates:

bigeye chub
 banded darter
 highland shiner

+Denotes established population 2004, 2006, 2007, 2009 () Denotes suspended re-intro

PR Re-introduction Totals : as of April 2010

Year	Organism	# Species	Individuals
1996-2010	Snail	6	215-220k
2000-2010	Mussel	9	145
2001-2010	Darter	5	5,861
2002-2010	Madtom	1	1,976
2002-2010	Minnow	8	17,107
2003-2010	Lamprey	2	1,697

Over 26,000 individual fish have been released into the Pigeon

Summary

- Re-introduced 20 species of fish
- Over 26,000 individuals into TN & NC
- Established populations of 5 species of fish in 20 miles of the Pigeon
- Established 2 genera of snails (225K) in 11 miles
- Reproduction in 4 additional species of fish

RESEARCH CONTINUES



Other aquatic life.....

.....Other Species

Salamander Surveys



Crayfish Surveys





Freshwater mussel...yes, it is a mussel!



PRRP TEAM
(just a few of many)



"...all in a day's work!"

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