

Crayfish Diversity of the Pigeon River and its Tributaries, in Haywood County North Carolina and Cocke County Tennessee

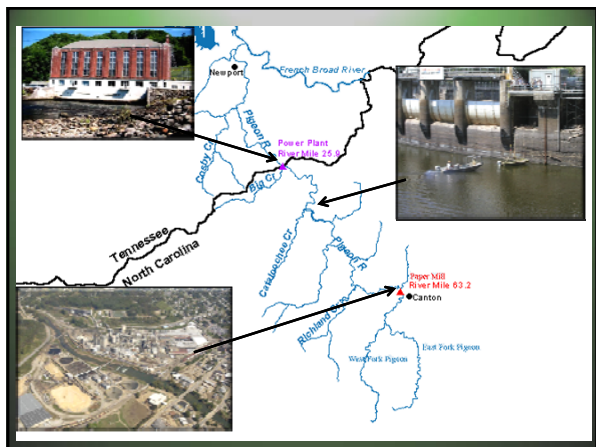


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Introduction

Champion Paper mill opened 1908

Contaminant Effluent Discharges

IBI scores < 38/60 up to 1993
→ 54/60 2007



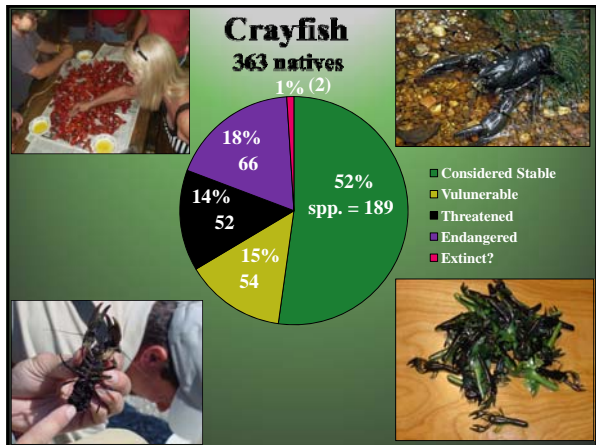
Pigeon River Recovery

River recovery began in the early 90s

Annual biotic monitoring by UT, TVA, TWRA, and Blue Ridge Paper Inc.

Research projects include:

- ▶ Non-game fish reintroductions (Joyce Coombs, TDEC and CFI)
- ▶ Salamander survey (Nikki Maxwell)
- ▶ Snail reintroductions (Joyce Coombs and TDEC)
- ▶ Aquatic insect info database (Melinda Bousfield)
- ▶ Water chemistry (UT, TDEC, TVA, Blue Ridge Paper Inc. et al.)



Justification for Research








76 Crayfish species
9 endangered

43 Crayfish species
2 endangered

Justification for Research

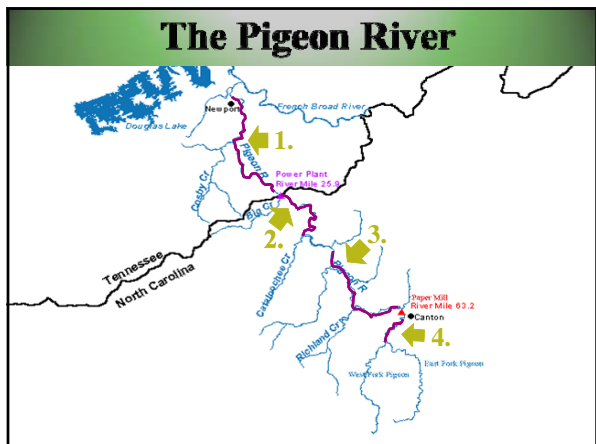
| | |
|----------------------|----------------------------|
| Common Crayfish | Big Water Crayfish |
| Long Nose Crayfish | Reticulate Crayfish |
| Surgeon Crayfish | French Broad Crayfish |
| Mitten Crayfish | Cataloochee Morph Crayfish |
| Virile Crayfish | Upland Burrowing Crayfish |
| White River Crayfish | Red Burrowing Crayfish |

Justification for Research

| | | | | |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  | | | |
| Reticulate Crayfish | Mitten Crayfish | | | |
| Common Crayfish | Upland Burrower | Virile Crayfish | Big Water Crayfish | White River Crayfish |
|  |  |  |  |  |


Objectives

- 1.) Survey of the main stem and tributaries
 - Document crayfishes distributions
 - Document diversity and concentrations
- 2.) Above paper mill vs. Below paper mill
 - Differences in crayfish community composition
 - Differences in crayfish sizes
- 3.) Above power plant vs. Below power plant
 - Differences in crayfish community composition
 - Differences in crayfish sizes




Tributaries

Big Creek
Crabtree Creek
Cosby Creek
Hurricane Creek



Beaver Creek
Jonathon's Creek
Richland Creek
Fines Creek




Methods

1.) Basic Water Chemistry and Physical Parameters

2.) (CPUE)

3.) Sample methods

- Backpack Shocking
- Snorkel Surveying
- Minnow Traps

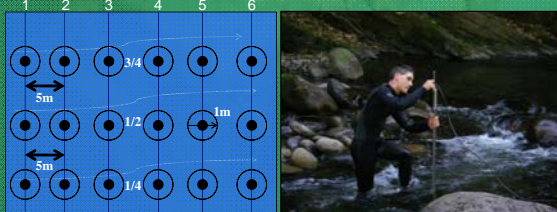


4.) 75% ethanol.

Methods

Water Chemistry and Physical Parameters


- Temperature
- Dissolved Oxygen
- pH
- Discharge
- Conductivity
- Average Depth
- Stream Width
- Substrate
- Salinity



The diagram shows a cross-section of a stream with six sampling points labeled 1 through 6. Points 1 and 2 are 5m apart, 3 and 4 are 3/4m apart, and 5 and 6 are 1m apart. A 5m width is also indicated between points 1 and 3. To the right is a photograph of a person in a waders wading in a stream.

Methods


1. Backpack shocking at depths <1 meter



A photograph showing several people in waders and carrying backpacks, wading in a stream. They appear to be performing backpack shocking.

Methods

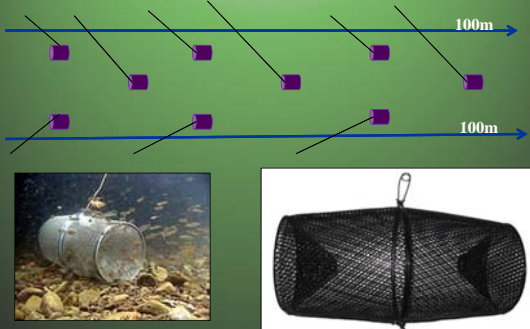
2. Snorkel surveys at depths between 1-2



A photograph of a stream with a snorkel survey setup. A person is visible in the water. An inset image shows a close-up of a fish being observed through a snorkel mask.

Methods

3. Minnow traps set at depths >2 meters.



The diagram shows two parallel blue lines representing trap lines, each labeled '100m'. Purple squares along these lines represent individual traps. Below the diagram are two photographs: one showing a trap on the bottom of a rocky stream with minnows nearby, and another showing a black mesh trap.

Methods

Collecting Burrowers




The diagram illustrates the process of collecting burrowers. It starts with a white probe being inserted into a burrow in a grassy field. An arrow points to a photograph of the probe being pulled out, with a burrower (a crayfish) attached. Another arrow points to a photograph of the burrower inside a small white container.

Data Collection

Measure Carapace Length

GPS Coordinate for each specimen

I.D. to species



The photograph shows a crayfish with a white line drawn across its carapace to indicate the measurement point for length.

Data Analysis

Comparison:
Carapace Lengths
Crayfish Concentrations

Above paper mill vs. below paper mill

Above dam vs. below dam

Species locations will be mapped

Acknowledgments

Committee: Dr. Larry Wilson
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Blue Ridge Paper Products Inc.

