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### Potential Restoration Methods of Native Fish in the Clinch and Powell Rivers

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# POTENTIAL RESTORATION METHODS OF NATIVE FISH IN THE CLINCH AND POWELL RIVERS



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## Purpose

- To assess ways in which the Slender Chub (*Erimystax cahni*), Yellowfin Madtom (*Noturus flavipinnis*), Blackside Dace (*Chrosomus cumberlandensis*), and Duskytail Darter (*Etheostoma percnurum*) populations can be monitored, which could in turn aid in the restoration of the populations.
- Utilize citizen scientists in monitoring efforts.
- To add to a plethora of data and information that may be used for future works.

## Research Question

- Are citizen scientists an effective way to monitor declining native endangered fish populations in Southwestern Virginia?

## Hypothesis

- If the fish populations are consistently studied by both scientists and citizen scientists, then there would be enough research and background knowledge to eventually restore declining fish populations.

## Background

- Pollution is a major factor connected to habitat loss of the species, which in turn leads to population decline (Soucek, 2003).
- Toxic runoff, which is harmful to both fish and humans, is being deposited into the Clinch and Powell rivers.
- Thermal pollution is degrading the water quality. As water is used as a coolant, it is then returned to the river or stream source at a much higher temperature (Environmental).
- As a result of coal mining and coal plant pollution, these four fish species are experiencing habitat loss, resulting in a decline in their populations (Soucek, 2003).
- Native Virginian fish are on the decline in the Clinch and Powell rivers located in southwestern region of the state (Figure 1)(Layman, 1991)(Black, 2013)
- Citizen scientists are members of the general public with interest in science. They play integral roles in the enhancement of scientific research and are effective in creating change and impacting the environment.

## What do I Purpose to doing?

- Instruct citizen scientists on proper techniques for various facets of the research that they would be assisting with in order to potentially use the information to restore native fish populations.

## Methods

Teach to citizen scientists how to properly identify the fish being monitored.

Demonstrate to citizen scientists how to properly use the nets and traps.

Instruct citizen scientists how to properly handle fish that are captured.

Aid citizen scientists in their field work in general to give them confidence that they are doing things correctly.

Ensure the citizen scientist are aware of proper recording techniques so that their data collection is accurate.

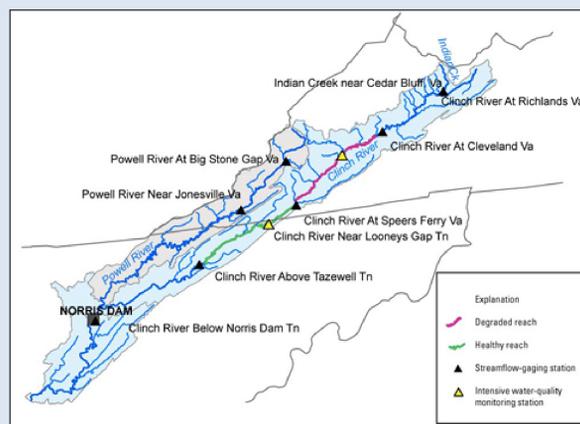


Figure 1: map of the Clinch and Powell rivers

## Predicted Results

- There will eventually be enough data to be able to identify good habitats along the Clinch and Powell rivers (all four species' native range) for the fish and restorative measures would be taken so the fish populations can begin to increase and flourish again.
- The citizen scientists will be receptive to instruction given and will properly record data on the native fish, their counts, and habitats so that scientists can in turn take this information and use it as needed.

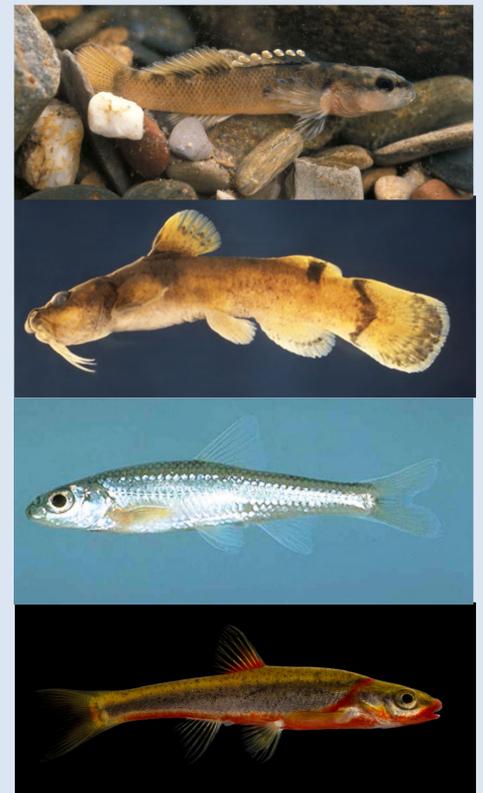


Figure 2: Native species affected. From top to bottom: Duskytail Darter (*Etheostoma percnurum*), Yellowfin Madtom (*Noturus flavipinnis*), Slender Chub (*Erimystax cahni*), Blackside Dace (*Chrosomus cumberlandensis*).

## Future Directions

- This study could be used in the future application of citizen science; and its effectiveness, quality, and helpfulness.
- It can be used in the future in assessment of fish populations and how to involve citizen scientists.
- It can assist in future studies of the Slender Chub, Yellowfin Madtom, Blackside Dace, and Duskytail Darter, which may include habitat restoration and conservation methods that could be used to save them.

## Limitations

- There could be issues getting citizen scientists involved because there is a lack of education and interest in this area. To overcome this, town halls could be orchestrated to raise awareness and concern for the threatened fish, thus empowering citizens to want to take charge and join efforts.

## Acknowledgements

I would like to take this time to acknowledge and thank Dr. Fink as well as my classmates for their continued guidance on this project.

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