



The movement of Brook trout over time

Brook trout of a cold water species and are highly sensitive to changes in water temperature.

As climate change continues to exacerbate, ecologist wonder how this will affect cold water species of fish.



My initial paper

The first paper that caught my attention was a paper by Emily S. Minor, Samantha M. Tessel, Katharina A. M. Engelhardt and Todd R. Lookingbill titled

The Role of Landscape Connectivity in Assembling Exotic Plant Communities: A Network Analysis

Here they wanted to show how ecological destruction dispurses native and invasive species causing greater competition between the two which ultimately leads to a heavy increase in biodiversity.



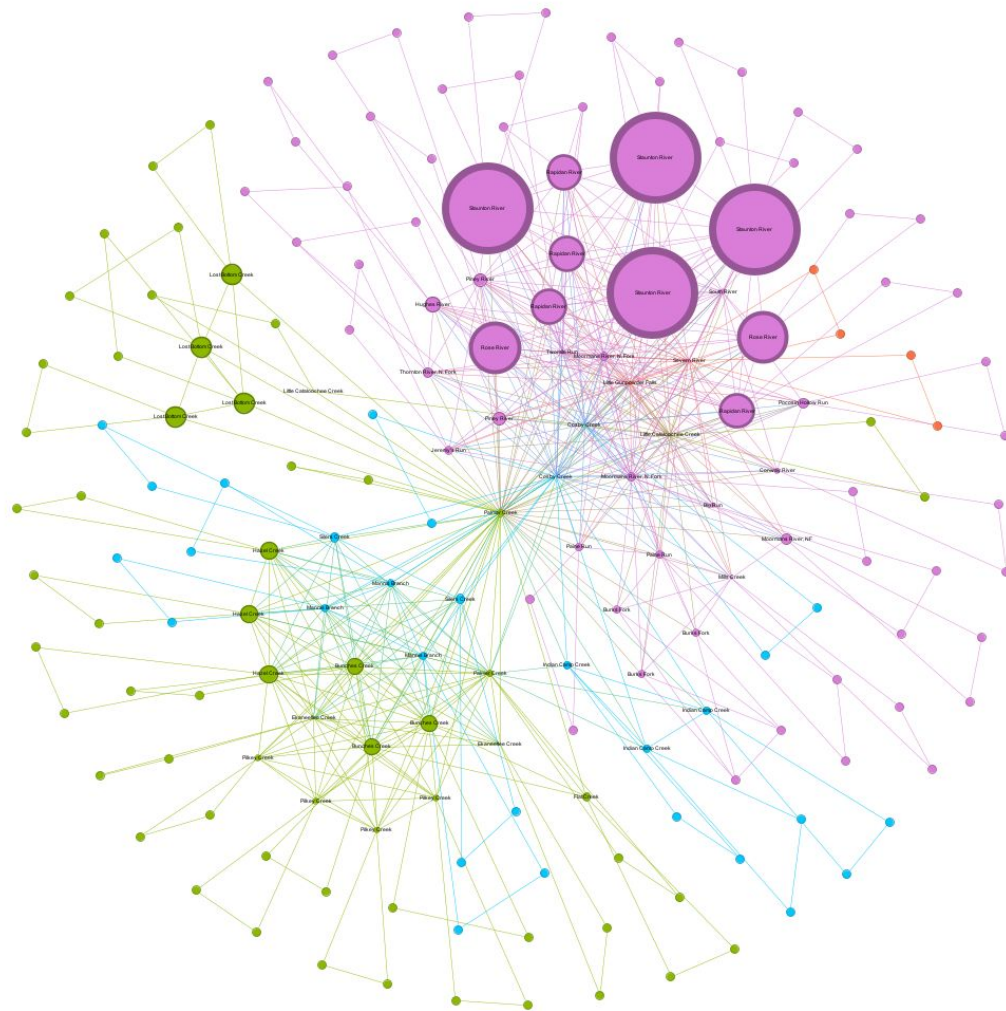
How I got to trout

Initially I wanted to see if I could recreate the project and see if I could find the same results.

I however was unable to find the data used and instead I looked at the USGS data base and I stumbled upon: Brook trout abundance in streams across southern Appalachia from 1958-2021.

A group of ecologist compiled a number of sources for brook trout population at a given coordinate. Noting the stream, state, and count of fish that where spotted at said point. The data I will show is over the span of 20+ years.

1999



Georgia

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Tennessee

North Carolina

Maryland

□

West Virginia

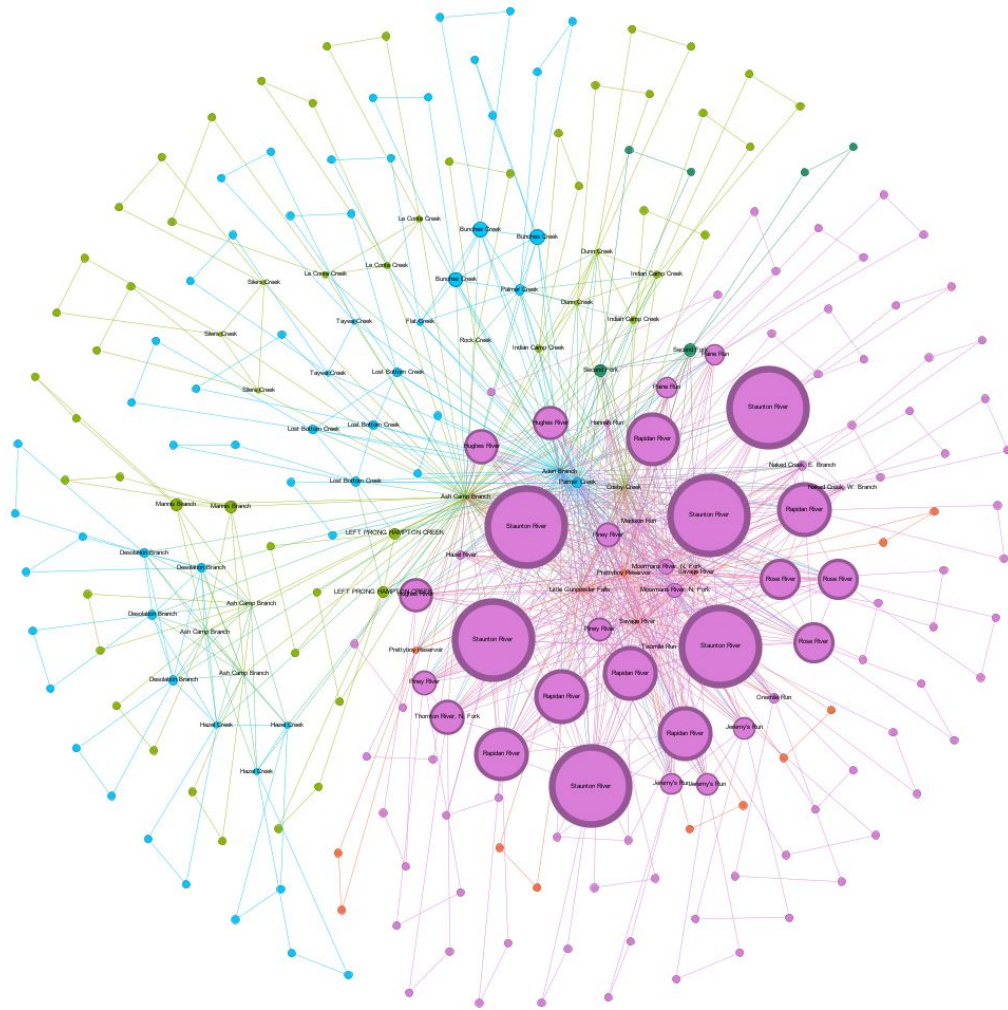
Virginia

South Carolina

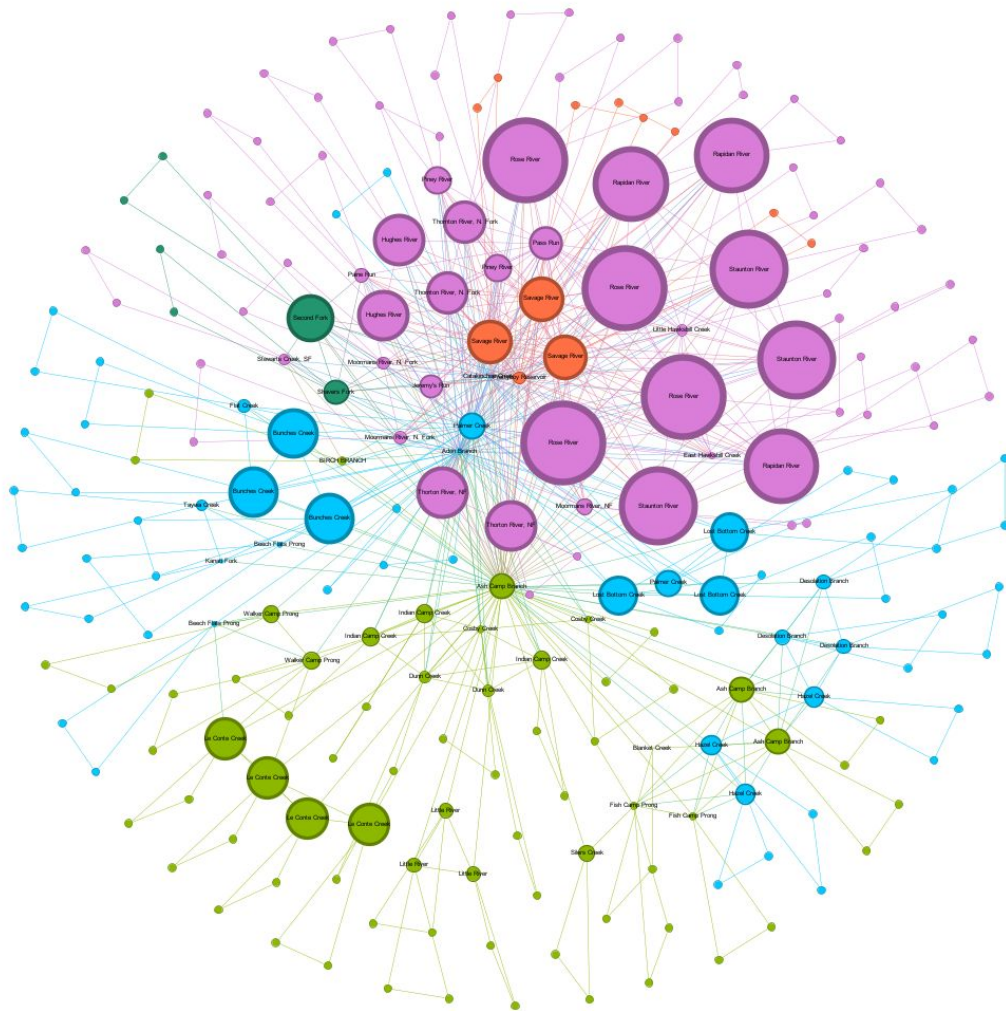


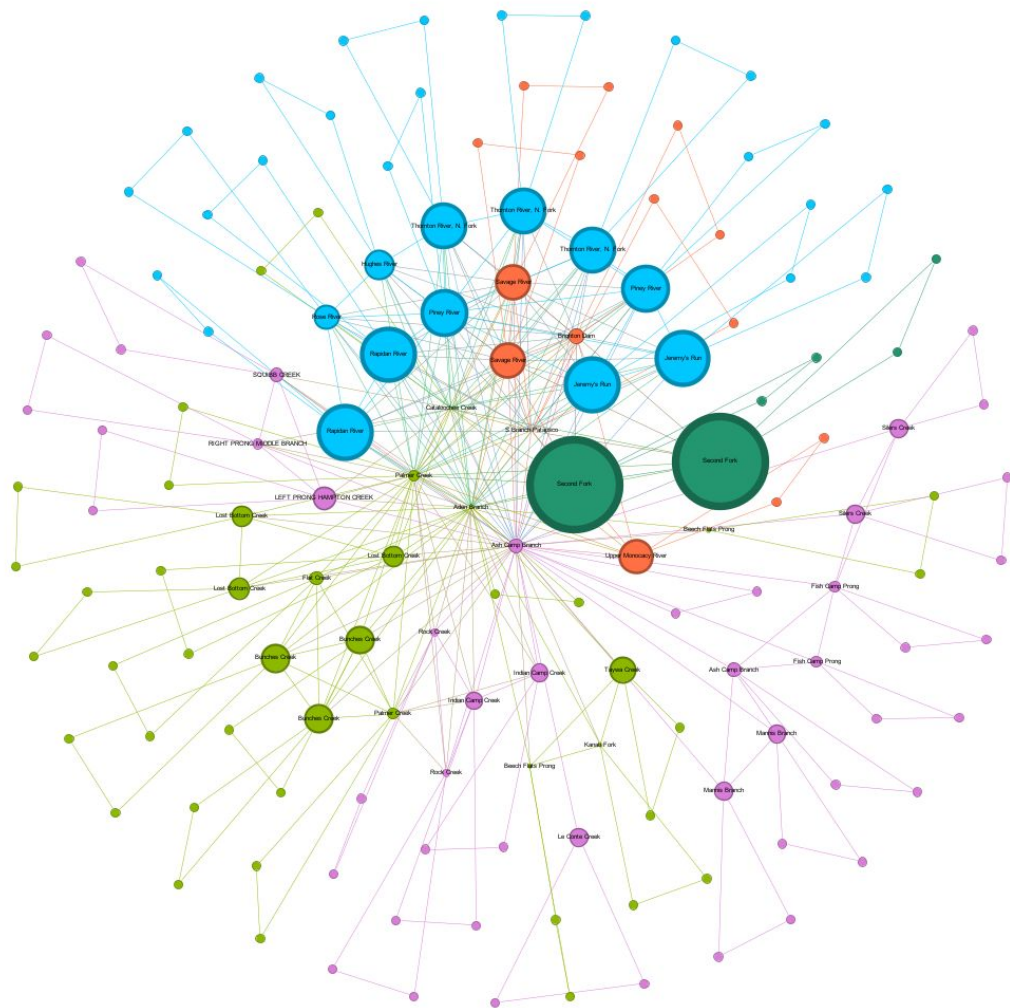
2002

2001

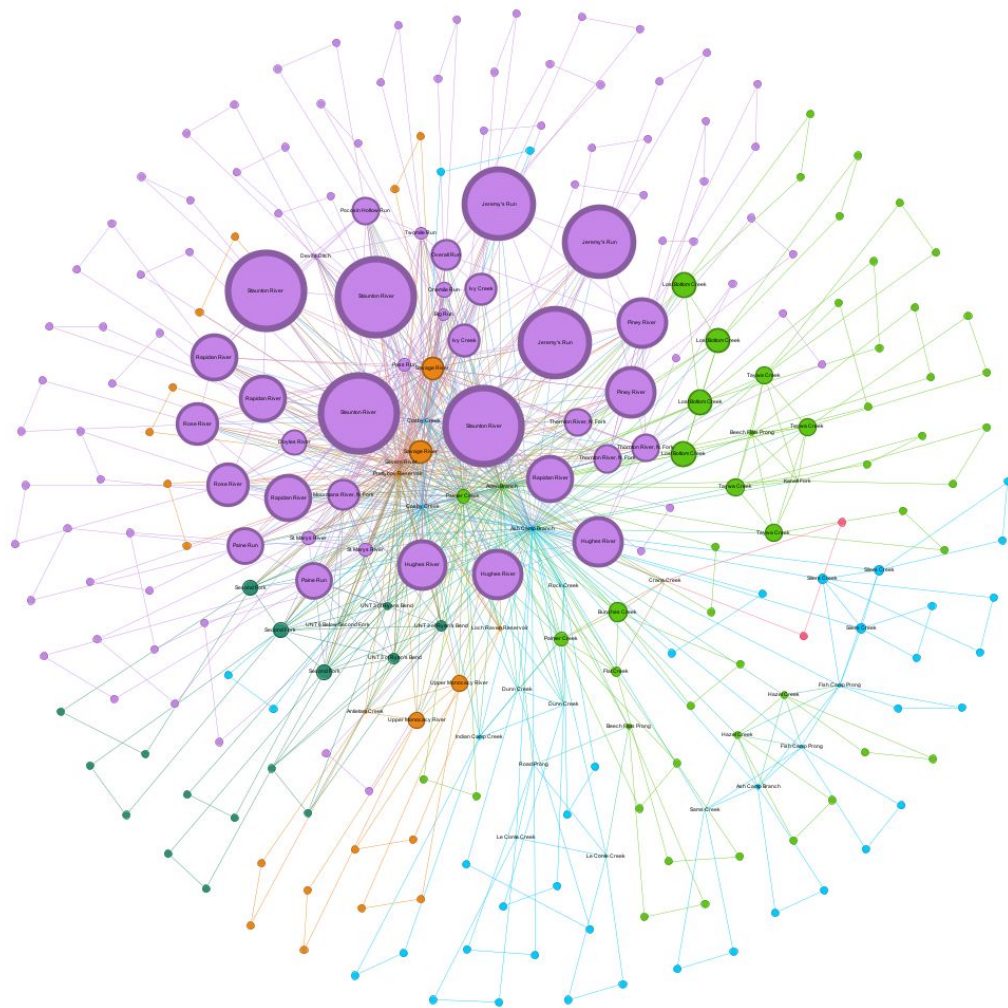


2002



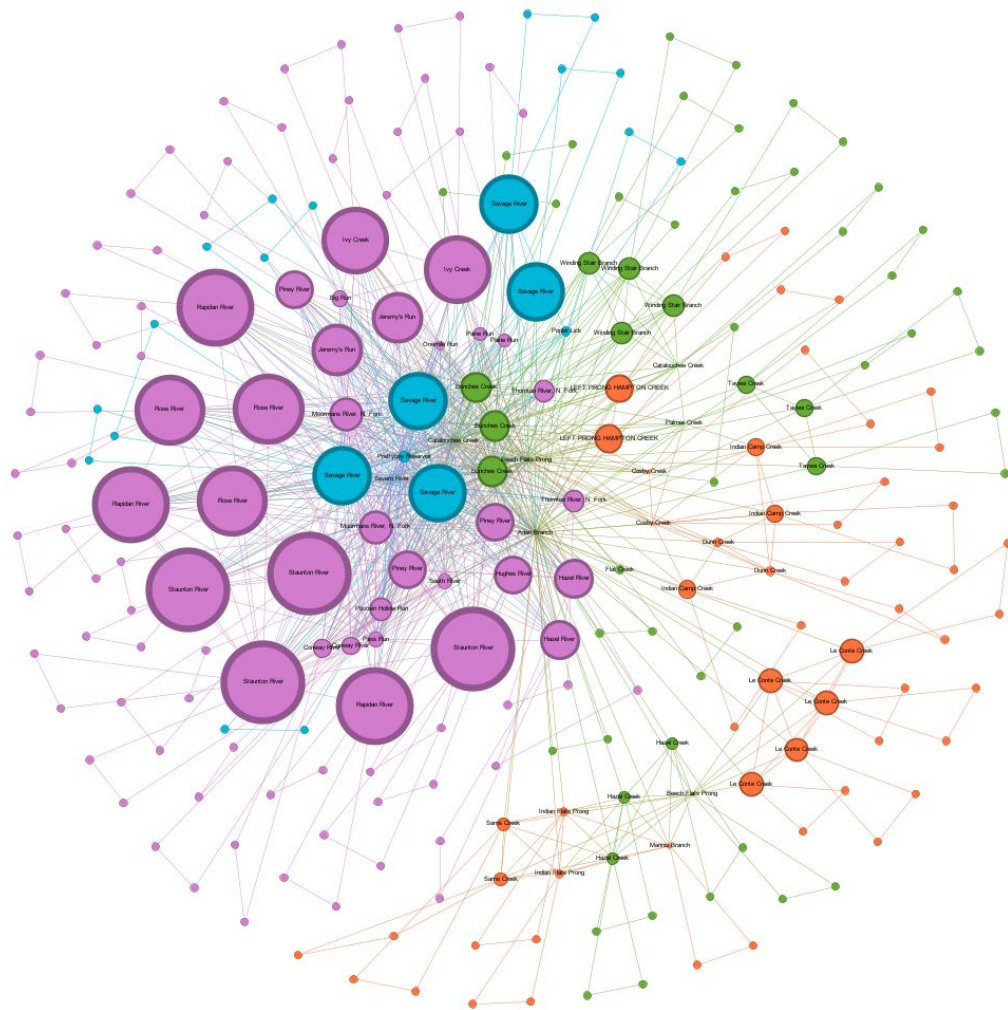


2004



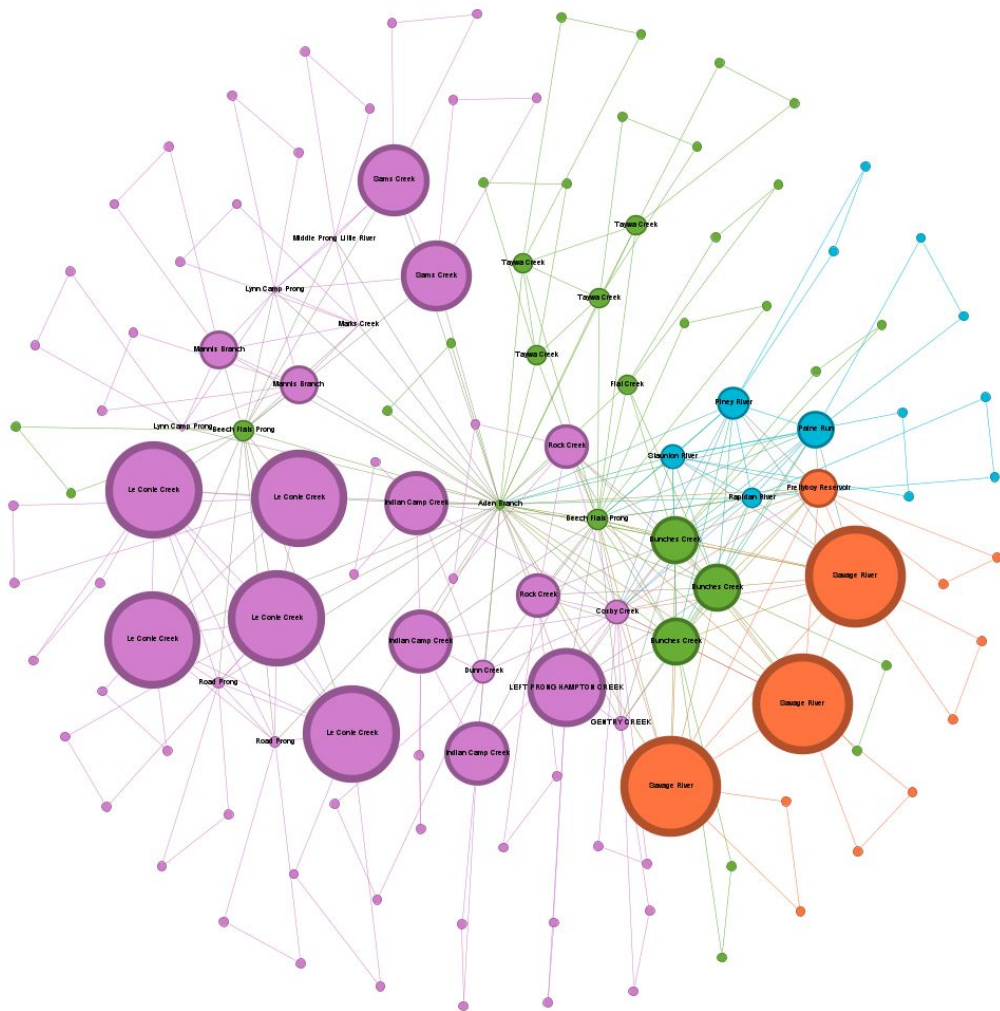


The graph displays a complex network of relationships between various locations. The nodes are categorized by color and size, representing different types of locations or entities. The connections (edges) are represented by lines of varying thickness, indicating the strength or nature of the relationships. The network is highly interconnected, with many nodes of the same color clustered together and connected by numerous edges. The colors used are purple, green, orange, blue, and yellow, each representing a different category of location or entity. The sizes of the nodes vary, with larger nodes indicating a higher degree of connectivity or importance within the network. The edges are represented by lines of varying thickness, with thicker lines indicating stronger or more direct relationships. The overall structure of the graph is dense and complex, with many overlapping clusters and connections.

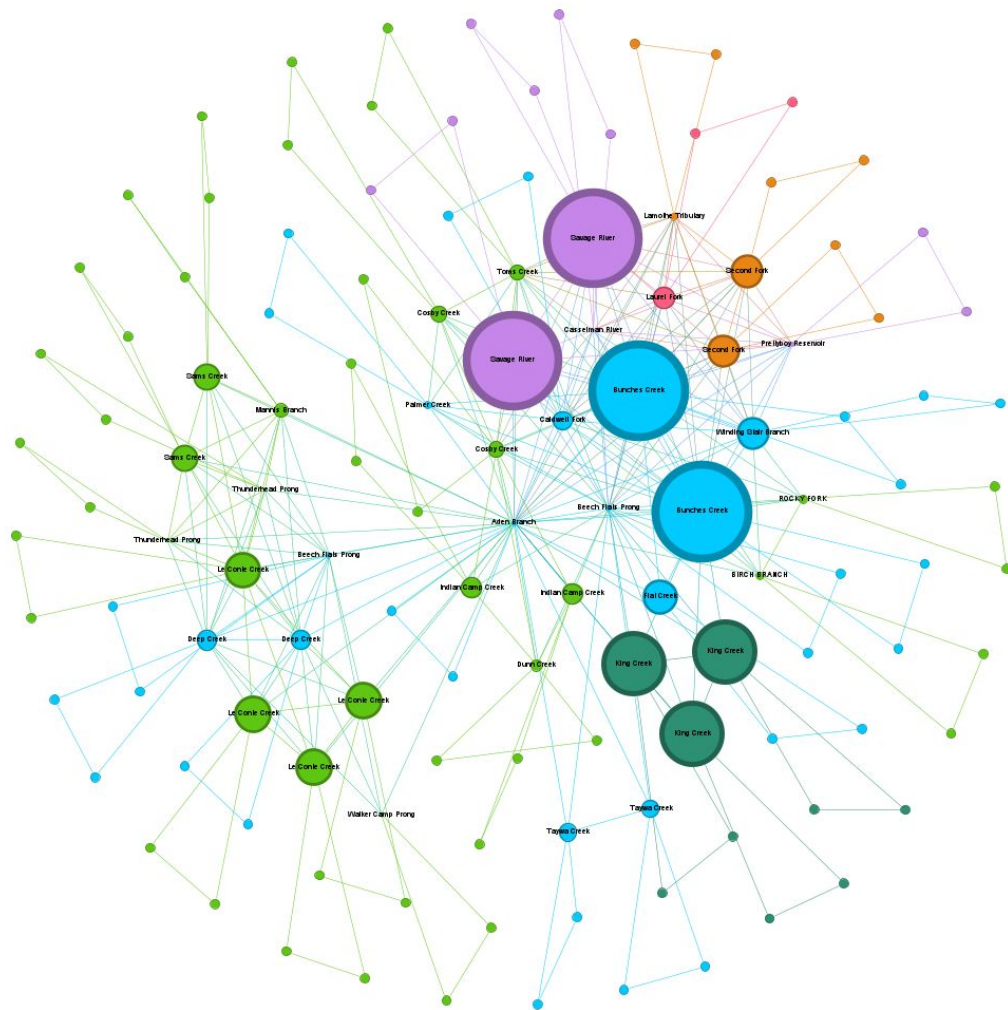


7

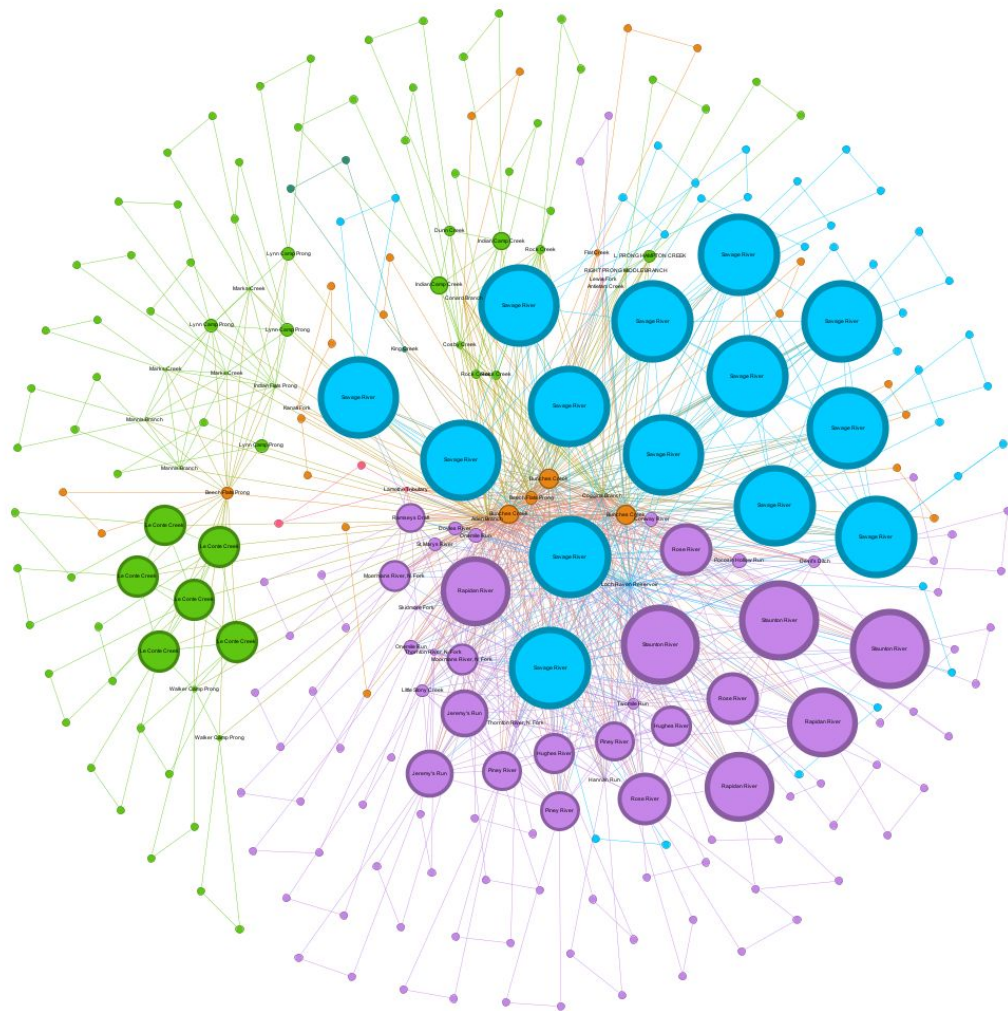
2008



2011



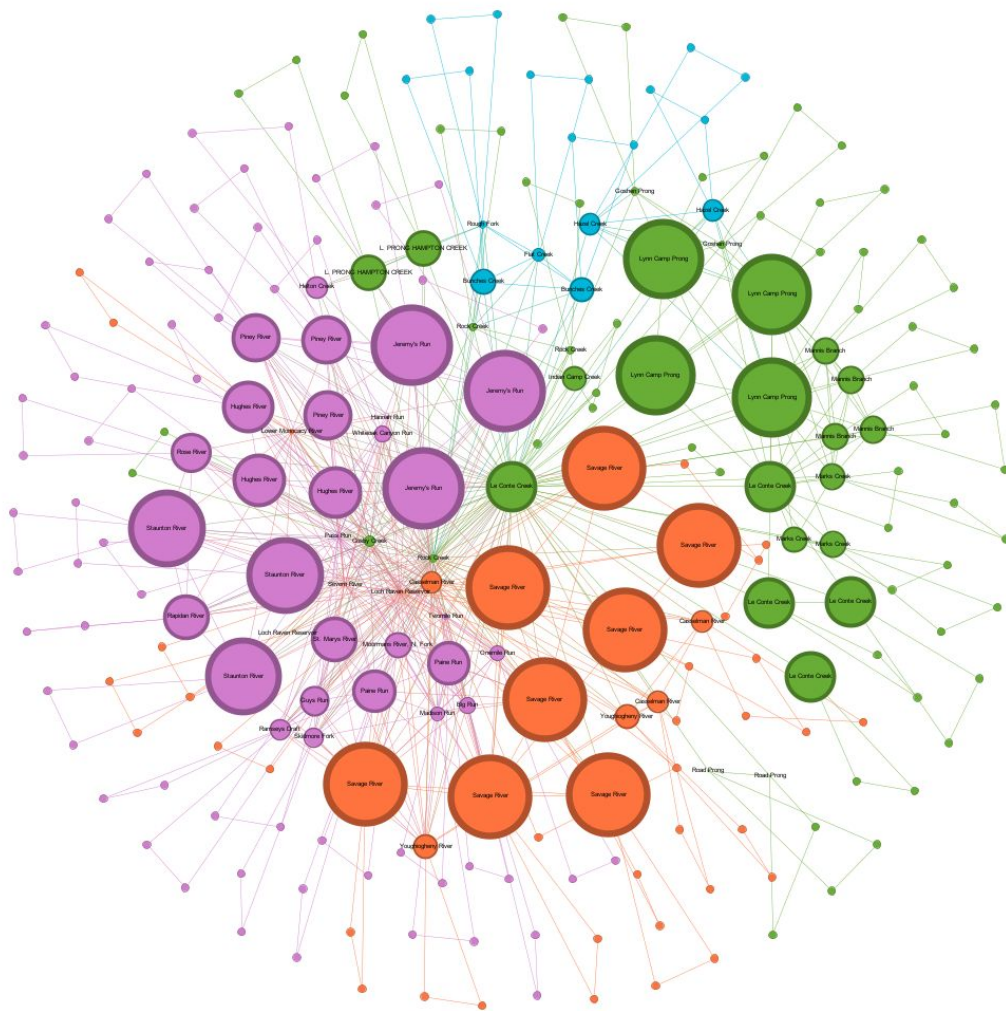
2012



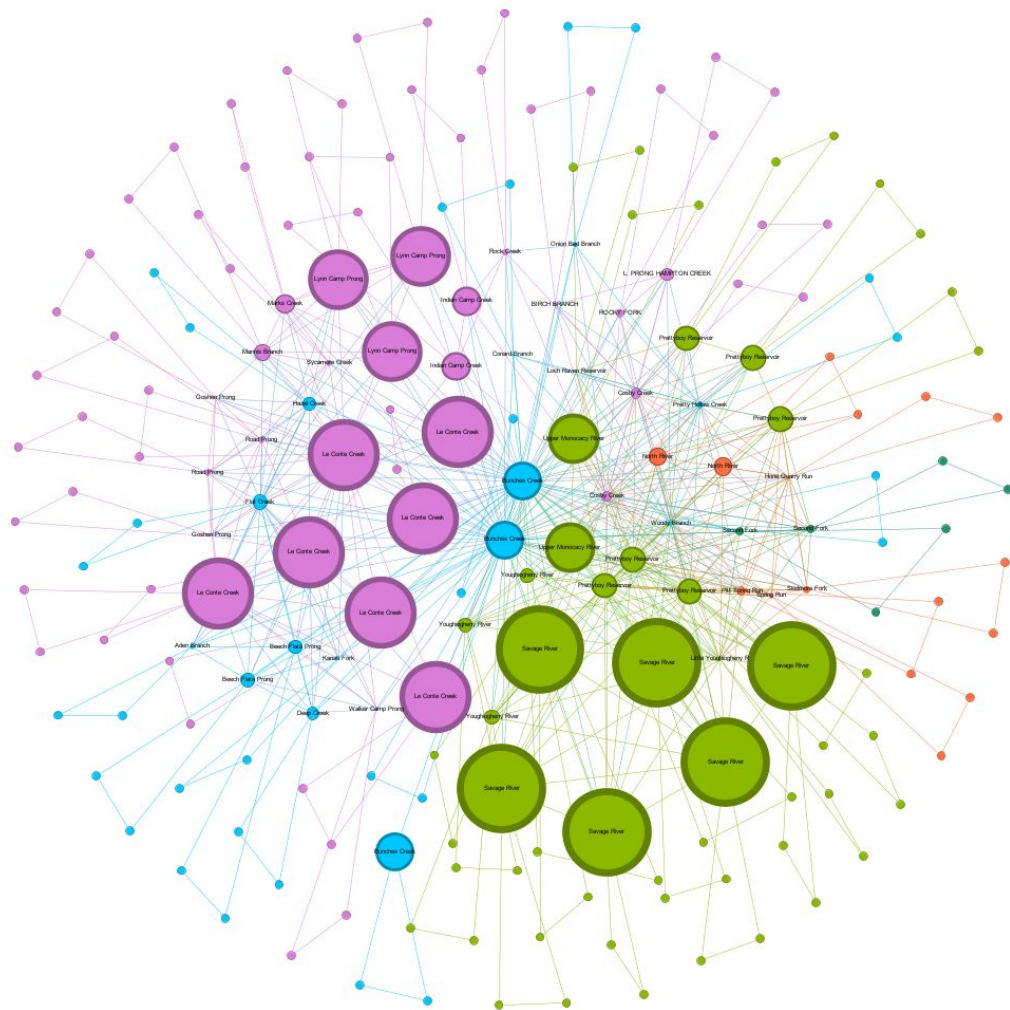


2015

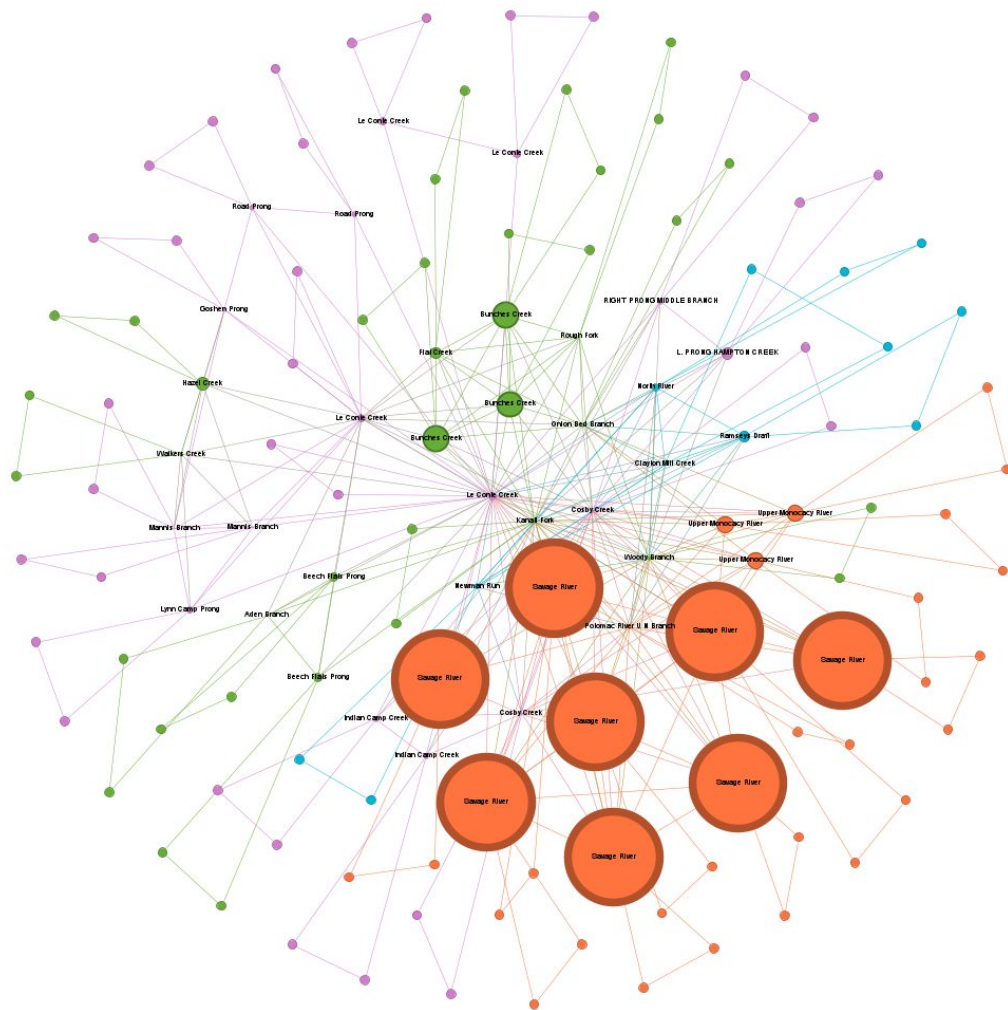
2014



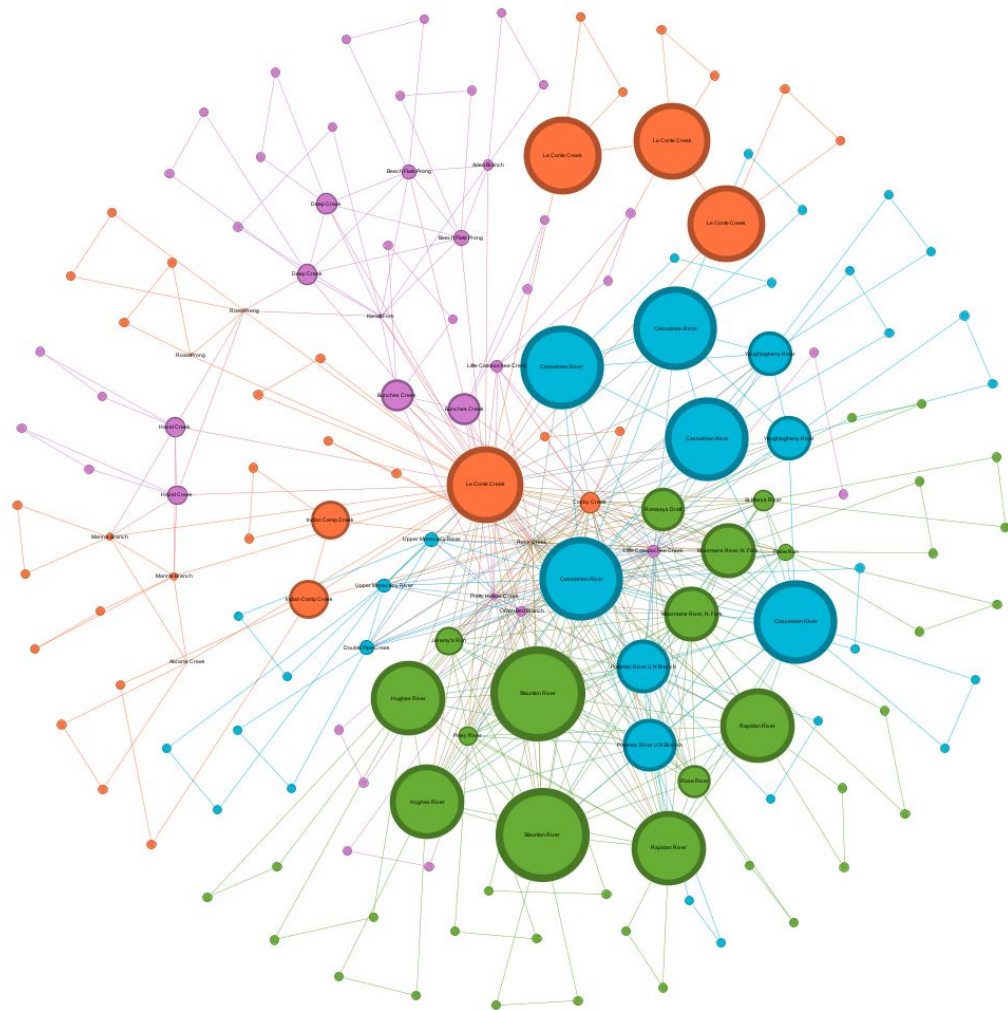
2015



2017



2018



The diagram illustrates the complex network of relationships between water bodies in the Upper Monocacy River watershed. The nodes represent individual water bodies, and the edges represent the relationships between them. The size of the nodes indicates their relative importance, and the thickness of the lines indicates the strength of the relationships. The diagram is organized into five color-coded clusters, each representing a different group of water bodies:

- Blue Cluster (Top Right):** Includes nodes like Little River, North River, and Upper Monocacy River.
- Green Cluster (Right):** Includes nodes like Upper Monocacy River, Little River, and North River.
- Purple Cluster (Bottom):** Includes nodes like Le Conte Creek, North River, and Upper Monocacy River.
- Orange Cluster (Top Left):** Includes nodes like Deep Creek, Beech Hole Pond, and Indian Camp Creek.
- Pink Cluster (Left):** Includes nodes like Le Conte Creek, North River, and Upper Monocacy River.

The diagram shows a high degree of connectivity between water bodies, with many nodes having multiple connections. The thickness of the lines indicates the strength of the relationships, with some connections being significantly stronger than others. The diagram also shows a clear hierarchy of water bodies, with some nodes acting as central hubs and others as peripheral nodes.



2020



Conclusions

We can see that initially the mass of brook trout were seen to stick around north carolina and moving around the area slightly till around 2011 where the trout radically moved out of the state and into different colder water streams. Until 2020 where it seems they have re entered north carolina.

However, what I would say is most concerning is the sporadic movement of the fish over time.