STREAMS MOST SUITED FOR TROUT POPULATIONS

STONY BROOK-MILLSTONE WATERSHED, NEW JERSEY, USA

N

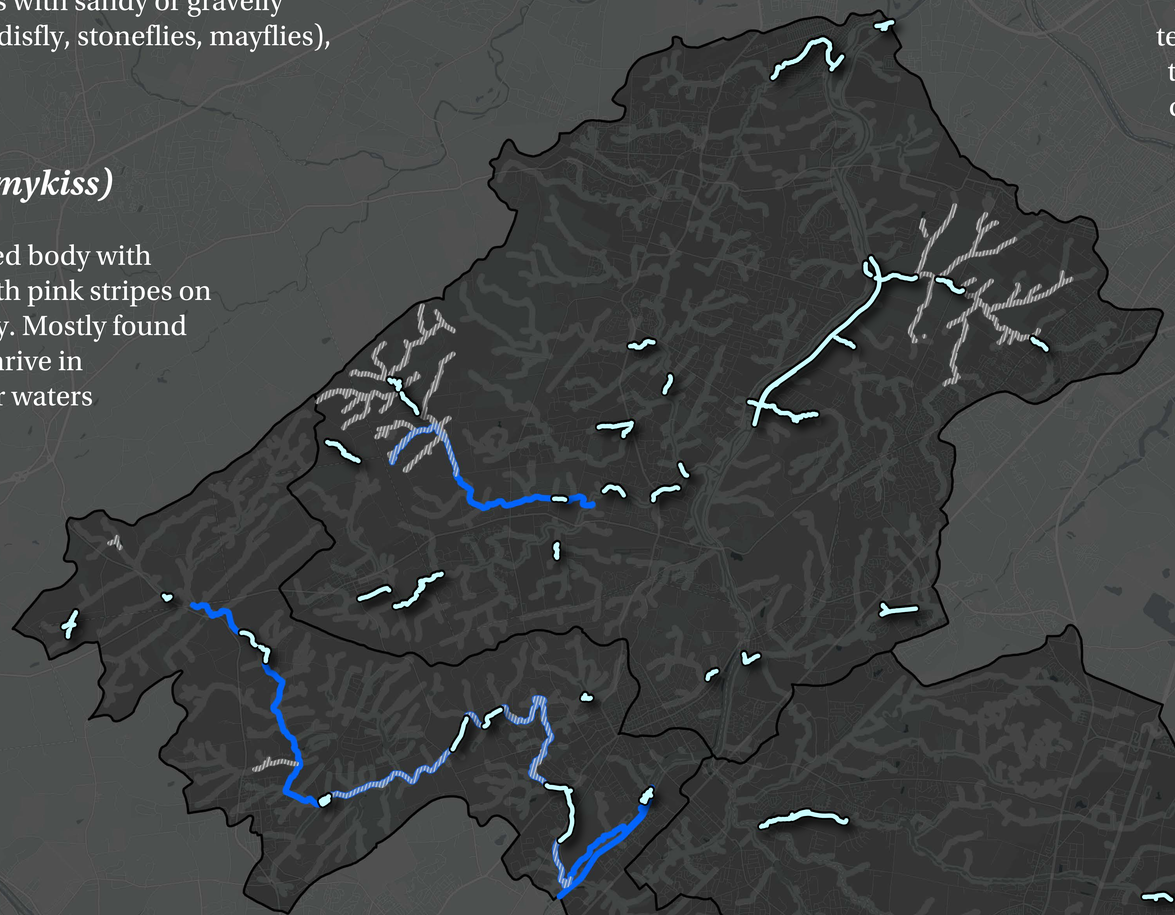
0 0.5 1 2 3 4 Miles

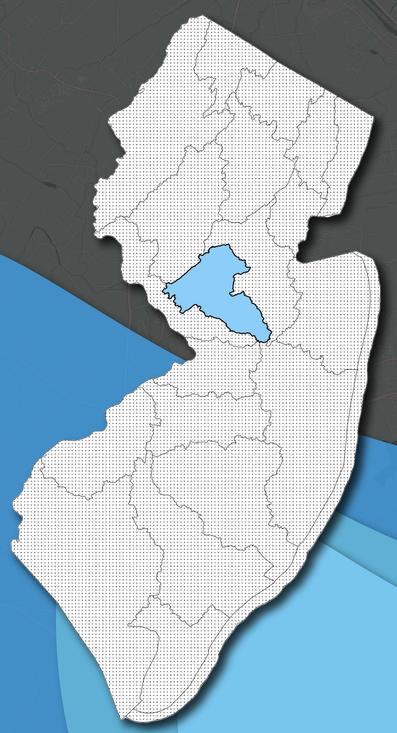
Brook trout (Salvelinus fontinalis)

They can thrive in clean and cooler waters with sandy or gravelly soil, and eat macroinvertebrates (like caddisfly, stoneflies, mayflies), leeches, frogs, and aquatic insects etc.

Rainbow trout (Oncorhynchus mykiss)

Rainbow trout have a large torpedo shaped body with bluish-green back, silver colored belly with pink stripes on the sides and black spots all over the body. Mostly found in freshwater but it can sometimes also thrive in saltwater water bodies. They prefer cooler waters with gravelly soil and consume macroinvertebrates (like caddisfly, stoneflies and mayflies), aquatic insects, frogs and smaller fishes etc.





PROJECT STATEMENT

The goal of this project was to find what streams have the potential to become Category 1 and if these streams could house trout populations. The trout populations found in streams require very healthy water, so when they are found in lakes and streams, it is a good indicator of healthy waterbody. Many factors determine healthy waters; but we looked into a few of these such as soil types, dissolved oxygen levels, fish index of biotic integrity, nitrate, temperature and benthic macroinvertebrates to find this.

WHAT IS A CATEGORY 1 STREAM?

Category 1 streams are defined by the New Jersey Department of Environmental Protection as "waters designated [...] for protection from measurable changes in water quality characteristics because of their clarity, color, scenic setting, other characteristics of aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resource(s)".(NJ.gov) There are a variety of stream qualities within New Jersey ranging from significantly polluted to high quality. While many streams may not meet the standards of Category 1, seeing what can be done to make our local streams healthier is a valuable endeavor that should be pursued.

Proposed Category 1 Streams

Current Category 1 Streams

Trout Stocked Streams

Data Sourced From:
Maine.Gov
NJDEP
Waterqualitydata.us
NJGIN
sciencedirect.com
NJGeoweb
soilseries.sc.egov.usda.gov
SSURGO
chesapeakebay.net
USDA
NJ.Gov
EPA
Arcgis.com

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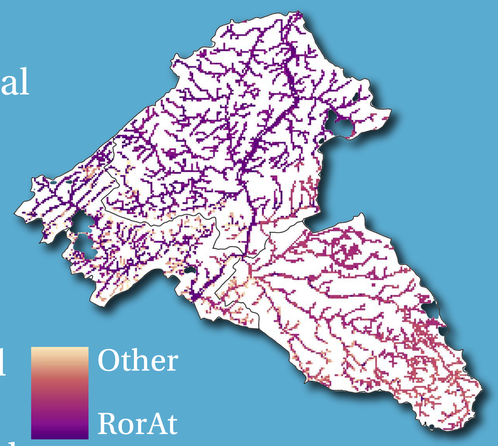
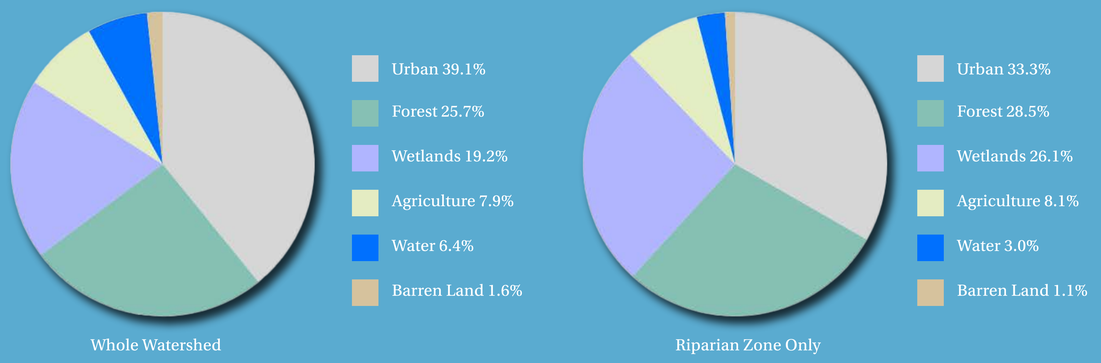
Soils

Rowland Silt loam soil (RorAt) is an ideal soil type for trout streams because of their preference for sandy and gravelly soil. And large portions of it made up in the Category 1 riparian zone. This soil type is a mixture of different soils like clay (no more than 27%), sand (no more than 50%) and silt and is well-suited for aquatic plant growth and phytoplanktons .



Land Use

Land use simply details how the land is being used. However, in the context of creating healthy streams it tells a very different story. Looking at the land use along the riparian zones, a large portion of the land is either urban, forest, or wetlands. Additionally, the current trout stocked streams are mostly along one of those three land types. As a result any new trout stocked streams will likely need to be within an urban, forest or wetland region.



Criteria Used for Suitability Analysis

Dissolved Oxygen (DO)

DO or dissolved oxygen is the amount of oxygen available to aquatic organisms like plants, fishes and macroinvertebrates to survive in the water. This parameter often varies due to water temperature and elevation and is one of the main indicators in determining if the water quality is good or not. Lower levels of dissolved oxygen often indicate contamination or pollution in water and can result in decrease in biodiversity of aquatic organisms.

Temperature

Water temperature is an important factor in determining stream health. If the water temperatures are higher it results in less dissolved oxygen and many aquatic organisms cannot survive in those warmer waters. Most aquatic organisms prefer cooler waters as the dissolved oxygen levels are higher and help the organisms survive.

Nitrate

Nitrate is a form of nitrogen found in aquatic environments and is an essential nutrient which promotes growth of aquatic plants and riparian zones.

Fish Index of Biotic Integrity

The fish index of biotic integrity is an index that assesses stream water quality based on several assessments of fish populations. The fish are collected, counted and assessed for several factors and the evaluation is recorded. Each site which is sampled for fish populations are then scored based on the evaluation of fishes and how close are the stream conditions to that of reference conditions which indicate healthy stream and aquatic ecosystem not affected by human disturbances.

Benthic Macroinvertebrate
(Biological Habitat Metric)

Benthic macroinvertebrates are bottom-dwelling aquatic animals lacking backbones and which are large enough to spot with the naked eye. They are good indicators of stream quality because they are impacted by the physical, chemical, and biological conditions of the stream. And have limited mobility and are relatively easy to sample and identify.
Examples of Benthic macroinvertebrates include: stoneflies, mayflies, worms, crayfish, clams and snails etc.

Benthic Macroinvertebrate (biological habitat metric) shows the index score and rating of biodiversity value of benthic macroinvertebrates habitat at the sampled stream sites.