

Passaic River Environmental Plan (PREP)



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Problem Statement:

Due to increased urbanization and development in northeast New Jersey, the water temperatures of the Passaic River Watershed have become warmer. This has led to a decrease in the population of wild brook trout, which the NJDEP considers a good indicator of water quality.

The influx of buildings and roadways limit the amount of permeable land. This lowers groundwater recharge, increases stormwater runoff, and increases chances of flooding.

Mission Statement:

PREP's mission statement is to extend the area of wild brook trout spawning from the headwaters of Morris County downstream and into the surrounding waters of Passaic and Essex County.

Characteristics:

The Passaic River is approximately 80 miles long; it begins meandering through the hills of northern New Jersey and ends in the bays connecting to the Hudson River. The basin area is 935 square miles, which encompasses the area of the watershed. Recorded in Little Falls Township, the discharge of the river is 2,100 cubic feet per second. The source of the river is an unnamed pond in Mendham, New Jersey and the mouth is Newark Bay, New Jersey. The elevation drop between those two locations is 540 ft. The counties in the watershed are Hudson, Essex, Bergen, Passaic, Morris, Union and Somerset.

Land Use:

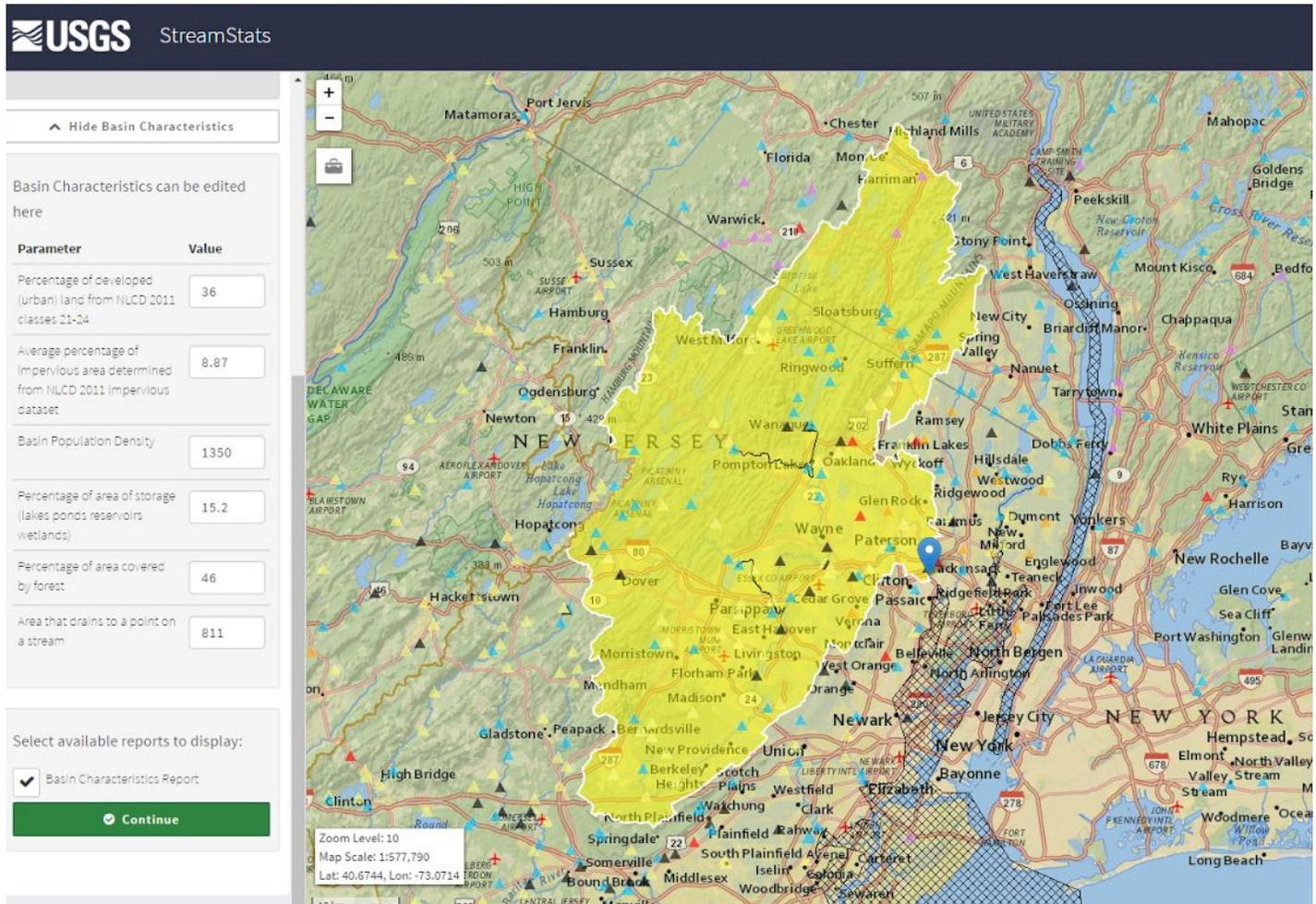


Figure 1. USGS StreamStats

The land use of the Passaic River differs drastically from its headwaters to the tidewaters. In its headwaters out in Western North Jersey, there are many forests and undeveloped areas surrounding the river. As you go east then the population density starts to increase around Wayne and then significantly again when you get to Essex county. This increase in population

has led to a large portion of the lower watershed being low, med, and high developed land. This is horrible for the watershed and as a result the water quality has suffered.

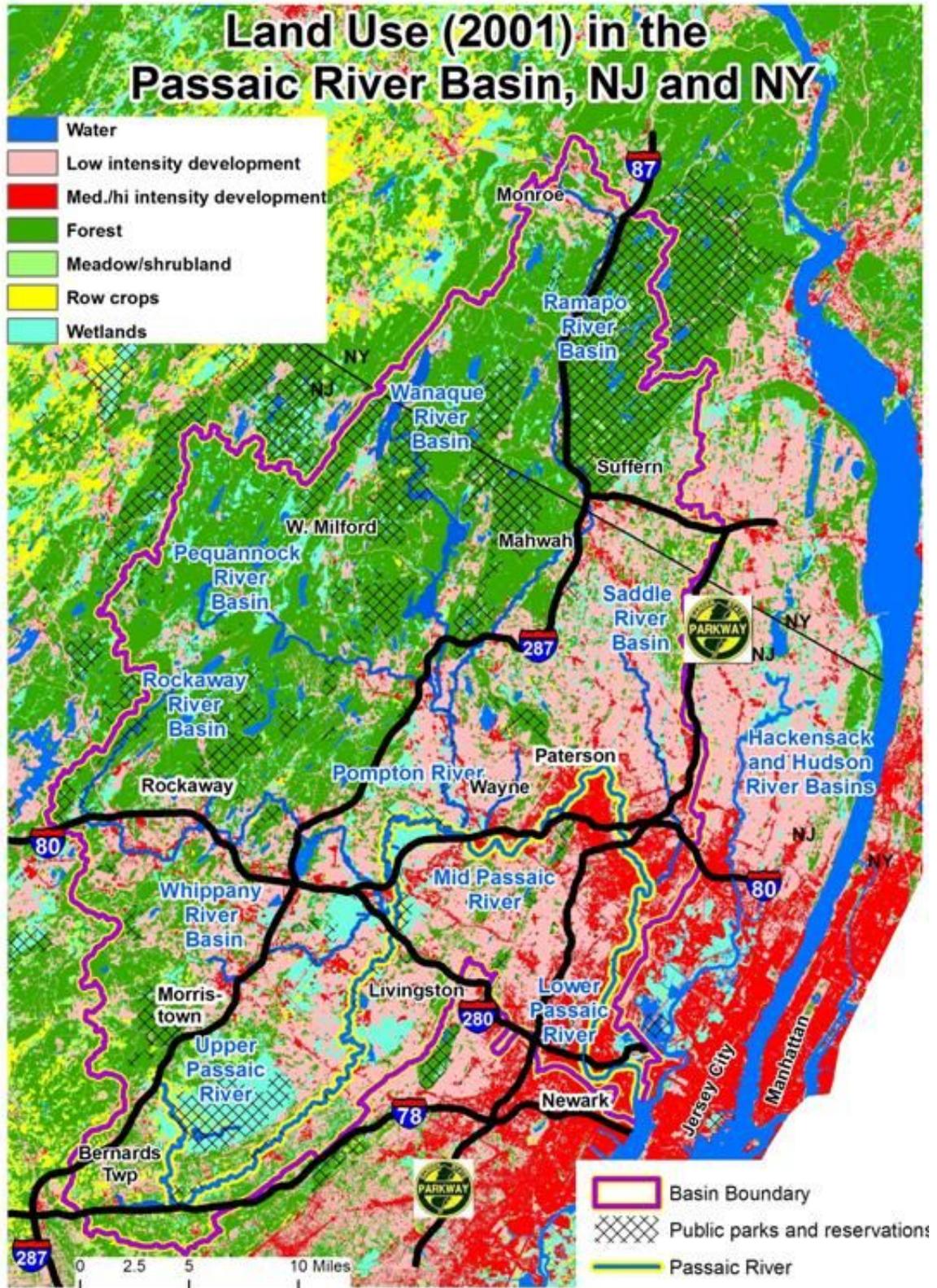


Figure 2. Land Use by Montclair State University

Water Use:

The Passaic River provides many services. The Upper River and its tributaries (Pequannock, Rockaway, Wanaque, Ramapo and Pompton Rivers) are a source of drinking water for millions of northern New Jersey residents. Interconnected systems deliver the water primarily through the North Jersey District Water Supply Commission serving 107 municipalities, the Passaic Valley Water Commission serving Clifton, Passaic and Paterson and numerous surrounding towns, and the NJ American Water Company, serving about 42 towns. A number of towns also rely on groundwater from the Buried Valley Aquifer, a sole source aquifer made by the glaciation of the area. Besides drinking water the Passaic River Watershed is the habitat for many different animals and even some endangered animals. The wetlands provide important nesting, feeding, and resting areas for migrating birds. These wetlands also absorb flood waters, reducing downstream flood damage. Although there is currently a fishing advisory on the river, it is a very popular spot to go fishing and you can catch very large pike there as well as kayak in the upper tributaries. The lower part of the watershed drains into the Newark Bay which houses the Port of Newark. This Port is the third largest in the country and supports constant large vessel traffic and commerce.



Figure 3. Port Newark by US Customs and Border Protection

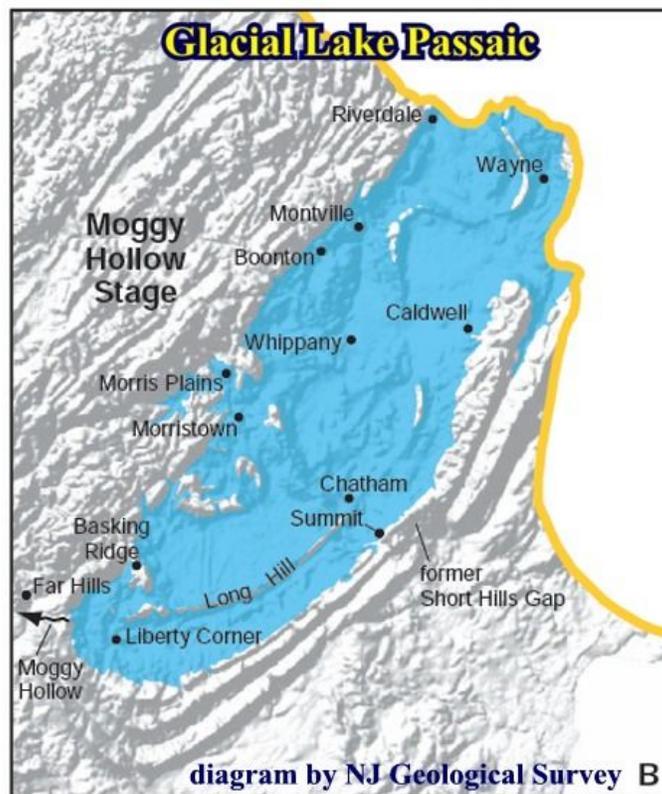


Figure 4. Glacial Passaic Lake by Montclair State University

History:

The Passaic River has a lot of historical significance in Northern New Jersey. Originally formed by glacial waters escaping the Glacial Lake Passaic, it has powered many industries to this day and currently gives drinking water to millions of New Jerseyans. The rich history started when our country was battling for independence when George Washington made his camps on the banks of the Passaic. After winning the revolutionary war and becoming a nation, Alexander Hamilton realized the potential of the river as a power source for industry. In 1792, Paterson harnessed the power of The Great Falls to successfully power textile plants and other factories along the riverbanks. As the need for more power grew the Dundee Dam was built in Garfield originally to flood a canal to allow ships to sail up river. After that plan failed the dam was instead used to power more factories along the river. As the population of New Jersey started to skyrocket, many people started to live closer and closer to the lower part of the river and the population density increased greatly. The peak of the industry on the Passaic River was from the early 1900's to the 1970's where tons of factories produced a wide variety of things such as heavy metals, pesticides, and even the toxic chemical Agent Orange that was used in the Vietnam War to deforest the jungles. All of these factories produced toxic waste that was pumped straight into the river and the quality suffered tremendously. In 1918 there was actually a fire on the surface of the river in Kearny which is almost at the mouth of the river near the Newark Bay. The Passaic River's history is quite an important one and led to the economic development and industry of Northern New Jersey. The Passaic River runs into the Newark Bay, where the Port of Newark is located, which is the third largest port in the country. To this day there are still some factories, but most have become run down collapsing buildings on the banks of the river. Towards the lower river, trash can be seen floating everywhere and decaying automobiles and old boats are scattered along the banks.



Figure 5. Decaying Boat by Wall Street Journal

Organizations:

- Passaic River Coalition - Est. 1969 and protects water quality and quantity of entire watershed in NJ also Rockland & Orange County, NY
- Pequannock River Coalition - Improve ecosystems of Pequannock & Wanaque Rivers
- Great Swamp Watershed Association - Educates communities about their effect
- Whippany River Watershed Action Committee - Community action projects
- Greenwood Lake Commission - Improve quality of the lake
- Hackensack Riverkeeper - Independent & Non-Governmental
- American Rivers - National Organization dedicated to preserve for future generations
- River Network - National Organization includes over 2,000 grassroots organizations
- Waterkeeper Alliance - Made up of over 200 local waterkeeper organizations

Existing Plans and Actions

The 1972 clean water act was the first legislation to begin improving water quality in the Passaic river. In 2008 the US EPA settled with Occidental Chemical Corp and Tierra Solutions. The companies agreed to pay \$165 million for ecological damage from dioxin contamination. The Passaic River Basin Flood Advisory was enacted in 2010 to recommend solutions for chronic flooding problems. In 2014 US EPA Announced New Plan. A 1.7 billion dollar plan to remove 4.3 million cubic yards of toxic mud from the lower 8 miles of the river. That section of river is considered one of the most polluted in the country.

Issues in the Watershed:

Problem	Description	Causes
P1: Decrease in Trout Spawning Grounds	Brook Trout used to be all over the Passaic River watershed and now they are only spawning in the headwaters of Morris County	The trout problem is caused by the water temperature. In order for trout to spawn they need cold water and the waters downstream are significantly higher in temperature.
P2: Increase in Severe Flooding	There have been many instances of flooding and many people's homes receiving massive water damage due to their close proximity to the river.	Due to increased urbanization and less available land more and more people are moving closer and closer to the river. The runoff from this urbanization also contributes to the flooding because less water is absorbed into the ground.
P3: Horrendous Factory Pollution	The water quality in the Passaic River is notorious for its terrible quality.	There are many factories from Paterson to Newark that have been dumping toxic chemicals into the river over the past century. One major example of this was the Agent Orange Factory in Newark that severely polluted the watershed.



Figure 6. Brook Trout that are used as a Water Quality Indicator

Goals and Objectives:

G1: To increase the trout spawning population. By decreasing the water temperature by two degrees we hope to see an increase of brook trout as far as the towns of fairfield.

G2: Decrease the severity and frequency of flooding By increasing the area of floodplains and retention ponds as well as adding non-livable zones, flood water management could be improved and the amount of people affected by the flooding would be reduced. This is a difficult problem because of the dense human population throughout the watershed.

G3: Limiting industrial pollution. One taxpayer costly step to combat the toxic chemicals would be to remove the already toxic mud by dredging. Another way to limit the chemicals entering the river would be to have strict regulations on industries the dumping in close proximity to the river.

Solutions:

S1: To increase the trout spawning population - Shade a larger portion of the stream by riparian (riverbank) vegetation and limit runoff by increasing the amount of stormwater that seeps into the ground

S2: Decrease the severity and frequency of flooding - New zoning laws must be made to prohibit building within 75 feet from either side of the waterway and also prohibit building in current flood plains. Along with government buybacks and establishing new parks next to the river.

S3: Limiting industrial pollution - Increase and enforce fines for properties that are next to the river and polluting it with garbage. Continue dredging and skimming of the lower Passaic for floating garbage



Figure 7. Dredging in the Passaic River by NorthJersey.com

Conclusion:

By the end of 2025 if these solutions are enacted then we estimate that brook trout will be able to be caught recreationally as far as the Dundee Dam in Garfield! Improvement in the water quality of the Passaic River Watershed would enhance the condition of the surrounding environment and make the river area much more aesthetic. This would promote economic and recreational activity.

References:

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