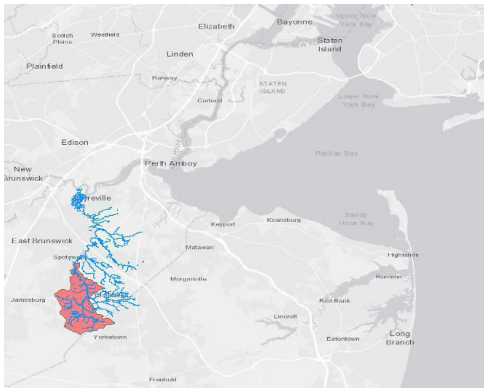
Aquatic Connectivity Through Climate-Ready Infrastructure

Matchaponix Subwatershed



This assessment found four priority restoration projects in the Matchaponix Subwatershed that will address either aquatic connectivity, hydrologic capacity, and/or crossing condition. This watershed was the largest assessed in 2021, with the most crossings. The Matchaponix Brook flows downstream into the South River on the north side of the watershed and continues into an upstream subwatershed to the south. There is likely little to no connectivity from this watershed to the ocean because of a dam further downstream on the South River, but connectivity for potadromous fish is generally good throughout. Hydrologic capacity is also generally good with some problematic culverts recommended for restoration.

Background

Aquatic connectivity is a key restoration goal for the New York – New Jersey Harbor & Estuary Program (HEP) and its partners because this connectivity is crucial for improving healthy ecosystems and managing severe storms and flooding caused by climate change. Recommendations for barrier removal were made based on the following assessments: the North Atlantic Aquatic Connectivity Collaborative (NAACC), dendritic connectivity, a culvert capacity model developed by Cornell University, and infrastructure condition. These results are being shared with stakeholders to advance planning and capital projects that will replace problematic road-stream crossings with climate-ready, connectivity-friendly versions.

This assessment was made possible by funding from the EPA Coastal Watershed Grant administered by Restore America's Estuaries, and in partnership with the Rutgers Sustainable Raritan River Initiative.

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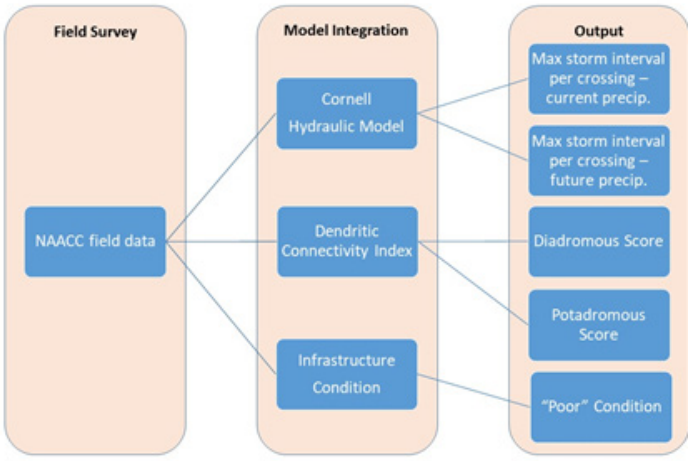
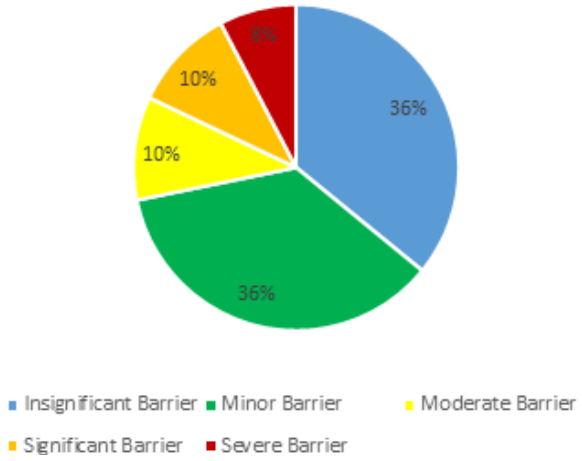


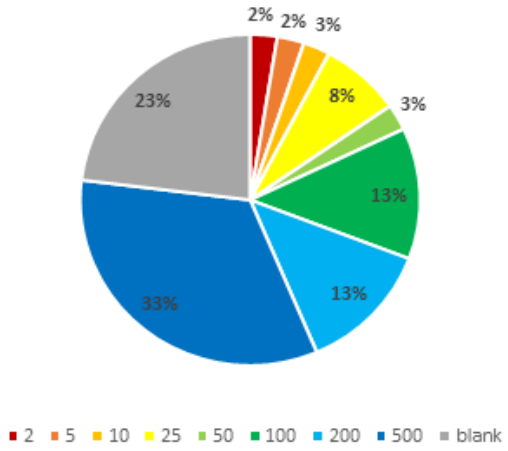
This diagram shows the evaluation process. First field measurements are taken to estimate how well fish can pass through the culverts and bridges. Then that data is plugged into the Cornell Model to estimate the size of the rain event the crossing can accommodate (as measured by the current projections of the 1 to 500-year storm events). Individual culverts were prioritized for passage for estuarine (diadromous) and freshwater (potadromous) species using a dendritic connectivity index. Finally, crossings were prioritized that were in poor condition (falling apart).

Aquatic Connectivity Results



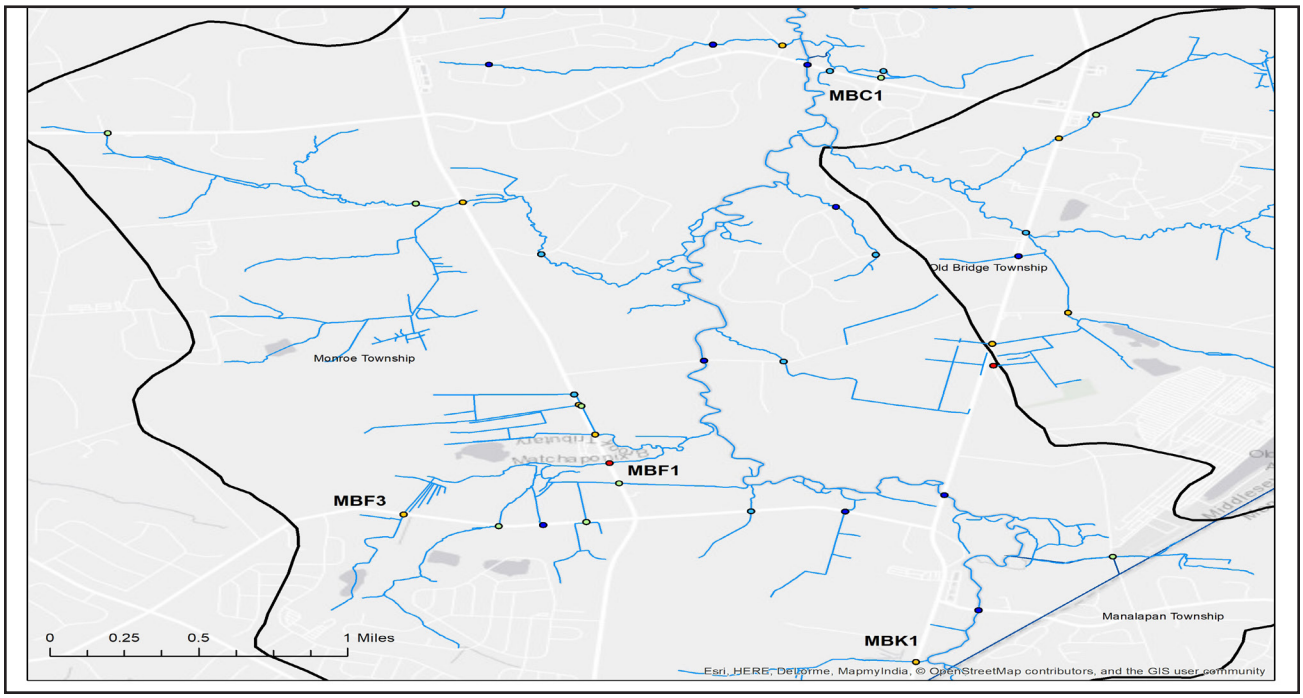
The connectivity in the Matchaponix subwatershed is good overall. Most of the barriers to connectivity are on the upstream reaches of tributaries, which leaves the main stem and deeper sections of the streams passable. This is one of the only subwatersheds assessed in 2021 where the field team saw fish in the tributaries.

Capacity Model Results



This chart shows the maximum storm interval (e.g. 10-year storm event) that the structure can accommodate without flows overtopping the road or causing erosion. This represents current precipitation scenarios, which are expected to increase. Hydraulic Capacity in this subwatershed was better than other neighboring subwatersheds with less than a quarter considered undersized. The crossings listed as blank could not be modeled, primarily due to their large size, indicating likely no capacity issues.

Priority Restoration Projects



MBC1 is located in Old Bridge Township, NJ. All others are in Monroe Township.

1. Matchaponix Brook Tributary F1 (MBF1) is the most important barrier for fish migration in the watershed. It is a small, undersized culvert that has a large outlet drop, completely blocking off connectivity and creating a large pool below the outlet. Some of the structure is also crumbling.

PHOTOS: NY/NJ HEP

2. Matchaponix Brook Tributary K1(MBK1) is a small double culvert that is nearly completely filled with sediment and can only accommodate a 2-year storm event.

3. Matchaponix Brook Tributary F3 (MBF3) is a culvert that you do not need a model to tell you is undersized. At the time of assessment there were three separate water sources flowing into the same small and obstructed inlet: the MBF tributary upstream, a drainage ditch to the east and a plastic pipe entering from the west (photo left). The scour pool on the other side is huge, indicating very high velocities and it continues to be a large stream downstream (photo right).

PHOTOS: NY/NJ HEP

4. Matchaponix Brook Tributary C1 (MBC1) is a "ghost crossing," a crossing that is not on a road but instead some other historical route. In this case, it is an earthen berm. The path on top does not appear to lead anywhere so the berm itself may be a flood control device. Though the stream was dry here during low-flow, the grate and drop at the inlet would completely block off all aquatic connectivity should waters rise.

PHOTOS: NY/NJ HEP