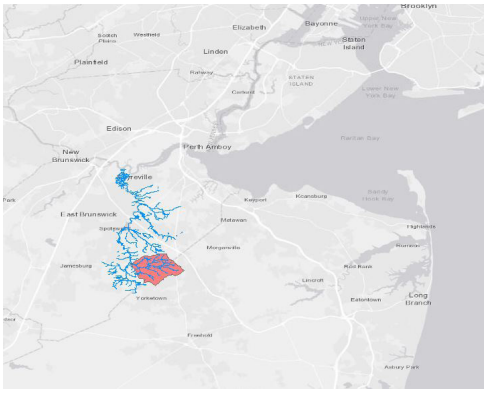
Aquatic Connectivity Through Climate-Ready Infrastructure

Barclay Brook Subwatershed



This assessment found five priority restoration projects in this subwatershed that will address either aquatic connectivity, hydrologic capacity, and/or crossing condition. The Barclay Brook subwatershed runs from its headwaters on the eastern side near Rt. 9 South in Marlboro NJ, west to meet up with the Matchaponix Brook. There is at least one dam that blocks flow from Barclay Brook to the ocean. The problematic culverts in this subwatershed tend to be so for both aquatic connectivity and hydraulic capacity issues, making them good candidates for restoration projects.

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.

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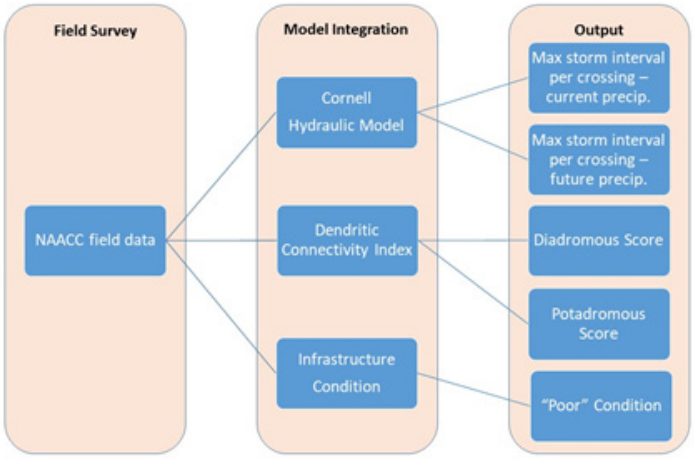
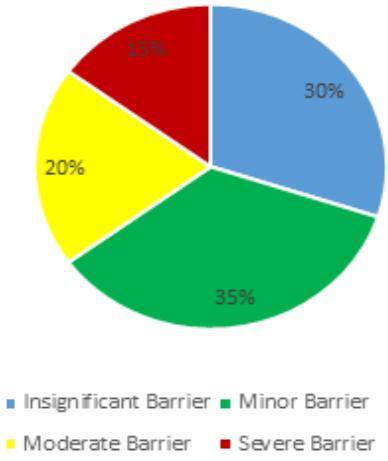


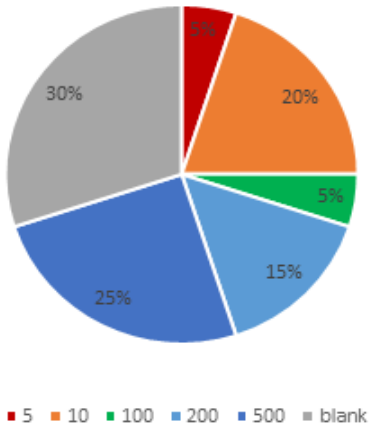
This diagram shows the evaluation process. First field measurements are taken to estimate how well fish can pass through the culverts and bridges. Then that data is plugged into the Cornell Model to estimate the size of the rain event the crossing can accommodate (as measured by the current projections 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



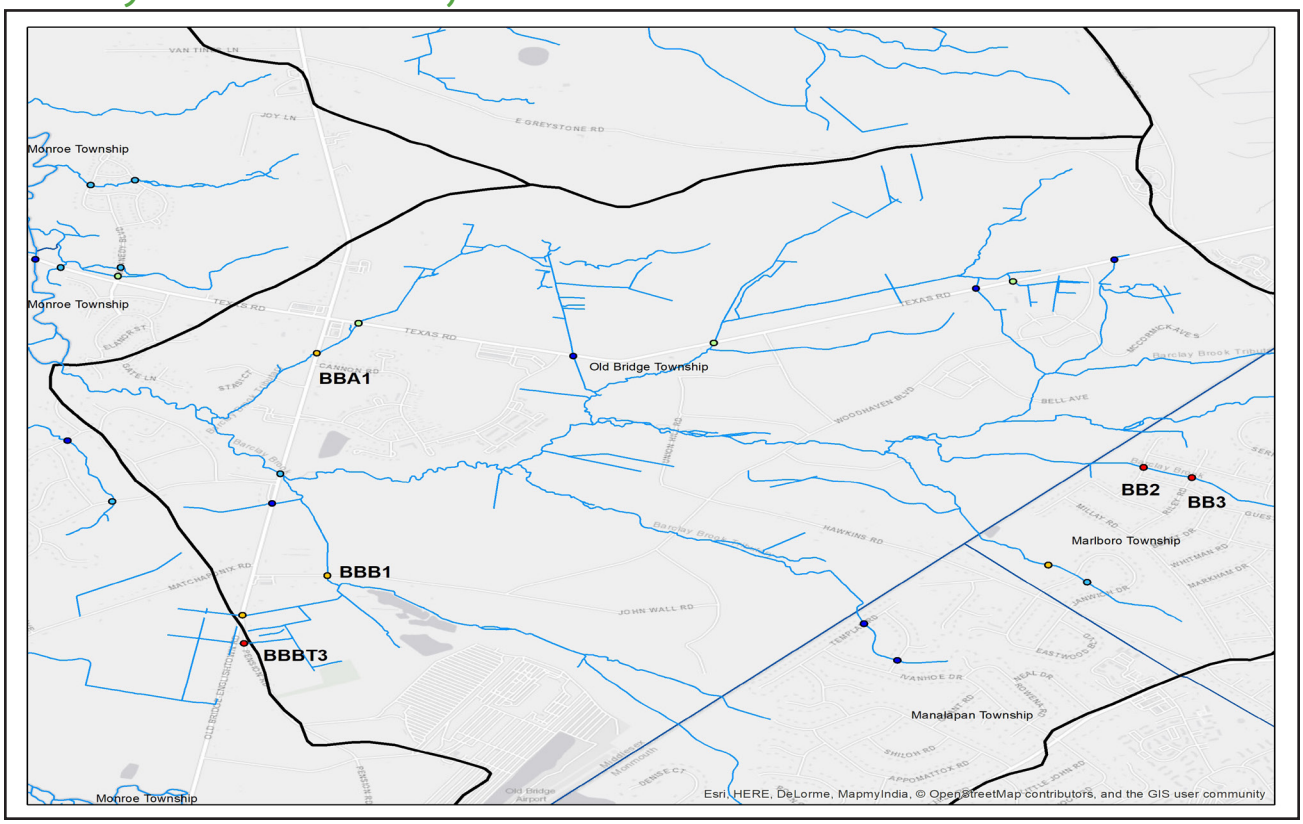
The Barclay subwatershed is highly dendritic (forking) leading to a good overall connectivity score. The watershed, uniquely, has many minor and moderate barriers. Those two categories tend to lead to good candidates for restoration projects as they are problematic but sometimes can be more feasible than, for example, a part of stream that is buried (a severe barrier).

Capacity Model Results



Hydraulic Capacity in this subwatershed was variable with a good portion that are adequately sized (>100). The crossings listed as blank could not be modeled; half were too large to be modeled (likely no capacity issues) and half buried or collapsed (likely capacity issues).

Priority Restoration Projects



BB2 and BB3 are located in Marlboro Township, NJ. All others are located in Old Bridge Township.

1. Barclay Brook 2 (BB2) is a clogged, submerged, and undersized culvert that is also blocking migration for potadromous fish. Due to these features, the outlet is a collection point for large woody debris and garbage, and the bank is greatly eroding.

PHOTOS: NY/NJ HEP

2. Barclay Brook 3 (BB3) is just upstream of BB2 and in similar condition. The crossing is undersized and nearly completely blocked by debris, and the metal culvert itself is misshapen. There is evidence of some stopgap erosion control measures on the bank in the form of large construction cobbles placed on the roadside leading down to the culvert top.

3. Barclay Brook Tributary B3 (BBBT3) is a small culvert that is completely filled in, allowing for no flow. The culvert is nearly at road-height, which likely leads to frequent flooding events. This culvert may need maintenance or replacement.

PHOTOS: NY/NJ HEP

4. Barclay Brook Tributary B1 (BBB1) is a double culvert that can only accommodate a 5-year flooding event. There is evidence of heavy erosion on the outlet side and the culverts both have a small diameter and long length, which may deter some fish from entering.

5. Barclay Brook Tributary A1 (BBA1) is a small, undersized culvert with a submerged outlet. The inlet is mostly blocked by debris and it is likely a deterrent to fish passage.

PHOTOS: NY/NJ HEP