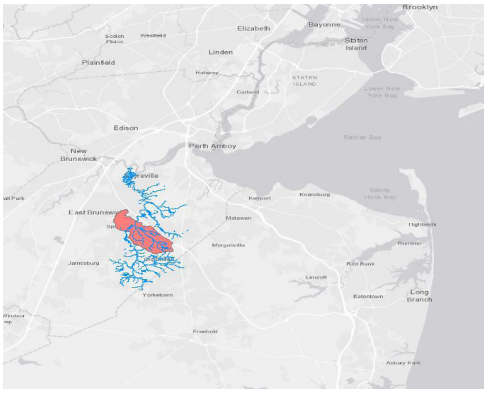
Aquatic Connectivity Through Climate-Ready Infrastructure

Iresick 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 Iresick Brook subwatershed runs into Duhernal Lake on the South River. Duhernal Lake is dammed at the outlet so there is likely little to no connectivity from this subwatershed downstream to the Raritan River and Ocean. This watershed is highly dendritic with many small streams running through it, some of them ephemeral. Connectivity is good at the headwaters of these small streams and worsens as many of them are buried through suburban areas near Duhernal Lake.

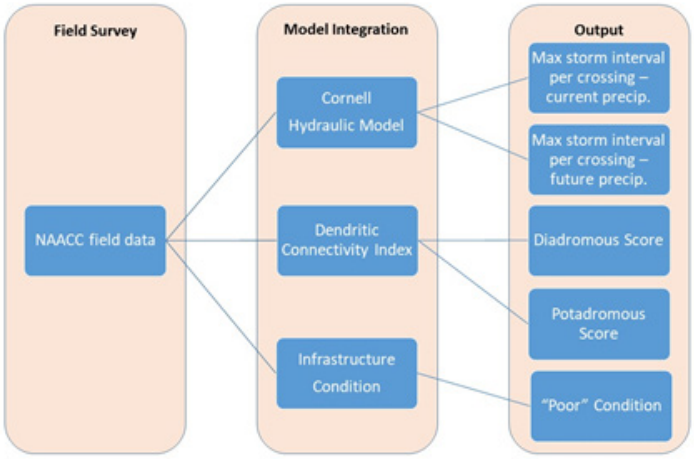
Background

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.

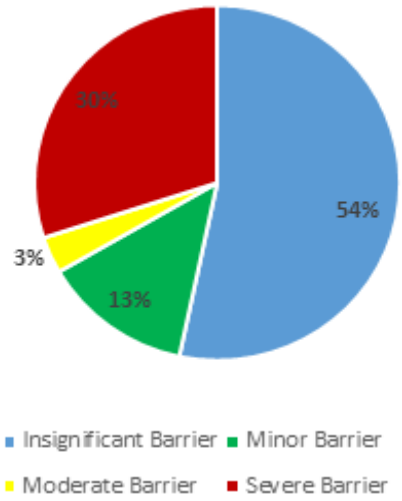
HUDSON RIVER FOUNDATION

NY/NJ HARBOR & ESTUARY PROGRAM



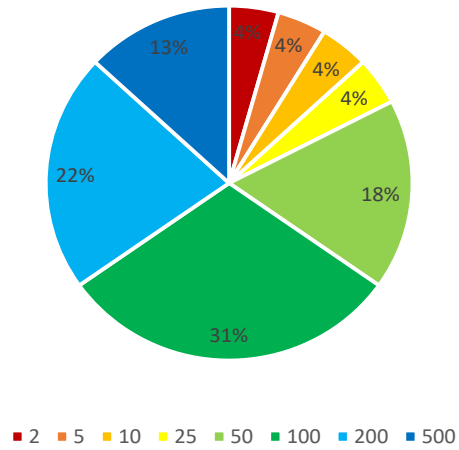
This diagram shows the evaluation process. First field measurements are taken to estimate how well fish can pass through the culverts and bridges. Then that data is plugged into the Cornell Model to estimate the size of the rain event the crossing can accommodate (as measured by the current projections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



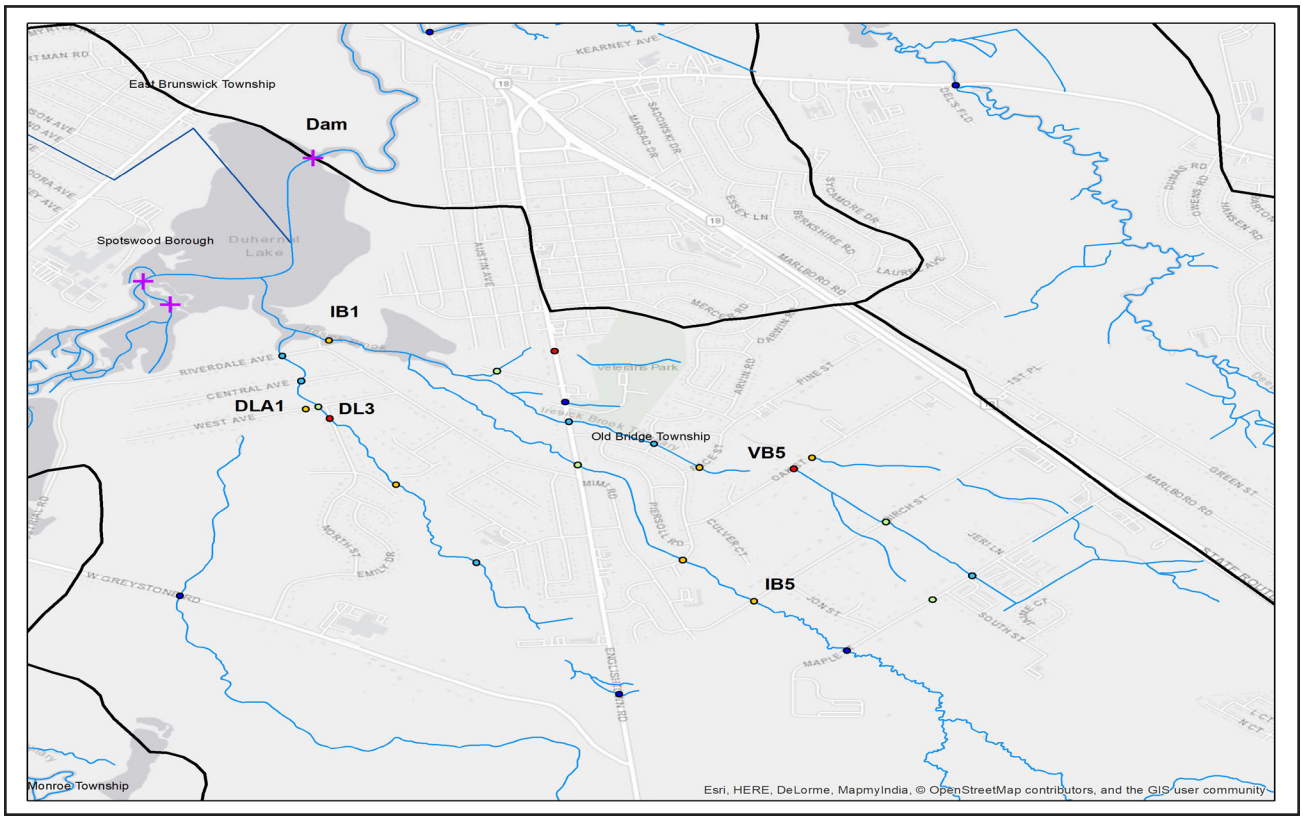
The aquatic connectivity of this subwatershed is largely fine except for a few sections of buried stream or extra-long culverts (the severe barriers) as the tributaries reach the downstream section of the watershed.

Capacity Model Results



This graph shows the maximum storm event a crossing can accommodate under current precipitation scenarios. Hydraulic Capacity in this subwatershed was variable. While most of the crossing structures were small culverts, the streams also tended to be small. However, this may become more of an issue with increased precipitation with climate change. Over half of the culverts modeled drop down to the next lower maximum capacity under a 15% increase in precipitation. Capacity under 50 is usually considered undersized for roadways.

Restoration Projects



All recommendations are located in Old Bridge Township, NJ.

1. Duhernal Lake 3 (DL3) is an overly long (~240 ft.) and undersized culvert on an ephemeral stream. Though the stream was dry during the assessment period, the dendritic connectivity assessment placed this as the most critical barrier for fish passage in the watershed. It can only accommodate a 5-year storm event.

PHOTOS: NY/NJ HEP

2. Veterans Brook 5 (VB5) is a very long and undersized culvert. This small diameter and length (>300 ft.) of this culvert likely deters most fish, and it can only accommodate a 2-year storm event.

3. Duhernal Lake Tributary A1 (DLA1) is a buried crossing under 1-3 residential streets. If this section of the stream could be daylighted, it would allow for aquatic connectivity from Duhernal Lake upstream on this tributary for 3 miles. No photo - see map.

4. Iresick Brook 5 (IB5) is an undersized double culvert that is in poor condition with an eroding bank. It can only accommodate at 50-year storm event and may block fish passage.

PHOTOS: NY/NJ HEP

5. Iresick Brook 1 (IB1) is an oddly structured bridge with culverts that run under it. Access prevented an assessment for either connectivity or capacity. However, the culverts were submerged under low flow conditions which likely indicates a capacity issue and the grate and concrete dead-ends likely do not support easy fish passage.

PHOTOS: NY/NJ HEP