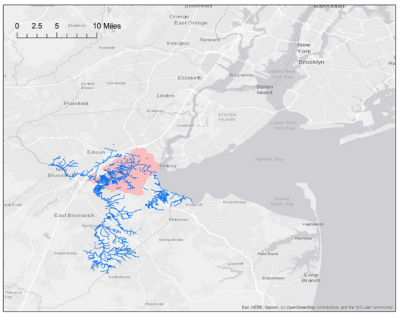
Aquatic Connectivity Through Climate-Ready Infrastructure

Raritan Mouth and Center Subwatersheds



This assessment found three priority restoration projects in these two subwatersheds that will address aquatic connectivity, hydrologic capacity, and/or crossing condition. These watersheds consist of small streams that all run into the lower Raritan River. Many of them are more tidal than fluvial and support salt marshes. Both subwatersheds share similarities in that there were many accessibility issues in getting to the road-stream crossings for assessment. Much of these watersheds are private property, retired or active landfills, or superfund sites, all which limit accessibility.

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 aquatic 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. The assessment is 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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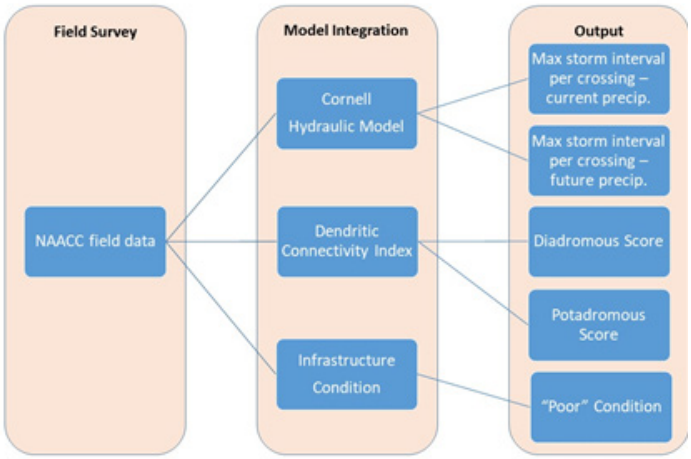
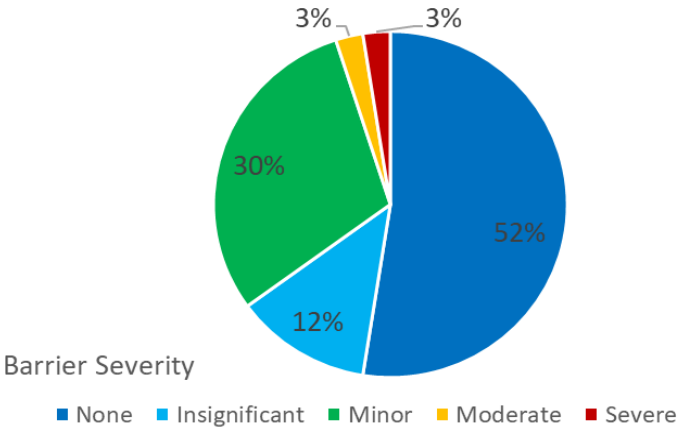
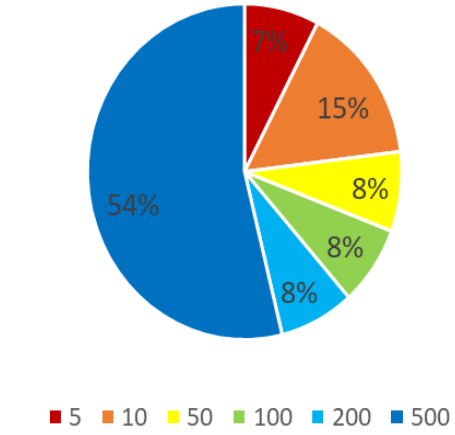


This diagram shows the evaluation process. First, field measurements are taken to estimate how well fish can pass through the culverts and bridges. Then that data is plugged into the Cornell model to estimate the size of the rain event the crossing can accommodate (as measured by the current projections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

Aquatic Connectivity Results



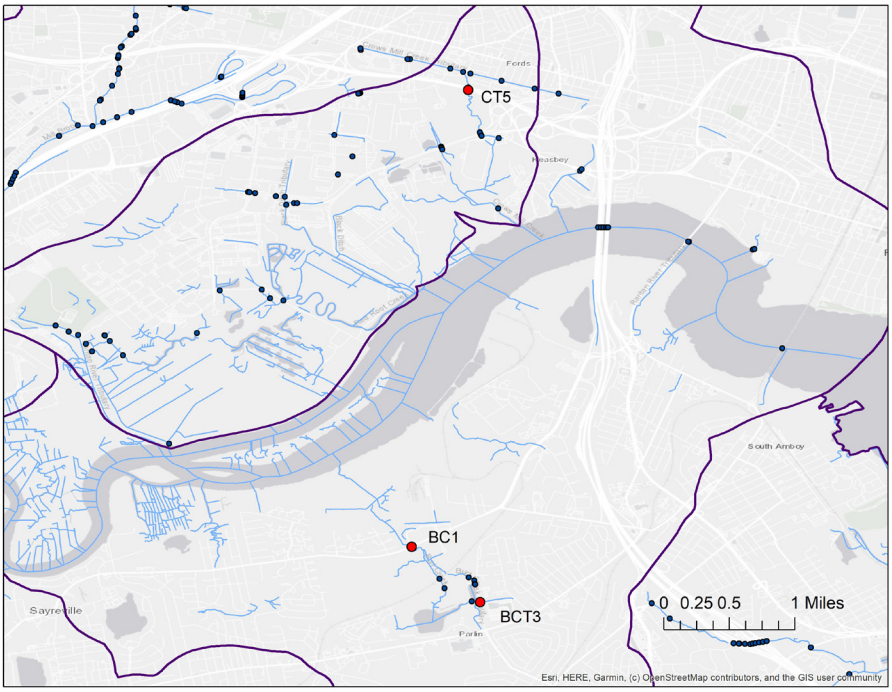
Capacity Model Results



Of the 57 crossings in this subwatershed, the field team was able to access 40. Aquatic connectivity at the sites assessed was very good overall. Many of the crossings that are labeled as a barrier severity of "none" are the large highway bridges that span the lower Raritan River and have no effect on fish passage. The minor to severe barriers in these watersheds are particularly important because for many it is the first barrier from the ocean for fish that migrate as part of their life cycle.

This chart shows the maximum storm interval (e.g. 10-year storm event) that the structures in the watershed can accommodate without flows overtopping the road or causing erosion. The model used current precipitation scenarios, which are expected to increase. Most of the crossings in this subwatershed were not able to be modeled for hydraulic capacity issues because of inaccessibility or wide widths (>25 ft. are not included in the model). All but three of the 13 crossings modeled are right-sized, that is, able to accommodate at least a 50-year storm event.

Restoration Projects



CT5 is located in Woodbridge Township, NJ. BC1 and BCT3 are in Sayreville.

1. Burt Creek 1 (@ Main Street) is a severely undersized small bridge that is the most important barrier in these watersheds for diadromous fish migration.

PHOTOS: NY/NJ HEP

2. Crows Mills Tributary 5 (@ NJ 440) is a large metal and concrete culvert that goes under Hwy. 440, that is in very poor condition. The bottom of the culvert has completely rusted out in parts and the concrete headwalls are cracking. This bottom rusting out of the culvert is also problematic for fish passage.

3. Burt Creek Tributary 3 (@ N. Ernston Rd.) is a bridge over a small tributary that has a large drop at the outlet that completely cuts off aquatic connectivity.