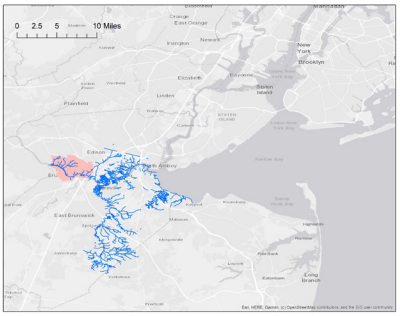
Aquatic Connectivity Through Climate-Ready Infrastructure

Campus Subwatershed



This assessment found four priority restoration projects in this subwatershed that will address aquatic connectivity, hydrologic capacity, and/or crossing condition. Campus subwatershed is characterized by many small streams that run into the Raritan River from the north. The crossings in this subwatershed are largely good for both aquatic connectivity and hydraulic capacity issues and those that are problematic, tend to be so for both factors, making them important opportunities for restoration.

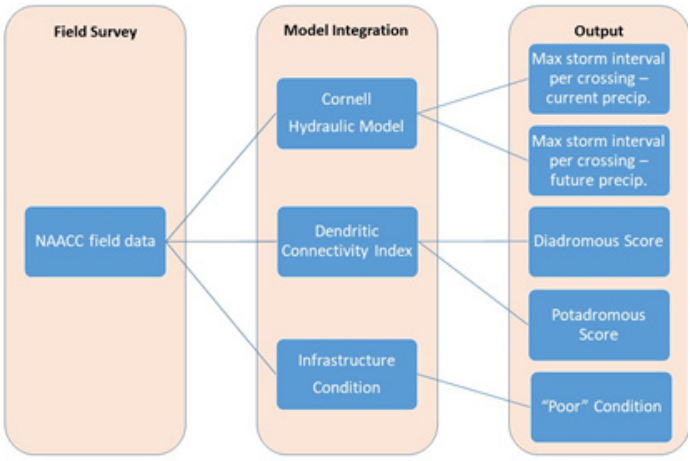
Background

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 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.

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 Raritan River Consortium.

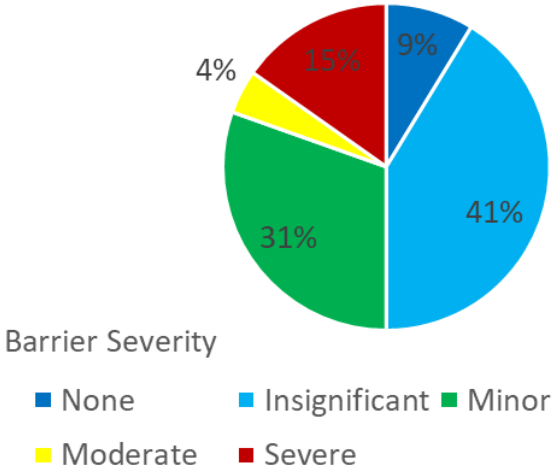
HUDSON RIVER FOUNDATION

NY/NJ HARBOR & ESTUARY PROGRAM



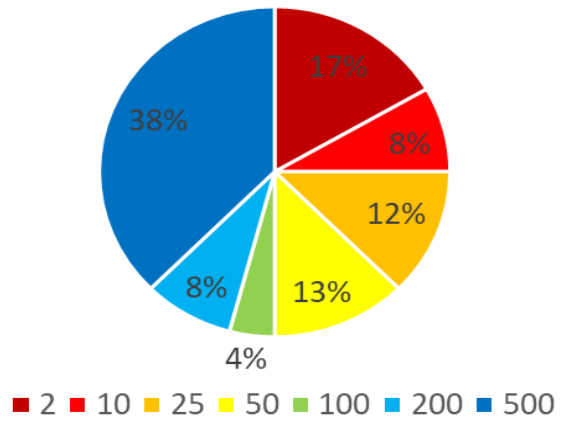
This diagram shows the evaluation process. First, field measurements are taken to estimate how well fish can pass through the culverts and bridges. Then that data is plugged into the Cornell model to estimate the size of the rain event the crossing can accommodate (as measured by the current projections of the 1-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



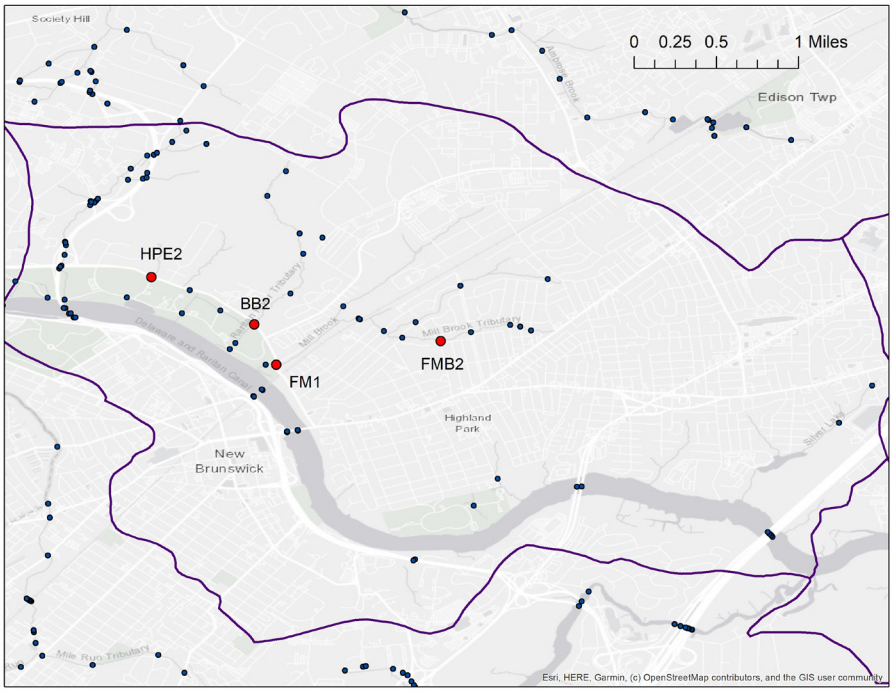
Aquatic connectivity in the campus subwatershed is very good. Two of the larger brooks, Buell Brook, which runs through the Rutgers University Eco-preserve and an unnamed brook that we called University, that runs under and around Rt. 18, are both largely barrier-free. Many of the problematic barriers are located within Johnson Park, which runs alongside the Raritan River to the north. Many of the streams are partially buried through this park or run into ponds that, while sometimes tidally connected to the Raritan, also have barriers to fish passage. Other severe barriers exist on a stream called Mill Brook, which we called FM (First Mill) so as not to confuse it with another nearby Mill Brook.

Capacity Model Results



This chart shows the maximum storm interval (e.g. 10-year storm event) that the structures can accommodate without flows overtopping the road or causing erosion. The model used current precipitation scenarios, which are expected to increase. Roughly half of the crossings in this subwatershed were not able to be modeled for hydraulic capacity issues because of wide widths (>25 ft are not included in the model) or buried crossings. The ones with wide widths likely do not have capacity issues. Of the crossings that were able to be modeled, most of them were right sized (>50-yr maximum storm interval).

Restoration Projects



HPE2 is in Piscataway, NJ. All others are in Highland Park Borough.

1. Highland Park E2 (@ River Rd.) is one of the small tributaries that runs underground through Johnson Park and could be daylighted to allow for more habitat connectivity for both anadromous and potadromous fish.

PHOTOS: NY/NJ HEP

2. First Mill 1 (@ River Rd.) is a long box bridge that is severely undersized, can only accommodate a 2-year storm event, and in poor condition. This scored as a minor barrier to fish passage as well because the crossing is long and dark, which may affect the desire of anadromous fish to enter this tributary.

3. First Mill Tributary B2 (@ N. 5th Ave.) is a partially channelized box culvert with a concrete bottom and large outlet drop. This barrier is important for both anadromous and potadromous fish. The assessment team noticed fish at both the inlet and outlet, but they did not appear to be able to get through the structure either way.

PHOTOS: NY/NJ HEP

4. Buell Brook 2 (@ River Rd.) is a severely undersized culvert that can only accommodate a 2-year storm event. It is in poor condition and a barrier for anadromous fish.