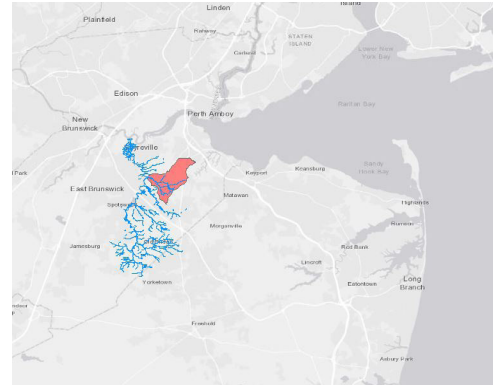


Aquatic Connectivity Through Climate-Ready Infrastructure

Tennent Brook Subwatershed

This assessment found four priority restoration projects in this subwatershed that will address either aquatic connectivity, hydrologic capacity, and/or crossing condition. The Tennent Brook Subwatershed is a tributary of the South River. There are no connectivity issues from the mouth of Tennent Brook to the ocean. This subwatershed is largely free flowing because much of the subwatershed lies on property owned by the Perth Amboy Waterworks, crossed with only a few service roads. However, the connectivity of the subwatershed is cut off entirely by one large dam near the mouth of the tributary, which is also a gravel service road. The Cornell hydraulic model predicts that there are also a few severely undersized culverts.

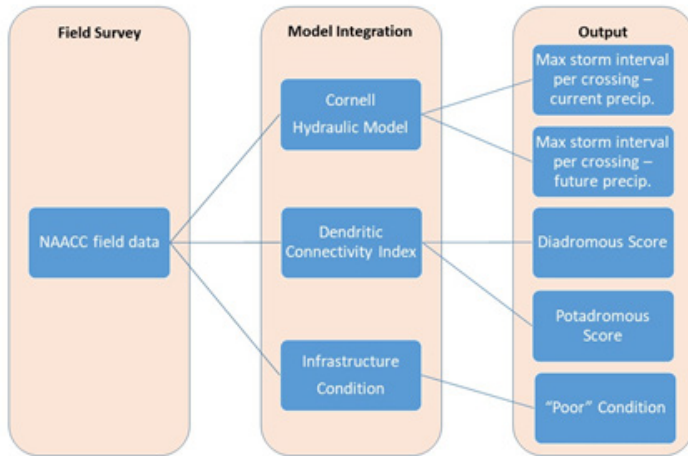


Background

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.

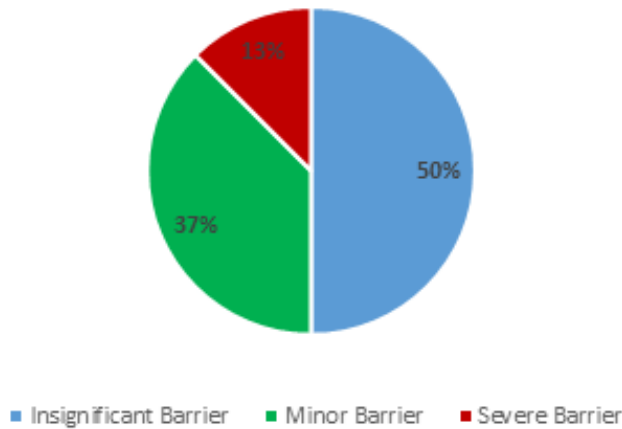


This assessment was made possible by funding from the EPA Coastal Watershed Grant administered by Restore America's Estuaries, and in partnership with the Rutgers Sustainable Raritan River Initiative.

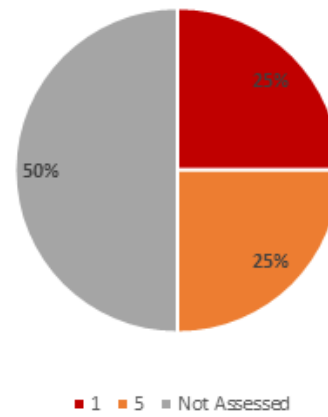


This diagram shows the evaluation process. First field measurements are taken to estimate how well fish can pass through the culverts and bridges. Then that data is plugged into the Cornell Model to estimate the size of the rain event the crossing can accommodate (as measured by the current projections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



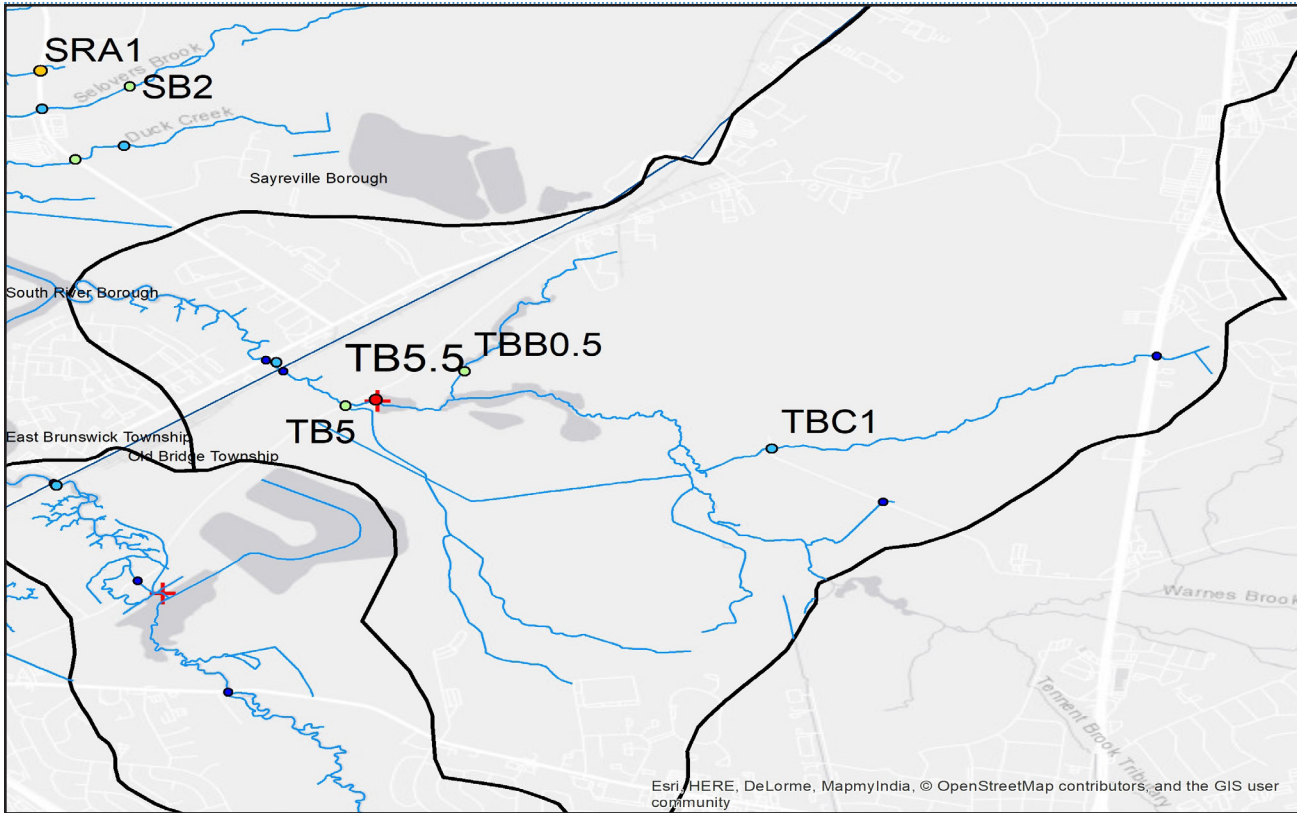
Capacity Model Results



There are only 8 road-stream crossings in the Tennent Brook Subwatershed and only one of them poses any major threat to connectivity for fish and other aquatic life.

This chart shows the maximum storm interval (e.g. 10-year storm event) that the structure can accommodate without flows over-topping the road or causing erosion. This represents current precipitation scenarios, which are expected to increase. Four of the crossings were undersized and four could not be modeled due to their size or configuration.

Priority Restoration Projects



All recommended projects are located in Old Bridge Township.

1. Tennent Brook 5.5 (TB5.5) is the dam and service road mentioned in the summary. The dam operates as a spillway for Tennent Pond, with sluice gates that are rarely opened, and water overtopping the service road when the water level is high. It is the most important barrier to both anadromous and potadromous fish migration in all the crossings assessed for this project in 2021. Additionally, the frequent flooding of the service road may be problematic for the Utility. This dam is unlikely to be removed so this may be a good project to establish a fish passage device.



2. Tennent Brook 5 (TB5) is an undersized set of double culverts just downstream of the dam. These culverts were completely submerged during the field assessment, in low-flow conditions, so roadway flooding here is likely.



3. Tennent Brook Tributary B0.5 (TBB0.5) is a severely undersized double culvert that connects Prickets Pond to Tennents Pond. The maximum storm interval that it can accommodate currently is a 1-year storm event, which changes to zero under increased precipitation scenarios indicating certain flooding.

4. Tennent Brook Tributary C1 (TBC1) is an undersized, submerged and clogged double culvert on private property that is under development.

