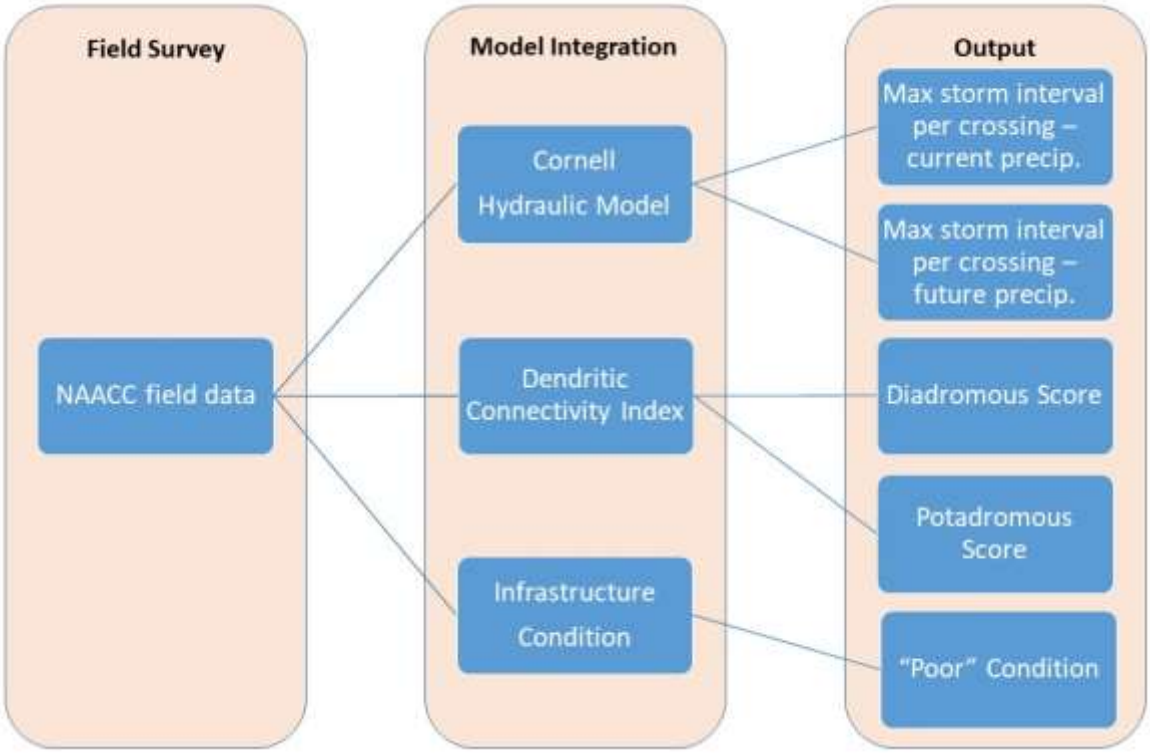
Aquatic Connectivity Through Climate-Ready Infrastructure

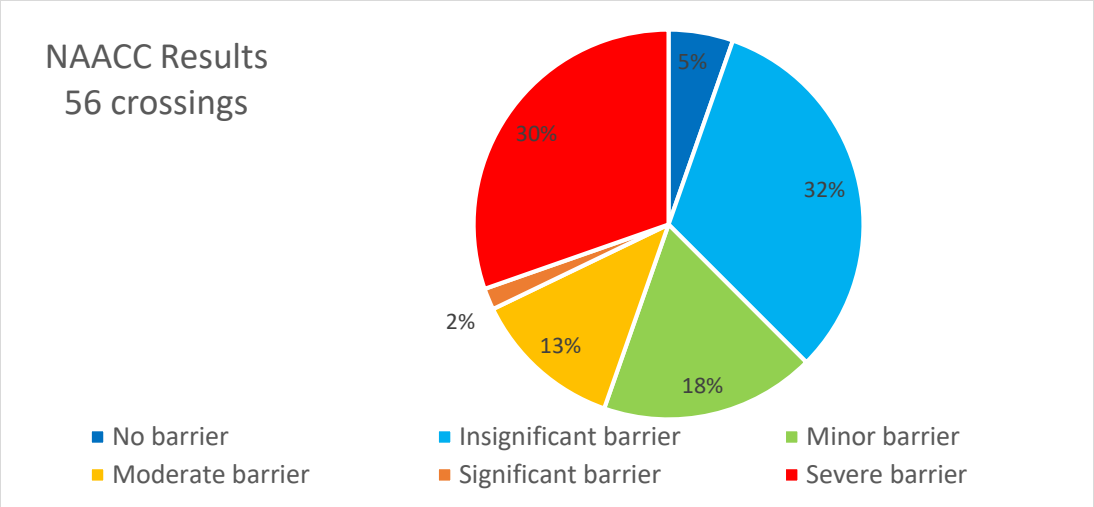
Lower Raritan River Subwatershed Fact Sheet

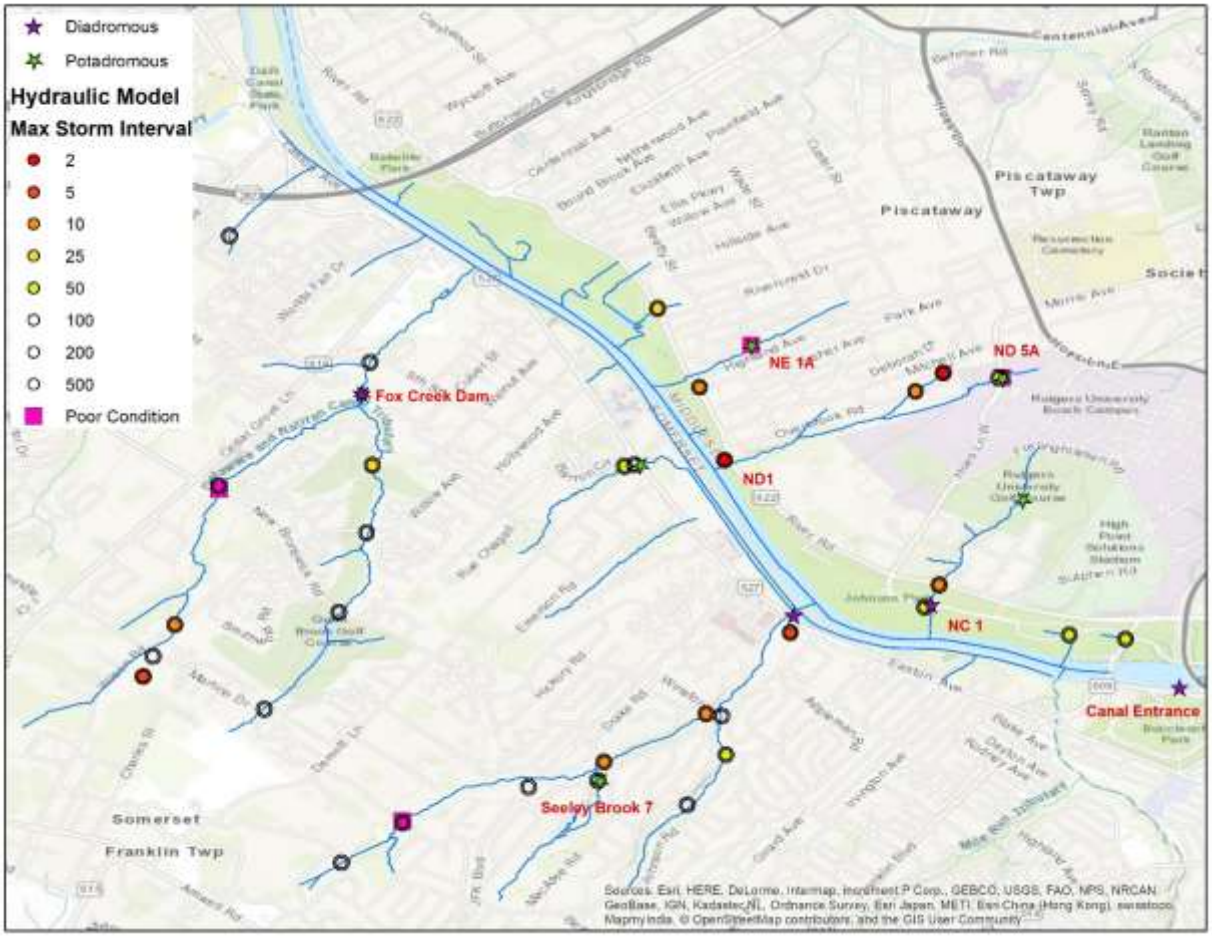
Aquatic connectivity is a key restoration goal for the New York – New Jersey Harbor & Estuary Program (HEP) and its partners. The creation of connectivity assessment protocols, training methods and data sharing developed by the North Atlantic Aquatic Connectivity Collaborative (NAACC) streamlined the effort to prioritize barrier removal to improve aquatic habitat. HEP combined information collected during the NAACC assessment in a model that evaluates the potential of hydraulic right-sizing of culverts to address flooding. This analyses (developed by Cornell University) uses culvert size and watershed information to assess which maximum storm interval (e.g. a 10-year storm event) a culvert can accommodate without the flow over-topping the road and causing roadside/streambank erosion. This helps predict function under future climate change scenarios.

HEP in partnership with Rutgers University developed recommendations for barrier removal in one subwatershed of the Lower Raritan River based on NAACC, dendritic connectivity, hydraulic model results, and infrastructure condition. Individual culverts were classified on features related to estuarine (diadromous) and freshwater (potadromous) species passage and the size of the rain event they could accommodate as measured by the return period from 2 year to the 500 year storm. This work trained Rutgers University students in the NAACC protocols, disseminating the methodology. 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.

Evaluation Process







Stars indicate a key barrier for diadromous or potadromous fish movement. The colored circles are the maximum storm interval that a crossing can accommodate without flows causing erosion or road overtopping. Pink squares or crossings with damaged infrastructure.

Raritan Barrier Restoration Recommendations

1. Seeley's Brook 7 – Most important potadromous barrier, would open up nearly a mile. This may be a quick fix as the problem is mostly just heavy debris and a small inlet drop.
2. Fox Creek Dam –Second most important diadromous and potadromous barrier. Big pond behind it so would probably have to consider a fish ladder rather than removal.
3. ND 5A – This barrier is superfluous in that it serves no overpass. The culvert could be removed in favor of a cut in the embankment.
4. NE 1A – This culvert is completely blocked by soil/debris. This would be a quick fix that restores hydrology and opens up 0.1 miles of habitat for potadromous species.
5. NC 1 – A diadromous barrier that also can only accommodate a 50 year storm (double culvert with an outlet drop).
6. ND 1 – Can only accommodate a 2 year storm event.

Other important less-feasible barriers

- Seeley's Brook 1A – This restoration scored the highest in the watershed on the diadromous dendritic evaluation. This is the first barrier that goes under the canal and connects right to the Raritan River. The outlet is underwater. It is unclear that fish will swim into long dark culverts to get into the rest of the Seeley's Brook habitat.
- Canal Entrance – this is a 25ft long steep slope that would be a large infrastructure fix but would open up >3 miles of aquatic habitat in the canal.

1 Seeley's Brook 7 inlet

2 Fox Creek Dam

3 ND5A inlet

4 NE1A inlet

5 NC1 Outlet

6 ND1 inlet