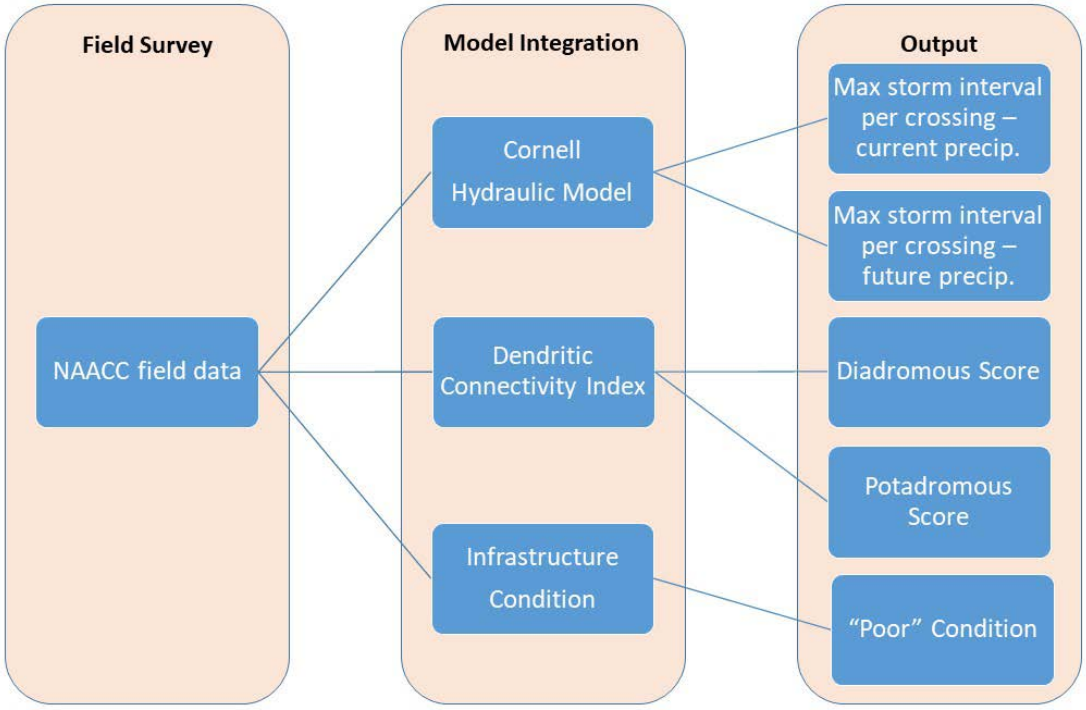
Aquatic Connectivity Through Climate-Ready Infrastructure

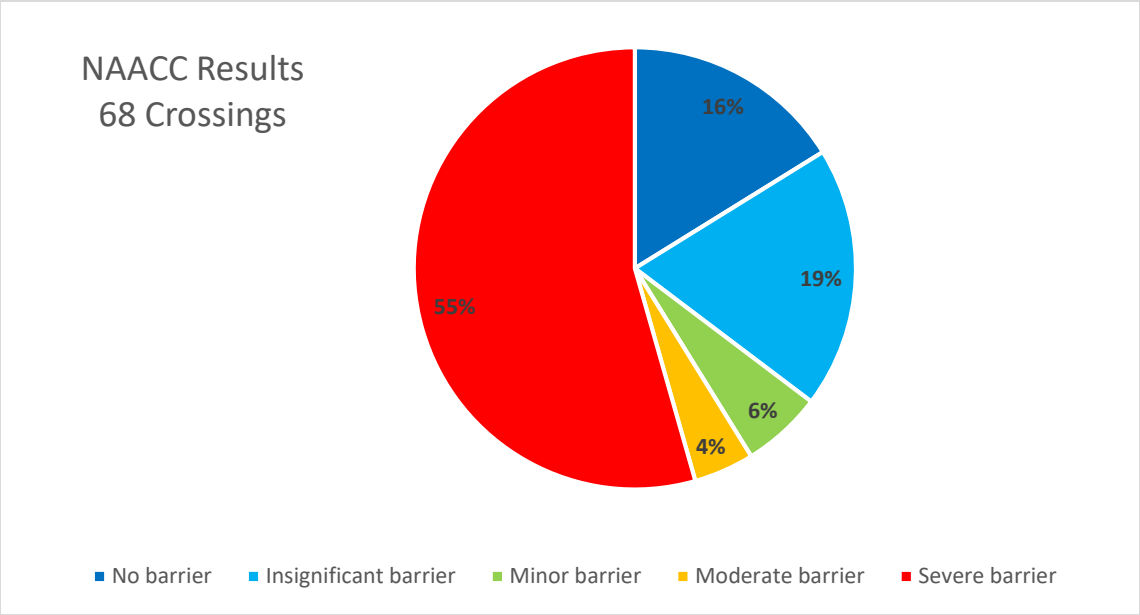
Passaic Subwatershed Fact Sheet

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 chose to assess barriers in one subwatershed of the Lower Passaic River based on metrics of habitat value, and proximity to NAACC training opportunities. Recommendations for barrier removal were developed 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 1-year to the 500-year storm. 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





Passaic Barrier Restoration Recommendations

1. Weasel Brook 33a - Most important potadromous barrier, would open up over a half a mile of habitat. This crossing is superfluous, a historic bridge behind an apartment complex that is grown over and no longer in use. This may be a quick fix as the problem is only a small outlet drop.
2. Weasel Brook 28 – This is the dam and crossing in the center of Weasel Brook Park. I witnessed a huge eel trapped below the dam, which means that eels are capable of traversing the 2.4 miles of largely concrete storm drains and spillways to get to this point. An eel ladder could be constructed in this Passaic County owned park, to continue the eel habitat.
3. Fleischer Brook 4 – This pedestrian crossing would not be problematic except for a large piece of historic concrete infrastructure that blocks stream flow and aquatic connectivity below it. I do not see any purpose to this structure so it would probably be a quick fix.
4. Fleischer Brook 2 and 3 – small bridges that can only accommodate a 1-year storm event and could be replaced with connectivity-friendly new bridges.
5. Weasel Brook 42a and 42b – these are historic crossing structures in Ravine Park that are no longer in use and could be removed.

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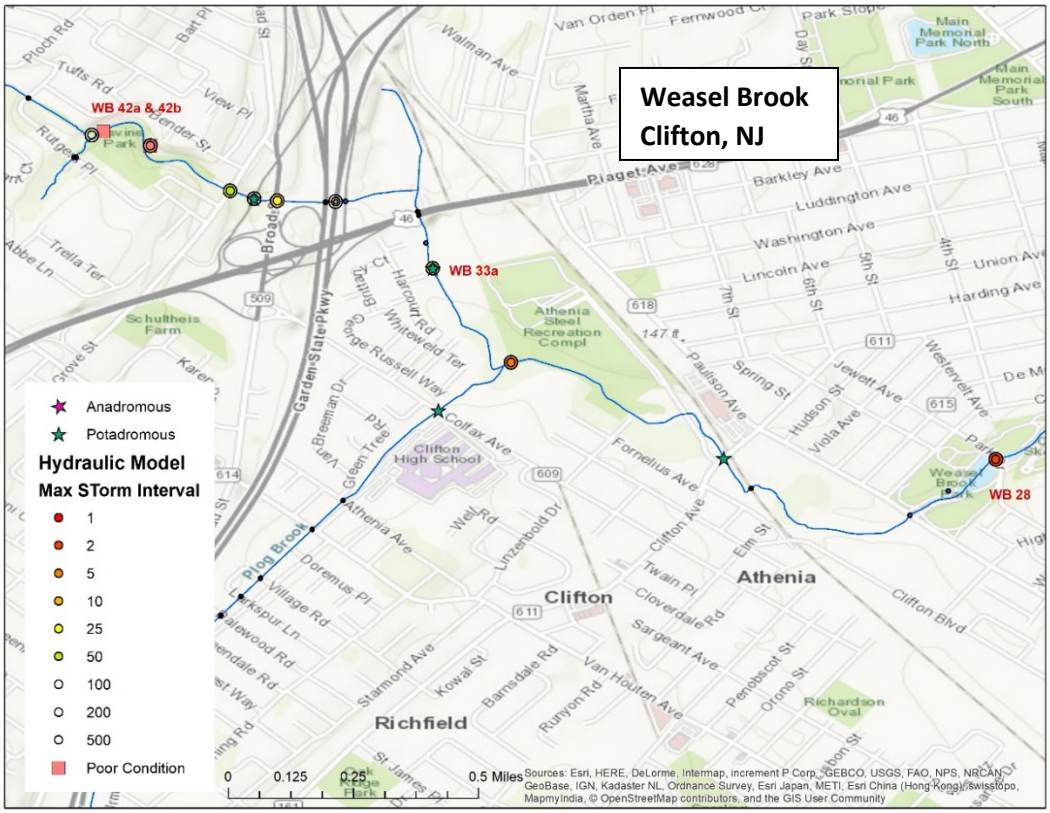
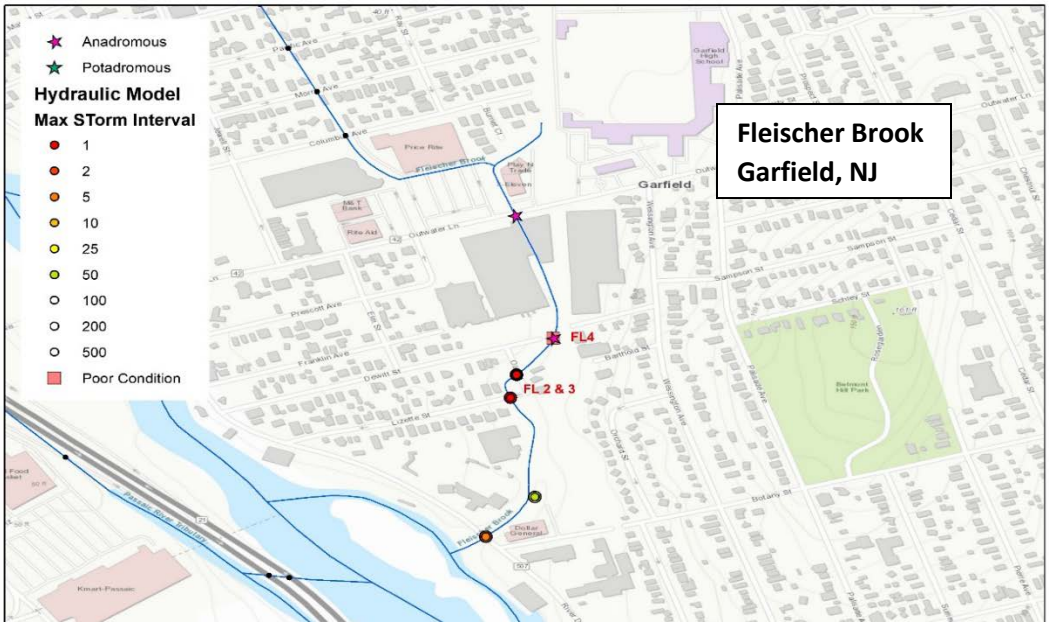
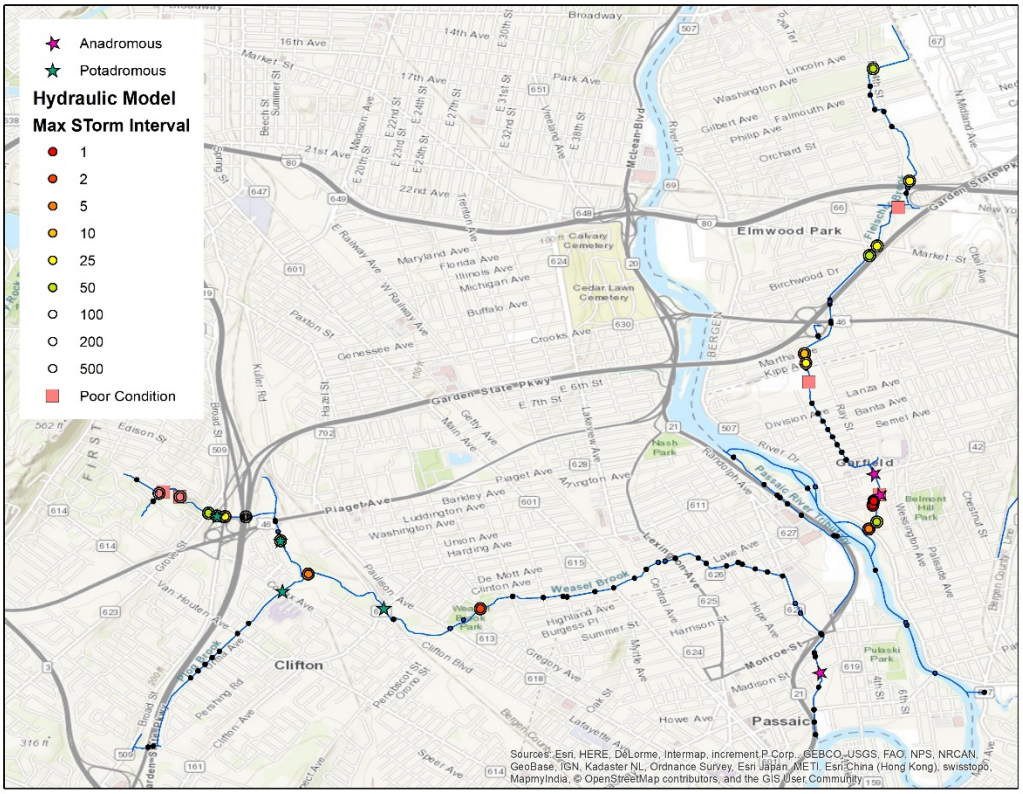


Stars indicate a key barrier for diadromous or potadromous fish movement. The colored circles are the maximum storm interval that a crossing can accommodate without flows causing erosion or road overtopping. Pink squares or crossings with damaged infrastructure.





1 Weasel Brook 33a inlet

2 Weasel Brook 28 inlet - dam right at inlet

3 Fleischer Brook 4 - looking down on blocking structure from crossing

4 Fleischer Brook 2 outlet

4 Fleischer Brook 3 outlet

5 Weasel Brook 42A inlet

5 Weasel Brook 42B inlet