# **IMPROVING THE ROUGE RIVER GREAT LAKES AREA OF CONCERN (AOC) - FISH AND WILDLIFE** HABITAT IMPROVEMENT THROUGH DAM REMOVAL





### PROJECT BACKGROUND



The Alliance of Rouge Communities (ARC), a 501(c)(3) organization, is a voluntary public watershed entity currently comprised of 34 municipal Alliance governments (i.e. cities, townships and villages), three counties of Rouge (Wayne, Oakland and Washtenaw), Henry Ford Community College, University of Michigan-Dearborn, Wayne County Airport Authority and six cooperating partners (i.e. other organizations) as authorized OURS TO PROTECT by Part 312 (Watershed Alliances) of the Michigan Natural Resources Working together, restoring the river and Environmental Protection Act (MCL 324.101 to 324.90106) as amended by Act No. 517, Public Acts of 2004.

The purpose of the ARC is to provide an institutional mechanism to encourage watershedwide cooperation and mutual support to meet water quality permit requirements and to restore beneficial uses of the Rouge River to the area residents.

The original designation of Areas of Concern (AOCs) within the Great Lakes was based on the presence of beneficial use impairments (BUIs) which are defined by the U.S.-Canada Great Lakes Water Quality Agreement (GLWQA), Annex 2 of the 1987 Protocol. Fortythree such areas were identified including the Rouge River. The BUIs were defined by

the International Joint Commission (IJC). The ARC over the last two years has made substantial progress toward eliminating the Benthos and Fish and Wildlife Habitat BUIs for the Rouge River AOC. At the focal point of this work have been two dam removal projects within the watershed. Funded by the Great Lakes Restoration Initiative (GLRI) and the National Oceanic and Atmospheric Administration (NOAA), the Danvers Pond Dam Removal and Stream Restoration Project located in Farmington Hills, Michigan and the Wayne Road Dam Removal and Habitat Improvement Project, located in Wayne, Michigan were completed. The projects had been identified by the Rouge River Advisory Committee (RRAC) and the Michigan Department of Natural Resources (MDNR) as two of the priority projects within the watershed to address the habitat and population BUIs within the AOC.





Wayne Road Dam before restoration



Danvers Pond Dam before restoration

### IMPACT ON AQUATIC ECOLOGY

The Danvers Pond Dam Removal and Stream Restoration Project and the Wayne Road Dam Removal and Habitat Improvement Project hydrologically reconnected approximately 30 miles of the Rouge River (125 miles of its tributaries) to the Great Lakes system and, in so doing, address these Rouge River AOC BUIs:

- Loss of Fish and Wildlife Habitat,
- Degradation of Fish and Wildlife, Populations, and
- Degradation of Benthos.

The projects featured two inter-related and mutually-supporting components: removal of the dams to provide for fish passage and related ecosystem restoration improvements to restore habitat for fish and terrestrial wildlife.

### IMPORTANCE OF RESTORATION

#### **DANVERS POND DAM - FARMINGTON HILLS, MICHIGAN**

The Danvers Pond, created when a dam was built in 1927, was located in the City of Farmington Hills, Michigan along the Main branch of the Rouge River. The dam acted as a barrier to fish passage as well as promoted the accumulation of sediment within the pond, which contributed to the degradation of the creek. Removal of the dam was a priority project for the Rouge Remedial Action Plan in order to implement delisting targets for Fish and Wildlife Habitat and Population BUIs. Removal and restoration reduced the impact on the environment. The project also fulfilled local and sub-watershed goals by improving the quality of the ecosystem and restoring approximately two acres of habitat for fish and terrestrial wildlife.



Aerial view of Danvers Pond Dam showing sediment accumulation - 2006



Aerial view of Danvers Pond Dam showing increase in sediment accumulation - 2010

#### WAYNE ROAD DAM - WAYNE, MICHIGAN

The Wayne Road Dam, built in 1914, was located in the City of Wayne, Michigan along the Lower Branch of the Rouge River. The dam no longer served a public purpose, and was an impediment to passage of the variety of fish found in the vicinity of the dam. An island

downstream of the dam was disrupting the natural sediment transport, causing flow impingement, and promoting erosion. The MDNR 1998 Fisheries Assessment identified the Wayne Road Dam as a major impediment to restoring fish and wildlife habitat in the Rouge River. Removal of the dam was also a priority project for the Rouge Remedial Action Plan in order to implement delisting targets for Fish and Wildlife Habitat and Population BUIs. Removing the Wayne Road Dam was considered one of the most important dam removal projects in the Rouge River Watershed because it reconnected the Rouge River to the Detroit River and the Lake Erie ecosystem.



Island downstream of the Wayne Road Dam

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### DANVERS POND DAM REMOVAL AND **STREAM RESTORATION PROJECT**

### ELEMENTS OF RESTORATION

#### DAM DEMOLITION

- Removal of the arch dam structure and wing walls and re-graded.
- The flow of Pebble Creek restored through the existing culvert.
- The existing culvert under the road serves as downstream grade control for stream channel.

#### **STREAM RESTORATION/STABILIZATION**

- An artificial riffle was constructed to control the streambed elevation upstream of the impoundment. Constructed with natural boulders and cobbles and trenched into the streambed and banks to the expected depth of scour. If the streambed elevation was not controlled, bed erosion and incision would cause instability, leading to streambank erosion, infrastructure damage, private property damage, and excessive sediment transport downstream of the dam.
- Constructed riffles were used to dissipate energy and control the stream bed elevation in the restored channel. A benefit of the artificial riffles is that they have an appearance similar to natural riffles and provide habitat for macroinvertebrates and fish. Associated pools provide fish habitat and wading bird habitat.
- Restoration of the creek through the pond, including restoration of pattern, stream habitat, and a vegetated floodplain with expected terrestrial wildlife value.

### **FLOODPLAIN RESTORATION**

- The bottom lands exposed were restored as a natural functioning floodplain.
- Restored floodplain is capable of conveying and storing water during floods with native vegetation similar to wet-meadow communities along streams.
- Floodplain restoration also creates a natural buffer and wildlife habitat along the corridor.

### OUTCOMES

- Removal of the dam now allows for unencumbered fish passage for Pebble Creek.
- Sedimentation within the creek has been reduced.
- Two acres of woodland and wetland habitat were restored.
- Approximately 300 linear feet of naturalized stream channel was created which improved habitat conditions for fish and wildlife using the corridor.
- Created a natural buffer between developed private property and the stream corridor.
- Minimized the amount of soil erosion and sedimentation.
- Improve and maintain the river ecosystem for wildlife and restore/maintain aesthetically appealing conditions.
- Fulfilled a goal of the City of Farmington Hills Storm Water Pollution Prevention Initiative.
- Wildlife usage of the project site evident. Whitetail deer, great blue herons, small fish and crayfish have been observed.



After restoration









### WAYNE ROAD DAM REMOVAL AND HABITAT IMPROVEMENT PROJECT

### ELEMENTS OF RESTORATION

#### DAM DEMOLITION

Approximately 5 feet of the existing structure at each stream bank remain in place to prevent potential damage to the Wayne Road bridge.

#### **CONSTRUCTION OF AN ENGINEERED RIFFLE/BOULDER CASCADE**

The riffle proposed for grade control is providing attachment sites for macroinvertebrates and feeding and spawning habitat for fish. The engineered riffle set the bed grade and prevents a head cut from developing and migrating upstream protecting the infrastructure (sanitary sewer lines, the Wayne Road bridge, and water main).





#### CHANNEL RE-ALIGNMENT/BANKFULL **BENCH CONSTRUCTION**

In order to create a sustainable flow channel with reduced shear stresses and velocities immediately downstream of the dam, approximately 320 feet of channel was modified. Improvements included removal of the in-stream island and re-grading to create a primary flow channel, with bankfull benches on both sides of the channel.



moval of in-stream island





Bankfull benches

*Tree planting complete, seed placed and* erosion control blanket installed

### OUTCOMES

- Removal of the Wayne Road Dam reconnected the river to the Great Lakes system for the first time in over a century and hydrologically reconnected 11 main river miles to the Great Lakes system.
- Reconnected an additional 112 miles of tributaries to the Great Lakes.
- Provided ancillary benefits: grade control, bank stabilization/erosion control,
- recreational use, sport fishing and canoe access. • Created habitat missing for macroinvertebrates - a total of five different families of macroinvertebrates and two different mollusk families were collected from the
- constructed riffle. • Facilitate fish passage: - Upstream species increased from 9 to 14 in the immediate area and 5 to 13 in the reach upstream
- 20 species were found in the constructed riffle.
- Species in area increased from 18 to 27 total collected.



Northern Pike