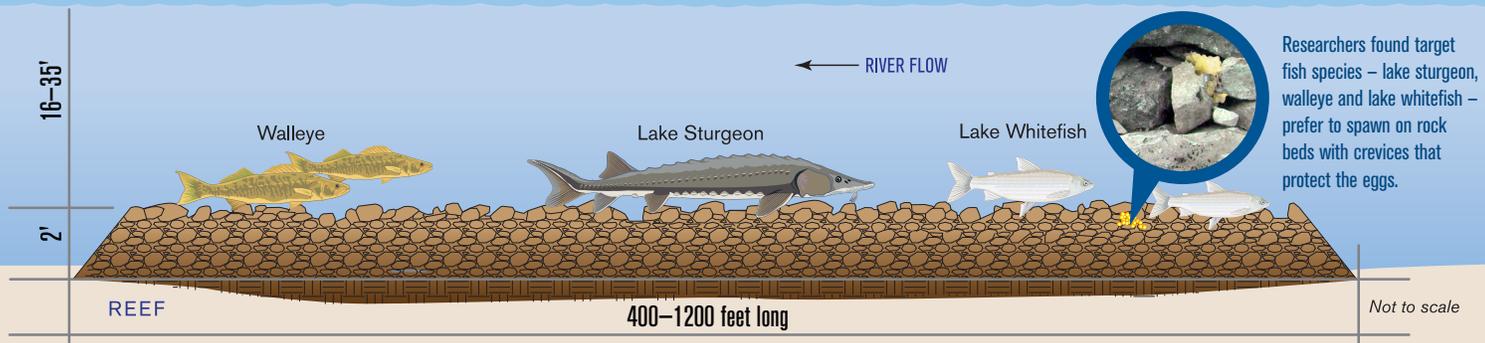


RESTORING FISH HABITAT IN THE ST. CLAIR AND DETROIT RIVERS



After successfully establishing several artificial spawning reefs in the Detroit and St. Clair rivers, a research team is planning a new restoration project using lessons learned in earlier efforts.

AN ABUNDANCE OF FISH

Historically, the St. Clair and Detroit rivers supported a diverse and productive fishery. Lake sturgeon, walleye and lake whitefish traveled to these rivers to spawn, depositing and fertilizing their eggs in rocky areas with fast-flowing currents.



Construction of the Livingstone Channel in the Detroit River.

However, beginning in 1874, both the St. Clair River and Detroit River were extensively modified. The river bottoms were dredged to create deep channels for large, commercial ships. The dredging and disposal of dredged materials such as dirt, sediment and rocks, changed the flow of the river and damaged the natural limestone reefs where millions of fish spawned (reproduced). These and other impacts — including overfishing and shoreline development — have dramatically reduced the populations of native fish, particularly lake sturgeon.

Despite the decline, the St. Clair and Detroit rivers continue to support one of the largest populations of lake sturgeon remaining in the Great Lakes, in part because most other large rivers have dams that block access to historical spawning areas. If the population is able to grow, it could help re-populate other parts of the Great Lakes.

LOST SPAWNING HABITAT

Scientists conducted a detailed analysis of the damage done to historical spawning areas and searched for the few places where native fish still reproduce. A focus has been on

sturgeon since they are listed as threatened or endangered by most of the Great Lakes states and Ontario.

The team found that more than 60 miles of the Detroit River have been dredged, which destroyed natural limestone reefs in the Livingstone Channel.

Today, the remaining lake sturgeon spawn in only a couple locations in the St. Clair and Detroit rivers. Because very few natural rocky areas remain, sturgeon have been found depositing their eggs on some unusual materials. For example, coal cinders that were dumped in the river when ships unloaded near Algonac, Michigan are used as spawning sites.

Many natural resource professionals believe that the recovery of native fish is limited by a lack of adequate spawning habitat, but that creating reefs that mimic the lost natural limestone reefs may help rebuild populations.

LEARNING TO RESTORE

Between 2004 and 2015, a team of scientists built six reef projects in the St. Clair and Detroit rivers. The team members took an adaptive management approach, questioning and evaluating as they went along.

What type of rock should be used?

Each reef was constructed using different types of rock material. Based on past projects, the team discovered that the target fish species — lake sturgeon, walleye and lake whitefish — weren't picky, as long as rocks were piled deep enough to form crevices that protect the eggs and that the rocks remain relatively free of silt, algae and mussels.

It was also discovered that some undesirable, invasive species do have a preference for rock type. Sea lamprey will build nests in gravel that is less than 1-2 inches in diameter; and Round goby are particularly fond of piles of large rocks.

FASCINATING FISH

In order to help lake sturgeon recover, scientists have been studying their life cycle, movement and habitat requirements.

Lake sturgeon are unlike any other fish in the Great Lakes — they can grow up to 7 feet in length and can weigh up to 300 pounds. They are slow to mature: females take 20-25 years to reach reproductive age, while males may take 15 years to reach reproductive age.

Females spawn only once every four years on average, and males typically spawn every other year. Female sturgeon live 80-150 years, while males live an average of 55 years.



Although lake sturgeon look somewhat like sharks, they don't have teeth, and instead, suck up invertebrates from the bottom of the river or lake.

Lake sturgeon are considered threatened or endangered in seven of the eight Great Lakes states and estimates indicate that their population is now 1 percent of what it once was.

Despite strict restrictions on fishing and improvements in water quality, lake sturgeon recovery has been very slow. Because sturgeon take decades to reach reproductive age, restoration efforts often take as many or more years to see results in the form of growing populations.

The conclusion: 4-8 inch limestone works best to encourage native species development, while discouraging invasive species.

Where should the reefs be built?

Areas with strong currents and deep waters are ideal places to create spawning habitat for the target native species. Scientists at the U.S. Geological Survey (USGS) developed a computer model using water depth and flows in the St. Clair and Detroit rivers to predict where lake sturgeon would

spawn if the river bottom were suitable. Project partners used the model to identify high-priority places for constructing reefs and then selected specific locations without contaminated sediments or heavy boat traffic.

At a potential reef site, underwater cameras and sonar are used to make sure the river bottom is hard and smooth and lacks any fish habitat. When possible, reefs are placed close to known spawning areas and upstream of wetlands that could protect young fish after they hatch.

How do we know the reefs are effective?

A diverse team of scientists study the river before and after reefs are established. They use a variety of techniques to determine if fish are depositing eggs on the reef, and if the eggs produce healthy young fish.

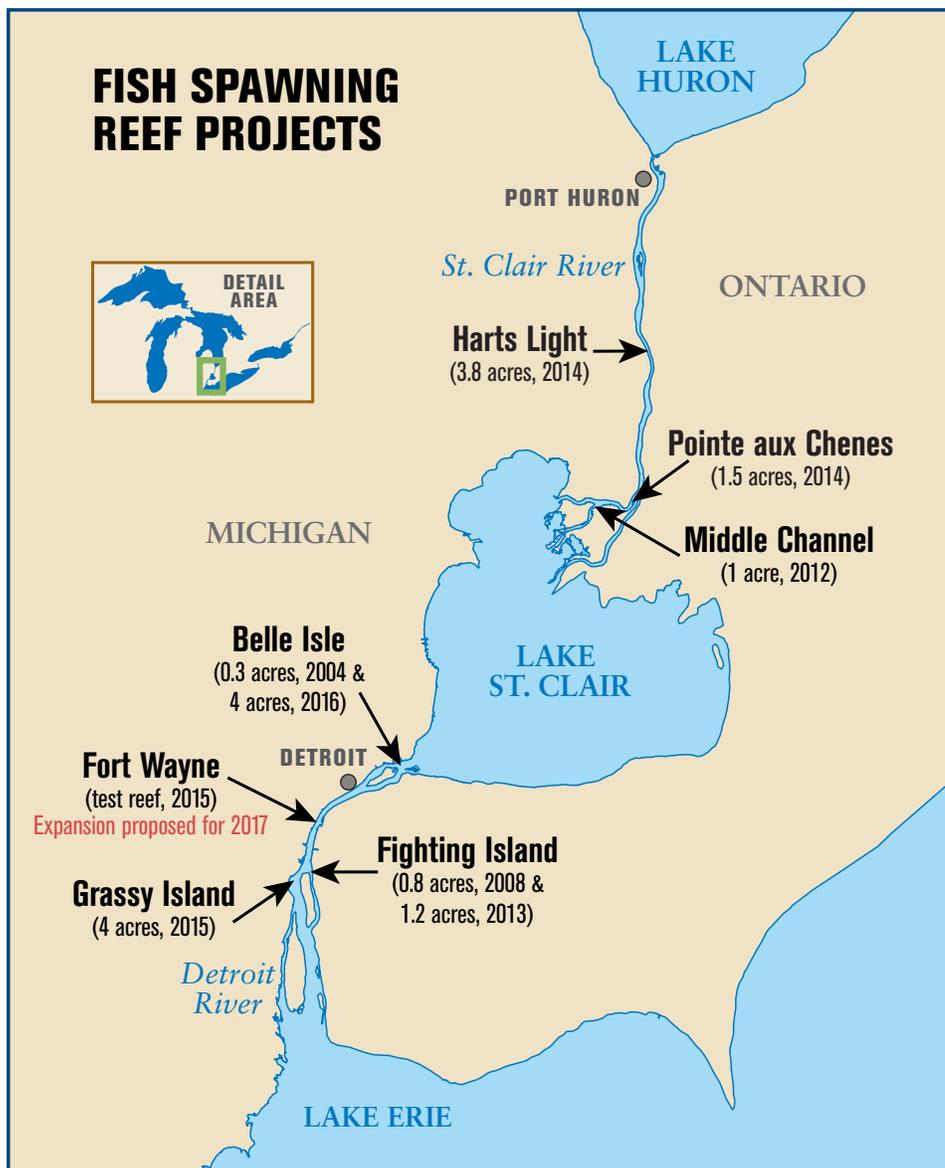
Additional researchers are monitoring populations of adult and juvenile fish on and near the reefs.

CURRENT PROJECTS

In addition to on-going assessment of completed reef projects, the team is currently planning one new reef project. The site selection and design are based on lessons learned from earlier habitat restoration projects.

■ Planned – Belle Isle Reef Project.

The project includes 3 reef units located around the head and just upstream of Belle Isle. Each reef unit consists of a bed of loose rock about 2-feet thick, and combined they cover 4-acres of river bottom. Reef construction is expected to begin in late fall of 2016.



The development of spawning reef projects has been supported through numerous grants, gifts and matching contributions. In addition to in-kind support from partner organizations, funding for reef restoration projects was provided by: the Great Lakes Restoration Initiative, National Oceanic and Atmospheric Administration, Sustain Our Great Lakes, U.S. Fish and Wildlife Service, Coastal Program, Great Lakes Fishery Trust, Michigan Coastal Zone Management, Environment Canada, Canada-Ontario Agreement, Ontario Ministry of Natural Resources, BASF, DTE Energy and the Michigan Wildlife Conservancy.



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