



Fish Habitat Remediation in the St. Clair River Area of Concern for the Great Lakes Restoration Initiative

This project is funded by the Great Lakes Restoration Initiative (GLRI), an interagency program that addresses the most significant environmental problems in the Great Lakes ecosystem. Results from U.S. Geological Survey (USGS) scientific studies and monitoring are helping guide the restoration effort. The GLRI is made up of five focus areas that address these issues:

- Cleaning up toxic substances and areas of concern
- Combating invasive species
- Promoting nearshore health by protecting watersheds from polluted runoff
- Restoring and protecting habitats and wildlife
- Tracking progress and working strategically with partners

More information is available on the USGS GLRI Web page (<http://cida.usgs.gov/glri/>).

Project Background



Huron-Erie Corridor lake sturgeon.

The Huron-Erie Corridor (HEC) is the connecting channel between Lake Huron and Lake Erie, including the St. Clair River, Lake St. Clair, Detroit River, and western Lake Erie. The HEC contains the largest freshwater delta in the Great Lakes, supports over 65 species of fish, 16 of which are classified as threatened or endangered, and is one of the busiest navigation centers in the United States. The HEC once provided spawning habitat for numerous sport and commercial fishes, such as lake trout, lake sturgeon, lake whitefish, lake herring, walleye, and yellow perch. However, changes to the physical habitat, primarily construction of shipping canals and filling of coastal wetlands, coupled with effects of invasive species and over-fishing have drastically impaired fish populations in the HEC.

The goal of this GLRI project is to remediate Beneficial Use Impairment 14 (loss of fish and wildlife habitat) in the St. Clair River Area of Concern (AOC) by constructing fish spawning reefs in the St. Clair River. USGS scientists have constructed one spawning reef in the lower St. Clair River (in the Middle Channel in 2012) and are leading the effort to construct three additional fish spawning reefs near Hart's Light and Point aux Chenes. This work is being completed as part of the greater Huron-Erie Corridor Initiative (<http://huron-erie.org/>), a highly collaborative initiative started in 2004 by the USGS Great Lakes Science Center and over 20 partners to restore habitats and native fish and wildlife species in the corridor, ultimately providing societal, economic, and environmental benefits to the Great Lakes region.

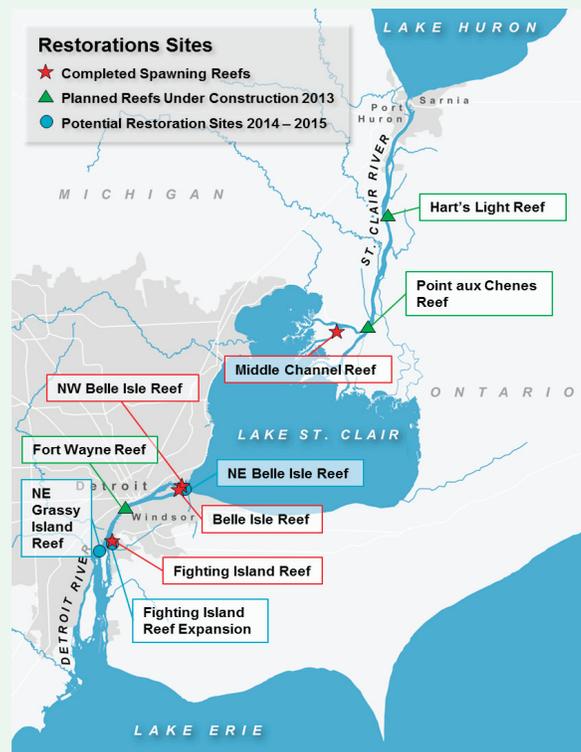


The Blue Water Bridge spanning the St. Clair River, which is home to numerous species of economically valuable fish.

Objectives and Approach

Objective:

The main objective of this project is to restore and enhance native fish habitat and populations in the HEC by designing and constructing fish spawning reefs in the St. Clair River AOC.



Completed, planned, and potential fish spawning habitat sites in the Huron-Erie Corridor. Three fish spawning reefs near Hart's Light and Point aux Chenes are being built as part of this GLRI project.

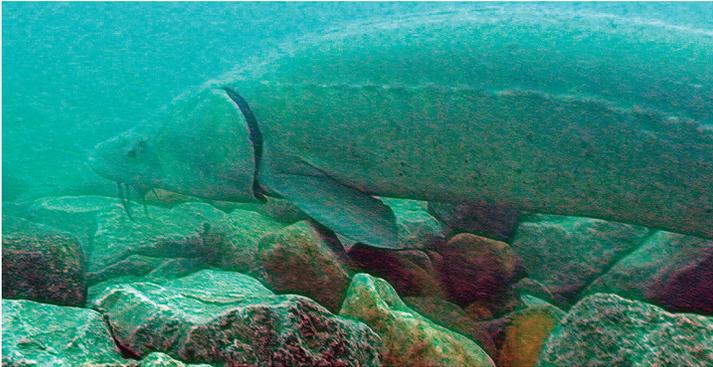
Approach

Fish habitat in the HEC is being restored by building new fish spawning reefs in the St. Clair River AOC. Locations for spawning reef construction were recently identified by USGS scientists using a geographic, hydrodynamic model of available fish habitat in the HEC. GLRI funding of this project is turning model results into reality through on-the-ground construction of fish spawning reefs in areas of deep, fast-flowing, and well-oxygenated water in the St. Clair River.

Reefs consist of 4-8 inch, broken limestone rock layered more than 2 feet thick in areas of high water velocity and depths greater than 30 ft. This rock size and placement is important because the crevices that are formed serve as protective habitats in which fish eggs can incubate and hatch successfully. Reef configuration includes a sloped top surface that ensures steady water flows wash away sediment, keeping rock crevices clean (see illustration of restored fish spawning reef on back). Similar reefs in the HEC have been used year after year by spawning lake sturgeon, lake whitefish, and walleye. Surveys are being completed before and after construction to assess fish egg deposition on the constructed reefs and production of hatched fish larvae coming off the reefs.

Outcomes

The HEC is the epicenter of fish populations and fish habitat restoration in the central Great Lakes. Fisheries in the HEC are tremendously valuable to the Great Lakes region, infusing over \$2 billion per year into local economies around Lake Erie alone. Unfortunately, over a century of habitat degradation has put HEC fisheries at risk due to loss of fish spawning and nursery habitat.



Soon after reef construction began in the Huron-Erie Corridor, lake sturgeon in spawning condition were observed using the reefs.



Lake sturgeon eggs deposited within rock crevices on a restored fish spawning reef. These crevices are critical habitats where fish eggs find protection from predators.

This project is remediating previous environmental damage in the HEC by constructing up to four fish spawning reefs in the St. Clair River. Previous surveys have identified the presence of over 65 species of fish, but loss of fish spawning habitat during past construction of shipping channels in the river limits the ability of these fish to spawn and maintain sustainable populations of harvestable adults. Construction of spawning habitat is the critical link that allows fish populations to reproduce and likely sustain sport and commercial fisheries into the future in the HEC.

Biological information generated by this project is being used to meet delisting criteria for the fish habitat loss Beneficial Use Impairment (BUI 14) in the St. Clair River. USGS is supporting this effort by providing credible, scientific information to define what constitutes adequate fish habitat restoration in this AOC. Together, the work of the USGS and partners is guiding recovery of the HEC from past degradation by rebuilding native fish communities and revitalizing the socio-economic value of this diverse and valuable ecosystem.

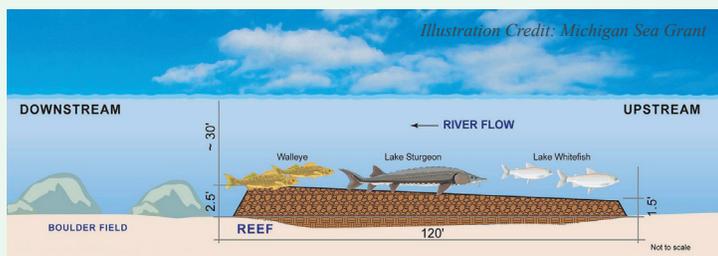


Illustration of a restored fish spawning reef.

Recent Highlights



USGS scientists are leading efforts to restore fish spawning habitats in the St. Clair River. Here a barge carries limestone that was used to build a spawning reef at Fighting Island in the Detroit River.

Using a geographic, hydrodynamic model, USGS scientists identified nine sites in the St. Clair River and nine sites in the Detroit River with deep, fast-flowing habitat suitable for spawning by native fish species. This project is achieving restoration goals in the St. Clair River through construction of fish spawning reefs. One spawning reef has already been constructed in the Middle Channel. Three other reefs are scheduled for completion in 2013.

Through GLRI funding of companion projects, the USGS and partners recently constructed three other fish spawning reefs in the HEC, remediating loss of fish habitat in the Detroit River at Belle Isle (0.3 acres) in 2004, Fighting Island (0.81 acres) in 2009, and in the St. Clair



Construction of a fish spawning reef. The reefs have increased spawning success of more than 12 native fish species within the HEC each year since construction, including the threatened lake sturgeon and economically-valuable walleye and lake whitefish.

Construction of fish spawning habitat at Belle Isle, Fighting Island, and Middle Channel has also provided habitat for the State and Provincially endangered Northern madtom, contributing to the recovery plan for this rare and valuable native fish.

Videos of the St. Clair River Middle Channel reef construction effort and of lake sturgeon aggregating on restored spawning grounds are available on the Michigan Sea Grant website: <http://www.miseagrant.umich.edu/explore/restoration/restoring-fish-habitat-st-clair-river/>.



Technicians holding a young lake sturgeon collected on restored spawning habitat in the Huron-Erie Corridor. Enhancement of reproduction by threatened species, such as lake sturgeon, is a major success of Great Lakes fish spawning habitat restoration.



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