STATE of the STRAIT

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Monitoring For Sound Management






A Binational Conference on the Detroit River Ecosystem

Convened December 2004 by Great Lakes Institute for Environmental Research, University of Windsor, The Greater Detroit American Heritage River Initiative of Metropolitan Affairs Coalition, The Detroit River Canadian Cleanup, The Detroit River International Wildlife Refuge, The Detroit Water and Sewerage Department, and other organizations.

Cover photos: photos left and center (upper and lower): Recreational fishing in the Huron-Erie Corridor (lower center photo by Kurt Byers, Michigan Sea Grant Extension, courtesy of United States Environmental Protection Agency, Great Lakes National Program Office; other photos courtesy of OMNR); upper right: Scientist sampling water, benthic invertebrates and sediment in Lake Erie (photo courtesy of Environment Canada and University of Windsor); lower right: Longear sunfish (*Lepomis megalotis*) (photo courtesy of Nicolas Lapointe)

STATE OF THE STRAIT

MONITORING FOR SOUND MANAGEMENT

2004 Conference Proceedings

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6.16. Creation of Lake Sturgeon Spawning Habitat in the Detroit River

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Figure 1. Gravid lake sturgeon caught in the Detroit River in 2000, held by Nathan Caswell, U.S. Fish and Wildlife Service.

Overfishing, reduced access to spawning sites (due to dam construction), and destruction of habitat have decreased lake sturgeon (*Acipenser fulvescens*, Figure 1) in the Great Lakes to less than 1% of their former abundance; in Michigan, they are threatened with extinction (Hay-Chmeilewski and Whelan 1997). In the Detroit River, four years of set line fishing captured only 86 lake sturgeon (Caswell 2003a, b). Underwater video surveys in 1998 and 1999 showed that, due to gravel removal and silt deposition, only two of nine historic spawning sites in this river had substrate with enough interstitial space for incubation of sturgeon eggs and that no sturgeon used those sites (McClain and Manny 2000). In 2001, lake sturgeon spawned on a man-made bed of coal cinders near Zug Island in the Detroit River (Manny and Kennedy 2002; Caswell et al. 2004). This is the only place in the Detroit River where egg deposition by lake sturgeon has been documented.

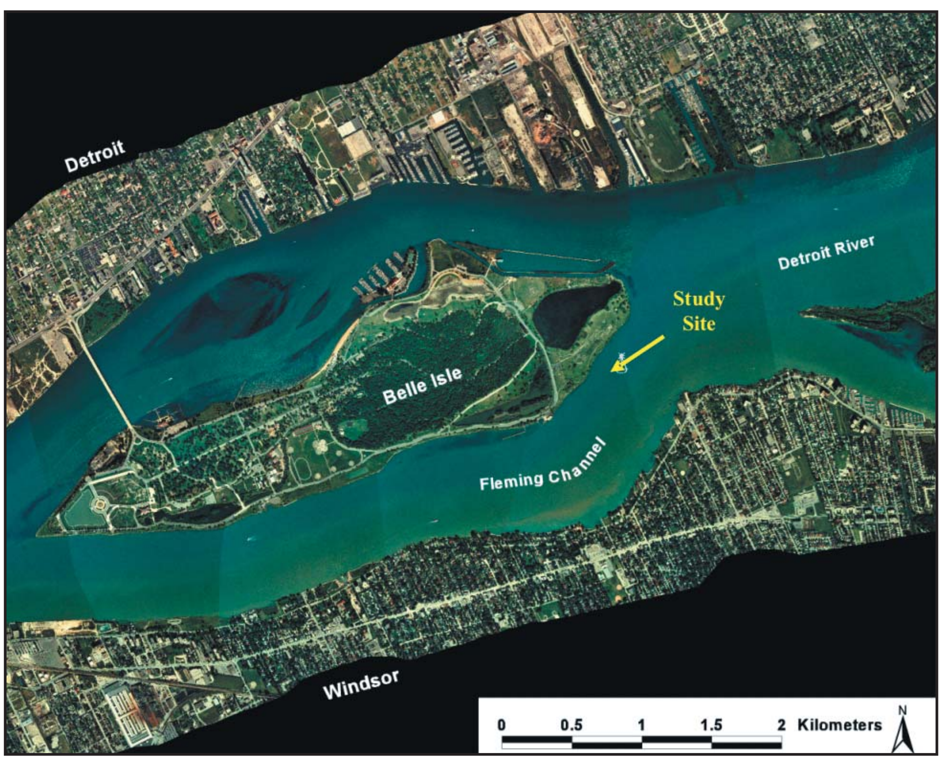

Figure 2. Location of lake sturgeon spawning habitat constructed near Belle Isle in the upper Detroit River in 2004.

In 2002, the effluent of a large combined sewer overflow (CSO) into the Detroit River (Conner's Creek; peak flow of 375 m^3/s), located approximately 16 km upstream of Zug Island, was chlorinated for the first time (Fujita et al. 2000). Its effluent plume is located close to the Michigan shore (Arginoff, personal communication, August 20, 2002) and frequent discharges of this CSO may expose the spawning ground at Zug Island to residual chlorine during the sturgeon spawning season. Since fish eggs and sac-fry are susceptible to pollutants, we suspect that few, if any, lake sturgeon offspring have survived at Zug Island since 2001. Therefore, restoration of lake sturgeon in the Detroit River is limited by the lack of suitable spawning habitat.

In 2002, funds were awarded to Michigan Sea Grant by the Great Lakes Coastal Restoration Grant Program of NOAA (National Oceanic and Atmospheric Administration) and the Great Lakes Fishery Trust to increase sturgeon spawning habitat in the Detroit River. Habitat requirements for successful spawning by lake sturgeon in the Huron-Erie Corridor include beds of broken rock or coarse gravel that possess adequate interstitial void space to protect sturgeon eggs from dislodgment and predation; water depth > 5 m to prevent colonization of spawning substrates by aquatic plants; water velocity > 0.5 m/s; and water temperatures of 9–16° C (Manny and Kennedy 2002). Except for suitable spawning substrate, these requirements were met at an area near the head of Belle Isle.

This area was assessed in April–May of 2003 and 2004 by the U.S. Fish and Wildlife Service and the U.S. Geological Survey (USGS) using gill nets, set lines, and egg mats placed on the river bottom. No fish were caught (Great Lakes Science Center unpublished data), and only 136 walleye eggs that drifted from an area upstream were collected (Manny et al., in review). In June 2004, we constructed three sturgeon spawning beds, consisting of broken limestone, 41–61 cm in diameter; metamorphic cobble and gravel, 20–30 cm in diameter; and coal cinders, 2–8 cm in diameter. Each bed was 372 m^2 in area, 0.6 m thick, and located at 7–8 m of water depth in high water velocity (0.6–1.0 m/s). Beds were located near the head of Belle Isle outside the shipping channel (Figure 2) where clean water that has descended in the shipping channel from Lake Huron deflects and accelerates off Belle Isle into the Fleming Channel. Due to the mid-channel location, the constructed spawning beds are isolated from shore-based pollution discharges.

In 2005 and 2006, set lines and gill nets will be deployed in the study area to catch lake sturgeon using the constructed spawning beds. Transmitters will be implanted in captured lake sturgeon to track their movements using ultrasonic telemetry and determine which population(s) of lake sturgeon were enhanced by the constructed spawning beds. Egg mats will be deployed on the constructed beds to collect fish eggs. Fish eggs will be removed and transported in chilled river water to the Great Lakes Science Center for hatching. Identification of fish larvae hatched from such eggs will document all fish species that deposited eggs on the constructed beds. After eggs are no longer found at the beds, USGS divers will assess the hatch of sturgeon eggs spawned on the constructed beds by disturbing the spawning substrates and collecting in drift nets any sturgeon larvae displaced, following methods of Nichols et al. (2002).

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