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## Review

## Habitat management lessons from the environs of the Detroit River International Wildlife Refuge

John H. Hartig <sup>a,\*</sup>, Michael A. Zarull <sup>b</sup>, Lynda D. Corkum <sup>c</sup>, Natalie Green <sup>d</sup>, Rosanne Ellison <sup>e</sup>, Anna Cook <sup>a</sup>, Ellen Green <sup>c</sup>, Gregory Norwood <sup>a</sup>

<sup>a</sup> U.S. Fish and Wildlife Service, Detroit River International Refuge, 9311 Groh Road, Grosse Ile, MI 48138, USA

<sup>b</sup> Water Science and Technology, Environment Canada, 867 Lakeshore Road, Burlington, Ontario L7R 4A6, Canada

<sup>c</sup> Department of Biological Sciences, University of Windsor, 401 Sunset Avenue, Windsor, Ontario N9B 3P4, Canada

<sup>d</sup> Detroit River Canadian Cleanup, 311–360 Fairview Avenue West, Essex, Ontario N8M 1Y6, Canada

<sup>e</sup> U.S. Environmental Protection Agency, 9311 Groh Road, Grosse Ile, MI 48138, USA

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## ABSTRACT

The Detroit River and western Lake Erie, located in the heart of the Great Lakes basin, support a great diversity of fish and wildlife, and their habitats, despite the enormity of habitat losses due to urban development and industrialization. This ecosystem also links Canada and the U.S. who share a long history of cooperative conservation. The river and lake are: at the intersection of two major North American bird migration flyways (i.e., the Atlantic and Mississippi); a significant fish migration corridor; and well recognized for their unique biodiversity. Over the past three decades much has been done to improve environmental conditions and to restore and conserve habitats. This paper reviews habitat management efforts within the environs of the Detroit River International Wildlife Refuge and provides advice to improve such efforts in the future. Ecological improvements resulting from these habitat projects, as well as the cumulative effects of these changes, have yet to be quantified or evaluated against existing program goals or targets. Habitat management remains a fragmented responsibility among many agencies and interests, which is often an obstacle to realizing ecological improvements, recovery, and sustainability. Moreover, cumulative habitat modifications are not reviewed often enough with respect to their impacts on the goals and targets established in existing programs, as well as their impacts on ecosystem results (e.g., fish or wildlife productivity). Clearly, there is a need to share experiences, synthesize science, learn from mistakes and successes, coordinate activities, and transfer knowledge on best practices and ecological effectiveness of habitat management.

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\* Corresponding author. Tel.: +1 734 692 7608.

E-mail address: [john\\_hartig@fws.gov](mailto:john_hartig@fws.gov) (J.H. Hartig).

## Introduction

Historic patterns of human use and development along the Great Lakes resulted in considerable loss and degradation of fish and wildlife habitat (Hartig et al., 1996). More recently, there has been a concerted effort to restore, enhance, rehabilitate, and conserve these areas (Kelso and Wooley, 1996). In general, these efforts result in many ecological improvements, including increasing biodiversity, improving biological productivity, enhancing ecosystem stability, and promoting sustainability. In addition, such habitat management efforts can result in concomitant economic (e.g., improving sport fishing, birding, and hunting opportunities, and enhancing ecotourism) and social benefits (e.g., creating “green” urban waterfront vistas founded on a sense of place, developing unique gathering places for wildlife and people that enhance community pride and contribute to livable communities, and creating unique destinations with learning stations that teach conservation and biological sustainability).

The Detroit River and western Lake Erie form a biologically important linkage between the upper and the lower Great Lakes, and despite the enormity of habitat losses, the area remains critical for migratory species. As well, there are significant resident populations of both fish and wildlife, which have responded favorably to environmental improvements (DeLisle, 2010; Hartig et al., 2009; Manny, 2010). The river and lake are at the intersection of two major North American bird migration flyways — the Atlantic and Mississippi. Over 300,000 diving ducks, 75,000 shorebirds, and hundreds of thousands of land birds and fall raptors frequent the area to rest, nest, and feed along the unique shoreline habitats, including many islands and marshes (Hartig et al., 2010a). Further, over 30 species of waterfowl, 23 species of raptors, 31 species of shorebirds, and 160 species of songbirds are found along or migrate through this corridor. In addition, 117 species of fish are found in or migrate through the Detroit River (Hartig et al., 2010a). This biodiversity and the diversity of habitats to support these biota have given the region international acclaim in the North American

Waterfowl Management Plan, the United Nations Convention on Biological Diversity, the Western Hemispheric Shorebird Reserve Network, the Biodiversity Investment Area Program of Environment Canada and U.S. Environmental Protection Agency, and, most recently, with the designation as North America's only International Wildlife Refuge — the Detroit River International Wildlife Refuge.

Canadian and U.S. scientists and managers have partnered on a number of binational projects in the corridor to both improve and restore essential fish and wildlife habitat, and focus attention on ecological improvements and remaining challenges. A keystone of this binational collaboration on the corridor is the biennial State of the Strait (SOS) Conference. The Conference brings together Canadian and U.S. managers, scientists, environmental organizations, industrial representatives, municipal leaders, students, and concerned citizens to address key issues on the Detroit River and the western basin of Lake Erie. The purpose of the most recent Conference (2009) was to address ecological benefits of habitat modification by highlighting numerous efforts underway to rehabilitate and restore habitat in the Detroit River and western Lake Erie, and by providing lessons learned and rationale for future habitat rehabilitation, restoration, and enhancement projects throughout the region. Presented here are the key issues and recommendations from the conference, as well as other relevant regional conferences addressing issues affecting habitat management.

## Approach

To address the ecological benefits achieved through habitat modification in the Detroit River and western basin of Lake Erie, 12 case studies were examined (Table 1). For the purposes of this manuscript, habitat modification means any efforts to conserve, restore, enhance, mitigate, or rehabilitate habitats. Some of the case studies, like soft shoreline engineering or small-scale habitat enhancements, were a collection of similar size projects. Others were single, much larger scale projects. The case studies were also chosen for their geographic coverage of the

**Table 1**  
A summary of habitat modification case studies presented at the 2009 State of the Strait Conference.

Site(s)	Location	Habitat type	Scope/size	Reference
Soft shoreline engineering projects	35 locations in the Detroit River watershed and one location in the River Raisin (tributary to western Lake Erie)	River and stream shoreline habitat	30–1150 m of shoreline habitat enhanced for habitat	Zarull et al. (2010)
Metzger Marsh	Western basin of Lake Erie, Lucas County, Ohio	Coastal wetlands	300 ha coastal marsh restoration	Kowalski and Wilcox (2010)
Kitty Todd Preserve	Lucas County, Ohio	Oak openings' wetlands	0.8 ha wetland restoration in a 324 ha nature preserve	Kromer et al. (2010)
Crosswinds Marsh	Adjacent to Detroit Metropolitan Airport, Wayne County, Michigan	Wetlands	189 ha wetland mitigation to compensate for airport expansion	Bauer et al. (2010)
Ojibway Prairie Provincial Nature Preserve	Windsor, Ontario	Tallgrass prairie	105 ha tallgrass prairie restoration	Pratt and Cedar (2010)
Sterling State Park	Monroe County, Michigan	Coastal wetlands	53 ha herbicide treatment of <i>Phragmites australis</i>	Fahlsing and Kowalski (2010)
Canadian portion of Detroit River area of concern	Essex County, Ontario	Wetlands, forests, meadows and prairies, and riparian habitats	23 projects ranging from 0.2 to 40 ha	Lebedyk and Groves (2010)
Fighting Island	LaSalle, Ontario	Uplands and wetlands	486 ha island restoration	DeLisle (2010)
Belle Isle waters of Detroit River	Detroit, Michigan	Lake sturgeon spawning habitat	Three spawning reefs each 15 × 25 m in size	Manny (2010)
Point Pelee National Park	Leamington, Ontario	Flying squirrel habitat	214 ha of deciduous forest habitat enhanced for southern flying squirrel	Carbrera and Reive (2010)
Wayne County Bridge in Trenton Channel of Detroit River	Grosse Ile, Michigan	Common tern nesting habitat	Two nesting sites were constructed on two cribs beneath a swing bridge: one 12 × 11 m in size and one 23 × 11 m in size	Norwood and Szczechowski (2010)
Peche Island, Boblo Island, and Point Pelee National Park	Windsor, Amherstburg, and Leamington, Ontario, respectively	Artificial nesting habitat for bald eagles	Constructed artificial nests at three locations within known nesting territories in Essex County	Roberts (2010)

Note: More detailed information on the case study descriptions can be obtained from Hartig et al. (2010b), which can be downloaded from the State of the Strait web site at [www.stateofthestrain.org](http://www.stateofthestrain.org).

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