

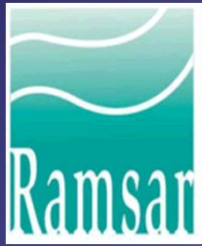
# Extreme Makeover: Brownfield Edition





*THE LAST MILE OF NATURAL  
SHORELINE ON THE U.S. MAINLAND  
OF THE DETROIT RIVER*





- 1,900 site worldwide
- 29 in the U.S.
- One in Michigan

## Humbug Marsh: a wetland of *international* importance



Humbug Marsh is Michigan's first "wetland of international importance" under the Ramsar Convention on Wetlands (Ramsar, Iran, 1971)! The Ramsar Convention, an international treaty, recognizes globally important wetlands and encourages their conservation. Humbug Marsh is the 27th Ramsar wetland in the U.S. to be added to the list, which also includes sites from over 160 countries around the world.



**1** Humbug Marsh is a Great Lakes coastal marsh, a globally endangered natural community

Coastal wetlands, like Humbug Marsh, are among the world's most productive ecosystems and many have been lost to human development.

**2** Humbug Marsh is rich in biodiversity

It provides food and shelter for a wide variety of plants, birds, fish, insects, and mammals.



### Four reasons why Humbug Marsh is an internationally important wetland

**3** Humbug Marsh provides valuable resources to birds during spring and fall migration periods

Over 300,000 ducks, 75,000 shorebirds, and hundreds of thousands of landbirds visit this area to rest, nest, and feed along the rare shoreline habitat.



**4** Humbug Marsh supports 51 species of fish and provides important spawning and nursery habitat

Fish species, like the walleye, use the marsh for habitat and food. The shallow waters of the marsh are safe places for fish to spawn and for young fish to live before they enter deeper, colder water.



### Species Spotlight!



**Great Egret**  
(*Ardea alba*)

The great egret lives in the Humbug Marsh area for much of the year and travels to warmer places during the winter. These birds build bulky nests in trees near large lakes where they can find reed beds or shallow wetlands - like Humbug Marsh!



**Canvasback**  
(*Aythya valisineria*)

The canvasback is a large diving duck that migrates through the Humbug Marsh area, along the Mississippi Flyway. These ducks feed on underwater plants, such as wild celery, that thrive in the shallow waters of the marsh.



**Yellow Perch**  
(*Perca flavescens*)

The shallow waters of Humbug Marsh are excellent spawning habitat for the yellow perch. In April or May, these fish lay 10,000 to 40,000 eggs on underwater plants or tree branches. The marsh provides more of this habitat than the fast-moving, deeper water of the Detroit River.



# REFUGE GATEWAY



From Brownfield



To Refuge Gateway

DETROIT RIVER INTERNATIONAL WILDLIFE REFUGE GATEWAY





# Humbug Marsh and the Refuge Gateway





# REFUGE GATEWAY



DETROIT RIVER INTERNATIONAL WILDLIFE REFUGE GATEWAY

Master Plan, Schematic Plan, and Green Buildings Council Review



Photos from the field.







# Monguagon Wetland System





# SHORELINE RESTORATION Project



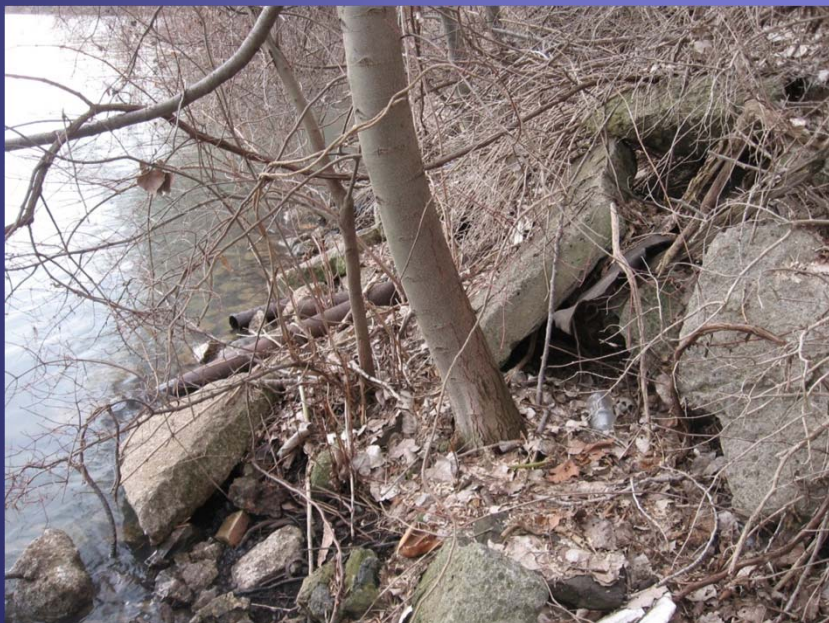
DETROIT RIVER INTERNATIONAL WILDLIFE REFUGE GATEWAY

REFUGE GATEWAY MASTER PLAN: HAMILTON ANDERSON & ASSOCIATES



# SHORELINE RESTORATION PROJECT

## 2009: Pre-construction





40,000 cubic yards of fill removed and reused onsite for cap enhancement





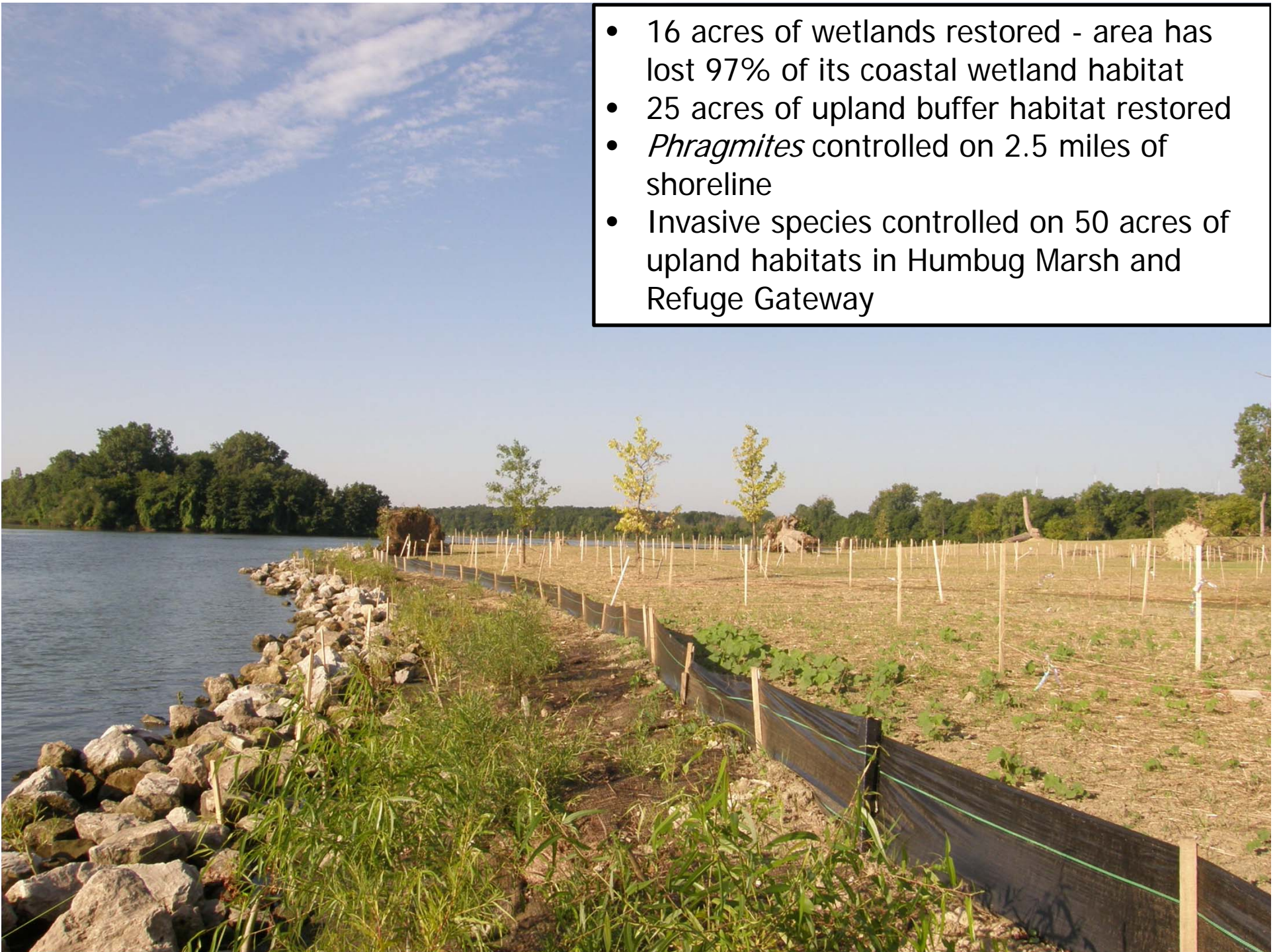
# SHORELINE RESTORATION PROJECT

## 2011: Riparian Excavation & Shelf Restoration





- 16 acres of wetlands restored - area has lost 97% of its coastal wetland habitat
- 25 acres of upland buffer habitat restored
- *Phragmites* controlled on 2.5 miles of shoreline
- Invasive species controlled on 50 acres of upland habitats in Humbug Marsh and Refuge Gateway





# View of Grosse Ile, Calf Island, Celeron Island, Lake Erie, Pointe Mouillee, and Humbug Island and Marsh From the restored Refuge Gateway Shoreline

