

# Thunder Bay Reef Habitat Restoration

## Lake Huron, Michigan

### Project Summary:

The reef habitat restoration site is located in Thunder Bay within Lake Huron on the eastern shore of Alpena. Valuable aquatic habitat has been lost on the CKD Pile Reef from years of cement kiln dust (CKD) deposition, a waste by-product of cement production. In 2002, the CKD pile onshore was capped and a revetment wall was installed along the lakeshore to prevent further erosion of CKD into the water. Aquatic habitat loss has meant a decrease in potential spawning areas for fish, a decrease in habitat for prey species and macroinvertebrates, and a loss of refuge areas for fry and eggs.



Fish Biologist with 20-year old male wild (unclipped) lake trout

Mapping efforts have determined suitable locations for placement of reef material. Coordination efforts with Thunder Bay National Marine Sanctuary and Underwater Preserve will ensure no historic artifacts are impacted. Preconstruction monitoring of egg and fry survival on existing spawning habitat has begun.

### Project Goals:



Egg bags being buried amongst rock to measure the number of lake trout and white fish eggs being deposited

The goal of this project is to mitigate degraded spawning habitat and create approximately 2 acres of new spawning habitat (artificial reefs) to increase reproduction of reef-spawning fishes in Thunder Bay.



Commercially Captured Whitefish from Thunder Bay

### Potential Outcomes:

- Improve spawning habitat and reproduction of lake trout.
- Progress toward restoration of self-sustaining lake trout population.
- Enhance spawning habitat for walleye and lake whitefish.
- Create a model for reef design that will guide similar restoration projects in the Great Lakes.
- Provide habitat attractive to smallmouth bass and other native benthic species.
- Increase local fishing opportunities and support local recreational industries including charter fishing and tourism.

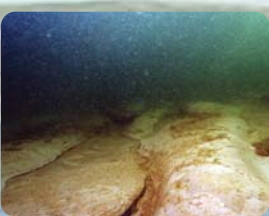
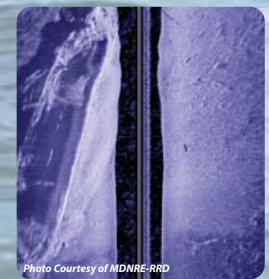


Photo of Underwater CKD Slabs



Photo of William P. Rend Shipwreck



Side Scan Sonar Image of William P. Rend Shipwreck

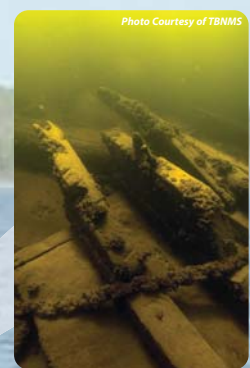
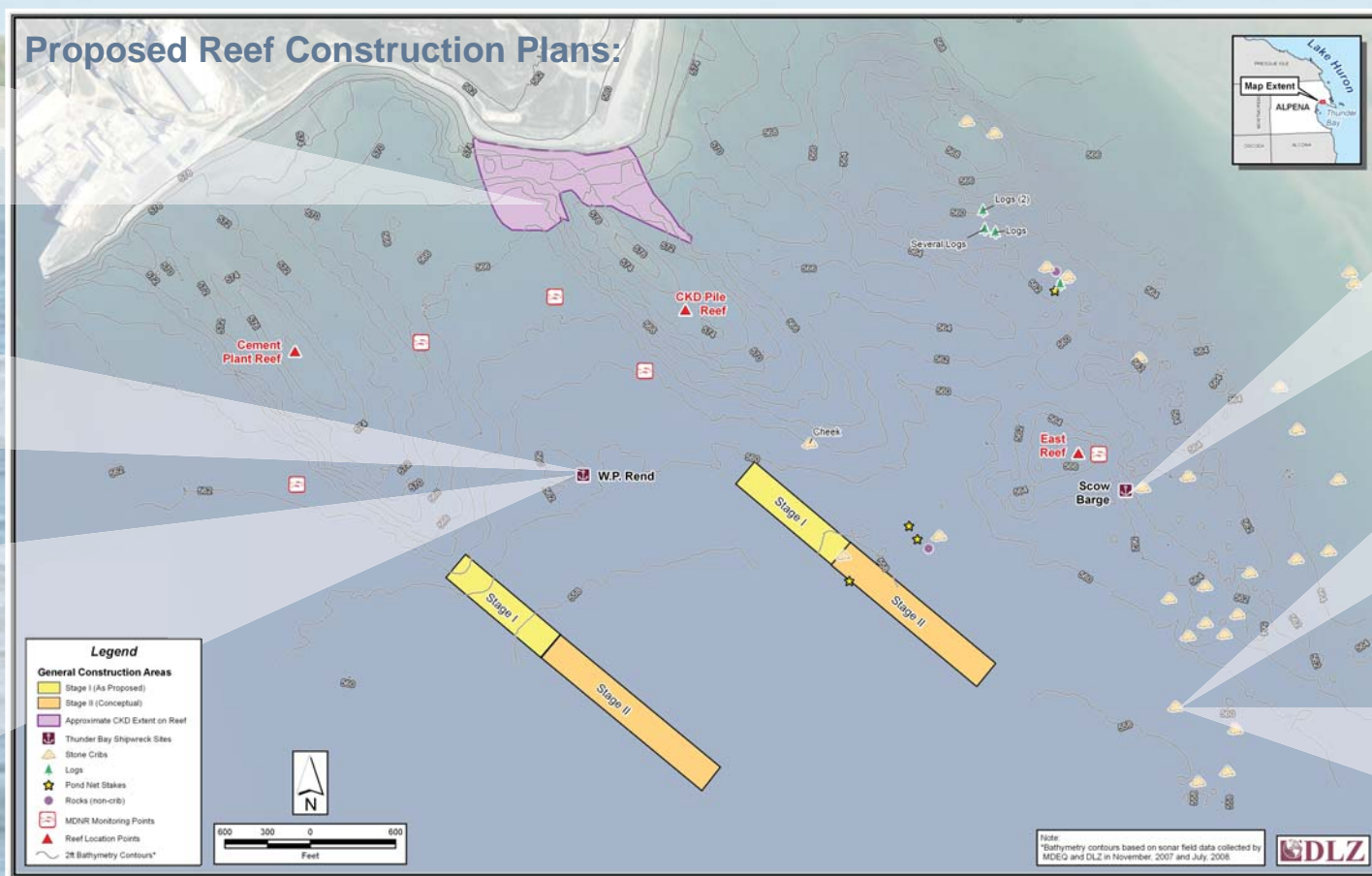


Photo of Scow Barge Wreckage



Photo/Side Scan Sonar Image of Rock Mounds Determined to be Stone Cribs (Above and Below Respectively)

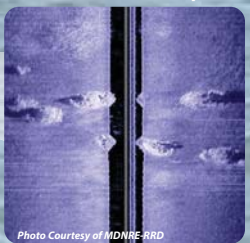


Photo Courtesy of MDNRE-RRD

### Proposed Construction Plans:

The plan for restoration includes reef construction using limestone cobble (donated by Lafarge) to build several new spawning reefs that will duplicate natural reef conditions. Construction will take place in two stages. Reefs will be located adjacent to the Cement Plant reef and CKD reef -- sites where spawning lake trout congregate. The East Reef will serve as a reference site and will not be altered.

**STAGE I** - Initial construction of functional prototype reefs. Design variables include reef height, orientation, and size.

- 16 to 20 reefs
- 15' width, 5 to 10' height, 15 and 70' lengths
- NW and NE orientation

**STAGE II** - Reef design will utilize data from Stage I construction to achieve an optimal design for lake trout reproductive success (i.e., egg incubation and hatching).

- Reef numbers and size will depend on funding.

### Grant Awards:

- Great Lakes Fish and Wildlife Restoration Act (\$64,000 grant) funds pre-construction monitoring and 1 year of post construction monitoring activities (including fall spawning assessments and spring fry assessments)
- Estuary Restoration Act (NOAA Estuary Habitat Restoration Program in conjunction with Army Corps of Engineers) \$517,000 grant, funds construction of Stage I

#### Lead Agency

MDNRE, Remediation and Redevelopment Division



Project questions may be directed to:

Ms. Janice Adams, MDNRE-RRD (Gaylord), (989) 704-3434

#### Consultants

Dr. Ellen Marsden and DLZ Michigan, Inc.

#### Stakeholders

- Fisheries Division (MDNRE)
- Thunder Bay National Marine Sanctuary & Underwater Preserve (NOAA & State of Michigan)
- U.S. Fish and Wildlife Service
- Lafarge – Alpena Plant
- City of Alpena