

Restoration and Recovery of the Kalamazoo River following the 2010 Enbridge Line 6B Oil Spill



Clark McCreedy - Michigan Ecological Services Field Office

The Spill:

- Occurred July 25, 2010 - Enbridge Line 6B
- From 2010 – 2014, 1.2 million gallons oil recovered
- Pipeline rupture in Talmadge Creek near Marshall, MI
- Into the Kalamazoo River, 38 miles to Lake Morrow
- As many as 1,500 spill responders mobilized
- Dredging of submerged oil: 2010, 2011, 2013, 2014
- Largest inland oil spill in the United States



2010 Enbridge Line 6B Spill

Lake Michigan

OTTAWA COUNTY

KENT COUNTY

ALLEGAN COUNTY

BARRY COUNTY

Saugatuck

Wayland

Gun Lake

Lake Allegan

Allegan

Otsego

Plainwell

VAN BUREN COUNTY

Gull Lake

Springfield

Morrow Lake

Kalamazoo

Galesburg

Marshall

Albion

Portage

Battle Creek

Jackson

KALAMAZOO COUNTY

CALHOUN COUNTY

JACKSON COUNTY



0 5 10 Miles



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Natural Resource Damage Assessment and Restoration:

- Non-punitive! Compensatory, polluter pays
- Structured process defined in regulation:
 - ✓ Determination of natural resource injury
 - ✓ Assessment to restore resources and their services
 - ✓ Recover damages (\$\$) or define restoration via negotiated settlement or litigation
 - ✓ Implement and monitor efficacy
- Trustees oversee, on behalf of the public

The Trustee Representatives:

- **The State of Michigan**

MDNR: Jessica Mistak, Jay Wesley

MDEQ: Nicole Zacharda, Michelle Delong

MDAG: Polly Synk

- **The Tribes:**

Nottawaseppi: John Rodwan

Match-E-Be-Nash-She-Wish: Jeff Martin, Liz Binoniemi-Smith

- **The Department of Commerce**

NOAA: Jessica Winters, Julie Sims, Kate Barfield

- **The Department of Interior**

USFWS: Stephanie Millsap, Lisa Williams, Clark McCreedy

DOI SOL: Kelly Bakayza, Mary Lynn Taylor



An aerial photograph of a river flowing through a rural area with houses and trees. A large, colorful oil spill is visible in the lower half of the river, creating a rainbow-like sheen on the water's surface. The text is overlaid on a semi-transparent green circle.

con · sen · sus

Noun: general agreement

**Synonyms: agreement, harmony,
concurrence, accord, unanimity, unity,
solidarity**

Important Later...



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Outcomes:

The State of Michigan

- **Oak Savannah Restoration – Fort Custer Recreation Area**
- **Enhancement of Lakes – Fort Custer Recreation Area**
- **Kalamazoo River Large Woody Debris Replacement**
- **Kalamazoo River Floodplain Wetland Restoration**
- **Off-site Wetland Mitigation**



FCRA Oak Savannah Restoration:

- **Funded, Implementation on-going.**
- **175 Acres To Be Treated Over Three Years**
- **Non-native Assessment, Treatments, Monitoring**
- **Girdling, Cut-stump and Foliar Herbicide Application**
- **Photo point monitoring**



FCRA Lake Enhancement:



Eagle Lake

Jackson Lake

Whitford and Lawler Lake

Google Earth



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FCRA Lake Enhancement:

- **Funded, Competitive RFP, Contractor Identified.**
- **Three Year Project**
- **Non-native Assessment, Treatments, Monitoring**
- **Monitoring of Recreational Use**
- **Outreach Related to Aquatic Non-natives**

Google Earth

5000 ft



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Large Woody Debris Replacement:

- Spill Response required substantial removal of LWD
- Locations and Attributes Recorded During Response
- Woody Material Not Oiled Stockpiled for Later Use



Large Woody Debris Replacement:

- Assessment of Wood Removal During Response
- Assessment of Interim Recruitment of Woody Material
- Characterization of Type & Orientation
- Identification of Most Appropriate Locations
- Large Woody Debris Replacement Work Plan
- Constructed, Barged, Placed, and Anchored



Large Woody Debris Replacement:

- Four Types of Structures
- Nearly 300 Large Wood Structures
- Anchored With Driven Posts, Cut into Banks
- Initiated June 2016, Completed October 2016



Kalamazoo River Wetland Restoration:

- Ensure Similar Degree of Vegetative Cover
- Ensure Similar Community Composition & Diversity
- Limit Invasive Species Cover to 10% or Less
- Limit Phragmites Cover to 10% or Less



Kalamazoo River Wetland Restoration:

Four Years Summary Reports, Data Evaluation:

- Small Wetland Polygons
- Limited Access
- Islands Within Invasives

Not All Wetlands of Equal
Conservation Value.



Kalamazoo River Wetland Restoration:

Priority Expansion Areas:

- Reduced Number and Wetland Acreage, but
- Wetland Areas Where Sustained Conservation Benefit is Most Likely to be Achieved



ENBRIDGE
 Drawn: EN 8/12/2016
 Approved: DP 8/12/2016
 Project #: 60481718



Legend
 Priority Expansion Areas
 One Mile Grid Segments

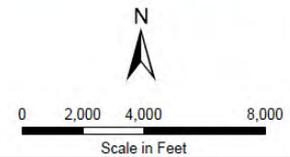


FIGURE 1
 PRIORITY EXPANSION AREAS
 SHEET 1 OF 14

ENBRIDGE LINE 6B MP 608
 MARSHALL, MI PIPELINE RELEASE
 ENBRIDGE ENERGY LIMITED PARTNERSHIP



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Wetland Mitigation / Compensation:

- Kalamazoo River Watershed – Eaton County
- 300 Acres of Off-site Wetland Restoration:
 - 129 Acres Emergent Wetland
 - 14 Acres Shrub/Scrub
 - 157 Acres Forested Wetlands
- Conservation Bank with Private Landowner



Outcomes:

The Tribes:

**Wild Rice Assessment,
Characterization, Propagation, &
Restoration**

**Watershed Cultural Resource
Assessment & Traditional
Ecological Knowledge Outreach**



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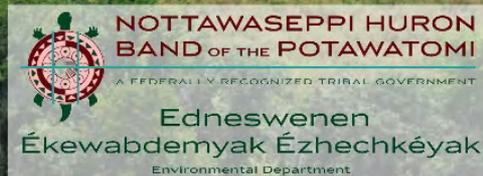
NHBP Mnomen Aerial Imagery

Identification of Sustainable Wild Rice Beds, On-going Assessment, Inventory & Monitoring

Wild Rice Beds

AES Oblique Imagery 2013
NHBP Wild Rice Program

Wild Rice Restoration



Michigan Ecological Services Field Office

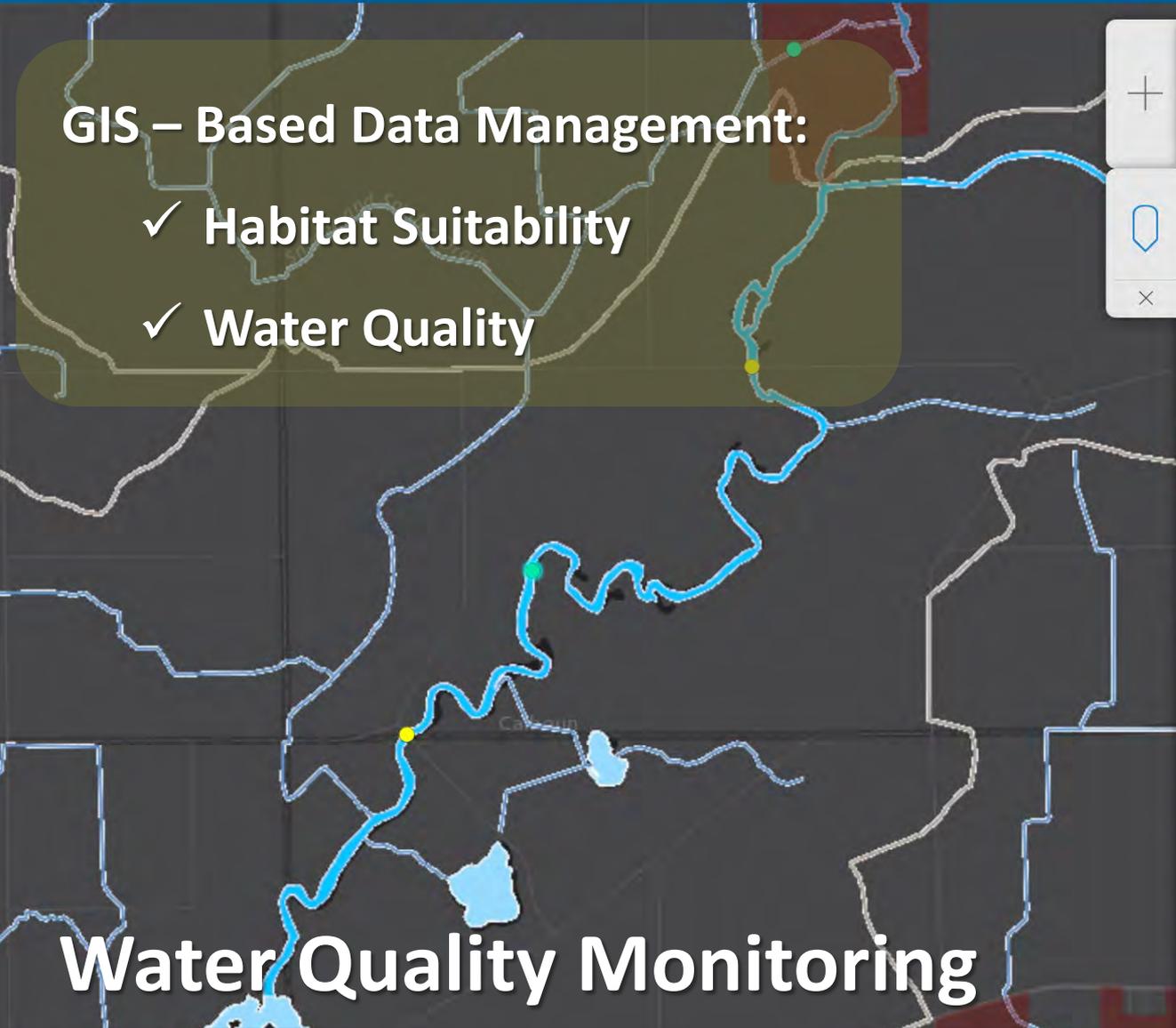
Maps



GIS – Based Data Management:

- ✓ Habitat Suitability
- ✓ Water Quality

Water Quality Monitoring



Overall Water Quality: NOT-ST-80
NOT-ST-80

Watershed Boundary Dataset Hydrologic Unit 12
Mud Lake-Nottawa Creek

Details

Location
Lat: 42.07823422° Long: -85.28072421°

Nottawa Creek

Avg. Temperature	64.37183333333333
Max Temperature	72.41
Avg. Turbidity	1.15
Max Turbidity	2.7
Avg. Dissolved Oxygen	7.8725
Min. Dissolved Oxygen	



Genetic Characterization:

Zizania aquatica and two varieties of *Zizania palustris* thought to occur within St. Joe and Kalamazoo River watersheds.

On-going study to genetically evaluate occurrence of species and varieties.



**Integrate Habitat Suitability, Water Quality,
Species Distribution to Facilitate Restoration**

Wild Rice Propagation & Transplantation



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Outcomes:

The Department of Interior

Tributary Fish Passage Projects (Brett Riser, CCD)

- Pigeon Creek
- Rice Creek

Rice Creek Floodplain Restoration

Turtle Recruitment, Demography, Habitat Use



Pigeon Creek



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Pigeon Creek



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Rice Creek Floodplain Restoration:

- **Entrenched– Banks with Berms of Dredge Spoils**
- **Berm Removal – Floodplain Reconnection**
- **Seasonal Ephemeral Wetlands**
- **470 Linear Feet of Berm Removal**





Turtle Recruitment in the Kalamazoo River
Dr. Jeanine Refsnider-Streby, University of Toledo

- Radio-track females
- Shoreline searching
- Protect & monitor nests
- Characterize in-situ thermal nest conditions
- Determine hatch success
- Movement of turtles
- Habitat use of turtles

- Leverage existing data
- 3,800 turtle captures during spill response
- All turtles marked during spill response



Outcomes:

Enbridge Energy

Ceresco Dam Removal – Channel Restoration (Scott Peyton)

Kalamazoo River Community Recreational Foundation (2.5M)

Five Recreational Access Projects:

- **Angler's Bend (Calhoun Conservation District)**
- **Ceresco Green**
- **Historic Bridge Park**
- **Paddler's Grove (Calhoun Conservation District)**
- **Saylor's Landing (Calhoun Conservation District)**



Outreach:

Regional & National External Affairs Staff

- Development of a Communication Plan
- Web-based Outreach:
 - [Feature stories](#)
 - [ESRI Story Map](#)

