WETLANDS IN THE
ST. JOSEPH RIVER
WATERSHED

Robert P. Zbiciak
March 15, 2010
Why Do We Care About Wetlands?

Why Protect and Restore Wetlands?

- Wetlands provide numerous valuable functions to society
- We have already lost many of our historic wetlands and the functions they provided
WETLAND FUNCTIONS AND THEIR BENEFITS

Flood Water Storage – Natures Sponges

- Reduced Flooding and Associated Damage During High Water Events
- Reduces Flashiness of Streams
  a) Reduces Bank Erosion
- Releases Water Slowly Over Time Which Provides Stable Stream Flows
  a) streams don’t dry up in summer
  b) improves biological health of stream
WETLAND FUNCTIONS AND THEIR BENEFITS

Water Quality – Natures Kidneys

- Sediment Removal
  stored or slowed water allows suspended sediments to settle out resulting in clearer water and natural substrate

- Nutrient Removal
  nutrients attached to suspended sediments are trapped and taken up by wetland plants resulting in fewer algal blooms and less nuisance aquatic vegetation
WETLAND FUNCTIONS AND THEIR BENEFITS

- **Shoreline Stabilization**
  wetland plants growing along the shoreline reduce erosion and the need for shore protection (e.g. seawalls, rip rap etc.)

- **Recharge Ground Water**
  a) wells for drinking water (individual and municipal)
  b) irrigation for agriculture
WETLAND FUNCTIONS AND THEIR BENEFITS

- Fish and Wildlife Habitat
  
a) Recreational Opportunities
     Fishing
     Hunting
     Trapping
     Bird Watching
     Open Space/Green Space

b) Threatened & Endangered or Rare Species
WETLAND FUNCTIONS AND THEIR BENEFITS

- Store Flood Waters – Reduce Flooding
- Remove Sediment – Clearer Water
- Remove Nutrients – Less Vegetation
- Stabilize Shorelines – Less Erosion
- Recharge Ground Water – Drinking Water
- Stream Flow Maintenance – Stable Flows
- Provide Fish and Wildlife Habitat – Fishing and Hunting Recreation
Twenty-two States have lost at least 50% of their original wetlands. Seven of these 22 (California, Indiana, Illinois, Iowa, Missouri, Kentucky, and Ohio) have lost more than 80% of their original wetlands.

Michigan originally contained approximately 11 million acres of wetlands.

Indiana originally contained approximately 5.6 million acres of wetlands.
Over 50% of Michigan’s original wetlands have been drained or filled.

Loss of 5.5 million acres. 5.5 million acres remain.

87% of Indiana’s original wetlands have been lost.

Loss of 4.8 million acres. 813,000 acres remain.

WHY WERE WETLANDS DESTROYED?

- Wetlands were considered mosquito-breeding swamps and “unusable wastelands”

- Wetlands needed to be “reclaimed” (e.g. drained and/or filled) to create “useable land”
A majority of the historic wetland loss in Michigan and Indiana was caused by drainage for agricultural purposes before 1930.

Additional acreage was drained by the Works Progress Administration to control mosquitoes between 1934 and 1940.

OTHER MAJOR CAUSES OF WETLAND LOSSES

- RESIDENTIAL, COMMERCIAL AND INDUSTRIAL DEVELOPMENT AFTER THE GREAT DEPRESSION AND WORLD WAR II
- USED AS DISPOSAL AREAS “ISLANDS OF GARBAGE” IN LAKE ST CLAIR WETLAND
- MODERN DAY SUBURBAN SPRAWL (e.g. MALLS, SUBDIVISIONS, ROADS ETC.)
WETLAND LOSES NOT UNIFORM

- UPPER PENINSULA – 17% LOSS (638,000 ACRES)

- NORTHERN LOWER PENINSULA – 20% LOSS (387,000 ACRES)

- SOUTHERN LOWER PENINSULA – 66% LOSS (3,320,000 ACRES)

- GREAT LAKES COASTAL WETLANDS – 71% LOSS
UPPER PENINSULA:
PRE-SETTLEMENT WETLANDS
UPPER PENINSULA: APPROXIMATE AREAS OF WETLAND LOSS
Northern Lower Peninsula:
PRE-SETTLEMENT WETLANDS
Northern Lower Peninsula:
APPROXIMATE AREAS OF WETLAND LOSS
Southern Lower Peninsula:
PRE-SETTLEMENT WETLANDS
Southern Lower Peninsula:
APPROXIMATE AREAS OF WETLAND LOSS
St. Joseph River Watershed Wetlands

Status and Trends Pre-Settlement Current Conditions

By: Jeremy Jones
June 2009
Data Layers Used in Michigan

- Pre-European Settlement Wetland Inventory (Michigan Natural Features Inventory)

- Hydric “Wet” Soils  USDA-NRCS

- National Wetland Inventory (NWI)
  United States Fish and Wildlife Service
  Updated to 1998 (being updated to 2005)
Data Layers Used in Indiana

- Hydric “Wet” Soils  USDA-NRCS

- National Wetland Inventory (NWI)
  United States Fish and Wildlife Service
  Updated to 2005

- No Pre-European Settlement Wetland Inventory Exits for Indiana
Data Limitations and Disclaimer

National Wetlands Inventory (NWI)

- Wetland boundaries determined from Aerial Imagery
- Last updated in 2005
- Obvious limitations to Aerial Photo Interpretation:
  - Errors of Omission (forested and drier-end wetlands)
  - Errors of Commission (misinterpretation of aerials)

The 2005 NWI data was used in this analysis to report status and trends, as this is currently the best data source available. However, this data may not accurately reflect current conditions on the ground.

THE MDEQ-Land and Water Mgmt Division has begun a joint project with Ducks Unlimited, Inc. to update the 1978 NWI using 1998 aerial imagery and 2005 aerial imagery. The project is ongoing, and this data will be used for all future Wetland Status and Trends analysis.

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.
St. Joseph River Watershed (Indiana)

Status and Trends Pre-Settlement to 2005

By: Jeremy Jones
June 2009
ST. JOSEPH RIVER WATERSHED (IN): WETLAND RESOURCES STATUS AND TRENDS

PRESETTLEMENT WETLAND CONDITION

- 281,797 total acres of wetland
- 18,379 Polygons
- Average Size – 15 Acres

2005 WETLAND CONDITION

- 79,155 total acres of wetland
- 18,331 Polygons
- Average Size – 4.3 Acres

28% OF ORIGINAL WETLAND ACREAGE REMAINS
72% LOSS OF TOTAL WETLAND RESOURCE
LOSS OF 202,642 ACRES
ST. JOSEPH RIVER (IN): PRE-SETTLEMENT WETLANDS
ST. JOSEPH RIVER (IN):
2005 NWI WETLANDS
ST. JOSEPH RIVER (IN): APPROXIMATE AREAS OF WETLAND LOSS
ST. JOSEPH RIVER (IN): Wetland Restoration Areas Map
St. Joseph River Watershed (Michigan)

Status and Trends Pre-Settlement to 1998

By: Jeremy Jones
June 2009
ST. JOSEPH RIVER WATERSHED (MI): WETLAND RESOURCES STATUS AND TRENDS

PRESETTLEMENT WETLAND CONDITION

- 390,981 total acres of wetland
- 16,255 Polygons
- Average Size – 24 Acres

1998 WETLAND CONDITION

- 236,934 total acres of wetland
- 36,498 Polygons
- Average Size – 6.5 Acres

60% OF ORIGINAL WETLAND ACREAGE REMAINS
40% LOSS OF TOTAL WETLAND RESOURCE
LOSS OF 154,047 ACRES
ST. JOSEPH RIVER (MI):
PRE-SETTLEMENT WETLANDS
ST. JOSEPH RIVER (MI):
1998 NWI WETLANDS
ST. JOSEPH RIVER (MI):
APPROXIMATE AREAS OF WETLAND LOSS
ST. JOSEPH RIVER (MI): Wetland Restoration Areas Map

[Map of the St. Joseph Watershed showing potential wetland restoration areas in Michigan]

- Green areas: 1998 NWR Wetlands
- Red areas: Potential Restoration Areas (Hydroic Soils)
- Black areas: CCAP Land Cover Land Use 2006

Map Information:
This map is intended to be used as one tool in a suite of selected geographic data to aid in the implementation of the Wetland Restoration Areas Implementation Plan. It is a summary of data and information that is an attempt to portray wetland conditions within the St. Joseph River Watershed in Michigan. The data used to create this map is based on the most recently available information. However, the geographic information system (GIS) projection is WGS84, a global geographic coordinate system. The map does not reflect current land use or land cover. The map data may also be in error due to the use of disparate datasets and information sources. The map data has been updated since 1998, but the geographic information system (GIS) projection is WGS84, a global geographic coordinate system. The map data may also be in error due to the use of disparate datasets and information sources.
St. Joseph River Watershed

Status and Trends Pre-Settlement
Current Conditions
ST. JOSEPH RIVER WATERSHED: WETLAND RESOURCES STATUS AND TRENDS

- **PRESETTLEMENT WETLAND CONDITION**
  - 672,778 total acres of wetland
  - 34,634 Polygons
  - Average Size – 19 Acres

- **2005/1998 WETLAND CONDITION**
  - 316,089 total acres of wetland
  - 54,829 Polygons
  - Average Size – 5.7 Acres

47% OF ORIGINAL WETLAND ACREAGE REMAINS
53% LOSS OF TOTAL WETLAND RESOURCE
LOSS OF 356,689 ACRES
ST. JOSEPH RIVER:
PRE-SETTLEMENT WETLANDS
ST. JOSEPH RIVER: PRESENT DAY WETLANDS
ST. JOSEPH RIVER:
APPROXIMATE AREAS OF WETLAND LOSS
STATE OF MICHIGAN WETLAND RESTORATION GOALS

- MICHIGAN’S WETLAND CONSERVATION STRATEGY (DEQ 1997)

- SHORT TERM : (BY 2010) RESTORE 1% OF LOST WETLANDS (50,000 ACRES)

- LONG TERM : RESTORE 10% OF LOST WETLANDS (500,000 ACRES) NO TIME FRAME ESTABLISHED
STATE OF MICHIGAN WETLAND RESTORATION GOALS

- SHORT TERM GOAL WILL BE REACHED BY 2010 (APPROX 4,000 ACRES BEING RESTORED ANNUALLY)

- 2079 ESTABLISHED TIMEFRAME FOR MEETING OUR LONG TERM GOAL. 100 YEAR ANNIVERSARY OF MICHIGAN’S WETLAND PROTECTION STATUTE

- 112 YEARS AT CURRENT RATE (4,000 ACRES PER YEAR)

- MUST INCREASE RATE OF RESTORATION BY 63% TO 6,500 ACRES PER YEAR AND MAINTAIN IT FOR the next 69 YEARS TO REACH OUR LONG TERM GOAL
ST JOSEPH WETLAND
RESTORATION GOALS

- Is there a goal?

- 1% restoration goal equals 3,567 acres

- 10% restoration goal equals 35,667 acres
ST JOE RIVER WATERSHED

- 54,800 individual wetlands to protect (316,089 acres)
- Hundreds of thousands of restorable wetland acres and sites
- Where to start?????
- What should be the priorities?????
Voluntary Wetland Restoration Programs

- USDA - Wetland Reserve Program (WRP),
- USDA - Conservation Reserve Program (CRP)
  Continuous sign up
- USDA - Conservation Reserve Enhancement Program (CREP)
- USFWS- Partners for Fish and Wildlife Program
- DNRE- Landowner Incentive Program (LIP)
- Ducks Unlimited Inc, Land Conservancies and Other Conservation Organizations
PASSIVE STRATEGY

- TAKE WHATEVER OPPORTUNITIES COME ALONG
- WAIT FOR INTERESTED LANDOWNERS TO MAKE CONTACT
- CURRENTLY USED BY FEDERAL AGENCIES (NRCS, FSA & USFWS)
PROACTIVE STRATEGY

- USE AVAILABLE INFORMATION AND TECHNOLOGY TO SET PRIORITIES AND SELECT SITES
- MAKE CONTACT WITH LANDOWNERS OF PRIORITY SITES
- SELL THE CONCEPT AND PROGRAMS
- STARTING TO BE USED BY WATERSHED GROUPS AND CONSERVATION DISTRICTS
USE GIS TO PRIORITIZE SITES

• Allows inclusion of multiple metrics

• Hones in on landscape level information to identify specific sites

• Allows flexibility for the user to define needs
DESKTOP REVIEW OF PRIORITY SITES
DNRE Wetland Protection and Restoration Tools

- Wetland Protection Prioritization Model (Protection Tool)

- Wetland Restoration Prioritization Model (Restoration Tool)

- Landscape Level Wetland Functional Assessment (Protection and Restoration)
DNRE Wetland Protection Tool

Saginaw Bay Coastal Initiative

Wetland Protection Scoring Criteria

- Size of the Wetland
- Proximity to a Stream
- Landscape Context (adjacent land use and buffers)
- Migratory Bird Use (Ducks Unlimited Study)
Protection Tool Scoring Criteria

- Rare Species and Natural Communities
- Coastal Wetlands
- Isolated Wetlands
DNRE Wetland Restoration Tool

Clinton River Area of Concern (AOC)

Wetland Restoration Scoring Criteria

- Historic Wetlands (one or two layers)
- Proximity to an Existing Wetland
- Proximity to a Waterway
- Road Fragmentation
Restoration Tool Scoring Criteria

- Proximity to Protected Areas
- Headwater Areas
- Development Threat
- Significant Biological Features in the vicinity
- Parcelization (How many owners)
DNRE Wetland Protection and Restoration Tool

Landscape Level Wetland Functional Assessment

- Every existing wetland will be evaluated for the functions they are currently performing (all 54,829 wetlands)
- Every historically lost wetland will be evaluated for the functions they would likely perform if restored (all 34,634 wetlands)
PAW PAW, & HODUNK WATERSHEDS
“LLWW” descriptors –

HGM based coding for NWI maps

L Landscape
Position

L Landform

W Water flow path

W Waterbody Type
Wetland Functions Evaluated

- Flood water storage
- Streamflow maintenance
- Nutrient transformation
- Sediment and particulate retention
- Shoreline stabilization
- Conservation of Rare & Imperiled Wetland Communities

- Habitat Functions
  - Herps & Amphibians
  - Fish
  - Shorebirds, Waterfowl, and Waterbirds
## FUNCTIONAL UNIT COMPARISON

### Table 5: Functional Unit comparison

<table>
<thead>
<tr>
<th>Function</th>
<th>Pre-European settlement Functional Units</th>
<th>2005 Functional Units</th>
<th>Predicted % of Original Capacity Left</th>
<th>Predicted % Change in Functional Capacity</th>
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</thead>
<tbody>
<tr>
<td>Flood Water Storage</td>
<td>10,699.44</td>
<td>2,399.26</td>
<td>22</td>
<td>-78</td>
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<td>Streamflow Maintenance</td>
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<td>8,035.00</td>
<td>6,240.73</td>
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<td>-23</td>
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<td>Shoreline Stabilization</td>
<td>11,278.65</td>
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<td>-46</td>
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<td>Conservation of Rare and Imperiled Wetlands</td>
<td>&lt;Null&gt;</td>
<td>385.26</td>
<td>&lt;Null&gt;</td>
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*Due to differences in mapping technique between pre-settlement and current wetland coverage, status and trends information for this function is not applicable.
FLOOD WATER STORAGE

- This function is important for reducing the downstream flooding and lowering flood heights, both of which aid in minimizing property damage and personal injury from such events.
- The following map illustrates wetlands that perform the above ecological service at a level of significance above that of wetlands not designated. Wetlands deemed to be performing this function are mapped in two distinct time periods; Pre-European settlement (red), and wetlands circa 2005 (green).
FLOOD WATER STORAGE

HODUNK-MESSENGER CHAIN OF LAKES WATERSHED

ENHANCED NWI:
Flood Water Storage
Pre-Settlement vs.
2005

The Michigan Department of Environmental Quality (MDEQ) enhanced National Wetland Inventory (NWI) data is intended to help users identify wetland functions and provides a visual representation of wetland and water bodies in the Hodunk-Messenger Chain of Lakes Watershed. The NWI produced this map from the following data sources from other agencies or organizations:

1. The National Wetland Inventory (NWI) produced by the United States Fish and Wildlife Service through interpretation of aerial photos and topographic data. (Data obtained through flickr.com, Inc.)
2. Such as supplied by the United States Department of Agriculture, Natural Resources Conservation Service (NRCS).

This map is not intended to be used to determine the specific locations and jurisdictional boundaries of wetlands or subject to enforcement of the Natural Resources and Environmental Protection Act, 1990 PA 116, or Part 334 of the Natural Resources and Environmental Protection Act, 1990 PA 116. Only an overall evaluation and directive by the MDEQ to a contracted consultant to determine if the NWI is in accord with Part 334 should be used for jurisdictional determinations. A permit is required from the MDEQ to conduct activities in wetlands regulated under Part 334.

The enhanced National Wetland Inventory data is current to 2005 conditions, and provides an approximate assessment of wetland function based on landscape position, landforms, and hydrodynamics for each NWI wetland polygon.
CONTACT INFORMATION:

Rob Zbiciak  
Wetland Restoration Coordinator  
517-241-9021  
zbiciakr@michigan.gov

Chad Fizzell  
GIS Specialist  
517-335-6928  
fizzellc@michigan.gov
LANDSCAPE POSITION
Landscape Position – Lentic (Lake)
Landscape Position – Lotic (Stream)

RIVER

STREAM
Landscape Position – Terrene (Uplands)
Fringe
Floodplain
Basin
Flat
Slope
WATER FLOW PATH
WATER FLOW PATH

- Inflow (Water flows in but not out)
- Outflow (Water flows out but not in)
- Through flow (Water flows in and out)
- Bidirectional (Water flows back and forth)
- Isolated (surrounded by upland)
Wetland Functions Evaluated

- Flood water storage
- Streamflow maintenance
- Nutrient transformation
- Sediment and particulate retention
- Shoreline stabilization
- Conservation of Rare & Imperiled Wetland Communities

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FLOOD WATER STORAGE

- This function is important for reducing the downstream flooding and lowering flood heights, both of which aid in minimizing property damage and personal injury from such events.
- The following map illustrates wetlands that perform the above ecological service at a level of significance above that of wetlands not designated. Wetlands deemed to be performing this function are mapped in two distinct time periods; Pre-European settlement (red), and wetlands circa 2005 (green).
FLOOD WATER STORAGE
NUTRIENT TRANSFORMATION

- Wetlands that have a fluctuating water table are best able to recycle nutrients. Natural wetlands performing this function help improve local water quality of streams and other watercourses.

- The following map illustrates wetlands that perform the above ecological service at a level of significance above that of wetlands not designated. Wetlands deemed to be performing this function are mapped in two distinct time periods; Pre-European settlement (red), and wetlands circa 2005 (green).
NUTRIENT TRANSFORMATION
This function supports water quality maintenance by capturing sediments with bonded nutrients or heavy metals. Vegetated wetlands will perform this function at higher levels than those of non-vegetated wetlands.

The following map illustrates wetlands that perform the above ecological service at a level of significance above that of wetlands not designated. Wetlands deemed to be performing this function are mapped in two distinct time periods; Pre-European settlement (red), and wetlands circa 2005 (green).
SEDIMENT AND OTHER PARTICULATE RETENTION

HODUNK-MESSINGER CHAIN OF LAKES WATERSHED

ENHANCED NWI: Sediment and Other Particulate Retention: Pre-Settlement vs. 2005

Legend:
- Green: Current
- Red: Pre-Settlement

The Michigan Department of Environmental Quality (MDEQ) holds the National Wetlands Inventory (NWI) data and uses it as an information base for wetland identification, wetland function and process, and potential management plan impacts on natural and cultural resources. The NWI project produced this map from the following data obtained from other agencies and organizations:

1. The National Wetlands Inventory (NWI) conducted by the United States Fish and Wildlife Service through incorporation of aerial photo and geographic data (Data obtained through Davis Multimedia, Inc.)
2. Soil survey data from the United States Department of Agriculture, Natural Resources Conservation Service (NRCS).

This map is not intended to be used to determine the specific location and areal extent of wetlands or if a property is a wetland. The National Resources and Environment Protection Act, 1994 P.L. 103-41, as amended, only requires evaluations performed by the NWI to be performed according to Part 350. Any parcel is required to be treated as if the parcel contains certain aquatic or wetlands regulated under Part 350.

The Enhanced National Wetlands Inventory data is current to 2005 conditions and provides an overview assessment of current wetland distribution and hydrogeomorphics for each NWI wetland polygon.
STATE OF MICHIGAN WETLAND RESTORATION GOALS

- SHORT TERM (BY 2010) RESTORE 1% OF LOST WETLANDS (50,000 ACRES)

- LONG TERM (BY 2079) RESTORE 10% OF LOST WETLANDS (500,000 ACRES)

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