

# MACATAWA RIVER WATERSHED

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Landscape Level Wetland  
Functional Assessment  
*(Enhanced NWI)*

# Data Limitations and Disclaimer

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## National Wetlands Inventory (NWI)

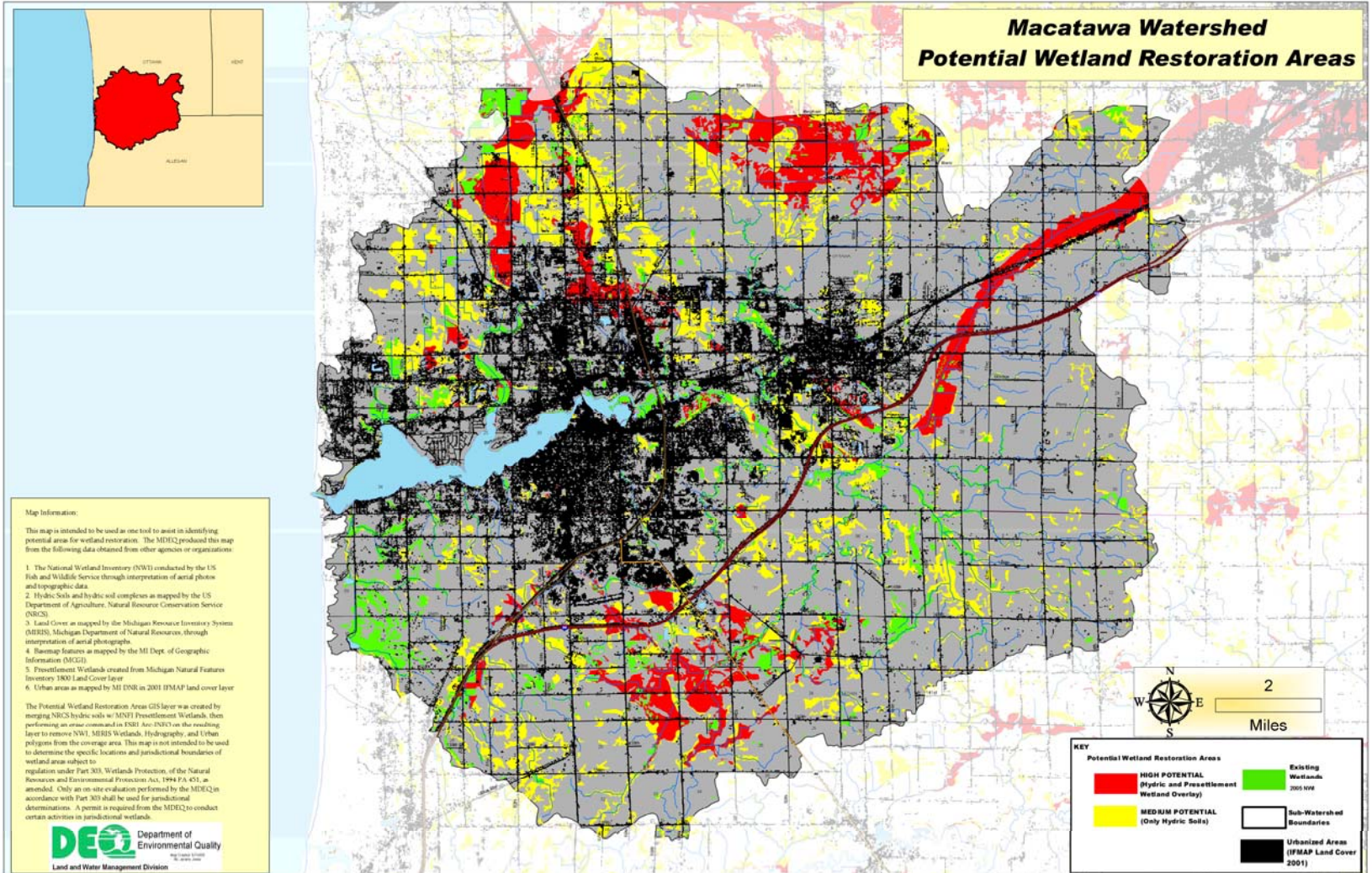
- Wetland boundaries determined from Aerial Imagery
- Last updated in 2005
- Obvious limitations to Aerial Photo Interpretation:
  - Errors of Omission (forested and drier-end wetlands)
  - Errors of Commission (misinterpretation of aerials)

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 on going, 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.

# MACATAWA RIVER WATERSHED



# Macatawa River Watershed

## Wetland Resources Status and Trends

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### Pre-settlement Wetland conditions

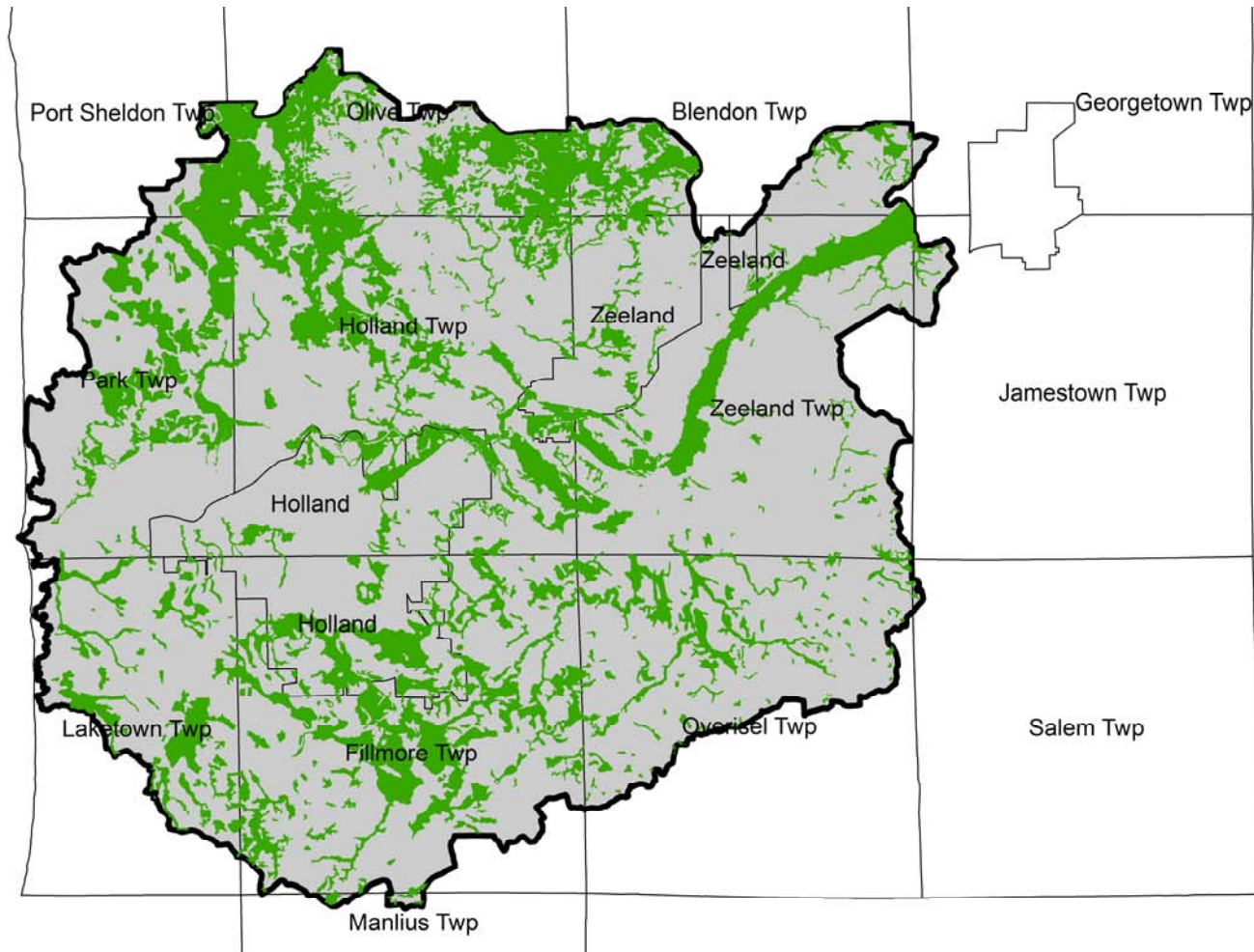
- 38,390 Acres of Wetlands
- 864 Polygons
- Average Size – 44 Acres

### 2005 Wetland Condition

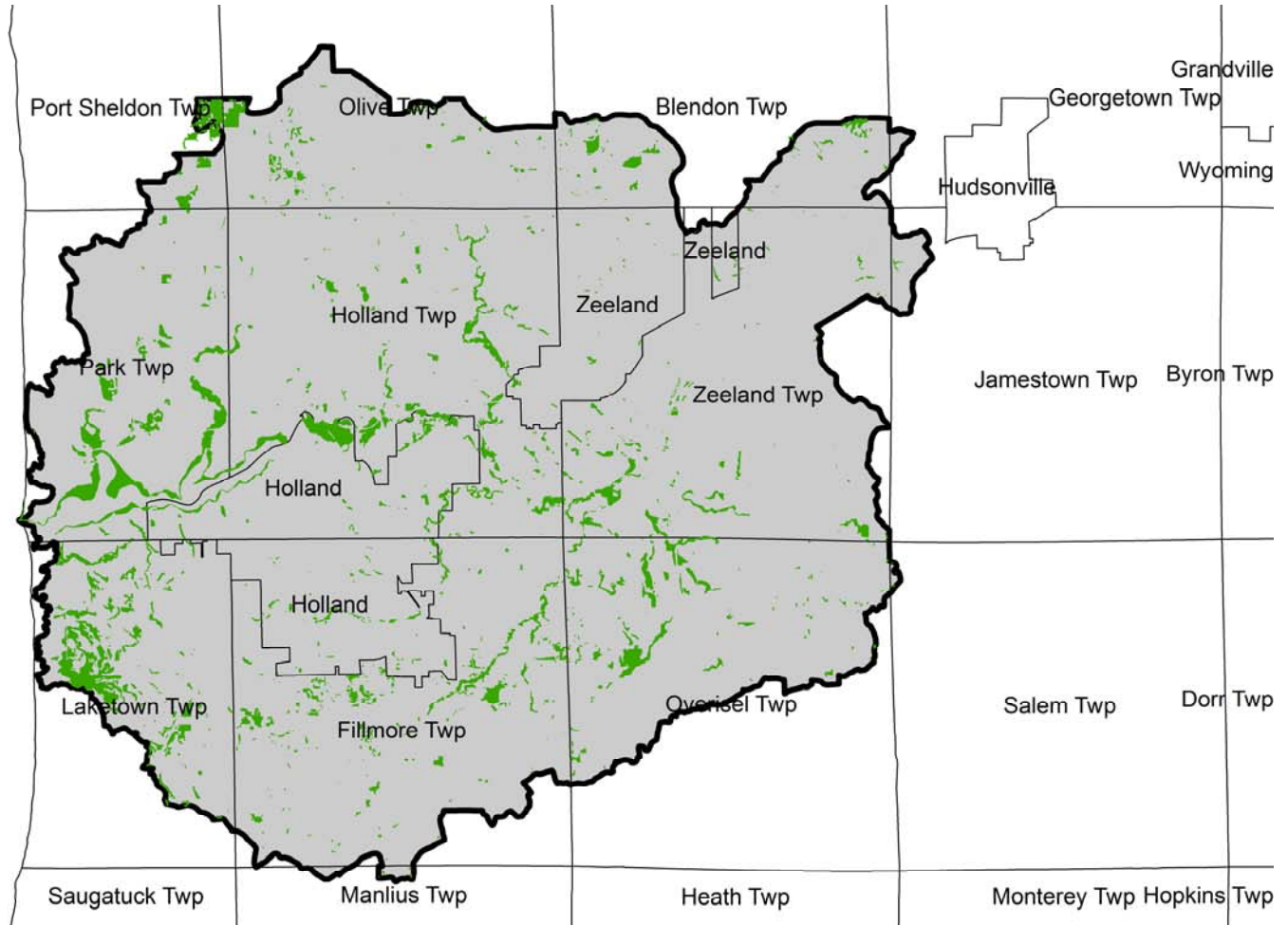
- 5,657 Acres of Wetlands
- 1,264 Polygons
- Average Size – 4.5 Acres

**14% OF ORIGINAL WETLAND ACREAGE REMAINS  
86% LOSS OF TOTAL WETLAND RESOURCE**

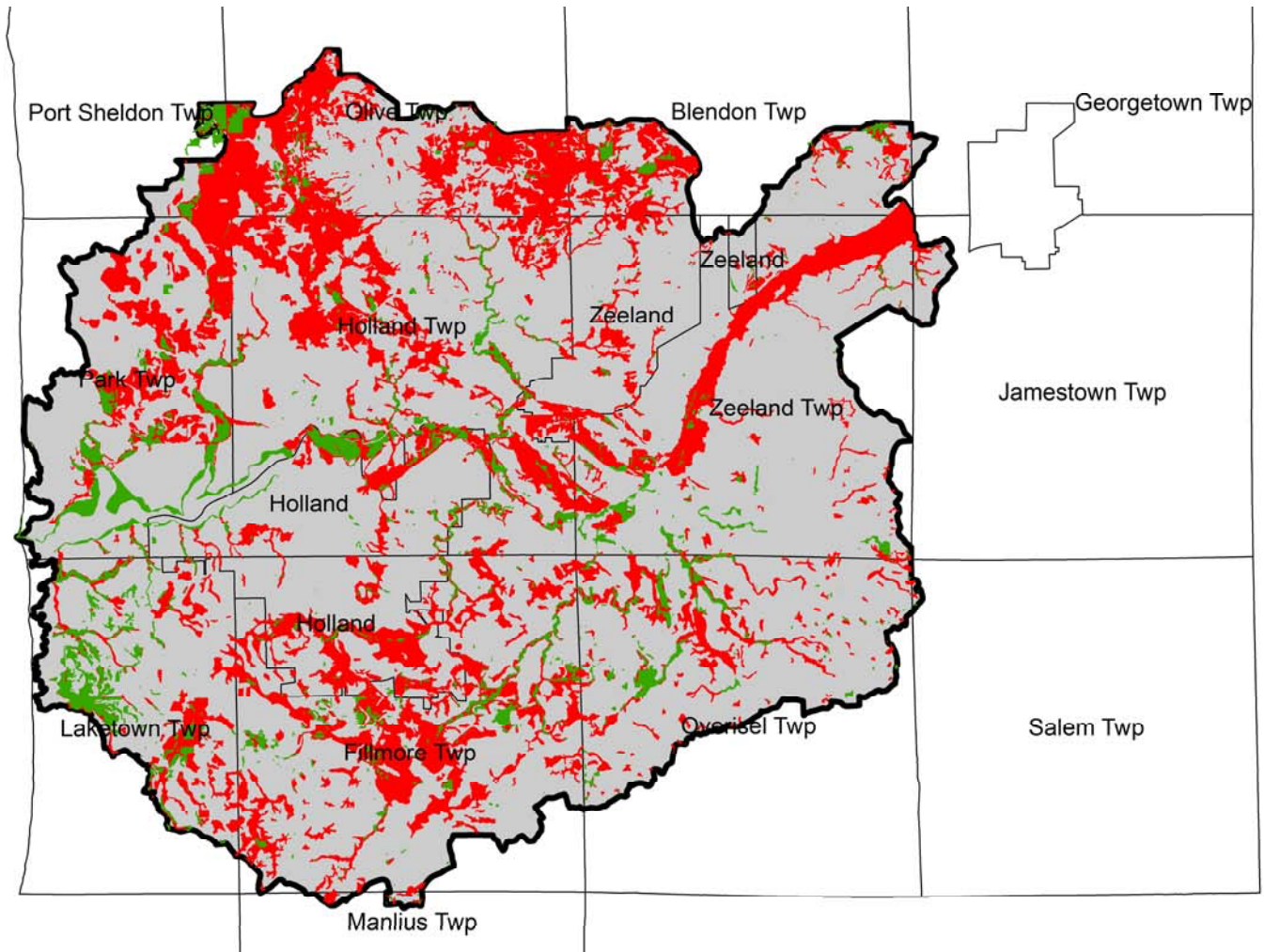
# PRE-EUROPEAN SETTLEMENT WETLAND COVERAGE



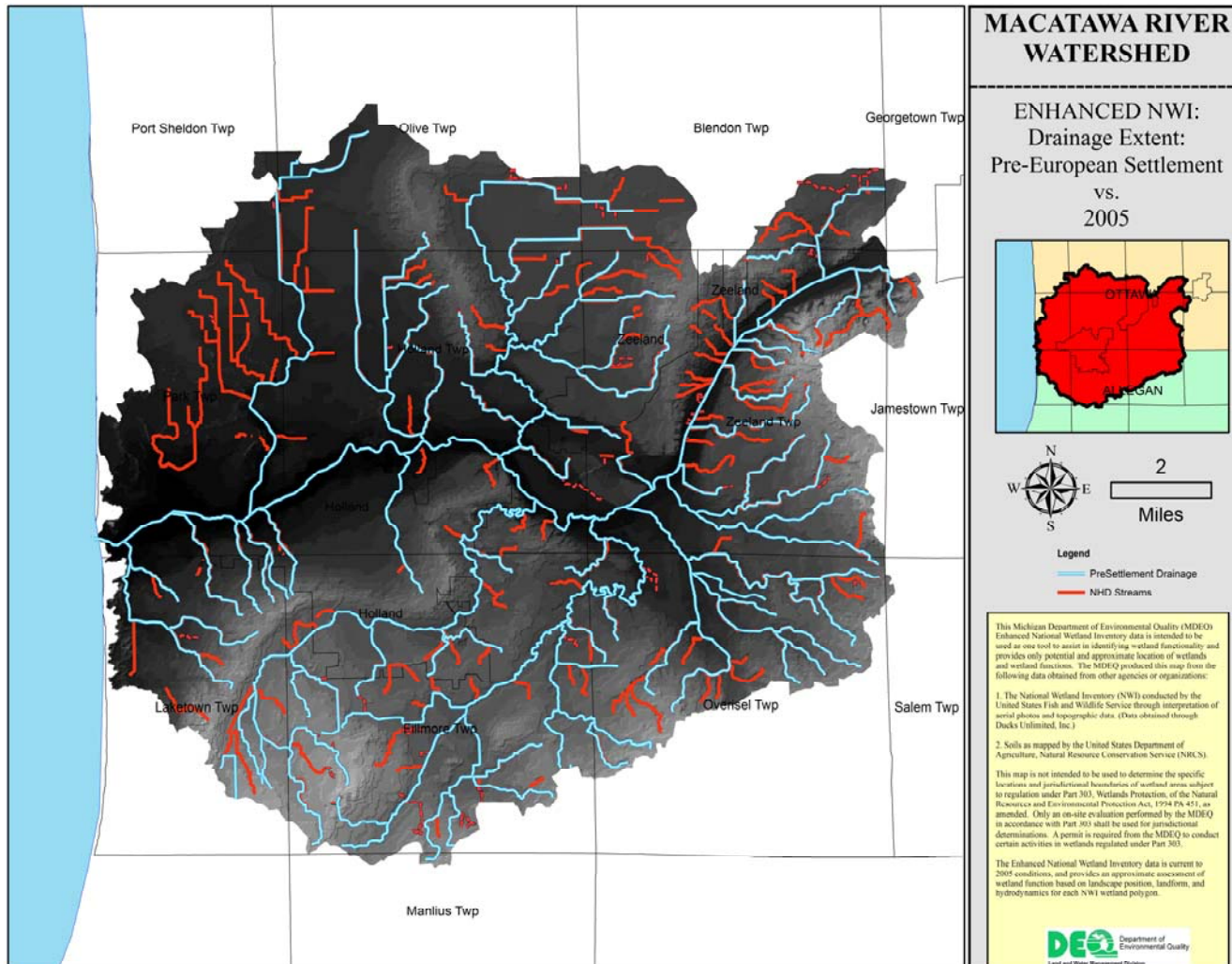
# 2005 WETLAND COVERAGE



# APPROXIMATE WETLAND LOSS PRE-EUROPEAN SETTLEMENT TO 2005



# DRAINAGE EXTENT





# NWI TYPE COMPARISON

**Table 1: Generalized NWI type comparison**

<b>Wetland Type</b>	<b>Pre-European Settlement Acres</b>	<b>2005 Acres of Wetlands</b>	<b>Net Acres Remaining</b>
Palustrine Emergent	292.02	732.30*	250%
Palustrine Forested	27,979.70	3,834.71**	13%
Palustrine Shrub-Scrub	1,873.10***	344.93****	18%
Other Palustrine			
Ponds	7.5*****	1,036.75	1,382%
<b>Total</b>	<b>30,152.32</b>	<b>5,948.69</b>	<b>19%</b>

\*Includes mixed emergent wetland classes and mixed communities where subclasses include Forested and Shrub-Scrub Areas

\*\*Includes mixed forested wetland classes and mixed communities where subclasses include Emergent and Shrub-Scrub Areas

\*\*\* Includes mixed Shrub-Scrub/Emergent communities

\*\*\*\*Includes mixed shrub-scrub wetland classes and mixed communities where subclasses include Emergent, Forested and Shrub-Scrub

\*\*\*\*\* Low acreage in ponds due to mapping differences between Pre-Settlement and Current wetland coverage's.

# NWI CLASSES

**Table 2: 2005 NWI Classes**

<b>NWI Wetland Type</b>	<b>Acreage</b>
Unconsolidated Shore	10.38
Littoral-Emergent	15.81
Littoral-Unconsolidated Bottom / Emergent	143.26
Aquatic Bed	4.59
Emergent	727.71
Broad-Leaved Deciduous Forested	3620.8
Broad-Leaved Evergreen Forested	42.65
Mixed Forested/Emergent (Deciduous)	8.37
Mixed Forested/Scrub Shrub (Deciduous)	162.89
Scrub-Shrub (Deciduous)	241.86
Mixed Scrub-Shrub/Emergent	103.07
Unconsolidated Bottom	1036.75
<i>Total</i>	6118.14
<b>Riverine-Unconsolidated Bottom</b>	25.11
<b>Limnetic-Unconsolidated Bottom</b>	1279.39
<b>Littoral-Unconsolidated Bottom</b>	573.38

# DETAILED FUNCTIONAL COMPARISONS

**Table 3: Detailed Functional Comparisons**

<b>Function</b>	<b>Potential Significance</b>	<b>Pre-European Acreage</b>	<b>2005 Acreage</b>	<b>% Change in Acreage</b>
<b>Flood Water Storage</b>	<b>High</b>	<b>12,051.43</b>	<b>1,542.19</b>	<b>-88</b>
	<b>Moderate</b>	<b>10,380.45</b>	<b>1,002.68</b>	<b>-91</b>
	<b>Total</b>	<b>22,441.88</b>	<b>2,544.88</b>	<b>-89</b>
<b>Streamflow Maintenance</b>	<b>High</b>	<b>19,642.86</b>	<b>2,447.90</b>	<b>-88</b>
	<b>Moderate</b>	<b>3,270.28</b>	<b>2,525.51</b>	<b>-23</b>
	<b>Total</b>	<b>22,913.14</b>	<b>4,973.41</b>	<b>-79</b>
<b>Nutrient Transformation</b>	<b>High</b>	<b>6,243.13</b>	<b>3,448.22</b>	<b>-45</b>
	<b>Moderate</b>	<b>23,901.69</b>	<b>1,465.71</b>	<b>-94</b>
	<b>Total</b>	<b>30,144.83</b>	<b>4,911.94</b>	<b>-84</b>
<b>Sediment and Retention of Other Particulates</b>	<b>High</b>	<b>22,403.20</b>	<b>2,288.79</b>	<b>-90</b>
	<b>Moderate</b>	<b>222.24</b>	<b>2,203.00</b>	<b>99+*</b>
	<b>Total</b>	<b>22,625.44</b>	<b>4,491.79</b>	<b>-81</b>
<b>Shoreline Stabilization</b>	<b>High</b>	<b>12,125.57</b>	<b>3,122.83</b>	<b>-75</b>
	<b>Moderate</b>	<b>9,064.99</b>	<b>981.98</b>	<b>-90</b>
	<b>Total</b>	<b>21,190.56</b>	<b>4,084.80</b>	<b>-81</b>
<b>Ground Water Influence</b>	<b>High</b>	<b>134.21</b>	<b>60.98</b>	<b>-40</b>
	<b>Moderate</b>	<b>28,879.79</b>	<b>6,880.14</b>	<b>-77</b>
	<b>Total</b>	<b>29,014.00</b>	<b>6,961.12</b>	<b>-77</b>

\* Increases in Moderate Sediment and Retention of Other Particulates is attributed to the increase in man made ponds and artificial waterways.

# FUNCTIONAL UNIT COMPARISON

**Table 4: Functional Unit comparison**

<b>Function</b>	<b>Pre-European Functional Units</b>	<b>2005 Functional Units</b>	<b>Predicted % of Original Capacity Left</b>	<b>Predicted % Change in Functional Capacity</b>
Flood Water Storage	34,493.31	4,087.06	12	-88
Streamflow Maintenance	42,556.00	7,421.31	17	-83
Nutrient Transformation	36,387.95	8,358.15	23	-77
Sediment and Other Particulate Retention	45,028.64	6,780.58	15	-85
Shoreline Stabilization	33,316.13	7,207.62	22	-78
Ground Water Influence	29,148.21	7,042.10	24	-76

# LIMITATIONS OF THE WETLAND FUNCTIONS FOR WATERSHED ASSESSMENT

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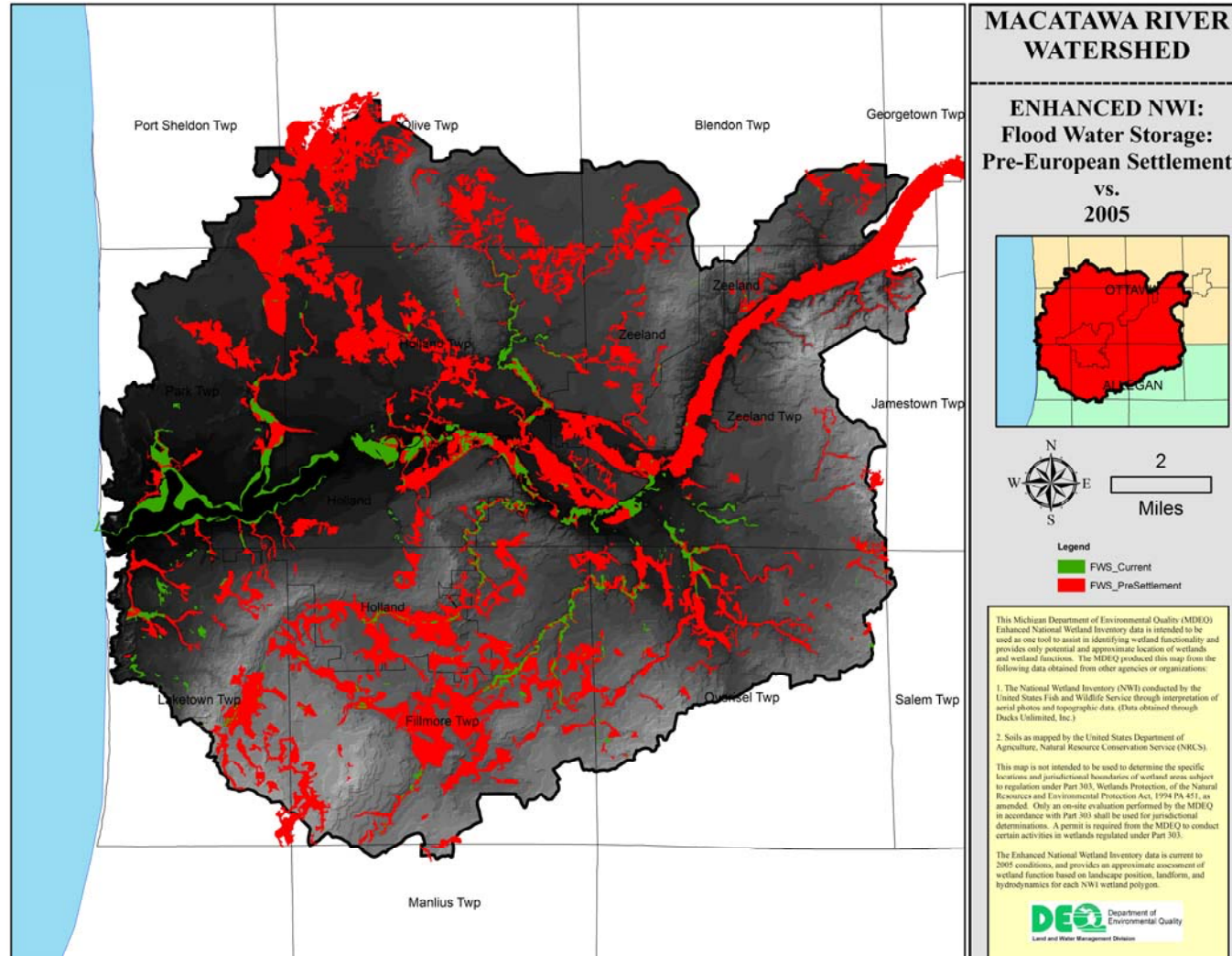
- ❑ Source data are a primary limiting factor.
- ❑ Wetland mapping limitations due to scale, photo quality, and date and time of year of the photos.
- ❑ Difficulty of photo interpreting certain wetland types
  - Forested wetlands
  - Drier-end wetlands
- ❑ Functional assessment is a preliminary one based on:
  - Wetland Characteristics interpreted through remote sensing
  - Professional Judgment of various specialists to develop correlations between those wetlands and their functions.
- ❑ Watershed-based Preliminary Assessment of wetland functions:
  - Applies general knowledge about wetlands and their functions
  - Develops a watershed overview that highlights possible wetlands of significance
  - Does not consider the condition of the adjacent upland
  - Does not obviate the need for more detailed assessment of various functions
- ❑ This analysis is a “Landscape Level” assessment and used to identify wetlands that are likely to perform a given function at a level above that of other wetlands not designated.

# FLOOD WATER STORAGE

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- ❑ 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



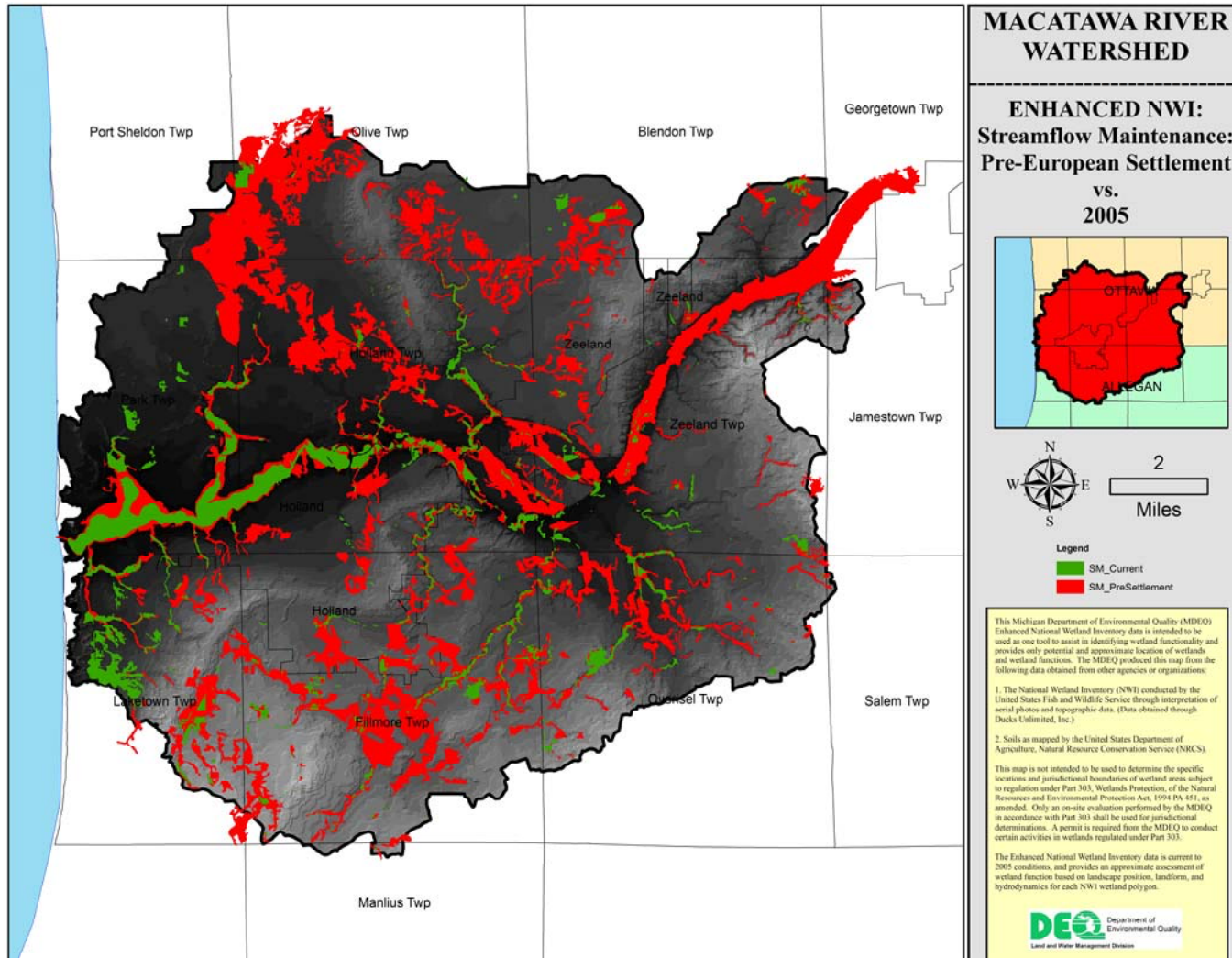
# STREAMFLOW MAINTENANCE

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- ❑ Wetlands that are sources of groundwater discharge that sustain streamflow in the watershed. Such wetlands are critically important for supporting aquatic life in streams. All wetlands classified as headwater wetlands are important for streamflow.
- ❑ 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).



# STREAMFLOW MAINTENANCE

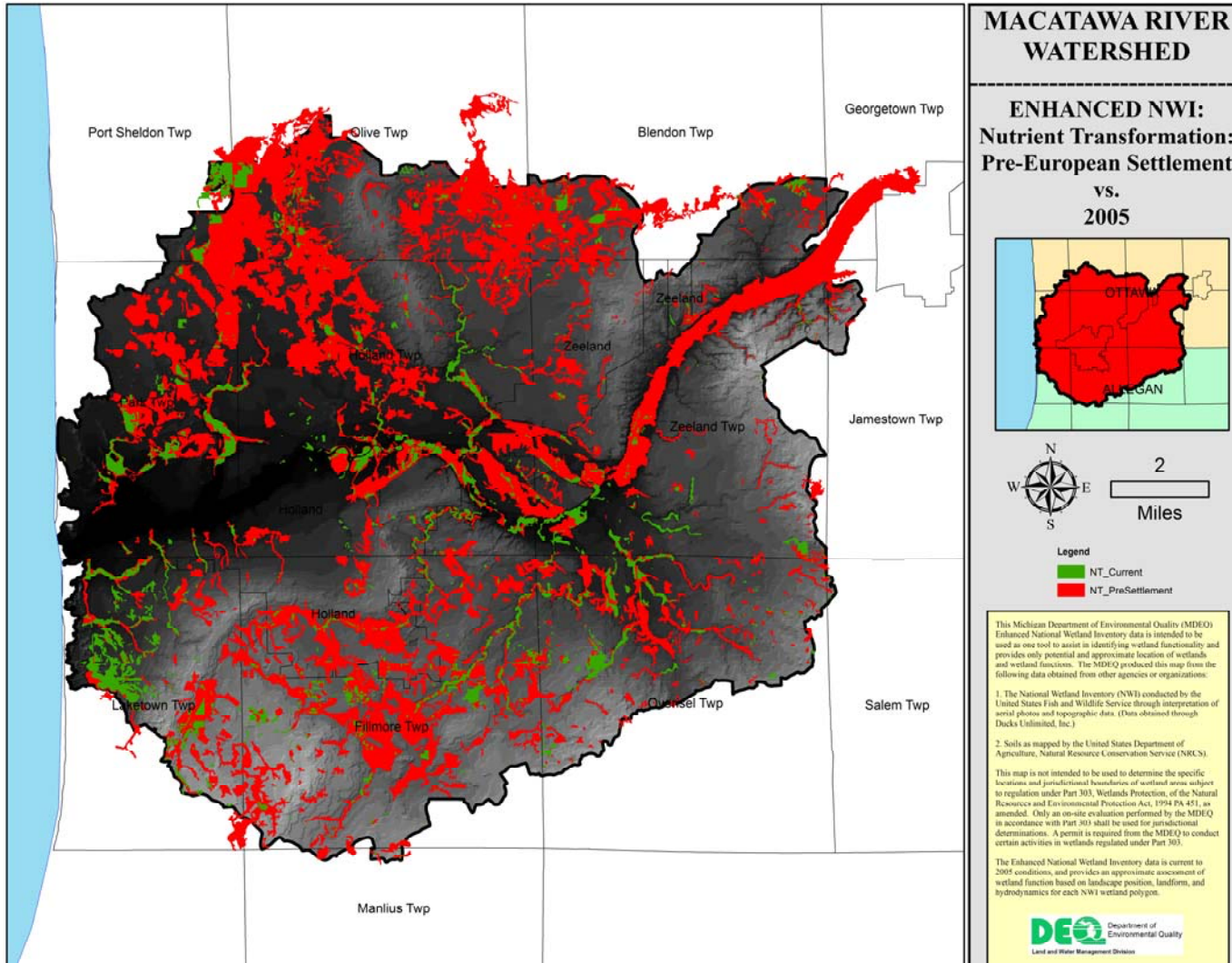


# NUTRIENT TRANSFORMATION

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- ❑ 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

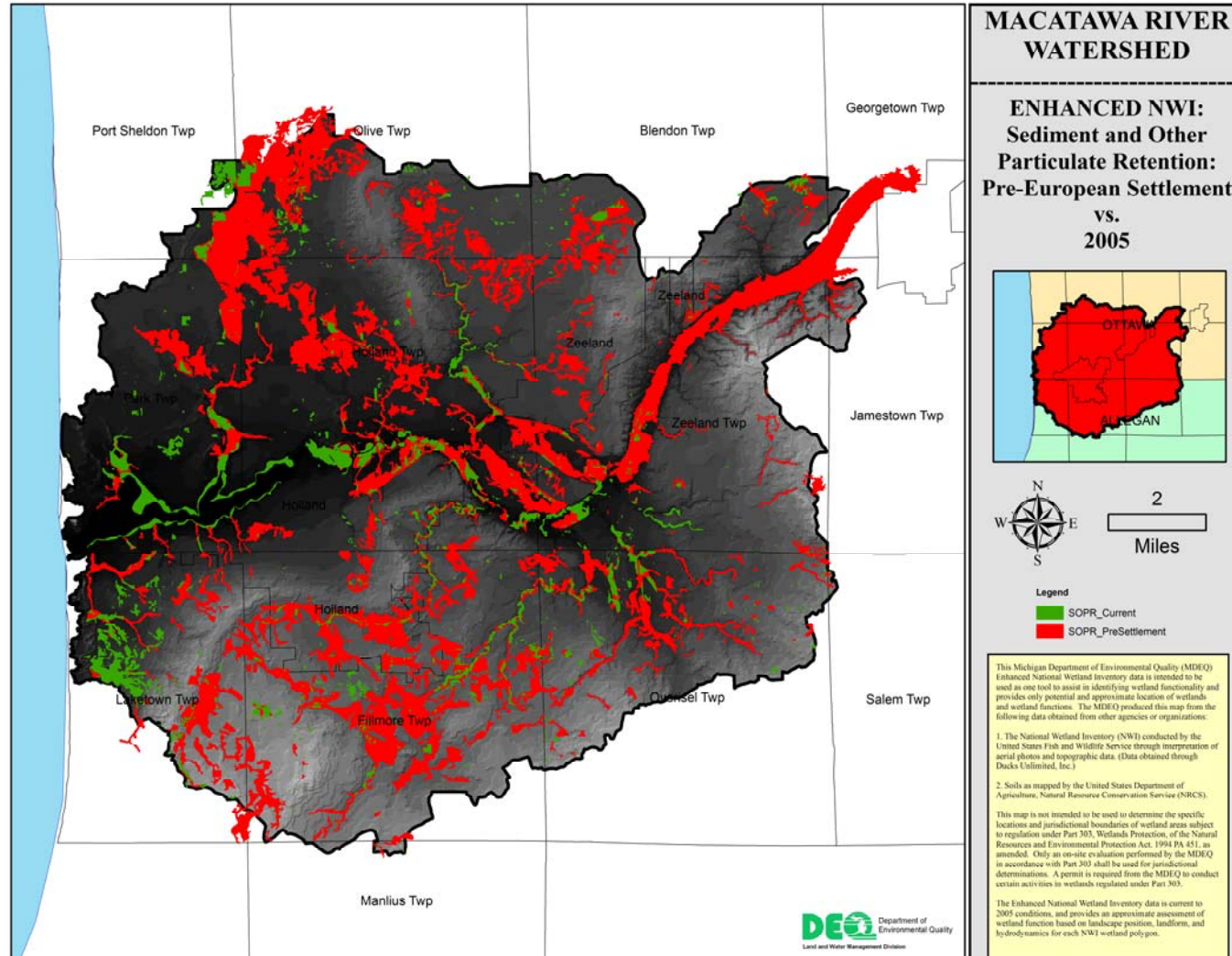


# SEDIMENT AND OTHER PARTICULATE RETENTION

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- ❑ 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

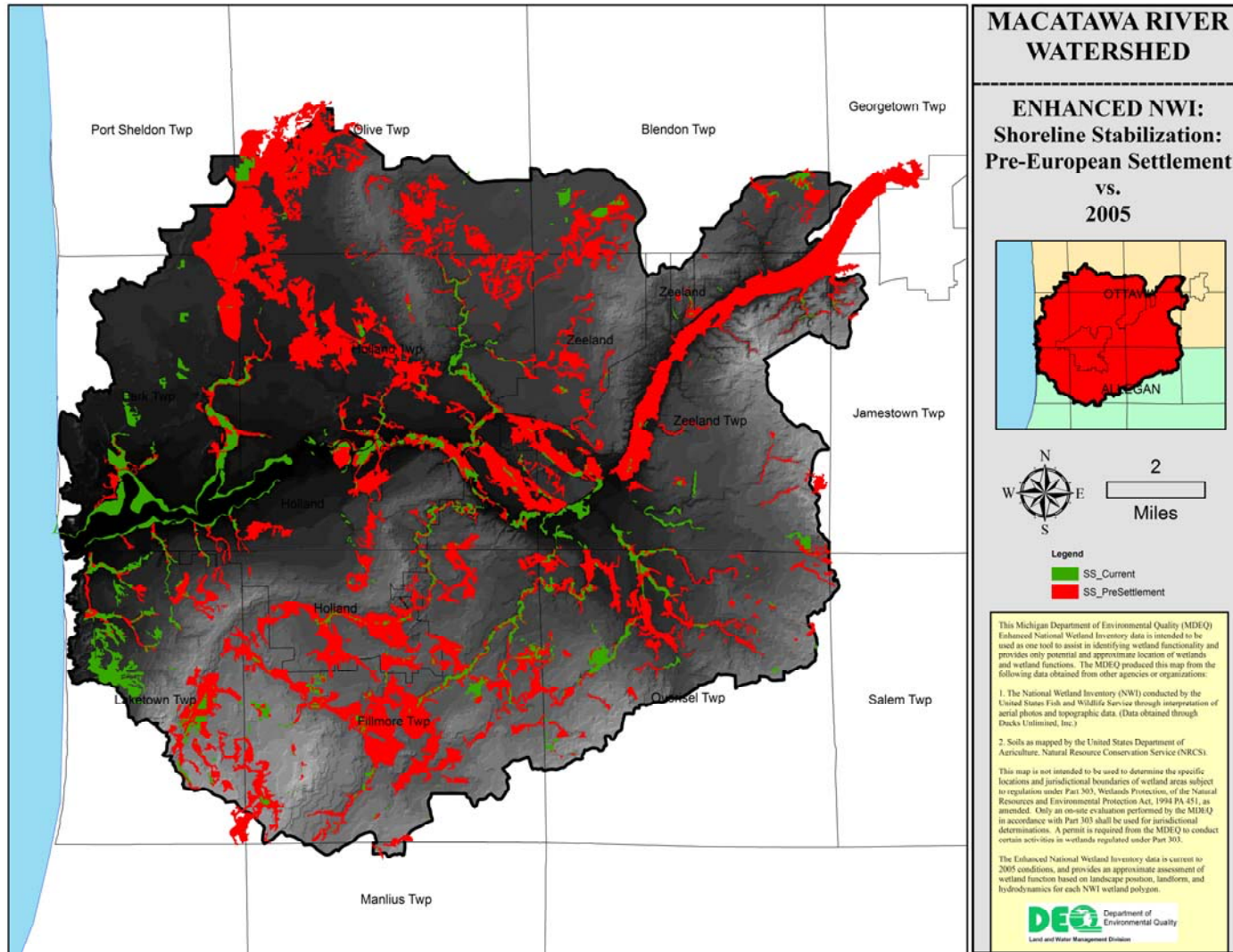


# SHORELINE STABILIZATION

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- ❑ Vegetated wetland along all waterbodies (e.g. estuaries, lakes, rivers, and streams) provide this function. Vegetation stabilizes the soil or substrate and diminished wave action, thereby reducing shoreline erosion potential.
- ❑ 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).

# SHORELINE STABILIZATION



# GROUND WATER INFLUENCE

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- ❑ Wetlands categorized as High or Moderate for Groundwater Influence are areas that receive some or all of their hydrologic input from groundwater reflected at the surface. The DARCY (definition of acronym) model was the data source utilized to determine this wetland/groundwater connection, which is based upon soil transmissivity and topography. Wetlands rated for this function are important for maintaining streamflows and temperature control in waterbodies.
- ❑ 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).



# GROUND WATER INFLUENCE

