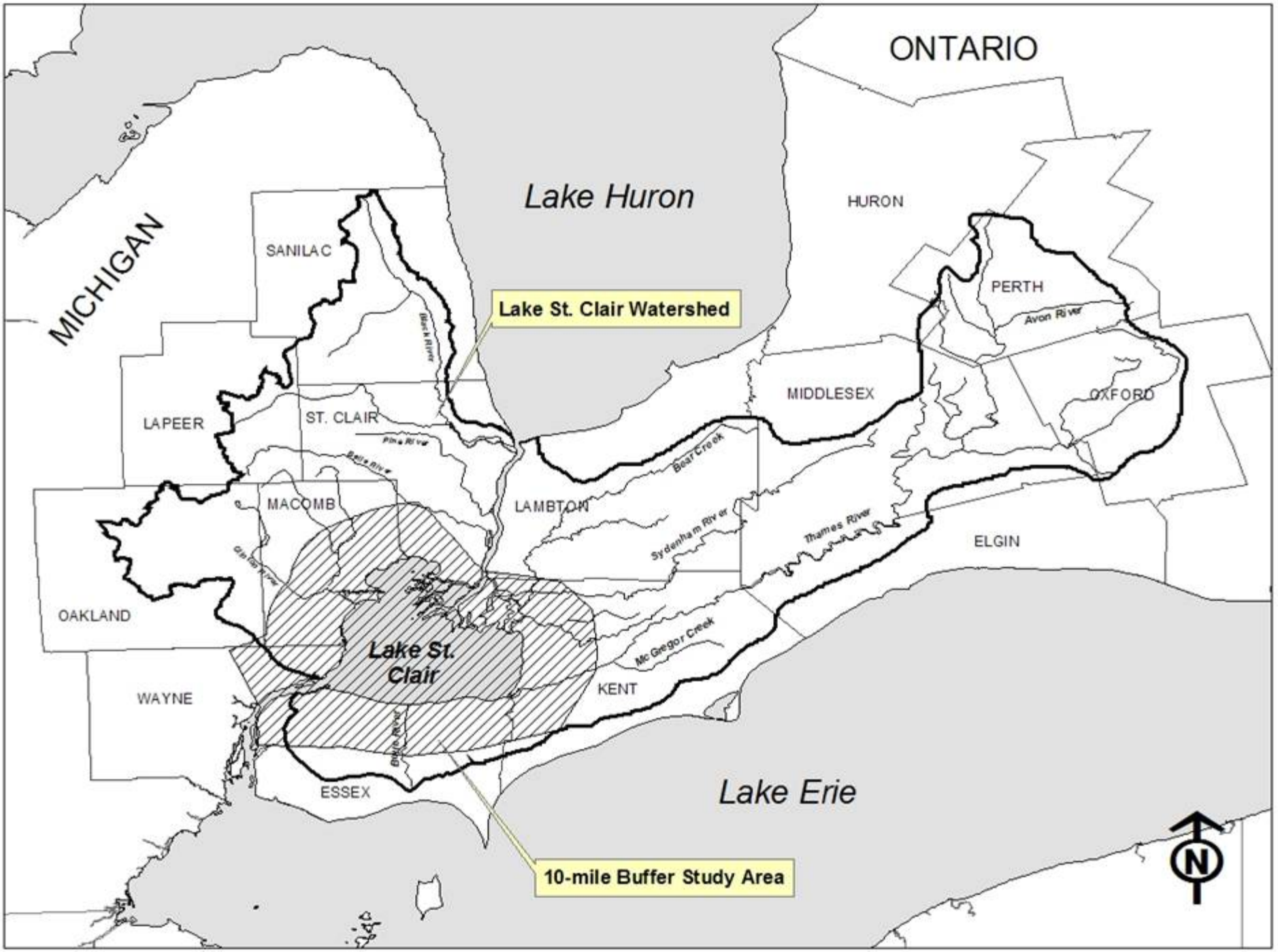
Lake St. Clair Coastal Habitat Conservation and Restoration

- Great Lakes Commission
- NOAA Coastal Services Center
- Michigan Natural Features Inventory
- Walpole Island First Nation
- Project Management Team


ONTARIO
Lake Huron
MICHIGAN
SANILAC
HURON
PERTH
Avon River
Lake St. Clair Watershed
Black River
MIDDLESEX
OXFORD
LAPEER
ST. CLAIR
Pine River
Bell's River
Bear Creek
MACOMB
LAMBTON
Sydenham River
Thames River
ELGIN
Clinton River
OAKLAND
Lake St. Clair
McGregor Creek
KENT
WAYNE
Belle River
ESSEX
Lake Erie
10-mile Buffer Study Area
N

Coastal Habitat Project

Project Goals & Objectives

- Enhance regional cooperation on and increase profile of Lake St. Clair coastal habitat
- Consolidate and analyze ecological & socioeconomic data
- Develop products:
  - Integrated Coastal Management Tool
  - Coastal Habitat Assessment
  - Web Site (GIS data & text)

Coastal Habitat Assessment

- Describe the resource
  - Socio-economic characterization
  - Physical characterization
- Stresses on or threats to the resource
- Programs & projects to mitigate/eliminate stressors
- Innovative tools
- Conservation and Restoration Guidelines

LSC Coastal Habitat Assessment

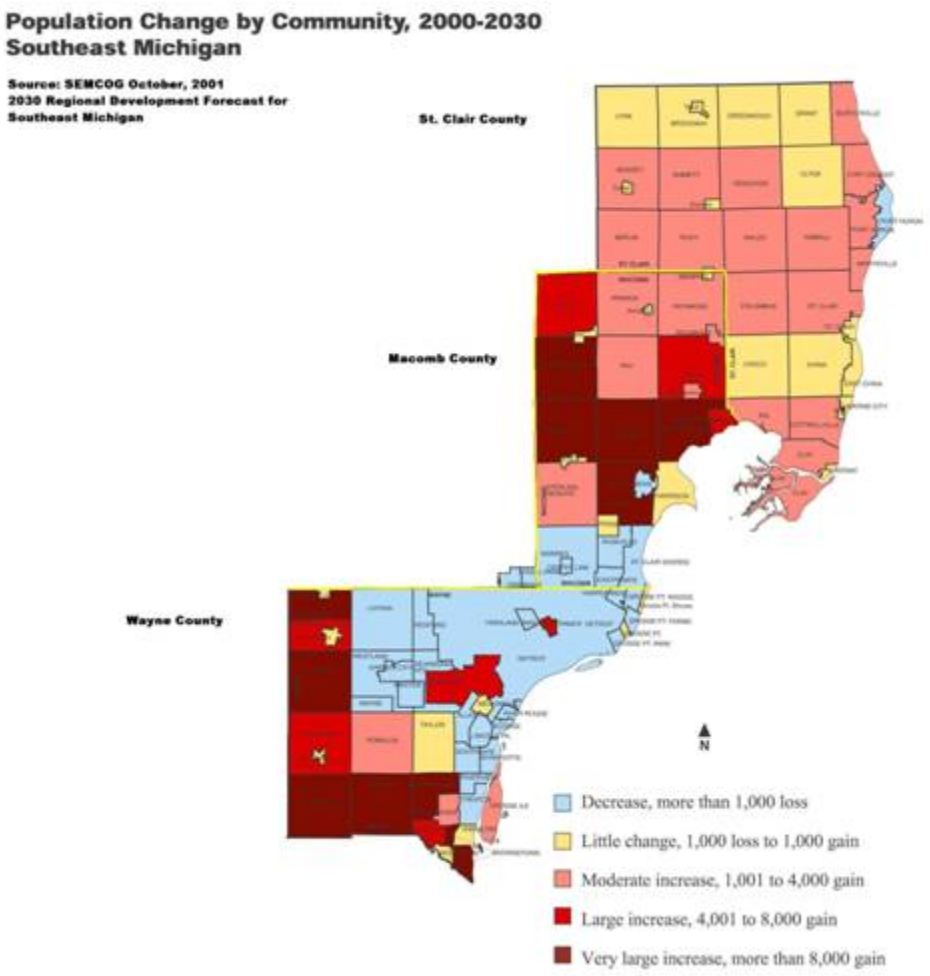
Responds to the Lake St. Clair Management Plan recommendation for "*a habitat strategy to protect, restore and maintain natural physical and biological diversity and identify priority habitat areas for restoration and conservation*."

Socioeconomic Characterization

- Jurisdictions
- Population Growth and Migration
- Economic Profile
- Land Use
  - Planning framework
  - Land Use Trends

- two federal governments
- Walpole Island First Nation
- Province of Ontario
- State of Michigan
- 6 counties
- 14 watersheds,
- hundreds of cities, villages, and unincorporated areas.

Socio-Economic Characterization:
U.S. Population Growth & Migration

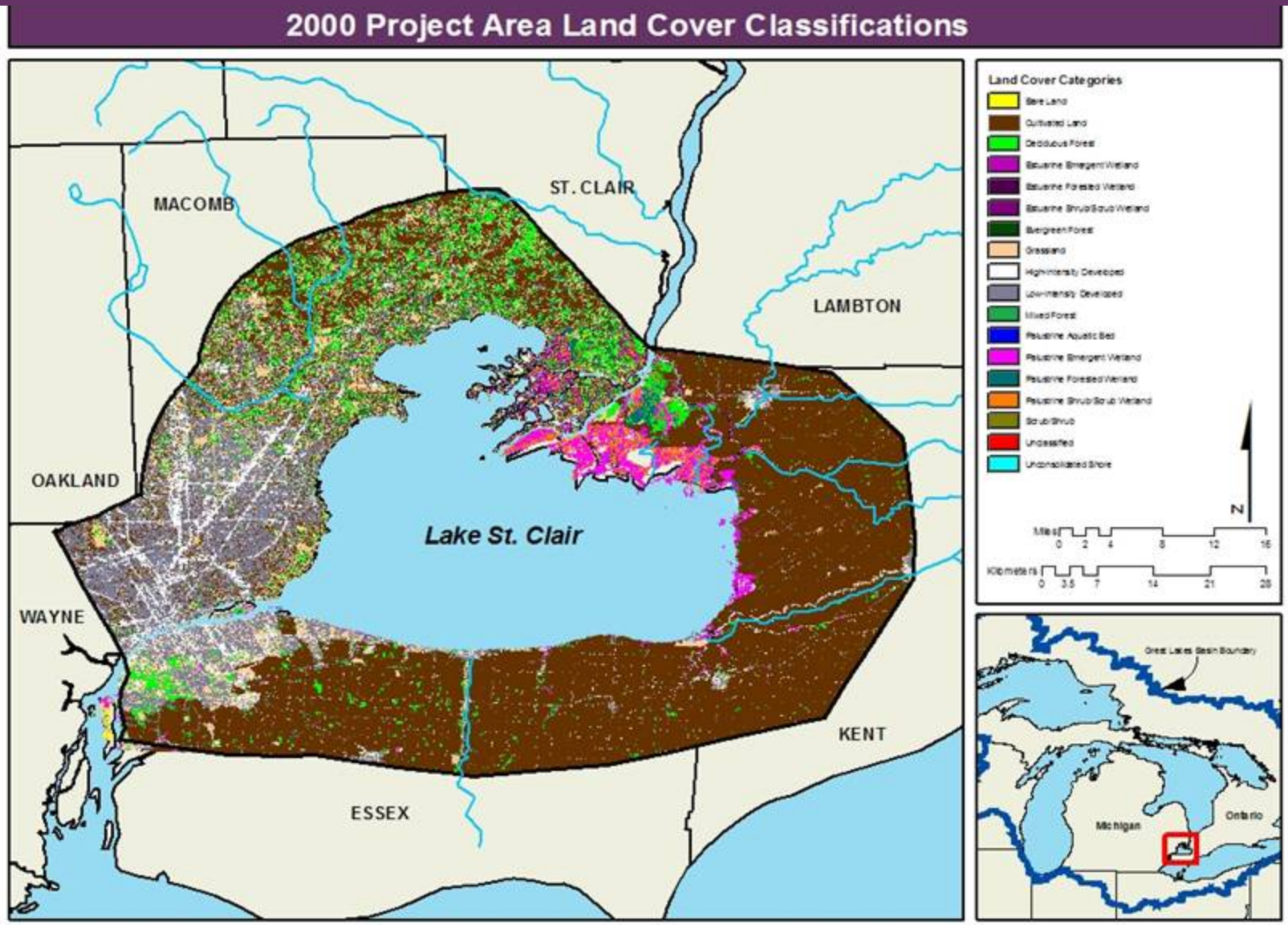


- 1990-2000
  - housing increases outpaced the population growth by two to one
  - smaller households
  - more houses occupy more land
  - trends similar to outside project area

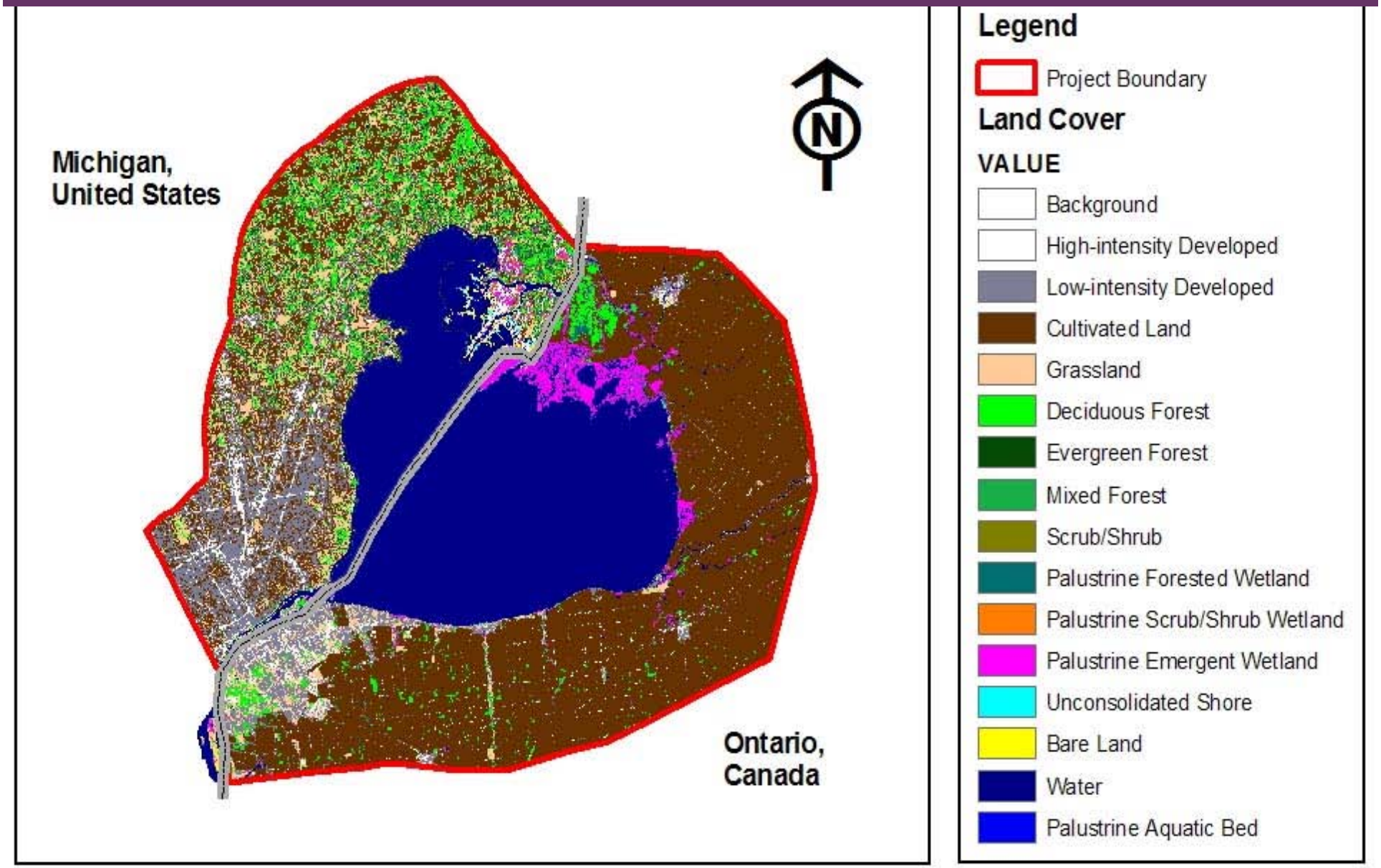
Socio-economic Characterization: Land Cover/Land Use Trends

- Michigan1990-2000: conversion of agricultural land to development = 88 percent of new development
- Ontario: lands converted to ag in 1800s largely intact
- C-CAP provided *land cover* data for the project area
- No *land use* data for entire project area.

Land Cover


2000 Project Area Land Cover Classifications
MACOMB
ST. CLAIR
LAMBTON
OAKLAND
Lake St. Clair
WAYNE
KENT
ESSEX
Land Cover Categories
Bare Land
Cultivated Land
Deciduous Forest
Estuarine Emergent Wetland
Estuarine Forested Wetland
Estuarine Shrub/Scrub Wetland
Evergreen Forest
Grassland
High Intensity Developed
Low Intensity Developed
Mixed Forest
Palustrine Aquatic Bed
Palustrine Emergent Wetland
Palustrine Forested Wetland
Palustrine Shrub/Scrub Wetland
Scrub/Shrub
Unclassified
Unconsolidated Shore
N
Miles
0 2 4 8 12 16
Kilometers
0 3.5 7 14 21 28
Great Lakes Basin Boundary
Michigan
Ontario

Land Cover

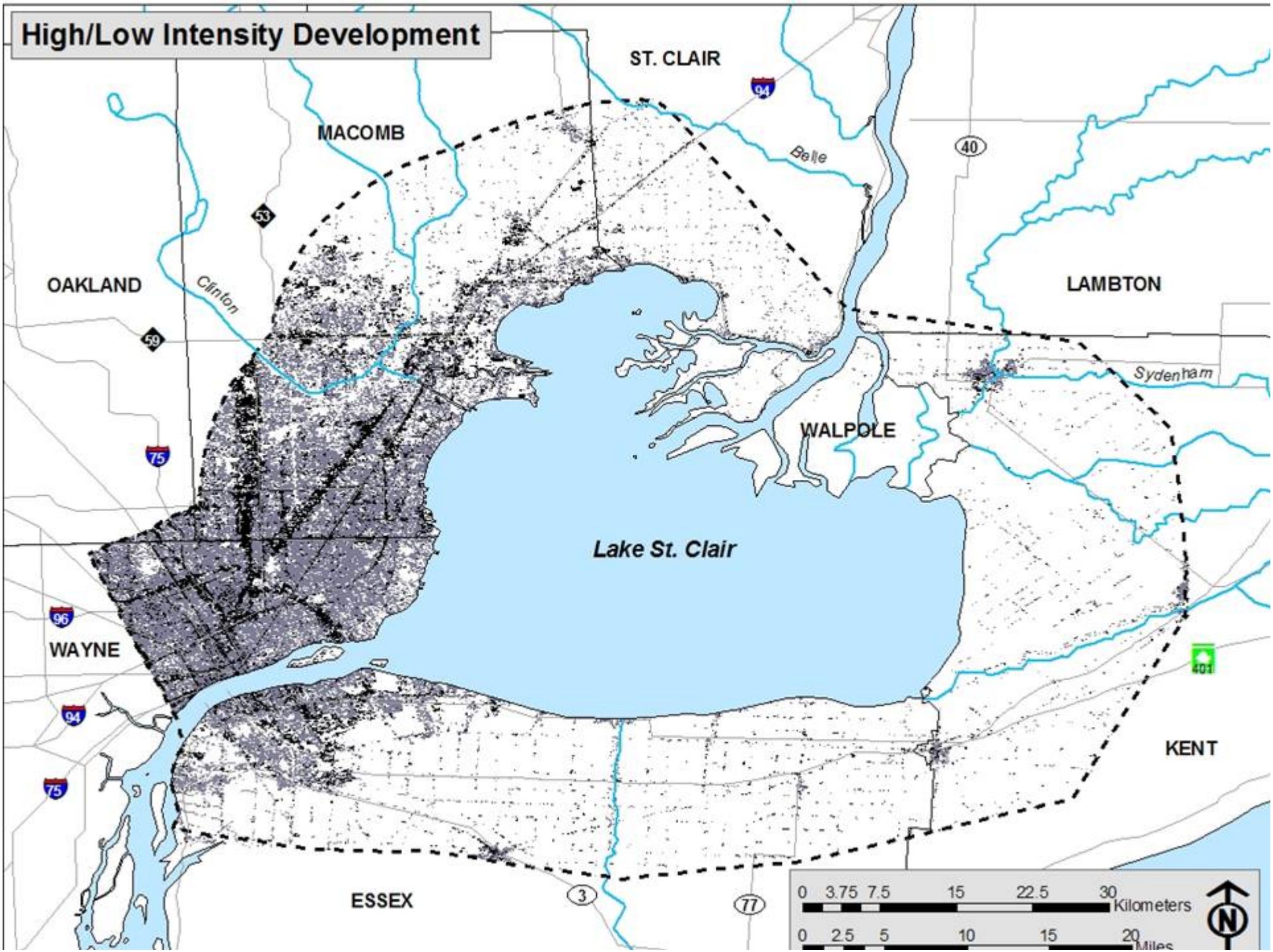

Michigan,
United States
N
Ontario,
Canada
Legend
Project Boundary
Land Cover
VALUE
Background
High-intensity Developed
Low-intensity Developed
Cultivated Land
Grassland
Deciduous Forest
Evergreen Forest
Mixed Forest
Scrub/Shrub
Palustrine Forested Wetland
Palustrine Scrub/Shrub Wetland
Palustrine Emergent Wetland
Unconsolidated Shore
Bare Land
Water
Palustrine Aquatic Bed

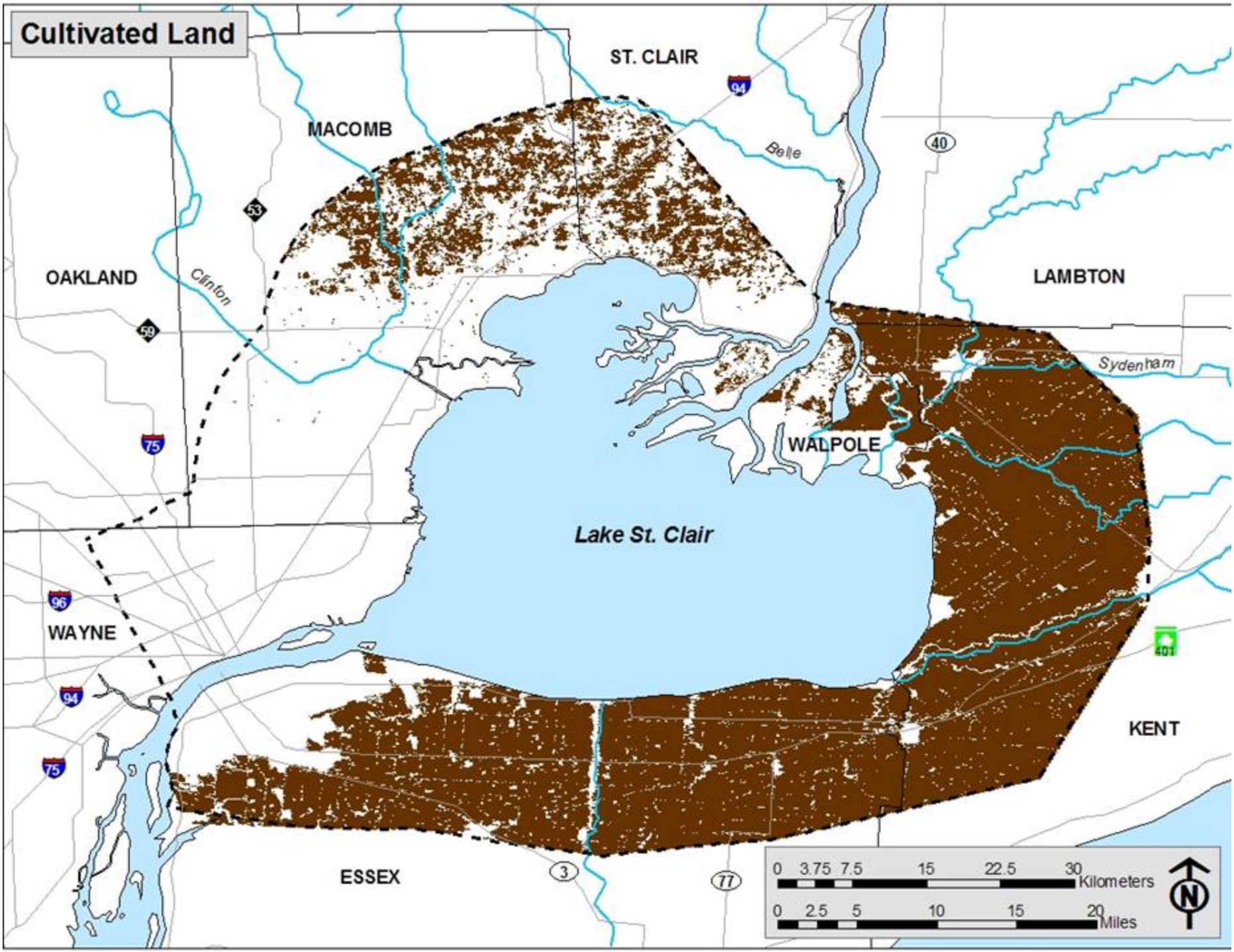
Ecological Assessment

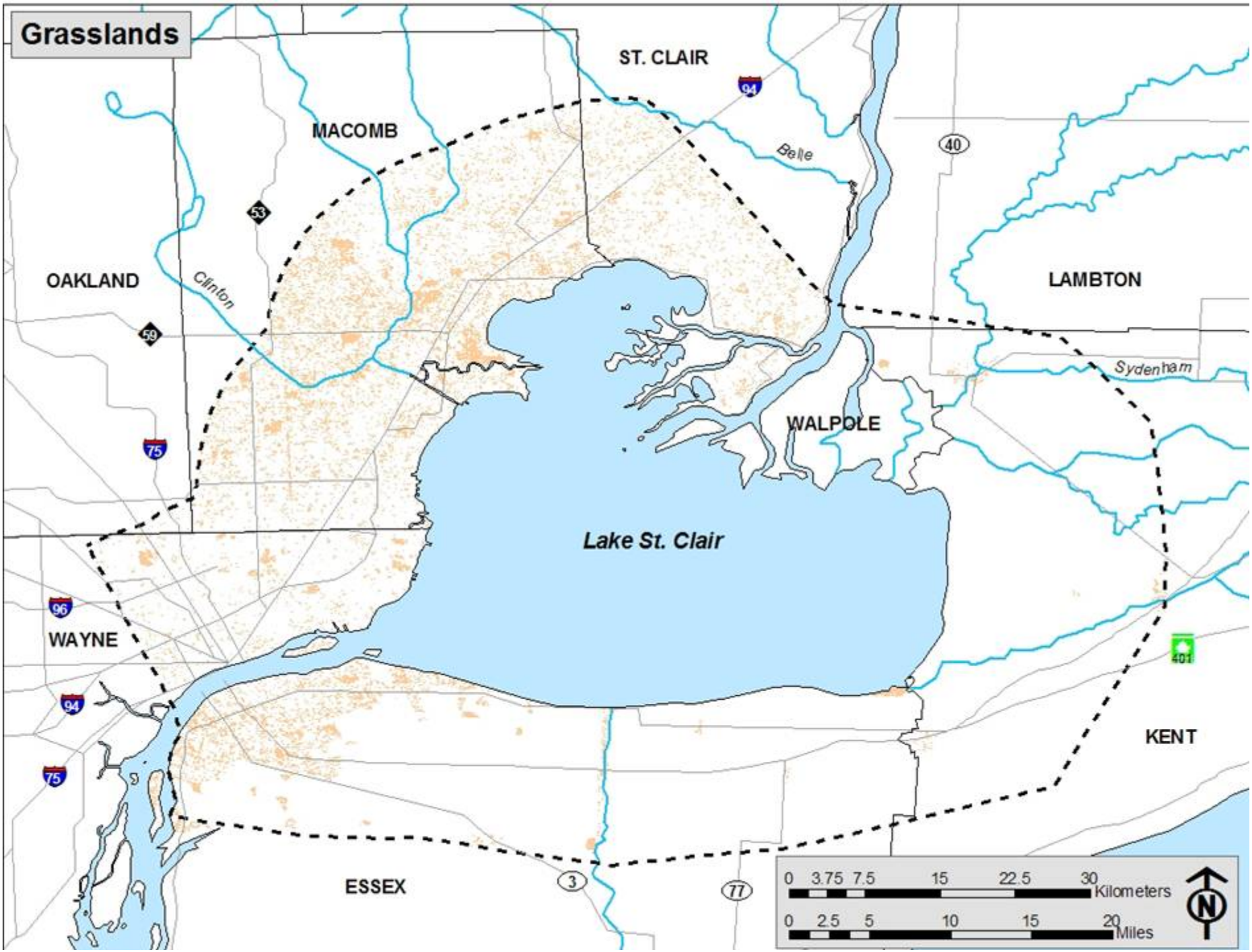
- Overview of the natural communities that were present historically within the project area
- Detailed descriptions of those habitats that remain today.
- Several globally imperiled natural communities: lakeplain prairie, lakeplain oak opening or savanna, and Great Lakes marsh, as well as a number of protected species.

Ecological Characterization: Upland Habitat Types

- Developed land (high and low intensity)
- Grassland
- Deciduous forest
- Evergreen Forest

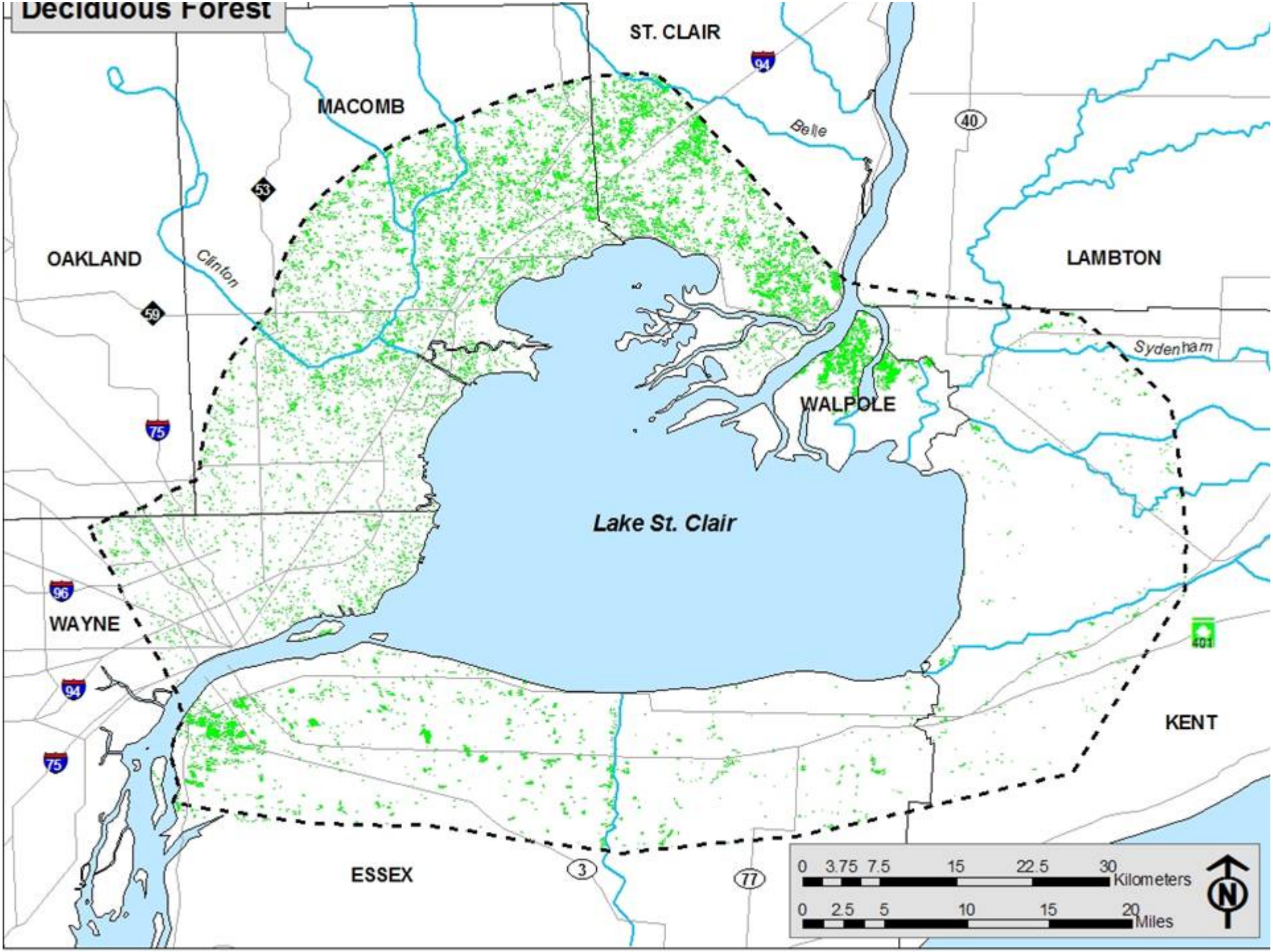

High/Low Intensity Development
ST. CLAIR
MACOMB
OAKLAND
WAYNE
LAMBTON
WALPOLE
KENT
ESSEX
Lake St. Clair
Belle
Clinton
Sydenham
0 3.75 7.5 15 22.5 30 Kilometers
0 2.5 5 10 15 20 Miles
N


Cultivated Land
ST. CLAIR
MACOMB
OAKLAND
LAMBTON
WALPOLE
Lake St. Clair
WAYNE
ESSEX
KENT
Belle
Clinton
Sydenham
0 3.75 7.5 15 22.5 30 Kilometers
0 2.5 5 10 15 20 Miles
N


Grasslands
ST. CLAIR
MACOMB
OAKLAND
Clinton
Belle
LAMBTON
Sydenham
WALPOLE
Lake St. Clair
WAYNE
KENT
ESSEX
0 3.75 7.5 15 22.5 30 Kilometers
0 2.5 5 10 15 20 Miles
N

Lakeplain Prairie

- lakeplain mesic sand prairie (grassland)
- lakeplain wet prairie (wetland)
- lakeplain wet-mesic prairie (wetland)


Deciduous Forest
ST. CLAIR
MACOMB
OAKLAND
Clinton
Belle
LAMBTON
Sydenham
WALPOLE
Lake St. Clair
WAYNE
KENT
ESSEX
94
40
53
59
75
96
401
3
77
0 3.75 7.5 15 22.5 30 Kilometers
0 2.5 5 10 15 20 Miles
N

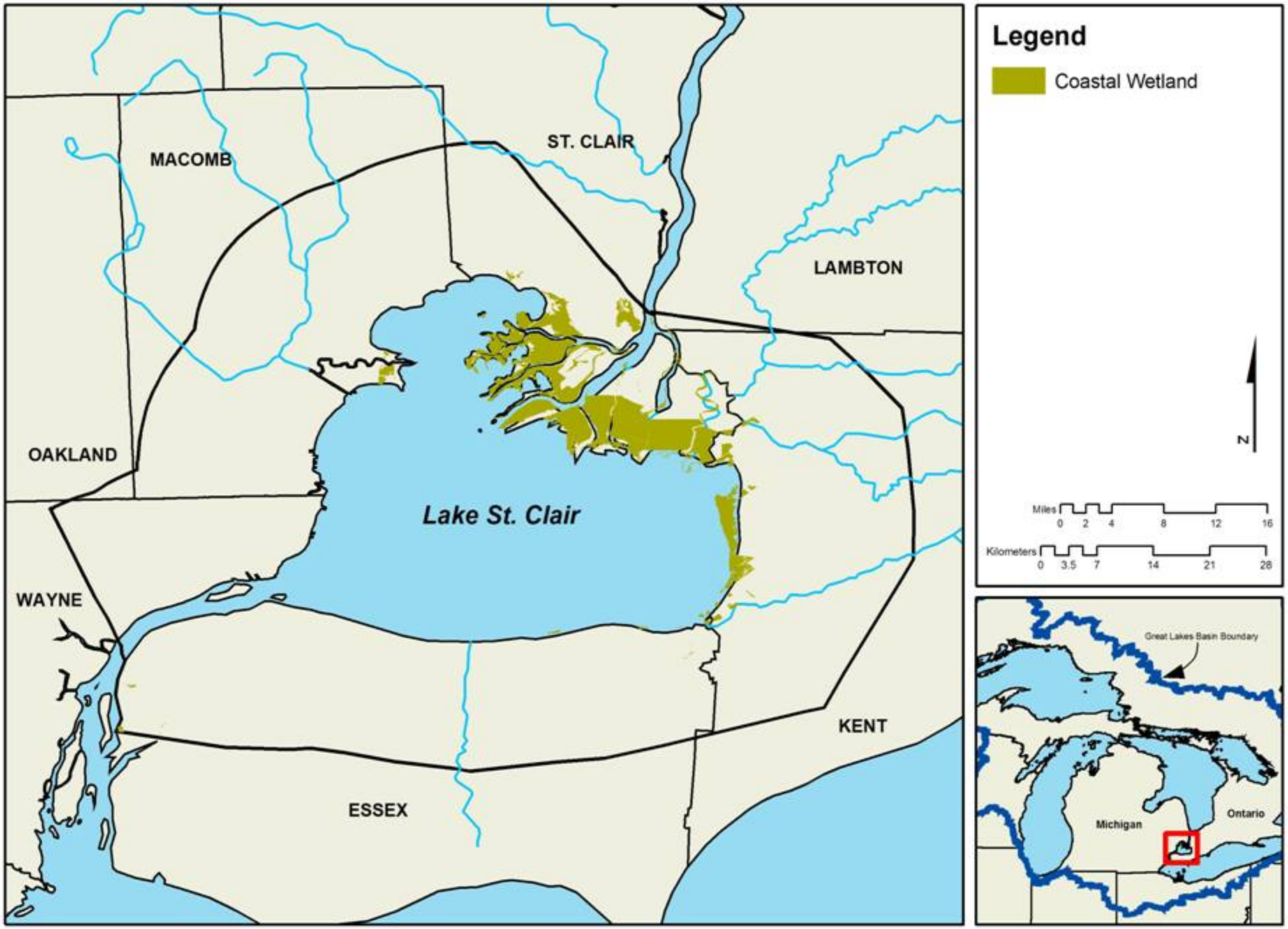
Forest Types

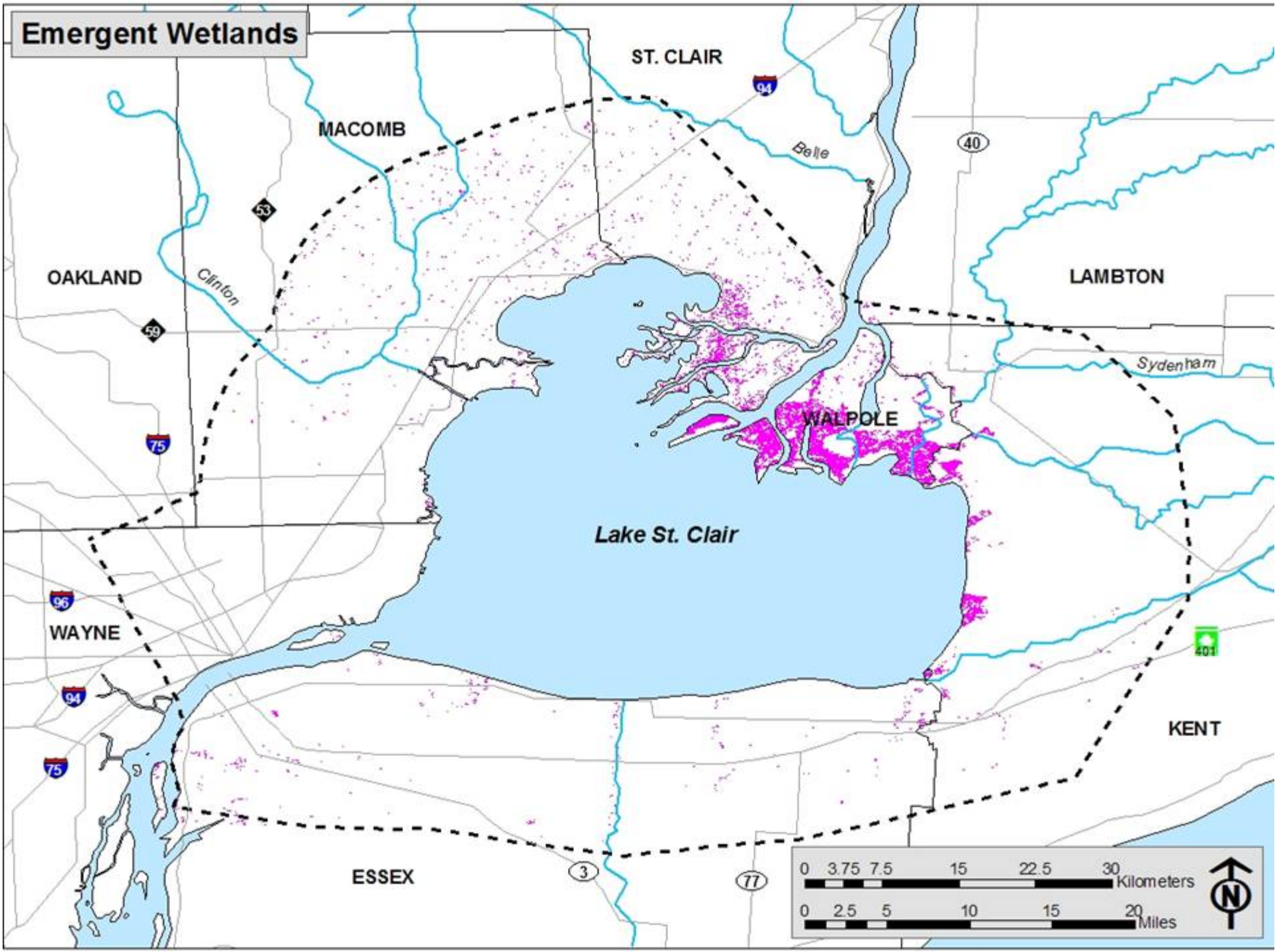
- Dry mesic southern forest
- Mesic southern forest
  - On the lakeplain differs from forest found elsewhere in the state.
- Lakeplain Oak Opening/Oak Savannah
  - dominated by widely spaced oaks, with a ground layer that contains both forest and lakeplain prairie species
  - Gobally imperiled

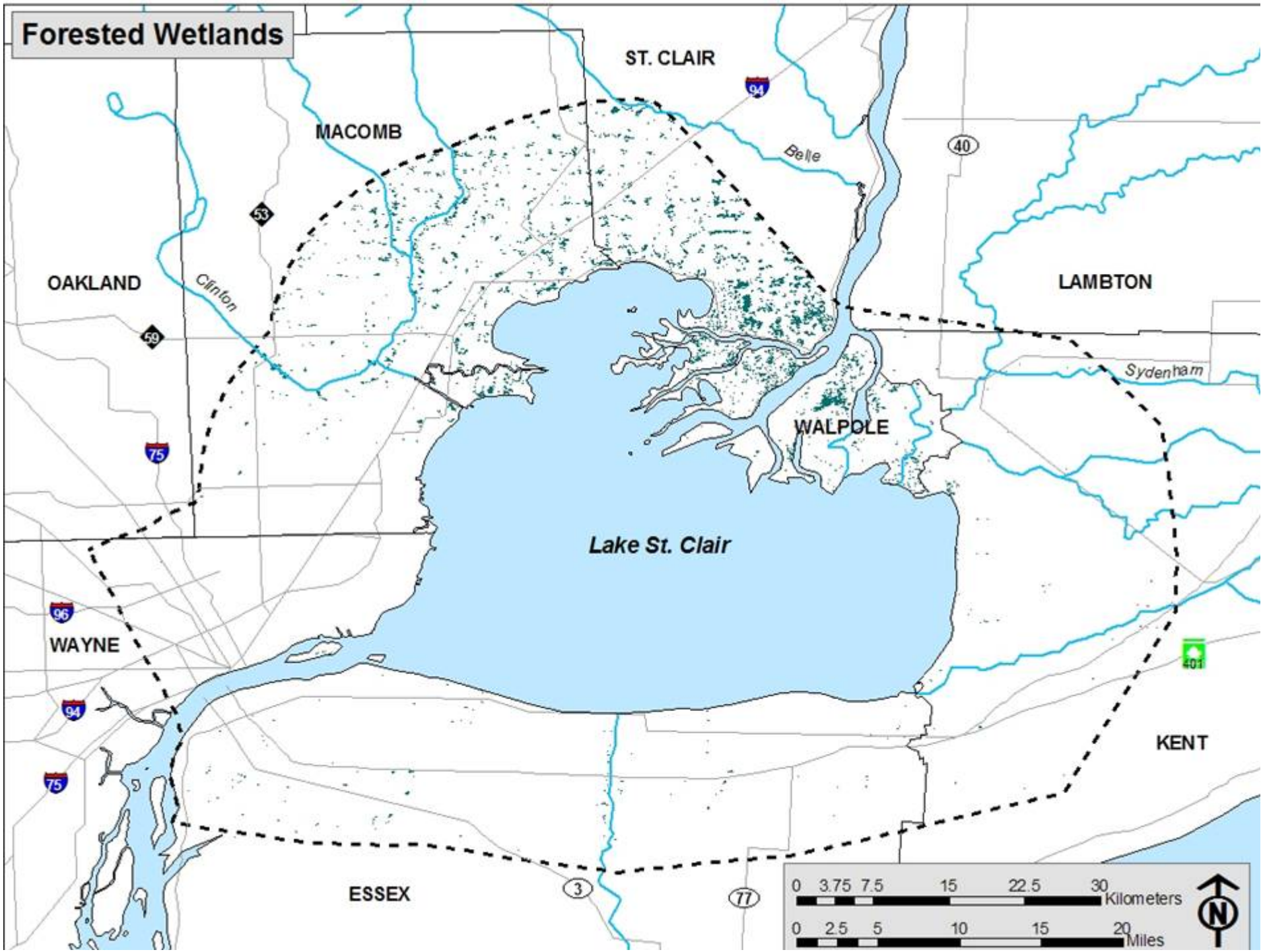
Ecological Characterization:
Wetland and Deepwater Habitats

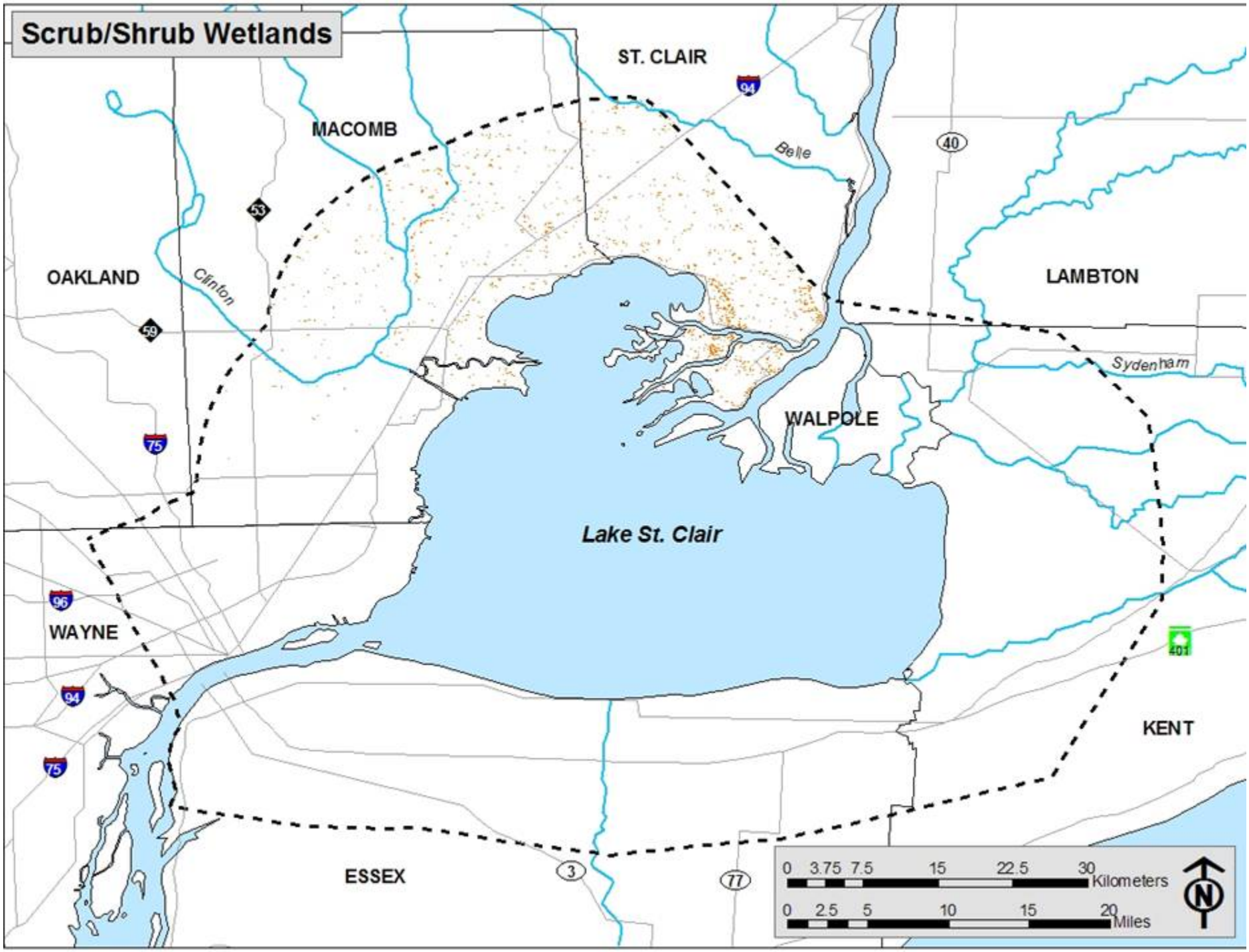
- Unconsolidated shore
- Palustrine emergent wetland
- Palustrine forested wetland
- Palustrine scrub/shrub wetland
- Open Water
- Palustrine Aquatic Beds

Great Lakes Coastal Wetlands

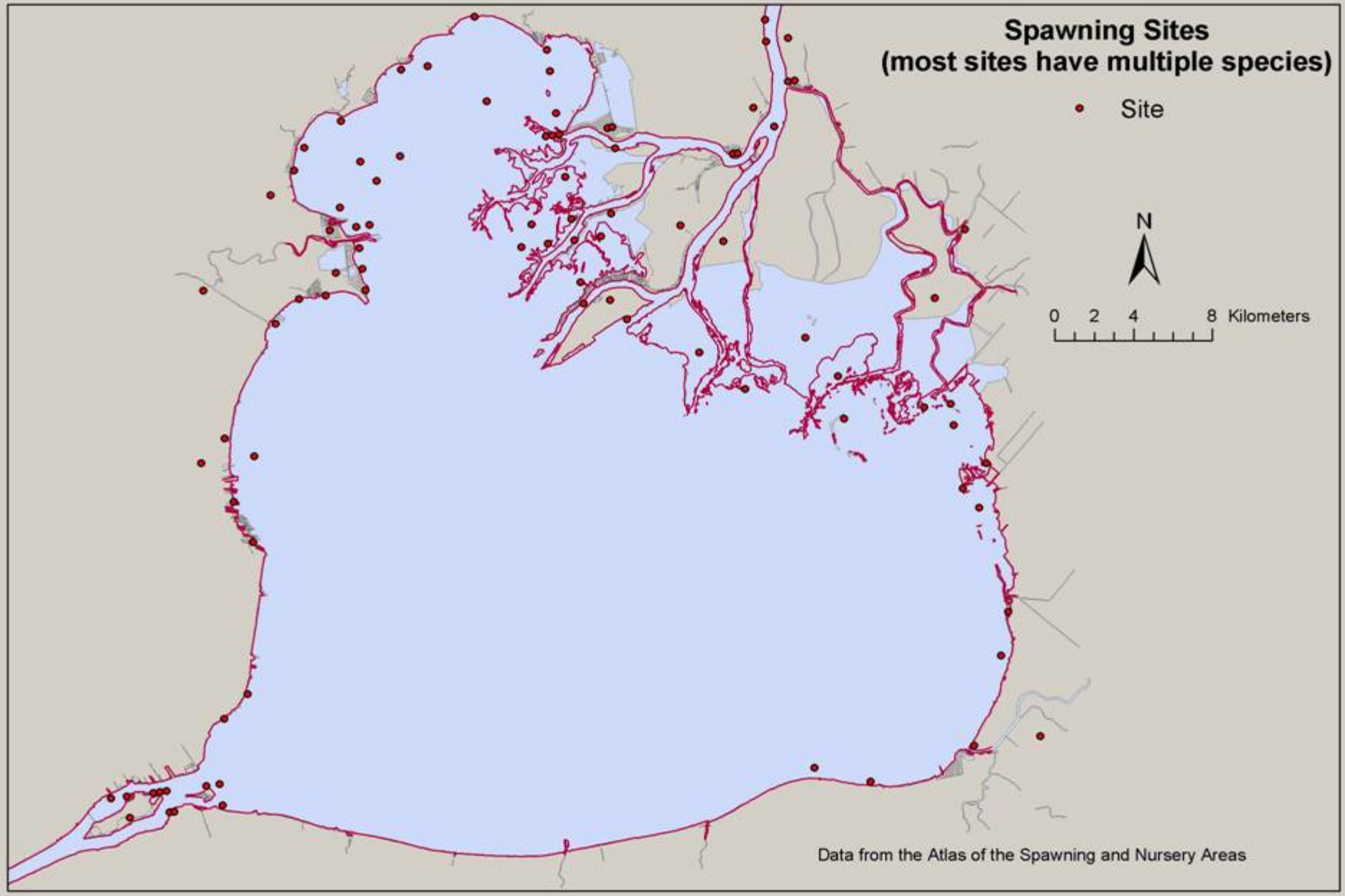



Emergent Wetlands
ST. CLAIR
MACOMB
OAKLAND
LAMBTON
WAYNE
ESSEX
KENT
Lake St. Clair
WALPOLE
Belle
Clinton
Sydenham
0 3.75 7.5 15 22.5 30 Kilometers
0 2.5 5 10 15 20 Miles
N

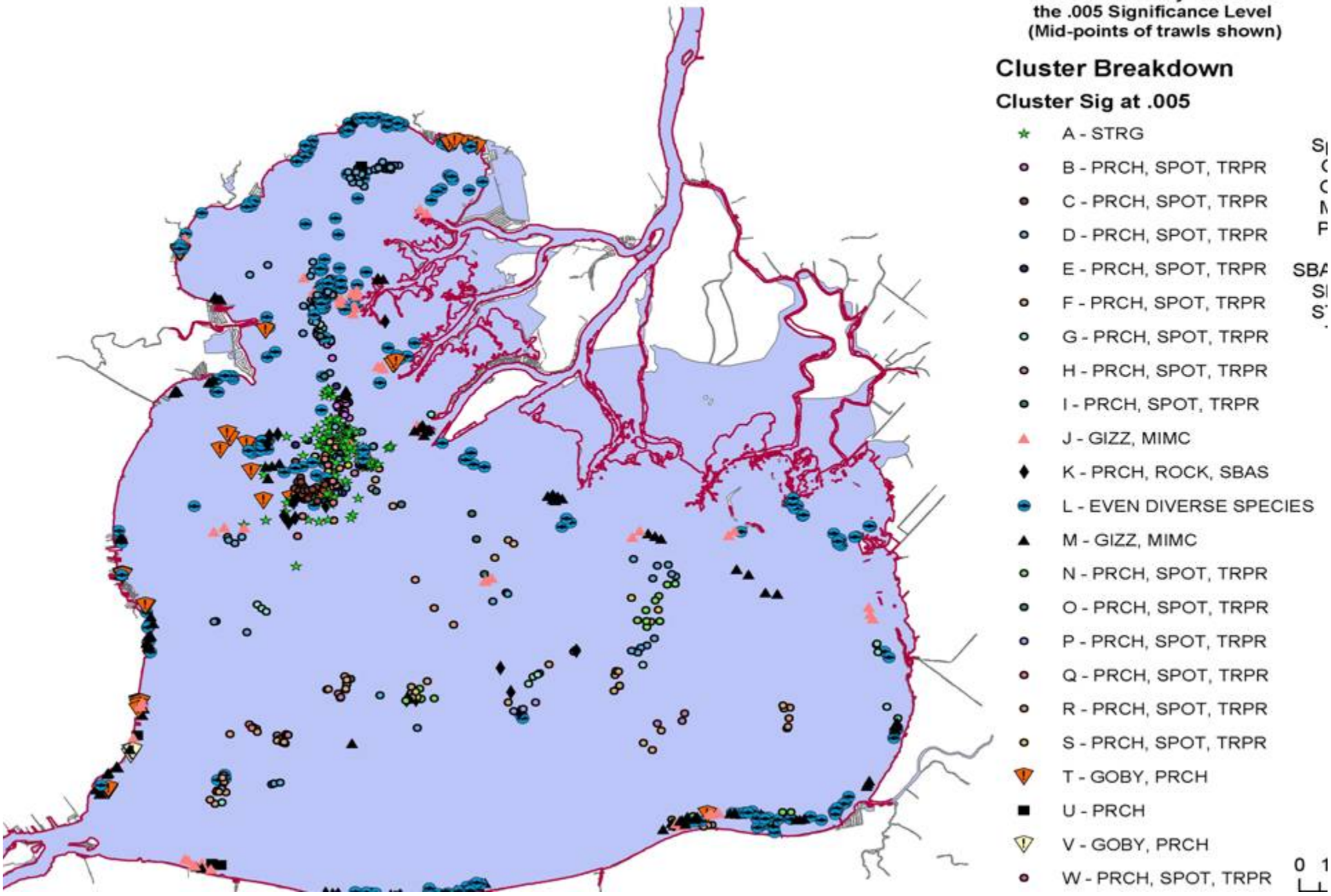

Forested Wetlands
ST. CLAIR
MACOMB
OAKLAND
LAMBTON
WALPOLE
Lake St. Clair
WAYNE
ESSEX
KENT
Clinton
Belle
Sydenham
94
40
53
59
75
96
3
77
401
0 3.75 7.5 15 22.5 30 Kilometers
0 2.5 5 10 15 20 Miles
N


Scrub/Shrub Wetlands
ST. CLAIR
MACOMB
OAKLAND
LAMBTON
WALPOLE
Lake St. Clair
WAYNE
ESSEX
KENT
Belle
Clinton
Sydenham
0 3.75 7.5 15 22.5 30 Kilometers
0 2.5 5 10 15 20 Miles
N

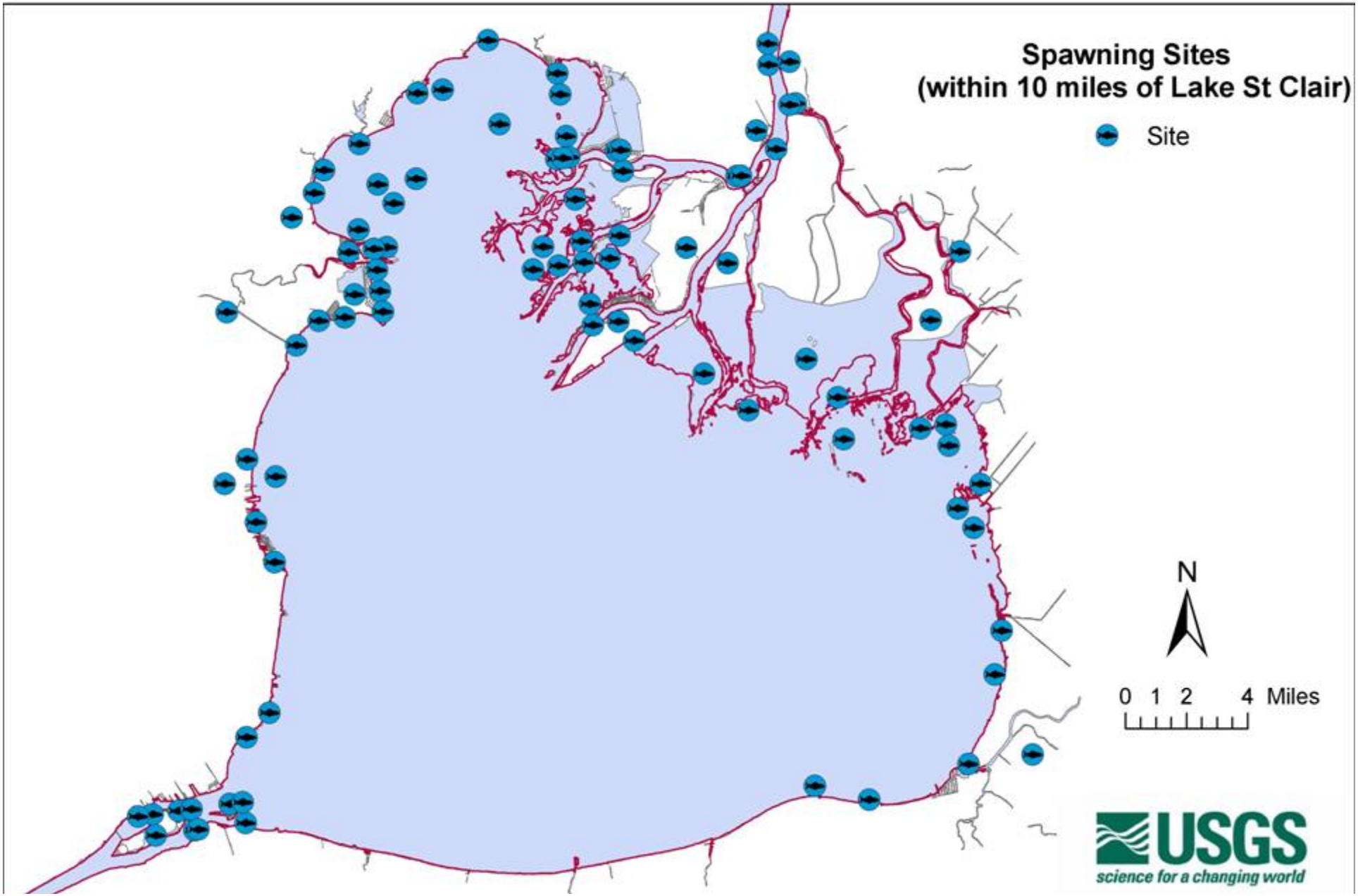
Spawning Sites



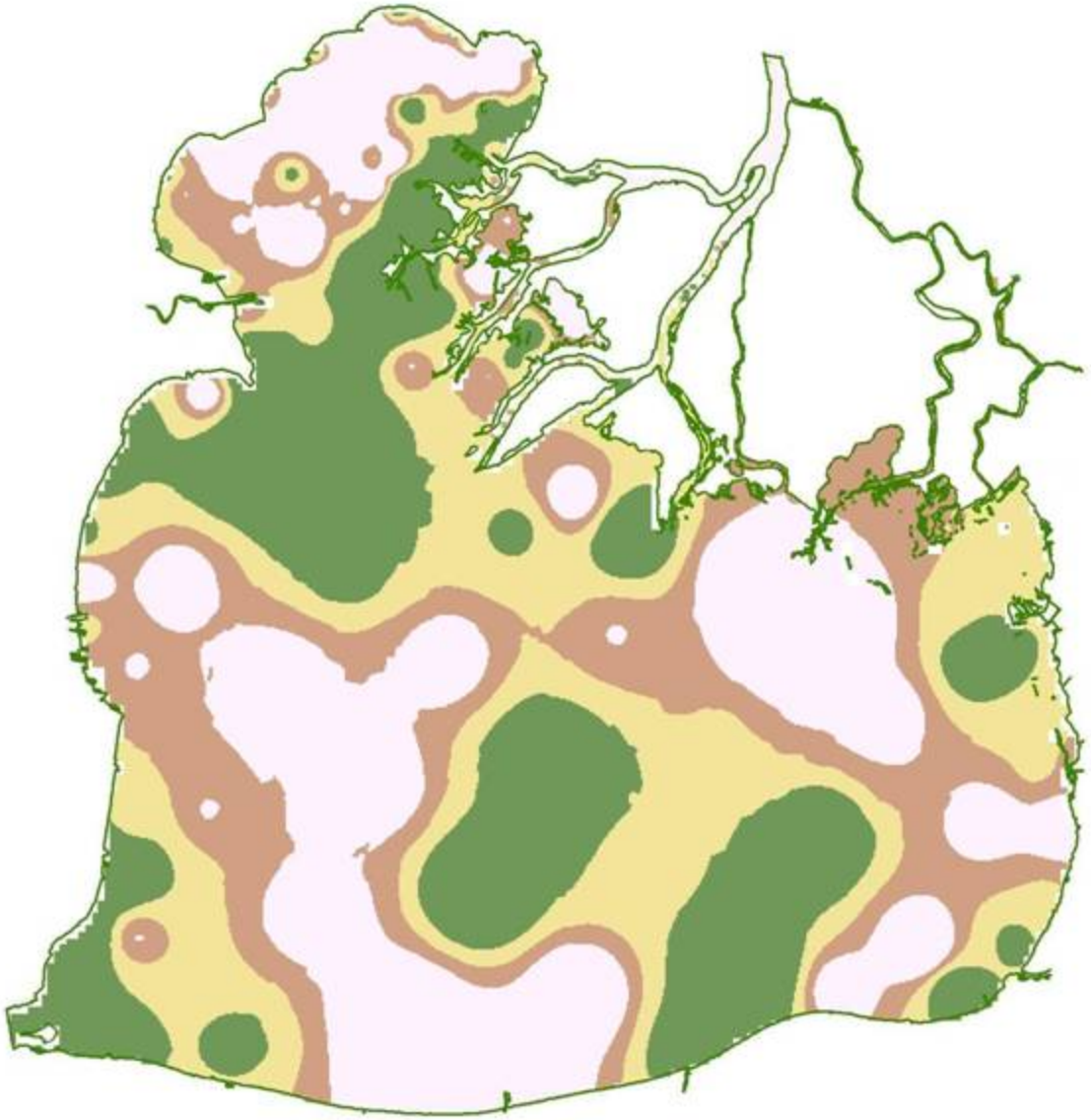
ROBERT HAAS - MDNR TRAWL-CAUGHT FISH DATA
)R LAKE ST CLAIR STANDARDIZED TO CPUE (Fish/HA)



Lake St Clair - Spawning Sites



Plant Biodiversity



Number of Taxa

Taxa

meters

- 0.00 - 3.34
- 3.35 - 4.21
- 4.22 - 4.94
- 4.95 - 8.9

Taxa:

Najas flexilis
Potamogeton richardsonii
Characeae
Vallisneria americana
Myriophyllum spicatum
Potamogeton narrow-leaf forms
Elodea canadensis
Heteranthera dubia
Unknown narrow-leaf forms
Potamogeton broad-leaf forms
Myriophyllum spp.
Potamogeton crispus
Unknown submerged sedge

N

0 3 6 12

Miles

USGS
science for a changing world

Data from Schloesser et al, 1996

Stressors and Responses

Stresses on or threats to the resource and programs/policies to address specific threats

- Altered Hydrology
- Land Development and Urban Expansion
- Contaminants
- Shoreline Modification, Shipping & Boating
- Invasive Species
- Natural Disturbances

Overarching Responses to Stressors

I. Habitat Management & Restoration Programs
   - Land Acquisition
   - Public Land Management Programs
   - Aquatic Habitats
   - Conservancies
   - Watershed-based organizations
   - Programs for Private Landowners
   - Training & Tech assistance

Overarching Responses to Stressors (cont'd)

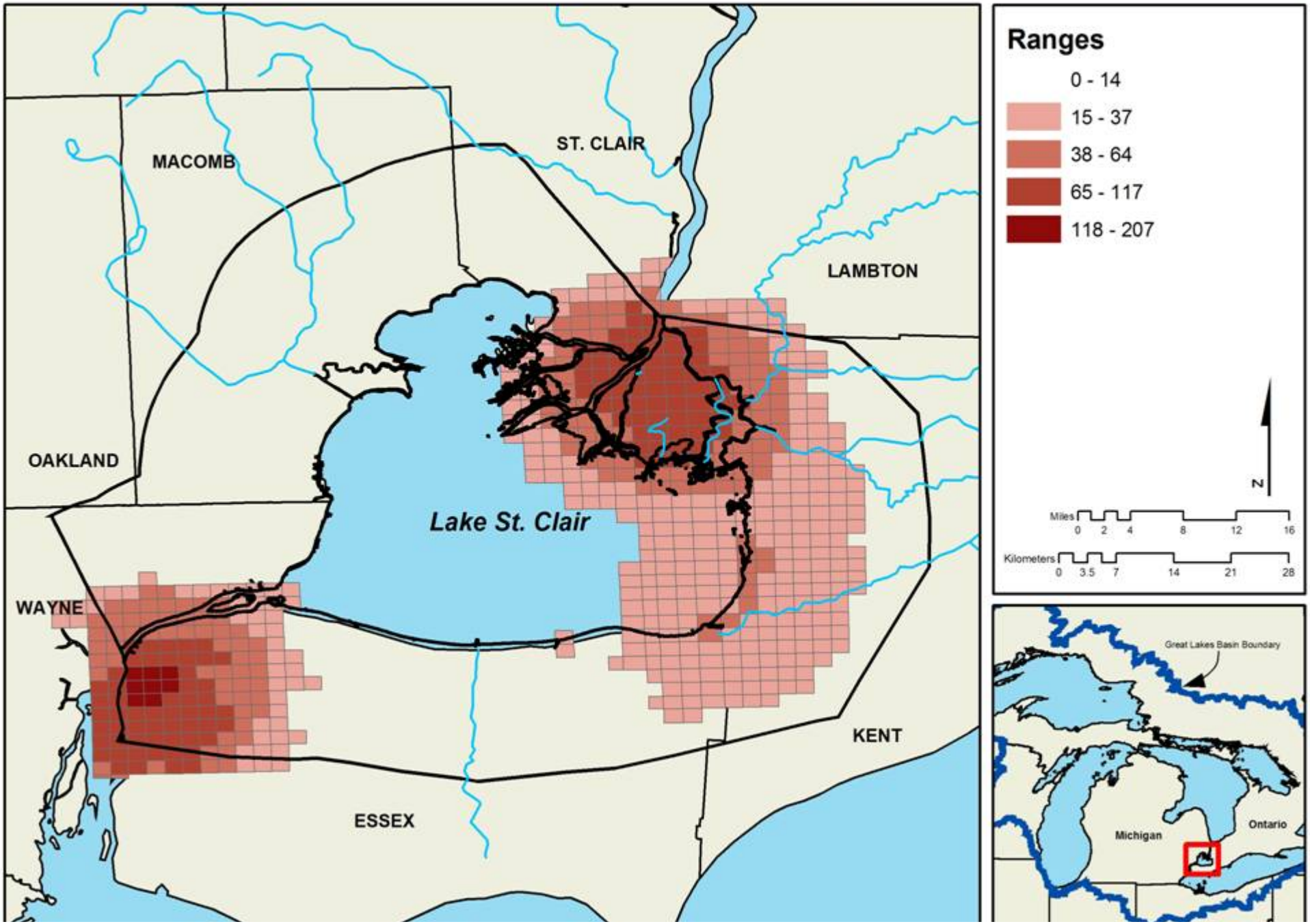
II. Inventory and Monitoring Tools
- Michigan Natural Features Inventory
- Ontario Natural Heritage Information Center
- USGS Great Lakes Regional Aquatic Gap
- Lake St. Clair Monitoring Inventory

III. Planning
- State, local, watershed

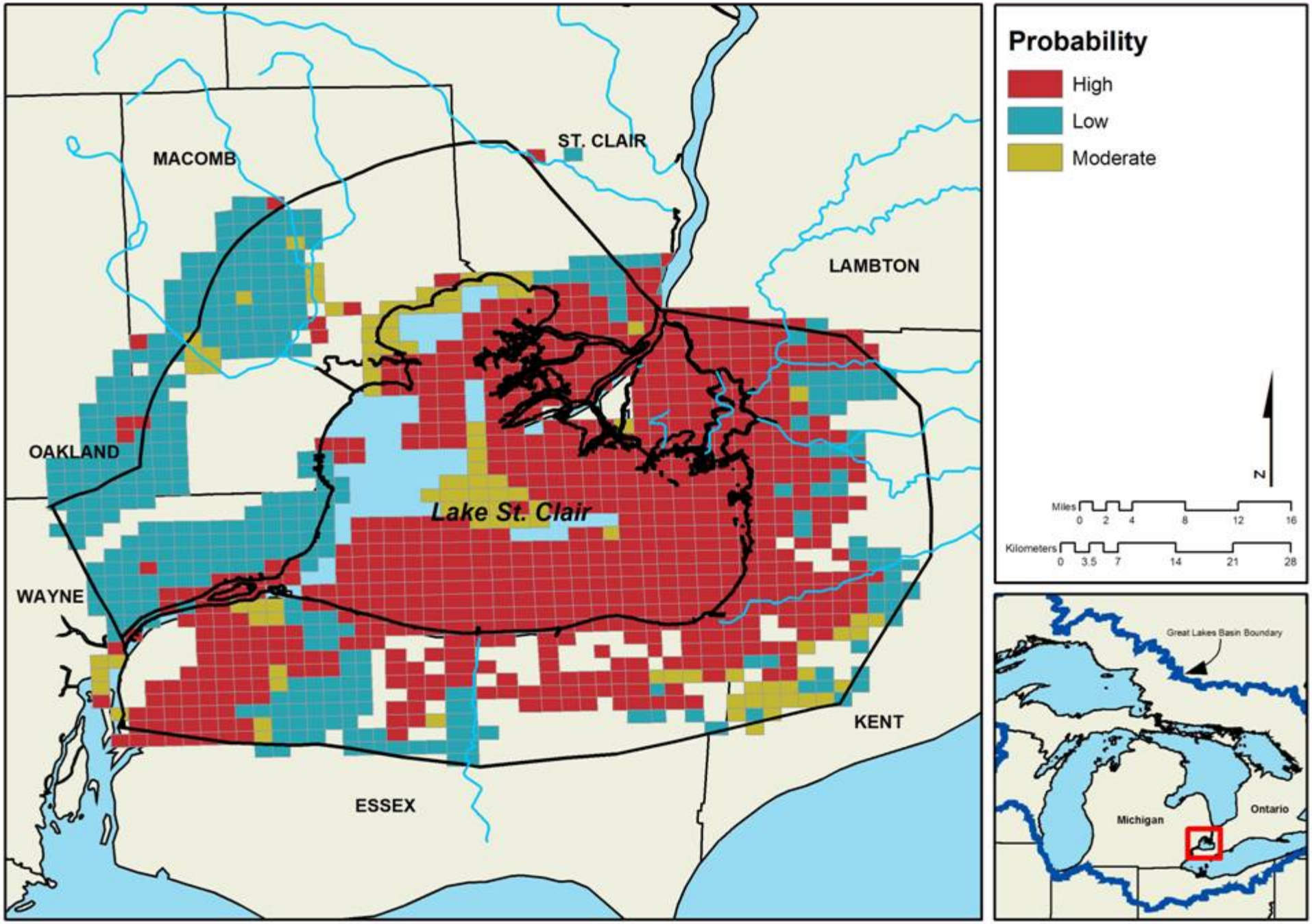
New Management Tools

- Element Occurrence Models
- Potential Conservation Area Analysis
- C-CAP Products and Application
- Integrated Coastal Management Tool

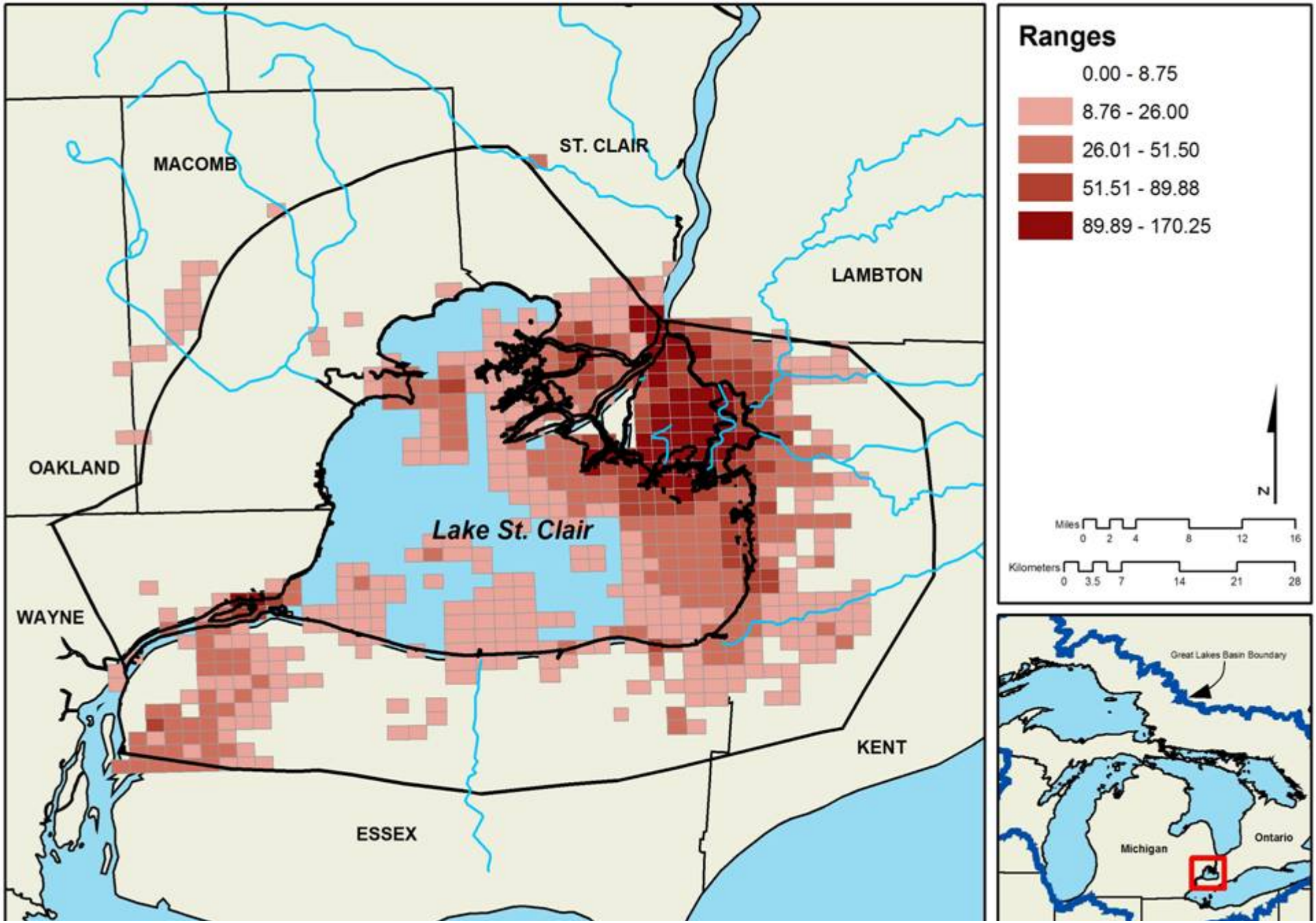
Element Occurence Frequency



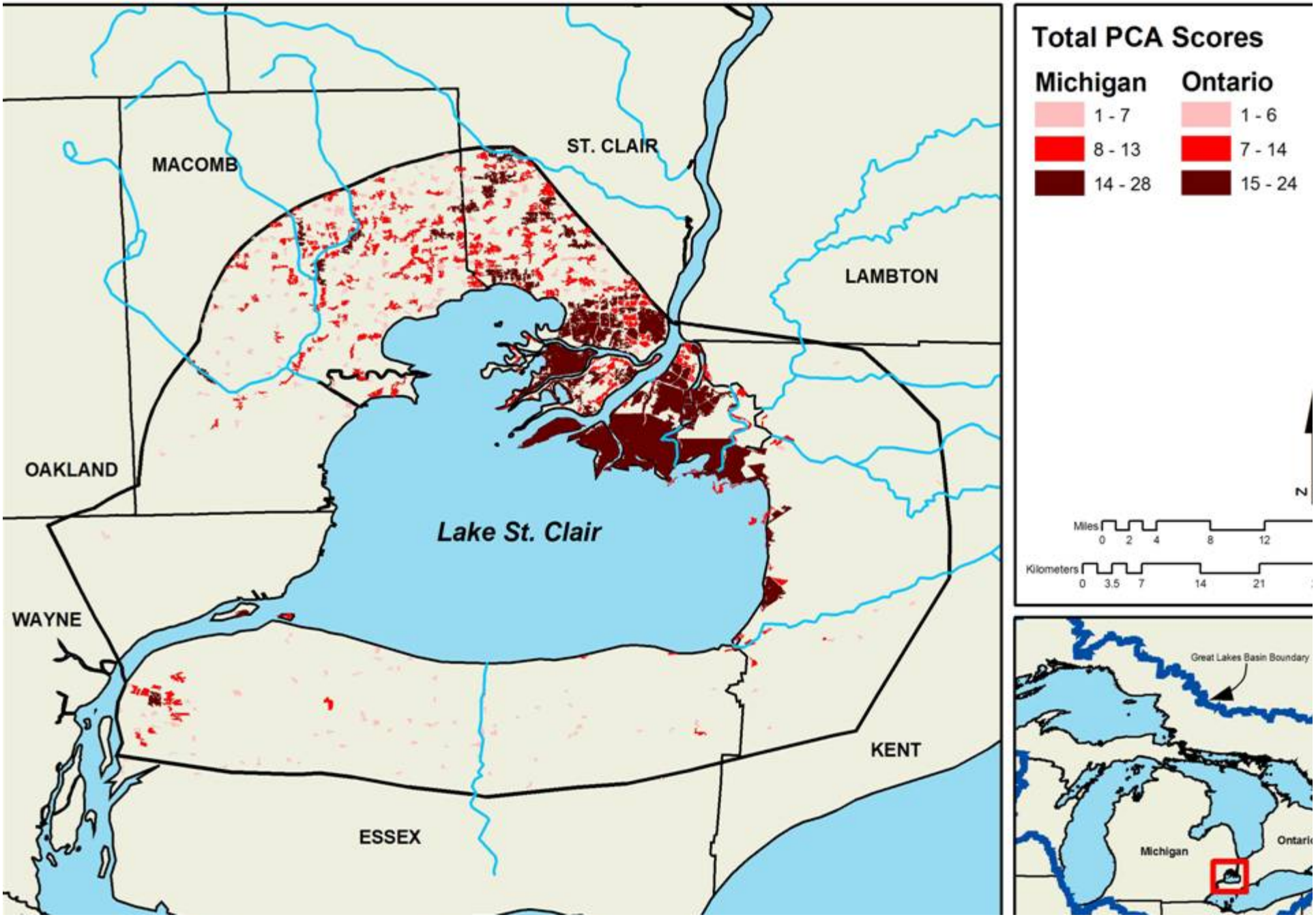
Element Occurence Probability



Biodiversity



Potential Conservation Areas



ICM Tool: What does it do?

- Allows users to evaluate the impacts of various management decisions on Lake St. Clair coastal habitat.
- The tool can be used for:
  - Identification and ranking of potential restoration and conservation areas
  - Habitat inventory
  - Land use planning
  - Evaluate impacts and alternatives (decision support) for land development or conservation

Integrated Coastal Management (ICM) Tool

A decision support tool to help coastal resource managers and planners

- Examine decisions
  - Scenario Testing—What If?
- Identify restoration and conservation priorities
  - Connectivity
    - Nearest neighbor
    - Proximity
  - Quality
    - Size
    - Core Area
    - Distance to Streams
    - Shoreline hardening
    - Element occurrences
    - Invasive Species

ICM Tool: How Does it Work

- Calculates habitat statistics that are used to examine how habitats function within a landscape
  - proximity: distance to the “nearest neighbor”
  - number of “nearest neighbors”.
  - Habitat quality assessments based on:
    - habitat size
    - core area
    - distance to streams
    - distance to shoreline hardening
    - the presence of invasive species
    - MNFI designations of rare, high quality, and other important features
  - impervious cover %
- Aquatic calculations:
  - water quality
  - substrate
  - depth
  - current direction
  - velocity
  - light
  - water temperature

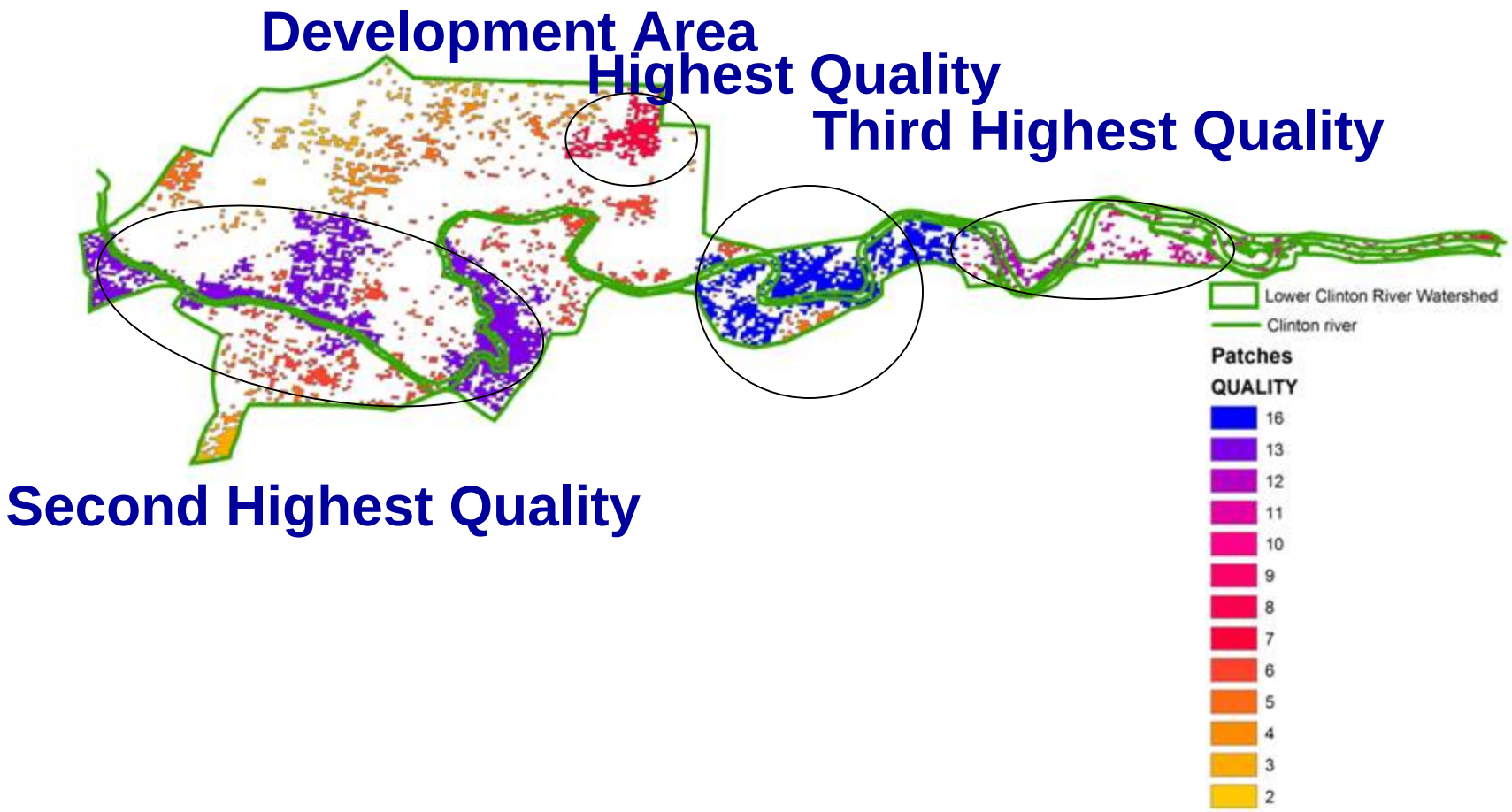
ICM Functionality

- **Flexible data inputs**
  - Raster land cover (required)
  - All others optional and can be point, line or polygon
- **Flexible location**
  - Any polygon
  - User drawn polygon
  - Any geographical boundary
    - Watershed
    - County, township
- **Flexible classification**
  - User chooses what is habitat
    - Simple
    - Unique
    - Grouped
- **Flexible scoring**
  - User determines values
  - User determines scores
- **Optional features**
  - Queries
  - Overlays
  - Scenario Testing
- **Multiple outputs**
  - GIS Shapefiles
  - Map images
  - Reports
  - Tables

ICM Data and Software Needs

- Data Included
  - Land cover
  - Political boundaries
  - Watersheds
  - Streams
  - Rare/unique natural features
  - Shoreline hardening
- Data needed: None
  - Can input own data in raster format
- Software Needs: CD
  - Arcview 8.3
  - Spatial Analyst
- Online Version
  - No special software needed
  - Limited functionality
  - Pre-set scenarios

Output Example – Habitat Quality



www.glc.org/habitat

Lake St. Clair | Coastal Habitat Restoration and Conservation

site map

Habitat Types
- Upland
- Wetlands
- In the Water

Stressors
- Altered Hydrology
- Land Development
- Contaminants
- Shoreline & Boating
- Invasive Species
- Natural Disturbances

Conservation Planning
Coastal Mgt. Tool
Spatial Data
Abstracts

Habitat Assessment

Get Acrobat Reader

Lake St. Clair Coastal Habitat Area: A 10-mile buffer around Lake St. Clair including all islands and channels.

Project Overview

The Lake St. Clair Coastal Habitat Project examines the variety of habitats around Lake St. Clair and ways to protect and conserve them. The geographic scope of the project extends from the nearshore waters to 10 miles inland. Habitats that far from the shore influence, and are influenced by, events at the water's edge. A full watershed assessment would incorporate all of the lands upstream that drain into Lake St. Clair. Nonetheless, the scope of this effort provides a wealth of information about the variety of habitats, stressors on them, and methods to conserve and protect them.

A series of tools have been developed and are featured on this web site, including maps that indicate managed (e.g., protected) areas, proposed conservation areas, and other important features. Also, check out the coastal management model that allows resource managers and other stakeholders to assess the impacts of various land use decisions within the study area and to prioritize activities to protect and restore those habitats that are most unique or valuable.