

Ottawa County Forum

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MICHIGAN STATE
UNIVERSITY



Overview of Michigan E.coli data

Beach Sanitary Surveys

Ottawa County Beaches

MSU Project Objectives

- Examine the MDEQ's *E. coli* database for surface waters of Michigan
- Examine use of alternative statistical analyses

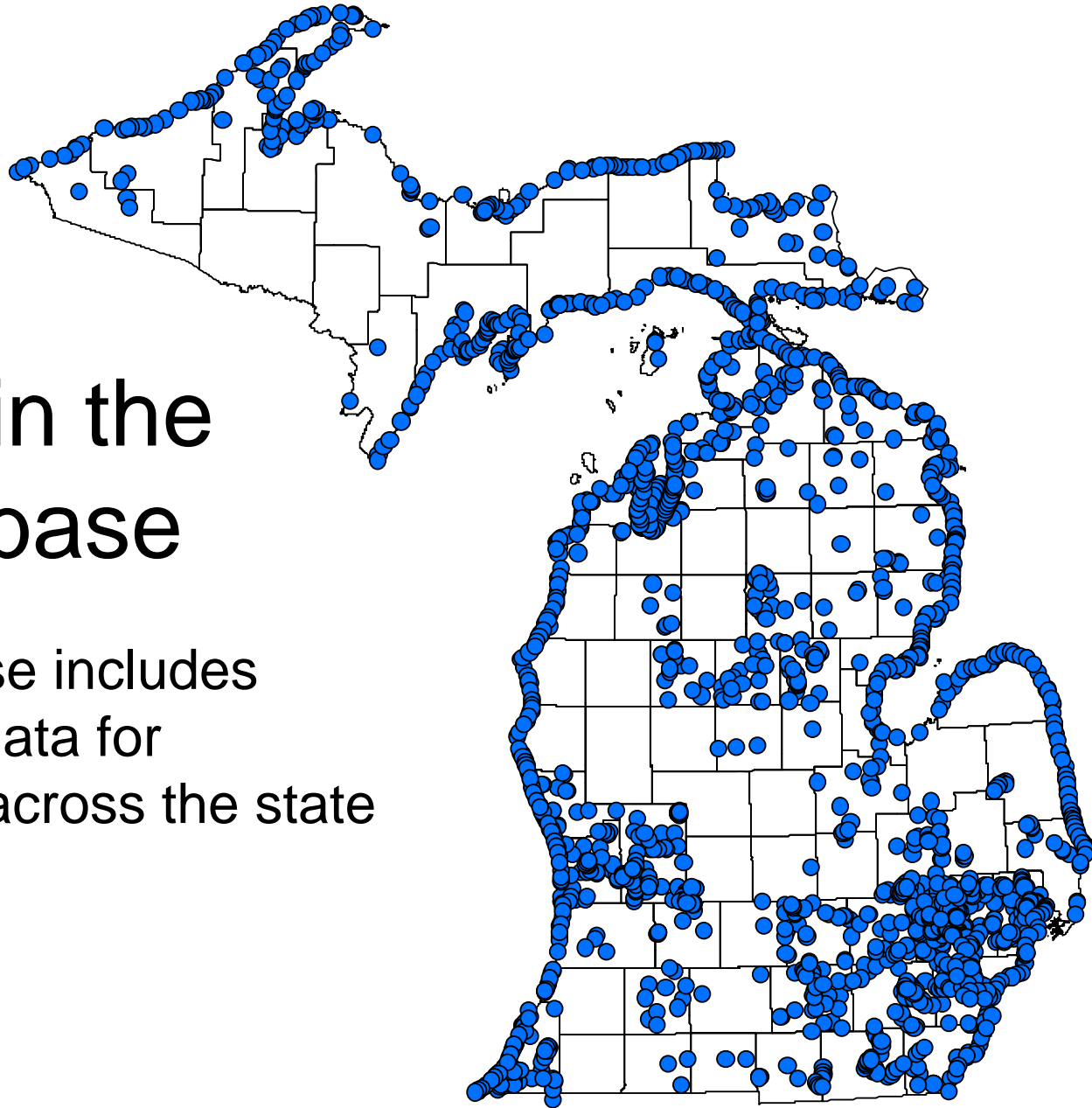


Michigan *E. coli* Database

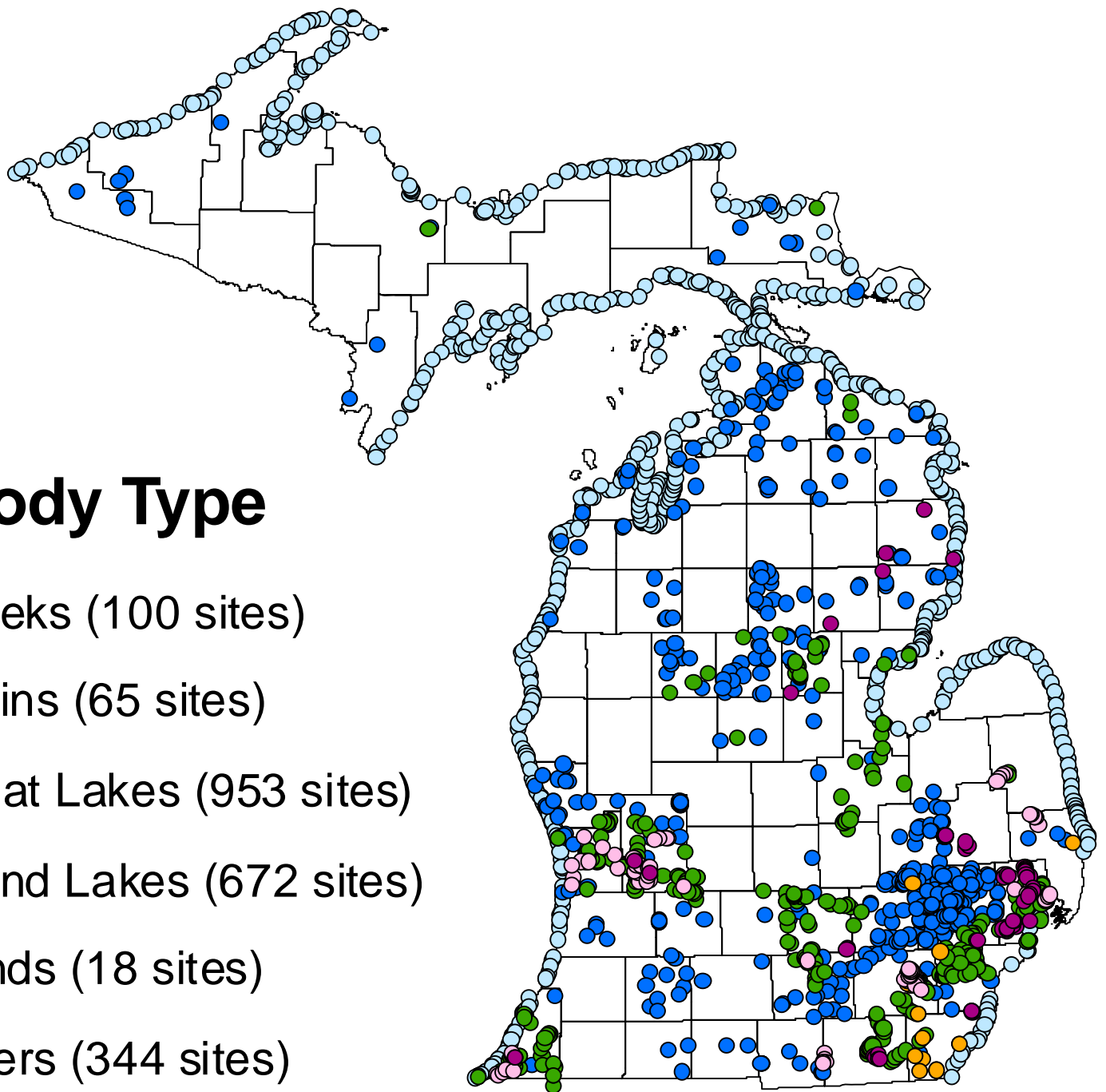
- Using MDEQ database for analysis
 - Long term data sets
 - QA/QC
 - Compiled from variety of monitoring programs
- Data:
 - Period of record: 1998-2006
 - Data reported: Monthly means, daily means, individual samples
 - Not a complete representation of state waters
 - Most sites monitored for *E. coli* as part of a WQS compliance effort
 - Beaches are monitored for ambient *E. coli* levels

Sites in the Database

The database includes monitoring data for 2,201 sites across the state



● All Sampled Sites (2201 sites)



Waterbody Type

- Creeks (100 sites)
- Drains (65 sites)
- Great Lakes (953 sites)
- Inland Lakes (672 sites)
- Ponds (18 sites)
- Rivers (344 sites)

Water Quality Standards for *E. coli*

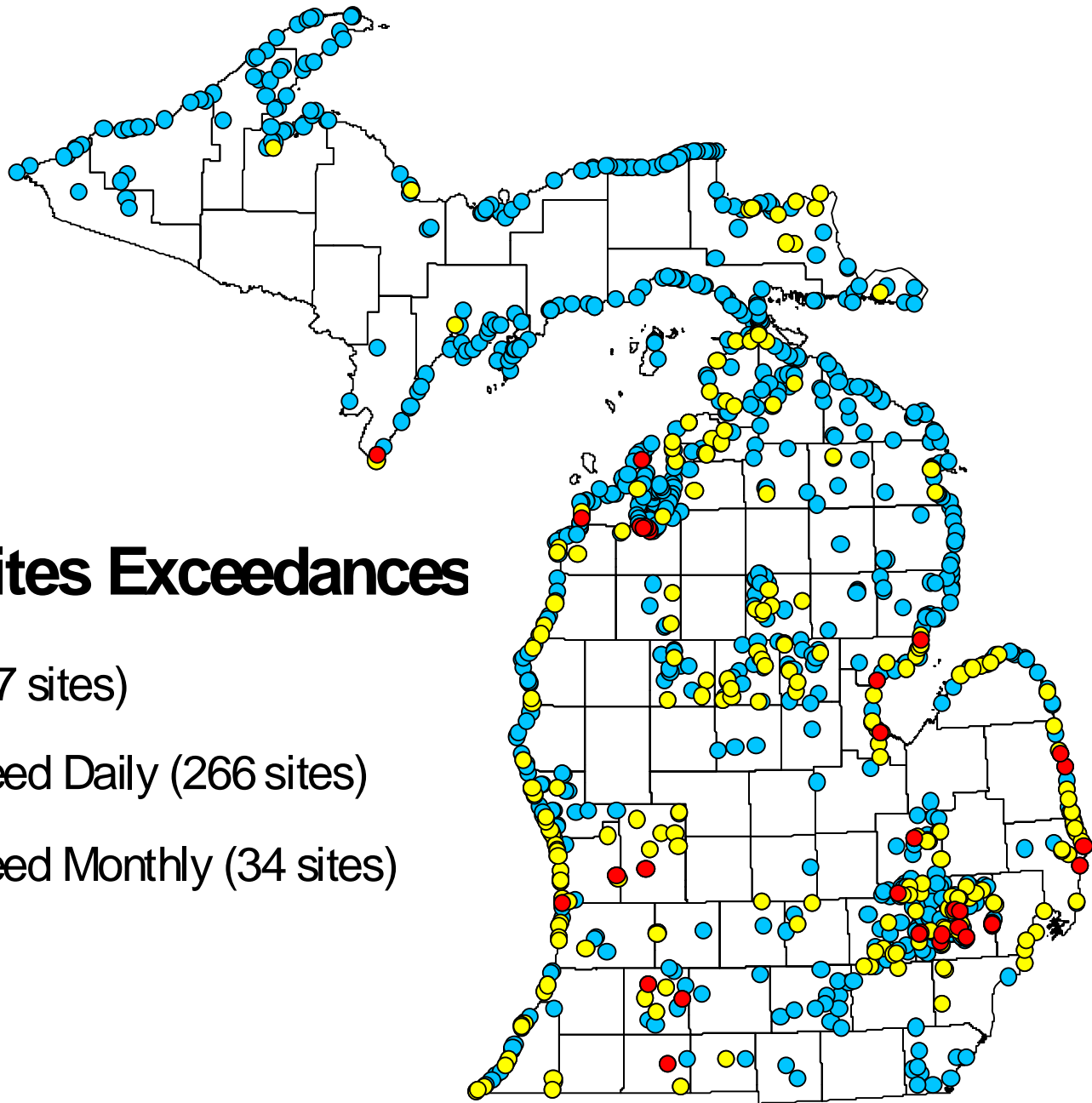
3 Individual samples collected per site and used to calculate the daily geometric mean

WQS for Daily Geometric Mean

300 *E. coli*/100ml

WQS for 30-Day Geometric Mean

130 *E. coli*/100ml

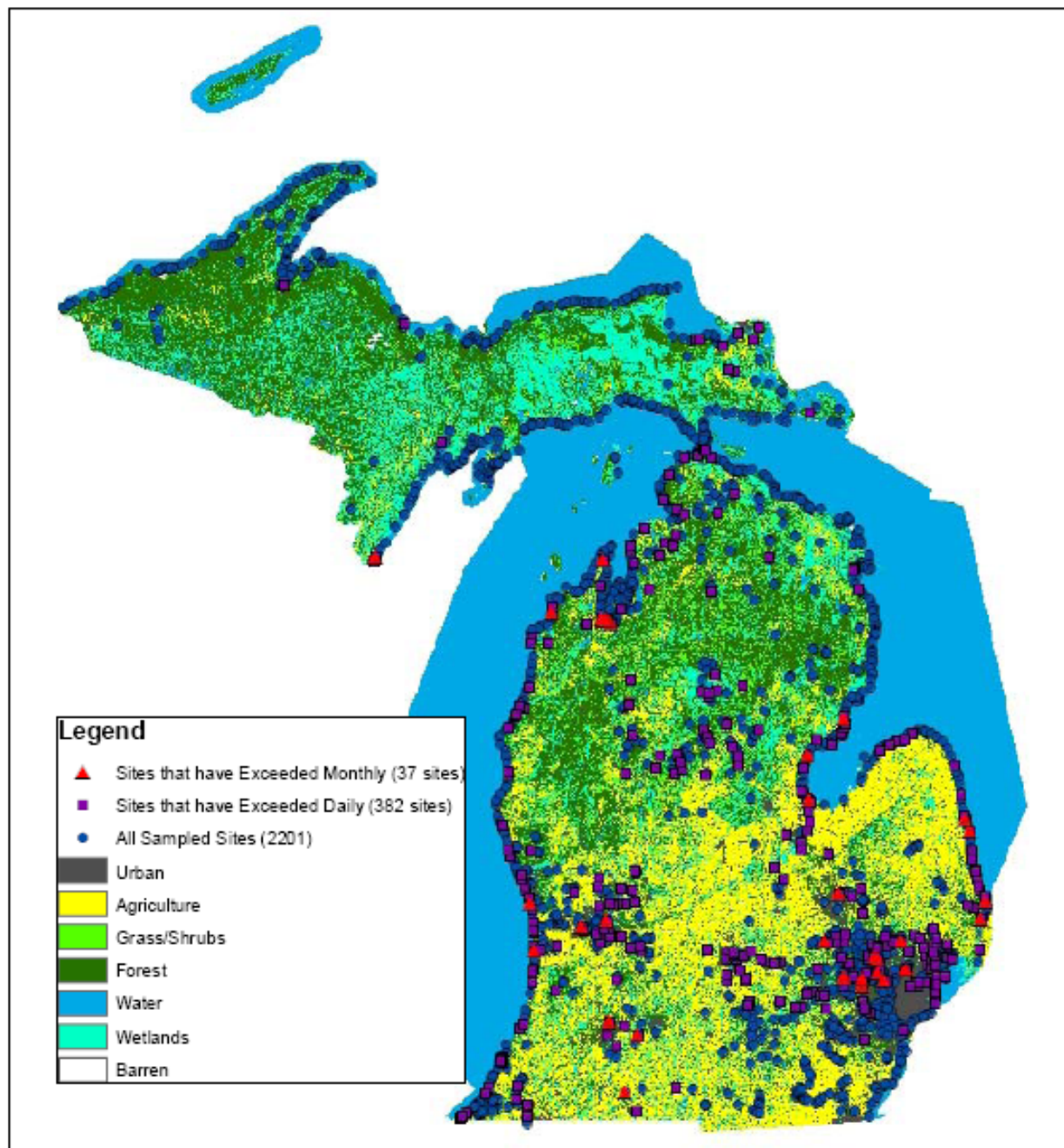


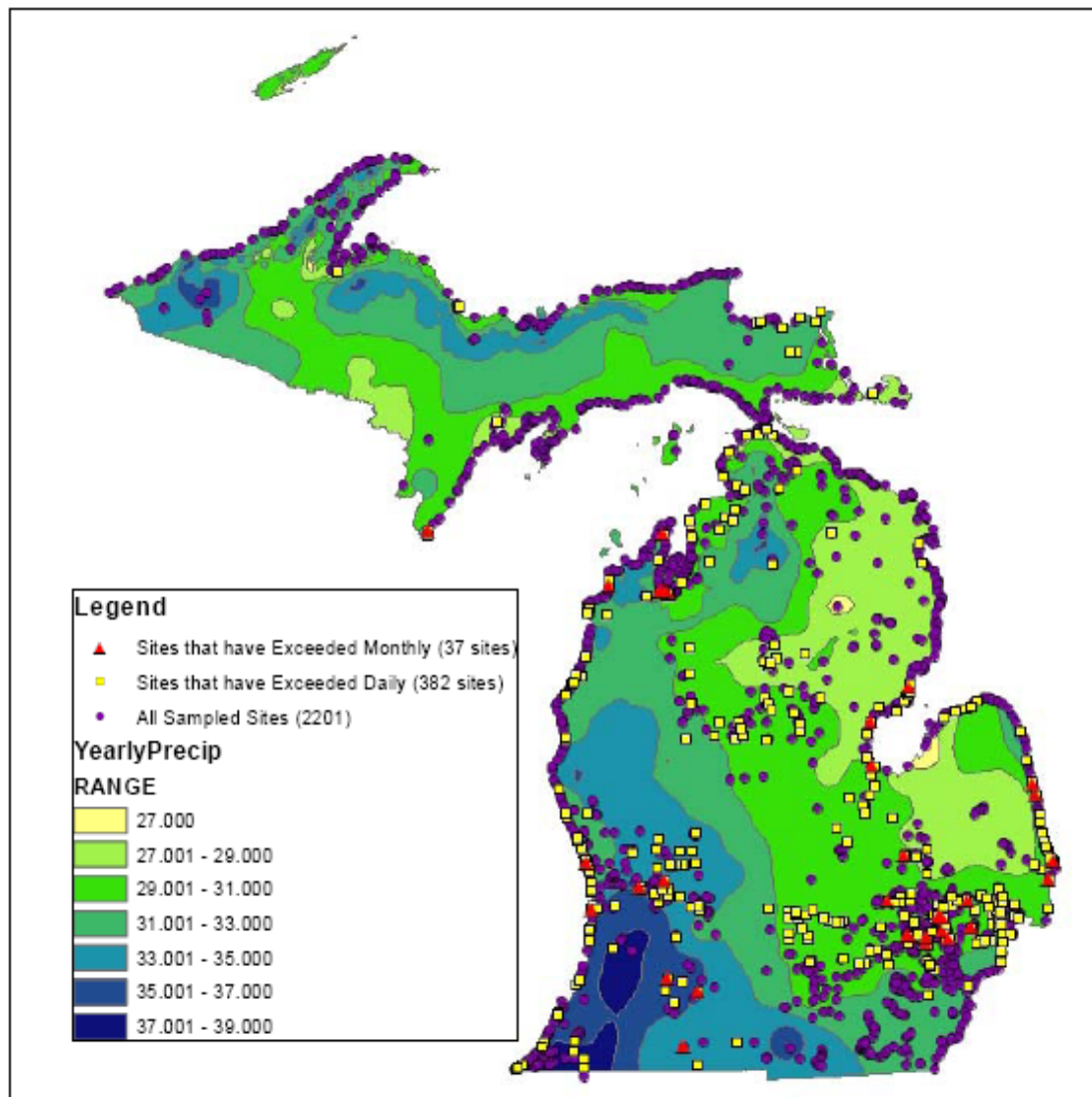
Public Beach Sites Exceedances

- Public (1127 sites)
- Public Exceed Daily (266 sites)
- Public Exceed Monthly (34 sites)

Spatial Patterns

- Strongest relationships:
 - Positive relationship between E. coli & urban
 - Negative relationship between E. coli & percent of wetlands in a watershed





Understanding Beaches

- Common problems: birds, run-off, sand, algae, storm-water, wave action, wind, human and animal wastes,...etc
- Common goals: beautiful beaches always open and safe
- Uncommon beaches: monitoring data and research shows Each Beach is Unique!

Understanding Beaches

- Statewide data may show trends but may not be applicable to every beach
- Local expertise is critical
- Study beaches and their watershed
- Use research and technology from around the world and apply knowledge to each beach (DVD available)
- Engage researchers to help you investigate your beaches

Tom Olson



Members of the Great Lakes Beach Association

At the annual Great Lakes Beach Conference

Traverse City, October, 2007

Beach Models DVD

Predicting Water Quality

Collaborative Project

USGS

US EPA

State of Illinois

Illinois Dept of Public Health

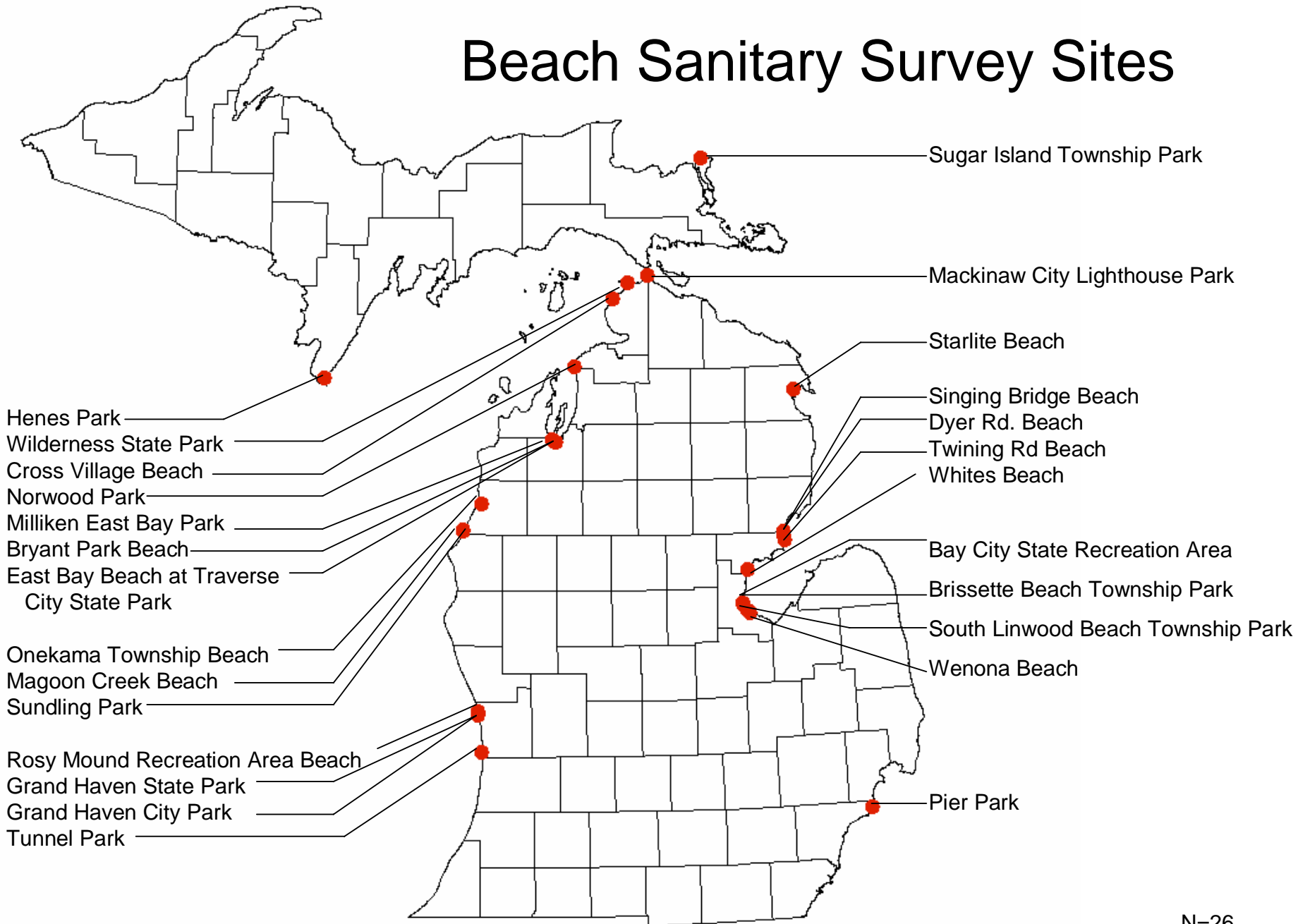
Beach Sanitary Survey Pre-Pilot with USEPA, Summer 2006

- Developed in GL with help from Adam London
- Develop survey for data that may correlate to individual beaches (Routine Survey)
- Record observable data while collecting water samples (*E. coli* in context, what is happening that may affect water quality)
- Develop watershed map for beach (Annual Survey)
- Investigate potential sources
- Characterize how beach water changes

Beach Sanitary Survey Project with USEPA, Summer 2007

- Routine Surveys
- Increased monitoring
- Look for correlations between *E. coli* data and observable data
- Annual Surveys
- Investigate potential sources
- Possible development of predictive model
(can be difficult to apply for normally good water quality)

Beach Sanitary Survey Sites



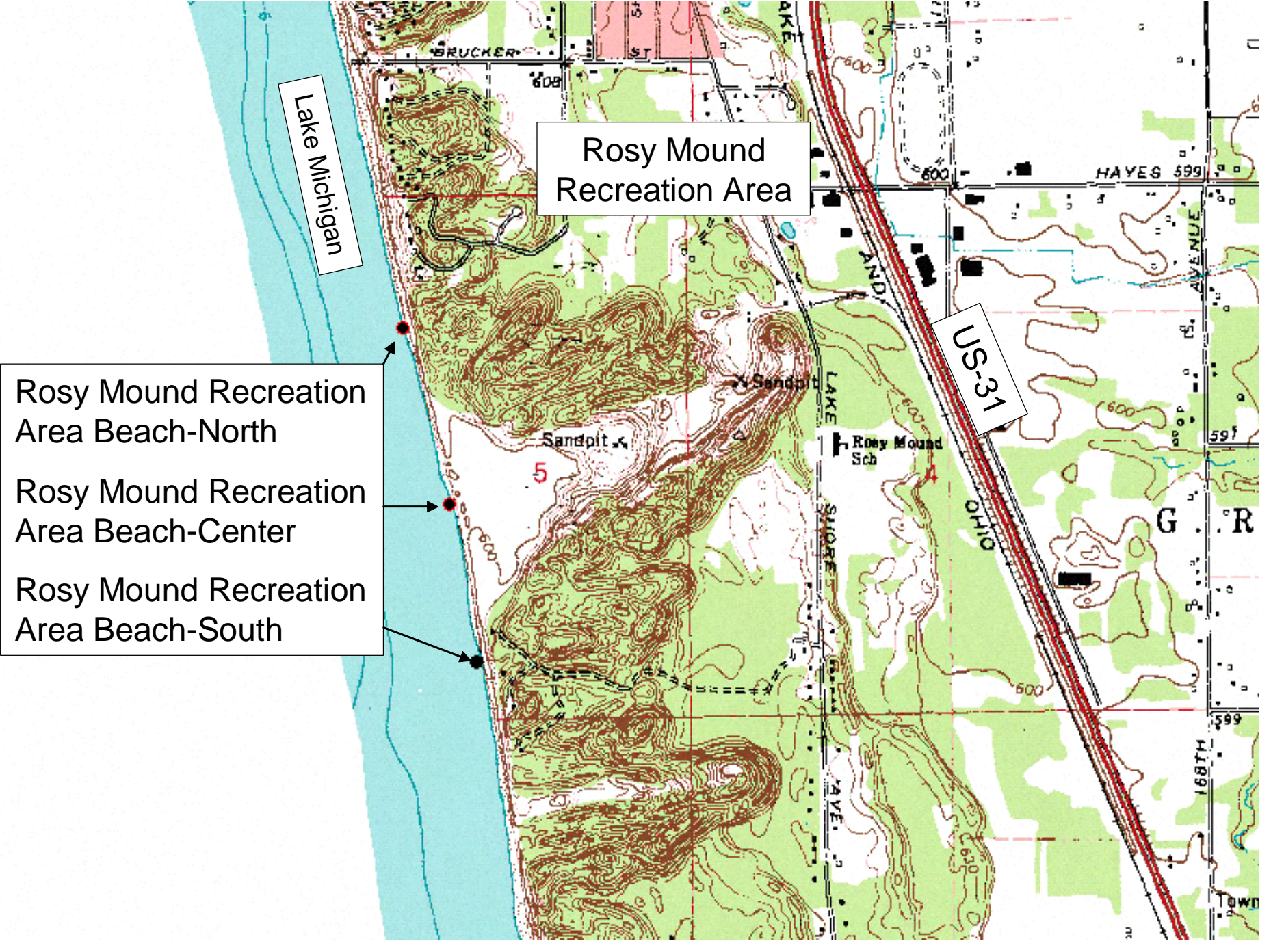
Lake Michigan

Grand River

Grand Haven

- Grand Haven State Park North
- Grand Haven State Park Center
- Grand Haven State Park South
- Grand Haven City Park North
- Grand Haven City Park Center
- Grand Haven City Park South





Lake Michigan

Rosy Mound Recreation Area

- Rosy Mound Recreation Area Beach-North
- Rosy Mound Recreation Area Beach-Center
- Rosy Mound Recreation Area Beach-South

US-31

BRUCKER ST

HAYES 599

ANDERSON AVE

LAKE SHORES DRIVE

SHORE DRIVE

HAYES AVE

G R

HAYES 599

HAYES 599

HAYES 599

TOWN

Sandpit

Sandpit

Rosy Mound Sch

5

600

600

600

600

599

599

599

599

599

Tunnel Park-North
Tunnel Park-Center
Tunnel Park-South

Lake Michigan

Lake Macatawa



Methods

- Calculate 95th percentile estimates
 - Hazen method
 - Need at least 20 data points
 - Replaced qualified values
 - $<n$ replaced with $n/2$
 - $>n$ replaced with $n+1$
 - Assign to class based on Annapolis Protocol

Annapolis Protocol & 95th Percentiles

- Annapolis Protocol
 - Developed at conference of experts hosted by WHO and EPA
 - Use new statistical approaches for managing beaches
 - Focus on local conditions and site-specific information
 - Uses 95th percentile as one component of classification

What's the 95th Percentile?

- 95% of data are below 95th percentile estimate
- If the 95th percentile = 100
 - 95% of data points fall below 100
 - 5% of data points fall above 100

95th Percentiles: Public Beaches

Water Quality	95th Percentile	% Beaches
Good ↓ Poor	<35	5
	35-130	27
	131-500	50
	500-1000	11
	>1000	8

Annapolis Protocol

- 95th percentile just first step
- Need sanitary survey information to complete classification
- Allows managers to focus on improving beach water quality (not just open vs closed---but reducing bacteria counts).

Beach Name (Data thru '06)	50 th percentile Median Value	95 th Percentile	Number of individual samples
Grand Haven City Beach	22	303.2	101
Grand Haven State Park	18.17	167.1	85
Rosy Mound Rec Area	18.46	189.22	64
Tunnel Park	27.14	298.68	94

Ottawa County Beaches

Meeting state and federal goals which are to meet the WQS 95% of the time.

Ultimate Ottawa County goal is to meet WQS ALL the time and have beaches OPEN!

My goal too!

