Wisconsin's Beaches: Impacts and Resiliency Overview

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Major Topics

- Water Quality (Kimberly Busse)
- Dangerous Currents and Risk Communication (Todd Breiby – WCMP)
- Harmful Algal Blooms (Mark Warner – DHS)
- Beach Resiliency and Sediment Transport (Gene Clark – UW Sea Grant)

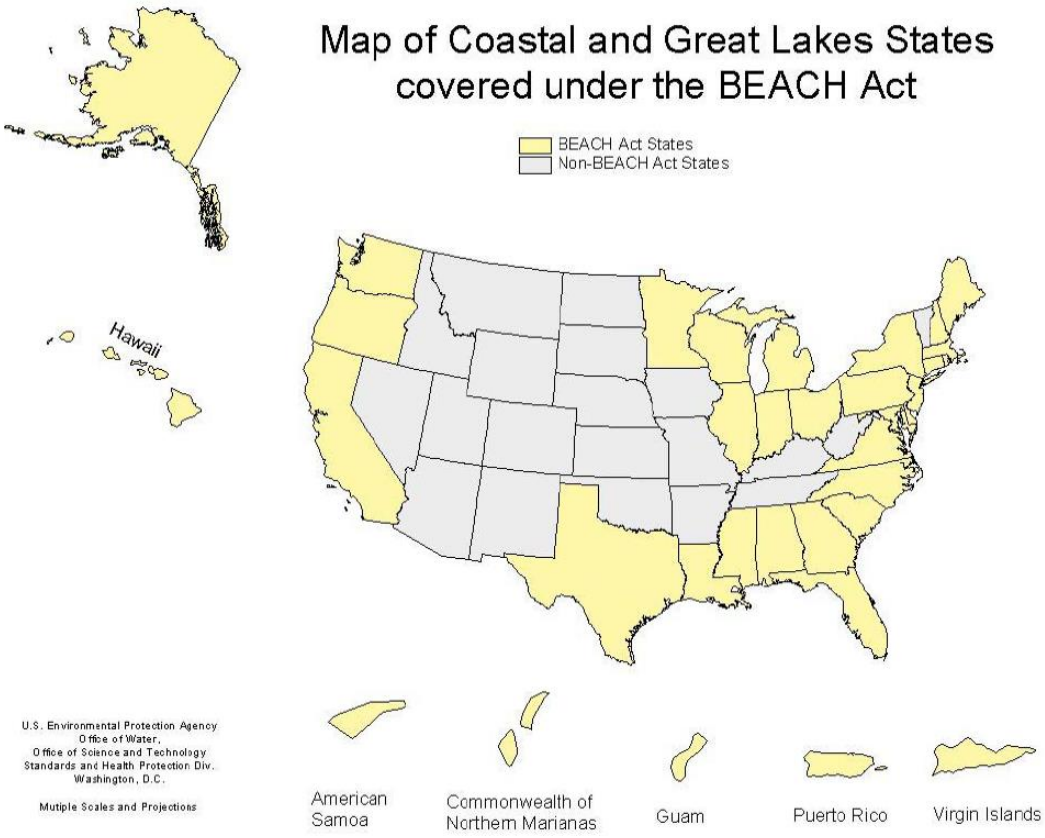
Water Quality

- Monitoring
  - Routine
  - Sanitary Surveys
  - Predictive Modeling
  - qPCR
- Source Tracking
  - Sanitary Surveys
  - Predictive Modeling
  - qPCR

Monitoring Water Quality

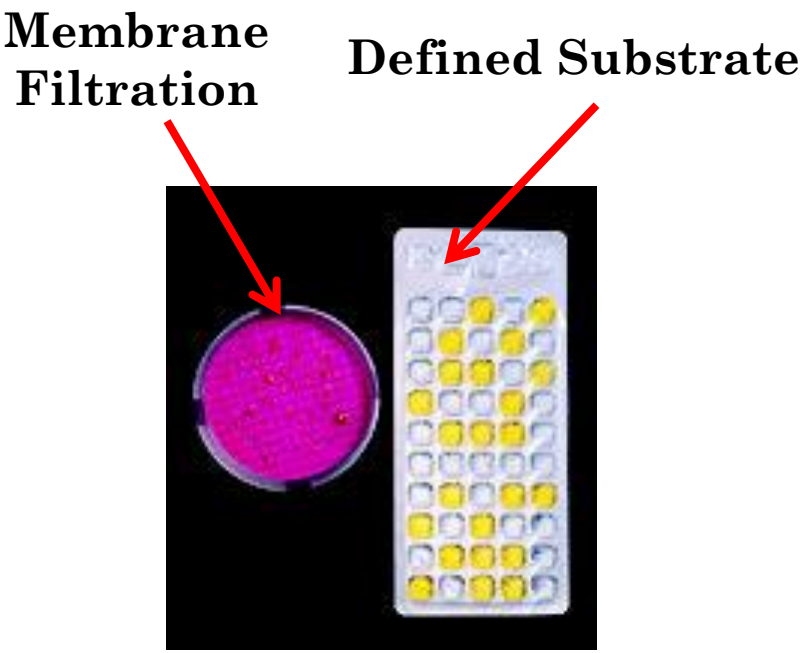
Routine Monitoring

- Monitoring recreational water quality
- Inform public health of beach quality



Collecting Water Samples

- Samples collected from center of beach at 24 inches depth 12 inches below the surface
- Sample collected into sterile 100 ml bottle
- *Escherichia coli* (*E. coli*) and enterococci are indicator organisms of choice
  - Enterococci = salt water
  - *E. coli* or enterococci = fresh water



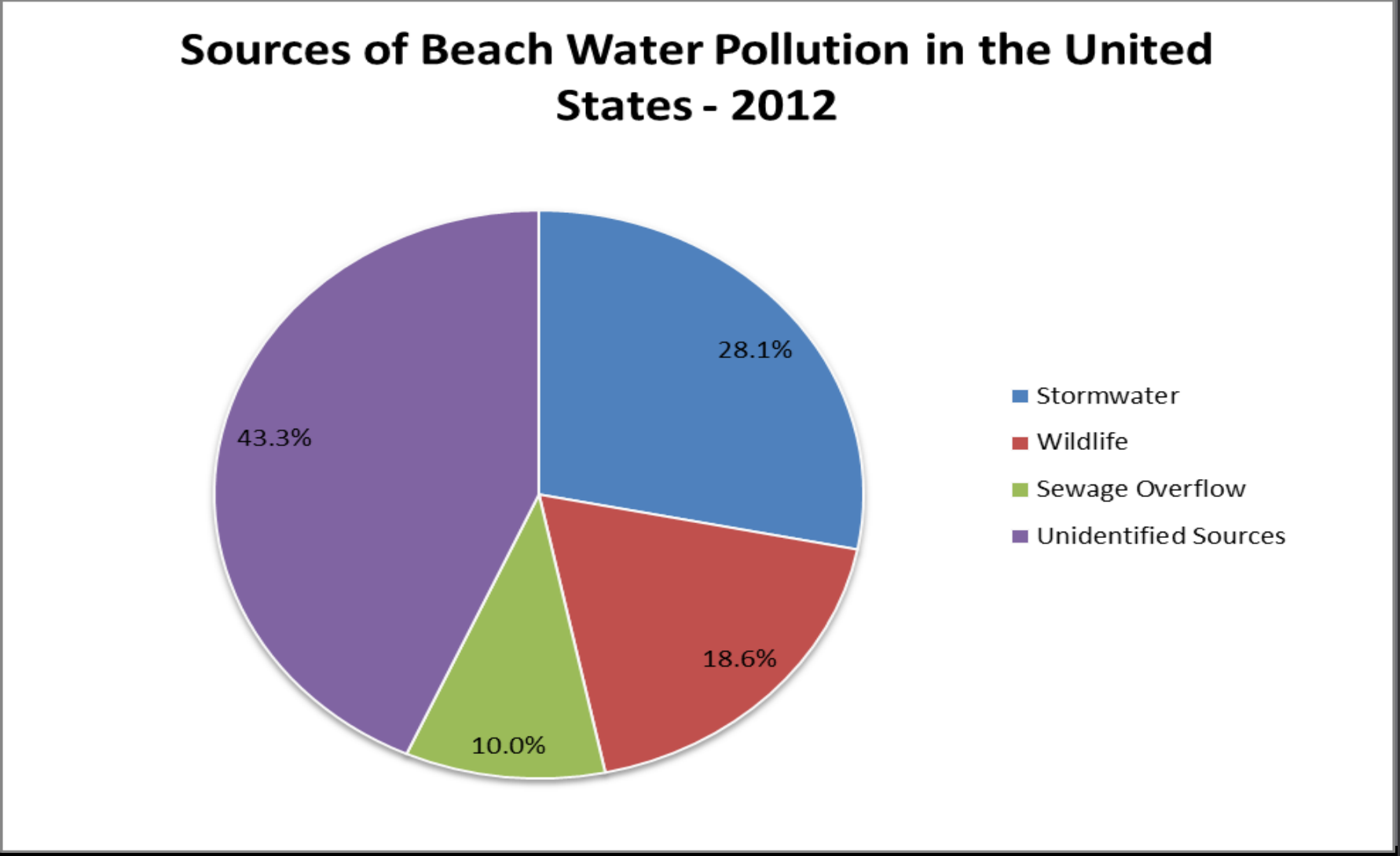
Rapid Testing Methods

qPCR

- Molecular based testing to evaluate FIB in recreational water
- Results same day as collection
- More expensive than traditional methods
- Requires highly trained staff

Predictive Modeling

- Statistical tool to predict FIB concentrations
- Utilized sanitary survey data to monitor normal fluctuations in water quality and other conditions
- Provides results same day as collection
- Used as another tool for beach managers to evaluate water quality
- Does not predict catastrophic events (i.e. sewage spill)
  - Still important to monitor water quality to validate results



Source Tracking

Sanitary Surveys

- To explore and accurately characterize Great Lake Beaches in terms of possible sources of microbial pollution entering the beach area.

What are Sanitary Surveys?

GREAT LAKES BEACH ANNUAL SANITARY SURVEY

1. BASIC INFORMATION

Name of Beach:	Date(s) of Survey:
Beach ID:	Name of Waterbody:
Town/City/County/State:	Number of Routine Surveys Used:
Sampling Station(s)/ID:	Name(s) of Surveyor(s):
STORET Organizational ID:	Surveyor Affiliation:

2. DESCRIPTION OF LAND USE IN WATERSHED

Current Land Use in Watershed

Type	Residential	Industrial	Commercial	Agricultural	Other (specify):
Percentage					

Development	Describe
% undeveloped	
% developed	

How was land use measured:

Waterbody Uses: ☐ Boating ☐ Fishing ☐ Surfing ☐ Windsurfing ☐ Diving ☐ Other (specify)

Are maps of the beach area attached? ☐ yes ☐ no Are maps of the watershed attached? ☐ yes ☐ no

List maps and their sources:

GREAT LAKES BEACHES ROUTINE ON-SITE SANITARY SURVEY

Name of Beach:	Date and Time of Survey:
Beach ID:	Surveyor Name(s):
Sampling Station(s)/ID:	Surveyor Affiliation:
STORET Organizational ID:	

PART I – GENERAL BEACH CONDITIONS

Air Temperature: _____ °C or °F | Wind: Speed (mph) _____ Direction (e.g., E or 90°) _____ (From which direction the wind is coming)

Rainfall: ☐ <24 hours ☐ <48 hours ☐ <72 ☐ >72 hours since last rain event and _____ inches or _____ cm rainfall measured

Rain Intensity: ☐ Misting ☐ Light Rain ☐ Steady Rain ☐ Heavy Rain ☐ Other

Weather Conditions:

Sky Condition	☐ Sunny	☐ Mostly Sunny	☐ Partly Sunny	☐ Mostly Cloudy	☐ Cloudy
Amount of cloud coverage	No Clouds	1/8 to 2/8	3/8 to 1/2	5/8 to 7/8	Total Coverage

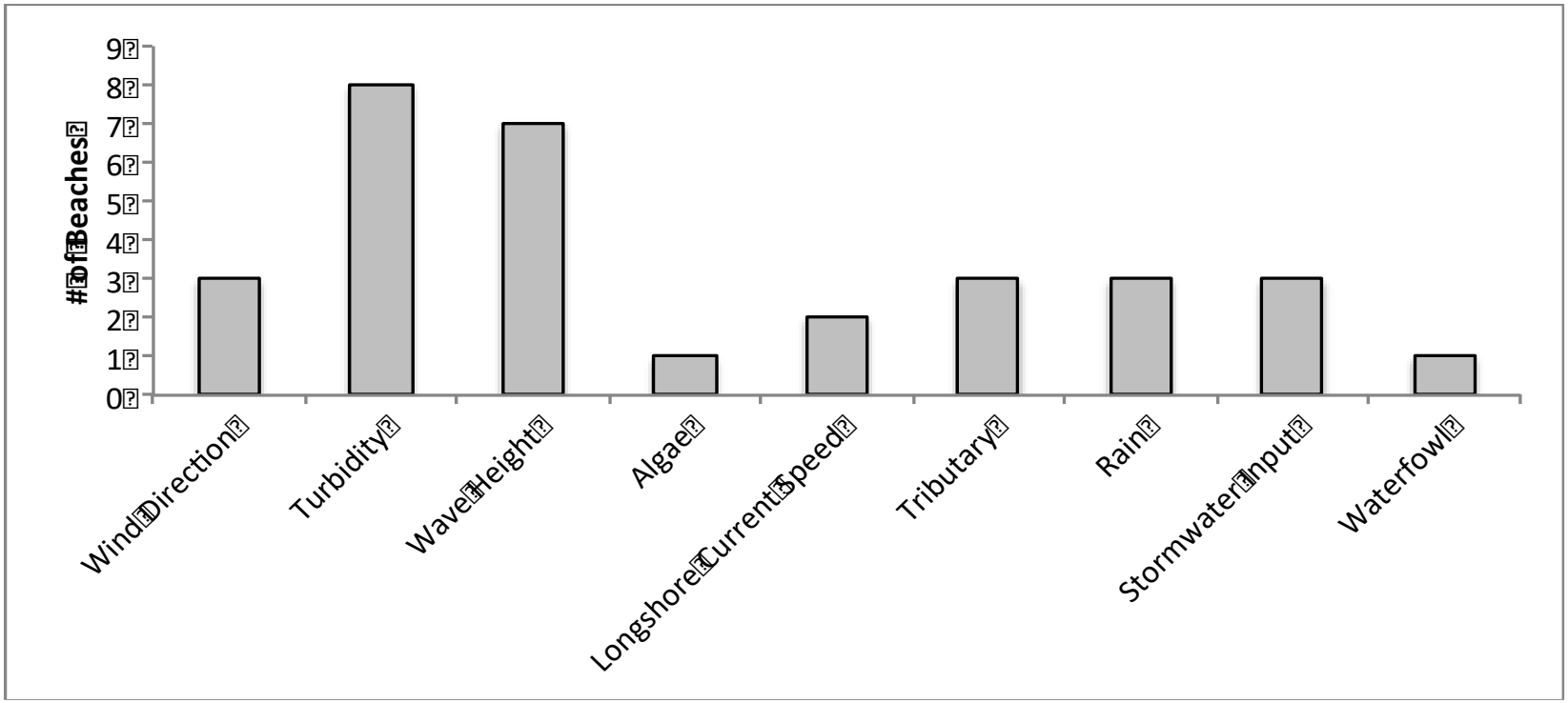
Wave Intensity: ☐ Calm ☐ Normal ☐ Rough Wave Height: _____ ft ☐ Estimated or ☐ Actual

Longshore current speed and direction (cm/sec, S or 180°):

Comments/Observations

- Affordable, simple tool to evaluate sources of fecal pollution
- Routine Sanitary Survey (RSS)
  - 2-page form for recording environmental conditions and pollutants on the beach
- Annual Sanitary Survey
  - 8-page form for recording physical beach conditions and watershed characteristics

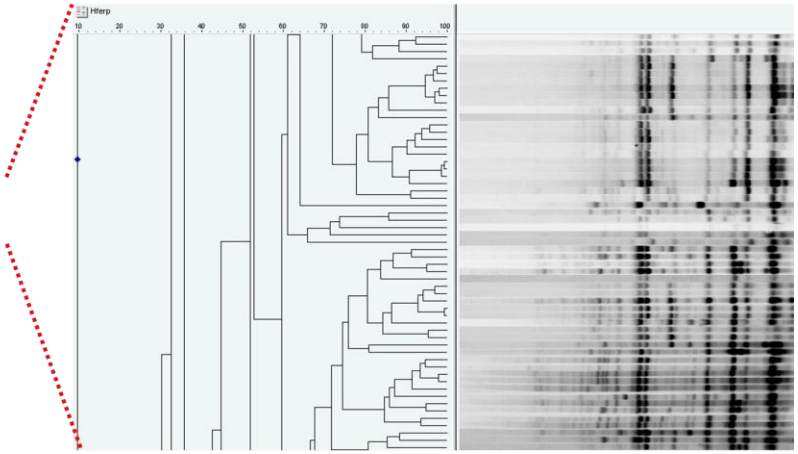
Contributors to Poor Water Quality



Data from a subset of 10 beaches in WI. Data collected from 2010-2012.

DNA Fingerprinting and qPCR

- Molecular testing to verify sanitary survey results by identifying specific sources
- Source specific – using molecular based techniques
- Very powerful tool once sources are narrowed



Leads to Healthier and Safer Beaches