Maumee Bay State Park
Wetland Restoration Study

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Overview of Today’s Meeting

- Maumee Bay and bacteria issues — a recap
- Goals of the current study
- Wetlands for Controlling Bacteria – Dr. Dwyer
- Wetland System Scenarios – Hull & Associates
- Questions
- Poster session: City of Oregon, ODNR, Hull, UT, TMACOG
- Comment cards
Bacteria Issues

- *E. coli* = an “indicator” species for presence of fecal matter. The standard is 235 colonies/100 ml of water.

- Maumee Bay State Park beaches posted for high bacteria levels a total of 316 days 1986-2007
  - Range of 0 to 50 days/year
  - Average 14 days/year
  - Bathing season is about 100 days/year

- Where are the bacteria coming from?
- What needs to be done to assure safe bathing at Maumee Bay State Park?
- Studies have narrowed these questions and suggest solutions.
Previous Studies

- Inland lake vs. Lake Erie beaches
- Geese and gulls?
- E. coli DNA tracking
- Maumee Bay sampling for sources
- Toledo Edison Bayshore plant sampling
- Wolf Creek / Berger Ditch sampling
- Other ditches draining into the bay
- UT, USGS, ODNR, Toledo/Lucas County Health Department, Cities of Oregon and Toledo, TMACOG
Wolf Creek Watershed

Wolf Creek and Berger Ditch Watershed
Oregon
Jerusalem Township
Northwood Ohio
2002 Wolf Creek
Conclusions

- *E. coli* in sediment were high throughout stream
- *E. coli* hot spots present, but not always in the same place
- Rainstorms stir up sediment & bacteria
- *E. coli* survive in sediments for a month with a population drop of 97%—still a health risk
- Fecal contamination remains in the sediments as long as they are under water or moist
- High *E. coli* upstream of the seiche
Maumee Bay 2004: *E. coli*

- **High** *E. coli* in Maumee River
- **Settle out in shipping channel**
- **Low** *E. coli* levels between CDF & park
- **High** *E. coli* levels at Berger Ditch
- **Low** *E. coli* levels at other ditches
Berger Ditch sites – 2004

Escherichia coli, in MPN per gram dry weight

Detection limit

Water
- 5 - 20
- 21 - 100
- 101 - 200
- 201 - 620

Distance, in meters

Maumee Bay State Park

F = Berger Ditch
**E. coli** in power plant intake & outfall

- **E. coli** levels slightly lower in outfall
- Low concentrations between outfall & park

**Median temperatures:**
- Intake: 22.7°C
- Outfall: 25.8°C

**Box plots:**
- **Escherichia coli**, in colonies per 100 milliliters
- **Escherichia coli**, in MPN per gram dry weight
Maumee Bay Study 2003-5
Weather conditions and E. coli
Factors that do not affect *E. coli* at Lake Erie beaches

- Rainfall 2 or 3 days ago
- Number of birds
- Number of bathers
- Water temperature
- UV index (yesterday)
Factors that do affect *E. coli* at Lake Erie beaches

- Rainfall in the previous 24 hours
- Turbidity
- Wave height
- Wind direction
2003-2005 Study Conclusions

- Sites in the shipping channel acted as depositional areas for *E. coli*
- Remote sources do not have a measurable impact on *E. coli* levels at MBSP Lake Erie beaches
- Effluent from Toledo Edison did not result in elevated *E. coli* concentrations
- Berger Ditch is a principal source of *E. coli* to MBSP Lake Erie beaches
Meanwhile …

- Toledo/Lucas County Health Department tested septic systems
- Required failed systems to upgrade
- Oregon built sewers @ $12 M
- Eliminated several package plants and hundreds of septic systems
Actions from 2003-5 Study

- Sewers help, but probably won’t eliminate problem
- DNA study indicates multiple sources are likely
- Wolf Creek has the single largest impact on park’s Lake Erie beaches
- Continue studies to identify and address all watershed sources (e.g. all warm blooded animals)
  … or …
- Treat the stream water to protect the beaches
What are the economic impacts to tourism, recreation of bacteria advisories?

- There has been declining attendance at the park’s beach: #1 reason may be beach advisories
- Other studies indicate an elimination, not reduction, of advisories needed to reverse the trend
- For beach visitors, the annual value of wetlands that eliminate advisories would be $6.5 million
- 84% of beach visitors would visit the wetlands
Wetland Restoration Study
Wetland Systems
Dr. Daryl Dwyer and Hull & Assoc.

- Evaluate wetland systems that could protect beaches from bacteria in Berger Ditch
- Develop a conceptual design for such a wetland system
Next Steps

- Review input from tonight’s meeting
- Revise/finalize conceptual wetland design based on public comments
- Study complete by end of 2007
- Present recommendation to ODNR and other affected entities
Project Management Team

- City of Oregon
- Lucas County Engineer
- Ohio DNR
- Ohio EPA
- University of Toledo
- US Geological Survey
- TMACOG, coordinator
- Hull & Associates, consultant