Nature-based shorelines and Ohio’s Coastal Management Program

- Research & Monitoring
- Design & Construction
- Training & Regulatory Policy

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Sandusky, OH
Ohio - Lake Erie

312 miles of shoreline: 8 counties, islands & bays
Two large bays: Sandusky & Maumee
Largest river/watershed in the Great Lakes: Maumee
8 Commercial ports with large federal breakwaters,
> 20 significant recreational harbor inlets.
Over 85% of shoreline is armored.
Vast majority of shoreline is private, except....
About 20 miles of diked wetlands in Ottawa & Lucas.
Ashtabula County, 60-foot high glacial till bluffs, highly eroded
Eastern Lake County, seawalls, groins, not much beach remaining
Eastern Cuyahoga & Lake Counties; concrete rubble legacy
West of Cleveland, vertical shale bluffs, very little beach
Western Ottawa County, low-lying upland, NE storm, April
Lucas & Ottawa Counties, armored dike protecting wetlands
Ohio Nature-Based Shoreline Projects

RESEARCH & MONITORING
• 2012- present: Nearshore fish sampling, analysis and GIS modeling to predict effects of nearshore habitat changes.
• Biomimicry PhD Fellows addressing shoreline risk models and natural shore structure design.
• On-going monitoring of NBS projects.

DESIGN & CONSTRUCTION
• NBS projects on Black, Cuyahoga & Ashtabula Rivers (AOCs) completed, monitoring
• Shoreline Park Sandusky pilot/example project.
• Sandusky Bay Initiative, engineering complete. Proceeding to construction.
• Maumee Bay / Cullen Park nearshore wetlands.

OUTREACH & POLICY
• 2016. Hosted NBS workshop with Hudson River NERR/
• 2017. Two Ohio NBS workshops for consultants, contractors and local government.
• Ohio NBS training/technical assistance for consultants & contractors.
• Potential regulatory rules & policy changes for NBS projects.
Since 2012, OCM has partnered with Ohio EPA, ODNR Fisheries and the University of Toledo for on-going yearly studies of fish abundance and shoreline features interactions. This work has resulted in a clearer understanding of how types of shoreline structures and vegetation can influence the health of the nearshore habitat.
Nearshore Fish Sampling
Total Abundance by Family

- Bowfin (Amiidae)
- Catfish (Ictaluridae)
- Drum (Sciaenidae)
- Gar (Lepisosteidae)
- Goby (Gobiidae)
- Herring (Clupeidae)
- Killifish (Fundulidae)
- Minnow (Cyprinidae)
- Perch (Percidae)
- Pike (Esocidae)
- Silverside (Antherinidae)
- Sucker (Catostomidae)
- Sunfish (Cenarchidae)
- Temperate Bass (Moronidae)
- Trout-perch (Percopsidae)
Species Richness
51 sites
Building Resilient Shorelines Research

- Shoreline alterations affect fish species diversity and abundance
- Armoring alters fish community diversity but response is variable based on underlying substrate/habitat types
- Shoreline / terrestrial vegetation = positive effect.
- Areas of low wave energy / sheltered bays and harbors have highest diversity and abundance
- Most of the open coast nearshore is similar to off-shore conditions (high wave energy and pelagic species)
- Developing statistical GIS shoreline change prediction tool using data
Sandusky Bay Shoreline Park
Downtown Sandusky, public access park

Why natives matter

Sandusky Bay Shoreline Park
Sandusky Bay Initiative: System Thinking at Scale

Portfolio of Projects

Planktothrix, dredging, wetlands, recreation and a multitude of partners
Geneva State Park

High water and storms erode recreational trail
Toledo / Maumee Bay

Largest annual dredging volume in Great Lake
Cullen Park Shoreline Toledo

TYPICAL SHORELINE SOFTENING - SECTION A-A'
SCALE: NOT TO SCALE
NBS Technical Assistance for property owners

- Don’t dump yard waste over bluff slope
- Keep and encourage native plants and trees
- “Trees work cheap”
Policy Directions

• Temporary, emergency, non-engineered erosion control structure permits (since May 2018)
• Simpler applications for beach nourishment and NBS permits
• Relax submerged lands lease requirements for private structures
Michigan Natural Shoreline Partnership

OCM/OWC planning similar consultant/contractor training
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• ODNR Fisheries, Parks & Watercraft, & Wildlife
• The hundreds of Lake Erie lakefront property owners

http://coastal.ohiodnr.gov/