

Lake Erie

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About Lake Erie



Physical Integrity



Land use



- Major stress on ecosystem
- Physical impacts
- Basin wide less than 20% “natural habitat” remains
- Most dramatic in western basin--less than 6% forest cover and 3% coastal wetland remains



Tributaries

- 89% of flow (80% Detroit River)
- Link between the land and the lake
- Plumes important habitat feature
- Spawning, nursery and forage habitats for many fish species
- Estuarine/riverine wetlands essential



Tributaries

- Lower reaches of many tributaries highly degraded even though > 50% reduction in sediment and nutrient inputs since GLWQA
- Structures alter river channels
 - Increasing temperature and
 - Suspended sediments
 - Decreasing oxygen and habitat complexity
 - Alter hydrology
 - Timing of spring runoff





Nearshore



- Over 80% characterized as nearshore
- Nearshore and offshore biotic communities dependant on physical integrity of nearshore
- Highly modified especially in western basin
- 80% wetlands lost
- 50% shorelines altered
- Rates of loss declining



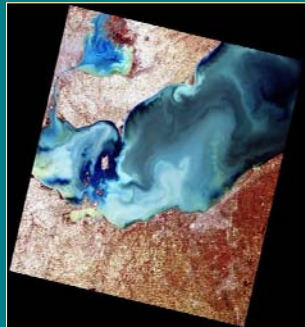
Zebra and quagga mussel impacts

- Prodigious filter feeders
- Dreissenid mussels have altered substrates transparency, food web
- Resulted in extirpation of native mussel, altered substrates, increased macrophytes and Cladophora
- Reduced benthic diversity
- Mussels are here to stay!



Offshore

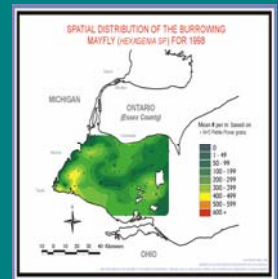
- Reliant on coastal inputs, current patterns, bathymetry and climate
- West to east movement nutrients and sediments
- Storm events – more frequent winter and summer re-suspension of material



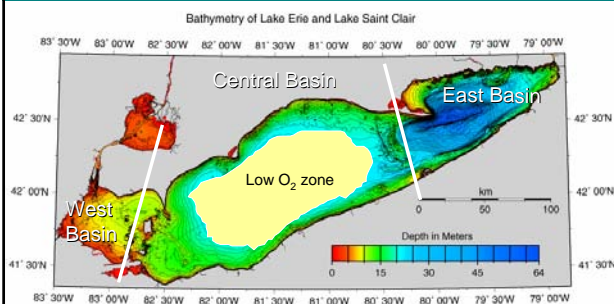
Hexagenia



- Rapid expansion in western basin late 1990s due to improved sediment quality
- Predominantly western basin
- Key component in food chain
- Distribution different from historical
- No further expansion since 2000



Offshore – Central Basin anoxia



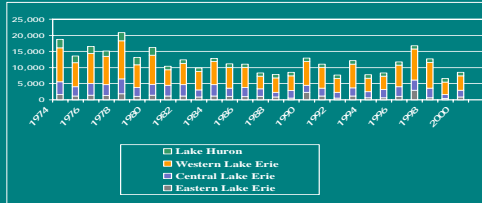
Offshore

- Dreissenid mussels have altered substrates and water quality
- Other invasive species further altered the system
- Benthic communities presently favoured
- Potential changes to mass sedimentation rate a concern
- Dreissenid abundance declining?



??? Phosphorus ???

- Lake-wide P loadings at or below target
- P concentrations increasing spring and summer
- Loading-concentration-productivity relationships breaking down
- Number of factors contributing – loadings, internal cycling, sedimentation coefficients, central basin oxygen



Future challenges

- Climate changes - exacerbate current conditions
- Prevent further introductions of non-native invasive species
- Tributaries and nearshore communities are highly degraded must be rehabilitated and protected to restore functional habitat connections
- Protect and restore remaining natural landscape features
- Expanding human populations exert increasing pressure

Status of Lake Erie: Mixed

- Recognition of the impacts of land use
- Tributaries and nearshore habitats degraded but improving
- Improving sediment quality
- Future introductions of invasive species likely
- Uncertainty around phosphorus dynamics and central basin anoxia



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