

Lecture 4 - Ecosystems and Matter Cycling

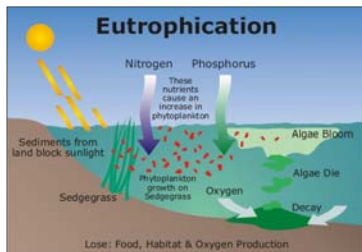
1. The Biogeochemical Cycles
2. Aquatic Dead Zones
3. Eutrophication and Harmful Algal Blooms in Lake Erie

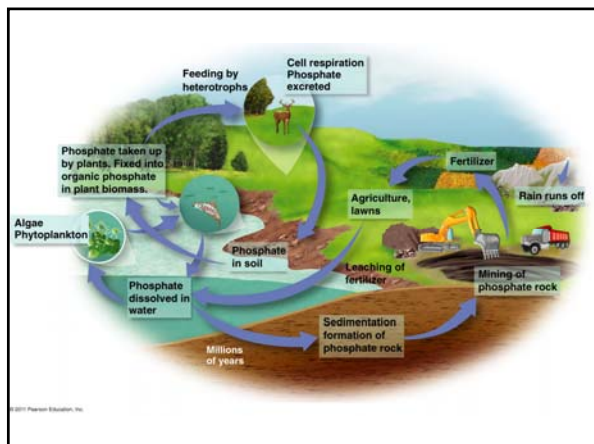
Key Concepts

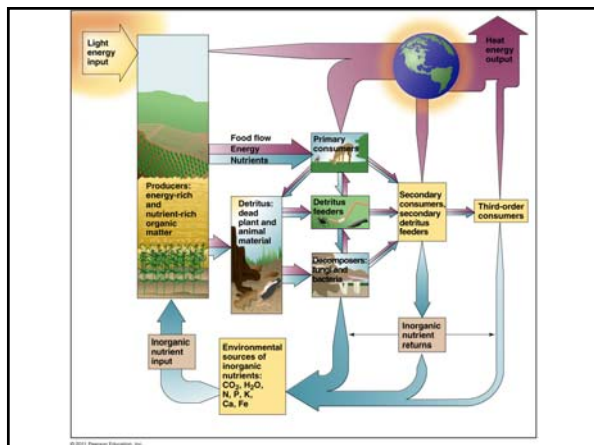
- Eutrophication: what is it and its causes
- The impacts of human activity on the flow of nutrients
- Aquatic Dead zones: what are they, examples
- Eutrophication in Lake Erie: history, sources, algae involved, issues

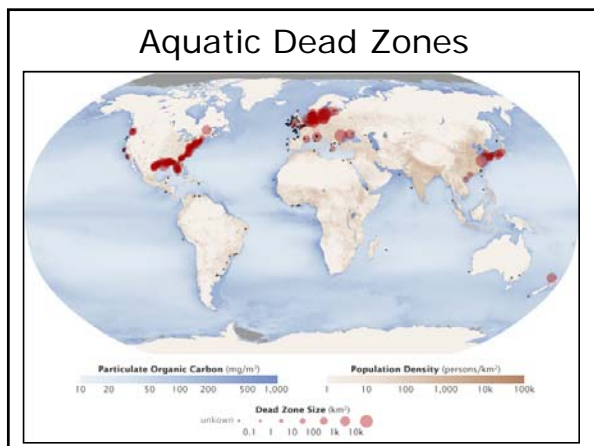
What is Eutrophication?

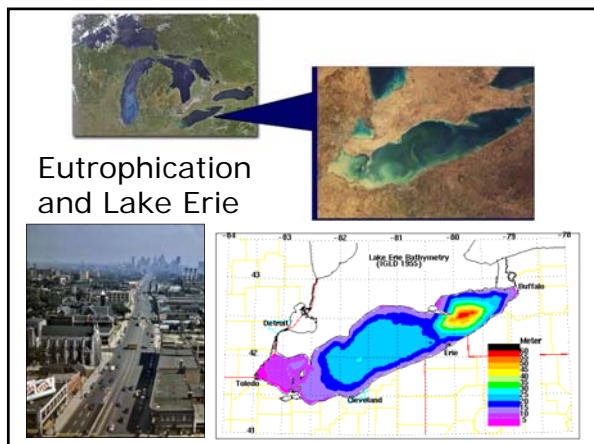
- **Natural process of nutrient enrichment of water bodies that:**

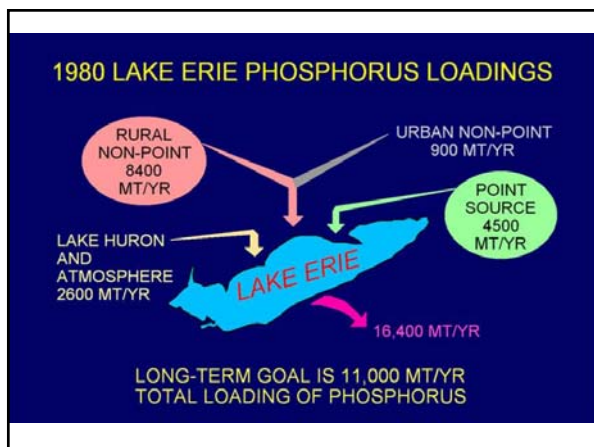


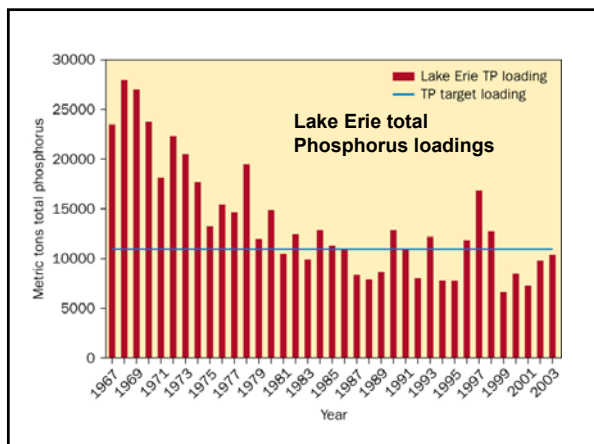












Great Lakes phosphorus levels rising, report warns

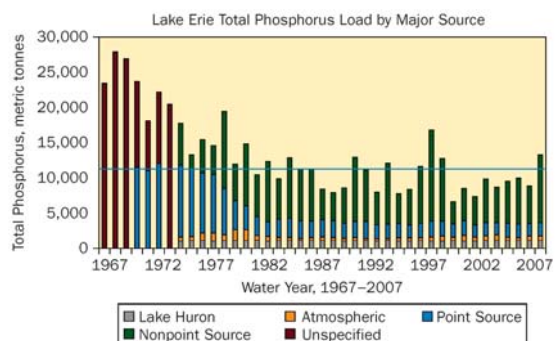
Lake Erie is the 'poster child' for eutrophication, says IJC U.S. co-chair

By Sharon Stappan, CBC News - Posted: Nov 09, 2011 5:22 AM ET | Last updated: Nov 09, 2011 1:18 PM ET

Great Lakes experiencing 'new stresses'

Pharmaceutical waste, fertilizers and climate change all new threats to fresh water

CBC News - Posted: Nov 10, 2012 2:53 PM ET | Last updated: Nov 10, 2012 3:23 PM ET



Ohio Lake Erie Phosphorus Task Force Final Report

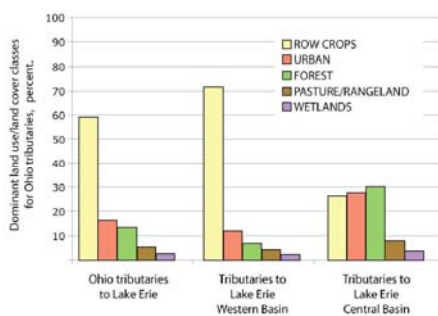
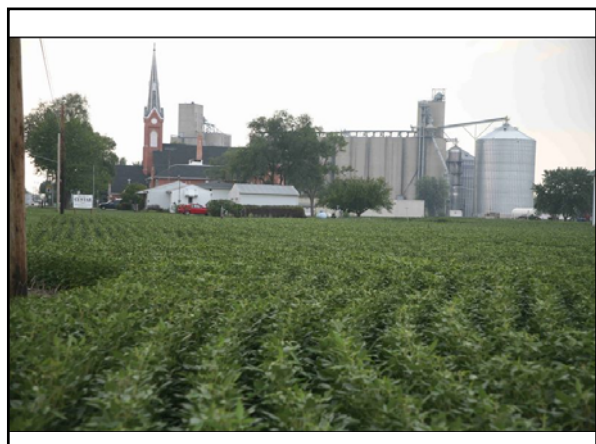
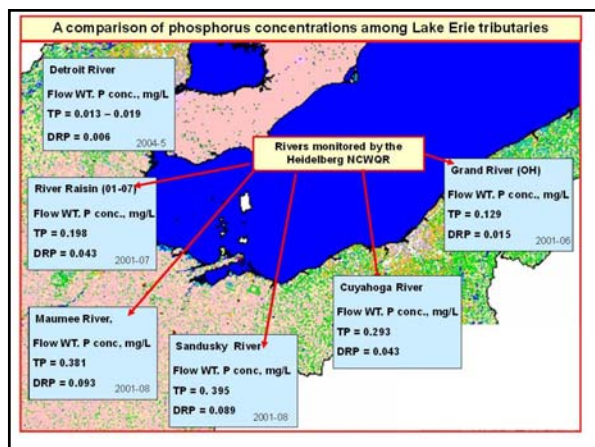
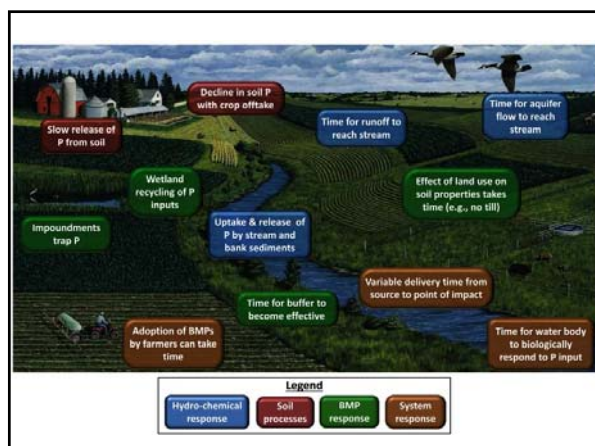


Figure 15 — Dominant land use/land cover classes for groups of tributaries in the Lake Erie basin. Row-crop agriculture is more prevalent in tributaries draining to the western basin, whereas mixed land use/land cover is found in the tributaries draining to the central basin. (Prepared by Don Button, USGS for the Phosphorus Task Force)



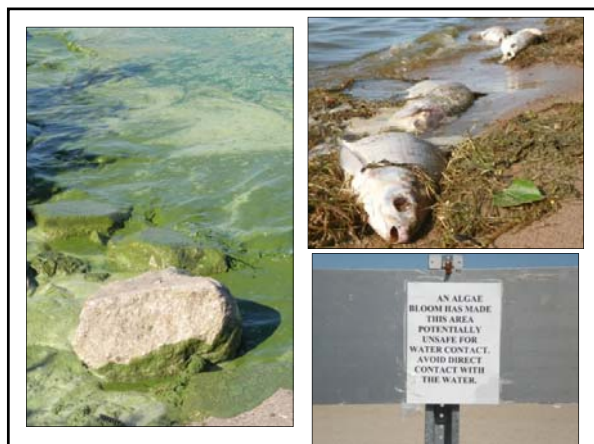


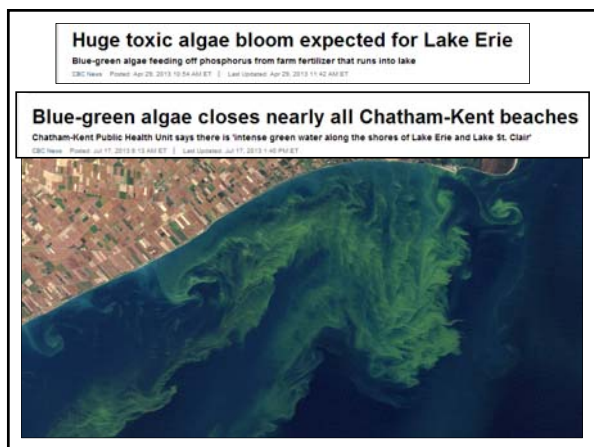














Stunning NASA photos spotlight algal blooms in Lake Erie, Lake St. Clair

Algae growth in Lake Erie could rival record-breaking 2011 bloom, scientists predict



the Operational Land Imager (OLI) on Landsat 8 captured these images of algal blooms around the Great Lakes. The bloom is visible in Lake St. Clair, left, and Lake Erie, right. (NASA)

Conclusion

- Eutrophication is a nutrient enrichment in a body water, that encourages the increased growth of phytoplankton
- The rate of eutrophication has considerably increased due to human activity
- Lake Erie has been particularly impacted by this phenomenon, with large blooms of toxic blue-green algae in the summer, in recent years

Things to Consider

1. What are the main socio-economic impacts of the algal blooms in the Great Lakes?
2. How can eutrophication be controlled around the Great Lakes?
3. Is dilution of aquatic contaminants always the solution to pollution?

TO DO!

1. Next lecture: *Video – Story of Stuff*
 - Questions will be posted on A2L

1. Tutorials start **this week** :Bring a copy of the Group Discussion Answer Sheet
