

TENTATIVE COURSE OUTLINE

Date		Lecture Topic	Lecturer
Sept-11	1	• Introduction: Great Lakes in a global context	MD
Sep-18	2	• Thermal structure of the Great Lakes	MD
Sep-25	3	• Structure and Productivity of Aquatic Ecosystems	MD
Oct-2	4*	• Carbon and Nitrogen Cycles/ Assignment 1	MD
Oct-9	5	• Phosphorus Cycle	MD
Oct-16	6	• Food Web, Planktonic Communities	MD
Oct-23	7*	• Eutrophication in Great Lakes/ Midterm in Class	MD
Oct-30	8	• Water-Land-Interfaces	MD
Nov-6	9	• Invasive species	MD
Nov-13	10	• Pollutants in Great Lakes	MD
Nov-20	11	• Students presentations	MD
Nov-27	12	• Students presentations	MD

Week 1 – September 11 ORIENTATION GREAT LAKES IN A GLOBAL CONTEXT

Course Outline; Lecture Schedule

Great Lakes in Global Context

Week 2 – September 18 THERMAL STRUCTURE OF THE GREAT LAKES

Thermal Layering & Lake Overturning

Thermocline Development

Thermal Classification of Lakes; Vertical Stability

Examples from the North American Great Lakes

Potential impacts of climate change

Week 3 – September 25 STRUCTURE AND PRODUCTIVITY OF GREAT LAKES

Lake Ecological Concept

Population growth and Regulation

Community Structure and Interrelationships

Ecosystem Interrelationships, Productivity

Week 4 – October 2 CARBON AND NITROGEN CYCLES

The Oxygen content of inland waters, distribution of oxygen in Lakes

The occurrence of inorganic carbon in freshwater systems, utilization of carbon by algae

Sources and transformation of nitrogen in water

Nitrogen Loading and Algal Productivity

Assignment I

Week 5 – October 9 PHOSPHORUS CYCLES

Phosphorus in freshwater systems

Phosphorus and the sediments, internal loading

Phosphorus Loading and Algal Productivity

Week 6 – October 16 FOOD WEB, PLANKTONIC COMMUNITIES

Composition of the Algae of Phytoplankton, Importance of size

Phytoplanktonic Communities, Growth Characteristics and Mortality of Phytoplankton

Heterotrophy of organic carbon by algae and cyanobacteria

Seasonal succession of Phytoplankton

Zooplankton, Food, Feeding and Food selectivity, Food-web Dynamics in Great Lakes

Week 7 –October 23 EUTROPHICATION PROBLEMS IN THE GREAT LAKES

Basic Concepts of Eutrophication

Natural and Cultural Processes of Eutrophication

Relationships among Nutrients, Water Clarity, and Phytoplankton

Eutrophication Problems in: (i) Lake Erie; (ii) Lake Superior; (iii) Lake Michigan, (iv) Lake Huron; (v) Lake Ontario.

Midterm in class

Week 8 – October 30 WATER-LAND-INTERFACES

A few Web Reference Sources:

<http://www.epa.gov/glnpo/atlas/> The Great lakes Atlas

<http://www.great-lakes.net/index.html> Great Lakes Information Network (GLIN)

<http://www.epa.gov/glnpo/index.html> U.S. Environmental Protection Agency (EPA)

<http://www.cciw.ca/nwri-e.html> Environment Canada, National Water Research Institute (NWRI)

<http://www.glc.org/> Great Lakes Commission (GLC)

<http://www.ndbc.noaa.gov/index.shtml> National Oceanic and Atmospheric Administration's (NOAA) National Data Buoy Center

<http://www.glerl.noaa.gov/> National Oceanic and Atmospheric Administration (NOAA) Great Lakes Environmental Research laboratory (GLERL)

<http://www.glerl.noaa.gov/res/Programs/ncrais/> National Oceanic and Atmospheric Administration (NOAA) National Center for Research on Aquatic Invasive Species

<http://www.glfc.org/home.php> Great Lakes Fisheries Commission (GLFC)