Biology 3EI3 Ecological Indicators

Instructor: Dr. Patricia Chow-Fraser (LSB Rm 224)

Office Hours: Immediately after lectures and labs, and by appointment ONLY

Course Description:
For over two decades, ecologists and managers have routinely used ecological indicators and indices (including several parameters) to evaluate the condition or health status of an ecosystem, to assess the effectiveness of management actions, and to track changes in ecosystem response to major environmental disturbances. This course will introduce students to some of the indicators and indices that have been developed for use in aquatic ecosystems including streams, wetlands and lakes. Several case studies will be used to illustrate how indicators have been used to guide ecosystem restoration and management of sensitive fish and wildlife taxa, including those occurring within the local community and within the Great Lakes basin. The associated laboratory exercises will reinforce in-class presentations and discussions and allow students to process field samples, analyze data, perform statistical tests and conduct GIS analyses. By the end of the course, students will be familiar with use of various indicators (e.g. water quality information, abundance or presence of biota, percentage land use and landscape features) to monitor the health of different types of aquatic ecosystems.

Required text: There is no recommended textbook. The course will rely on the exclusive use of on-line primary and secondary literature, as well as data and samples that will be provided for the course. A lab manual containing all procedures and protocols will be required (sold to students ($10) during the first week of classes).

Presentation Format: Two 1-h lectures and One 3-h laboratory weekly

Avenue to Learn will be used to communicate with students in the course. Students are expected to consult this regularly (before weekly lectures and your lab) to keep up with updates and instructions.

Tentative Grading Scheme*:

Lab write-ups /assignments	40%
Midterm Exam	20%
Seminar presentation	20%
Class participation	5%
Final Lab Exam (practical)	15%

*The percentage for each course component is subject to change but will be made public at the beginning of the term.

Tentative list of topics

1. How ecologists choose indicators; insights from a meta-study of 14 years of papers published in *Ecological Indicators*
2. Introduction to aquatic ecosystems: streams, vernal pools, coastal wetlands, lakes
3. Use and development of indicators to assess stream health in urban and agricultural settings
4. Use and development of indicators to assess coastal wetlands: tracking effectiveness of management actions; evaluation of wetland quality across the Great Lakes; tracking changes in ecosystem health following disturbance
5. Use of remote sensing and GIS to assess impact of land uses on aquatic resources in watersheds
6. Trophic State indicagtors for lakes and embayments
7. Influence of nearshore geomorphology on habitat use by the wetland fish community
8. Indicator of pathogenic contamination in source water
9. Use of univariate and multivariate statistical analyses to determine significant trends