

## Environmental Analysis and Management

**1. INTRODUCTION:** This is a course in which we attempt to relate the need for environmental management with the practical skills and techniques that are available, or are being developed, to meet that need. It draws on the strengths of having students from different academic backgrounds and explores mechanisms for the kind of interdisciplinary collaborative problem-solving that is essential in environmental work.

While environmental appreciation—and management concern—have a long history, we are only about 50 years into active commitment to “managing” environmental impacts. Despite this, the challenges of environmental work have proven to be significant. Climate change, biodiversity loss, desertification, water shortages, human population growth and increasing per capita demand all pose conspicuous, omnipresent, challenges that require critical examination and informed, coordinated, action. These overarching issues arise from the aggregate of individual local activities, but it is as yet unclear what will be the right combination of management efforts that target local conditions (like urban planning, local bylaws, or community action) and management efforts that target international or global agendas (like trade laws, environmental protocols, or climate accords). The goal in management is to contribute to what is now loosely called “sustainability.” The various strategies we are now exploring may (may!) provide solutions; but it is clear—especially now—that more innovation will be required. Perhaps you will provide that essential innovation!

The discipline of environmental management is intended to ensure more informed decisions, more strategic decisions, and decisions with better outcomes. It is intended to help us maintain what are, quite simply, our life support systems. The objectives are therefore not only to enhance the positive outcomes, but also to reduce the risk of negative outcomes, most notably environmental disasters. Despite the 50 years of effort on and attention to environmental management, we are still faced with what seems an increasing flood of concerns about environmental limits, threats and catastrophes.

**Reading the signals:** Landmark environmental disasters have marked our “progress” in environmental management. These include Bhopal (Dec 3, 1984 -- litigation continuing to 2012); Chernobyl (April 28, 1986 contaminated ground still sequestered) and the Exxon Valdez (March 24, 1989 – impacts still detectable in the coastal areas). More recently, consider Katrina -- Aug 25, 2005, the Jan 12, 2010 earthquake in Haiti that killed some 300,000 (by initial claim); the April 20, 2010 explosion of Deepwater Horizon and the 86 days of sustained oil discharge into the Gulf of Mexico, marking the largest ever US oil spill; the March 11, 2011 earthquake/tsunami/nuclear disaster Fukushima, Japan. And, unfortunately, to this pantheon, we add our local Lac Megantic tragedy (July 6, 2013). The Fort McMurray wildfire – The Beast – in May 2016, startled the world. While climate change was not the smoking gun, it is certainly linked.

While some of these events have natural causes, a natural event itself is not a disaster, it is the context and the outcome that makes it so. The impact of Hurricane Harvey is still in the news, and will for a long time to come. Think of the ways natural and anthropogenic factors have interacted to make a weather event an environmental disaster. It is not just the question of how climate change may have altered extreme weather events (including storm frequency, intensity and distribution), but it is also what has happened to the landscape that increases vulnerability, economic cost, human loss, and environmental damage (think altered drainages, broken levees, contaminated water, vulnerable buildings, inadequate escape routes, poor emergency responses, and increased public health risks). These are not easy situations to manage; they WILL require new paradigms, new commitments, new skills and new actors.

While Harvey raged, unprecedented fires burned in B.C. and Europe only just began to recover from Lucifer, with daily temperatures over 44°C (Cordoba, Spain, hitting 47°C (117 °F)). These events do not suggest “sustainability,” but like the events listed above, they reflect the increasing vulnerability of humans in increasingly precarious relationships with their habitat. Paradoxically perhaps, it is “progress” that creates these changes, and progress that has made us more numerous and healthier than ever before; in a sense, the race is between innovation and vulnerability, or as HG Wells put it, between education and catastrophe. We hope for a better future, but the big persistent issues remain: population increase, increased human impact on ecosystem dynamics, biodiversity loss, climate change, resource depletion. That this vulnerability should still be increasing after 50 years of conscientious effort by some of the world’s smartest and most progressive thinkers might be cause for discouragement. In the current political climate, it is.

**Political will and environmental management:** Significantly, while Trump clouds loom to our south, we are approaching the end our second year with “sunny ways” in Canadian politics. But witness the change from, say, the 1972 United Nations Conference on the Human Environment (which led to UNEP), to the 1983 World Commission on Environment and Development, (which led to “Our Common Future” in 1987), to the UN Conference on Sustainable Development 1992 (the so called “Earth Summit” in Rio that led to Agenda 21 – the biggest ever meeting of heads of state!!), finally, in 2012, to the fraught “Rio + 20” UNCSD meeting, where delegates scrambled to save face at the end of a meeting which captured practically no media attention and produced very few tangible results. From Kyoto (1997), to Copenhagen (2009), to Paris (2016), to the night of June 1, 2017 (Trump announces withdrawal from Paris Agreement)! There are many conflicting priorities in world politics and in economic action. It is unclear still how environmental management will rank.

And yet... and yet...despite the grounds for discouragement, there is still cause for hope. At this time in 2015 UN delegates met in New York to approve the sequel to the Millennium Development Goals, the so called “Sustainable Development Goals.” And certainly there are successes (acid rain; ozone and CFCs in fridges; lead in gasoline; river restoration; AND smarter people).

**Three conclusions:** We are just over four years from the still-unresolved disaster at Lac-Mégantic. The final damage, the overall consequences will not be fully known for years. But if you select almost any environmental crisis—Fukushima, The Beast (only now declared out), Harvey—two immediate and incontrovertible conclusions can be drawn: one, we live within increasingly complex social-economic-technological-ecological systems, and, two, to minimize the risks associated with the complexity, we are obliged – morally, economically and ecologically – to focus intelligence and attention on adaptive planning and management. A third conclusion, or at least observation, arising from events like the disasters listed above, is that our obligations to improve our ability for adaptive planning will require concerned, informed and empowered citizens—people like you—to be aware, involved, and competent. Your university education—including this course—should help.

This course is part of the on-going effort to “to ensure more informed decisions, more strategic decisions, and decisions with better outcomes” in regard to how humans relate to their habitat. It sets three general goals: 1) to provide you with something (useful!) you will remember as you move into your career, whatever that may be; 2) to assist with development of marketable technical competence in environmental management, and 3) to give you something serious to think about – ambitious goals for a university course perhaps.

What do you think are the “environmental management” dimensions of the crises listed above? What can be learned from them? What should be done? What can be done? What will be done, and what will explain the differences between is done and what can and/or should be done? This course will take a broad view of these questions, within a *Human Ecology Perspective*. The focus is not on the specific crises listed above, but rather on the “human condition” and on human capabilities, circa 2017 AD, that are implicated in the crises, and which certainly affect the prognosis. We look at the perceptions, attitudes and behaviours that are linked to the vulnerabilities, and at the scientific, technical, regulatory and policy tools that are available to intervene. So...

**2. HUMAN ECOLOGY:** All organisms influence their environments. Some influences are ameliorative, that is, they reduce stresses or hazards for the organism itself or for others of its species. Other influences may make a habitat more hostile to the organism. Local extinction is a common outcome. For non-human species, and even for some human groups, a spatial or temporal cycling through habitable environments may be seen as a natural and even a necessary process. For modern humans, it is an environmental crisis.

What is special about dynamics in human ecology is 1) the scale of change, 2) the fact that, in human eyes anyway, human life has a special sanctity, and 3) the fact that we can establish conscious programs to do something about our ecology. Efforts to increase environmental utility or decrease environmental hazard are called environmental management.

**Terms of reference:** Environmental management might be considered as an applied, technical, science: some problem arises in an ecological system and a manager’s task, like a plumber’s, is to go in and “fix it.” Certainly practitioners should have a thorough, technical, understanding of natural systems. Natural science continues to build this understanding - and we ignore scientific advances at our peril. You should already have a good background from general reading and from other courses you have taken. But applying this knowledge to environmental problems requires much more than a mechanical cause-and-effect understanding of environmental systems. Why?

In common parlance we have no trouble with the words "environment" and "management." But we shall see that in practice, things are more difficult because:

- \* *environments* are the entire sustaining contexts for life and, for humans at least, this context is variable, determined in part by resource relations, by available technology and by cultural values (thus, "environment" is a non-specific term). Human ecology *is* different.
- \* *management* must recognize this difference. Management can only work through cultural systems (thus, "management" is an indirect activity with inescapable social dimensions).

When these words are put together, the difficulty, predictably, is amplified. Two additional factors contribute:

- \* environmental systems are inherently complex, and so predictability is low,
- \* the field is new, so established practices are few.

Ideas from the social sciences, engineering and humanities as well as from the natural sciences must be addressed. The fact that these ideas are not always consonant is what makes the field both interesting and challenging.

**Two distinct but interdependent problem sets:** Since the 1987 Brundtland Commission report, "sustainable development" has become a fashionable phrase for describing the challenge of reconciling human needs with planetary limitations. How much impact has this thinking had? The net impact of humans on the carrying capacity of the planet, or of any region, is a function of both numbers of people and impact *per capita*. The global community, through the UN, committed to the Millennium Development Goals (<http://www.un.org/millenniumgoals/>). Likewise, *The Millennium Ecosystem Assessments* (<http://www.millenniumassessment.org/en/Condition.aspx>) show commitment and some progress, at least in defining issues. As noted, The United Nation has agreed to Sustainable Development Goals (SDGs: <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>).

### **3. COURSE OBJECTIVES**

Environmental studies attempts to nest the expertise of specific contributing disciplines into a common framework of general understanding. This is necessary to define compatible directions and mutually supportive roles for individuals involved in environmental management. Since environmental management deals with action intended to improve environmental conditions, it requires appreciation of both methods and goals. This course addresses both. It should help you to put your existing knowledge into context, develop a perspective on the range of practical management strategies, acquire an understanding of some of the major relevant theoretical issues, and establish your own priorities for further study.

The course has two specific objectives, one related to **how**, one related to **why**.

- \* Objective 1: to ensure that all students are conversant with essential concepts of environmental analysis and management that determine how things are done in this field – this is a technical subject, but it is contested, interdisciplinary, experimental and rapidly evolving.
- \* Objective 2: to consider elements of humanity's evolving perception, understanding and valuing of environmental resources that determine why things are done – this is not technical, but value laden and driven; it is more complex and more contested, and yet, for all that, it is arguably more important, more interesting, and more appropriate to a university setting.

#### **4. READING and STRUCTURE**

There is one required text for this course and required online document.

- Bram F. Noble (2014). Introduction to Environmental Impact Assessment A Guide to Principles and Practice, Third Edition. OUP Canada ISBN-10: 0195429621
- Secretariat of the Convention on Biological Diversity (2015). Linking Biodiversity Conservation and Poverty Alleviation: A State of Knowledge Review. CBD Technical Series 55. 73pp. ISBN # 92-9225-281-X <https://www.cbd.int/doc/publications/cbd-ts-55-en.pdf>

We will also make reference to parts of the following document:

- CEAA (2017) Building Common Ground: A New Vision for Impact Assessment in Canada  
<https://www.canada.ca/en/services/environment/conservation/assessments/environmental-reviews/environmental-assessment-processes/building-common-ground.html>

Lectures and text readings are intended to complement, not duplicate, one another. You are responsible for both. The tests will draw on lectures and material from the book, including material not covered in class. Material from the lectures, not covered by the book, will also be examinable (so coming to class is a good idea). Additional readings will be assigned as needed for special topics.

#### **5. GRADES and ACTIVITIES**

The marking scheme is as follows:

Two in-class tests @ 20%	- 40%	
Three Assignments		
Two take-home exercises @ 20%	- 40%	
One debates and write-up	- 20%	(last two weeks of class)

##### Five Class Activities

1. Environmental Management Theory and Context
  - what we can do and why we want to do it.
2. Case studies (“Virtual Field Trips”)
  - Environmental management characterized by complexity, change, uncertainty, and conflict. Students learn best in the field. This is the best approximation.
3. Readings on selected environmental management focus areas:
  - The “Global North” : EIA Practice and CEAA 2012
  - The “Global South” : Conservation and poverty reduction.
4. Student EIA debates
5. Evaluations: Two little quizzes for which you must a) attend lectures and grasp the material and b) read and understand assigned material. N.B. Take note of the adage about “leading a horse to water.” The quizzes test primarily whether you have been to the pond!

#### **6. INSTRUCTORS, OFFICE HOURS and CONTACTS.**

The instructor for the course is Thomas Meredith. There are also 3 TAs—Alyssa Wilbur, Alexandra Lesnikowski, and Liz Pis – who will be actively involved in your group assignment. For practical reasons, email communication for the course will be will be limited. Office hours and contacts TBA

## **7. THE FINE PRINT**

1. "McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see [www.mcgill.ca/students/srr/honest/](http://www.mcgill.ca/students/srr/honest/) for more information).(approved by Senate on 29 January 2003)  
"L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site [www.mcgill.ca/students/srr/honest/](http://www.mcgill.ca/students/srr/honest/))."
2. "In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded." (approved by Senate on 21 January 2009 - see also the section in this document on Assignments and evaluation.)  
"Conformément à la Charte des droits de l'étudiant de l'Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté (sauf dans le cas des cours dont l'un des objets est la maîtrise d'une langue)."
3. Text-matching Software: In light of the policy on integrity, we reserve the right to use text-matching software for written assignments in this course, or, if plagiarism is suspected, to provide the student with the right to choose an alternative way of attesting to the authenticity of their work.
4. For information on university and department policies for student assessment, please go to <http://www.mcgill.ca/geography/studentassessment>.
5. Instructor generated course materials (e.g., handouts, notes, summaries, exam questions, etc.) are protected by law and may not be copied or distributed in any form or in any medium without explicit permission of the instructor. Note that infringements of copyright can be subject to follow up by the University under the Code of Student Conduct and Disciplinary Procedures.
6. "As the instructor of this course I endeavor to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me and the Office for Students with Disabilities, 514-398-6009."
7. Guidelines for the use of mobile computing and communications (MC2) devices in classes at McGill have been approved by the APC.
8. "End-of-course evaluations are one of the ways that McGill works towards maintaining and improving the quality of courses and the student's learning experience. You will be notified by e-mail when the evaluations are available on Mercury, the online course evaluation system. Please note that a minimum number of responses must be received for results to be available to students."
9. "McGill has policies on sustainability, paper use and other initiatives to promote a culture of sustainability at McGill." (See the Office of Sustainability.)
10. In keeping with McGill's preparedness planning strategies with respect to potential pandemic or other concerns: "In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change."
11. "Additional policies governing academic issues which affect students can be found in the McGill Charter of Students' Rights"