

Biology for environmental management
pocketguide

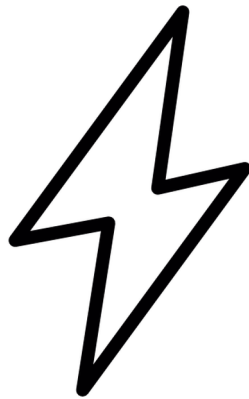
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Chapter 1

Introduction



Welcome to biology for environmental management. The goal of this course is to examine global grand challenges that we face through the lens of solutions from science. Science can be magical because it provides us with incredible outcomes in so many domains of the human endeavour. Here, we work to find the magic spells from science for the environment to promote the well-being of people and the planet.

If you are electing to engage with this learning opportunity formally for BIOL4265 at York University, here is the official course outline.

There is an opportunity for us to mobilize science to do social good. We we can leverage what we know, what we do not know, i.e. uncertainty, and what we need to know, to enable conservation, protection, and better management of the environment. This benefits the environment. It benefits us. Here are the ten simple rules the underpin an evidence-informed philosophy for the entire course (Lortie and Owen, 2020).

Learning outcomes

1. Critically read environmental science peer-reviewed journal publications.
2. Reverse-engineer the critical reproducible science tools using peer-reviewed publications.
3. Appreciate the extent and scope of environmental challenges we face globally.
4. Explain the balance between direct human needs and environmental health.
5. Do a formal synthesis such as meta-analysis or systematic review.
6. Effectively communicate scientific synthesis findings to the public.

Structure**Module 1.**

Read a total of 9 useful peer-reviewed science publications.
Test your practical knowledge by applying to a new challenge.

Module 2.

Choose your own adventure (i.e. a dimension of an environmental challenge you care about).
Draw a comic or infographic to communicate challenge to the public.
Write a short synthesis paper on this topic for a scientific audience.

Rationale

For each environmental management challenge case examined, students will be responsible for reading the literature provided at their own pace. The professor will facilitate learning as needed.

The goal is to become more literate environmental citizens and develop, consolidate, and evaluate critical environmental science thinking and problem solving.

The first module highlights some of the most pressing challenges and more common replicable tools used by the scientific community. The formative test is provided immediately at the start of course to enable asynchronous work and provide a clear, transparent, and testable outcome for this module.

The second module provides an opportunity for students in this upper-year offering to do a deep dive into a topic that care about deeply. The dimension of the challenge and the solution they pick is open provided it is well articulated. The graphical assignment is a stepping stone or scaffolding to the final paper.

It is also a chance to be as creative as students elect to be with communicating science to the public. The final paper is an Ignite, Forum, or Mini-review format contribution on their topic appropriate for a general science journal. These types of papers are increasingly common and important in science and used extensively for evidence-informed decision making by leaders.

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Chapter 2

Outline

Here is an overview of the content and topics covered in this course of study. Complete at your own pace, asynchronously. However, please check the official course outline if you are doing the work for credit to ensure you submit summative work at the appropriate times.

Instructions

Read and use the papers to link environmental challenges that we collectively face with potential solutions. Only one solution per challenge is suggested here, but there are many dimensions to each challenge and numerous solutions too.

The link to decks are optional. They are my interpretation of the papers from a science-to-magic philosophy and identify the salient elements and concepts from each reading that resonated with my perspective as an ecologist.

Schedule

week	grand challenges
1	[Ten simple rules to facilitate evidence implementation in the environmental sciences](https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2010GL042845) & [climate change](https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2010GL042845) & [pollinator declines](http://science.sciencemag.org/content/339/6127/1611) & [deck](https://link.springer.com/article/10.1007/s10530-017-1461-x) & [deck](https://link.springer.com/article/10.1007/s10530-017-1461-x) & [land use challenges](https://esa.journals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.2367) & [land use challenges](https://esa.journals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.2367) &
2	
3	
4	
5	
6	prep for test
7	[take-home test](http://www.nrcresearchpress.com/doi/10.1139/cjfas-2016-0520#.W6Uwoy-ZM)
8	choose your own adventure (i.e. challenge): search lit, read, sketch ideas
9	complete & submit scientific comic or infographic
10	choose your own adventure: write paper (review, systematic review, or meta)
11	choose your own adventure: write paper
12	choose your own adventure: submit final synthesis paper

Chapter 3

Climate change

Chapter 4

Pollinator declines

Chapter 5

Invasive species

Chapter 6

Landuse challenges

Chapter 7

Test prep

Chapter 8

Test

Chapter 9

Synthesis science

Chapter 10

Scientific communication

Chapter 11

Meta-analyses

Chapter 12

Paper writing

Bibliography

Lortie, C. J. and Owen, M. (2020). Ten simple rules to facilitate evidence implementation in the environmental sciences. *FACETS*, 5(1):642–650.