2018 ERS 337: ReWilding & Ecological Restoration

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ReWilding is the macro-scale approach to conserving and restoring the socioecological resilience of ecosystems.   It can be spatially explicit and quite dependent on large scale modeling and landscape ecology but it can also take a more integrative approach that is more geared towards ecological planning, management, and monitoring of the whole socioecological system. Consistent with the mission of the School of Environment, Resources & Sustainability, this course will explore the full range of facets that ReWilding involves. Specifically, the course will focus on restoration and conservation at landscape scale, including an emphasis on connectivity, reintroduction of keystone species, novel ecosystems, and re-introduction of apex predators, herbivores, and omnivores. Because ReWilding can be infused with various political agenda and ideologies, technocratic issues, policy ambitions, and governance issues, students can expect to experience a course focused on ecology and technical skills but contextualized and connected to the larger concepts of socioecological change and resilience. This is a 3rd year course: Expect a lot of reading, thinking, synthesis, and action.

Assessment of students (grading/weighting)

1. Announced 1st Quiz on Fundamental Concepts in ReWilding: 5% of final grade
2. Assignment (Media) on ReWilding in One Minute: 10% of final grade
3. Assignment (Writing) on a Policy Briefing on ReWilding: 15% of final grade
4. Two Unannounced Quizzes on Class Lessons: 10% on final grade (each quiz = 5%)
5. Final Exam: 60% of final grade; includes a revisiting of the 1st quiz's scope.

1. Quiz on Fundamental Concepts in ReWilding

This year, I'm going to have students demonstrate how much you learn between the beginning and end of the course. Besides ensuring that you are keeping up with class, this allows me to quantify how much learning (of the fundamental concepts) has occurred by the end of the course. This 1st quiz focuses on material from the first class' lesson. The question or questions will not be trivial but probe your understanding of what rewilding is all about.

2. Rewilding in One Minute

For this exercise, I intend that you put into practice the idea of an 'elevator speech' or 'pitch'. What you are to do is create a 1 minute pitch that explains, in plain language, why rewilding is important. Your audience would be laypeople – the general public. You aim to explain this to people with no more than a grade 10 high school education. The format will be done as an audio/video composition - it can be as simple as you creating a 1 minute pitch and doing a self-video with a good quality cellphone camera (or you can pair off with colleagues and take videos of each other). You can make it more visually complex but the trade-off is that if it is too complex, it risks distracting from the message. Essentially, this allows you to be creative; the mark value is modest so I don't expect too many will put enormous amounts of time into this – I'll be quite happy with a good quality and concise video, but I would expect you to practice it.

You will use the University of Waterloo's sendit service to send it to me (stephen.murphy@uwaterloo.ca).   How to do this is described here: https://uwaterloo.ca/information-systems-technology/services/sendit/about-sendit

NOTE: You must use your university of waterloo address; you cannot use a proxy or alias for this function.

Marking Rubric: As this is a visual and audio exercise, I will grade it on its content, conciseness, message clarity, quality of audio/video, and sophistication. If one wants to reflect on the relative value of each of these, I'd say they are not easily untangled. However, I think those who clearly spend more time and effort to successfully (note this word: successfully) move your contribution above a competent level can expect to be eligible for higher grades. I think that if one makes a good, solid effort reflecting the grade weighting, a student will normally be in the 75-82% range. To achieve a grade beyond this level requires much more (successful) effort and outcome – and that will require more effort on audio and visual cues or effects without diluting the message.

3. Writing a Policy Briefing Note on ReWilding

The art of writing and influencing people is rather important. Here, you take the role of a senior policy advisor or senior (natural or physical) scientist who is asked to provide the material needed to help the Assistant Deputy Minister (ADM) advise the Minister of the Environment and Climate Change of the Provincial Government of Ontario. The Minister is usually not a social or natural or physical scientist and will need to know key ideas and pros/cons to help make decisions. In this case, you are asked to provide advice on whether the federal government should support a decision to declare the crown lands around Windigo Lake (Kenora District, northwestern Ontario) as protected under the Wilderness Act and the Far North Act. The main reason is a desire to protect habitats and 'rewild' for woodland caribou (*Rangifer tarandus caribou*) and the wolverine (*Gulo gulo*). You have some resources like the Crown Land Use Policy Atlas (https://www.ontario.ca/page/crown-land-use-policy-atlas) and access to the actual Acts (see https://www.ontario.ca/page/ontarios-parks-and-protected-areas). The grey literature and academic literature may help – but the grey literature from advocates or opponents may be tainted. Briefing notes are rather short but there is no well-defined word or page limit. However, there are some good guidelines and public resources on how to do this:

- http://www.ppsc-sppc.gc.ca/eng/pub/fpsd-sfpg/fps-sfp/fpd/ch48.html
- https://web.uvic.ca/~sdoyle/E302/Notes/WritingBriefingNotes.html
- https://www.publicsectorwriting.com/?page_id=6
- https://www.publicsectorwriting.com/wp-content/uploads/2011/09/Briefing-Notes-versus-Memorandum.pdf
- http://www.writingforresults.net/classic.pdf

Marking Rubric: I will grade your effort based on how sound your evidence is, discussions of pros/cons, and the basis for your recommendation – if any. The grade also depends on how effective this communicates information to an ADM and Cabinet Minister. If you follow the structure and content suggestions of the resources I provided in terms of how to write the note and show clear signs of having synthesized a reasonable amount of credible studies from the grey and academic literature, then you can expect to attain grades above 80%.

4. Unannounced Quizzes on Class Lessons

To ensure you keep up with classes, there will be two separate and unannounced short quizzes on any aspect of any class lessons concluded before the date of each quiz. These will, however, focus on synthesis and not focus on trivia. To study or be prepared for them, you need to review your class lessons each week and synthesize the material. I provided some breaks in the class lesson schedule to give you some time to reflect; these are also scheduled when the two assignments are due. They will be single-question quizzes and occupy no more than 10 minutes of a given class.

5. Final Exam

As scheduled by the Registrar, there will be a final exam in the normal April Exam Period. Do not plan to be absent from campus until after the official exam period ends. The exam will cover the entire course, and will specifically have a question that revisits the fundamentals of rewilding and ecological restoration that you addressed in the first quiz. This helps me see how much you have progressed through the course. The exam will not engage in a focus on trivial matters but will be a series of questions on the conceptual, theoretical, and applied aspects of rewilding and ecological restoration.

Grading & Related Policies Specific to ERS 337

Failure to be present for - and submit - any one of the quizzes (announced or unannounced) results in a grade of 0 (zero) for that quiz. The only exception is if I receive and accept a written medical or other professional note explaining the absence. If that note is accepted by me, then the value of the missing quiz is added to the final exam.

Assignments that are submitted after the deadline are penalized 10% for submissions within each subsequent 24 hour period after the deadline and are not accepted at all (grade = 0%) after 96 hours have elapsed past the deadline.

I note that communication between us is very important; if you are struggling or need help in any form, seek this immediately. The more time we have to discuss matters and perhaps plan alternatives, the less stress you will encounter. Generally, my courses tend not to be the source of stress but when life gets difficult, anything with deadlines and expectations will add to that difficultly. There are vehicles to assist you, some of which will be detailed in the set of Faculty of Environment Advisories on the next pages.

Advisories from the Associate Dean of Undergraduate Studies of the Faculty of Environment

♦ **Intellectual Property:**

Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

o   Lecture content, spoken and written (and any audio/video recording thereof);
o   Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
o   Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
o   Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

♦ **Academic Integrity:**

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. The University's guiding principles on academic integrity can be found here: http://uwaterloo.ca/academicintegrity. ENV students are strongly encouraged to review the material provided by the university's Academic Integrity office specifically for students: http://uwaterloo.ca/academicintegrity/Students/index.html

Students are also expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for their actions. Students who are unsure whether an action constitutes an offense, or who need help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. Students may also complete the following tutorial: https://uwaterloo.ca/library/get-assignment-and-research-help/academic-integrity/academic-integrity-tutorial

When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline: https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71. Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy #70, Student Grievance: https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70

♦ **Note for students with disabilities:** AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

♦ **Mental Health:** The University of Waterloo, the Faculty of Environment and our Departments/Schools consider students' well-being to be extremely important. We recognize that throughout the term students may face health challenges - physical and / or emotional. **Please note that help is available**. Mental health is a serious issue for everyone and can affect your ability to do your best work. Counselling Services http://www.uwaterloo.ca/counselling-services is an inclusive, non-judgmental, and confidential space for anyone to seek support. They offer confidential counselling for a variety of areas including anxiety, stress management, depression, grief, substance use, sexuality, relationship issues, and much more.

♦ **Religious Observances:** Students need to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

♦ **Grievance:** A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. See Policy 70 - Student Petitions and Grievances, Section 4, www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please contact your Undergraduate Advisor for details.

♦ **Appeals:** A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 – (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) www.adm.uwaterloo.ca/infosec/Policies/policy72.htm

♦ **Unclaimed assignments:**
Unclaimed assignments will be retained on LEARN per IST's normal procedures. After that time, they will be destroyed in compliance with UW's confidential shredding procedures.

♦ **Communications with Instructor and Teaching Assistants:**
All communication with students must be through either the student's University of Waterloo email account or via Learn. If a student emails the instructor or TA from a personal account they will be requested to resend the email using their personal University of Waterloo email account.

♦ **Recording lectures:**
  o Use of recording devices during lectures is only allowed with explicit permission of the instructor of the course.
  o If allowed, video recordings may only include images of the instructor and not fellow classmates.
  o Posting of videos or links to the video to any website, including but not limited to social media sites such as: facebook, twitter, etc., is strictly prohibited.

Co-op interviews and class attendance: Co-op students are encouraged to try and choose interview time slots that result in the least amount of disruption to class schedules. When this is challenging, or not possible, a student may miss a portion of a class meeting for an interview. Instructors are asked for leniency in these situations; but, a co-op interview does not relieve the student of any requirements associated with that class meeting.

When a co-op interview conflicts with an in-class evaluation mechanism (e.g., test, quiz, presentation, critique), class attendance takes precedence and the onus is on the student to reschedule the interview. CECA provides an interview conflict procedure to manage these situations.
Students will be required to provide copies of their interview schedules (they may be printed from WaterlooWorks) should there be a need to verify class absence due to co-op interviews.

Class Schedule (Classes are held Tues & Thurs 0830-0950 in Hagey Hall [HH] Room 150)

Class	Learning Objectives/Inquiries	Required Reading(s) + Tasks/Assignments Due
Th Jan 4 A Synthesis of ReWilding Scope & Theory	How has the theoretical framework for rewilding developed; what does it say?	Donlan et al. (2005; 2006) Oliveira-Santos et al. (2010) Corlett (2016) Johns (2016) Nogués-Bravo et al. (2016)
Tu Jan 9 A Synthesis of How Evolutionary Ecology Applies in Rewilding	Evolution underpins all in ecology; how has rewilding explored this?	Ashley et al. (2003) Vaughn et al. (2003) **Quiz #1 runs for 1st 15 minutes of this class**
Th Jan 11 A Synthesis of How ReWilding Uses Landscape Ecology	Being a 'big data/big scale' approach, how have spatially explicit approaches informed rewilding?	Leidner & Haddad (2011) Lausch et al. (2015) Olds et al. (2016) Ziółkowska et al. (2016)
Tu Jan 16 A Synthesis on ReWilding & Keystone & Umbrella Species	Rewilding – like much of conservation – is species focused; how do keystone and umbrella species fit?	Griffiths et al. (2011) Seddon et al. (2014) Naundrup & Svenning (2015) Malhi et al. (2016)
Th Jan 18 Socioecological Systems Analysis for ReWilding	Given rewilding is a process as much as an outcome and involves big decisions, how can this work for governance/ecological systems?	Bhattacharyya & Murphy (2015) Mathevet et al. (2016) Sharma et al. (2016)

Tu Jan 23 Socioecological Resilience as a ReWilding Objective	Is resilience of complex socioecological systems a useful metric or goal?	Walker et al. (2004) Botsford et al. (2009) Standish et al. (2014)
Th Jan 25 (no formal class)	*(no formal goal, save for the Assignment)*	**Assignment on "ReWilding in a Minute" Due at 2300 h via U Waterloo Sendit.**
Tu Jan 30 Developing a Strategic & Operational Plan for Wildlife Corridors in ReWilding & Restoration I Th Feb 1 Developing a Strategic & Operational Plan for Wildlife Corridors in ReWilding & Restoration II	These two lessons will focus on the theory and practical applications involved in corridor design for rewilding and restoration; our focus is based on the work of Paul Beier & colleagues	Beier et al. (2008) & resources via the related website http://corridordesign.org/
Tu Feb 6 Circuit Theory & ReWilding I Th Feb 8 Circuit Theory & ReWilding II	One of the big advances in open-source software for connectivity & rewilding is by Brad McRae & colleagues; these two classes focus on this topic and the technical details	McRae et al (2008; 2014) http://www.circuitscape.org/home
Tu Feb 13 Connectivity Analysis for ReWilding I Th Feb 15 Connectivity Analysis for Rewilding II	Connectivity analysis can take many forms; we will explore a 'connectivity toolkit' that Carlos Carroll & colleagues have devised	Resources from the Klamath Centre for Conservation Research http://www.klamathconservation.org/science_blog/
Feb 19-23 Winter Study Week (NO CLASSES)		
Tu Feb 27 The Politics of ReWilding	Learn how rewilding has been used a political cudgel in governance & science	Hintz (2007) Lorimer & Driessen (2013) Lorimer et al. (2015) Pellis et al. (2015a; 2015b)

Th March 1 (no formal class)	*(no goal except for the Assignment)*	**Assignment on Policy Briefing Due in Dropbox 2300 h**
Tu March 6 ReWilding & Y2Y	Yukon to Yellowstone (Y2Y) & Algonquin to Adirondacks (A2A) predate rewilding as a formal concept but may be a best practice for it – or not. These two lessons will tackle each initiative separately but we'll also compare their approaches and outcomes.	MacMynowski (2006) Pearce et al. (2008) Chester et al. (2015)
Th March 8 ReWilding & A2A		Brown & Harris (2005) Vásárhelyi & Thomas (2005) Koen et al. (2014)
Thu March 13 ReWilding in Europe	Learn how rewilding operates in one of the longest-developed areas of the world	Lorimer & Driessen (2014) Jepson (2016)
Th March 15 ReWilding in Central & South America	Learn how rewilding operates in rapidly developing areas	Crespin & Garcia-Vellilata (2014) Pires et al. (2014) Root-Bernstein & Svenning (2016)
Tu March 20 Rewilding in Australia	Learn how rewilding is useful even in a continent/country with asymmetrical human habitation	Newsome et al. (2015) Hunter et al. (2015; 2016) Baker et al. (2016) Fancourt & Mooney (2016) http://www.gondwanalink.org/links/default.aspx
Th March 22 ReWilding in Africa	Learn how rewilding is useful in a continent where people probably assume it is not needed – but they are wrong	Laurance et al. (2006) Sinclair et al. (2014) Reisland & Lambert (2016)
Tu March 27 Rewilding in Asia	Learn how rewilding is being approached in a politically volatile and vast continent	Zimov (2005) Louys et al. (2014) www.sciencemag.org/news/2015/12/rewilding-great-white-north (Stone 2015 on the Zimovs)

Th March 29 This Ain't Jurassic Park, But are We Recreating the Pleistocene?	Learn the current state of the scientific and management debates; discuss the future prospects for rewilding	Rubenstein et al. (2006) Caro (2007) Caro & Sherman (2009) Keulartz (2016) Svenning et al. (2016)
Tu April 3 The End is At Hand – Fortunately, It is Just the End of the Course	Review for the final exam	*(none)*