ERS 337: ReWilding & Ecological Restoration v.2020

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Email me for an appointment to reduce your waiting time. I don't discourage people from dropping by my office, but it may be more efficient for you to set up an appointment – I am sensitive to your time management

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 & Ecological Restoration 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 & Ecological Restoration 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.   For some of the classes, I will provide a skeleton outline on the slides and I will expect the class to participate fully in discussing the concepts and readings that day.

Assessment of students (grading/weighting)

1. Policy briefing: 20% of final grade. Due on January 29 at 2000 h (8 PM) in LEARN dropbox.
2. Rapid response team exercise on ReWilding: 30% of final grade. In class exercise on 4 March and due in LEARN dropbox in real-time at the end of the class.
3. Final Exam: 50% of final grade. Date to be announced & posted via the Registrar's Office.

1. Writing a Policy Briefing Note on ReWilding and Ecological Restoration. The art of writing and influencing people is rather important. The scenario is a real one. In this year's exercise, you are working as a mid-level scientific advisor to the Assistant Deputy Minister (ADM) of the Federal Ministry of Environment and Climate Change. You are knowledgeable regarding the current provincial government's political goals. However, you are a civil servant and not normally subjected to political aims. The ADM has been asked by the Canadian Federal Minister of the Environment and Climate Change, Hon. Jonathan Wilkinson, to issue a policy brief on the relative merits of restoring the ecological integrity of multiple Canadian jurisdictions based on a possible desire to rewild at least some of these areas to increase populations of woodland caribou (*Rangifer tarandus caribou)*. There is a long history of controversy with management (e.g. who has jurisdiction, conflicts between various Ministries at federal and provincial levels, conflicts with resource extraction goals, First Nations' treaty rights, genetic status, ecological status, and social license regarding conservation and rewilding). The grey literature ([defined here](#)) and academic literature may both help – but the grey literature from advocates or opponents may be tainted; there will be federal and provincial documents as well. Your job is to sort through this morass of information and recommend to the ADM if any actions should be taken to foster rewilding of woodland caribou.

Briefing notes are rather short but there is no well-defined word or page limit. However, my experience is that most ADMs and Ministers want brevity and pithiness so usually <u>one aims for about 2 pages double sided, single spaced at most</u> (*it could be much briefer indeed*). There are some good guidelines and public resources on how to do this – again, there is no one universal style so you have flexibility in your structure and focus; I usually add some examples in the LEARN folders or announcements as I find more – any of these styles and examples are useful though:

- 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
- http://www.writingforresults.net/classic.pdf

I will grade your effort based on how sound your evidence is, discussions of pros/cons, and the basis for your recommendation. 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 above 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%.

2. Rapid Response Team Exercise on Rewilding & Ecological Restoration. The ability to think on the fly after having paid close attention to learning and kept up with information (in our case, a course with classes and readings) is vital. This exercise functions like a test but mimics what happens in professional life when an issue or crisis emerges, and you must respond quickly, devising a plan. I will have people form teams of 2-3. The team will then have 30 minutes to discuss how to draft a short action plan based on a scenario that I provide. Each person then takes 45 minutes to write an individual and short version of the plan and submit it to LEARN in real time (bring your laptops during this whole time period). It is, in effect, open book. I will grade the plan on focus, knowledge of the topic (based on the course, naturally) and the brief details and feasibility of the plan provided. You should be prepared – and able – to provide a theoretical and conceptual framework to address the question being asked of your team, a research design and plan to address the question, some notions of how data should be analyzed, and commentary on likely outcomes and, again, how these outcomes address the question.

3. 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 – be advised that we do get cancellations because of weather (e.g. we had 2 extra days added to the exam period in April 2018 for that reason). The exam will cover the entire course. The exam will not 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 write – the in-class exercise yields a grade of 0 (zero). The only exception is if a student can present a case and evidence for waiving the penalty; then the value of the missing item 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, many via the "Resources for You" section that is a few pages hence.

A Refresher to Assist You to a Successful Path in ERS 337 and Beyond:
Surviving & Thriving in University/Expectations and the Meaning of Grades in University

In high school, mastery of basic foundations and expected efforts often yield grades above 90%. In University, they do NOT; meeting expectations at a level commensurate with your program level (e.g. 1A, 3B, 4B) typically earns you a grade around 75%. That means the remaining 25% is for extraordinary effort. It also means that if you never progress and submit the same level of work, what earns you a 75% in 1A will probably earn you a 65% in 2A, 55% in 3A and less than 50% in 4A. This rarely happens because people begin to learn the system and get better as they progress during University.

This is what students rarely consider when they first enter university; the assumption is that a good and

basic effort will yield a high grade. Nope. That means you get a good and basic grade – around 75%, though one could choose any baseline (in the UK, they choose around 50-60% for this but that really hurts students going for scholarships internationally where all others use the 75% basis for 'meets standards'). Our job is to make you better and show you how to be the best if you're willing to put in a lot of effort and/or work efficiently.

This is why I – or any professor – will say you need to start assignments immediately, finish early, write many drafts or you need to review class lessons immediately after they happen and do the mandatory readings before and after (taking notes on these – synthesizing main points) or you need to reflect and synthesize the big ideas or principles in each class/reading/tutorial and consider how case examples – including ones in current events you can read about in the news – are examples of how these principles/idea are applied. You want an A+? You can earn it – with a lot of work.

University is full time; think of it as a job – one that can be fun and rewarding if one has a good attitude and dedication. If you must work more than 10 hours a week because of finances, I'd recommend taking no more than 4 courses a term; it means perhaps an extra term in total over 4-5 years or taking some higher credit weight courses (e.g. ERS has 2 triple weight and 4 double weight courses in spring terms) but it is worth it. You need to devote about 10-15 hours per course each week to achieve above 80% in each course; this means 40-75 hours per week if you are taking 5 courses so that leaves 93 hours a week for all else. Not too bad but since you'll want to sleep, eat, have some non-academic fun, and allow for days when you are exhausted or ill, it is less time than you think. Work-life balance is something that we all must learn; it is a skill and an art.

Personally, I recommend taking even an old-fashioned paper calendar of some type and working BACKWARDS from the end of each term. You won't know exact dates of your final exams until the end of the 2nd month of each term but you will know you have X number of exams during the final month of term based on course syllabi. Add in your test, quiz, or assignment due dates for all courses and add in times when you anticipate big social events or other happenings. Then add in a schedule where you set hours/times to start assignments and review course materials, synthesizing them in anticipation of your tests and exams. Stick to this schedule. If you maintain a great routine, you will succeed.

Grades can be interpreted a bit differently depending on the professor and type of course (and in some places in the world – like the UK – they use a different basis for grading, i.e. they rarely assign a grade higher than 80% so the mean and median grades and interpretation of student success is different than in Canada). Below, you will find a decent description of what grades mean in my courses and in many SERS courses. Personally, I tend to grade by range-blocks (e.g. 100, 95, 90, 85, 80…) because I examine the quality of an answer – based on the criteria below – and then transform them into a numerical grade reflective of the effort and achievement of a student. Higher grades = better completeness, nuance, creativity, and technical abilities.

- A+ (90% and above): Your work gives an in-depth, reflective or analytical answer that addresses the question beyond a fundamental outline of the main issues; essentially, the answer makes use of class discussions, class resources and other credible sources or ideas and translates these into an answer that produces a workable strategic assessment and operational solutions. Grades in this range or the next one below usually reflect the fact that a student has made a serious and successful effort to review material daily or weekly, anticipate assignments by starting them early and drafting several versions before handing them in, considered the synthesis and specific issues for the course material, made notes on key points of the readings assigned or read extensively beyond mandatory

readings or expectations for an assignment, and explored the current events/news relevant to the course or assignment material to mine comparative examples. In sum, the highest grades reflect extraordinary effort

- A/A- (between 80% & 90%): Your work addresses the fundamental issues related to the question and provides a useful and concise summary of them. The upper end of this range means that you have taken reasonably intense efforts at going beyond the materials provided, insights covered in class or the literature assigned. On the lower end of this grade range, your answer does not take the time or provide enough depth to convince the reader that you have great insight into the issues or the technical knowledge to produce an operational solution

- B-/B/B+ (between 70% & 80%): Your work shows that you have most of the basic elements and knowledge related to answering the question but the text and answer itself is a bit muddled or disorganized. Answers receiving the lower end of this grade range normally are ones that reflect a more superficial understanding of the issues related to the answer or are not well written.

- C-/C/C+ (between 60% & 70%): You generally addressed the main requirements of the question or an assignment, but your answer shows less than rudimentary mastery of the basic materials and no real cohesion in your answer. If it is a written report, it usually reflects some rather poor sentence structure, grammar, spelling, and/or organization.

- D-/D/D+ (between 50% & 60%): You had enough elements in your work to convince me you have some vague notion of the requirements and key concepts but that's about all; there is usually no cohesion at all on an exam question and if it is a written assignment, your answer is barely readable but does contain enough to pass.

- F (less than 50%): The work gives me a strong suspicion you didn't care, didn't bother, or didn't attempt to comprehend the question and made little to no effort – either that or you truly missed the point of the question or assignment. This usually reflects a very rushed job on an exam or written assignment (no drafts and no real editing); for assignments, it means you probably failed to meet even the most basic requirements (e.g. did not pay attention to instructions or missed key objectives). If it is around the 40% range, it usually means you made some effort but did not address the major issues or wrote poorly; less than that usually means you had no clue or didn't care to get a clue. The answer may be incoherent, contradictory, or plain wrong. It may not even address the question asked. In some cases, however, it can reflect a life crisis or a hidden learning challenge that we can use to diagnose, get help and solutions, and in those cases, we then eliminate this grade and work out a plan to fix things. I do that if the same situation arises and you passed with, say, a D-level grade too.

The above is a good summation of the principles and guidelines when one is marking on a basis of the quality of the answer.   In some cases, the assignment or exam lends itself to a very strict and point-by-point grading rubric. Annotated bibliographies, multiple choice or true-false questions on exams and perhaps brief lab reports are examples where there is less reliance on a qualitative framework for grading and more on a tallying rubric where X gets you Y points. I tend not to use it much because life is not multiple choice; it is all reflection, essay and synthesis.

How does a student write a good paper or exam answer?

No matter what the approach, I think students sometimes miss the two most important points when they answer exam questions or write an assignment:

1. Is this answer or assignment any good – is it great (beyond expectations; A+), perhaps?
2. Did it address the question/follow the instructions/focus on the main goals of the assignment or exam question?

Point 1 is rather obvious and yet so many people miss it; people get caught up in life and in scrambling to juggle (usually) 5 courses with multiple assignments and deadlines and class attendance (one hopes). The mind's focus then goes to the simple stuff: how many words do I need to use (what is the word limit – minimum, maximum or both?). That simple stuff is the wrong question and the wrong attitude – you don't get graded on how many words you use; yes, some professors levy heavy penalties for exceeding the word limit and you need to watch that. Word limits are usually no more than attempts at telling you when to stop and that's all. Simply ask yourself upon reading your draft versions: Is this any good? Be honest with yourself.

Point 2 is also trite and yet also missed by many; follow the instructions and focus on what is demanded and emphasized as being important. Do you have an assignment where it is a scientific or consultant style report and 80% of the grade weight is on the discussion? Well, then, 80% of your attention and effort should be on the discussion, right? You'd be surprised. I've seen people who clearly spent days formatting a cover for their report (said cover is worth ZERO marks) and then handed in a 1-page discussion when there were another 8-10 pages allocated to discussion and the concomitant weight of the grade. And then students get shocked when they fail the assignment; a little sober reflection on the sheer imbalance and mismatch between efforts on each part would have saved some tears, I think.

Content-wise, the effort needed varies depending on circumstances and questions asked. For exam answers, the total weight (number of marks) can sometimes reflect the number of 'points' tallied or expected. That happens with short answer or multiple-choice type exams. However, whether it is more of an essay style or even a 'point-form exam' (which is not the same as 'tallying points' – it just means you don't have to use proper essay style), the weight simply gives you an idea of the depth and breadth expected in an answer.

- My rule of thumb was that a 20-25-mark weight indicated a very deep and sophisticated answer was expected. I never bothered to worry if I had 20 or 25 points or items because the professor could easily give the same great mark to someone who took 10 items and explained them more in depth as to someone who took 15 items and explained them well but perhaps with a less depth for each but more integration of the ideas and items. I simply tried to do my best where 'best' meant weeks of work/prep.
- Sometimes the depth vs. breadth approach depended on the question being asked but in most cases, it is a challenge question to the student: Show me you understood the concepts, explain them, show me how these address the question, raise any issues about missing information and how we should research it/find it, and impress me with your sophistication and well-read nature (did you read beyond the mandatory material and did you reflect and practice answering questions all term?). These big questions are usually synthesis and reflection – the big picture of the course and about strategic ideas.

- A 10-15-mark weight is often one that is a problem-solving one; greater mark value usually means more detail is expected or it is cross-linked between several topics and lessons and perhaps multi or transdisciplinary in nature.
- Questions around 5 marks are usually more reductionistic and focused on one idea.
- Thus, I worried less about how many actual marks were allocated and more about what the relative number of marks/weights against the whole exam can tell me about the type of answer expected – meaning the marks reflect the quality of answer, translated to a numerical assessment.

The writing style often bedevils students because as one begins to learn terminology and reads peer literature, there is a temptation to emulate the complex language and sentence structure in some of these sources to sound smart. In some cases, students emulate the worst excesses of peer literature. My advice: KISS – keep it simple, stupid. Write simple (not compound) sentences that focus on one subject, one verb, one object. Structure the paper so that the paragraphs each focus on one main point and the series of paragraphs lead to an emergent and important theme, that is often reinforced by active voice subtitles to help readers focus. For example, here are two possible subheadings:

- Importance of diversity to ecological restoration.
- Increased genetic diversity increased the successful outcome of ecological restoration.

The second subheading tells us what the series of paragraphs that follow lead us too; this is not a murder mystery novel so don't worry about giving away the plot. Don't bury the lede.

As far as first vs. third person is concerned, unless the instructions demand one of the other, it does not matter. I tend to use first person, active voice because it is less awkward to write and produces clearer and better writing.

Don't waste time and space on rhetorical flourishes, pedantic comments, burying the lede, irrelevance, half-a-story, or chattiness.

For example, this is bad writing: "A study that was done in Australia in 1987 by DS Smith, FP Jones, AB Uriah, and Dr. Robert Q. Important-Person showed that restoration was good."

The citation style is wrong, most of the sentence is not needed, why call the last author by a full name, and this never tells us why we should care.

This is better: "Smith et al (1987) determined that connectivity analysis improved landscape scale restoration of sand-dune ecological communities' outcomes by 80% vs. use of Landsat satellite mapping because connectivity focused on animal and plant migrations, fecundity and survival in real-time." This tells us a lot; there may be more we could add but it gives us a clear idea of what was done and what the relevance is.

The bottom line: Ensure your submission addresses the question, ensure that it is good (that means a lot of hard work with multiple drafts written well in advance), and ensure that it has evidence and proper citations to back your interpretation and claims.

That's a reasonably detailed guideline to grading in university, or at least the way that I (and many colleagues) do it. There are inevitably going to be many more permutations but professors who know

their field and use qualitative grading frameworks know how to spot gems vs. bullshit; good answers vs. great ones; all possible combinations of answers. Therefore, professors should (and usually do) mark final exams in courses that are 120 students or less.

An Obvious but often Neglected Piece of Advice: Attend Classes.

There is often a temptation to become indolent and skip classes, assuming that the slides provided, or the readings will provide all that is needed. In my experience as a student and as a professor, I've found this is rarely the case. The classes provide real-time engagement and the slides are merely a useful foundation. The professors elaborate and explicate the nuances and emphasizes on the topics and ideas – and that is where learning happens. I've long studied impacts of class attendance in my courses and while I generally have very good attendance, I still have enough data from those who tend to miss my class (and, from talking with colleagues, all their other classes) to draw some conclusions. Examining the relative impact of attendance to classes (and tutorials in courses where that is relevant), the latest data indicate that attending > 90% of the classes (etc.) is rather important to success in courses I teach. The difference in grades on the exam indicate that there is a 36.5% difference (mean exam grade for those MIA is 51.8%; mean exam grade for those attending and [I add] participating or involved otherwise in classes is 88.3%). The overall course grade shows similar trends but a bit lower since one can do assignments solo; it is a 31.7% difference. If illness/mental health are issues, let us talk; we can make alternative arrangements for those sorts of deeper needs.

Resources for You – University Policies, Your Rights, Mental Health Help, AccessAbility

We used to have a mandatory 'advisory' from the Dean of Environment. That has been replaced with a webpage with many resources (policies, mental health help and so forth): https://uwaterloo.ca/environment/undergraduate-teaching-resources

Please make all efforts to communicate with AccessAbility if there are acute or chronic struggles that affect your class attendance or course performance – I know it is tough to admit you need help or to trust anyone. The earlier we address issues and find a success path, the better; I am willing to assist and alter the standard path. There are cases where students prefer to talk to me directly; by all means, but please be aware you don't have to reveal anything personal or medical to get accommodations – that is why AccessAbility exists. We follow all policies on privacy and human rights.

Class Schedule (Classes are held Mon & Wed 1130-1250 h in EV1 350)

Class Date & Topic	Learning Objectives/Inquiries	Required Readings
M Jan 6 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)
W Jan 8 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)
M Jan 13 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)
W Jan 15 Synthesis of 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)
M Jan 20 Synthesis of 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)
W Jan 22 Developing a Strategic & Operational Plan for Wildlife Corridors in ReWilding & Restoration I	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 http://corridordesign.org/
M Jan 27 Developing a Strategic & Operational Plan for Wildlife Corridors in ReWilding & Restoration II		

W Jan 29 No formal class; Policy Briefing is Due at 2000 h via Dropbox	Gives you a chance to either finish up loose ends on the briefing or relax a bit if you're done already	
M Feb 3 Circuit Theory & ReWilding I	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) Dickson et al. (2013) Resources via http://www.circuitscape.org/home
W Feb 5 Circuit Theory & ReWilding II		
M Feb 10 Connectivity Analysis for ReWilding I	Connectivity analysis can take many forms; we will explore a 'connectivity toolkit' that Carlos Carroll & colleagues have devised	Klamath Centre for Conservation Research http://www.klamathconservation.org/science_blog/ Carroll et al 2011; 2013; 2017
W Feb 12 Connectivity Analysis for Rewilding II		
Feb 17-21 Family [Civic] Holiday & Winter Study Week (NO CLASSES)		
M Feb 24 The Politics of ReWilding	Learn how rewilding has been used as a political cudgel in governance	Hintz (2007) Lorimer & Driessen (2013) Lorimer et al. (2015) Pellis et al. (2015a; 2015b)
W Feb 26 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)
M March 2 ReWilding & A2A		Brown & Harris (2005) Vásárhelyi & Thomas (2005) Koen et al. (2014)
W March 4 Rapid Response Exercise in Class; results due at End of Class (posted to dropbox)	This exercise functions like a test but mimics what happens in professional life when an issue or crisis emerges, and you must respond quickly, devising a plan.	
M March 9 ReWilding in Europe	Learn how rewilding operates in one of the longest-developed areas of the world	Lorimer & Driessen (2014) Jepson (2016) Theunissen (2019)

W March 11 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)
M March 16 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
W March 18 ReWilding in Africa	Learn how rewilding is useful in a continent where people probably assume it is not needed	Laurance et al. (2006) Sinclair et al. (2014) Reisland & Lambert (2016)
M March 23 Rewilding in Asia	Learn how rewilding is being approached in a yet another politically volatile and vast continent	Zimov et al. (1995) Zimov (2005) Louys et al. (2014) Stone (2015)
W March 25 No formal class	Self-care day for students as we near the end of term	
M March 30 Jurassic Park Is Melting in the Dark… (see if you can figure out the reasonably cryptic allusions in this title before the slides)	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)
W Ap 1 The End is At Hand	Review for the final exam	(none)