ESM 483/583, Marine Conservation Science and Management
Professor Elise Granek **Winter 2025**

Instructor: Elise Granek
Lecture: VSC 415 - T, Th: 12 -1:50 am;
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Course Description

This course provides an overview of marine conservation and management issues and the role of science therein. We will begin by discussing the state of the oceans and ecological differences between marine and terrestrial/aquatic systems. Next, we will discuss several major threats to ocean systems. Finally, we will focus on current issues in marine conservation and management and how these are being addressed through policies, management, and public action. Examples include hypoxia, ocean acidification, state of Oregon's kelp forests, current issues in shellfish fisheries **and** potential strategies and solutions in marine conservation and management including protected areas, regional and national policy and task force and planning efforts. Student teams will work on an agency-identified real-world project to produce a report and presentation to the agency partners.

Objectives

By the end of the course, students will understand the suite of issues affecting marine ecosystems and be able to communicate tools and strategies for addressing these issues, **create** an ecologically based, applicable **management document** on a marine conservation or management issue. Students will practice **skills** of **reading** pertinent **primary literature, interacting with marine management and science professionals,** and **presenting a management plan/proposal (orally and in writing)**.

Course Outline

Week	Lecture Topic	Readings and Assignments
1-Tues (1/7)	The state of the oceans	Ch 1 and 2; Ohare et al. 2018, Knauss 1990
1-Thurs (1/9)	Why Marine Conservation: A history	Sloan 2002. *Cons Bio;* Montero-Serra et al. 2018; Halpern et al. 2008
2-Tues (1/14)	Life in the sea: ecological differences b/n land & sea	Ch 3, 4, Crowder et al. 2006; Ch 9, 10;; Tracy et al. 2019; Miner et al. 2018 ; (supplem: Hamilton et al. 2021); **Outline due**
2-Thurs (1/16)	Marine disease; Habitat destruction/habitat loss	
3-Tues (1/21)	Fisheries declines and marine extinctions	**Homework due**; Ch 5, 13; Pauley et al. 1998; Jackson 2008; McClenachan et al. 2009, McClenachan et al. 2006; Ch 8; Carlton and Geller 1993; Geraldi et al. 2019; Lin et al. 2019 (Sorte et al. 2010; Molnar et al. 2008) ***Quiz #1 due**
3-Thurs (1/23)	Marine invasive species, ***Dr. Cat de Rivera,*** *PS*	
Sun (1/26)		
4- Tues (1/28)	Changing ocean conditions, ***Joshua Bowman***, NOAA	Kintisch 2015; Bond et al. 2015, Peterson et al. 2017 (Barton et al. 2015; Boehm et al. 2015; Somero et al. 2016)
4-Thurs (1/30)	State of West Coast Fisheries and Aquaculture, ***Angee Doerr*****,** Oregon Sea Grant and OSU	**Connect with your project community partner;** Ch 11, 15; Fuller et al. 2017, Reverter et al. 2020

5- Tues (2/4) **5- Thurs (2/6)** **Sun (2/9)**	Pollutants in the oceans Extinction Risk in the Ocean	**Homework due**; Meador et al. 2016, Scully Engelmeyer et al. 2021, Baechler et al. 2020, Tissot et al. 2022 **Chapter 10,** Danovaro et al. 2008 ; **Rough draft due; FRIDAY** ***Quiz #2 due;**
6- Tues (2/11) **6- Thur (2/13)**	Human dimensions of Blue Carbon, ODFW, Sarah Klain, ODFW **Midterm**	Carr et al 2017; Caveen et al. 2012 (suppl: Burt et a 2018; Brock 2012), Ecological & Human Dimensions Monitor Plans**;** **Midterm in class;**
7- Tues (2/18) **7- Th (2/20)**	Calamity in the Kelp; ***Steve Rumrill****, ODFW* US perspectives on Ocean acidification and hypoxia *Kaitlin Goldsmith, NOAA*	**Return rough draft peer reviews;** **Homework due**; **TBA**
8- Tues (2/25) **8- Thurs (2/27)**	Marine Renewable Energy – Sara Swett, Oregon Sea Grant OR Sea otter restoration, ***Chanel Hason***, Elakha Alliance	TBA **Term paper due;** Hughes et al. 2024 **and** links on CANVAS
9- Tues (3/4) **9- Thurs (3/6)** **Sun (3/9)**	Coastal conservation planning – rocky shore habitat designations, Eva Krukowski, CZMP, DLCD ***TBC***	Territorial Sea Plan –on Canvas; and TBA National Ocean Policy Implementation Plan; other readings **Quiz #3 due**
10- Tues (3/11) **10-Thurs (3/13)**	**Student presentations** **Student presentations**	 **Op ed due (Grad students)**
Exam Th (3/20)	**Final exam**	**10:15-12:05 am**

Assignments

Attendance and Participation: **You are expected to attend and participle in class sessions**; your participation is important to your learning and the learning of your peers. Please come prepared, ask questions, and contribute with your insights and expertise. Group discussions will be held during the 2nd part of lecture on multiple occasions. For these discussions, you will be assigned scientific, working group, and/or technical paper(s) to read. During the session, the class will discuss the paper and the findings. If you actively engage in the dialogue, you will receive full credit for discussion that day. If you attend these discussions, but do not participate verbally, you will receive partial credit. If you miss these sessions, you will receive no credit. This is true for guest speaker and lecture sessions as well.

***Homework and Readings*:** For journal articles read for weeks 3, 5, and 7, you are required to turn in a brief (150-300 words) response to the articles answering the following questions:

1. What was the most interesting thing you ***learned*** from the articles?
2. How does the information therein build on, complement, or contradict other issues we have discussed or read?

3. How can the information in the article(s) be applied to management, conservation, and or policy?
4. What article(s) would you recommend be included in addition to **or** in place of the current articles for the week.

Readings

Textbook: *Marine Conservation Biology*, by E. A. Norse and L.B. Crowder (2005; Island Press)
Other reading: Articles will be provided on class Canvas site

Papers

The papers or links to them are available on Canvas. Required papers are listed above. You'll need an ODIN account to access library materials and Canvas. If you don't have one, go to: https://www.account.pdx.edu/, call (503 725 4357), or email (help@pdx.edu) the office of information technologies help desk.

Canvas Quizzes

To assist students in keeping up with class content and better prepare students for exam content, there will be 3 online Canvas quizzes (during weeks 3, 5, and 9). You will be able to take each quiz twice.

Speaker questions: For at least 5 of our **external** guest speakers, each student must come prepared to ask a question to the speaker. If time runs short and you are not able to ask your question, you can submit it in writing at the end of class. However, each student needs to **orally ask a question to at least 3 of the speakers**.

Management Term Project: Select from one of the projects below. Conduct your project **with your group** *in and mostly outside* of class. Each group will develop an outline to address the topic, produce both a rough draft and final written product, and give a brief (~15 min) group presentation to the class. The presentation must have no more than 20 slides. Each student should expect to spend ~35-50 hours working on the project throughout the term (including meetings, research, writing). The **outline** should include: the goal of the project, methods to be used, expected project outcomes, initial literature review. Please include a timeline *agreed upon by the group* in your outline. Teamwork is an important aspect of professional work in environmental science and management. Therefore, **IF your group fails to work together to complete the project and you have not come to me by Thursday of Week 5 to attempt to work through issues your group is having, each member of your team will be penalized 10% on your final paper grade and final presentation grade.**

Written product: Groups will submit an outline, rough draft, and final paper (5 pages) not including tables, figures, and citations.

Presentation: Each group will give a ~15 minute presentation, with 3 minutes for questions using power point or similar. ***All group members should present during the presentation***. The presentation should serve as a mini-lesson for your peers about the topic as well as reporting findings to the relevant agency or organization (most years community partners are able to Zoom in to the final presentations).

***Exams*:** There will be one midterm exam and one comprehensive final exam. The final exam will be based on all material covered in class, **including student and guest presentations**. Questions will include definitions/short answer and essays. The final will be weighted more heavily than the midterm to encourage retention and synthesis of course materials.

Op Ed: Graduate students are required to identify a current marine conservation, management or policy issue and write an op ed. Students should identify the target audience/media outlet of the op ed. Op eds should be 200-300 words and written in an op ed format (engaging, responding to or addressing an issue).

Grading component	**485%**	**585%**
Attendance and Participation	5	5
Homework & readings	3	3
Speaker questions	3	3
Quizzes	6	6
Midterm exam	17	15
Comprehensive exam	21	18
Management project: outline	2	2
Management project: rough draft	2	2
Management project: peer review	2	2
Management project: written product	24	24
Management project: presentation	13	13
Management project: evaluations	2	2
Opinion editorial (op ed)- Grad only	0	5
Total grade	100	100

Management project topics:

#1: Project Title: **Developing rocky habitat monitoring goals on the North Coast (including Cape Lookout MCA, Chapman Point MG, Ecola Point MCA)**
Identify key intertidal and subtidal indicator species to monitor in the short term and long term. Write a monitoring plan for community science efforts at one or more of the north coast site and recommendations for longer term lab research. How can these monitoring efforts translate into adaptive management strategies? What data could evaluate the effectiveness of habitat designation?
Agency Partner: **Eva Krukowski, Oregon Coastal Management Program**

#2: Project Title: **Developing rocky habitat monitoring goals on the Central Coast (Fogarty Creek MCA or Coquille Point MG)**
Identify key intertidal and subtidal indicator species to monitor in the short term and long term. Write a monitoring plan for community science efforts at one or more of the north coast site and recommendations for longer term lab research. How can these monitoring efforts translate into adaptive management strategies? What data could evaluate the effectiveness of habitat designation?
Agency Partner: **Eva Krukowski, Oregon Coastal Management Program**

#3: Project Title: **Impacts of climate change on rocky habitats (coastwide)**
How are direct and indirect effects of climate change currently impacting rocky habitats in Oregon? What are the long-term effects of climate change on rocky habitats? What management strategies could be implemented in rocky habitat management plans now to mitigate these impacts in the long term?
Agency Partner: **Eva Krukowski, Oregon Coastal Management Program**

#4: Project Title: **How sea level rise will impact rocky habitats in Oregon (coastwide)**
How will the systems change over time, what species will be impacted the most and what are the implications of these changes? What mitigation strategies could be implemented by land managers and communities to strengthen or prepare habitats for sea level rise?
Agency Partner: **Eva Krukowski, Oregon Coastal Management Program**

#5: Project Title: **Blue carbon in Oregon**
Should the state government in Oregon take a 1) hands off; 2) no-net loss or 3) interventionist approach to blue carbon in our state? Should the state invest public funds to expand these types of habitats? What are the key trade-offs to consider? What scientific knowledge do we have or need to restore/expand sea grass, tidal estuary and/or kelp habitat?
Agency Partner: **Sarah Klain, Oregon Department of Fish and Wildlife**

#6 Project Title: **Kelp as a blue carbon habitat**
Does Oregon kelp primarily cycle carbon, or is there a quantity of carbon from kelp detritus pushed to the deep ocean where it is sequestered on time scales relevant for responding to climate change? How does this vary along the US West Coast? And how should this be incorporated into policy and management?
Agency Partner: **Sarah Klain, Oregon Department of Fish and Wildlife**

#7 Project Title: **Abalone at-risk: Development of conservation actions to help with recovery of red, flat, and pinto abalone along the Oregon coast**

Abalone are iconic marine species that are highly prized by commercial and recreational divers, but they are particularly sensitive to environmental perturbation and overharvesting. Four species of abalone historically occurred along the Oregon coast (black, red, flat, pinto). Black abalone disappeared from Oregon many decades ago, and the remaining species are are currently diminished and persist at very low abundance. The purpose of this project is to review the historical information about abalone in Oregon, and develop recommendations for a series of potential conservation actions that may be carried out to assist with the maintenance, enhancement, and recovery of abalone populations along the rocky shores.

#8 Project Title: **Reducing plastics in Oyster Aquaculture**
Agency Partner: **Angee Doerr, OSG**

Policies

Communication and Availability: ***I am happy to answer your questions; however, before you ask me, please check the syllabus and course handouts, or talk to a peer!*** You are welcome to drop in during my office hours. If the course office hours don't work for you, please make an appointment at another time. I commonly receive over 100 emails a day and struggle to respond in a timely manner. If you need to email, please use the Canvas email client and put "ESM 483/583 Winter 2024" in the subject line so that I can easily find your email. If you are having difficulties, come to office hours early in the term.

Late policy: Late assignments for which an extension has not been discussed, will be penalized by 10% per day and will be accepted for 1 week past the deadline; there will be a delay in my grading of late work. If you have extenuating circumstances, please reach out with an extension request at least 24 hrs before the assignment due date.

***Illness policy*: If you're sick PLEASE STAY HOME**! And please work with me to figure out how to compensate for missed class and email me or upload your assignments as they're due (if you didn't ask for and receive an extension). I will likely offer a Zoom option for those who are sick/contagious but who want to join class. The Zoom option will ONLY be for those who have a documented illness.

***Conduct*:** We are to 'realize' the 'highest ethical standards of professional' and student behavior. Check out the Student Code of Conduct, to which you are bound: http://www.pdx.edu/dos/codeofconduct

Please consult the Purdue OWL regarding plagiarism and other writing issues:
https://owl.english.purdue.edu/owl/resource/589/01/

Resources & Services:

ESM webpage: all sorts of info on what the department is doing: http://www.pdx.edu/esm/

Consult the Purdue OWL re: ***plagiarism*** and other writing issues:
https://owl.english.purdue.edu/owl/resource/589/01/

Library Research Tutorials: http://guides.library.pdx.edu/home/howto and
http://guides.library.pdx.edu/biology

DRC: If you are a student with a documented disability and are registered with the Disability Resource Center, please contact me so that we can arrange whatever academic accommodations you need. Please arrange with the DRC ahead of tests and send me a prompt to send them the test if required.

Resources for students can be found at: http://my.pdx.edu/students/resources-across-campus including Writing Center: for class assignments, resumes... http://www.writingcenter.pdx.edu/ Cramer rm 188; Free Tutoring...: http://www.pdx.edu/tutoring/ PSU library rm 245; Career Services: https://www.pdx.edu/careers/what-can-i-do-degree-environmental-studiesenvironmental-sciences and https://www.pdx.edu/careers/; Multicultural Centers: https://www.pdx.edu/dmss/multicultural-student-center ; https://www.pdx.edu/dmss/native-american-student-community-center ; https://www.pdx.edu/dmss/la-casa-latina-student-center ; LSAMP (Louise Stokes Alliance for Minority Participation in STEM) 103 Epler Hall http://www.pdx.edu/lsamp/home; Queer Resource Center: www.pdx.edu/queer; Food pantry: https://sites.google.com/a/pdx.edu/psufoodpantry/; Office of Veterans Services https://www.pdx.edu/veterans/veterans-services

You may report any incident of discrimination or discriminatory harassment, including sexual harassment, to either the Office of Equity and Compliance or the Office of the Dean of Student Life. Please be aware that as a faculty member, I have the responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination.