# BI150 – Ocean Planet: A User's Guide

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GTF Info:
BULA Info:

Much marine life is easily observed from shore – if one pays attention. Using field trips early in the course, and then facilitated use of field guides and discussion, the course will help students discover the natural world, and their own ability to absorb it and learn about it, even if they are not scientists. Most field guides are written for the educated layperson, not technical experts, and they include many interesting facts that stimulate interest. Following this period of immersion (not literally) in the Oregon coastal environment (through pictures and field trips), the course will turn its attention to case studies relating to problems on the Oregon coast that have universal application and require input of science to resolve. Some topics will also involve reference to other ecosystems with similar ecology or environmental challenges. We will work in groups, identifying the science involved in the problem, developing conceptual models of the problem to separate aspects that have to be addressed with science and without, and then to determine what science is required and at what stages of the problem-solving process. Resources on the topic (readings and websites) as well as on problem solving approaches and conceptual modeling will be provided, but student groups will develop final products on their own and present a concept map for each of the three case studies we will do. Individual students in each group will also turn in a short three-page summary of the case that is their own individual interpretation of the concept map. Examples of topics for the case studies are: oil spills and oil spill response, marine reserves, management of fisheries, endangered species management, invasive species management, oceans and human health. The course introduces the general foundations of marine biology and the process of scientific reasoning, and meets general education requirements for science. Students meet in three 50-minute lecture sessions per week, and one 80-minute discussion section. The discussion sections will provide opportunity for students to work up data from the field trips and develop conceptual models for the case studies, as well as to discuss and debate topics that arise from the case studies.

**Participation and Workload:** This class involves a normal workload that requires you to spend about eight or nine hours per week actively working on the class, reading papers and working on assignments. It is very important to keep up, and come prepared to every class because the development of case studies requires direct application of information in the readings and the fieldtrips depend on students having mastered concepts from lecture and discussion in advance.

**Field Trips**: There are two required field trips for this course. Together we will explore Oregon's tide pools, seabird colonies, and the Oregon Coast Aquarium. Using our field guides and course discussion, you will learn to identify common flora and fauna and understand how they fit into our coastal ecosystem. You will need to have weather-appropriate clothing and be prepared to hike on somewhat uneven surfaces for part of each field trip. Students for whom this may be a problem should bring this to the attention of the instructors.

**Course Grade:** Participation 5%, Midterm 20%, Final 20%, Case Studies 30%, Writing Assignments 15% , Field Trips 10%

**Comment on Writing Assignments and Case Studies –** Each **WRITING ASSIGNMENT** will be based on topics covered in class, and include some problem solving based on material worked on in small groups in the class. They will usually include interpretation of at least one graph or figure from the course readings, five to ten objective-type questions (multiple choice questions, matching, etc. with space for you to explain your answer) and two-to-four short-answer questions relating to material in the class, that will need to be answered in complete, well-constructed sentences. The first writing assignment will focus on concepts relating to biodiversity and intertidal ecology, and will require you to show mastery of the use of a field guides to determine the key characters of some common organisms of the intertidal. The second will focus on seabirds and marine mammals, and also require you to show knowledge of the seasonal pattern of grey whale migration off the Oregon coast. The third, and final, writing assignment will include material on salmon but also require you to demonstrate an understanding of the difference between science and policy and will include several concept maps for you to critique or evaluate. Each **CASE STUDY** will consist of four parts – 1) a replica of the concept map your group designed for the topic of the case study (provided in class), 2) your three paragraph summary of the science, social science/economics, and integration components of the concept map (written in your own words), 3) your answers to 5-10 short-answer or objective type questions on the reading assigned for the case study, and 4) a single, well-constructed paragraph explaining your opinion about the degree to which science has been, or can be, used effectively in solving the problems featured in the particular case study of interest.

**Grading Policy:** The course grade includes several components to allow you to show your engagement in the course and what you have learned in a variety of ways. Writing assignments, field trip reports, and case study reports will be graded using a High Pass- A, Pass- B0, Low Pass- C, and No Pass -D or F.) "A" work always shows evidence of editing and includes a fairly high information content that links ideas in the work to course topics. "B" work shows evidence of extra effort but may not rise to the level of an "A" effort in one or more areas. "C" work has major deficiencies in several areas but the student had made an effort and mastered the basics of the assignment. "D" work represents some effort, is acceptable in at least one area, but deficient in others. "F" work is not acceptable, either because no aspect of the work rises to acceptable levels, major portions of the assignment are missing, or, despite some small aspect being acceptable, most of the work is extraordinarily subpar. Writing Assignments (only writing assignments) can be revised and turned in for regrading.

**Academic Integrity:** Ideas and creative expression are the cornerstone of the intellectual life of the University. Plagiarism and other forms of dishonesty in the academic endeavor are thus contrary to the goals of the University and an enlightened life, just as personal integrity, collaboration and honest sharing of ideas (with credit given where it is due) is part of the path to new knowledge and a just society. Students are expected to adhere to University policy on academic misconduct and are responsible for consulting with the instructors if they have any questions about proper procedures for attribution, cooperative projects, or other acts that might be construed as plagiarism or other forms of misconduct. See guidelines at conduct.uoregon.edu and information on plagiarism at http://library.uoregon.edu/guides/plagiarism/students/index.html

# BI150 - Ocean Planet: A User's Guide --- Course Outline

| WEEK | TOPIC | RELEVANT READINGS AND ASSIGNMENTS |
|---|---|---|
| **Week 1** | **Oceans and Biodiverstiy** | |
| Lec t1 | Why is this course important and what can I learn? | C&H, pp/ 1-15, 55-58, 244-67 |
| Lect 2 | Biodiversity in the Intertidal | Harbo, pp. 1-24 |
| Disc 1 | Using Field Guides | Harbo, Chs. 1,2 |
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| **Week 2** | **Life in an Intertidal Mussel Bed** | |
| Lect 1 | Major Players | Harbo, Chs. 1,2,5,6; C&H, Ch. 7 |
| Lect 2 | Stresses and Colonization | C&H Remainder of Ch. 11; **Writing Assgmt. 1 Due** |
| Lect 3 | Mortality and Competition | |
| Disc 2 | Tide Tables | http://www.math.nus.edu.sg/aslaksen/teaching/tides.html, http://co-ops.nos.noaa.gov/restles1.html, http://hmsc.oregonstate.edu/weather/tides/tides.html |
| Sat | Field Trip South Coast/OIMB | |
| Sun | FieldTrip South Coast/OIMB (if needed) | |
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| **Week 3** | **Moving Offshore** | |
| :ect 1 | Kelp Forests and Sea Urchins | Estes et al. 2010, C&H, pp. 182-203 & 300-305; **Tide Table Assgmt Due** |
| Lect 2 | Whales and more whales | Schultz, 1990, Harbo, Ch. 10 |
| Lect 3 | Seabirds | **Field Trip Writeup Due** |
| Disc 3 | Science and Policy | Lovebrand 2007 |
| Sat | Field Trip Aquarium/Yaquina Head | |
| Sun | Field Trip Aquarium/Yaquina Head (if needed) | |
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| **Week 4** | **Land-Sea Interactions - Salmon** | |
| Lect 1 | The Anadromous Lifestyle | C&H 383-99 |
| Lect 2 | Salmon and the Coast | Schindler et al. 2003; **Writing Assgmt. 2 Due** |
| Lect 3 | Salmon and other endangered species | Stansell et al. 2010 |
| Disc 4 | Science and Policy - Concept map for salmon | |
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| **Week 5** | **Case Study I - Endangered Species Management** | |
| Lect 1 | MIDTERM | |
| Lect 2 | Endangered Species Act and other key concepts | http://www.nmfs.noaa.gov/pr/laws/esa/, http://www.nwf.org/Wildlife/Wildlife-Conservation/Endangered-Species-Act.aspx |
| Lect 3 | Walla Walla Case Study | Weber et al. 2013 |
| Disc 5 | Concept Map for Walla Walla | |
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| **Week 6** | **Case Study I - Cont.** | |
| Lect 1 | Review Concept Map for Walla Walla, id issues | **Writiing Assignment 3 Due** |
| Lect 2 | Details for Walla Walla and Salmon | TBA based on concept map review |
| Lect 3 | Follow Up from Concept Map Review | |
| Disc 6 | Complete Concept Map - group presentation | |
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| **Week 7** | **Case Study II - Oil Spills** | |
| Lect 1 | Oil Spills 101 | **Case Study 1 Due** |
| Lect 2 | Exxon Valdex and OPA 90 | Peterson et al. 2003, Skalski et al. 2001 |
| Lect 3 | Oil Spill Recovery in Prince William Sound | |
| Disc 7 | Concept Map for Valdez Spill & Response | |
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| **Week 8** | **Case Study II - Cont.** | |
| Lect 1 | Deepwater Horizon I | http://www.oilspillcommission.gov/final-report; Safina 2011 |
| Lect 2 | Deepwater Horizon II -issues for concept map | Houck 2010 |
| Lect 3 | New Carissa | |
| Disc 8 | Complete Concept map - group presentation | |
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| **Week 9** | **Case Study III - Marine Protected Areas** | |
| Lect 1 | Categories of Protection | **Case Study 2 Du**e; http://www.youtube.com/watch?v=RDJgMt19GRI&feature=youtu.be |
| Lect 2 | Marine Reserves, Science, and Policy | Science of Marine Reserves, PISCO (2003) |
| Lect 3 | Marine Reserve Planning in Oregon | **Writing Assignment 4 Due**; Lubchenco et al. 2003, Halpern et al. 2003 |
| Disc 9 | Concept Map for Oregon Marine Reserves | |
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| **Week 10** | **Case Study III - Cont.** | |
| Lect 1 | Current Thinking on Marine Reserves | |
| Lect 2 | Review Oregon Concept Map and ID Issues | |
| Lect 3 | Follow Up from Concept Map Review | TBA based on concept map review |
| Disc 10 | Complete Concept Map - group presentation | **Case Study 3 Due** |
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| FINAL EXAM | | |

**TEXTS:**
Castro, P. and M. E. Huber. 2012 *Marine Biology*, 9th Ed. McGraw Hill, New York, 460 pp.
Harbo, R. M. 2011. *From Whelks to Whales*, Harbour Publishing, Madeira Park, B.C., Canada, 328 pp.

**READINGS (On Blackboard):**

Estes, J.A., C. H. Peterson, and R. S. Steneck. 2010. Some effects of apex predators in higher-latitude coastal oceans. IN, *Trophic Cacades*: Predators, Prey and the Changing Dynamics of Nature. J. Tergborgh and J. A. Estes, Eds. Pp. 37-53.

Lövbrand, E. 2007. Pure science or policy involvement? Ambiguous boundary-work for Swedish carbon cycle science. *Env. Sci. & Policy*. 10:39-47.

Halpern, B. S. 2003. The impact of marine reserves: do reserves work and does reserve size matter? *Ecol. Appl.* 13(1)Suppl:S117-S137.

Houck A. 2010. Worst case and the Deepwater Horizon blowout: there ought to be a law. *Env. Law Reporter* 40:11034-11040.

Lubchenco, J. S. Palumbi, S. Gaines, & S. Andelman. 2003. Plugging a hole in the ocean: the emerging science of marine reserves. *Ecol. Appl.* 13(1)Suppl.:S3-7.

Partnership for Interdisciplinary Studies of Coastal Oceans. 2007. *The Science of Marine Reserves* (2nd Ed., United States Version). www.piscoweb.org. 22 pps.

Peterson, C.H., S. D. Rice, J. W. Short, D. Esler, J. L. Bodkin, B. E. Ballachey, & D. B. Irons. 2003. Long-Term Ecosystem Response to the Exxon Valdez Oil Spill. *Science* 302:2082-2086.

Safina, C. 2010. *A Sea in Flames.* Crown Publishers, New York. pp. 67-118, 274-99

E., M. D. Scheuerell, J. W. Moore, S. M. Gender, T. B. Francis, and W. J. Palen. 2003. Pacific salmon and the ecology of coastal ecosystems. *Front. Ecol. Environ*. 1(1):31-37.

Schultz, S. T. 1990. *The Northwest Coast*, Timber Press, Portland, pp. 57-95.

Skalski, J. R., D. A. Coats, A. K. Fukuyama. 2001. Criteria for oil spill recover: a case study of the intertidal community of Prince William Sound, Alaska, following the Exxon Valdez Oil Spill. *Env. Mgmnt.* 28(1):9-18.

Stansell, R., K. M. Gibbons, and W. T. Nagy. 2010. Pinniped predation on adult salomonids at the Bonneville Dam tailrace, 2008-2010. USACE Report

Weber, E. P., N. Lovrich, & M. Gaffney. 2013. Collaboration, enforcement, and endangered species: a framework for assessing collaborative problem-solving capacity. *Soc. & Nat. Res.:An Int. Journal.* 18:677-698.