

## FW 331 – Ecology of Marine and Estuarine Birds

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Hatfield Marine Science Center

### **Credit Hours: 4**

This course meets for 8 hours of lecture and 4 hours of lab per week, and combines outside preparation and assignments for a total of 120 hours of instruction.

**Prerequisites:** a year of introductory biology

### **Course description:**

Marine and estuarine birds are highly diverse and differ in many ways from more familiar terrestrial species. For example, many seabirds have life histories that are more similar to marine mammals, including their diving capabilities. Through lecture, field, and laboratory experience, students will gain detailed knowledge of the biology and ecology of marine and estuarine birds. This course will focus on how marine birds are adapted for life at sea, their morphology, physiology, foraging ecology and biogeography as well as covering topics in introductory Oceanography. The course will include lecture, class discussion, field trips and sampling, lab exercises, data interpretation, project or term paper.

### **Measurable Student Learning Outcomes:**

The successful student will be able to:

- a. Describe various disciplines within marine ornithology and key hypotheses being addressed.
- b. Discuss marine and estuarine bird adaptations that are specific to life at sea.
- c. Explain general biogeography, foraging ecology, and life history adaptations of marine and estuarine birds.
- d. Define basic coastal oceanographic processes
- e. Interpret current conservation concerns for marine and estuarine birds.
- f. Identify local marine and estuarine bird species.

### **Evaluation of Student Performance:**

Student evaluation for the course will be based on quizzes (20%), lab/field exercises (20%), project/term paper (30%), exams (30%)

#### Quizzes (20%)

1-2 quizzes are given each week. Quizzes include information and key concepts from readings, lectures, and lab. Students are given 10 minutes at the beginning of class to read over quiz and answer as many questions as possible. Students retain quizzes to complete unanswered questions during lecture, by asking questions, and by discussing with classmates. Quizzes are turned in after class lecture and discussion.

#### Lab & Field Exercises (20%)

The laboratory activities include a (1) marine bird necropsy and (2) Google Earth GIS exercise. During the necropsy, students work in pairs to take morphological measurements and identify many anatomical features (external, skeletal, internal organs). A 2-page list of specific requests is provided by the instructor for the teams to fill out and return at the end of the lab. Students in the Google Earth GIS lab will be taught to manipulate and overlay albatross tracking and remotely-sensed oceanographic data. For each layer students will answer a series of questions

about the source and interpretation of the data. Lab discussions and questions on worksheets will include topics of seabird tracking technology, physical & biological oceanography (integrating discussion from prior lecture).

During all field trips (including the Oregon Coast Aquarium) students will keep notes on location, habitat, bird identification, species lists, and abundances. Additionally, two field trips will include organized, group data collection where all students will be taught standard point count and strip transect survey methods. Each student will be required to participate as a data collector and in summarizing the data to present and discuss in class.

Class project (30%).

Students will be given a choice to conduct a field sampling project and report, skeletal articulation, or a term paper and presentation. Students conducting field projects, skeletal articulations, or giving presentation can work in teams of 2-3. Papers (research or term) are written individually. Examples of research projects, skeletal articulations, presentations, and papers will be provided to students at the beginning of the class.

Exams (30%)

Students will be given two 1-2 hour exams. The exams will be comprehensive with a combination of fill-in-the-blank, identification, multiple choice, and essay. Exams can include material from any part of the class.

### **Learning Resources:**

Rite in the Rain or similar field notebook

Reading material will be provided as pdfs or put on reserve

*The Biology of Marine Birds* by Schreiber and Burger, 2002 (Optional)

### **Schedule of Topics:**

#### *Week 1*

- Tue (6/24): Course Overview, Expectations, & Resources, Introduction to Marine/Estuarine Birds, Life Histories, Taxonomy & Field Identification, Field trip (13:00): Oregon Coast Aquarium (Alcid life history and husbandry) & Yaquina Head Outstanding Natural Area (ID, colony & population dynamics).
- Thu (6/26): Class Projects, Foraging Ecology (Part I), Land-Sea Connection, Field trip (12:00) Audubon Society's 10 mile Creek Preserve (coastal forest and ocean, marine reserves, Marbled Murrelet conservation).

#### *Week 2*

- Tue (7/01): Anatomy, Physiology, Diving, Lab: Seabird necropsy
- Thu (7/03): Mid-course Exam, Marine/Estuarine Birds as Indicators, Field trip: Seawatch surveys at Boiler Bay, Otter Rock, Seal Rock

#### *Week 3*

- Tue (7/8): Life Histories & Foraging Ecology (Part II.), Oceanography, Biogeography, Lab: Google Earth seabird tracking and oceanographic data GIS exercise
- Thu (7/10): Migration and Navigation, Population Dynamics, Field trip: Birding Yaquina Bay

#### *Week 4*

- Tue (7/15): Conservation, Field Trip: Marine Discovery Tour, offshore seabird ID & survey

- Thu (7/17): Climate Change and Marine Birds, Final Exam, Projects/Term Papers Due

\*The schedule may be changed due to weather or other considerations

### **Schedule of Lectures and Labs:**

The instructor is engaged with the students during all classroom, lab, and field activities.

#### **Day 1:**

Classroom (9:00-12:00): Course Overview, Expectations, and Resources. Lectures introducing the biology, ecology, and taxonomy, life histories, and field Identification. Readings include Jodice and Suryan 2010 book chapter from Landscape-scale Conservation Planning.

Field (13:00-16:00): Oregon Coast Aquarium. Students and instructor meet with aviculturist in the aviary and behind the scenes to discuss Alcid life history and husbandry. Instructor and students visit Yaquina Head Outstanding Natural Area with over 60,000 nesting seabirds of 5 species. Topics to discuss include identification, colony & population dynamics).

#### **Day 2:**

Classroom (9:00-11:00): Discussion of class projects - students should choose their project by the beginning of next week. Lectures will include foraging ecology (Part I), land-sea connection. Students are given quiz #1 at the beginning of class that they complete during lecture and discussion. Readings discussed include: Becker and Bessinger 2006 Conservation Biology, Croll et al. Science, Audubon 10 Creek Preserve report,

Field (11:00-17:00): Students and instructor meet with Audubon Society's 10 mile Creek Preserve manager at Cape Perpetua lookout. Outdoor lecture/discussion includes coastal forest management, coastal marine biology, and marine reserves. Visit 10 mile Creek Preserve to see riparian ecosystem restoration, old growth forest habitat for the marbled murrelet. Discuss land-sea connection, and forest management that effected marbled murrelet habitat and current coastal forest stewardship efforts.

#### **Day 3:**

Classroom (9:00-11:00): Lectures will include anatomy, physiology, and diving. Students are given quiz #2 at the beginning of class that they complete during lecture and discussion. Readings include Halsey et al. 2006 Functional Ecology, Gutierrez et al. 2012 Functional Ecology.

Lab (11:00-14:00): Seabird necropsy. Students work in pairs using field measuring and laboratory dissecting tools, to take morphological measurements and identify many external, skeletal, internal anatomical features. Communication among groups and with instructor is encouraged while using diagrams from Proctor and Lynch 1993 Manual for Ornithology to complete the lab exercise. Discussions during lab include morphological adaptations among marine birds.

Independent study (14:00-1700): Students allowed time to work on class projects (skeletal articulation, field project, report, presentation). Students who are conducting skeletal articulations continue to dissect and prepare the carcass for cleansing and re-articulating the skeleton (instructor is accessible to answer questions).

#### **Day 4:**

Classroom (9:00-12:00): Mid-course Exam. Lecture marine and estuarine birds as environmental indicators. Readings discussed include Durant et al. 2009 Climate Research, Piatt et al. 2007 Marine Ecology Progress Series.

Field (13:00-17:00): Seawatch surveys at Boiler Bay, Otter Rock, and/or Seal Rock. Instructor selects two locations for comparison. Students learn bird identification and point count survey methodology. The class is divided into 2-3 groups and conducted timed “seawatch” surveys, counting birds within a defined area. Students alternate observing and recording data. Each team is required to organize field data and notes to present to the class for comparison of species composition and abundance among observer teams and between sites.

#### **Day 5:**

Classroom (9:00-12:00): Lectures on life Histories and foraging ecology (Part II.), oceanography, biogeography. Students are given quiz #3 at the beginning of class that they complete during lecture and discussion. Readings include Balance et al 2001 Encyclopedia of Ocean Science, Paredes et al. 2012 Marine Ecology Progress Series, Suryan et al. 2009 Progress in Oceanography.

Lab (13:00-15:00): Google Earth seabird tracking and oceanographic data GIS exercise. GIS lab will be taught to manipulate and overlay albatross satellite tracking and remotely-sensed oceanographic data. Spatial coverage is North Pacific, including the Bering Sea. Albatross tracking data are from Argos GPS PTTs so that students can compare resolution/precision of different tracking methodologies. Students are introduced to and expected to summarize time series data for multi-month/year tracking data. Oceanographic layers include bathymetry, sea surface temperature, and sea surface height. For each layer students will answer a series of questions about general patterns, the source, and interpretation of the data. Instructor is present to guide students and discuss findings throughout the lab. Students are encouraged to discuss questions with each other.

Independent study (15:00-1700): Students allowed time to work on class projects (skeletal articulation, field project, report, presentation).

#### **Day 6:**

Classroom (9:00-12:00): Lectures on seabird/shorebird migration and navigation. Students are given quiz #4 at the beginning of class that they complete during lecture and discussion. Readings to discuss include: Gill et al. 2009 Proceedings of the Royal Society B, Nevitt and Bonadonna 2005 Biology Letters, Warnock and Bishop 1998 Condor.

Field (13:00-15:00): Students and instructor conduct bird surveys of Yaquina Bay. Students record independent field notes including the species and number of birds they see as a group while conducting a survey from the deep waters of the bay entrance to the shallow tide flats for Idaho Point. Students are expected to discuss changes in species composition and abundance with respect to morphology, feeding ecology, and habitat selection.

Independent study (15:00-1700): Students allowed time to work on class projects (skeletal articulation, field project, report, presentation).

#### **Day 7:**

Classroom (9:00-12:00): Lectures on population dynamics and conservation. Review basic line transect survey methodology. Readings to discuss include: Blais et al. 2005 Science, Pichergru et al. 2010 Biology Letters, Robards et al. 1995 Marine Pollution Bulletin, Danchin et al. 1998 Ecology, Lewis et al. 2001 Nature

Field (12:00-15:00): Marine Discovery Tour. Students learn natural and cultural history of Yaquina Bay. In the outer bay and offshore, students conduct strip transect surveys from the bow of the vessel, alternating observer and recorder positions. Back in class students summarize and discuss survey results.

Independent study (14:00-1700): Students allowed time to work on class projects (skeletal articulation, field project, report, presentation).

**Day 8:**

Classroom (9:00-12:00): Lecture on climate change impacts on marine and estuarine birds. Video on climate change in Antarctica and impact on penguin breeding colonies – “Penguin Science”, National Science Foundation. Final class discussion. Readings for discussion include: Gjerdrum et al. 2003 Proceeding of the National Academy of Sciences, Peirsma and Lindstrom 2004 Ibis.

Final Exam (12:00-14:00)

Course Wrap-up (14:00-1700): Students allowed time to complete and turn in projects, field notes, etc.

**Disabilities Statement:**

Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

**Equality in the Course:**

The instructor(s) are dedicated to establishing a learning environment that promotes diversity of all students’ races, cultures, genders, sexual orientations and physical abilities. If you notice discriminatory behavior, or if you feel discriminated against, please bring it to the attention of the instructor(s).

**Academic Integrity:**

The instructor(s) will hold you accountable to the highest standards of academic integrity. Please read and understand the policies on academic integrity as published on the OSU website: <http://oregonstate.edu/studentconduct/>;  
<http://oregonstate.edu/studentconduct/http://%252Foregonstate.edu/studentconduct/code/index.php>