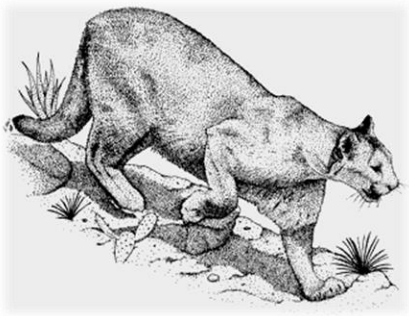

Biology 3063 Syllabus
Conservation Ecology
Spring 2021

Catalog Course Description: Conservation Ecology BIO 3063 (3 units) + BIO 3063L (1 unit)
An examination of the key concepts and issues at the intersection of conservation biology and ecology, starting with environmental ethics and the valuation of nature and moving to sustainable development and creation care. Students read journal articles and discuss the medical value of biodiversity, zoonotic disease and public health, trophic cascades, toxicology, endocrine disruption, conservation genetics and extinction vortices, de-extinction and species resurrection, shifting baselines, physiological ecology, road ecology, conservation behavior, and community-based conservation. We also explore innovative technology driving advances in conservation such as biologgers, camera traps, and fecal genetic and hormonal analysis. Students complete a team field research project on or near the Point Loma campus to apply the concepts of conservation ecology to the local environment. Prerequisite: BIO 2011.

Instructor: Dr. Mike Mooring
Rohr Science Room 128
Telephone: (619) 849-2719
E-mail: mmooring@pointloma.edu

Office hours:
Make a Zoom appointment

Teaching Assistants: Antoinette Piraino – apiraino2017@pointloma.edu
Courtney Baker – cbaker1999@pointloma.edu

Lecture: Tuesday-Thursday from 11:00-12:15 in **Latter Hall 01***
Lab: Thursday 1:30-5:00 PM in **Latter Hall 01** or field trips

Equipment: iClicker REEF Student Web for class participation via laptop / tablet / smartphone

Optional: Conservation Biology for All, Oxford University Press, 2010;
Open access: www.mongabay.com/conservation-biology-for-all.html

** Subject to State of California Tier designation for San Diego County*

Student Learning Outcomes: Upon completion of the course, students will be able to…

- Explain the value of biodiversity and the role of conservation in relation to economics, sustainability, and ethical/spiritual considerations.
- Recognize the forces at work to diminish biodiversity and anticipate the consequences of various scenarios based upon ecological principles and case studies.
- Critically read & evaluate journal articles and current events from technical & theoretical perspectives.
- Recognize the environmental symptoms of habitat degradation and biodiversity loss from first hand observations (e.g., field trips and field project).
- Design an original team field project that juxtaposes ecological and conservation issues and communicate the results and conclusions via written and oral presentations.

Foundation of Course Philosophy:

God spoke: "Let us make human beings in our image, make them reflecting our nature so they can be responsible for the fish in the sea, the birds in the air, the cattle and, yes, Earth itself, and every animal that moves on the face of Earth." (Genesis 1:26, The Message)

God says "I make you trustees of My estate." The human family is to join God in the ongoing work of creation. The earth below and the sky above with all their inhabitants are too beautiful and too good to be left alone. They need the tender care and close attention that only God's favored creature can give. (Commentary on Genesis 1:27-28 from The Voice)

Every time we celebrate a conservation success such as the recovery of the white rhinoceros in South Africa, we are strengthened in this present hope that God is working with us to redeem his creation. Furthermore, these present successes are a very real foretaste of even greater things to come on that day when God will fully restore all that He has made. (Dr. Simon Stuart, La Rocha)

COURSE COMPONENTS:

(1) Lectures: We will be covering exciting ground this semester, as conservation ecology is a new and rapidly growing sub-discipline of ecology. My goal is to introduce you to a wide variety of approaches to conservation ecology, many of which may be new to you. We will focus on readings from the primary literature (journal articles) to explore the more specialized topics covered in this course. Reading a journal article is an essential skill for developing scientists and you will have plenty of practice! I am assuming that everyone in this class has a good grasp of basic ecological concepts from lower division classes. If your grasp of ecology is rusty, you may want to brush up with the free access textbook *Conservation Biology for All*. Class periods will introduce the week's topic using lecture, group activities, and case studies. REEF quizzes will provide an opportunity for everyone to participate. The reading assignment will typically be tested on Tuesdays using REEF polling.

(2) Journal Articles: Ecology textbooks cover the basics that you have already learned. The advanced topics that we will be covering here are rarely found in conventional texts. Peer-reviewed scientific journal articles will be the primary "textbook" for the course. During the Tuesday session, I will typically try to review the basic concepts involved before we move on to the more specialized aspects or a case study. The Thursday session will go deeper into the topic with videos, group activities, and advanced topics.

(3) Labs: One cannot really learn ecology without spending some time studying natural ecosystems in the field. Because of social distancing restrictions and contact tracing requirements, you will be performing your field activities with your designated partner or trio. Because of the changing status of access to field sites, some of the field lab activities are subject to change. My plan is for your partner groups to get the majority of your field time working on the *eBird* and *iNaturalist* project in which you will spend 2-3 hours per week in the field (on or off campus) to observe, identify, and record living organisms in their natural environment.

(4) Canvas: All assignments will be submitted directly to Canvas Assignments. Please note that **Canvas does not support PAGES** – please use Word or PDF formats! Your TAs will be grading all assignments on Canvas, and giving you helpful feedback on each assignment through the text box and annotation features. It is your responsibility to review the graders' comments on each assignment so that you understand the expectations for receiving full points and to adjust your understanding of the topic in preparation for exams.

(5) Exams: We will have 3 exams during the year, 2 mid-terms and a final. The exam will be taken on Canvas. Half of the class can take the exam in the classroom during lab period, while the other half will take the exam online using Honorlock. I will give you a study guide to help prepare for each exam. There will be no make-ups for those exams unless you have made arrangements with me beforehand. After the exam, I will provide feedback to anyone who requests it.

(6) iClicker REEF Polling: To enable everyone to participate, I require everyone to purchase access to the REEF polling app and to login to REEF before every class meeting and to participate in quizzes. Quiz questions will be used for class participation (being engaged in class activities) and performance (getting the right answer). A review quiz based on the reading assignment will be administered in class on Tuesdays.

(7) *eBird* and *iNaturalist* field project: This assignment is an opportunity for you to gain firsthand experience observing, identifying, and recording birds, mammals, insects, reptiles, or plants in the field. Each partner group is expected to spend a minimum of 2 hours in the field during each week of the project, for a total of at least 12 hours of fieldwork over 6 weeks. Partner groups should plan to use the 3.5-hour Thursday lab period for their field observations. In some cases, your group can choose an alternative time to complete the field work. Partner group members will evaluate each other at the end of the project.

Description: Citizen science is scientific research conducted by amateur (non-professional) scientists. Citizen participation in field research (e.g., monitoring surveys) often results in scientific advancements as well as an increase in public understanding of science. The two most popular citizen science websites are *'iNaturalist'* and *'eBird'*. These are online social networks of millions of scientists and naturalists who share biodiversity information to help each other learn about nature. *iNaturalist* is used to record your own observations of animals and plants, while *eBird* documents bird distribution worldwide. Both have free apps that can be loaded onto your smartphone. Use *eBird* for birds and *iNaturalist* for other animals or plants. Your job will be to take photos and submit species accounts of as many species as possible. To do this you will have to register and learn how to submit observations from the *eBird* and *iNaturalist* websites and then provide proof of your contributions (photos or links). Each week, your partner group will submit a one-page species account on Canvas highlighting your favorite observation that week (must be a different species each time).

(8) Attendance: Regular and punctual attendance is important for optimal achievement in any realm of life, and is a requirement for this course. Attendance will be taken with REEF and you must therefore login to REEF at the beginning of each class meetings (not for labs). You are permitted 3 absences without penalty. Every absence in excess of 3 will incur a reduction of your Attendance Participation points.

(9) Late Assignments: The following penalties will apply for all assignments submitted after the due date. If you have a legitimate reason for a late assignment, please tell the grader what happened using the text box when you submit your assignment on Canvas.

- Readings (worth 10 pts): 1 point deducted for each day late (no points after 10 days)
- Labs (usually 20 pts): 2 points deducted for each day late (no points after 10 days)

Grading Criteria

Points are estimates and may change

- Attendance Participation……..…... 50 pts
- REEF Polling quizzes……. 75 pts
- Journal Article Readings (15 @ 10 pts) … 150 pts
- Lab and Field Trip reports (8 @ 20 pts) …160 pts
- Canvas Exams (3 @ 100 pts) …….300 pts

TOTAL POINTS…… **735 pts**

LETTER GRADES:			
A	90%	C	70%
A-	88%	C-	68%
B+	86%	D+	66%
B	80%	D	60%
B-	78%	D-	58%
C+	76%	F	< 58%

PLNU INSTITUTIONAL POLICIES

PLNU Mission: To Teach ~ To Shape ~ To Send
Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

General Education: This course is one of the components of the General Education Program at Point Loma Nazarene University, under the category of "Exploring an Interdependent World." By including this course in a common educational experience for undergraduates, the faculty supports an introduction to the natural and social sciences as tools for exploring the world, with emphasis on collecting and interpreting empirical data for both theoretical and practical purposes. PLNU provides a foundational course of study in the liberal arts informed by the life, death, and resurrection of Jesus Christ. In keeping with the Wesleyan tradition, the curriculum equips students with a broad range of knowledge and skills within and across disciplines to enrich major study, lifelong learning, and vocational service as Christ-like participants in the world's diverse societies and cultures.

PLNU Attendance and Participation Policy: Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See Academic Policies in the Undergraduate Academic Catalog.

PLNU Academic Honesty Policy: Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty includes plagiarism, fabrication, deception, or impersonation. Plagiarism is the act of presenting information, ideas, or concepts as one's own when in reality they are the result of another person's creativity and effort. Such acts include copying assignments from another student, or copying and pasting answers from the reading into your answer – both involve using someone else's words as if they were your own. Much of the learning process involves articulating the answer in your own words, so bypassing this step will almost guarantee an inadequate understanding of the material. Please write using your own words, and no copy-pasting! A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination. See Academic Policies for definitions of kinds of academic dishonesty and further policy information.

PLNU Academic Accommodations Policy: While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in the Bond Academic Center. (DRC@pointloma.edu or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

PLNU Copyright Policy: PLNU, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU Final Examination Policy: Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on this syllabus. No requests for early examinations or alternative days will be approved unless you have 3 final exams scheduled on the same day or another compelling reason.

BIO 3063 LECTURE SCHEDULE – SPRING 2021

WEEK	DATES	TOPIC	READING
1	Mar 2-4	Introduction and Conservation Ethics	*Reading 1*
2	Mar 9-11	Emerging Disease and Biodiversity	*Reading 2*
3	Mar 16-18	Medical Value of Biodiversity	*Reading 3*
4	Mar 23-25	Toxicology and Endocrine Disruption	*Reading 4*
5	Mar 30-Apr 1	Lost Predators and Trophic Cascades	*Reading 5*
6	Apr 6-8 Apr 8	Shifting Baselines and Ocean Conservation ► **Exam 1**	*Reading 6*
7	Apr 13-15	Conservation Genetics and Genomics	*Reading 7*
8	Apr 20-22	De-extinction and Species Resurrection	*Reading 8*
9	Apr 27-29	Conservation Endocrinology	*Reading 9*
10	May 4-6	Physiological Ecology and Biologgers	*Reading 10*
11	May 11-13 May 13	Camera Trapping Revolution ► **Exam 2**	*Reading 11*
12	May 18-20	Road Ecology and Movement Ecology	*Reading 12*
13	May 25-27	Conservation Behavior	*Reading 13*
14	June 1-3	Community-based Conservation	
15	**June 8**	► **Final Exam (Tuesday) 10:30-1:00**	

FIELD TRIP - LAB SCHEDULE 2021 Thursdays 1:30-5:00 PM

DATE	ACTIVITY	
Mar 4	Instrumental versus Intrinsic Valuation of Nature	*Reading 1*
Mar 11	► Sunset Cliffs Tidepools (-0.93 ft. low tide @ 2:27 PM)	Field lab
Mar 18	► Birds and Island Biogeography at Famosa Slough	Field lab
Feb 6	► Introduction to *eBird* and *iNaturalist* field project	Field lab
Mar 25	► 1-Independent partner fieldwork: *eBird* and *iNaturalist*	Field project
Apr 1	► 2-Independent partner fieldwork: *eBird* and *iNaturalist*	Field project
Apr 8	**Exam 1**	
Apr 15	► 3-Independent partner fieldwork: *eBird* and *iNaturalist*	Field project
Apr 22	► 4-Independent partner fieldwork: *eBird* and *iNaturalist*	Field project
Apr 29	► 5-Independent partner fieldwork: *eBird* and *iNaturalist*	Field project
May 6	► 6-Independent partner fieldwork: *eBird* and *iNaturalist*	Field project
May 13	**Exam 2**	
May 20	*Zooniverse* Camera Trap Project	Online lab
May 27	Wildlife Collision Project	Online lab
June 3	Presentation of field project highlights	
June 8	**► Final Exam (Tuesday) 10:30-1:00**	

Conservation Ecology Readings – 2021

Reading	Topic	Citation	Due Tues before class
1	Conservation Ethics	Krajick K (2006). The lost world of the Kihansi Toad. *Science* 311: 1230-1232. McCauley DJ (2006). Selling out on nature. *Nature* 443: 27-28. Maguire LA, Justus J (2008). Why intrinsic value is a poor basis for conservation decisions. *BioScience* 58: 910-911.	Mar 9
2	Emerging Diseases and Biodiversity	Keesing F et al. (2010). Impacts of biodiversity on the emergence and transmission of infectious diseases. *Nature* 468: 647-652.	Mar 16
3	Medical Value of Biodiversity	Chivian E (2013). Global environmental threats: Why they are hard to see and how a medical model may contribute to their understanding. *Cardiovascular Diagnosis & Therapy* 3: 93-104.	Mar 23
4	Ecotoxicology	Hayes TB et al. (2010). Atrazine induces complete feminization and chemical castration in male clawed frogs (*Xenopus laevis*). *PNAS* 107: 4612-4617.	Mar 30
5	Trophic Cascades	Terborgh J. et al. (2001). Ecological meltdown in predator-free forest fragments. Science 294: 1923-1926.	Apr 6
6	Shifting Baselines	Pauly D (1995). Anecdotes and the shifting baseline syndrome of fisheries. *Trends in Ecology & Evolution* 10: 430. Giglio VJ et al. (2015). Depletion of marine megafauna and shifting baselines among artisanal fishers in eastern Brazil. *Animal Conservation* 18: 348-358.	Apr 13
7	Conservation Genetics	Shaffer ML. 1981. Minimum population sizes for species conservation. *BioScience* 31: 131-134.	Apr 20
8	De-Extinction	Ben-Nun IF et al. (2012). Induced pluripotent stem cells from highly endangered species. *Nature Methods* 8:829–831.	Apr 27
9	Conservation Endocrinology	Bhattacharjee S. et al. (2015). Glucocorticoid stress responses of reintroduced tigers in relation to anthropogenic disturbance in Sariska Tiger Reserve in India. *PLOS ONE* 10: 1-13.	May 4
10	Physiological Ecology	Pagano et al. (2018). High-energy, high-fat lifestyle challenges an Arctic apex predator, the polar bear. *Science* 359: 568–572.	May 11
11	Camera Trap Revolution	Tobler MW, Powell GVN (2013). Estimating jaguar densities with camera traps: Problems with current designs… *Biological Conservation* 159: 109-118.	May 18
12	Road Ecology	Espinosa S, Branch LC, Cueva R (2014). Road development and the geography of hunting by an Amazonian indigenous group: Consequences for wildlife…*PLOS ONE* 9: 1-21.	May 25
13	Conservation Behavior	Cremona T, Spencer P, Shine R, Webb JK (2017). Avoiding the last supper. *Conservation Genetics* 18: 1475-1480. Indigo N, Smith J, Webb JK, Phillips B (2018). Not such silly sausages… *Austral Ecology* 43: 592–601.	June 1