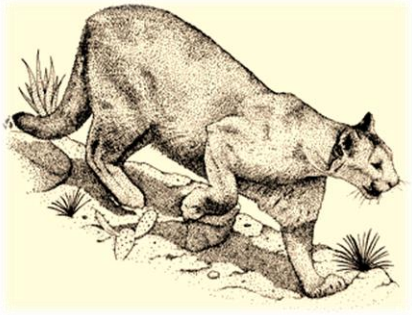

Biology 3063 Syllabus
Conservation Ecology
Spring 2020

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 211.

Instructor: Dr. Mike Mooring
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Office hours: drop by, or by appointment

Teaching Assistants: Abby Wagner – awagner444@pointloma.edu
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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

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

To register your **iClicker2** remote: https://www.iclicker.com/remote-registration-form-for-classic

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).
- 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, IUCN and 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. If you do not already know how to read a journal article, I will provide you with some "best practices" for this essential science skill. I am assuming that everyone in this class has a good grasp of basic ecological concepts from your lower division classes. However, if your grasp is shaky or rusty, it is your responsibility to brush up. You may want to use the free access textbook *Conservation Biology for All* for supplementary use. Class periods will introduce the week's topic using lecture and group activities, often based on case study examples and short films. iClicker questions will often be used to review and reinforce the material from the readings and engage you in practical applications.

(2) Journal Articles: Ecology textbooks cover the basic stuff that you have already learned in BIO 211. The advanced topics that we will be covering here are almost never 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 ecological concepts involved before we move on to the more specialized topic. 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. To this end, we will initially do **four field labs** to visit local habitats and collect field data for a team-based field lab assignment. Another 4 lab periods are set aside to collect data for your semester-long **team field project** (see below for details). Teams will be organized early in the semester and all field labs plus in-class small group assignments will be done with your team. In addition, we will typically have a **guest lecture or two** by top scientists to tell us about current developments in the field of conservation ecology.

(4) Canvas: All assignments (except for in-class activities) will be submitted directly to Canvas Assignments. Please note that Canvas does not support PAGES – please use Word or PDF formats!

(5) Exams: We will have 3 exams during the year, 2 mid-terms and a final. The exams will be held during the Thursday afternoon lab time from 2:30-5:00 pm in Latter 01. 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. An optional video will be shown before the exam from 1:30-2:30. You may earn extra credit points by answering questions about the video that pertain to conservation issues.

(6) iClickers: To enable everyone to participate, I require everyone to get an iClicker2 remote and bring it to every class to participate in questions posed throughout the period. iClicker questions represent about 10% of your total grade. Register your clicker at https://www.iclicker.com/remote-registration-form-for-classic so that your participation is recorded. I use the iClickers for class participation (being engaged in class activities) and performance (getting the right answer). For example, review quizzes from the reading assignments will be typically be administered in class on Tuesday using iClickers. Exams will be taken with the iClicker remote in 'self-paced' mode, so keep your clicker until after the final exam!

(7) Field project: This assignment is an opportunity for you to gain firsthand experience conducting an applied field research project. Teams of students will design a project, collect field data during four lab periods and any time needed outside class, and then analyze, write up, and present your research. Each team should expect to spend a minimum of 12 hours of data collection IN THE FIELD during the semester. To accomplish this, each team must plan to use all of the lab period as efficiently as possible (at least 3 hours in the field per lab). If necessary, your team can choose alternative times outside of lab to complete the 12 hours of field data collection, but you are responsible for 12 hours in the field. You will have the opportunity to meet with me to help you plan your project. Team members will evaluate each other at the end of the project.

Description: The field projects will be conducted either on campus or at nearby sites and will involve systematic data collection in which you will measure variables in the field, and subsequently analyze and write up your results. Your team will be assigned a project, with input from you on preferences. The projects will involve conducting surveys to estimate species abundance and diversity at one or more sites, and in some cases to answer a particular question or test a hypothesis. The taxonomic organisms to be surveyed includes plants, mammals, birds, reptiles, insects, invertebrates, and perhaps fish. Survey tools include live traps, camera traps, transects, acoustic sound meters, GPS units, and so forth. Each team will be responsible to choose a field project and submit a **project proposal** before beginning fieldwork to spell out the goals and methods to be used. Following completion of the field work, you will analyze your data and write a **report** and give a **presentation** (plus Q&A) to the class during the final lab meeting to share what you have learned. Finally, you will do peer evaluations to ensure that all students carry their fair share. You should treat this field project the same way that you would treat your thesis or dissertation research as a Master's or doctoral graduate student!

Research Projects on (or near) PLNU Campus:

1. Camera trap survey of wild mammals
2. Sherman live trap survey of rodents
3. Breeding bird survey
4. Coastal sage scrub vegetation
5. Insect / invertebrate survey
6. Herpetofauna survey
7. Biodiversity study at Famosa Slough
8. Noise pollution study of bird song
9. Visitor pressure on tidepools
10. Wild parrot and parakeet survey

(8) Attendance: Woody Allen has said that "Eighty percent of success is showing up." This is actually true, although the exact percentage may vary. Regular and punctual attendance is important for optimal achievement in any realm of life, and is a requirement for this course. There will be an attendance sheet passed around, and it is your responsibility to make sure you sign it. You are permitted 3 absences without penalty. Every absence in excess of 3 will incur a reduction of your Attendance Participation points. You may not have another student sign in for you. *Having someone else sign your name is forgery*, so please don't do it! Late arrivals are disruptive, so please try to arrive punctually in class.

(9) Late Assignments: The following penalties will apply for all assignments submitted after the due date. The intent of late penalties is to (1) encourage you to turn in your work on time, and (2) to be fair to those who do submit their work on time. If you have a legitimate reason for a late assignment, please tell me and the grader (by emailing me and including a note in the Canvas Assignments text box when you submit).

- 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)

(10) Technology Etiquette: It is obligatory to use your electronic devices responsibly and with respect for others. In this class, it is simply bad manners to be wired to your smartphone or other device instead of being engaged with class activities. Texting and similar activities are a distraction to your fellow students and to me. To ensure the best learning environment possible, **classroom policy is that all electronic devices are turned off and put away out of sight when class is in session.** Stay focused and do not get distracted!

Laptops: Recent studies have shown that we are currently experiencing an epidemic of 'digital distraction' caused by multi-tasking – moving quickly between tasks on electronic devices in which only partial attention is given to each task. In the classroom setting, studies reveal that the use of laptops for non-course related tasks (e.g., checking emails, social media, browsing) distracts attention from learning and results in reduced academic performance and lowered grades. The reality is that you cannot fully learn new information or master new concepts when distracted by multi-tasking. The evidence indicates that even classmates that see your screen are distracted and their performance reduced. Studies have also shown that students learn better when they have to take notes by hand because they must summarize information in their own words. **I recommend that you do not use your laptops in class** (unless asked to); if you choose to take notes on your laptop, please sit in the back and do not use your laptop for anything incompatible with giving the class your undivided attention.

What the research shows about laptops and learning:

1. **It is hard not to check other things, which impairs your learning although you might not be aware of it.**
   See "Students can't resist multitasking, and it's impairing their memory"

2. **Even if it doesn't impair your learning, it impairs someone else's learning.**
   See "Laptop multitasking hinders classroom learning for both users and nearby peers"

3. **You write more but learn less. Writing your notes creates synthesis which increases your learning.**
   See "The Pen Is Mightier Than the Keyboard" and "Why I'm Asking You Not to Use Laptops"

(11) Academic honesty: 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. Although you may discuss readings and class material among yourselves, I expect that you will each do your own work. For example, you may not team up with other students to write answers to questions that are turned in as if they were individual efforts. Each assignment must be written in your own words, and no electronic files should be exchanged. Another form of plagiarizing is to copy and paste answers from the reading into your answer, which involves 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. So please write using your own words, and no copy-pasting! Plagiarizing an assignment will result in failure of the assignment.

How grades will be assigned: Points will be distributed *approximately* as follows:

Attendance Participation		50 pts
iClicker quizzes		75 pts
Lab write-ups	8 @ 20 pts	160 pts
Journal Article Readings	15 @ 10 pts	150 pts
Field Project and Paper		100 pts
Mid-term Exams	2 @ 100 pts	200 pts
Final Exam		100 pts
		785 pts total

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.

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 is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See Academic Policies for definitions of kinds of academic dishonesty and for 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 accommodations. At PLNU, these students are requested to file documentation during the first two weeks of the semester with the Academic Support Center (ASC), located in the Bond Academic Center. This policy assists the University in its commitment to full compliance 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. Once the student files documentation, the ASC will contact the student's instructors and provide written recommendations for reasonable and appropriate accommodations to meet the individual learning needs of the student. The PLNU Disability Resource Center (DRC) can be reached by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information. For more details, see the PLNU catalog Accommodations. Students with learning disabilities who may need accommodations should also discuss their needs with the instructor.

PLNU Copyright Policy: Point Loma Nazarene University, 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 in this syllabus on the following pages. 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 2020

WEEK	DATES	TOPIC	READING
1	Jan 16	Introduction to Conservation Ecology	
2	Jan 21-23	Conservation Ethics and Theology	*Reading 1*
3	Jan 28-30	Medical Value of Biodiversity	*Reading 2*
4	Feb 4-6	Emerging Disease and Biodiversity	*Reading 3*
5	Feb 11-13	Toxicology and Endocrine Disruption	*Reading 4*
6	Feb 18-20 Feb 20	Lost Predators and Trophic Cascades ► **Exam 1 (2:30)**	*Reading 5*
7	Feb 25-27	Shifting Baselines and Ocean Conservation	*Reading 6*
8	Mar 3-5	Conservation Genetics and Genomics	*Reading 7*
9	Mar 10-12	**Spring Break**	
10	Mar 17-19	De-extinction and Species Resurrection	*Reading 8*
11	Mar 24-26	Conservation Endocrinology	*Reading 9*
12	Mar 31-Apr 2 Apr 2	Physiological Ecology and Biologgers ► **Exam 2 (2:30)**	*Reading 10*
13	Apr 7 Apr 9	Camera Trapping Revolution **Easter Recess**	*Reading 11*
14	Apr 14-16	Road Ecology and Movement Ecology	*Reading 12*
15	Apr 21-23	Conservation Behavior	*Reading 13*
16	Apr 28-30	Conservation and Society	
17	**May 7**	► **Final Exam (Thursday) 10:30-1:00**	

FIELD TRIP / LAB SCHEDULE 2020 **Thursdays 1:30-5:00 PM**

DATE	ACTIVITY	
Jan 16	Journal Article Workshop	Latter 01
Jan 23	► Cabrillo Tidepools (-1.16 ft. low tide @ 2:53 PM)	Field lab
Jan 30	► Coastal Sage Scrub of Bayside Trail	Field lab
Feb 6	► Birds and Island Biogeography at Famosa Slough	Field lab
Feb 13	► San Diego Zoo IUCN Conservation Status	Field lab
Feb 20	**Exam 1 at 2:30** Extra Credit Video @ 1:30	
Feb 27	TEAM FIELD RESEARCH #1	
Mar 5	TEAM FIELD RESEARCH #2	
Mar 12	**SPRING BREAK**	
Mar 19	TEAM FIELD RESEARCH #3	
Mar 26	TEAM FIELD RESEARCH #4	
Apr 2	**Exam 2 at 1:30** Extra Credit Video @ 1:30	
Apr 9	**EASTER RECESS**	
Apr 16	TBA	
Apr 23	TBA	
Apr 30	Team Field Project Presentations!	
May 7	**► Final Exam (Thursday) 10:30-1:00**	

Conservation Ecology Readings – 2020

Reading	Topic	Citation	Due Tues
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.	Jan 28
2	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.	Feb 4
3	Emerging Diseases and Biodiversity	Keesing F et al. (2010). Impacts of biodiversity on the emergence and transmission of infectious diseases. *Nature* 468: 647-652.	Feb 11
4	Ecotoxicology	Hayes TB et al. (2010). Atrazine induces complete feminization and chemical castration in male clawed frogs (*Xenopus laevis*). *PNAS* 107: 4612-4617.	Feb 18
5	Trophic Cascades	Terborgh J. et al. (2001). Ecological meltdown in predator-free forest fragments. Science 294: 1923-1926.	Feb 25
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.	Mar 3
7	Conservation Genetics	Shaffer ML. 1981. Minimum population sizes for species conservation. *BioScience* 31: 131-134.	Mar 17
8	De-Extinction	Ben-Nun IF et al. (2012). Induced pluripotent stem cells from highly endangered species. *Nature Methods* 8:829–831.	Mar 24
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.	Mar 31
10	Physiological Ecology	Pagano et al. (2018). High-energy, high-fat lifestyle challenges an Arctic apex predator, the polar bear. *Science* 359: 568–572.	Apr 7
11	Camera Trap Revolution	Tobler MW, Powell GVN (2013). Estimating jaguar densities with camera traps: Problems with current designs… *Biological Conservation* 159: 109-118.	Apr 14
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.	Apr 21
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.	Apr 28