



Department of Biology

Biology 3063 Syllabus **Conservation Ecology** *Spring 2025*

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 an appointment (office or Zoom)

TA-Graders: Khloe Bracken – kbracken0022@pointloma.edu

Kristen Graham – kgraham0021@pointloma.edu

Lecture: Tuesday-Thursday from 11:00-12:15 in **Latter Hall 101**

Lab: Thursday 1:30-5:00 PM in **Latter Hall 101** or field trips

Equipment: [iClicker2 remote](#) for class participation and quizzes

Optional: [Conservation Biology for All](#), Oxford University Press, 2010; Open access

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*. I will typically try to review the basic concepts of the weekly module on Tuesday before we move on to more specialized aspects or a case study on Thursday. Videos, group activities, and advanced topics will be incorporated. The reading assignment will typically be tested in class during the following week using iClicker2 polling.

(2) Journal Articles: Ecology textbooks cover the basics that you have already learned. The advanced topics that we will be covering in this course are rarely found in conventional texts. Peer-reviewed scientific journal articles will be the primary “textbook” for the course. To assist you in your readings, you will be responsible for answering ‘guided questions’ for each reading. Readings must be done individually! Please DO NOT share files or collaborate on the answers to the reading questions – such actions will be considered plagiarism.

(3) Labs: One cannot really learn ecology without spending some time studying natural ecosystems in the field. To this end, we will initially do 4 class 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. The field project will require about 3 hours per week in the field (on or off campus) to observe, identify, and record living organisms in their natural environment (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. We may also have guest lectures by local scientists on current developments in conservation ecology.

(4) Canvas: All assignments will be submitted directly to Canvas Modules. 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, which will be taken using iClickers in the “self-paced mode”. The exams will be held during the Thursday afternoon lab time from 2:30-5:00 pm in Litter 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 film will be shown before the exam from 1:30-2:30 and you will have the opportunity to do an extra credit assignment aligned to the film.

(6) iClickers: To enable everyone to participate in a large class, I require you to obtain an iClicker2 remote and to bring it to every class to participate in questions posed throughout the period. iClicker questions represent about 10% of your total grade. If your clicker is not already registered, please see me about that. Clickers are used for class participation (being engaged in class activities) and performance (getting the right answer), and you receive points for both.

(7) Field project: This is an opportunity for you to gain firsthand experience conducting an applied 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 (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 plan your project. Team members will evaluate each other’s contribution at the end of the semester.

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 of plants, mammals, birds, reptiles, or insects using survey tools that might include live traps, camera traps, transects, acoustic sound meters, GPS units, and citizen science apps such as *eBird* and *iNaturalist*. Each team will be responsible to submit a project proposal to establish the goals and methods to be used. Following completion of data collection, you will analyze your results and write a journal article style report and an oral presentation (plus Q&A) to the class. At the end of the semester, all team members will complete peer evaluations. Treat this project as seriously as you would treat research for a graduate degree!

Examples of research projects on (or near) PLNU Campus:

1. Camera trap survey of wild mammals
2. Sherman live trap survey of rodents
3. Coastal sage scrub vegetation
4. Insect / invertebrate survey
5. Herpetofauna survey
6. Experimental study of noise pollution
7. Visitor impact on tidepool biodiversity
8. Biogeography study at Famosa Slough
9. Wild parrot and parakeet survey
10. Nature history of a wild area off campus

(8) Attendance: 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 sign it. You may not have another student sign in for you, which will be considered forgery. You are permitted 3 absences without penalty; every absence in excess of 3 will incur a reduction of your Attendance Participation points. 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. 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)

(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 not being used for note-taking or team activities are turned off and put away out of sight when class is in session.** Stay focused, don't 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. **In this classroom, you should only use your laptop for (a) taking notes, or (b) working on team assignments. Do not use your laptop for anything incompatible with giving the class your undivided attention (e.g., other class assignments, browsing the web, playing games).**

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](#)"

Grading Criteria

Points are estimates and may change

- Attendance Participation..... 50 pts
- iClicker Polling quizzes..... 70 pts
- Journal Article Readings (13 @ 10 pts) ... 130 pts
- Lab and Field Trip reports (8 @ 20 pts) ...120 pts
- Team Field Project 65 pts
- Team Field Project Report100 pts
- Exams (3 @ 100 pts) 300 pts

TOTAL POINTS..... 835 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%

BIO 3063 LECTURE SCHEDULE - SPRING 2025

• Video Lecture

WEEK	DATES	TOPIC	READING
1	Jan 14-16	Introduction and Conservation Ethics	<i>Reading 1</i>
	Jan 20	MARTIN LUTHER KING DAY	
2	Jan 21-23	Medical Value of Biodiversity	<i>Reading 2</i>
3	Jan 28-30	• Road Ecology	<i>Reading 3</i>
4	Feb 4-6	• Camera Trapping Revolution	<i>Reading 4</i>
5	Feb 11-13	Toxicology and Endocrine Disruption	<i>Reading 5</i>
6	Feb 18-20 Feb 20	Emerging Disease and Biodiversity ▶ Exam 1	<i>Reading 6</i>
7	Feb 25-27	Lost Predators and Trophic Cascades	<i>Reading 7</i>
8	Mar 4-6	Shifting Baselines and Ocean Conservation	<i>Reading 8</i>
9	Mar 11-13	SPRING BREAK	
10	Mar 18-20	Conservation Genetics and Genomics	<i>Reading 9</i>
11	Mar 25-27	De-extinction and Species Resurrection	<i>Reading 10</i>
12	Apr 1-3 Apr 3	Physiological Ecology and Biologgers ▶ Exam 2	<i>Reading 11</i>
13	Apr 8-10	Conservation Endocrinology	<i>Reading 12</i>
14	Apr 15 Apr 17-21	'Stress: Portrait of a Killer' Video EASTER RECESS	
15	Apr 22-24	Conservation Behavior	<i>Reading 13</i>
16	Apr 29-May 1	Community-based Conservation	
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17	May 6	▶ Final Exam (Tuesday) 10:30-1:00	

FIELD TRIP - LAB SCHEDULE 2025 Thursdays 1:30-5:00 PM

• Online Lab

DATE	ACTIVITY	
Jan 16	NO LAB	
Jan 23	▶ Lab 1: Bayside Trail and north-south facing slopes	Field lab 1
Jan 30	• Lab 2: Costa Rica Wildlife Crossings Gala Module	Online lab 1
Feb 6	• Lab 3: Zooniverse Camera Trap Project	Online lab 2
Feb 13	▶ Lab 4: Birds and Island Biogeography at Famosa Slough	Field lab 2
Feb 20	<u>Exam 1</u> Extra Credit Film @ 1:30 Exam @ 2:30	
Feb 27	▶ Lab 5: Cabrillo Tidepools • 2:51 PM / -0.73	Field lab 3
Mar 6	1- Team Field Project	
Mar 13	SPRING BREAK	
Mar 20	2- Team Field Project	
Mar 27	3- Team Field Project	
Apr 3	<u>Exam 2</u> Extra Credit Film @ 1:30 Exam @ 2:30	
Apr 10	4- Team Field Project	
Apr 17	EASTER RECESS	
Apr 24	5- Team Field Project	
May 1	♥ Presentation of field project reports	
May 6	▶ Final Exam (Tuesday) 10:30-1:00	

Conservation Ecology Readings - 2025

Reading	Topic	Citation	Due Tues before class
1	Conservation Ethics	Krajick K (2006). The lost world of the Kihansi Toad. <i>Science</i> 311: 1230-1232. McCauley DJ (2006). Selling out on nature. <i>Nature</i> 443: 27-28. Maguire LA, Justus J (2008). Why intrinsic value is a poor basis for conservation decisions. <i>BioScience</i> 58: 910-911.	Jan 21
2	Emerging Diseases and Biodiversity	Keesing F et al. (2010). Impacts of biodiversity on the emergence and transmission of infectious diseases. <i>Nature</i> 468: 647-652.	Jan 28
3	Road Ecology	Espinosa S, Branch LC, Cueva R (2014). Road development and the geography of hunting by an Amazonian indigenous group: Consequences for wildlife... <i>PLOS ONE</i> 9: 1-21.	Feb 4
4	Camera Trap Revolution	Tobler MW, Powell GVN (2013). Estimating jaguar densities with camera traps: Problems with current designs... <i>Biological Conservation</i> 159: 109-118.	Feb 11
5	Ecotoxicology	Hayes TB et al. (2010). Atrazine induces complete feminization and chemical castration in male clawed frogs (<i>Xenopus laevis</i>). <i>PNAS</i> 107: 4612-4617.	Feb 18
6	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. <i>Cardiovascular Diagnosis & Therapy</i> 3: 93-104.	Feb 25
7	Trophic Cascades	Terborgh J. et al. (2001). Ecological meltdown in predator-free forest fragments. <i>Science</i> 294: 1923-1926.	Mar 4
8	Shifting Baselines	Pauly D (1995). Anecdotes and the shifting baseline syndrome of fisheries. <i>Trends in Ecology & Evolution</i> 10: 430. Giglio VJ et al. (2015). Depletion of marine megafauna and shifting baselines among artisanal fishers in eastern Brazil. <i>Animal Conservation</i> 18: 348-358.	Mar 18
9	Conservation Genetics	Shaffer ML. 1981. Minimum population sizes for species conservation. <i>BioScience</i> 31: 131-134.	Mar 25
10	De-Extinction	Ben-Nun IF et al. (2012). Induced pluripotent stem cells from highly endangered species. <i>Nature Methods</i> 8:829-831.	Apr 1
11	Physiological Ecology	Pagano et al. (2018). High-energy, high-fat lifestyle challenges an Arctic apex predator, the polar bear. <i>Science</i> 359: 568-572.	Apr 8
12	Conservation Endocrinology	Bhattacharjee S. et al. (2015). Glucocorticoid stress responses of reintroduced tigers in relation to anthropogenic disturbance in Sariska Tiger Reserve in India. <i>PLOS ONE</i> 10: 1-13.	Apr 15
13	Conservation Behavior	Cremona T, Spencer P, Shine R, Webb JK (2017). Avoiding the last supper. <i>Conservation Genetics</i> 18: 1475-1480. Indigo N, Smith J, Webb JK, Phillips B (2018). Not such silly sausages... <i>Austral Ecology</i> 43: 592-601.	Apr 22

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.

ARTIFICIAL INTELLIGENCE (AI) POLICY

You are ONLY allowed to use Artificial Intelligence (AI) tools to generate ideas, but you are NOT allowed to use AI tools to generate content that will end up in any work submitted to be graded for this course. AI tools (e.g., ChatGPT, iA Writer, Marmot, Botowski) are based on predictive machine learning and not true 'intelligence', thus the information it spits out is often inaccurate. If you have any doubts about using AI, please ask the instructor.

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

PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities. Students with disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2486). Once a student's eligibility for an accommodation has been determined, the EAC will issue an academic accommodation plan ("AP") to all faculty who teach courses in which the student is enrolled each semester. PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course and/or if they do not wish to utilize some or all of the elements of their AP in that course. Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all class sessions is considered essential to optimum academic achievement. If the student is absent for more than 10 percent of class sessions, the faculty member will issue a written warning of 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 an "F" grade.

STATE AUTHORIZATION

State authorization is a formal determination by a state that Point Loma Nazarene University is approved to conduct activities regulated by that state. In certain states outside California, Point Loma Nazarene University is not authorized to enroll online (distance education) students. If a student moves to another state after admission to the program and/or enrollment in an online course, continuation within the program and/or course will depend on whether Point Loma Nazarene University is authorized to offer distance education courses in that state. It is the student's responsibility to notify the institution of any change in his or her physical location. Refer to the map on [State Authorization](#) to view which states allow online (distance education) outside of California.

CONTENT WARNING

I acknowledge that each of you comes to PLNU with your own unique life experiences which contribute to the way you perceive various types of information. In BIO3063/3063L (Conservation Ecology) all of the class content, including that which may be intellectually or emotionally challenging, has been intentionally designed to achieve the learning goals for this course. The decision to include such material is not taken lightly. **These topics include conservation ethics, emerging diseases, toxicology, road ecology, trophic cascades, shifting baselines, conservation genetics, de-extinction, endocrinology, physiological ecology, and conservation behavior.** If you encounter a topic that is intellectually challenging for you, it can manifest in feelings of discomfort and upset. If this occurs, I encourage you to come talk to me or your friends or family about it. Class topics are addressed for the sole purpose of expanding your intellectual engagement in the area of environmental biology and sustainability and I will support you throughout your learning in this course.

TRIGGER WARNING

In BIO3063/3063L (Conservation Ecology) we will be exploring the themes of **conservation ethics, emerging diseases, toxicology, road ecology, trophic cascades, shifting baselines, conservation genetics, de-extinction, endocrinology, physiological ecology, and conservation behavior.** It is possible that these topics and activities may be a trigger for you. The experience of being triggered versus intellectually challenged are different. The main difference is that an individual must have experienced trauma to experience being triggered, whereas an intellectual challenge has nothing to do with trauma. If you are a trauma survivor and encounter a topic in this class that is triggering for you, you may feel overwhelmed or panicked and find it difficult to concentrate. In response, I encourage you to take the necessary steps for your emotional safety. This may include leaving class while the topic is discussed or talking to a therapist at the Counseling Center. Should you choose to sit out on discussion of a certain topic, know that you are still responsible for the material; but we can discuss if there are other methods for accessing that material, and for assessing your learning on that material. Class topics are discussed for the sole purpose of expanding your intellectual engagement in the area of vertebrate biology and I will support you throughout your learning in this course.

LANGUAGE AND BELONGING

Point Loma Nazarene University faculty are committed to helping create a safe and hospitable learning environment for all students. As such, it is important that our language be equitable, inclusive, and prejudice free. By working toward precision and clarity of language, we mark ourselves as serious and respectful scholars, and we model the Christ-like quality of hospitality. You may report an incident(s) using the [Bias Incident Reporting Form](#).

SEXUAL MISCONDUCT AND DISCRIMINATION

In support of a safe learning environment, if you (or someone you know) have experienced any form of sexual discrimination or misconduct, including sexual assault, dating or domestic violence, or stalking, know that accommodations and resources are available through the Title IX Office at pointloma.edu/Title-IX. Please be aware that under Title IX of the Education Amendments of 1972, faculty and staff are required to disclose information about such misconduct to the Title IX Office. If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact Counseling Services at counselingservices@pointloma.edu or find a list of campus pastors at pointloma.edu/title-ix.

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.

SPIRITUAL CARE

Please be aware PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our students to encounter God and grow in their Christian faith.

If students have questions, a desire to meet with the chaplain or have prayer requests you can contact your professor or the [Office of Spiritual Life and Formation](#).

Loma Writing Center

The Loma Writing Center exists to help all members of the PLNU community cultivate transferable writing skills to engage their academic, professional, personal, and spiritual communities. We work toward this goal by conducting one-on-one consultation sessions, supporting writing education across the PLNU community, and participating in ongoing writing center research. Getting feedback from the Loma Writing Center while you're in the process of working on an assignment is a great way to improve the quality of your writing and develop as a writer. You are encouraged to talk with a trained writing consultant about getting started on an assignment, organizing your ideas, finding and citing sources, revising, editing for grammar and polishing final drafts, and more. For information about how to make in-person or online appointments, see Loma Writing Center webpage or visit the Loma Writer Center on the first floor of the Ryan Library, room 221.

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.

PLNU Recording Notification

In order to enhance the learning experience, please be advised that this course may be recorded by the professor for educational purposes, and access to these recordings will be limited to enrolled students and authorized personnel. Note that all recordings are subject to copyright protection. Any unauthorized distribution or publication of these recordings without written approval from the University (refer to the Dean) is strictly prohibited.



Unless someone like you
Cares a whole awful lot,
Nothing is going to get better.
It's not.

~ Dr. Seuss, The Lorax