



**WILDLIFE RECOVERY AND REINTRODUCTION:
THE CALIFORNIA CHANNEL ISLANDS PROGRAM
SUMMER 2019
July 11 - July 25, 2019**

ACADEMIC SYLLABUS

Faculty:

Lead instructor: Adam Dillon, PhD. Candidate

Contact Hours:

We will be in close contact throughout the program, with the instructor on-site and available. Class will meet every day, with the instructor available for individual meetings.

Class Meetings:

This Wildlands Studies Program involves seven days per week of instruction and field activities, with limited to no time during the program for resupplying or doing laundry. Faculty and staff work directly with students 6-10+ hours a day and are available for tutorials and coursework discussion before and after scheduled activities. Our activities typically begin each morning and extend into the late afternoon, with some breaks for meals, rest and study time. Most evenings include scheduled activities, such as guest lectures, structured study time, article discussion, and lectures. Some activities may start as early as 6 am or end as late as 10 pm. It is necessary to be flexible and able to accommodate a variety of class times.

Course Credit:

Wildlands Studies students receive credit for one undergraduate course:

ESCI 437A, Environmental Wildlands Studies (5 quarter / 3.35 semester credits)

Field-based course studying the environmental problems affecting the natural and human-impacted ecosystems of our study region, including the role of human interactions.

This course has distinct objectives, and we integrate teaching and learning through both formal learning situations (i.e., lectures and seminars), experiential learning and field work. Academic credit is provided by Western Washington University with support from the Environmental Science Department in WWU's Huxley College of the Environment. An extended description follows in the course description section of this syllabus.

Readings:

A Course Reader has been established for this program, a digital version of which will be provided to students in advance of the program. Students are responsible for bringing a printed copy with them. Another alternative is to use a small tablet as your Reader but our access to electricity will be intermittent. Readings include selections from academic primary literature, book chapters, and technical reports. Field guides and textbooks will supplement our field activities and are an integral part of our program. Together we will carry a shared reference library on all activities and backcountry field studies. In addition, there is one required book that students need to purchase before the program:

The Natural History of the Islands of California by Allan A. Schenherr, C. Robert Feldmeth, and Michael J. Emerson. 2003, University of California Press.

Contents of this syllabus:

- I. Program Overview
- II. Learning Objectives
- III. Course Description
- IV. Assessment
- V. Grading Scheme
- VI. General Reminders
- VII. Academic Schedule & Course Content
- VIII. Reading List

I. Program Overview

Throughout human history islands have been magical and inspiring locations, and the California Channels Islands are no exception. With their close proximity to the California mainland, yet isolated off the coast, the California Channel Islands have a unique assemblage of species and a diverse human history. Over time numerous plants and animals have naturally colonized these islands and, due to isolation from the mainland, have evolved into endemic species. More than 1000 plants and animal species currently inhabit Santa Cruz Island, the largest and most diverse of the islands, including more than 60 species that are found nowhere else on Earth. The island's isolation has influenced the ecology of its native species, yet made them vulnerable to the impacts of invasive species, disease and anthropogenic disturbances. When the ranching era began on the northern Channel Islands in the mid-1850s, sheep, cattle and other herbivores were introduced to the landscape. After 100 years of large scale ranching operations these introduced herbivores had severely impacted the island ecosystems, through de-vegetation, increased erosion and the disturbance of Native American archeological sites. By the mid-1990s golden eagles had colonized the islands and the island fox populations declined by more than 90%. To save many important species and significant archeological sites, the National Park Service and The Nature Conservancy, who jointly own the island, embarked upon a multi-year program to restore Santa Cruz Island.

We will spend the first week of the course exploring the western side of Santa Cruz Island, which is owned by The Nature Conservancy. We will stay at both historic Christy Ranch on the western end of the island and the University of California Santa Barbara's Field Station in the central valley. During the first week we'll spend our days hiking and volunteering on different conservation and ecological research projects. Later, in the afternoons and evenings, we will discuss ecological topics such as island ecology, island biogeography theory, and the impacts of invasive species. We will learn about the human and ecological history of the island, from its home as one of the earliest records of humans in North America to its historic bald eagle and island fox decline and recovery. We will also discuss the restoration goals and management decisions that have been made over the past decades. In our second week, we'll travel to the eastern side of Santa Cruz Island, which is owned by the National Park Service. Here we'll spend our days hiking around the island, learning about the different vegetation communities, and sharpening our identification and observation skills.

Throughout the course, students will acquire skills in wildlife observation, identifying native flora and fauna, and reading, analyzing and discussing research articles. Our hands-on field activities will be complimented by exchanges with wildlife experts, conservation scientists, and land managers as we explore the ecology and restoration of Santa Cruz Island. Although this course is not taught in a classroom, the academic expectations are high. There will likely be additional challenges posed by factors such as long days, inclement weather, logistical changes, and physically demanding conditions. As such, we will get the most out of our experiences together if we bring along flexibility, ample patience, a sense of humor, self-motivation, and perhaps most importantly, the desire to work as a team towards a common goal.

II. Learning Objectives

Following this program, students should have working knowledge of and experience in:

1. **Ecosystem of the California Channel Islands.** Species identification is essential to managing and understanding the communities in this region and for identifying change over time. Through readings, lectures, workshops, and journal assignments, students will learn to identify plant and animal species using field guides and taxonomic keys. In a

series of field excursions, lectures, readings and discussions, students will understand the natural history of the Channel Islands and be able to identify community types and the processes that underlie community development and change.

2. ***The biological needs, ecology and interactions of key species on Santa Cruz Island.*** Every organism in the Channel Islands Ecosystem has evolved life history characteristics that determine its ability to survive. We will focus on the interactions of charismatic species, their fluctuations over time, and their roles in structuring the island ecosystem. Through readings, lectures, discussions, journal assignments, and field studies, students will learn basic ecological concepts as they relate to these key species.
3. ***The impacts of invasive species and the potential for island restoration through research, management, and conservation.*** Invasive species have dramatically impacted native wildlife on the Channel Islands, especially the endemic island fox. Through readings, lectures, and hands-on experience, students will learn about the management decisions that have been made to combat the impact of invasive species, as well as the current restoration and research projects being conducted. Students will meet with biologists, natural resource managers, and conservation scientists to discuss the positive ecological impacts that management decisions and research have had on native species such as bald eagles and island foxes.
4. ***Field observation skills, including methods for documenting and sharing findings.*** Field observation skills are an integral part of good science and promote understanding of the world around you. Through directed learning of biology and ecology in the region, students will gain experience observing the world around them. Students will be introduced to techniques for recording and presenting information, and will gain experience observing ecosystems, ecological communities and species interactions through a scientific lens.
5. ***Critical reading, discussion, and evaluation of primary literature in ecology and conservation.*** Throughout this course we rely heavily on primary literature, which provides students a significant amount of experience reading and critically discussing scientific articles. Following an introductory discussion about “how to read a scientific paper” students will read a number of scientific articles throughout the class, learning over time and with practice where to focus their attention to be able to critically evaluate the work. Students will read scientific articles and take part in group discussions, ensuring they have understood the work and demonstrating their ability to critically evaluate the articles. Students will also be grouped together, with each group evaluating a scientific article and giving a summary presentation to the rest of the class.
6. ***Basic backcountry skills, including backcountry travel and safety, field navigation, and group management.*** Although not the focus of this course, students will gain experience in planning for a backcountry trip, how to travel safely in the backcountry, and how to lead and manage a group.

Our overarching goal is to have students leave the course not only with extensive knowledge about this particular region, but also with broader skills and an understanding of ecology, conservation and natural resource management, so that they can critically evaluate information in other settings in their future lives and careers.

III. Course Description

We teach this course in an integrated format in the field. Students will receive transcript credit for the following course that was introduced on page 1:

ESCI 437A, Environmental Wildlands Studies (5 quarter / 3.35 semester credits):

Field-based course studying the natural and human history of the California Channel Islands, including the impacts of invasive species and the role that management and conservation have played in the current restoration of the island ecosystem.

Experiences/Activities

Students will learn concepts and principles of island ecology, conservation biology, natural resource management, conservation planning, data collection techniques, and analysis of field data. Students will also help conduct field studies

on different animals across the island, exposing them to ecological relationships and the interactions within ecological communities. Students will examine the outcomes of wildland/wildlife management, and evaluate the progress of current island restoration. Along the way, students will explore concepts and principles of environmental research, conservation planning, and the role of people in natural resource management.

Outcomes

Students will gain the ability to critically read and evaluate scientific literature and texts written for popular audiences. They will gain a knowledge base in wildlands natural history, with specific emphasis on the Channel Islands Ecosystem. Students will discuss and critique the literature in light of other information they have learned from local experts, lectures, observations, and other relevant readings. By the end of the course students should be able to demonstrate an understanding of basic ecological, management, and conservation concepts as related to the California Channel Islands, including community ecology, species interactions, and the impacts of invasive species. Students will be able to apply the ecological and natural resource management knowledge they gain here to new scenarios they encounter in the future.

IV. Assessment

The following is an overview of the academic requirements for the program.

Course Grade: 100 point scale

Taxonomic Family Assignment	5%
Taxonomic Family Presentation	5%
Scientific Article Presentation	10%
Scientific Article Participation	10%
Species List	10%
Scientific Observations	10%
Field Journal	20%
Lab Practical	10%
Final Exam	20%

Taxonomic Family Assignment (5%)

Each student will be assigned a taxonomic plant and taxonomic animal family prior to the start of the class. Each of the families will focus on one or two key species. Before the class begins, each student will conduct background research on their families (including family characteristics, what order they belong to, closely associated sister families, the number of genera within each family, etc.) and species (including global range, conservation status, ecological role on the island, etc.). Students will turn in their written taxonomic assignment prior to the start of the course.

Taxonomic Family Presentation (5%)

Over the first few days of the course students will give a brief oral presentation (15 mins) on their taxonomic families and specific species, explaining major characteristics and important facts about their families, genera and species. Students will also be considered an “expert” on their taxonomic families and will be in charge of teaching other students how to identify species within their families throughout the course. Students will be graded on the quality of their oral presentation, their ability to stay within the specified time, and how thoroughly and competently they teach other students to correctly identify their species.

Scientific Article Presentation (10%)

In groups, you will choose a single publication from a selection of scientific research papers. You will read, take notes, and summarize the research. Then you will present a brief synopsis (15 mins) of the research that will address questions such as: what needs does the research fill; how was the research performed; and what were the pertinent outcomes? Following the synopsis, the group will answer questions from the class on the specific article and more generally, the major ecological topics involved. Although each presentation will focus on a single article, students will draw from scientific articles, popular media, field guides and personal experience during presentations. Grades will be based on how effectively the group covers the main topics of the articles, adequately answers questions, and stays within the specified time frame.

Scientific Article Participation (10%)

All students are required to read the scientific articles that we will discuss as a group. The discussions involve students summarizing the major points, asking questions, sharing their own opinions, and generally participating in the discussion. Although students will not be required to read the scientific articles that other groups present, students will need to actively listen to the presentations and ask questions. Grades will be based on whether students have read the required articles and their participation in discussions and presentations. It is also important that students demonstrate an open mind and a respectful etiquette in interacting with other students and community groups.

Species List (10%)

Students will maintain a species list throughout the course that is organized alphabetically by Latin name. Each species entry will include the date, time and location the species was identified.

Scientific Observations (10%)

Students will conduct two separate scientific observations throughout the course. Scientific observations are focused observations on a single species. These exercises are intended to narrow the student's focus and train them to observe ecological and behavioral details that may otherwise be overlooked. Each observation will be conducted in isolation and may take between 30 to 90 minutes. Ideally students distance themselves from other people, wander for a bit while looking around and observe their surroundings until something strikes their interest. At that point they begin their observation on the species of their choice. Some animals or plants are easier to observe than others and choosing an appropriate time of day or location will greatly increase the chances of a successful observation.

Field Journal (20%)

The field journal is an integral part of the California Channel Islands course and will be used to describe our account as we travel across the island. Journal entries are a careful summary of observations and field notes taken throughout the day. It will highlight the differences and changes in vegetation, fauna, and topography across the island. It serves as a learning tool, a place for reflection, and a record of your experience as a whole. Students should write neat and legibly.

Lab Practical (10%)

At the end of the course there will be a lab practical that will test the student's knowledge and identification skills of native flora and fauna.

Final Exam (20%)

Students will take a final exam to evaluate their understanding of the key themes addressed throughout the course. We see this exam as a teaching/learning tool to solidify what students have learned in the program. The exam will draw on course lectures, reading material, and field activities. Students will be tested on their understanding of ecological concepts and island dynamics. Testing will encompass everything from students demonstrating their understanding of ecological terms to critically examining ecological research and applying concepts they have learned, to novel locations or situations.

V. Grading Scheme

To convert final grade percentages to letter grades for each course that will appear on your transcript, we will use the following grading scheme:

Letter grade	Percentage
A	92.5- 100+
A-	90.0- 92.4
B+	87.5- 89.9
B	82.5- 87.4
B-	80.0- 82.4
C+	77.5- 79.9

Letter grade	Percentage
C	72.5- 77.4
C-	70.0- 72.4
D+	67.5- 69.9
D	62.5- 67.4
D-	60.0- 62.4
F	< 60.0

VI. General Reminders

Academic Integrity is as relevant in this field course as it is at your home institution. Plagiarism, using the ideas or materials of others without giving due credit, cheating, or putting forth another student's work as your own will not be tolerated. Any plagiarism, cheating, or aiding another to cheat (either actively or passively) will result in a zero for the assignment. Cases of academic dishonesty may be reported to your home institution.

Assignment deadlines are established to promote equity among students and to allow for ample assessment time for faculty before other assignments are due or other activities are to occur. Therefore, deadlines are firm and late work will receive at a minimum a 10% loss of grade points for each day they are late. If you believe that extenuating circumstances have prevented you from completing your work on time, make sure to discuss this with the relevant faculty as soon as possible and certainly before the work is due.

Participation and attendance are crucial throughout this program. Because of the demanding schedule and limited time, all components of the program are mandatory (unless indicated) and missing even one lecture can have a proportionally greater effect on your final grade. Hence, it is important to be prompt and prepared (i.e., with required equipment) for all activities.

Students with special needs should meet with the lead faculty member as soon as possible to discuss any special accommodations that may be necessary.

VII. Academic Schedule & Course Content

Outlined in the following table, but subject to change. Readings, activities and lectures may be added or changed. Please be ready to be flexible. A more detailed description of daily activities/readings will be provided when you arrive.

Date	Location	Lecture Topics & Activities
Day 1	Ventura, CA	Students arrive in Ventura Grocery shopping and course preparation Introduction, overview and course logistics
Day 2	UCSB Field Station	Island Packers Boat trip to Santa Cruz Island Lecture: Introduction to the Channel Islands/Island Ecology Taxonomic Presentations
Day 3	UCSB Field Station	Island Fox Monitoring: Open and set traps Lecture: Island Fox and Island Spotted Skunk Research Taxonomic Presentations
Day 4	Christy Ranch	Island Fox Monitoring: Trapping day 1 Travel to Christy Ranch Taxonomic Presentations
Day 5	Christy Ranch	Island Fox Monitoring: Trapping day 2 Lecture: Argentine Ant Eradication/Pollination Studies Taxonomic Presentations
Day 6	UCSB Field Station	Island Fox Monitoring: Trapping day 3 Travel to UCSB Field Station Turn in Field Journal Lecture: Bald Eagle Reintroduction / Scrub Jay Ecology
Day 7	UCSB Field Station	Island Fox Monitoring: Trapping day 4
Day 8	UCSB Field Station	Island Fox Monitoring: Trapping day 5 Turn in Observation #1 Article Presentation #1
Day 9	UCSB Field Station	Island Fox Monitoring: Trapping day 6 Article Presentation #2

Day 10	Del Norte Campground	Travel to Prisoners Dock Pelican Bay Hike Hike to Del Norte Campground Article Presentation #3
Day 11	Scorpion Campground	All day hike to Scorpion Campground
Day 12	Scorpion Campground	Day hike to Smugglers Ranch Article Presentation #4
Day 13	Scorpion Campground	Afternoon hike to Potato Harbor Lecture: Human History of the Channel Islands
Day 14	UCSB Field Station	Island Packers Boat to Prisoners Harbor Turn in Observation #2 Turn in Species List Turn in Field Journal
Day 15	Class Ends!	Final Island Packers Boat to Ventura

VIII. Complete Reading List and Reader Contents

We cover a great deal of content in this two-week course. It is highly recommended that students do some pre-course reading before they arrive to familiarize themselves with the history, ecology and management of the California Channel Islands.

1. *The Natural History of the Islands of California* by Allan A. Schenherr, C. Robert Feldmeth, and Michael J. Emerson. 2003, University of California Press.
2. Reader: Content is assembled prior to each program with relevant and current papers. Content is assembled and modified prior to each program. The following are possible articles for the reader.

General Articles:

Botanists view of Santa Cruz – Philbrick

Flora of Santa Cruz – Junak & Wilken

Distribution and evolution of endemic plants of the California Islands – Philbrick

The biology of insularity: An introduction – Drake

Stream Fauna of Santa Cruz Island – Furlong & Wenner

Golden eagles, feral pigs, and insular carnivores: How exotic species turn native predators into prey – Roemer

Causes and consequences of ant invasions – Holway

Flora visitation by the Argentine ant reduces bee visitation and plant seed set – Hanna

The Role of lethal control in managing the effects of apparent competition on endangered prey species – Gibson

Winning the war against island invaders – Krajick

Does the Order of Invasive Species Removal Matter? The Case of the Eagle and the Pig – Collins

Reducing risk and enhancing efficiency in non-native vertebrate removal efforts on islands: a 25 year multi-taxa retrospective from Santa Cruz Island, California – Morrison

Origins and antiquity of the island fox (*Urocyon littoralis*) on California's Channel Islands – Rick

Mitochondrial genomes suggest rapid evolution of dwarf California Channel Island foxes – Hofman

Estimated population size of the Island Scrub-Jay *Aphelocoma insularis* – Kelsey & Collins

Reproductive Ecology of the Island Scrub Jay – Caldwell

Presentation Articles:

An essay on some topics concerning invasive species – Brown & Sax

Are invasive species a major cause of extinctions? – Gurevitch & Padilla

Invasive species are a leading cause of animal extinctions – Clavero & Garcia-Berthou

Rapid eradication of feral pigs (*Sus scrofa*) from Santa Cruz Island, California – Parkes

Facing the dilemma at eradication's end: Uncertainty of absence and the Lazarus Effect – Morrison

Sudden Increase in a rare endemic carnivore: Ecology of the island spotted skunk – Jones

Genomic flatling in the endangered island fox – Robinson

Adaptive divergence despite strong genetic drift: Genomic Analysis of the evolutionary mechanism causing genetic differentiation in the island fox – Funk

Proactive conservation management of an island-endemic bird species in the face of global change – Morrison

Islands within an island: Repeated adaptive divergence in a single population – Langin