



Course Outline

2026-2027 Catalog

NR 40 - Watershed Ecology and Habitat Restoration

Catalog Description

Transfer Status: CSU

Unit(s): 3.00

Lecture: 34.00 Contact hours/68.00 Out of class hours/102.00 Total hours/2.00 Unit(s)

Lab: 51.00 Contact hours/0.00 Out of class hours/51.00 Total hours/1.00 Unit(s)

Total: 85.00 Contact hours/68.00 Out of class hours/153.00 Total hours/3.00 Unit(s)

Course Description: This course is an introduction to the methods, techniques, and tools used to restore and enhance watershed health. Topics will include reforestation techniques, hydrologic cycle, disturbance mitigation, and use of native plants for biofiltration. The course emphasizes local water issues and restoration efforts.

Objectives

Upon successful completion of this course, the student should be able to:

1. Discuss traditional ecological knowledge (TEK).
2. Define the hydrologic cycle and explain the various processes of the cycle.
3. Identify the biologic and economic need for restoring and maintaining watershed health in California.
4. Identify the tools and techniques of watershed restoration.
5. Demonstrate techniques for reducing erosion.
6. Compare and contrast local watersheds, and discuss land use impacts (both perceived and real) relative to cause and effect.
7. Evaluate local restoration projects, both completed and planned, and develop and demonstrate prescriptions for repair as a field trip activity.
8. Analyze and discuss important water issues in California.
9. List and discuss wetland and upland habitat restoration techniques using native plants and various irrigation methods.

Course Content

Topic Titles / Suggested Time Topic

Lecture

<u>Topics</u>	<u>Lec Hrs</u>
Introduction to Water Resources in California	6.00
Hydrology/Ecology	5.00
Ecological Restoration - Project Planning	6.00
Restoration of In-Stream Habitat Conditions	5.00
Riparian Restoration - Implementation Techniques	6.00
Upslope Processes/ Routing	6.00
Total Hours:	34.00

Lab

<u>Topics</u>	<u>Lab Hrs</u>
State water projects	3.00
Federal water projects	3.00
Local water projects	3.00
Stream Channels	3.00
Impaired Watersheds	3.00
Healthy Watersheds	3.00
Mitigation Sites	3.00
Restoration Plans	3.00
Invasive Species	3.00
Land-Use Impacts and Innovative Solutions	3.00
Re-creating Aquatic Habitat	3.00
Bioengineering Techniques	3.00
Native Plant Revegetation	3.00
Diseases and Restoration Efforts	3.00
Sediment Delivery, Storage and Yield	3.00

<u>Topics</u>	<u>Lab Hrs</u>
Hillslope Processes	3.00
Erosion Restoration Techniques	3.00
Total Hours: 51.00	

Methods of Instruction

- A. Class Activities
- B. Field Trips
- C. Guest Speakers
- D. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- E. Lecture
- F. Reading Assignments

Methods of Evaluation

- A. Exams/Tests
- B. Quizzes
- C. Papers
- D. Lab Projects
- E. Class Discussion

Examples of Assignments

Reading Assignments

1. Read the article (handed out in class) on the necessity of erosion control prior to re-vegetation of a restoration site. Be prepared to discuss the difficulties of controlling erosion on sites after re-vegetation has begun.
2. Read the chapter on ecological attributes of restored ecosystems and prepare a detailed list of those attributes to share in class.

Writing Assignments

1. Write a short essay (500 words) on the ability of a given species to increase its population density on restored habitat sites. Be sure to include peer-reviewed materials as references.
2. Write a 5-page research paper on guidelines for restoration on different habitat types. In your paper, explain how soil type and climate influence the species that may be present.

Out-of-Class Assignments

1. Attend our field trip to the Sul Norte habitat restoration site on the Sacramento River National Wildlife Refuge. Be prepared to take notes on the irrigation system and arrangement of the restored vegetation. Pick a particular restored plant species and be prepared to discuss its water needs.
2. Attend our field trip to a logged site on the Big Chico Creek Watershed. Describe in your notes ways that logging companies minimize soil loss through erosion and be prepared to discuss your findings in class.

Recommended Materials of Instruction

Allison, S. K. (2024). Ecological Restoration and Environmental Change Renewing Damaged Ecosystems. *Routledge*, 2nd. 9780367461706.

Falk, D. A., et al. (2016). Foundations of Restoration Ecology. *Island Press*, 2nd. 9781610916967.

Florentine, S., et al. (2023). Ecological Restoration Moving Forward Using Lessons Learned. *Springer*, 1st. 9783031254116.

Minimum Qualifications

Forestry/Natural Resources

Created/Revised by: Wittsell, Ricky

Date: 02/23/2026