

**Klamath River Basin Field Course:**  
*Watershed Restoration, Ecology, and Natural History*  
**(ESM 480) 3 units**

Saturday, July 9 – Friday, July 22 (14 days total)

**On-campus meetings:**

We will meet during the spring semester to discuss logistics and initial course content. Meeting times will be determined based on students' availability.

<b>Instructors:</b>	Dr. Alison O'Dowd	Mason London
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**Contact Hours:**

Instructors will be in close contact with students throughout the program, with the Instructors on-site and available. Class will meet every day during the course, with the Instructors available for individual meetings upon request.

**Class Meetings:**

This course involves 14 days of instruction, field activities, and student independent work. The class will meet every day of this course (14 days straight), with limited time during the program for resupplying or doing laundry. Faculty and staff work directly with students 8-10+ hours a day and are available for tutorials and coursework discussion before and after scheduled activities. Activities typically begin each morning and extend into the late afternoon, with some breaks for meals, rest, and independent work 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. The first two days of the course (July 9-10) take place on the HSU campus in Arcata, CA. The following 12 days (July 11-22) will take place at various sites throughout the Klamath Basin (see draft itinerary below). *It is necessary to be flexible and able to accommodate a variety of class times.*

**Course Credit:**

Students receive credit for one undergraduate course:

**ESM 480. Selected Topics (3).** Field course focused on ecology, natural and cultural history, and restoration of the Klamath Basin. Identifying causes of degradation, devising methods and goals for restoration, monitoring changes and assessing success from an ecological stance. Hands-on learning through site visit investigations.

This course has distinct objectives that focus on watershed ecology, restoration and past and current events that apply to issues surrounding these topics. Students that successfully complete this course will receive 3 units of ESM 480 from Humboldt State University. This course can serve as a substitution for several courses on campus including, but not limited to, ESM 355 (Principles of Ecological Restoration), ESM 455 (Applied Ecological Restoration), BIOL 306 (California Natural History) or an upper division elective. Students should consult with their Academic Advisor to see how this course can count as a requirement for their major, minor or degree.

## Course description:

This course is an interdisciplinary synthesis of topics concerning restoration, ecology and natural history within the Klamath River Basin. Throughout the course, students will investigate topics associated with past, current and future Klamath Basin restoration projects and associated ecology and natural history. Teaching and learning will be facilitated through lectures, discussions, group activities, service projects and fieldwork.

There are three main themes that we will be using to explore topics of restoration throughout this course: 1) Ecology/Natural History, 2) Cultural Environmental History, and 3) Field Survey Methods (such as monitoring of amphibians, fish, benthic macroinvertebrates and plants).

The Klamath River flows 253 miles from southern Oregon to the California coast, draining a basin of more than 15,000 square miles. The Klamath River was once the third most productive salmon and steelhead river in the West, surpassed only by the Columbia and the Sacramento Rivers. With a long history of impact and over-allocated resources, the Klamath Basin faces numerous water quality and quantity challenges. Since the 1860s, the watershed and its fisheries have been a topic of focus, with negotiations intensifying in recent history. Because of these issues, more focus and interest are directed towards the restoration of this region's ecological and natural resources. The Klamath River Basin is an ideal location to study restoration, ecology, and natural history because of the expansive diversity in habitat types, hydrology, geology, ecology, land ownership, and land use. There are numerous restoration projects that previously, currently and are planned to occur within the Klamath Basin that incorporate all of these themes in one way or another. One restoration project of particular focus in this course will be the removal of four large dams on the mainstem Klamath River, which is scheduled to begin in 2023 and will be the largest dam removal project in world history.

We will explore the California portion of the Klamath Basin through hiking, rafting, snorkeling and driving. We will visit Iron Gate Dam and reservoir, high alpine lakes, deep clear pools of the Salmon River via snorkel and mask, and observe the banks of the Klamath River as we raft down the mid-Klamath section. Throughout our exploration of the Basin, we will learn about principles of restoration, ecology, and natural history as we meet with representatives from local nonprofits, government agencies, and Native American tribes.

## Course Learning Outcomes

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

1. The variety of restoration projects in the Klamath Basin and how and why they are implemented.
2. The components of the rich and diverse ecosystems that comprise the Klamath River Basin, both terrestrial and aquatic.
3. Field observation skills, including methods for documenting and sharing findings, primarily focused on restoration monitoring and natural history observations.
4. Critical reading, discussion and evaluation of primary literature in ecology and restoration.
5. Exploration of the unique natural history and geology of the Klamath Basin.
6. The significance and history of Native Tribes in the Klamath Basin
7. The array of employment opportunities related to watershed restoration and natural resource science
8. Basic camping skills, including safety, field navigation, meal preparation, and group management.
9. Basic ecological, management and conservation concepts as related to the Klamath River Basin.

## Prerequisites

No prerequisite is required, but successful completion of an introductory Environmental Science/Studies, Geography, Biology, Botany, Ecology, Recreation or related course is highly recommended.

## Required Readings

Materials from various texts (such as those listed below) will be made available online via the course Canvas site and in a course reader. Aside from excerpts from these texts, scientific articles and other literature will be assigned prior to and during the course. Additional handouts provided throughout the course will be assigned in order to complement these readings.

Readings will draw from sources such as:

- Bartholow, J.M., Campbell, S.G. and Flug, M., 2004. Predicting the thermal effects of dam removal on the Klamath River. *Environmental Management*, 34(6), pp.856-874.
- Gosnell, H. and Kelly, E.C., 2010. Peace on the river? Social-ecological restoration and large dam removal in the Klamath basin, USA. *Water Alternatives*, 3(2), p.362.
- Hodge, B.W., Wilzbach, M.A., Duffy, W.G., Quiñones, R.M. and Hobbs, J.A., 2016. Life history diversity in Klamath River steelhead. *Transactions of the American Fisheries Society*, 145(2), pp.227-238.
- Kauffman, M. 2012. Conifer Country: A natural history and hiking guide to the 35 conifers of the Klamath Mountain region. Backcountry Press, Kneeland, CA.
- National Research Council, 2008. Hydrology, ecology, and fishes of the Klamath River basin. National Academies Press.
- Pollock, M., Witmore, S. and Yokel, E., 2019. A field experiment to assess passage of juvenile salmonids across beaver dams during low flow conditions in a tributary to the Klamath River, California, USA. *bioRxiv*, p.856252.
- Powers, K., Baldwin, P., Buck, E.H. and Cody, B.A., 2005. Klamath River basin issues and activities: an overview. Congressional Research Service, the Library of Congress.
- Schakau, V., Hilker, F.M. and Lewis, M.A., 2019. Fish disease dynamics in changing rivers: Salmonid Ceratomyxosis in the Klamath River. *Ecological Complexity*, 40, p.100776.
- Wallace, D. R. 2003. The Klamath Knot: Explorations of Myth and Evolution, Twentieth Anniversary Edition. University of California Press. 174 pp.
- Most, S. 2006. River of renewal: myth and history in the Klamath Basin. Portland: Oregon Historical Society Press in association with University of Washington Press, Seattle & London.

## Assignments & Grading

Grading Scale: A = 90-100%; B = 80-89%; C = 70-79%; D = 60-69%; F <60% (+ and – grades will be given).

Assignment	% of grade
Taxonomic Family Assignment	10%
Taxonomic Family Presentation	10%
Restoration Article Presentation	10%
Restoration Article Participation	10%
Field Journal	20%
Research Paper	25%
Appreciation Letter	5%
Participation/Attendance	10%
Total	100%

## Course Requirements

### **Taxonomic Family Assignment (10%)**

Each student will be assigned a taxonomic plant and 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 (10%)**

Over the first few days of the course, students will give a brief oral presentation (~10-15 minutes) 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.

### **Restoration Article Presentation (10%)**

In groups, students will choose a single publication from a selection of scientific research papers in the field of restoration. Students will read, take notes, and summarize the research. Then students 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 period.

### **Restoration Article Participation (10%)**

All students are required to read the scientific restoration articles that we will discuss as a group. This includes those articles other classmates will be presenting on, as well as other articles assigned by the instructors. Students will be graded on their involvement in discussions by demonstrating their ability to summarize the major points, ask thoughtful questions, and share their own opinions. When not in an open discussion, students are required to actively listen to the presentations and prepare relevant 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.

### **Field Journal (20%)**

The field journal is an integral part of this course and will serve as a learning tool and an opportunity to closely attend to the environment and document observations. Journal entries are a careful summary of observations and field notes taken throughout the day. Entries recorded in your journal will highlight the differences and changes in vegetation, fauna, and topography across the Klamath Basin. The journal outcomes should focus on an ongoing description along a prescribed route; a theme observed several times; a landscape description and the forces that influence it; a focus on relationships among species observed (food webs; other interactions); geological history as seen by the observer; and/or solely on

what is encountered with the full and exacting use of the senses. The emphasis is therefore on the phenomena that the student actually senses and experiences, not on an abstraction based on what they were told or read. Students should write neat and legibly in their field journal. Class and personal notes are not included as formal journal entries, although we encourage students to take notes, as they will be useful for other assessment.

### **Research Paper (25%)**

Each student will be required to complete an independent research paper on a topic approved by one of the Instructors. Students will propose potential topics prior to course. This topic should be directly relevant and related to course material. The final research paper will be due to the Instructor 14 days after the student returns from the field on July 22 and can be submitted electronically to the Instructor. The paper will receive a penalty of 10% per day that it is submitted late. More details about format requirements will be given at a later date. This assignment will include a proposal (initial proposal= 5 pts and revised proposal = 5 points) and final paper (50 points).

### **Appreciation Letter (5%)**

Each student will be required to write an email (or handwritten letter) to a guest speaker, researcher, conservationist or guide that interacts with our group throughout the course. The Appreciation Letter is to show gratitude to the individual who shared their skills and knowledge with us and to explain to them how their involvement was inspiring or made an impact. These letters should be no more than one to two paragraphs and will either be drafted by hand or electronically and sent or given to the Instructor for grading before they are sent to the appropriate person. This assignment is an exercise to help students understand the importance of communication and networking with individuals in their discipline.

### **Participation & Attendance (10%)**

This segment of the course is probably the most important. Participants are expected to attend all class sessions for all course functions including group activities, field study trips, service-learning activities, guest presentations, etc. Unexcused absences will result in the final grade being lowered accordingly. Your participation grade includes being on-time to all course activities, maintaining a positive attitude throughout, actively engaging in all activities, and being attentive and respectful to all speakers (including fellow students). Behavior such as talking while a speaker is talking, being on a cell phone during inappropriate times, repeated tardiness and not staying with the group will impact this portion of your grade.

### **Campus Policies and Resources**

Visit the **Syllabus Addendum** website (<http://www2.humboldt.edu/academicprograms/syllabus-addendum-campus-resources-policies>) for information about campus policies, procedures and resources for students. The site includes links such as Resources for Students with Disabilities, Academic Honesty Policy, Attendance and Disruptive Behavior Policy, Financial Aid, Emergency Procedures, and Counseling and Psychological Services. Students are responsible for knowing the policies and procedures related to the above topics. Please take the time to read the information on this website.

**Academic Dishonesty and Plagiarism:** Any exam, quiz, or assignment submitted by you and that bears your name is presumed to be your own original work that has not previously been submitted for credit in another course unless you obtain prior written approval to do so from your instructor. Cheating and plagiarism are very serious matters and will be treated as such.

**Classroom conduct and disruptive behavior:** Disruptive behavior during class time will not be tolerated. Do not come to class under the influence of drugs or alcohol. Students are responsible for knowing the policy regarding attendance and disruptive behavior, posted at the following website: <https://www2.humboldt.edu/studentrights/attendance-behavior>

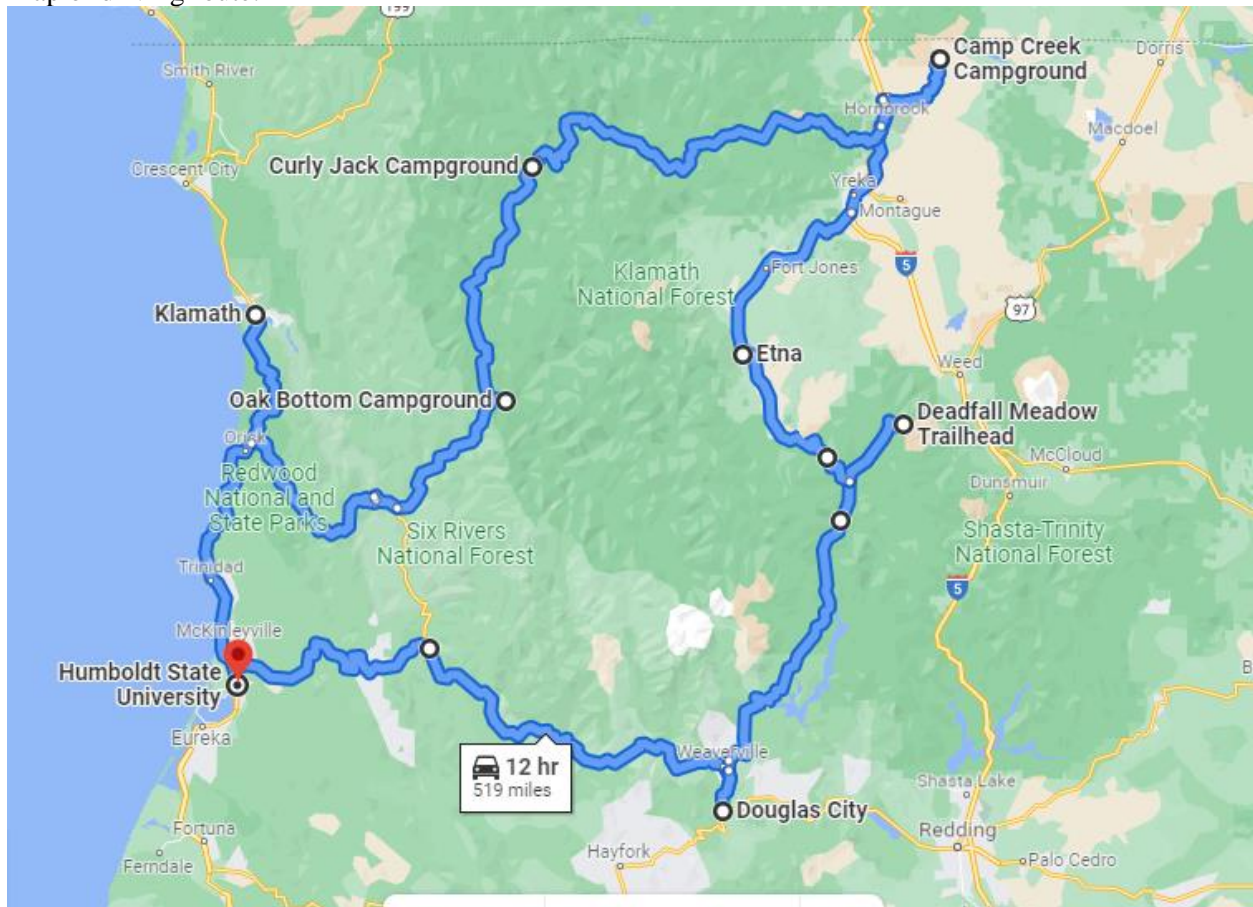
**Klamath River Basin Field Course (ESM 480)**  
**Saturday, July 9 – Friday, July 22 (14 days total)**

**DRAFT Course Itinerary:**

Day	Date	Description	Location/ camping
1	Sat, July 9	Course Intro, Overview of the Klamath, Health/safety talk Student Family/Species presentations	HSU campus (dorms or local accommodations)
2	Sun, July 10	Go over course itinerary and map of our route Meal planning and shopping, packing	HSU campus (dorms or local accommodations)
3	Mon, July 11	Drive from Arcata to Willow Creek. Meet with Yurok Tribal Fisheries Biologist Max Ramos to learn about salmonid monitoring and restoration on the Trinity River	Hayden Flat campground - camping
4	Tues, July 12	Drive from Hayden Flat to Douglas City/Weaverville. Visit restoration sites on the South Fork Trinity River and discuss restoration monitoring. Meet with Yurok Tribal Fisheries personnel to discuss the ‘restoration reach’ downstream of Lewiston Dam. Observe and discuss instream active restoration. Drive from Douglas City to campground on way to Mt Eddy	Camp somewhere between Weaverville and Mt Eddy
5	Wed, July 13	Drive to Deadfall Meadow trailhead and do day hike up Mt Eddy to Deadfall Lakes. Discuss background alpine lake amphibian restoration efforts in the Trinity Alps ( <a href="#">Project info</a> ).	<a href="#">Scott Mountain campground</a> or Etna
6	Thurs, July 14	Etna (visit Beaver Dam Analogs) Habitat monitoring on the Patterson Creek Wood Acceleration Project, or working on Beaver Dam Analog projects on Sugar Creek.  Klamath Bioregion. Meet Michael Kauffmann to take us to “miracle mile” ( <a href="https://www.michaelkauffmann.net/2014/07/miracle-mile-russian-wilderness/">https://www.michaelkauffmann.net/2014/07/miracle-mile-russian-wilderness/</a> ) and talk about the incredible biodiversity in this region.	Etna Park Campground
7	Fri, July 15	Drive from Etna to Iron Gate Dam and Camp Creek Campground. Trip to Yreka to do laundry and grocery shop. Hike to spring (swimming hole) - nature observation and journaling.	Iron Gate reservoir- Camp Ck Campground
8	Sat, July 16	Visit Iron Gate Dam and meet with Klamath River Renewal Corp (KRRC) personnel to discuss dam removal plans and restoration implications. Sample Bogus Creek	Iron Gate reservoir- Camp Ck Campground
9	Sun, July 17	Shasta River and/or Sample Beaver Creek and Horse creek – tour of off channel ponds at Horse Creek (Karuk Tribe), then drive to Curly Jack campground (Happy Camp)	Curly Jack campground (Happy Camp)
10	Mon, July 18	1-DAY RAFTING TRIP (Ferry Point to Coon Creek with hike to Ukunome Falls hike etc.) Outfitter: <a href="https://www.awrafting.com/">https://www.awrafting.com/</a>	Curly Jack campground (Happy Camp)

		<p>Discuss river processes, geomorphology, ecology, natural history and implications of dam removal as we raft down the river. Several stops will be made to point out specific features and discuss specific course concepts.</p> <p>Day hike to Ukonom Falls</p>	
11	Tues, July 19	<p>Drive to Salmon River.</p> <p>Salmon River Restoration Council (snorkeling and restoration activity)</p> <p>Snorkeling the Salmon River: Explore the Salmon River and focus on freshwater ecology.</p> <p>Learn about the long-term monitoring they have been doing collecting data on fish populations.</p> <p>Help clear rocks at the confluence of Woolly Creek and Salmon River to increase passage for fish.</p> <p>Spend time doing other aquatic ecology activities such as BMI sampling and volunteering with other projects SRRC have going on at the time: (<a href="https://srcc.org/programs/fisheries.php">https://srcc.org/programs/fisheries.php</a>).</p>	Oak Bottom campground
12	Wed, July 20	<p>Cultural burning – with the Karuk Tribe and Mid-Klamath Watershed Council (MKWC)</p> <p>Discuss prescribed burns and fuel reduction projects</p> <p>Visit a previously burn site. Meet with the MKWC staff and assist with restoration projects they have going on in the watershed: (<a href="http://www.mkwc.org/">http://www.mkwc.org/</a>).</p>	Oak Bottom campground
13	Thurs, July 21	<p>Drive from Oak Bottom over Bald Hills road to Klamath mouth (Angler’s Cove campground)</p> <p>Meet with Keith Parker, a Yurok Fisheries Department Molecular Biologist, and learn about the work he is currently doing in the watershed.</p>	Anglers Cove Campground
14	Friday, July 22	<p>Klamath Estuary</p> <p>Volunteering with water quality project: (<a href="https://www.yuroktribe.org/departments/ytep/waterquality.htm">https://www.yuroktribe.org/departments/ytep/waterquality.htm</a>) – Thomas Starkey-Owens</p> <p>Visit the mouth of the Klamath River.</p> <p>Discuss estuary and river mouth habitats</p> <p>Drive from Klamath to Arcata</p> <p>Course Wrap-up</p>	

Map of driving route:



Google map link for map of driving route: <https://goo.gl/maps/7QJZn2WJXieVR4cs7>