

Instructor: Lisa Eby

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Office hours: Tuesday 1-2pm, and Thursday 12:30-2pm, or by appointment (please confirm by email)

Course description:

Fisheries management consists of three interrelated processes: fish populations, fish habitat, and people. This course introduces some of the fundamental principles and approaches of inland fisheries ecology and management. Through general readings and specific case studies we will explore the challenges of balancing multiple human values in managing fisheries resources. We will focus on understanding

1. The drivers of change in fish populations,
2. Quantitative nature of fish population assessment,
3. Fish habitat requirements, impacts, and restoration,
4. Harvest and other social/economic value of fisheries,
5. Complexity of ecological interactions linking fish to other components of aquatic ecosystems and broader social community.

This course, in combination with 2 others, fulfills the upper division writing requirement for Wildlife Biology majors. The UM upper-division writing requirement includes: (1) Identify and pursue more sophisticated questions for academic inquiry, (2) Find, evaluate, analyze, and synthesize information effectively from diverse sources, (3) Manage multiple perspectives as appropriate, (4) Recognize the purposes and needs of discipline-specific audiences and adopt the academic voice necessary for the chosen discipline, (5) Use multiple drafts, revision, and editing in conducting inquiry and preparing written work, (6) Follow the conventions of citation, documentation, and formal presentation appropriate to that discipline, and (7) Develop competence in information technology and digital literacy.

Textbook: Hubert and Quist (eds). Inland Fisheries Management in North America. American Fisheries Society. American Fisheries Society, Bethesda, Maryland is a good textbook and we will be reading several chapters from that book this semester. These chapters and all of the additional readings are posted on the Moodle site in pdf format.

Grading policy:**Proposal**

Proposal prospectus is due March 3rd in class, proposal draft due April 7th, review of proposals due April 17th, and final proposal due May 5th.

Proposals (15% of your grade, draft and final) should be no longer than ten pages, including figures, tables, and a brief resume of the principal investigator. The following information must be provided: (a) Principal Investigator name & affiliation; (b) Title of project; (c) Description of project: this section should include a brief introduction to the problem, your specific objectives, your study plan; (d) Expected benefit/results of project to fish management; (e) Proposed project schedule and timeframe (not longer than 2 years for the entire project); (f) Biographical information. Each person must provide a brief resume summarizing his/her qualifications and experience; (g) Budget Table (no more than \$75,000 for the two years), you need to include salary (# people, # days, hourly pay), fringe (12% of salary for people you employ less than 6 months, 30% of salary for people you employ for longer), supplies needed to perform the project, travel (\$0.54/mile and any per diem), equipment use or rental (boat days, etc.), and equipment repair. Turn in 3 copies of your proposal. *If you plagiarize, you will get a zero for the proposal. A 5% per day late penalty will be assessed unless prior arrangements are made.*

Reviewing 2 proposals will be an assignment. Proposals will be evaluated on organization, writing, scientific/technical merit, feasibility, and benefits to fisheries management. Review sheets will be

provided. Students will have a week to complete the review and turn it in at the panel discussion evaluating which proposals will be funded. I will also comment on drafts for the final version. *The proposal grades are based on grading rubric not on whether your proposal gets funded. Your proposal review is based upon your ability to provide constructive, positive comments that improve the proposal (aspects for comment include: the design, methods, organization, and writing)*

Assignments (65%)

Computational and written assignments will be passed out in class throughout the semester. There are multiple assignments (as listed in syllabus). Students are free to discuss results, but all components of the assignments must be prepared individually. *All written material, calculations and graphs to be handed in must be your own work (answers must be in your own words). If you plagiarize, you will get a zero for the assignment. A second infraction will result in failing the course. A 5% per day late penalty will be assessed unless prior arrangements are made.*

Participation and Discussions (15%)

Come to class with readings perused and assignments complete and ready to *participate* in class (15%).

Professional Points (5%): Participation in AFS Chapter meetings to hear professionals (Thursdays 6pm), going to [MT Chapter AFS](#) (Feb 21-24, Butte), and/or participating in the [Clark Fork River Science Forum](#) (April 20-21) in Missoula. **You must have documented attendance and turn in summaries of talks**

Course Calendar (*subject to change as opportunities arise*):

Dates	Topic	Reading	Assignments
Jan 18	Class introduction, what is fisheries, & What is in a resume and cover letter?		1. Find one job announcement, write a cover letter and resume.
Jan 20	History of inland fisheries management	Whelan et al. 2020. Tracking Fisheries Through Time: AFS as a historical lens	
Jan 23	Adaptive management and co-management.	Reid et al. "Two-eyed seeing": an indigenous framework to transform fisheries research and management.	See Moodle for focus questions
Jan 25	Fisheries Process and Management tools	<u>Optional</u> : Arlinghaus et al. Ch 6.3	
Jan 27	Using marketing to promote sustainability discussion	Discussion of assignment and using consumer choice in promoting sustainability	2. Where is my fish from?
Jan 30	Historical perspectives: overexploitation in recreational fisheries	Post et al. 2002. Canada's Recreational Fisheries: the invisible collapse. Fisheries.	
Feb 1	Consideration of current concerns in exploitation of recreational fisheries: increasing effort on small populations, and interactions of temperature and recovery	Meyer et al. 2022. Effects of elevated water temperature on cutthroat trout angler catch rates and catch and release mortality in Idaho streams. Fisheries Management and Ecology Roth et al. 2018 Effects of air exposure in summer on the survival of CR salmonids. NAJFM	
Feb 3	Ethics in fisheries discussion	Ch 15. The Ethics of Exploitation and Intervention: Do We Have the Right? In Fish Conservation	3. In class discussion and assignment on ethics in fisheries.
Feb 6	Populations, metapopulations, and issues of scale	Riemann and Dunham 2000. Metapopulations and salmonids: a synthesis of life history patterns and empirical observation. Ecology of Freshwater Fish 9:51-64.	

Dates	Topic	Reading	Assignments
Feb 8	Coldwater streams and habitats	Fausch et al. 2002. Landscapes to Riverscapes: Bridging the gap between research and conservation of stream fishes. Bioscience 52. Optional: Ch 3 Scale and Fisheries Mgmt in Inland Fisheries Management	
Feb 10	Considerations in Design and Monitoring discussion	Ch 18 Design and analysis for monitoring	4. In class group activity for Design and Monitoring, scale considerations in monitoring and research designs. Complete on own for an assignment.
Feb 13	Bull trout and westslope cutthroat trout status, limiting factors, and threats	Sinnatamby et al. 2019. Threats to at-risk salmonids of the Canadian Rocky Mountain Region Ecology of Freshwater Fishes.	
Feb 15	Common techniques for Restoration in lotic systems and lessons from intensively monitored watersheds	Roni et al. 2002; Optional Foote et al. 2019	
Feb 17	Blackfoot Case study: Restoration discussion	Pierce et al. 2019 & MFWP Blackfoot management plans	5. Blackfoot assignment reviewing management plans and considerations
Feb 22	Feb 20 (President's Day) MT AFS	Watched taped talks and answer questions	
Feb 25	The Catch 22: Isolation versus connection in conservation of inland fish species discussion		6. Review taped talks and submit assignment for main points and questions
Feb 27	Using the recreational fisheries to reduce exotics	Paul et al. 2003	
Mar 1	Fish population sampling techniques	Mark-recapture and Depletion examples	
Mar 3	Fish population sampling techniques: design issues	Roni et al. 2019	7. Proposal Prospectus
Mar 6	Sampling the fisheries Creel surveys and angler observations	Chapter 21: Sampling the recreational fishery	
Mar 8	Sampling the fisheries Creel surveys and angler observations	TBD	
Mar 10	Class discussion of Blackfoot case study assignment		8. In class discussion of Blackfoot case study evaluating restoration success assignment
Mar 13	Natural Lakes and food webs	Ch 15 Inland Fisheries Management	
Mar 15	Management and Ecology of Lake Food webs	Ellis et al. 2011	
Mar 17	Case Study: Flathead Lake	EIS Lake Trout Suppression for Flathead Lake	(work on proposal outline and methods)
Mar 20	Spring Break (Mar 20-24)		
Mar 27	Deriving demographic parameters	EIS Lake Trout Suppression for Flathead Lake	
Mar 29	Deriving demographic parameters	Ch 2 Inland Fisheries Management p 43-55	

Dates	Topic	Reading	Assignments
Mar 31	Deriving demographic parameters		9. Demographic Estimation Assignment
Apr 3	Introduction to population models		
Apr 5	Population modeling of Flathead Lake	Population Modeling Appendix of EIS Lake Trout Suppression for Flathead Lake <i>For reference: age based matrix models</i>	
Apr 7	Population modeling of Flathead Lake	Hansen et al. 2016 Lake trout suppression for bull trout recovery in Flathead Lake. Hydrobiologia	Full Draft Proposals: Due April 7 th
Apr 10	Population modeling	Age structured models	
Apr 12	Population modeling		
Apr 14	Class discussion of Lake Trout Population Model Assignment: What can we achieve?		10. Population modeling assignment
Apr 17	In case of field trip? TBD		
Apr 19	River Ecology and limiting factors	Ch 20: Inland Fisheries Management	
Apr 21	River Ecology and limiting factors		11. In Class Discussion: Proposal Reviews due
Apr 24	River Ecology and limiting factors		
Apr 26	Limiting factors and management of anadromous fishes	TBD	
Apr 28	Discussion on limiting factors and management of anadromous fishes	TBD	12. Angler observation or creel Assignment?
May 1	Use of cultured fish in fisheries management?	Ch 9: Inland Fisheries Management	
May 3	In case field trip to hatchery		
May 5	Class wrap up		13.. Assignment anadromous fish case study

Course guidelines and policies:

Students with Disabilities Statement <https://www.umt.edu/disability/>

Students with disabilities may request reasonable modifications by contacting ODE and myself. The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with ODE, please contact them. I will work with you and ODE to provide an appropriate modification.

Student Conduct Code Statement <https://www.umt.edu/student-affairs/community-standards/default.php>

- All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the https://www.umt.edu/student-affairs/community-standards/um_student_code_of_conduct_effective_8-1-2021.pdf
- Plagiarism occurs when a writer uses someone else's language, ideas, or other original (not common-knowledge) material without acknowledging its source. Please do not plagiarize.

Course Withdrawal Deadlines Statement <https://www.umt.edu/registrar/calendar/spring.php>

Important Dates Restricting Opportunities to Drop a Course Spring 2023 (please check registrar website):

To 7 th instructional day Jan 25 th	Students can add classes on Cyberbear without consent of instructor
To 15 th instructional day Feb 6 th	Students can drop classes on Cyberbear with partial refund, switch to CR/NCR, or change variable credit courses.

<p>16th to 45th instructional day March 28th</p>	<p>Through Spring Class Day 45:</p> <p>Spring course adds & drops require instructor's & advisor's approval using the Course Add/Change/Drop link in CyberBear. \$10 fee applies per add or drop.</p> <p>A 'W' will appear on the transcript for dropped classes. No refunds.</p> <p>Students can change variable credit amounts and grading options (except audit) on eligible courses using the Course Add/Change/Drop link in CyberBear.</p>
<p>Beginning 46th instructional day</p>	<p>After Spring Class Day 45:</p> <p>Adds require instructor's & advisor's approval using the Course Add/Change/Drop link. \$10 fee applies.</p> <p>Drops require instructor's, advisor's, & Dean's approval via Course Add/Change/Drop link. \$10 fee applies.</p> <p>A 'WP' or 'WF' will appear on the transcript for dropped classes. No refunds.</p> <p>Students can change variable credit amounts, or change grading options, (except audit) using the Course/Add/Change Drop link in CyberBear. .</p>