9-2005

BIOL 308.01: Biology and Management of FIshes

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Biology and Management of Fishes

Biology 308 Fall 2005

Instructor: Lisa Eby, BRL 103, x 5984, leby@forestry.umt.edu
Office Hours: Tuesday and Thursday 10-12 or by appointment
T.A. Magnus McCaffery, magnus.mccaffery@umontana.edu
Office Hours: Monday 10-11 am; Wednesday 2-3 pm

Required Text: Moyle and Cech (2004) Fishes: An introduction to ichthyology. Fifth Edition.

Readings: See syllabus for schedule; the papers are on electronic (password:FISH05) and 2 hour reserve in Mansfield Library. Read them for examples, applications, generalizations, and principles. Questions based on lecture and reading material will appear on the midterms and final exam. Electronic Reserve is located at: http://eres.lib.umt.edu and can also be reached with a link in the Library catalog under "course reserves".

Objectives of class:
This class explores the biology of fishes, the most diverse group of vertebrates. The areas treated include morphological, physiological, and behavioral adaptations of fishes to their aquatic environments, as well as aspects of population, community, and applied ecology. We will be discussing both freshwater and marine fishes with an emphasis placed on freshwater fishes native to Montana.

Grading:

Midterm I	20%
Midterm II	20%
Final (Comprehensive)	20%
Project	10%
Lab quizzes, exercises, & problem sets	30%

Projects:

Projects will be done by a group of four students working together. A statement of group membership and a proposed project is due by September 15th, a study plan is due by September 29th, and a list of papers that you are finding on the subject is due October 13th. If you are struggling with a topic, please come see me during office hours. I expect that I will meet with each group briefly a few times during the semester. The final product of the project will be a scientific paper due (following the formatting of Ecology and no longer than 10 pages) due on 11/22/05 by 5:00 pm and presented to the class during the last two weeks of class. The presentation will be a formal powerpoint presentation with a time limit of 15 minutes. In addition to my grade of the final product, each group member will be grading the other group member's contribution to the project.

Class Policy:

Some of the field and lab projects will be done by teams of students so the resulting data are team or class property. Students are free to discuss results. However, all written material, calculations and graphs to be handed in must be your own work. Late penalties will be 5% of grade each day late.

The class final is Wednesday, December 14 from 10:10 to 12:10.
NO EARLY EXAMS WILL BE GIVEN !

Date	Lecture Topic and Readings
8/30 – 9/1	Diversity of aquatic environments and fishes & Locomotion ***Readings:*** *Moyle and Cech Chapter 1 and Chapter 2 section 2.8*
9/6 – 9/8	Respiration and Circulation ***Readings****: Moyle and Cech Chapters 3 and 4 p. 37-75*
9/13 – 9/15	Buoyancy and Thermal regulation ***Readings****: Moyle and Cech Chapter 5* *Selong, et al. 2001. Effect of temperature on growth and survival of Bull Trout, with application of an improved method for determining thermal tolerances in fishes. Transactions of the American Fisheries Society 130: 1026-1037.*
9/20 – 9/22	Osmotic regulation and energetics ***Readings:*** *Moyle and Cech Chapter 6 and Chapter 7*
9/27 – 9/29	Energetics and growth ***Readings:*** *Moyle and Cech Chapter 8*
10/4 – 10/6	Sensory systems and Exam I (10/6) ***Readings:*** *Moyle and Cech Chapter 10* *Pepper, A.N. 2003. Effects of anthropogenic sounds on fishes. Fisheries 28:24-31*
10/11 – 10/13	Behavior ***Readings:*** *Moyle and Cech Chapter 11* *Hixon, M.A. 1981. An experimental analysis of territoriality in the California reef fish Embiotoca jacksoni (Embiotodiae). Copiea 1981:653-665.*
10/18 – 10/20	Species interactions ***Readings:*** *Moyle and Cech Chapter 9* *Tasniguchi, Y. and S. Nakano. 2000. Condition-specific competition: implications for the altitudinal distribution of stream fishes. Ecology 8:2027-2039.*
10/25 – 10/27	Reproduction and Life history ***Readings:*** *Moyle and Cech Chapter 9* *Fleming and Gross. 1990. Latitudinal clines – a trade-off between egg number and egg size in Pacific salmon. Ecology 71:1-11.* *Nelson, et al. 2002. Decline of the migratory form in bull charr, Salvelinus fontinalis, and implications for conservation. Environmental Biology of Fishes 64: 321-332*
11/1 – 11/3	Population Ecology ***Readings:*** *Berkeley et al. 2004. Fisheries Sustainability via protection of age structure and spatial distribution of fish populations. Fisheries 29:23-32.*
11/8 – 11/10	Population Ecology

11/15 – 11/17	Populations to communities and Exam II (11/16) ***Readings**: Levin, P.S. et al. 2002. Non-indigenous brook trout and the demise of the Pacific salmon: a forgotten threat? Proc. R. Soc London B 269:1663-1670*
11/22 – 11/24	Community Ecology and Thanksgiving ***Readings**: Jackson, D.A. P.R. Peres-Neto, and J.D. Olden. 2001. What controls who is where in freshwater fish communities- the roles of biotic, abiotic, and spatial factors. Canadian Journal of Fisheries and Aquatic Sciences 58:157-170.* *Helfman et al. Diversity of Fishes. Chapter 25, Communities, Ecosystems, and the Functional Role of Fishes*
11/29 – 12/1	Presentations and Zoogeography of Fishes ***Readings:** Rahel, F.J. 2000. Homogenization of fish faunas across the United States. Science 288:854-856.*
12/6 – 12/8	Presentations Fish in an Ecosystem Context ***Readings**: Cederholm et al. 1999. Pacific salmon carcasses. Fisheries 24:6-15.* *Nakano, S. and M. Murakami. 2001. Reciprocal subsidies: dynamic interdependence between terrestrial and aquatic food webs. Proc. Nat. Acad. Sci: 98:166-170.*

Lab Schedule

Week of:	*Topic*	*Readings*
8/29	Excel and data examination	
9/5	Field – Fish and their habitats	
9/12	Identification and Anatomy	Moyle and Cech: p. 11-23
9/19	Computer lab – Culvert Design	*Warren, M.L. Jr. and M.G. Pardew. 1998. Road crossings as barriers to small-stream fish movement. Transactions of the American Fisheries Society 127:637-644.*
9/26	Age and Growth	
10/3	Computer lab - Bioenergetics	
10/10	ID – Families	
10/17	Field lab	
10/24	ID – Fishes of Montana **Lab Quiz**	
10/31	ID – Fishes of Montana **Lab Quiz**	
11/7	ID – Fishes of Montana **Lab Quiz**	
11/14	ID – Fishes of Montana **Lab Quiz**	
11/21	**Happy Thanksgiving**	**NO LAB**
11/28	ID – Fishes of Montana **Lab Quiz**	
12/5	Population estimation **Lab Quiz**	

Field Labs: We will meet by the footbridge. Be ready to get wet, bring extra clothes if necessary those days.

Computer Labs: Meet in the Biology computer lab Health Sciences Room 114