

University of Montana

## ScholarWorks at University of Montana

---

Syllabi

Course Syllabi

---

Fall 9-1-2001

### BIOL 308.01: Biology and Management of Fishes

Andrew Sheldon

*University of Montana - Missoula*

Follow this and additional works at: <https://scholarworks.umt.edu/syllabi>

**Let us know how access to this document benefits you.**

---

#### Recommended Citation

Sheldon, Andrew, "BIOL 308.01: Biology and Management of Fishes" (2001). *Syllabi*. 5380.

<https://scholarworks.umt.edu/syllabi/5380>

This Syllabus is brought to you for free and open access by the Course Syllabi at ScholarWorks at University of Montana. It has been accepted for inclusion in Syllabi by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact [scholarworks@mso.umt.edu](mailto:scholarworks@mso.umt.edu).

# Biology and Management of Fishes

**Biology 308**

**Fall 2001**

**Instructor: Andrew Sheldon, HS203A**

**Office Hours: T, Th 10-12; W 9-11**

**T.A.: Jonas Davis**

**Required Texts:**

- i) Moyle and Cech - Fishes, Fourth Edition
- ii) Page & Burr - Peterson Field Guide to Freshwater Fishes
- iii) Gould - Key to Montana Fishes

**Optional Reference:** Holton - Field Guide to Montana Fishes

**Reserve Readings:** See attached list.  
Assignments from this list are indicated by e.g. "Readings #7, #213".

**Grading:**

Midterm I	20%	October 9
Midterm II	20%	November 6
Final (Comprehensive)	30%	December 17, Monday 10:10-12:10
Lab quizzes, exercises, class quizzes, and problem sets	20%	
Lab Final	10%	

**Objectives:** Upon completing this course, you should:

- a. Understand how an individual fish "works" and how the structures and functions of fishes compare with those of other vertebrates.
- b. Be able to identify most of the families of North American freshwater fishes and to identify, to the species level, representatives of these families.
- c. Understand the diversity of ecology, behavior and management issues exemplified by North American freshwater fishes.
- d. Have practical experience with some basic methods (e.g. aging, electrofishing) and computational experience with analytical techniques such as fitting growth curves, and estimating population numbers by mark and recapture or mortality rates from age composition.
- e. Understand the basic biological, economic and social issues in global fisheries problems.
- f. Be familiar with representative issues, concepts and techniques in the management of freshwater fishes.
- g. Be confident enough in your understanding and factual toolkit to apply for a seasonal fisheries position.

## LECTURE SCHEDULE

Dates	Subject	Readings
Sept. 4	Introduction, Locomotion	p. 1-5, 11-34
6	Locomotion, Buoyancy	p. 69-72 Readings #1,2
11	LAST DAY TO ADD (DBS regulation)	
11	Respiration	p. 72-78
13	Circulation	p. 53-62
18	Thermal Regulation	p. 72-78
20	Osmotic & Ionic Regulation	p. 79-96
25, 27	Feeding, Growth, Age	p. 97-110, 111-122 Readings #3,4,5
Oct. 4, 11	Sensory Systems & Behavior	p. 145-160, 161-180 Readings #6,7,8,9
9	<b>MIDTERM I</b>	
15	LAST DAY TO DROP	
16, 18	Reproduction & Recruitment	p. 123-144
23-30 &	Ecology & Diversity of	p. 341-360, 377-432
Nov. 1	North American Freshwater Fishes	Readings #10-19 <u>plus</u> taxon specific readings. See Lab Schedule.
Nov. 6	<b>MIDTERM II</b>	
8, 13, 15	Population Analysis	Reading #20
20, 27		
Nov. 29	Management	p. 504-532
Dec. 4, 6, 11, 13		Readings #21-33
Dec. 17	Monday, <b>FINAL EXAM</b>	10:10-12:10 <b>NO EARLY FINALS WILL BE GIVEN!</b>

## LAB SCHEDULE

Dates	Subject	Readings
Sept. 4,6,7	No Lab - Read ahead!	
11,13,14	Field Exercise I	
18,20,21	Morphology, etc.	Bring your text!
25,27,28	Age & Growth	See lecture readings.
Oct. 2,4,5	Evolution, Keys, etc.	p. 181-192, 193-211 Readings #34, 35
9,11,12	North American Freshwater Fishes I Lampreys Sturgeons, Paddlefish, Gars, Bowfin Hiodontidae Anguillidae Clupeidae	p. 214-218 p. 237-240 p. 244 p. 246-248 p. 250-252
Oct. 16,18,19	Field Exercise II (tentative date)	
Oct. 23,25,26	<b>LAB QUIZ</b> Salmonidae, Osmeridae Esocidae, Umbridae	p. 267, 268-275
Oct. 30, Nov. 1,2	<b>LAB QUIZ</b> Cyprinidae & Catostomidae Characidae Ictaluridae	p. 254, 256-260 p. 260-261 p. 261-263
Nov. 6,8,9	<b>LAB QUIZ</b> Percopsidae, Aphredoderidae & Amblyopsidae Gadidae Cyprinodontidae Fundulidae Poeciliidae Atherinidae Percomorpha Gasterosteidae Cottidae Moronidae	p. 283 (fig. 20.5) p. 286 p. 293-298  p. 290-291 p. 300-301 p. 304-305 p. 309-311 p. 317

## LAB SCHEDULE

Dates	Subject	Readings
Nov. 13,15,16	Centrarchidae Percidae Sciaenidae	p. 317 p. 317-318 p. 319
Nov. 27,29,30	<b>LAB QUIZ</b> REVIEW and ??	
Dec. 4,6,7	<b>LAB FINAL</b>	
Dec. 11,13,14	<b>TBA</b>	

The following papers are on electronic and 2 hour reserve in Mansfield Library. Read them for generalizations and principles. Questions (essays) based on this material will appear on the midterms and final. Short quizzes and discussion time in class are planned.

1. Warren, M.L., Jr., and M.G. Pardew. 1998. Road crossings as barriers to small-stream fish movement. *Transactions American Fisheries Society* 127:637-644.
2. Toepfer, C.S., W.L. Fisher, and J.A. Haubelt. 1999. Swimming performance of the threatened leopard darter in relation to road culverts. *Transactions American Fisheries Society* 128:155-161.
3. Burnham-Curtis, M.K., and C.R. Bronte. 1996. Otoliths reveal a diverse age structure for humper lake trout in Lake Superior. *Transactions American Fisheries Society* 125:844-851.
4. Scarnecchia, D.L., P.A. Stewart, and G.J. Power. 1996. Age structure of the Yellowstone-Sakakawea paddlefish stock, 1963-1993, in relation to reservoir history. *Transactions of the American Fisheries Society* 125:291-299.
5. Jones, M.S., J.P. Goettl, Jr., and S.A. Flickinger. 1994. Changes in walleye food habits and growth following a rainbow smelt introduction. *North American Journal of fisheries Management* 14:409-414.
6. Schindler, D.E., S.I. Geib, and M.R. Williams. 2000. Patterns of fish growth along a residential development gradient in north temperate lakes. *Ecosystems* 3:229-237.
7. Hughes, N.F. 1992. Rank of feeding positions by drift-feeding arctic grayling (*Thymallus arcticus*) in dominance hierarchies. *Canadian Journal of Fisheries and Aquatic Sciences* 49:1994-1998.
8. Chivers, D.P., R.S. Mirza, P.J. Bryer, and J.M. Kiesecker. 2001. Threat-sensitive predator avoidance by slimy sculpins: understanding the importance of visual versus chemical information. *Canadian Journal of Zoology* 79:867-873.
9. Rakes, P.L., J.R. Shute, and P.W. Shute. 1999. Reproductive behavior, captive breeding, and restoration ecology of endangered fishes. *Environmental Biology of Fishes* 55:31-42.
10. De Staso, J., III, and F.J. Rahel. 1994. Influence of water temperature on interactions between juvenile Colorado River cutthroat trout and brook trout in a laboratory stream. *Transactions of the American Fisheries Society* 123:289-297.
11. Nakano, S., S. Kitano, K. Nakai, and K.D. Fausch. 1998. Competitive interactions for

foraging microhabitat among introduced brook charr, *Salvelinus fontinalis*, and native bull charr, *S. confluentus*, and westslope cutthroat trout, *Oncorhynchus clarki lewisi*, in a Montana stream. *Environmental Biology of Fishes* 52:345-355.

12. Swanberg, T.R. 1997. Movements of and habitat use by fluvial bull trout in the Blackfoot River, Montana. *Transactions American Fisheries Society* 126:735-746.

13. Jakober, M.J., T.E. McMahon, R.F. Thurow, and C.G. Clancy. 1998. Role of stream ice on fall and winter movements and habitat use by bull trout and cutthroat trout in Montana headwater streams. *Transactions American Fisheries Society* 127:223-235.

14. Bohn, T. and P.-A. Amundsen. 2001. The competitive edge of an invading specialist. *Ecology* 82:2150-2163.

15. White, J.L., and B.C. Harvey. 2001. Effects of an introduced piscivorous fish on native benthic fishes in a coastal river. *Freshwater Biology* 46:987-995.

16. Johnson, B.M., and J.P. Goettle, Jr. 1999. Food web changes over fourteen years following introduction of rainbow smelt into a Colorado reservoir. *North American Journal Fisheries Management* 19:629-642.

17. Pipas, J.C., and F.J. Bulow. 1998. Hybridization between redeye bass and smallmouth bass in Tennessee streams. *Transactions American Fisheries Society* 127:141-146.

18. Reeves, G.H., F.H. Everest, and J.R. Sedell. 1993. Diversity of juvenile anadromous salmonid assemblages in coastal Oregon basins with different levels of timber harvest. *Transactions of the American Fisheries Society* 122:309-317.

19. Travnichek, V.H., M.B. Bain, and M.J. Maceina. 1995. Recovery of a warm water fish assemblage after the initiation of a minimum-flow release downstream, from a hydroelectric dam. *Transactions of the American Fisheries Society* 124:836-844.

20. Weathers, K.C., and M.B. Bain. 1992. Smallmouth bass in the Shoals Reach of the Tennessee River: population characteristics and sport fishery. *North American Journal of Fisheries Management* 12:528-537

21. Paukert C.P., J.A. Klammer, R.B. Pierce, and T.D. Simonson. 2001. An overview of northern pike regulations in North America. *Fisheries* 26(6):6-13.

22. Murphy, M.D., and R.E. Crabtree. 2001. Changes in age structure of nearshore adult red drum off west-central Florida related to recruitment and fishing mortality. *North American Journal Fisheries Management*. 21:671-678.

23. Gowan, C., and K.D. Fausch. 1996. Long-term demographic responses of trout populations to habitat manipulation in six Colorado streams. *Ecological Applications*

6:931-946.

24. House, R. 1996. An evaluation of stream restoration structures in a coastal Oregon stream, 1981-1993. *North American Journal Fisheries Management* 16:272-281.
25. Edwards, S.F. 1999. Influence of a century of macroeconomic change on U.S. fisheries production. *North American Journal Fisheries Management* 19:1-17.
26. Dewees, C.M. 1989. Assessment of the implementation of individual transferable quotas in New Zealand's inshore fishery. *North American Journal of Fisheries Management* 9:131-139.
27. Acheson, J.M. 2001. Confounding the foals of management: response of the Maine lobster industry to a trap limit. *North American Journal Fisheries Management* 21:404-416.
28. Crowder, L.B., and S.A. Murawski. 1998. Fisheries bycatch: implications for management. *Fisheries* 23(6):8-17.
29. Kerr, S.R., and R.A. Ryder. 1997. The Laurentian Great Lakes experience: a prognosis for the fisheries of Atlantic Canada. *Canadian Journal Fisheries Aquatic Sciences* 54:1190-1197.
30. Field, J.D. 1997. Atlantic striped bass management: where did we go right? *Fisheries* 22(7):6-8.
31. Knight, R.L. 1997. Successful interagency rehabilitation of Lake Erie walleye. *Fisheries* 22(7):16-17.
32. Burkhead, N.M., S.J. Walsh, B.J. Freeman, and J.D. Williams. 1997. Status and restoration of the Etowah River, an imperilled southern Appalachian ecosystem. Pp.375-444. In Benz, G.W., and D.E. Collins (eds.), *Aquatic Fauna in Peril: the Southeastern Perspective*. Special Publication 1, Southeast Aquatic Research Institute.
33. Fraley, J. 1996. Cooperation and controversy in wilderness fisheries management. *Fisheries* 21(5):16-21.
34. Schmetterling, D.A., and M.H. Long. 1999. Montana anglers' inability to identify bull trout and other salmonids. *Fisheries* 24(7):24-27.
35. Warren, M.L., Jr., B.M. Burr and J.M. Grady. 1994. *Notropis albizonatus*, a new cyprinid fish endemic to the Tennessee and Cumberland River drainages, with a phylogeny of the *Notropis procne* species group. *Copeia* 1994:868-886.