

ENVIRON/EAS 409/EEB 487 – Ecology of Fishes

Winter 2019

Lecture MWF 10-11; Room 1024 Dana

Lab syllabus will be presented in the Lab Section

Dr. Karen Alofs – Instructor

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Office hours – Monday 11:30-12:30, Thursday 11-12

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Office hours – Tuesday 2:30-3:30pm and Friday 11:00am-12:00pm

Lecture Schedule

| Month | Date | Topic | Diana |
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| | | I. INTRO FISH ECOLOGY | |
| January | 9 | Aquatic Ecosystems | Chpt 1 |
| | 11 | Morphology and Biology of Fishes | |
| | | Diversity of Fishes: <i>Dr. Hernan Lopez-Fernandez,</i> | |
| | 14 | <i>U-M EEB and UMMZ</i> | |
| | 16 | Ecomorphology | |
| | 18 | Life history strategy | Chpt 17 |
| | 21 | <i>MLK Day Holiday</i> | |
| | 23 | Ecological Niche | Chpt 8 |
| | | II. PHYSIOLOGY & BIOENERGETICS | |
| | 25 | Balanced Energy Equation | Chpt 2 |
| | 28 | Metabolism and Growth | Chpt 3 & 5 |
| | 30 | Growth in the field | Chpt 6 |
| February | 1 | Energy Storage and Use -short | |
| | 4 | Body and Gonad Growth | |
| | 6 | Bioenergetic Models | Chpt 7 |
| | 8 | <i>Discussion: Applied Bioenergetics Models</i> | |
| | 11 | EXAM 1 | |
| | | III. POPULATIONS & COMMUNITIES | |
| | 13 | Density Dependence | Chpt 9 |
| | 15 | Density Independence, Critical Period | |
| | 18 | Competition | Chpt 10 |
| | 20 | Foraging Behavior | Chpt 11 |
| | 22 | Predator-Prey | |
| | 25 | Optimal Foraging | Chpt 13 |
| | 27 | Predation and Structure | |
| March | 1 | Foraging and Predation Risk | |
| | | <i>Winter Recess Mar 4 - Mar 8</i> | |
| | | IV. REPRODUCTION & MOVEMENT | |
| | 11 | Movements of Predatory Fishes <i>Bret Fickes, UM SEAS</i> | Chpt 15 |
| | | Reproductive Behavior and Spawning Migrations <i>Dr.</i> | |
| | 13 | <i>Tim Cline U-M EEB</i> | Chpt 16 |

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| | 15 | Larval Fish/Hatching/Emergence <i>Guest Lecturer TBD</i> | Chpt 18 |
| | | V. AQUATIC ECOSYSTEMS & FISHERIES | |
| | 18 | Fish Communities in Temperate Streams | Chpt 21 |
| | 20 | EXAM 2 | |
| | 22 | <i>Discussion: River Food Webs</i> | |
| | 25 | Tropical Rivers | Chpt 22 |
| | 27 | The Great Lakes | Chpt 25 |
| | 29 | Tribal Fisheries: <i>Great Lakes Case Study</i> | |
| | 1 | Fish Communities in Lakes | Chpt 20 |
| April | 3 | Monitoring and assessment: <i>Dr. Kevin Wehrly MI-DNR and Institute for Fisheries Research</i> | |
| | 5 | Coral Reef Communities | Chpt 23 |
| | 8 | Aquaculture and Fisheries | Chpt 24 |
| | 10 | <i>Discussion: Fisheries</i> | |
| | | VI. CONSERVATION ECOLOGY | |
| | 12 | Endangerment and Extinction | Chpt 26 |
| | 15 | <i>Discussion: Multiple Stressors</i> | |
| | 17 | Resilience and Ecosystem Services | |
| | 19 | Habitat Restoration | |
| | 22 | Environmental Change Film Festival | |
| May | 1 | FINAL EXAM- 4-6pm | |

Reading Materials

Reference Text: Diana, J.S. 2004. *Biology and Ecology of Fishes*, Second edition. Biological Sciences Press, Carmel, Indiana.

Supplemental reading materials for lecture topics will be provided on Canvas.

Discussion 1: Applied Bioenergetics Models, February 2

Cooke, S. L., and W. R. Hill. 2010. Can filter-feeding Asian carp invade the Laurentian Great Lakes? A bioenergetic modelling exercise. *Freshwater Biology* 55:2138–2152.

Discussion 2: River Food Webs, March 16

Power, M. E. 1990. Effects of fish in river food webs. *Science* 250:811–814.

Power, M. E., K. Bouma-Gregson, P. Higgins, and S. M. Carlson. 2015. The thirsty Eel: summer and winter flow thresholds that tilt the Eel River of Northwestern California from Salmon-supporting to Cyanobacterially degraded states. *Copeia* 103:200–211.

Discussion 3: Fisheries, April 4

Hilborn, R. 2006. Faith-based fisheries. *Fisheries* 31:554-555.

Roberts, C. M, J. A. Bohnsack, F. R. Gell, J. P. Hawkins, and R. Goodridge. 2001. Effects of marine reserves on adjacent fisheries. *Science* 294:1920-1923.

Conover, D. O., and S. B. Munch. 2002. Sustaining fisheries yields over evolutionary time scales. *Science* 297: 94-96.

Conover, D.O., C.M. Roberts, and R. Hilborn. 2007. Faith, evolution, and burden of proof. *Fisheries* 32:90-93.

Discussion 4: Multiple Stressors, April 11

Pringle, R. M. 2005. The origins of the Nile Perch in Lake Victoria. *BioScience* 55:780–787.

van Zwieten, P. A. M., J. Kolding, M. J. Plank, R. E. Hecky, T. B. Bridgeman, S. MacIntyre, O. Seehausen, and G. M. Silsbe. 2016. The Nile perch invasion in Lake Victoria: cause or consequence of the haplochromine decline? *Canadian Journal of Fisheries and Aquatic Sciences* 73:622–643.

Grading

Two Midterm Exams - 20% each x 2

One Final Exam – 30%

Assignment 1 – *Media Presentation*- 10%

Assignment 2, 3, and either 4 or 5 – *Discussion Summaries* - 5% each x 3

*complete Assignment 1, 2, 3 and either 4 or 5

Participation in lecture and discussion - 5%

Final grades will be curved up at the instructor's discretion.

Expectations for assignments will be presented in lecture and posted on Canvas.

Other Considerations

Participation- Please engage in lecture, ask questions, contribute your thoughts and respect your classmates. The diversity of our experiences and knowledge strengthens science, our understanding of it, and our ability to explain it to others.

Academic Integrity- We will follow the University of Michigan's Policy Statement on Academic Integrity.

Electronics- Out of respect for your instructors and fellow students limit cell phone, tablet and laptop usage to purposes directly related to class.

Late Assignments- Late assignments will lose 10% per day. No assignments will be accepted more than a week after their deadline. Please consult your instructor as soon as possible if there are extenuating circumstances which will prevent you from completing an assignment on time.

Regrades- Other than simple calculation errors, requests to re-consider grading should be submitted to the instructor in writing. In such cases, the instructor reserves the right to regrade the entire assignment or exam.

Accommodations- Please inform your instructors as soon as possible if there are accommodations that will help you to succeed in this course.