Principles of Fisheries Ecology and Management
ENR 5342: Spring 2015
12:40–1:35; M, W, and F; Kottman Hall, rm. 370

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Office hours: M/W/F 1:45–3:45 or by appointment

Course description

This course is an introduction to the conceptual elements of fisheries management. It will provide fisheries and wildlife majors and graduate students with background information for future courses and the profession. It is also organized to provide useful information to non-majors and graduate students who may not have the opportunity to take additional courses in this field.

Course goals
A. Students will understand the various meanings of the term “fisheries” and what “management” in a fisheries conservation context implies.

B. Students will understand the rate functions that structure exploited aquatic populations.

C. Students will understand the development, use, and revision of policy/regulation to attain management objectives.

Learning objectives
1. Students will recognize and define diverse activities and three intersecting study areas as “fisheries” and their management.
2. Students will demonstrate knowledge of the history of fisheries conservation and sport fishing.
3. Students will demonstrate basic knowledge of the biology and ecology of select organisms important to fisheries management in North America.
4. Students will identify common issues associated with different fisheries habitats.
5. Students will identify and define the three rate functions that structure exploited populations and the relationships between them.
6. Students will select appropriate procedures to calculate simple population indices and statistics commonly used by fisheries managers.
7. Students will apply appropriate decision making processes in population manipulation context.
8. Students will demonstrate basic understanding of the application of population functions in fisheries management and conservation contexts.
9. Students will define and apply the formal steps associated with policy formulation and assessment.
10. Students will demonstrate knowledge of the regulatory use of aquatic-organism and habitat indices as indicators of ecosystem health.
11. Students will incorporate an appreciation for competing
**Course goals**

D. Students will increase the ability to communicate knowledge about this topic matter.

**Learning objectives**

- Interests in decision-making processes and recognize that compromise is a necessary component of fisheries management.

1. Students will explore professional fisheries management literature and evaluate sources using an annotated bibliography.
2. Students will create a professional-style document adhering to a prescribed professional format.
3. Students will evaluate their peers' professional writing in a formal peer-reviewer format.

**Required text**


**Suggested references (NOT required)**

*Fisheries management texts*


Field guides and systematic texts


Student evaluation and grading
Your grade will be based on a total of 1,000 points. Understanding that there are different learning styles and that different students excel in different areas, opportunities for student evaluation will be presented in three categories, each comprising an approximate third of the total grade: homework calculations, exams, and written assignments. All assignments can be submitted electronically via Carmen or in hard copy. All late assignments will be docked 10% per day. Please plan accordingly.

Examinations will be divided between multiple choice and questions requiring short answers, lists, definitions, and brief essays. The final examination will be comprehensive, requiring an integration of concepts presented throughout the course.

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<thead>
<tr>
<th>Assignment/Assessment</th>
<th>Point value</th>
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<tbody>
<tr>
<td>Annotated bibliography</td>
<td>75</td>
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<tr>
<td>Fish &amp; wildlife conference assignment</td>
<td>50</td>
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<tr>
<td>Population estimation assignment</td>
<td>50</td>
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<td>Age &amp; growth assignment</td>
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<td>Relative weight assignment</td>
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<td>Diet indices assignment</td>
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<td>Fisheries assessment assignment</td>
<td>50</td>
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<tr>
<td>Midterm 1</td>
<td>100</td>
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<td>Midterm 2</td>
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<tr>
<td>Draft term paper</td>
<td>50</td>
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<tr>
<td>Term paper</td>
<td>150</td>
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<td>Peer review</td>
<td>75</td>
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<td>Final exam</td>
<td>150</td>
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<td><strong>Total: 1,000</strong></td>
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Letter grades will be assigned on the four-point system following the university’s “standard scheme.”

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<tr>
<th>Grade</th>
<th>Percentage</th>
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<tr>
<td>A</td>
<td>93.00–100 %</td>
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<td>A-</td>
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<td>B+</td>
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<td>B</td>
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<td>B-</td>
<td>80.00–82.99 %</td>
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<td>C+</td>
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Course outline

Theme & readings

Week 1    Course introduction, fisheries management
          Hubert & Quist (H&Q) Chs. 1, 4, 5, & 6

Week 2–3  Introduction to ichthyology and fish ecology
          H&Q Ch. 2

Week 4–5  Fishery assessments
          Assessing anglers and the public
          H&Q Chs. 2, 3, 11, & 14
          Assessing fish populations

Week 6    Manipulations of watersheds and stream habitat management
          Watershed-fisheries relations
          H&Q Chs. 10
          Examining and analyzing stream habitat
          Habitat protection
          Habitat restoration
          Stream flow management

Week 6–7  Reservoir and lake habitat management
          Management to maintain habitat quality
          H&Q Chs. 13
          Management of fish populations

Week 7–9  Management of introduced fishes
          Reasons for fish introductions
          H&Q Chs. 8 & 9
          Stocking programs
          Stocking techniques
          Evaluations of fish introductions
          Aquatic invasive species

Week 9    Endangered species management
          Laws and treaties
          H&Q Chs. 12
          Management for endangered species
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<tr>
<th>Week 10–11</th>
<th>Managing with regulations</th>
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<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td>H&amp;Q Chs. 7</td>
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<td><strong>Types</strong></td>
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<td>Regulations for specific fisheries</td>
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<td>Regulatory process</td>
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<tr>
<th>Week 11–12</th>
<th>Conservation and management practices of flowing-water fisheries</th>
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<tr>
<td><strong>Coldwater streams</strong></td>
<td>H&amp;Q Chs. 18, 19, 20, &amp; 21</td>
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<tr>
<td><strong>Warmwater streams</strong></td>
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<td><strong>Large rivers</strong></td>
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<th>Week 12–13</th>
<th>Conservation and management practices of impoundment fisheries</th>
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<tr>
<td><strong>Small ponds</strong></td>
<td>H&amp;Q Chs. 16 &amp; 17</td>
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<td><strong>Reservoirs</strong></td>
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<th>Week 14</th>
<th>Conservation and management of natural-lake fisheries</th>
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<tr>
<td><strong>Basis of fish production</strong></td>
<td>H&amp;Q Chs. 15, 16, &amp; 17</td>
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<td><strong>Approaches to lake management</strong></td>
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<td><strong>Classes of management problems</strong></td>
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<td><strong>Great Lakes fisheries: changes and management setting</strong></td>
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<td>Week</td>
<td>Monday</td>
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<td>1: 12-16 January</td>
<td>Lecture: Fisheries intro.</td>
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<td>2: 19-23 January</td>
<td><strong>Martin Luther King, Jr. Day: No classes.</strong></td>
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<tr>
<td>8: 2-6 March</td>
<td>Lecture: Managing with introduced fishes.</td>
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<td>Break: 16-20 March</td>
<td><strong>Spring break: no classes.</strong></td>
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<tr>
<td>11: 30 March-3 April</td>
<td><strong>Midterm 2.</strong></td>
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<td>15: 27 April</td>
<td>Open review session.</td>
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<td>Finals week</td>
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Instructions for annotated bibliography, term paper, and peer review

You will select a unique topic as a subject for your annotated bibliography and for later elaboration in your term paper. A list of suggested topics follows within this syllabus; however, it’s possible to select any fishery-related topic of interest to you. If you would like to choose a topic not included on this list, seek approval from instructional staff to ensure it is not redundant to a topic already selected by somebody else. The bibliography and term paper assignments will be discussed during the first or second week of class. Please note the 10 % penalty per working day for late assignments. This will be strictly enforced, so please plan ahead!

Annotated bibliography
An annotated bibliography is a list of citations or references, like those that you include at the end of a term paper. However, instead of just listing the author, title, etc., you also include the most important findings contained in the article or book that you are referencing.

For this assignment, you will need to locate and read at least eight articles/chapters from at least three different professional journals and books. Both journal articles and books can be represented, but with the emphasis on primary research presented in professional journals: at least ¾ of your bibliography citations must be from primary research. You will then provide us with a correct citation of the article/chapter and a brief, three- to five-sentence summary of the content of each. The annotated bibliography must be typed; nothing should be hand-written.

Remember two important things: 1) Do not use abstracts for these sources; you must locate and read the actual paper or book chapter. To ensure that you at least locate the source, it is required that you attach to your annotated bibliography a copy of the title pages of each book which includes the title, authors, publisher, publication date, and ISBN number. Also include a copy of the table of contents of the book. For journal articles, include a copy of the first page, which will include the title, list of authors, source information, and the abstract. 2) Paraphrase your sources; do not directly copy another author’s phrases or sentences.

The texts and articles you choose are to deal with the topic of your term paper. Many of the topics provided within this syllabus are too broad to write an effective paper. Change the scope and your resultant title as necessary to write a concise and conceptually complete term paper. Begin your search in books to learn something about your topic. Move to indexes and reference lists to find related articles in professional journals. Use scholarly web-based databases to your advantage, but mostly to locate scholarly texts and peer-reviewed articles. When you have found an article title that is of interest to you, locate and read the article, making sure to take good notes on content to help you write the annotation. Don't forget to make a complete record of the citation for later use. There is nothing more frustrating than having excellent information in your notes and no idea where that info originated!

Accessing the internet via Ohio State University (OSU) servers will provide you with easy access to a tremendous number of appropriate references through a vast many subscription services. Be certain to still format your citations and list of references following the prescribed style of the American Fisheries Society (AFS). If you access journal articles electronically, cite the formal publication in accordance with AFS guidelines, not the web service/site you used to access it. Many subscription services will add a title page to publication downloads that may include a recommendation “To cite this article…” or similar. If that recommended citation is formatted differently, edit it to fit AFS’s prescribed style (Note: even the service OSU uses to download AFS journals gives a recommended citation that does not follow the AFS’s style).
For correct citation style, use the North American Journal of Fisheries Management’s guide for authors. The complete document can be found in the January 2014 issue (34:216–221) as well as accessed by university machines at http://www.tandfonline.com/doi/pdf/10.1080/02755947.2014.890477. The recent Guide for Authors and A Guide to AFS Publications Style will both be posted to Carmen for your reference.

The following is an example of an annotation for the article:


Markham et al. (1991) used radio tags in White Crappies Pomoxis annularis to determine summer movement patterns and habitat preferences. Fish movement increased at dusk, peaked at night, declined at dawn, and then remained low during the day. Areas most often chosen by crappies were about 5 m deep; had relatively steep slopes; and structure in the form of rocks, stumps, or fallen trees. Fish showed high fidelity to home areas, returning to them each morning after feeding during the evening and nighttime hours. Fishing can be improved for this species by marking favorable locations for anglers as well as by adding structure to improve otherwise good locations.

Term paper
The term paper will be written on the same topic used for your annotated bibliography and must also be typed. Be certain to craft a title that is descriptive of the finished paper’s content. Although many of the sources used in your annotated bibliography will be used in your paper, some may be left out and additional references should be added. Your paper and headings, complete with title page and abstract, should be formatted as prescribed by the posted AFS guide to authors. Note that there is no requirement for page length, but my experience has been that it takes approximately 10 pages of narrative (excluding figures, tables, and references) to adequately address a topic to my own (your grader’s) satisfaction. (If you’ve managed to generate around 8–12 or more pages and feel you’re conceptually complete, you very well may be. If you’ve generated 3.25 pages, probably not.) Your submissions can be electronic or hard copy; electronic submission is preferred. Microsoft Word must be able to open any electronic submissions. Any hard-copy submissions should be fastened at the upper left corner with a single staple. Do not place between hard or plastic covers. Remember to number your pages, double space, and left-align text (do not justify).

If figures or tables are included, make sure they are cited properly. If you have modified them for your purposes (often a good idea), indicate that they are “based on” or “modified from” (as appropriate) and then follow with the correct citation. Each table or figure should have a clear caption that stands on its own to explain the information it includes.

Because this course does not include the collection of new field data, your papers are likely to take the form of a “critical review.” This is not necessarily representative of a typical submission to any journal with a focus on primary research. Thus, the “components” of a “typical manuscript” listed by the guide to authors don’t necessarily apply, although they can if it seems appropriate to you. Feel free to consider examples of other literature-review papers in crafting your content and
headers. Three recent published examples (Stapanian 2010; Bodine et al. 2013; Weltman-Fahs and Taylor 2013) will be posted to Carmen for your reference.

If you have collected field data on a fisheries-related project, you may be able to draft a primary-research-style manuscript to fulfill the requirements of this course. Talk to instructional staff if this applies to you. Your paper would still need to competently address all four points from the grading rubric described below.

The following guidelines will comprise a grading rubric for term papers in this course:

1. The bulk of points will be awarded for content and formal style considerations (75 pts.): succinctness, clarity of thought, integration/synthesis of ideas (i.e., several authors’ ideas used to arrive at your own conclusions), demonstrated understanding of course materials, completeness of content, adherence to AFS style guidelines, and correct language mechanics. Use dictionaries, style references/examples, proofreading, and word-processing software to your advantage.

2. All papers must quantitatively address (a) population rate function(s) or some statistical analysis (30 pts.). This means that you should support your assertions with numbers—if possible, wherever appropriate, including reference to hypothesis tests and associated numeric statistics (for purposes of this course, this is in slight contrast to the AFS style guide)—and correct citations for the sources of those numbers.

3. Specifically address how the topic relates to or impacts resource management and/or regulation/policy (30 pts.).

4. Your paper should include at least 12 sources (ideally, even more), at least 8 of which (ideally, even more) should be peer-reviewed primary research presented in professional journals (15 pts.).

Avoid any chance or appearance of plagiarism! Make sure you credit the correct source for any ideas or facts not your own. Avoid direct quotes; place the ideas in your own words and then use proper citation techniques. The consequences of plagiarism are very serious. I don't even have the option of dealing with it on my own; I must turn you and the suspect materials in to the University Committee on Academic Misconduct. It is your responsibility to give me no reason to suspect your work.

A draft of your term paper will be due one week before the finished product. The purpose of the draft is mainly to be certain you are correctly applying the prescribed style and format. As such, the draft’s format is relatively open ended: whatever and however much you submit, I will strive to read and grade strictly for style and format. In general, try to include a mostly complete title page, at least one header, at least one page of finished narrative, and some citations.

Peer review
Each student will follow the format of the North American Journal of Fisheries Management to submit a formal peer-review form on one other student’s paper. Author names will be redacted for anonymity. In reviewing the work of your peers, be certain to refer to the prescribed style and author guides.

Copies of term papers and peer reviews will be returned to students who would like them on finals day.
Approved annotated-bibliography/term-paper topics

- Power-generating plants and their impact on fisheries.
- Great Lakes commercial fisheries.
- The history of Common Carp in North America and its impacts on aquatic ecosystems.
- The impact of new invasive species on native fisheries.
- Alewife ecology and the associated management implications on the Great Lakes.
- Sea Lamprey ecology and associated management implications.
- Striped Bass ecology and associated management implications.
- Shark ecology and management.
- Cage-culture of finfishes.
- Fishing rights of Native Americans.
- Ecology and management of tuna.
- Aquaculture in developing countries.
- Mortality associated with fishing tournaments and management implications.
- Sample-gear bias and implications for planning monitoring/research programs.
- Managing quarry/upground reservoir fisheries.
- Current problems and new ideas in fisheries management.
- Lake eutrophication and potential impacts on fisheries.
- Fisheries management, planning, and policy.
- Fisheries economics: recreational or commercial fishing and impact on regional economies.
- Paddlefish ecology and associated management implications.
- Salmonid ecology and associated management implications.
- The effect of in-stream impoundments or dam removal on fisheries.
- Fish use of water control structures and/or habitat.
- The effects of fish on benthic invertebrate or plankton populations.
- Fish movements: the implications of migration for managed fisheries.
- The impacts of fish on wetlands.
- The effect of wetland loss on fisheries.
- The effects of stocking on wild trout stocks in streams.
- Use of size limits in fisheries management.
- Genetic, species, or functional biodiversity affects in food web knowledge influence on management.
- Largemouth or Smallmouth bass ecology and associated management implications.
- Asian carps and the Great Lakes: potential ecological impacts.
- The use of fishes and invertebrates as indicators of aquatic ecosystem biotic integrity.
- Environmental contaminants, bioaccumulation to fish tissue, and fish-consumption advisories.
Class policies

As I am sure you expect instructional staff to be prepared and come to class for every session, we expect the same from you. Exam material will cover both lecture and text material. Because the penalty for late papers is not exorbitant, I will not extend deadlines. Makeup exams will be offered only under extreme circumstances and will consist of oral or essay questions. If you must leave class early, please let me know.

My teaching philosophy is similar to my life philosophy. I give respect and trust to everyone unless I am given reason to do otherwise. In return, I and my teaching assistant expect to be given that same respect. We are here to present a specific body of knowledge and to help you assemble skills that will assist you in learning throughout your academic and professional careers. Your job is to integrate this material into your own background. If something doesn't make sense or seems contradictory, please come see one of us. We will do our best to find a way to present the material in a manner that helps you master it. What we learn from that process will improve the course in the future. Working together as a community in a supportive environment is to our mutual advantage.

Academic integrity

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (CoAM) expect that all students have read and understand the University’s Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University’s Code of Student Conduct and this syllabus may constitute “Academic Misconduct.”

The Ohio State University’s Code of Student Conduct (Section 3335-23-04) defines academic misconduct as “Any activity that tends to compromise the academic integrity of the University, or subvert the educational process.” Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University’s Code of Student Conduct is never considered an “excuse” for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the CoAM. If CoAM determines that you have violated the University’s Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web: [http://oaa.osu.edu/coam.html](http://oaa.osu.edu/coam.html)
- Ten Suggestions for Preserving Academic Integrity: [http://oaa.osu.edu/coamtensuggestions.html](http://oaa.osu.edu/coamtensuggestions.html)
Disability statement
Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. Please contact the Office for Disability Services at 614-292-3307 in room 150 Pomerene Hall to coordinate reasonable accommodations for students with documented disabilities.