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### BIOE 428.00: Freshwater Ecology

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## **Freshwater Ecology Autumn 2014: BIOE 428, 5 Credits**

**Lecture:** 00, Tue/Thu 11:10-12:30 pm, CRN 74527, Chemistry Room 102

**Labs:** 01 Tue 1:10-5:00 pm CRN 72324; 02 Thu 1:10-5:00 pm CRN 72325, Health Sciences 102

**Instructor:** Craig Stafford

**E-mail:** craig.stafford@mso.umt.edu (best way to contact)

**Office Hours:** Mon 3pm-5 pm or by appointment; Health Sciences 111

**TA:** Brett Addis; brett.addis@umontana.edu; office hours Mon & Fri 11am-12pm; Health Sciences 311

**TA:** Claire Bayer; clarice.bayer@umconnect.umt.edu; office hours Wed 2pm-4pm; Health Sciences 311

### **Course Content & Approach**

We will be examining the structure and function of freshwaters as well as the associated biology and ecology of freshwater biota. The course is organized into four major units: physical processes, chemical processes, biota (especially invertebrates), and ecological processes in a freshwater setting.

### **Required Text**

Introduction to Limnology by Stanley Dodson, 1<sup>st</sup> Edition, 2004

### **Moodle**

Lectures, readings not in your text, and handouts (including those for lab) will be placed on Moodle (accessed through [umonline.umt.edu](http://umonline.umt.edu)). The lectures are not meant to be stand alone documents and will require class attendance for full comprehension. Printing of the lecture slides as “handouts” (6 slides per page works well) before class is recommended.

### **Grading**

You will receive one grade for the course that will be weighted 70% by lecture and 30% by lab. Your lecture grade will be based on three midterms, a cumulative/mandatory final, a term paper, and one outside lecture review. I will drop the lowest of your three midterm scores only. The final cannot be dropped. Your lab grade will be based on seven assignments and a lab final exam, and the lab final cannot be dropped. I will be using the +/- grading system. The dates of tests and lecture assignments are on the class schedule.

**Lecture:** 2 midterms @20%=40%, 1 final @30%, 1 term paper @20%, 1 lecture review @10%

**Lab:** 7 assignments @10%=70%, 1 lab final @30%

### **Grading Policies**

If you miss one of the three midterms, you forgo dropping your lowest score. You cannot drop the final exam or lab final. I will deviate from this grading scheme only under exceptional and documented (in writing) circumstances (doctors notes, university sanctioned events which require attendance like games for athletes, etc). It is your responsibility to provide the necessary written documentation to verify your absence was legitimate. You should always talk to me *before* you miss a lecture midterm or final if at all possible. Similarly, speak with TA regarding the lab final *before* you miss it. For lab, you must participate in the lab to get credit for the associated assignment. All graded work you do in this course must be entirely your own and done exclusively for this course.

**Drops, Adds, and Other Academic & Disability Information**

The University's *Academic Policies and Procedures* (drops, adds, and other academic policies) are described at <http://www.umt.edu/registrar/students/dropadd.php> . The Academic Calendar can be found at <http://www.umt.edu/registrar/PDF/ImportantDatesFall2014.pdf> . Information on the student conduct code is at [http://www.umt.edu/vpsa/policies/student\\_conduct.php](http://www.umt.edu/vpsa/policies/student_conduct.php) . Students with disabilities can find relevant information at <http://www.umt.edu/dss/> .

# Freshwater Ecology Term Paper Assignment

## OBJECTIVES

The primary objectives of this assignment are (1) to give you the opportunity to explore a topic in freshwater ecology that is interesting to you, (2) to fine-tune your skills in evaluating, synthesizing, and communicating scientific information, and (3) to expand your awareness of the sources of primary information on freshwater ecology.

## STRUCTURE OF THE PAPER

This will be a review or synthesis paper. I expect you to use the primary literature to identify broader and/or particularly interesting themes related to your topic, then to build the body of the paper around these themes, citing the primary literature to support specific statements and interpretations. In general, there are three main elements to a review paper: the introduction, thematic sections, and the conclusion.

*Writing tips:* You should try to start each paragraph with a “topic sentence” that frames the contents of that paragraph, this helps improve the organization and clarity of the paper. Often the organization of paper is also improved if you start broad and then focus in on specific topics. Also, be sure to avoid plagiarism in all its many forms including re-use of your materials from another course. If someone else’s writing is so compelling that you need to use it word by word, put that passage in quotes and credit the original author.

*Title:* On a per word basis the title is the most important writing you will do in scientific writing. This is because everybody will read your title (and it is only a few words), but only a subset of people will go on to read the paper. You should choose a title that is reasonably short yet descriptive, and if possible the title should convey your major conclusions. For example, *Altered UV Light Regimes Affect Amphibian Survival* is much less informative than *Increased UV Light Reduces Egg Survival in Tiger Salamanders*. In these days of information overload a relatively short yet informative title is critical.

*Introduction:* Your main goals for the introduction should be to frame your topic in light of what is known on the subject, and also to “hook” your reader. One good approach for hooking the reader (of many) is to use the first paragraph as a well framed overview of the paper’s content and its relevance - think of it as an abstract for your introduction. This approach also forces you to organize your own thoughts and often improves the writing. After your overview paragraph (if you choose this approach) or at the beginning of the introduction, you need to frame your specific topic into context. Often the most widely read papers address topics that are widely applicable across several fields of study. As such, it pays to put your writing into the broadest possible context and then progressively narrow it down as the introduction progresses. Towards the end of the introduction you should describe the objectives or “point” of your specific investigation into the topic.

*Thematic sections:* The main body of the paper is built around thematic sections representing the aspects of your topic that you find most interesting. Selecting these aspects is subjective, but you need to have enough citations to build each section. The exception is where you believe that an important aspect of your topic has not been addressed in the primary literature. It is great to build a section around these research “gaps”, and this can be especially effective in promoting new research.

But keep in mind that there is A LOT of primary literature out there, so you want to be sure that someone has not done the research you see as lacking. By indentifying the knowledge gaps, you are then well set up to make recommendations for future research on the topic. Be sure each of your thematic sections has a short yet informative title.

*Conclusions:* Here you want to provide a concise review of the MOST interesting and important points that came out of your work reading and evaluating the primary literature. This is where you lay out the handful of main points that you absolutely-positively want the reader to take away. To show her/him why it is important to remember these points, it helps to have you discuss their implications. If your review was thorough you should be able to point to areas where information is lacking - be sure to include your recommendations for future research so that these information gaps can be closed.<sup>2</sup>

## SPECIFIC ASSIGNMENTS

\*\*\*All assignments will be double-spaced, in 12-point font, and 1 inch margins\*\*\*

### *Prospectus: 10% of assignment*

This is what you would write if you were trying to convince a journal editor to publish your paper. It will include (1) several sentences of introduction, (2) an outline of the thematic sections, and (3) your best guesses on the major contributions of the review (e.g., “I expect this review to provide valuable insight on X, Y, and Z.”). Cite the papers or books that you expect to contribute the most to the overall paper. The prospectus is a lot like the abstract of research paper, but with a few citations. This is also a way to help me to direct you to useful sources of information.

~300 words

3+ citations

### *Outline: 15% of assignment*

This will include (1) **complete drafts** of the introduction and conclusion, and (2) bulleted outlines of the thematic sections. Specifically, each section should have a title followed by bullet points corresponding to each paragraph of the section where you indicate the main point of that paragraph and the citations you will use to support that point. For example:

- Several studies conducted along Tennessee rivers suggest that that rainfall is important in controlling access to housecats during the summer (Lowe 2002, Sepulveda 2004). Specifically, high rainfall events were associated with spikes in reports of lost cats in suburbs surrounding Memphis.

I suggest aiming for 3-5 paragraphs per thematic section.

10+ citations at this point

### *Full Paper Rough Draft: 35% of assignment*

~3000-4000 words excluding citations

15+ citations

### *Full Paper: 40% of assignment*

~3000-4000 words excluding citations

15+ citations

3

## CITATION FORMAT

In text:

- First sort by **year**: Zebel 1985 before Anderson 1992
- Then by first author's last **name**: Pinto 2010 before Wilson 2010
- e.g., (Pickett and White 1985; Clobert et al. 2001; Ims and Hjermann 2001; Funk et al. 2005)

In bibliography (alphabetically by author):

- Journal article

Funk, W. C., A. E. Greene, P. S. Corn, and F. W. Allendorf. 2005. High dispersal in a frog species suggests that it is vulnerable to habitat fragmentation. *Biology Letters* **1**:13-16.

- Book

Petranka, J. W. 1998. *Salamanders of the United States and Canada*. Smithsonian Institution Press, Washington, DC.

- Edited book

Pickett, S., and P. White, editors. 1985. *The ecology of natural disturbance and patch dynamics*. Academic Press, Orlando.

- Book section

Ims, R. A., and D. O. Hjermann. 2001. Condition-dependent dispersal. Pages 203-216 *in* J. Clobert, E. Danchin, A. A. Dhondt, and J. D. Nichols, editors. *Dispersal*. Oxford University Press, Oxford, UK.