

ABE 591 – Restoration Engineering & Biogeochemistry

Instructor

Dr. Sara K. McMillan, P.E.
ABE 208B, mcmill@purdue.edu

T/Th 9:00-10:15AM; ABE 212

Course Description

In this class we will critically read current and seminal papers in riparian biogeochemistry focusing on restoration practices at the site and watershed scale. In addition to the science, you will also:

- Develop skills that allow you to not only understand a specific study, but place it in a broader context both in science and management,
- Critically evaluate rather than just absorb information,
- Prepare thoughtful, concise, clearly articulated written summaries of peer-reviewed literature.
- Lead lively, interactive discussions of a topic by asking open-ended questions of your fellow classmates.

Grading:

This is graded 3-hr course with the ultimate goal of us all learning together. Articles will be posted to our shared Google Drive. We will read 2 papers together each week from a list that I generate. You will also work with me to develop a list of papers relevant to your own research and a work plan (e.g., literature review for your thesis, research proposal). You will be expected to read 2 papers from this list as well each week. You will be responsible for presenting and leading discussion each week and preparing written summaries, which will be available to the entire class. Grades will be determined based on quality of written summaries, leadership and participation in discussion.

At times, things may come up and necessitate missing a class meeting. If this is the case, I expect you to email me prior to class, preferably as soon as you know. If it is your week to lead discussion, we will work together to modify the assignments.

Expectations

Each week all members of the class will read two articles/book chapters and be ready with questions and comments. For this class, we want to move beyond a simple retelling of the paper. You will evaluate the science including (but not limited to) the hypotheses, results, and conclusions. As you read the paper, ask yourself the following questions:

1. What are the purpose and/or hypotheses?
2. Read the results section (prior to the discussion). What are the main results from the paper? Are they reasonable? Did your interpretation of the results match the authors' conclusions presented in the discussion?
3. What assumptions were made during this research and how do they affect the conclusions?
4. Did the authors ask the correct question?
5. Are there aspects of the article that are confusing or unfamiliar? Highlight those, but spend time looking beyond the paper to other literature, textbooks or online.
6. Are there specific figures/tables that were especially helpful in illustrating the

- authors point or explaining a conceptual model?
7. What are the good points of the paper? What did you like about it? What was fun? What was surprising? These are aspects that you will want to incorporate into your own writing.

There are several websites that provide guidance on “how to read a scientific paper” that you can read for general advice. As this is a graduate class, I will assume that you understand the basic structure of a scientific article. Please note, you may need to look up unknown terms and read the paper more than once before writing the review!

Written summaries:

You will be assigned to complete a written summary of one article each week. The summary must contain the following elements and be ~500 words (no more than 1 page)

1. Full bibliographic reference + 2 sentence summary
2. Research question/purpose: What is the big message? What is the context?
3. Brief summary of the results: I do not need to know every detail here but are interested in the main results; include relative orders of magnitude/ranges of concentrations, flow rates, etc.
4. Key findings highlighted by the authors
5. Interpretation and inferences made by you (based on the internal questions you were asking yourself as you read). Place the paper in the context of the broader field (this will get easier as the semester progresses) and compare the paper to other studies. Is this a significant contribution to the field?
6. Are there major questions left unanswered?

Note: There are several different formats for journal articles (e.g. theoretical, experimental, review) and your review will differ slightly with each of these formats.

Student-led discussions:

You will use your written summary each week to lead our in-class discussions. These will be shared with the group to guide discussion so please bring typed copies for all of your classmates and instructors. At the end of each class, we may ask that the summaries be revised based on discussions and then posted to Blackboard/Google. I anticipate allowing 20-30 minutes for each paper to allow us to finish within the allotted time.