

Watershed Management and Restoration- FNR 6628

1 Overview

This course addresses science and policy of watershed management, focusing on 1) biophysical factors, 2) socioeconomic drivers, and 3) the legal/policy context.

- Offered in Fall semester, even years
- 100% online, optional synchronous meetings
- <http://elearning.ufl.edu/>

Course Prerequisites: Basic water resources course or Instructor Permission

Instructor: Matthew Cohen (Professor), mjc@ufl.edu, 328 Newins-Ziegler Hall, (352) 846-3490.

- Please use the Canvas message/Inbox feature for fastest response.
- Office hours: available by email or phone; office visits available MW 10am-12pm.

Textbook(s) and/or readings: There is no required text for the course. Online readings will be provided for each learning topic.

2 Learning Outcomes

Students in this course will engage the topic from multiple disciplines with a focus on watersheds in Florida, but with examples drawn from around the world. There are 4 learning outcomes that form the core objectives of this class:

- Students will understand the multiple overlapping stressors that create the need for watershed management.
- Students will also understand the myriad constraints that limit options for watershed management, and be able to articulate where and how these have successfully been addressed.
- Students will demonstrate competence in synthesizing information on a single watershed by delivering as their final output, a document that describes the physical, biological, socio-economic and regulatory setting, and establishes future needs and opportunities for successful watershed management.
- Students will broaden their basis for understanding watershed management by reviewing and providing constructive criticism on other students' watershed reports, and by engaging actively in open-ended discussion sections.

3 Course Logistics

This course is entirely web-based and students are expected to access lectures, readings, and supporting materials as they become available each week. Course modules are divided into week long themes.

Learning modules consisting of a lecture, readings, and discussions with optional live weekly conferences. Lectures and readings will be posted on Fridays, with initial discussion posts due Tuesday by 2 pm. Optional live discussions via Canvas Conferences tool will be Tuesdays from 3:30-4:30pm with recordings made available to students not present. Replies to discussions, which should incorporate content presented in the weekly Conference, are due Thursdays 11:59pm.

Project assignments are due for peer review on Thursday 11:59pm of the relevant week, and peer reviews should be completed by Sunday 11:59pm. **The Synthesis Paper has adjusted deadlines to allow more time to review and revise.**

This course leans heavily on the refereed literature and government report. Relevant documents will be assigned on each topic area. Additional readings (2-3 per week) will be provided for additional context once specific focal watersheds are selected.

Technology Requirements:

- A computer or mobile device with high-speed internet connection.
- A headset and/or microphone and speakers; a web cam is suggested.
- Latest version of web browser. Canvas supports only the two most recent versions of any given browser. [What browser am I using?](#)
- Voicethread: <http://ufl.voicethread.com> (more instructions will be provided)

3.1 Assignments & Deliverables

Participation

Class participation will be evaluated according to engagement in formal online discussions and the peer review process. A rubric for constructive feedback will be provided.

Peer review grades are given on an all-or-nothing basis per assignment, so be sure you review/comment on submissions by at least four of your peers for each project.

Projects/Writing Assignments

The projects are intended to focus on a single watershed. Choose this watershed early (coordinate with the instructor). It may range from small (ca. 300 km²) to large (ca. 50,000 km²). It is recommended that massive watersheds (e.g., the Columbia or Amazon) be avoided due to the complexity of synthesizing the information, the variety of issues that interact at that scale, and the scope legal and institutional participation. Small watersheds are fine, but the goal is to identify sites where interacting priorities create conflict and, ultimately, the need for water management. Consider this decision carefully as you will be engaged in the same place the entire semester.

E-Poster: Biophysical Template. The first assignment will describe the biophysical template (climate, geology, biology) relevant to management. What underlies the watershed? How is this important for understanding how to protect or manage that watershed? What characterizes the hydrology, and what are the kinds of ecosystems and organisms present in the watershed? What is the natural condition that would be there if not for human uses? Maps and pictures are essential.

- Posters will be created in the program of your choice (e.g., Powerpoint) and uploaded to Voicethread for sharing and submission. You will need to provide comments and feedback to FOUR other submissions for peer review participation grade.

Presentation: Stakeholder Engagement. The second project will focus on what people do within your watershed. What human activities are currently occurring and how significant are they? What are historical land uses and what are expected future trends? How does human use affect the natural system? What happens at the interface of human and natural systems in your watershed that create problems that management seeks to redress?

- Presentations will be created, converted to PDF, and uploaded to Voicethread where you will then narrate or use video commentary to present projects. Presentations should be no more than 15 minutes. You will need to provide comments and feedback to FOUR other submissions for peer review participation grade.

Short Paper: Legal Brief. The third project will focus on legal and institutional attributes of the basin. Key questions when considering watershed management are: What institutions have jurisdiction, and over what aspect of the system? How are overlapping jurisdictions handled? What laws affect watershed management (e.g., are there wetlands, endangered species, navigable waters, national parks)? To what extent has litigation affected management responses, and what regulatory programs exist to redress those problems? Your task with this assignment is to summarize the major elements of one law (e.g., Clean Water Act, Florida Water Resources Act, Swampbusters Act) and one institution (e.g., Water Management District, Army Corps of Engineers, Farm Bureau, public stakeholder group) directly relevant to your watershed.

- This short paper (~2 pages) will be submitted in Canvas and you will be randomly assigned to peer review four submissions.

Synthesis Paper. The final paper should be a summative assessment of watershed management in your basin. Development of this paper should parallel the three other assignments because it should include sections on biophysical factors, socioeconomic drivers and constraints, and legal drivers and constraints. The goal is to synthesize the management needs, actions taken to date to meet those needs, the adequacy of those actions, and a vision for the future of the basin.

- This synthesis paper (~15 pages) will be submitted in Canvas by the initial due date. You will be randomly assigned to peer review four submissions by the peer review deadline.
- After peer review, students will revise and resubmit the assignment for instructor grading.

3.2 Grades & Grading Scale

Discussion Participation:	20%
Peer reviews:	10% (2.5% per assignment)
Poster:	15%
Presentation:	15%
Short Paper:	15%
Synthesis Paper:	25%

Grading Scale (%)

A	90-100
B+	86-89
B	80-85
C+	76-79
C	70-75
D+	66-69
D	60-65
E	< 60

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

4 Course Content

Learning Modules

Week 1: Conceptual Framework and Motivation for Management

Week 2: The Watershed Concept: History and Implications

Week 3: The Biophysical Template: Water Availability

Week 4: The Biophysical Template: Landform

Week 5: The Biophysical Template: Biological Systems

Week 6: The Biophysical Template: What is Restoration?

Week 7: The Socioeconomic Drivers: Land and Water Use I

Week 8: The Socioeconomic Drivers: Land and Water Use II

Week 9: The Socioeconomic Drivers: Contamination

Week 10: The Socioeconomic Drivers: Ecosystem Services

Week 11: Uncertainty and Complexity in Watershed Management

Week 12: Legal/Institutional Framework: Overview

Week 13: Legal/Institutional Framework: Quality and Quantity

Week 14: Thanksgiving – no lecture or discussion.

Week 15: Legal/Institutional Framework: Species and Compacts.

Week 16: Course Overview: The Future of Watershed Management

Deliverables

Choose your watershed.

*Posters due Thursday**

*Presentations due Thursday**

*Legal Brief due Thursday**

*Draft Synthesis due Wednesday**

Final Synthesis due Thursday

** Peer review for posters, presentations, legal briefs and draft synthesis papers will be due the following Tuesday.*

Readings

The following is a partial list of reading material which may be required:

Watersheds: Processes, Assessment and Management. 2004. Paul DeBarry, John Wiley and Sons, New York, NY

Arthington, A.H., S.E. Bunn, N.L. Poff and R.J. Naiman. 2006. The challenge of providing environmental flow rules to sustain river ecosystems. *Ecological Applications* 16:1311-1318

Beck, W.L. and B.F. Beck. 1993. Hydrogeologic factors affecting new sinkhole development in Florida. *Groundwater* 30:918-931

Bednarek, A.T. 2001. Undamming Rivers: A Review of the Ecological Impacts of Dam Removal. *Environmental Management* 27:803-814

Berkes, F., J. Colding and C. Folke. 2000. Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications* 10:1251-1261

Christensen, N.L. and others. 1996. The Report of the Ecological Society of America on the Scientific Basis for Ecosystem Management. *Ecological Applications* 6:665-691

Cohn, J.P. 2001. Resurrecting the Dammed: A Look at the Colorado River Restoration. *Bioscience* 51:998-1003

Costanza, R. and others. 1997. The value of the world's ecosystem services and natural capital. *Nature* 387:253-261

Delfino, J.J., J.P. Heaney. 2004. Challenges to water resources sustainability in Florida. *Allocating Water: Economics and the Environment*, 9 pp

Hobbs, R.J. and others. 2006. Novel ecosystems: Theoretical and management aspects of the new ecological world order. *Global Ecology and Biogeography* 15:1-7

Millenium Ecosystem Assessment. 2005. World Resources Institute, Washington DC, USA

Obreza, T., and others. 2010. A Guide to EPA's Proposed Numeric Nutrient Water Quality Criteria for Florida. University of Florida EDIS Publication #SL316

Palmer, M.A. 2008. Reforming watershed restoration: Science in need of application, applications in need of science. *Estuaries and Coasts* DOI 10.1007/s12237-008-9129-5

Reiss, K.C., E. Hernandez and M.T. Brown. 2007. An evaluation of the effectiveness of mitigation banking in Florida: Ecological success and compliance with permit criteria. Final Report to the US EPA, Region IV 162 pp

Scheffer, M. and S.R. Carpenter. 2003. Catastrophic regime shifts in ecosystems: linking theory to observation. *Trends in Ecology and Evolution* 18:848-857

Vitousek, P.M. and others. 1997. Human domination of the Earth's Ecosystems. *Science* 277:494-500

5 Policies and Requirements

This syllabus represents current plans and objectives for this course. As the semester progresses, changes may need to be made to accommodate timing, logistics, or to enhance learning. Such changes, communicated clearly, are not unusual and should be expected.

5.1 Late Submissions & Make-up Requests

It is the responsibility of the student to access on-line lectures, readings, quizzes, and exams and to maintain satisfactory progress in the course.

Computer or other hardware failures, except failure of the UF e-Learning system, will not excuse students for missing assignments. Any late submissions due to technical issues **MUST** be accompanied by the ticket number received from the Helpdesk when the problem was reported to them. The ticket number will document the time and date of the problem. You **MUST** e-mail your instructor within 24 hours of the technical difficulty if you wish to request consideration.

For computer, software compatibility, or access problems call the HELP DESK phone number—352-392-HELP = 352- 392-4357 (option 2).

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

5.2 Semester Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning.

At approximately the mid-point of the semester, the School of Forest Resources & Conservation will request anonymous feedback on student satisfaction on various aspects of this course. These surveys will be sent out through Canvas and are not required, but encouraged. This is not the UF Faculty Evaluation!

At the end of the semester, students are expected to provide UF with feedback on the quality of instruction in this course using a standard set of university and college criteria (UF Faculty Evaluations). These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

5.3 Netiquette: Communication Courtesy

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. Failure to do so may result in loss of participation points and/or referral to the Dean of Students' Office. <http://teach.ufl.edu/docs/NetiquetteGuideforOnlineCourses.pdf>

5.4 Academic Honesty Policy

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."*

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct or appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated.

Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see:

<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

5.5 University Policy on Accommodating Students with Disabilities:

Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams.

Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

5.6 Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

6 Getting Help

For issues with technical difficulties for e-learning in Canvas, please post your question to the Technical Help Discussion in your course, or contact the UF Help Desk at:

- Learning-support@ufl.edu | (352) 392-HELP - select option 2 | <http://elearning.ufl.edu>
- Library Help Desk support <http://cms.uflib.ufl.edu/ask>
- SFRC Academic Hub <https://ufl.instructure.com/courses/303721>

6.1 Student Life, Wellness, and Counseling Help

- Counseling and Wellness resources <http://www.counseling.ufl.edu/cwc/>
- U Matter, We Care <http://www.umatter.ufl.edu/>
- Career Resource Center <http://www.crc.ufl.edu/>
- Other resources are available at <http://www.distance.ufl.edu/getting-help> for online students.

6.2 Student Complaint Process

The School of Forest Resources & Conservation cares about your experience and we will make every effort to address course concerns. We request that all of our online students complete a course satisfaction survey each semester, which is a time for you to voice your thoughts on how your course is being delivered.

If you have a more urgent concern, your first point of contact should be the SFRC Academic Coordinator or the Graduate/Undergraduate Coordinator for the program offering the course. You may also submit a complaint directly to UF administration:

- Students in online courses: <http://www.distance.ufl.edu/student-complaint-process>
- Students in face-to-face courses:
https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf