

WATERSHED MANAGEMENT AND RESTORATION
FNR 6628 (3 credits)
Fall 2014

GENERAL COURSE OVERVIEW

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

Student 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:

- 1) Students will understand the multiple overlapping stressors that create the need for watershed management.
- 2) 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.
- 3) 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.
- 4) 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.

PREREQUISITES

Basic water resources course **or** Instructor Permission

HOURS AND LOCATION

This is a web-based class. Course materials are delivered asynchronously via the University of Florida's E-learning site (<http://lss.at.ufl.edu>). Students are expected to download the relevant readings, lecture materials, and discussion topics at this website. Communication between the instructor and students will occur via email (within the E-learning system). Course modules are divided into week long themes.

INSTRUCTOR

Matthew Cohen (Associate Professor)
328 Newins-Ziegler Hall
Office Hours (or by appointment)

mjc@ufl.edu
(352) 846-3490
MW 10:00-12:00

REQUIRED READINGS

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.

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

PERFORMANCE EVALUATION

Grading Scale:

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

Additional information on grade policies at the University of Florida can be found at <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>.

Assignments

Paper #1 (Biophysical Template)	25%	100 pts
Paper #2 (Socioeconomic Drivers)	25%	100 pts
Paper #3 (Legal and Institutional Framework)	25%	100 pts
Class Participation (discussion boards, peer grading)	25%	100 pts

Notes:

- 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
- Synthesis papers (~15 pgs each) are due **Oct. 3rd (Paper 1), Nov. 7th (Paper 2), and Dec. 12th (Paper 3).**

SYNTHESIS PAPER

- The papers 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. Smaller 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.
- The first paper 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 extremely helpful for this paper.
- The second paper will focus on what people do within your watershed. What enterprises are currently occurring and how significant are they? What are historical land uses? How does the mosaic of 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?
- The third paper will focus on the legal and institutional attributes of the basin. What institutions have jurisdiction, and over what aspect of the system? How are jurisdictions that overlap 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?
- In addition to the instructor grades, rotating peer review will ensure that each student learns about the other watersheds, and learns to provide detailed constructive feedback.

WATERSHED MANAGEMENT AND RESTORATION COURSE SCHEDULE (FALL 2012)

Week of...	Lecture Materials	Reading Materials	Deliverables
Week 1 (8/25)	Conceptual Framework and Motivation for Management		
Week 2 (9/1)	The Watershed Concept: History and Implications		
Week 3 (9/8)	The Biophysical Template: Water Availability		
Week 4 (9/15)	The Biophysical Template: Landform		
Week 5 (9/22)	The Biophysical Template: Biological Systems		
Week 6 (9/29)	The Biophysical Template: What is Restoration?		Paper #1 (Oct. 3rd)
Week 7 (10/6)	The Socioeconomic Drivers: Land and Water Use I		
Week 8 (10/13)	The Socioeconomic Drivers: Land and Water Use II		
Week 9 (10/20)	The Socioeconomic Drivers: Contamination		
Week 11 (10/27)	The Socioeconomic Drivers: Ecosystem Services		
Week 12 (11/3)	Uncertainty and Complexity in Watershed Management		Paper #2 (Nov. 7th)
Week 13 (11/10)	Legal/Institutional Framework: Overview		
Week 14 (11/17)	Legal/Institutional Framework: Quality and Quantity		
Week 15 (11/24)	THANKSGIVING – NO CLASS		
Week 16 (12/1)	Legal/Institutional Framework: Species and Compacts		
Week 16 (12/8)	Course Overview: The Future of Watershed Management		Paper #3 (Dec. 12th)

ADDITIONAL INFORMATION

Academic Honesty:

The University of Florida requires all members of its community to be honest in all endeavors. Cheating, plagiarism, and other acts diminish the process of learning. When students enroll at UF they commit themselves to honesty and integrity. Your instructor fully expects you to adhere to the academic honesty guidelines you signed when you were admitted to UF. As a result of completing the registration form at the University of Florida, every student has signed the following statement: *“I understand the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.”* Furthermore, on work submitted for credit by UF students, 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 to be assumed all work will be completed independently unless the assignment is defined as group project, in writing by the professor. This policy will be vigorously upheld at all times in this course.

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.

Campus Helping Resources:

Students experiencing crisis or personal problems that interfere with their general wellbeing are encouraged to utilize the university’s counseling resources. Both the Counseling Center and Student Mental Health provide confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal or lacking clear career and academic goals, which interfere with their academic performance. The Counseling Center is located at 301 Peabody Hall (next to Criser Hall). Student Mental Health is located on the second floor of the Student Health Services in the Infirmary.

1. *University Counseling Center*, 301 Peabody Hall, 392-1575; personal and career counseling: www.counsel.ufl.edu
2. *Student Mental Health*, Student Health Care Center, 392-1171, personal counseling: www.hsc.ufl.edu/shcc/smhs.htm
3. *Sexual Assault Recovery Services (SARS)*, Student Health Care Center, 392-1161, sexual assault counseling; and
4. *Career Resource Center*, Reitz Union, 392-1601, career assistance and counseling.

Students with Disabilities Act:

The Dean of Students Office coordinates the needed accommodations of students with disabilities. This includes the registration of disabilities, academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services, and mediating faulty-student disability related issues. *Dean of Students Office*, 202 Peabody Hall, 392-7066, www.dso.ufl.edu.