

9-2014

ENSC 540.01: Watershed Conservation Ecology

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ENSC 540 Watershed CPR (Conservation, Preservation, Restoration) Fall 2014 **subject to change**
Vicki Watson, 101 NS, 243-5153, Vicki.watson@umontana.edu office hrs: **10am--noon, Wed usually or by appointment**

GOALS: To increase student understanding of watershed science, policy, actions & organizing with a view to increasing citizen participation in the stewardship of watersheds & training watershed professionals.

Sept. Introduction – 7 C's of Watershed CPR, Watershed CPR plans; grading/projects
1st day Assignment: see Clark Fork Slide show (www.umt.edu/clarkforkslideshow)

Watershed Science – Connections, Condition, Changes, Capacity

Reading: *Postel & Richter 2003. Rivers for Life. Island Press. Ch 1 & 2.*

References: From most basic: Murdoch, T. **Streamkeepers Guide** Ch 1 & 2 (assessments ch 3-7)

To increasingly advanced – Entering the Watershed 93 (esp. exec sum & ch 3)

Naiman, R. 92 Watershed Management (esp chs. 1, 3, 6)

Rosgen, D. 96 Applied Stream Morphology (esp. ch 3 & 4) & Field Guide

Williams, J. 97 Watershed Restoration (esp: chs 1, 5-8, 25)

Naiman, R. 99 River Ecology & Mgt (esp: chs 1, 2-4, 5, (11,12,16), 18, 24, 26

Online: Google: Federal Stream Corridor Restoration Handbook (NEH-653) and read (chs 1-3)

EPA's online watershed courses at www.epa.gov/watertrain

Clark Fork papers: www.umt.edu/clarkforksymposium

Watershed Clinic web site: www.umt.edu/watershedclinic

National River Restoration Science Synthesis (NRRSS) <http://nrrss.nbii.gov>

"Synthesizing U.S. River Restoration Efforts," E.S. Bernhardt, et al, Science, 29 April 2005:

www.sciencemag.org/cgi/content/full/308/5722/636

Oct – **Watershed CPR – Actions** – (Field trips also serve to illustrate this – see field trip list)

References – see many web sites on web list (emailed)

Federal Stream Corridor Restoration Handbook (planning & design 4-8, implement 9, actions A)

Will email: Aikens article (Blackfoot case study) from Watershed Restoration

Chris Frissell's articles in Watershed Restoration & Naiman 99 (also ch 26)

In Watson lab: file of pamphlets & booklets on BMP's, restoration & management

Nov 1st half – **Watershed Law/Policy**—US & MT water laws/regs, water rights, nondegradation, TMDL law, definition of impairment & sufficient credible evidence of use support

References: US law: Postel & Richter, Ch 3. Ch 22 of Naiman 99 (River Law)

River Network's Understanding the Clean Water Act – www.cleanwateract.org

ELI, 2008. State Wetland Protection: Status, Trends & Model Approaches

www.eli.org/freshwater-ocean/state-wetland-programs

Brown, et al. 1993. Laws controlling nonpoint sources. Water Res Bull. 29(1):1-13.

MT Law: Mt DEQ web site: www.deq.mt.gov/wqinfo see Laws & Rules

Guide to Stream Permits <http://dnrc.mt.gov/permits/streampermitting/default.asp>

More guides -- Guide to MT WQ Regulations (2012), MT Water Rights (2014), Index of env permits (2012),

SEE <http://leg.mt.gov/css/Publications/Environmental/default.asp>

TMDLs: <http://deq.mt.gov/wqinfo/TMDL>

Nutrient work group -- <http://deq.mt.gov/wqinfo/NutrientWorkGroup/default.mcp>

Nov, 2nd half – **Watershed Organizing/Funding – Communities, Choices, Commitment**

References: Chs. 21 & 25 of Naiman 99; Conflict resolution <http://www.cnrep.org/resources.html>

Guide to Effective Outreach in your Watershed <http://cfpub.epa.gov/watertrain/pdf/modules/NEWgettinginstep.pdf>

FUNDING <http://water.montana.edu/funding/> watercenter.montana.edu <http://mtwatersheds.org/Resources/FundingDirectory.html>

Dec – **Student Presentations** **Final meeting – Dec 10 (Wed) 10 - noon**

Guest Speakers/field trip leaders include: watershed coordinators, land trust managers, planners, fish biologists, mining reclamation engineers, restoration scientists, floodplain managers

Field trips: sign up lists in class or later at M2 Rankin; some listed on www.umt.edu/conservationcalendar

References – Above references in **bold** are at library, online &/or available from me. See also Citations on ref list (emailed)

Many educational pamphlets/booklets are free or cheap (see examples in 102 Natural Science).

Grading –1 or 2 papers worth 200 pts [proposal(s) 10 pts, outline(s)/biblio(s) 40pts, paper(s) 100 pts, presentation(s) 50 pts]
attend meeting of a conservation district, watershed group, or water quality district & summarize for class: 50 pts
participation in class and go on at least 2 field trips: 100 pts. Total possible points = 350 pts

1-2 papers & presentation worth 200 pts (10 for proposal, 40 for progress report, 100 for paper(s); 50 for presentation on one paper)
 100 pts --**participation in class/field trips**; 50 pts--**report on relevant public meeting**; **350 pts total**.

1) An academic paper (sort of a mini-**thesis**) that attempts to be an original creative work. It may involve carrying out an original study designed by you that collects data to answer a question or test a hypothesis. It may instead involve analyzing data collected by others, once again to answer a question or test a hypothesis. These data may come from government data files or appear in the open literature. Often you will be pulling together data from several sources and using it to answer a new question. The paper could also be a review paper on some topic, but it is often a challenge to be really creative and original with this approach.

Your goal is to advance our understanding of a subject (try to teach me & other academics something).

The paper should be publishable. You should identify a target publication and write the paper in its style.

It is wise to identify a model paper that accomplishes a similar goal to yours and ask if a paper with a similar goal/format/sophistication, etc is appropriate. Make use of refereed literature as well as other sources.

2) A more applied paper aimed at an off campus target audience (sort of a mini **professional paper**). You will act as a consultant to some off campus target audience. Identify a need and fill it. You might: investigate a subject and develop a position paper or action plan for them (based on scientific info and group's values); critique an EIS or other government decision; conduct a survey or other study that gathers/analyzes data; develop a curriculum or exercise for a teacher. Often this paper will address an issue that may be of local interest only; or address very site-specific questions (ie analyzing local data to address how a site should be managed, restored, etc). The level of sophistication depends on the target audience (but the science must be scientifically defensible).

The two papers can be on the same or different subjects. Either can be produced first. Often the timing needs of the applied paper may dictate this (there may be a deadline for comments, for example). THE TWO PAPERS MAY BE COMBINED INTO A SINGLE PAPER IF IT CAN SATISFY THE GOALS OF BOTH.

Length of paper(s): About 20 single spaced pages total (+/- 5) of original, well written, tightly crafted, no-wasted-words prose. These pages may be allocated between the two papers as you see fit. (Two 10 pp papers or one 15 pp and one 5 pp). Don't worry about the exact number of pages. It should be as long as it needs to be to address the question, explore the relevant literature, & treat the subject at the agreed upon level of sophistication. Don't put in unnecessary words or explanation to fill up space and don't cut it shorter than you feel necessary to fit into some length. The page guidance given above is to help you establish the scope of the paper. And also to remind you that not much that is longer than 10-20 pages ever gets read or published. If you wish to emphasize one paper over the other, you may negotiate for reapportioning points.

Suggested Milestones (negotiable). Can email me all assignments but the paper –that I need in hard copy & e-copy. Note: I will need at least a week to provide feedback after receiving something in writing.

Week of course: if writing 2 papers, observe these milestones:

3rd (Sept 11) —Proposal for first paper 6th (Oct 2) — Progress Report 8th (Oct 17) —First paper due
 10th (Oct 30) —Proposal for 2nd paper 12th (Nov 13) — Progress Report 14th (Nov 25) —2nd paper due
1 paper: 3rd (sept 11)–Proposal; 8th (Oct16)–progress report; 12th (Nov 13)–draft paper; 14th (Nov 25)–final paper
 14-15 th week —Presentation on one of the two papers (you can negotiate for an earlier time)

Proposal: GIVE TITLE. Explain need for the project/paper: explain questions/hypotheses to be addressed.

Who is the target audience or target publication?

How will you address this question/hypothesis? What study design & methods?

What do you plan to produce and how can it be used?

What relevant resources have you located so far? What problems do you anticipate?

What is your timeline for milestones? (be specific to your project—don't give me my timelines)

Optional – but good practice: Discuss your qualifications for doing this work. Give a budget.

Progress Report: Explain any changes from original proposal;**** provide detailed outline of paper****.

And a bibliography of the sources collected to date (use the CBE citation style; guide emailed on request).

Paper: Single space (double space between paragraphs). Double-sided preferred. Provide 2 copies: one to mark up & return; one for me to keep. Also an e-copy. **DO NOT EMBED** tables, figures, in text. Put them all at the end. If they are large, put them in a separate file. Keep formatting simple and easy to edit. NUMBER PAGES. If you write a single paper, a double spaced draft is due at least 2 weeks before final is submitted. Revise based on my comments.

540 students must attend at least one water-related public meeting & report back to class. Some meeting possibilities are:

Montana Watershed Coordination Council meetings (mtwatersheds.org).

Any watershed group's meeting (see <http://www.mtwatersheds.org/updates/calendar/> or subscribe to MWCC's newsletter

<http://www.mtwatersheds.org/updates/subscribe-to-watershed-news/>

Milltown planning group (meets monthly)

Msl Conservation district meets – 2nd Mon; 7-9pm; USDA Service Center, 3550 Mullan Road (near Mullan Rd & Reserve) Agenda, call 829-3395.

Msl Water Quality Advisory Council – 2nd Tuesdays, 7-9pm; City-County Health Dept. (301 W. Alder, Missoula; 2nd floor) Agenda, 523-4890

Clark Fork Basin Task Force – meeting dates announced in class

EVST 540 Fall 2014 Field trips;

See the Con Cal for lectures, meetings, workshops, etc

Such as: Oct 9-10 -- AWRA conference in Kalispell.

For trips with UM vans (*), Students in ENSC 105, 360 & 540 may register for a space in a UM van on a sign up list at Rankin Hall room M-2. Other UM students can ride in the UM van if there is space. Non-students must provide their own transportation.

Aug 27 (Wed, walk) & 29 (Fri, bike)--**Clark Fork River sampling in Msl**—meet at 102 Natural Science at 2:10pm
Aug 30-Sept 1 (Sat-Mon), – **sampling on upper & lower river.** arrange to ride with VW on any of these days (as space permits).
* Sept 13, Sat – **Clark Fork Superfund tour.** meet at 8am at north end of Van Buren br. (East Gate parking lot). return 6pm.
Sept 19-20 – Missoula Hazardous Waste Collection Days (volunteers needed, great experience & counts for field trip hours)
* Sept 27 Sat – Public Land Day (volunteers needed; ecological service work may count as field trip; check with Watson)
* Oct 4, Sat, **Blackfoot Restoration Tour** – meet at 8am at north end of Van Buren Br. (East Gate parking lot). return 6pm.

Others field trips that will be organized (in Oct or Nov).

****Tour Missoula Wastewater Treatment & Ekocompost** (composts Missoula's sewage sludge; started by an EVST student!)
.....and land application site with poplar plantation – also started by EVST students

Note: Some field trips of ngos, government agencies or other departments may be of interest. You'll need to arrange your own transportation. For more info (time, location, contacts) on field trips, see -- www.umt.edu/conservationcalendar
See field trips offered by Clark Fork Coalition, Audubon, Sierra, MPG Ranch, etc . Also trainings by WEN. Sept 7, 11, 13, 17
Ecological Restoration field trips (courtesy of Cara Nelson) are also recommended. Info on these will be emailed.

Project ideas -- Evaluate new state water plan (or one subbasin plan). Comments are due by Oct 24 to DNRC.

Official public copy will come out Sept 15, but Watson has an advance copy she can email to you.

Evaluate one of the many recent TMDLs produced by DEQ. <http://deq.mt.gov/wqinfo/tmdl/default.mcp>

Assist a watershed group with developing a presentation for the Clark Fork Symposium (which will be next spring 2015).

Evaluate new poplar plantation land application project at Missoula wastewater plant.

Evaluate remediation needs at abandoned Frenchtown mill in light of EPA superfund assessment there.

Work on Water Footprint Analysis with Mike Sweet of Montana Climate Office

Evaluate DEQ's Load Reduction Estimation Guide (released July 21, 2014)--

http://montananps319grants.pbworks.com/w/file/attach/83284165/LoadReductionEstGuide_072114.pdf

Evaluate EPA's attempt to clarify the definition of "waters of the US" for regulatory purposes and the mischaracterizations by the farm lobby. Clarify what the new rule does and doesn't do, and why it's generating such opposition. Comments due in October.

Assist Msl Water Quality District with surveying urban river users & developing an education campaign to reduce their impacts on urban river corridor.

Design a study of Rye Creek (in the Bitterroot) which will continue to undergo restoration efforts. Meeting on this Sept 29, SC 452

Clark Fork Coalition: angler survey and compare to FWP fish population surveys – do they suggest the same highs & lows?

Maybe of interest to Clark Fork Task Force

- Review studies on materials used for conserving irrigation water, specifically the useful life and water-savings related to different kinds of pipe and ditch-liners.

-diversion inventory and flow study of the mainstem Clark Fork River during late August. Collect flows and temperature at various points from the headwaters to Missoula. Also, inventory and photograph all irrigation diversions and pumps. Take flow measurements above and below each diversion. (more of a thesis project)

New resource of interest

EPA 2012 report on the Economic Benefits of Protecting Healthy Watersheds. EPA 841-N-12-004

http://water.epa.gov/polwaste/nps/watershed/upload/economic_benefits_factsheet3.pdf