

1-2014

ENSC 550.01: Pollution Ecology

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Subject to Change

Goal: Students will increase their understanding of: sources, fate & effects on organisms & ecosystems of pollutants & related disturbances; methods of quantifying effects, assessing/reducing risks, estimating ecosystem assimilation capacity, setting standards; restoring polluted ecosystems; relevant laws and policies. **Prereq:** ecology course.

REFS -- Free e-book: Gilbert. **A Small Dose of Toxicology** www.toxipedia.org/display/dose/A+Small+Dose+of+Toxicology

Connell, D. W, et al . 1999. **Introduction to Ecotoxicology**. Wiley-Blackwell. 180pp.

Library e-book <http://site.ebrary.com/lib/umontana/docDetail.action?docID=10345920>

www.wiley.com/WileyCDA/WileyTitle/productCd-0632038527.html ebook \$65; paper \$100

Week of: Topic

Readings:

Jan 28,30: Course purpose and mechanics, What is pollution ecology? G1-3, Connell Ch 1, handouts

Boudou, What is ecotoxicology www.ncbi.nlm.nih.gov/pmc/articles/PMC1470317/

Cairns, Ethics of Ecotoxicology www.int-res.com/esepbooks/EB2Pt1.pdf SEE p19-27

Feb 4,6: What are our goals for pollution ? Ecosystem health & indicators Connell Ch 2

Suter, GW. 1993...ecosystem health concepts & indices. *Env Toxicology & Chem.* 12:1533-1539.

<http://onlinelibrary.wiley.com/doi/10.1002/etc.5620120903/abstract>

Lackey, R. T. 2001 Values, policy & ecosystem health. *BioScience* 51(6): 437-443

<http://www.jstor.org/stable/10.1641/0006-3568%282001%29051%5B0437:VPAEH%5D2.0.CO;2>

Feb 11: Environmental Fate of pollutants, models Connell Ch 3 (or C&M2, R&P19, Rombke4) PNAS on fracking

Feb 13 Continued

1st paper proposal due, Feb 13

Feb 18: Responses of organisms & systems to pollution

Connell Ch 4 & 5

Feb 19: Webinar Endocrine Disruption of the Neuro-immune Interface at 11 am Mtn Time

www.healthandenvironment.org/partnership_calls/13590

Feb 20: Reproductive & Developmental Toxins

G-15;

Dr. Tyrone Hayes-- found that atrazine feminized male frogs at concentrations 30x below drinking water standards.

Can see Hayes in *From Silent Spring to Silent Night* www.youtube.com/watch?v=z4lijvIjpRw Judy Hoy's papers

Feb 25: Climate & pollution & population

article from climate handout

Sources, Fate and Effects of various pollutants:

Feb 27 Organic matter, nutrients, eutrophication

C&M Ch 5&6 (Feb 28-ELS media)

Mar 4 EPA nutrient criteria & Clark Fork VNR

1st paper outline due, Mar 4

March 6: Metals & acid mine drainage

G 8-11; C&M Ch 10; Moore article

Mar 11,13,18: Other pollutants (student choice & student led): see other chapters in G or C&M
sediments, temperature, asbestos, endocrine disruptors, radiation, biopollution, etc

Mar 20,25,27 continue with other pollutants

1st paper due, March 25

Mar 26-29 NW Science meeting in Msl (abs deadline Feb 9)

(Mar 21 ELS)

Mar 30-31-- Turning the Tide Conference, Msl.

proposal for 2nd paper due, March 27

Apr 1-4 SPRING BREAK

(April 11-12 – ELS)

Apr 8,10,15,17: Quantifying/Predicting Effects/Risks

outline & biblio of 2nd paper due, Apr 15

Bioassays, bioindicators, biomonitors, microcosms, models, field vs lab studies Connell Ch 6 & 7 (& 5)

Site & Risk assessments, uncertainty

G 25; Connell Ch 8 & 9

Setting standards to protect human health & env. Obrien article, Tickner article

April 23-24 (W,R): Nitrate conference in Helena <http://www.nitrateinmontanawater.org/>

EARTH DAY April 22

Apr 29, May 1: Relevant Laws and Policy

CWA, SDWA, CAA, TSCA (Connell Ch 9), FIFRA, RCRA, CERCLA – common scientific approaches

May 6,8 Solutions: Pollution Prevention, Ecosystem Restoration

2nd PAPER DUE

May 15, Thurs, 8-10am ('final time' assigned to us) Student Presentations & peer reviews due

Required Work and allocation of points in EVST 550 2014

Students write 2 papers, one academic (100pts) & one applied (100pts), & present at least one orally to class (80pts).
Students provide a peer review of another student's paper (40pts), Participation in class & special events (40pts)
Students will select a paper for class to read & lead a discussion on it. (40pts) Total 400 pts

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 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 except 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:

Feb 13—Proposal for first paper; Mar 4— Progress Report; Mar 25 --First paper due

Mar 27— Proposal for 2nd paper; April 15 — Progress Report; May 6 -- 2nd paper due

1 paper only: Feb 13 –Proposal; Mar 13 –progress report; Apr 15 --draft paper, May 6 -- final paper
last week of class & final—Presentation on one of the two papers (you can negotiate for an earlier time)

Proposal: 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.

2014 Events of interest to Pollution Ecology (all are at www.umt.edu/conservationcalendar)

Copper Cliff Mineral Exploration Info Meeting (another Blackfoot mine?). WHEN: Jan 29 (Wed) at 7pm; WHERE: Blackfoot Church behind Potomac Elementary school. More info: jennifer@blackfootchallenge.org or 360-6445.

Feb 12 (Wed) --Clark Fork Basin Task Force meets to work on state water plan. WHEN: Feb 12 from 9am to 4pm; WHERE: DNRC Forestry office on Spurgin Road, Msla. Open to public. **Also March 12, April 16 and May 21**
The state water plan will finally recognize the need to plan for climate change, and reserve sufficient water to maintain water quality, habitat, and ecosystem health

Note Lecture Series on Water, Tuesdays 7 to 8:30 in UC Theater, esp March 4 (law), 11 (groundwater), 18 (native fish), 18 (water management)

March 4-7 -- [Annual meeting of MT Ch of American Fisheries Society](#) at Chico Hot Springs. Theme: Reflecting on the Past and Anticipating the Future. [Details here.](#)

March 7-8 -- Turning the Tide Conference, St Pat's Hospital. Theme: How biodiversity loss affects human health. For more info: contact [Beth Schenk](#)

March 20-21 [Montana Environmental Education Association annual conference.](#) MT Tech-Butte. Theme: Bringing Science to Life: Restoring our Watershed.

March 26-29 Future of Forests & Forest Management conference, Univ. of Montana, jointly sponsored by the Northwest Scientific Association, UM Plum Creek Lecture Series, Montana Wetland Council, and Northwest Lichenologists. Info at : www.northwestscience.org/

April 8-10 -- Montana Storm Water Management Conference, Bozeman.

More info at mtwatercourse@montana.edu or 406-994-6671.

April 19 Earth Service Day – includes annual Clark Fork River cleanup

April 23-4 --[Nitrate in Montana Hydrologic Systems Conference.](#) Helena

May 19-23 -- [Large Wildland Fires: Social, Political and Ecological Effects.](#) Missoula. www.largefireconference.org

Can Gabrielle give a summary of

Endocrine Disruption and Immune Dysfunction. Wednesday, January 8, 2014 at 10:00 am Pacific / 1:00 pm Eastern.

There is an MP3 recording and background info at

http://www.healthandenvironment.org/partnership_calls/13389