

Limits of the Earth: Issues in Human Ecology

V36.0333

Limits of the Earth: Issues in Human Ecology

Prerequisite: V36.0100

NOTE: THE SYLLABUS BELOW WAS USED IN FALL 2006, WHEN THE COURSE WAS LAST TAUGHT AS V49.0875 IN A FORMER MINOR PRIOR TO THE START OF THE CURRENT ENVIRONMENTAL STUDIES PROGRAM.

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To Students who are considering taking Limits of the Earth with Professor Volk:

This will be an inquiry-based SEMINAR course in which substantial portions of the course will require you to actually conduct research by locating technical papers, reading them, synthesizing your own facts and viewpoints, and writing short technical papers to be peer-reviewed by the other “researchers” in the class. You will also give a number of presentations.

The course does not assume specific math abilities, but you should be willing to work with numbers. You also need to be enthused about a course in which you will forge ahead on your own during self-directed investigations that complement (but are not exactly the same as) what the other people in the class are doing. In this manner, for the semester we will form a community of thinkers.

Topics in the course will run something like this (BUT SEE BELOW): energy, agriculture, population (including material inputs and outputs), water, and sustainability. Again, much of the course will be project-based, with presentations and short papers that will be peer-reviewed.

Major sections

ENERGY (BUT—SEE BELOW): Fossil fuels, nuclear, conservation, renewables, present and future.

AGRICULTURE: Agriculture, animal husbandry and grazing, biotech related to agriculture and animals, deforestation for crops and wood, agro-forestry, forestry, soils.

WATER: Supply and demand, rain, irrigation, dams, various uses and conflicts, aquifers, water treatment, water pollution and contamination, parasites, fisheries (wild and aquaculture), anoxic regions.

POPULATION: World population, countries, age distributions, past and future of population, resource use and disparities, globalization of systems, urbanization, habitation, transportation, urban land use. Wastes: all wastes, from computers to dispersed toxins into air and soil, recycling.

INDICATORS: Indicators for a sustainable world, ecological footprint, ecological economics, biodiversity, preservation of nature, types of U.S. Federal lands, preserves around the world, multi-use preserves.

SYLLABUS

(NOTE: FROM FALL, 2006. THIS SHOULD ONLY BE READ AS AN APPROXIMATE SYLLABUS FOR FALL 2009. Specifically, I might take out the energy unit and add something else, because now the ES program has an entire course on energy. I'm still thinking about this. But the past syllabus below will at least give you an idea of the structure of the course.)

1. Wednesday September 6: Introduction to course. Assignment for Monday, Sept. 11 on the SCI (see notes below)
2. Monday September 11: Energy lecture 1. SCI assignment due.
3. Wednesday September 13: Energy lecture 2.

4. Monday September 18: Energy lecture 3.
5. Wednesday September 20: PRESENTATIONS on Energy
6. Monday September 25: PRESENTATIONS on Energy. Energy papers due.
7. Wednesday September 27: General discussion on energy. Reviews of energy papers due.
- 8. Monday October 2: Re-written energy papers due. Start Agriculture.**
9. Wednesday October 4: Continuation of Agriculture.
10. Monday October 9: Continuation of Agriculture.
11. Wednesday October 11: PRESENTATIONS on Agriculture
12. Monday October 16: PRESENTATIONS on Agriculture
13. Wednesday October 18: PRESENTATIONS and general discussion on Agriculture. Agriculture papers due.
- 14. Monday October 23: Reviews of agriculture papers due. Start Water.**
15. Wednesday October 25: Re-written agriculture papers due. Continuation of Water
16. Monday October 30: PRESENTATIONS on Water
17. Wednesday November 1: PRESENTATIONS on Water
18. Monday November 6: PRESENTATIONS and general discussion on Water. Water papers due.
- 19. Wednesday November 8: Reviews of water paper due. Start Population.**
20. Monday November 13: Re-written population papers due. Continuation of Population.
21. Wednesday November 15: PRESENTATIONS on Population
22. Monday November 20: PRESENTATIONS on Population

23. Wednesday November 22: PRESENTATIONS and general discussion on Population. Population papers due.

24. Monday November 27: Reviews of population paper due. Start Indicators.

25. Wednesday November 29: Re-written population papers due. Continuation of Indicators

26. Monday December 4: PRESENTATIONS on Indicators etc.

27. Wednesday December 6: PRESENTATIONS on Indicators etc.

28. Monday December 11: PRESENTATIONS on Indicators etc. Indicators papers due (no reviews on this one.)

29. Wednesday December 13: Wrap up

Library/computer work for Monday, September 11: Learn to use the incomparably important Science Citation Index (SCI). We will talk about this in class. You have access to this in the following way: From the Bobst home page, go into “articles via databases.” From that into “databases by title” and then into “S.” From that into “Science Citation Index.” (There are other ways to get there, see if you can find them.) Once in the SCI, click on “general search.” Find information on the following article: Hoffert, M.I, et al. 2002. Advanced technology paths to global climate stability: Energy for a greenhouse planet, *Science*, 298, 981-987. (By the way, this shows you the form for a citation, when there are more than 3 authors.). Print out the abstract and other relevant information. Figure out how to make a list of all the articles that cited this article since its publication. How many articles have cited this paper since its publication? Click on and look at the abstracts of a few articles from in the list of those that have cited the paper since its publication in 2002. (We will talk about the “web” of science on Monday.)

The peer-review process:

During this course you will hand-in a number of two-page papers to go into what is called peer-review (the procedure used by scientists to publish in technical journals). **For submission**, write up your work as a short, technical paper, with the format used in peer-review scientific articles. This means title, your name and affiliation, abstract, introduction, several named sections,

conclusions, and references. Include figures and tables, which must be labeled as Figure 1, Table 1, etc., and referred to in the text. Usually you will only have room for 1-2 figures but sometimes it's possible to put in more. For submission, bring in 3 copies. Two will be handed out to “reviewers” in the class. One goes to me.

During each peer-review process, on the day you submit your paper, you will receive two papers written by others. Read them and write short reviews (see the guidelines below). Write up your reviews and make 2 copies of each. One will go to each author. One will go to me. Put your name on only the copy that goes to me. Your review to the author is anonymous, as in science. Expected time this will take: about 2 hours (40 minutes to read each paper, 20 minutes to write each review.).

For submission of the revised paper, after you have read the reviews, write up a letter to the journal editor (that's Volk, and see the guidelines below), describing how you re-wrote your paper to take the reviews into account. Re-write the paper and hand it and the letter to the editor in on the date requested. Expected time this will take: 3 hours.

More Guidelines for papers, reviews, and re-writes.

Every topic will have due dates for papers, reviews, and re-writes. The paper is the formal submission of the work you presented to the class. The reviews are anonymous reviews that you will write after studying 2 papers from other students. The re-write is the final submission of your paper, which includes the re-written paper with changes based on the reviews, plus a “letter to the editor.” These are described in more detail below.

The paper (2 pages in length, 3 copies, stapled) covers the essence of the most important findings of your presentation. Here's the format: Title, then your name and affiliation. Abstract (probably 3-4 sentences.) Introduction (probably 3-5 sentences). Then a series of sections with titles as you see fit. Finally, a section called Conclusions. You probably will only have space for 1-2 figures maximum and/or 1-2 tables (though you will probably present more in your talk, this is always the case in science). Figures and tables should have captions, and be labeled Figure 1, Table 1, etc., so you can refer the them in your text. If the figures and numbers in tables are taken from references, be sure to put the citation in a caption. At the end of the paper comes the list of References (see below for instructions). In general, your presentation and paper must include one original calculation(s) or graph (make clear what is your contribution in the paper). Bring in 3 copies. Two will be handed out to “reviewers” in the class. One goes to me.

A review is written to provide technical evaluation of a paper submitted to a journal, so the editor of a journal can decide if there is agreement that enough new “truth” has been found to warrant publication. You will have been given two papers to review. Read them and write reviews of at least 200 words for each, on separate sheets. Are the papers clear? Were the conclusions justified? Were the figures clear? Do you have technical or theoretical suggestions? Are the references in the correct format? As you read, if you wish, you can mark up the paper and I will hand that back to the author, along with your review. Write up your reviews and make 2 copies of each. One will go to each author. One will go to me. Put your name on only the copy that goes to me. Your review to the author is anonymous, as in science. Be tough but respectful, as if you are serving as the gatekeeper for the publication of objective new truth or a review of a subject.

The re-write (paperclip all items together, no staples at all, so I can put the papers into a stack for the copy machine) includes (1) your re-write that incorporates improvements based on the reviews you received, and (2) a “letter to the editor,” explaining what major changes you made based on the reviews, as well as explaining anything in the reviews you did not go along with, because the reviewers remarks were mistaken or not relevant (say why). You can agree with points and say how you made additional calculations, modified figures, searched for additional information, and so forth.

Using the re-written, final papers, I will make copies for everyone in the class, if the form of a booklet of results about our work on the topic.

GUIDELINES FOR REFERENCES

Publications cited in the text should be listed alphabetically at the end of the paper under the first author's last name. In the text itself, citations to the publications should be by author(s) and year. Where there are two authors, both should be named; when a work with more than two authors is mentioned, only the first author's name plus 'et al.' need be given, e.g., Helliwell (2002) or (Helliwell, 2002) or Fejer et al. (2003) or (Helliwell, 2002; Fejer et al., 2003). For example: “On the average, carbon dioxide in the atmosphere rises by about 1.5 ppm per year (Helliwell, 2002).” Another way to write this: “Helliwell (2002) showed that in most years, carbon dioxide in the atmosphere rises by 2-3 ppm per year.”

For websites, cite them in the text using the first important word in the title of the website plus the word “website” and then the access year. For example: “Data from the experimental forest just described showed that the experimental

trees had an increased root mass of 50% (Hadley website, 2004)”. In the list, put the websites into the alphabetical order with all the other references, using the first important word you took to refer to the site.

In general, your paper should include a reference to at least one technical paper from a scientific journal.

Here are examples of how to format citations in the “References” section of your paper:

For a journal article:

Bindschadler, R. A., and C. R. Bentley, On thin ice, *Scientific American*, 287, 98-106, 2003. (Note: 287 is the volume number, 98-106 are the pages. Journal name, volume number and pages are italicized, but not the authors, the title of the article, or the year. This would be cited as (Bindschadler and Bentley, 2003) in the text.)

For a book:

Schlesinger, W. H., *Biogeochemistry: An Analysis of Global Change*, Academic Press, San Diego, California, 1991. (Note: Book title is italicized. This would be cited as (Schlesinger, 1991) in the text.)

For a web site (note that this would be alphabeticized under “H” in the reference list and cited as (Hadley website, 2004) in the text):

The Hadley Centre for Climate Research and Prediction,
<http://www.env.duke.edu/forest/FACTS.htm>, accessed October 23, 2004.

BOBST LIBRARY

Earth / Environmental Science Journals

The following is an alphabetical list of earth and environmental science journals that were available a few years ago through the Coles Science Reference Center in NYU's Bobst Library (9th floor). Included here are environmental, earth, planetary, atmospheric, soil and oceanic sciences, ecology and water pollution journals. So much changes so fast on the NYU Bobst web site that I have not been able to find such a list now. But I assume most journals below are still carried. There may be relevant journals not on this list. Many are now available electronically through Bobst.

Current issues of science journals are arranged by Library of Congress call number in the Coles Science Reference Center on the 9th Floor of Bobst Library. Back issues are shelved by call number in the stacks on the 9th and 10th floors, or are arranged alphabetically by title in the Microform Room on Level A.

QH540.A52 AMBIO: A Journal of the Human Environment
Q1 .A5 American Journal of Science
QE351.A5 American Mineralogist
Q1 .A54 American Scientist
QE701.A55 Annales de Paleontologie
Q1 .A56 Annals of Science
Q1 .A6 Applied Scientific Research
RA565.A1.A78 Archives of Environmental Contamination and Toxicology
RC963.A36 Archives of Environmental Health
TD881.A822 Atmospheric Environment
QH83.B55 Biochemical Systematics and Ecology
Q125 .B77 British Journal for the History of Science: BJHS
Q11.U84.A22 Bulletin / National Science Foundation
RA565.A1B8 Bulletin of Environmental Contamination and Toxicology
QE1.B65 Bulletin of the Natural History Museum: Geology Series
SK601.A1.C36 Camping Magazine
QE1.C17 Canadian Journal of Earth Sciences
Q1 .C4 Centaurus
TD172.C5 Chemosphere
QD1.A262 Comptes Rendus Del'Academie des Sciences: Serie II, a :
Earth & Planetary Sciences
QH75.A1.C665 Conservation Biology
QH765.N7.C61 Conservationist
RA565.A1.C7 Critical Reviews in Environmental Science and Technology
Q11 .B7 Daedalus
Q1 .D57 Discover
QE1.E12 Earth and Planetary Science Letters
QE11.E27 Earth Sciences History: J. of the History of the Earth Sciences Society
QE1.E14 Earth-Science Reviews
QH540 .E273 Ecological Applications
QH540.E28 Ecological Monographs
QH540.E295 Ecologist
QH540.E3 Ecology
QE1.E2 Economic Geology and the Bulletin of the Society of Economic Geologists

QH545.A1.E27n Ecotoxicology and Environmental Safety
 TK2896.A5 Energy Conversion and Management
 TA170.E5 Environmental Engineering
 RA565.A1.E13 Environmental Health Perspectives: EHP
 RA565.A1.E13Suppl. Environmental Health Perspectives Supplement: EHP
 QP82.2P6.E554 Environmental Pollution
 TD172.E55 Environmental Research
 TD180.E5 Environmental Science and Technology: ES & T
 Q11.A52 EOS
 S590.J6 European Journal of Soil Science
 QE701.G45x Geobios: Paleontologie, Stratigraphie, Paleoecologie
 QE1.G2 Geological Society of America Bulletin
 QE1.G528 Geology
 QE500.G4 Geophysics
 QE1.G56 Geotimes: News and Trends in the Geosciences
 QH344.G59 Global Biogeochemical Cycles
 Q125 .H49 History of Science
 QB1.I3 Icarus
 Q300 .I432 IEEE Transactions on Systems, Man, and Cybernetics. Part A
 S960.I55 International Wildlife
 QC851.A27323n Izvestia. Atmospheric and Oceanic Physics
 QH84.J68 Journal of Biogeography
 QH540.J63 Journal of Ecology
 S946.E54 Journal of Environmental Education
 TD1.J665 Journal of Environmental Science and Health. Part A, Environmental Science
 and Engineering & Toxic and Hazardous Substance Control
 QH545.A1.J68 Journal of Environmental Science and Health. Part B, Pesticides, Food
 Contaminants and Agricultural Wastes
 RA565.A1.J68n Journal of Environmental Science and Health. Part C, Environmental
 Carcinogenesis and Ecotoxicology Reviews
 TD1.J67 Journal of Environmental Systems
 QE1.J8 Journal of Geology
 QC811.J6 Journal of Geophysical Research: JGR
 QE40.J6 Journal of Geoscience Education
 QE701.J6 Journal of Paleontology
 Q3 .Z43a Journal of Physical Sciences
 TD883.A48 Journal of the Air and Waste Management Association
 QE1.G4 Journal of the Geological Society
 QE841.J67 Journal of Vertebrate Paleontology
 QH98.L75 Limnology and Oceanography
 QE501.M37 Marine Geophysical Researches
 QB740.M473 Meteoritics and Planetary Science
 QH1.N25 Natural History
 Q1 .N3 Nature: International Weekly Journal of Science
 Q3 .N4 Naturwissenschaften
 Q1 .N5 New Scientist
 QH76.5.N7.C61 New York State Conservationist
 QE701.S725 News Bulletin - Society of Vertebrate Paleontology
 QE78.3.N6t Northeastern Geology and Environmental Studies
 Q1 .N6 Northwest Science

QH327.A1.S7n Origins of Life and Evolution of the Biosphere
 QE701.P28 Palaeontology
 QE1.P25x Palaeogeography, Palaeoclimatology, Palaeoecology
 QE701.P17 Paleobiology
 QE39.5.P25.P35 Paleoceanography
 QE701.P5443 Paleontological Journal (Paleontologicheskii Zhurnal)
 SB469.P3 Parks and Recreation
 QE501.P53 Physics and Chemistry of the Earth
 QE500.P54 Physics of the Earth and Planetary Interiors
 QE1.G76 Proceedings of the Geologists' Association
 Q11 .N26 Proceedings of the National Academy of Sciences of the USA
 QE696.I67 Quaternary Perspectives
 QE696.Q65 Quaternary Research: An Interdisciplinary Journal
 QE696. Q355 Quaternary Science Reviews
 Q2 .R12n Recherche, La
 TD794.5.R4585 Resource Recycling
 Q180 .A1 R448 Research Policy
 QE993.R4 Review of Palaeobotany and Palynology
 QC801.R46 Reviews of Geophysics
 Q1 .S32 Science
 Q127 .U6 S312 Science & Government Report
 Q1 .S4 Science Education
 Q175 .4 .S343 Science in Context
 Q1 .S6 Science News
 TD172.S43 Science of the Total Environment
 Q1 .S7 Science Progress
 Q175 .N39N Science, Technology, and Human Values
 Q1 .S75 Sciences
 QE581.S4 Sedimentology
 S590.S577 Soil Biology and Biochemistry
 S590.S6 Soil Science
 S590.S64.A13 Soil Science Society of America Journal
 TJ810.S6 Solar Energy
 TJ810.S65n Solar Energy Materials and Solar Cells
 Q85.S5 South African Journal of Science
 Q125 .S85 Studies in History and Philosophy of Science
 QC801.T42 Tellus. Series A: Dynamic Meteorology and Oceanography
 QH366.A1T772 Trends in Ecology and Evolution
 TD172.W36 Water, Air and Soil Pollution
 TD511.S4 Water Environment Research
 QC851.W4 Weather