

GEOG 7.14: Thirsty Planet

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X-Hours: Expected use as detailed in schedule and for makeup classes
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Course Description

Humans have radically altered the distribution of water on Earth. We've built cities in deserts supplied with water from hundreds of miles away, extracted enough groundwater to alter the Earth's gravitational field, and dammed sixty-five percent of global freshwater flows. This course will: 1) Introduce students to the physical geography of water, 2) Survey human interactions with water through case studies from around the world, and 3) Explore how climate change and population growth will affect future water availability and quality. Exercises, lectures, and assignments will emphasize synthesizing and distilling complex scientific ideas with clarity. Assignments will include reading reactions, a discussion presentation, an opinion editorial that addresses a facet of water management, and a research paper focused on a pressing water-related scientific or policy issue. Drafts of the opinion editorial and research paper will receive peer and professor feedback in a workshop setting.

Classes are designed to be interactive and will encourage participation through student presentations, reading reactions, and discussion. Assignments include a 5-minute presentation, a 1-page opinion editorial, and a 5-page review article suitable for submission to a scientific journal. This course counts as a Natural and Physical Science without Lab (SCI) Distributive Course Requirement.

Learning Objectives

By the end of this course, students will be able to:

1. Describe the hydrologic cycle, primary human uses of water, and key water resources issues in regions throughout the world.
2. Understand the likely implications of population growth and climate change on water availability and quality.
3. Interpret and synthesize scientific literature.
4. Develop a convincing opinion composition within the scientific context.
5. Construct and refine a scientific manuscript.
6. Give and receive effective feedback through multiple peer review process

In addition to the objectives outlined above, students should also expect to engage the outcomes common to all First-Year Seminars (<http://writing-speech.dartmouth.edu/curriculum/writing-courses/first-year-seminars/first-year-seminar-course-outcomes>).

Prerequisites

WRIT 5

Books

Pinker, S., 2014: *The Sense of Style: The Thinking Person's Guide to Writing in the 21st Century*. Penguin.

Reisner, M., 1993: *Cadillac desert: The American West and its disappearing water*. Penguin.

Course Resources on Reserve or Available Online

Barnett, T. P., J. C. Adam, and D. P. Lettenmaier, 2005: Potential impacts of a warming climate on water availability in snow-dominated regions. *Nature*, **438**, 303–309, doi:10.1038/nature04141.

Chetham, D., 2004: *Before the Deluge: The Vanishing World of the Yangtze's Three Gorges*. Macmillan.

Dalin, C., M. Konar, N. Hanasaki, A. Rinaldo, and I. Rodriguez-Iturbe, 2012: Evolution of the global virtual water trade network. *Proceedings of the National Academy of Sciences*, **109**, 5989–5994, doi:10.1073/pnas.1203176109.

Duarte, N., 2008: *Slide: ology: The art and science of creating great presentations*. O'Reilly Media Toronto, ON.

Koutsoyiannis, D., N. Zarkadoulas, A. Angelakis, and G. Tchobanoglous, 2008: Urban Water Management in Ancient Greece: Legacies and Lessons. *J. Water Resour. Plann. Manage.*, **134**, 45–54, doi:10.1061/(ASCE)0733-9496(2008)134:1(45).

Maupin, M. A., J. F. Kenny, S. S. Hutson, J. K. Lovelace, N. L. Barber, and K. S. Linsey, 2014: *Estimated use of water in the United States in 2010*. Reston, VA, <http://pubs.er.usgs.gov/publication/cir1405>.

Oki, T., and S. Kanae, 2006: Global Hydrological Cycles and World Water Resources. *Science*, **313**, 1068–1072, doi:10.1126/science.1128845.

Shah, T., 2010: *Taming the anarchy: Groundwater governance in South Asia*. Routledge.

Trenberth, K., and G. Asrar, 2014: Challenges and Opportunities in Water Cycle Research: WCRP Contributions. *The Earth's Hydrological Cycle*, L. Bengtsson et al., Eds., Vol. 46 of *Space Sciences Series of ISSI*, Springer Netherlands, 515–532.

Vörösmarty, C. J., and Coauthors, 2010: Global threats to human water security and river biodiversity. *Nature*, **467**, 555–561, doi:10.1038/nature09440.

Grading

Over the course of the term, each student is expected to complete reading reactions, give a presentation, write an opinion editorial, write a review manuscript, and participate in the peer review process. Reading reactions consist of a brief summary of the reading, as well as a mix of questions, key insights, and critiques submitted via Canvas online text entry in advance of class. Reactions will be graded on a 1-3 scale. The discussion presentation is an 8-minute presentation introducing the day's reading. Discussion presentation slides must be uploaded to Canvas as one document in pptx or pdf format by 5pm of the presentation day. The opinion editorial is a 1-page persuasive composition that addresses a facet of water management, similar in style to a newspaper op-ed. Students submit a first draft, receive both peer and professor feedback in a workshop setting, and then revise for resubmission. The opinion editorial assignment will be graded out of 20 points, broken into 5 points for the first draft and 15 points for the final draft. The review manuscript is a 5-page technical composition focused on a pressing water-related scientific or policy issue, similar in style to a review journal article. Students will submit an outline, first draft, and final draft. The outline will receive professor feedback, and the first draft will receive both peer and professor feedback in a workshop setting. The review manuscript is graded out of 35 points, broken into 5 points for the outline, 5 points for the first draft, and 25 points for the final draft. All drafts of the opinion editorial and review manuscript must be uploaded to Canvas as one document in docx or pdf format. Assignments received after the date and time due are considered late. The final draft of the review manuscript will not be accepted

late. All other assignments will be penalized 10% per 24-hour period, and may not receive peer and professor review. While lectures will be recorded for students in offset time zones or with exceptional circumstances, I strongly encourage synchronous participation in lectures.

<u>Assignment</u>	<u>Weighting</u>
Reading Reactions	15%
Discussion Presentation	15%
Opinion Editorial	20%
Review Manuscript	35%
Peer Review	10%
Class Participation	5%

The expected median grade of this class is a B+ (commensurate with the median across Dartmouth courses). All assignments will be scored numerically and mapped to letter grades according to the table below, with + and - modifiers given for the top and bottom of each 10-point range, respectively (e.g., A- <93, B+ >=87, B- <83).

<u>Letter Grade</u>	<u>Numerical Range</u>
A	90% - 100%
B	80% - <90%
C	70% - <80%
D	60% - <70%
E	<60%

Student Needs

Students requesting disability-related accommodations and services for this course are encouraged to contact me as early in the term as possible. In order for accommodations to be authorized, students are required to consult with Student Accessibility Services (SAS; student.accessibility.services@dartmouth.edu; SAS website; 603-646-9900) and to email me their SAS accommodation form. We will then work together with SAS if accommodations need to be modified based on the online learning environment. If students have questions about whether they are eligible for accommodations, they should contact the SAS office. All inquiries and discussions will remain confidential.

Academic Honesty

All students must comply with Dartmouth's Academic Honor Principle, described here: <https://students.dartmouth.edu/judicial-affairs/policy/academic-honor-principle>, with additional guidance here: <https://writing-speech.dartmouth.edu/learning/materials/sources-and-citations-dartmouth>. If you have questions or concerns, please contact me or the Undergraduate Deans Office.

Mental Health

The academic environment at Dartmouth is challenging, terms are intensive, and classes are not the only demanding part of your life. There are resources available on campus to support your wellness, including your Undergraduate Dean (<http://www.dartmouth.edu/~upperde/>), Counseling and Human Development (<http://www.dartmouth.edu/~chd/>), and the Student Wellness Center (<http://www.dartmouth.edu/~healthed/>).

Religious Observances

If you have a religious observance that conflicts with your participation in this course, please meet with me before the end of the second week of the term to discuss appropriate accommodations.

Textbook Costs and Financial Difficulty

If you encounter financial challenges related to this class, please let me know.

Consent to Record

1. Consent to recording of course and group office hours. By enrolling in this course,
 - a. I affirm my understanding that the instructor may record this course and any associated group meetings involving students and the instructor, including but not limited to scheduled and ad hoc office hours and other consultations, within any digital platform used to offer remote instruction for this course;
 - b. I further affirm that the instructor owns the copyright to their instructional materials, of which these recordings constitute a part, and my distribution of any of these recordings in whole or in part without prior written consent of the instructor may be subject to discipline by Dartmouth up to and including expulsion;
2. Requirement of consent to one-on-one recordings. By enrolling in this course, I hereby affirm that I will not under any circumstance make a recording in any medium of any one-on-one meeting with the instructor without obtaining the prior written consent of all those participating, and I understand that if I violate this prohibition, I will be subject to discipline by Dartmouth up to and including expulsion, as well as any other civil or criminal penalties under applicable law.

Schedule

Date	Topic	Assignments and Readings
Class 1	TEDIndia: The Ancient Ingenuity of Water Harvesting	
Class 2	Introduction to Presentations and Reading Reactions	Duarte 2008, Chapters 1, 2, and 3
Class 3	Presentations Guest Lecture: Educational Technologies	Duarte 2008, Chapters 11 and 12
Class 4	Introduction to Writing Manuscript Cover Letters	
Class 5	Reading Reaction Peer Review, The Global Water Cycle	Oki and Kanae 2006*
Class 6	Origins of Water Management	Koutsoyiannis et al. 2008*
Class 7	Water Use in the United States	Maupin et al. 2014*; Manuscript Cover Letter to Editor Due
Class 8	Virtual Water Trade	Dalin et al. 2012*
Class 9	Cadillac Desert: The American West and its Disappearing Water	Reisner 1993
Class 10	Cadillac Desert: The American West and its Disappearing Water	Reisner 1993

Class 11	Cadillac Desert: The American West and its Disappearing Water	Reisner 1993
Class 12	Opinion Editorial Guest Lecture: Dartmouth Office of Public Affairs	
Class 13	Writing Reverse Engineering and Avoiding Academese	Pinker 2014, Chapters 1 and 2
Class 14	Curses and Webs	Pinker 2014, Chapters 3 and 4
Class 15	Workshop: Evaluating Previous Writing with Pinker	Prepare writing sample for critique; Opinion Editorial First Draft Due
Class 16	Opinion Editorial Peer Review Workshop	Opinion Editorial Peer Review Workshop
Class 17	Introduction to Review Articles and Citation Management	Barnett et al. 2005
Class 18	Taming the Anarchy: Groundwater Governance in South Asia	Shah 2010
Class 19	Taming the Anarchy: Groundwater Governance in South Asia	Shah 2010; Opinion Editorial Final Draft Due
Class 20	Taming the Anarchy: Groundwater Governance in South Asia	Shah 2010
Class 21	Before the Deluge: The Vanishing World of the Yangtze's Three Gorges	Chetham 2004
Class 22	Before the Deluge: The Vanishing World of the Yangtze's Three Gorges	Chetham 2004; Manuscript First Draft Due
Class 23	Manuscript Peer Review Workshop	
Class 24	Manuscript Peer Review Workshop	
Class 25	Before the Deluge: The Vanishing World of the Yangtze's Three Gorges	Chetham 2004
Class 26	Remote Sensing of the Water Cycle	Ceccato and Dinku 2010*; Manuscript Second Draft Due
Class 27	Threats to Water Resources	Vörösmarty et al. 2010*
Class 28	Grand Challenges in Water Cycle Research	Trenberth and Asrar 2014*
Class 29	Cadillac Desert: Mulholland's Dream	
Class 30	Cadillac Desert: Mulholland's Dream	Manuscript Final Draft Due on Final Exam Date