

SSCI 265Lg, The Water Planet

Syllabus

Units: 4

Term: Fall 2024

Lecture: Tuesdays and Thursdays, 11:00 a.m. – 12:20 p.m.

Labs: Tuesdays, 2:00 – 3:50 p.m. and Wednesdays, 10:00 – 11:50 a.m.

Location: KAP 158 (Lectures), VPDLL101 (Tuesday Labs) and WPH B36 (Wednesday Labs)

Instructor: John Wilson, PhD

Office: AHF B55F

Office Hours: Mondays, 3:00 p.m. – 3:50 p.m. and Fridays, 3:40 – 4:30 p.m.

Contact Information: jpwilson@usc.edu

Lab Instructor: **TBD**

Office: AHF B57A

Office Hours: **TBD**

Contact Info: **TBD**

Library Help: Andy Rutkowski

Office: LIPA B40-A

Office Hours: By appointment via email

Contact Info: arutkows@usc.edu

IT Help: Myron Medalla

Office: AHF B56B

Office Hours: By appointment via email

Contact Info: spatial_support@usc.edu, 213-740-4415

Course Description

The primary topic covered in this course—water—plays an important role in our everyday lives and aside from quenching our thirst, it is used for cooking, cleaning, and watering plants, including food crops. Water is also used in energy production and various industries and as a means of transportation using regional and global water networks. In brief, water is the epitome of life on Earth.

This course therefore entails a comprehensive investigation into the multi-faceted dimensions of water on Earth. Topics range from micro-scale concerns (e.g. water properties, form, and behavior) to regional-scale issues (e.g. water resource distribution, groundwater mining, and watershed dynamics) to global-scale processes such as the hydrologic cycle including atmospheric and oceanic circulation, climate change, sustainability, and resilience. Although there are many perspectives from which to approach the topic of water (e.g. economic, legal, political, institutional, and engineering perspectives), we will situate our investigation within a scientific framework with a particular focus on methodologies and the unique insights that science is able to reveal.

In addition, the human (social science) dimensions of water supply and demand, and the implications for past and future societies will be studied. Techniques and challenges for provision and consumption of clean water and for treating wastewater will also be studied. These aspects will be studied through a series of case studies that simultaneously explore the water footprint of modern consumer societies and how various cultures and countries have been shaped by some of the world's largest and most iconic rivers as well as some other globally significant freshwater sources.

This course satisfies the requirements for General Education Category E (Physical Sciences). Courses in this category are intended to bring to bear the perspectives of several scientific disciplines on a theme, illustrating the relevant scientific principles, their technological applications, and the societal significance and consequences. The GE designation further requires that the course content give students the opportunity to think critically through focused inquiry into a particular area of knowledge. Scientific methodologies, analytical techniques, and digital scholarship will be stressed. The overall goal of the GE Program is to provide necessary context for an informed citizenry, and therefore the courses that are part of this program emphasize a broad sweep of knowledge and require active intellectual engagement with scientific principles. In practice, this means that students will be introduced to many concepts and terminologies that may be new and unfamiliar. The focus, nevertheless, will be on applying basic principles to specific problems rather than simple description, memorization, and recapitulation.

Learning Objectives

Upon successful completion of this course, a student will be able to:

- Identify the special properties of water and the fundamental role water plays in the functioning of life on Earth;

- Describe the ways that human behavior affects water quality and the rates and patterns of the water cycle around the world;
- Identify the integration of economic, legal, and cultural factors with physical characteristics of water that together explain current water-related issues affecting sustainability and other facets of human society;
- Use spatial data and maps to perform simple analyses of water-related processes; and
- Employ basic cartographic principles and integrate spatial datasets and other digital resources to communicate the results of water-related research.

Prerequisite(s): None

Co-Requisite(s): None

Recommended Preparation: None

Class Conduct

Harassment, sexual misconduct, interpersonal violence, and stalking are not tolerated by the university. All faculty and most staff are considered Responsible Employees by the university and must forward all information they receive about these types of situations to the Title IX Coordinator. The Title IX Coordinator is responsible for assisting students with supportive accommodations, including academic accommodations, as well as investigating these incidents if the reporting student wants an investigation. The Title IX office is also responsible for coordinating supportive measures for transgender and nonbinary students such as faculty notifications, and more. If you need supportive accommodations you may contact the Title IX Coordinator directly (titleix@usc.edu or 213-821-8298) without sharing any personal information with me. If you would like to speak with a confidential counselor, Relationship and Sexual Violence Prevention Services (RSVP) provides 24/7 confidential support for students (213-740-9355 (WELL); press 0 after hours).

COVID-19 policy—Students are expected to comply with all aspects of USC’s COVID-19 policy including, but not limited to, vaccinations and indoor mask mandates. Failure to do so may result in removal from the class and referral to Student Judicial Affairs and Community Standards. Students are recommended to keep safe physical distancing, whenever possible, to prevent any possible transmission. Please contact your instructor if you have any safety concerns.

Diversity and Inclusion—It is my intent that students from all diverse backgrounds and perspectives be well served by this course. The diversity that students bring to this class will be viewed as a resource, strength and benefit. The learning needs of students will be addressed both in and out of class. It is my intent to present materials and activities that are respectful to everyone, and you as a student are also expected to respect others regardless of their race, ethnicity, gender identity and expressions, cultural beliefs, religion, sexual orientation, national origin, age, abilities, ideas and perspectives, or socioeconomic status. Your suggestions are encouraged and appreciated. Feel free to let me know ways to improve the effectiveness of the course for you personally or for other students.

Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is prohibited. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which has been distributed to students or in any way has been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. (Living our Unifying Values: The USC Student Handbook, page 13).

Technological Proficiency and Hardware/Software Required

ArcGIS is provided online via the SSI Server; hence, you do not need to install it on your own computer. Instead, every student must have the following technology requirements:

- A computer with a fast Internet connection;
- A functional webcam and microphone for use whenever a presentation or meeting is scheduled; and
- An up-to-date web browser to access the SSI Server.

If a student does not have access to any of these, please speak with the instructor at the start of the semester. Also, see the USC ITS Student Toolkit here:

<https://keep Teaching.usc.edu/students/student-toolkit/>

Required Readings and Supplementary Materials

Please acquire the text listed below. It is available at the USC Bookstore. All other supplementary readings listed in the syllabus are available online through USC Libraries or under the tab marked “Readings” on the course Blackboard.

The required textbook for this course is:

- Holden, J. (Ed.) 2020. *Water Resources: An Integrated Approach* (2nd edition). Routledge.

Supplementary readings for this course are:

- Arce-Nazario, J. 2018. The science and politics of water quality. In *Handbook of Critical Physical Geography* (eds. R. Lave, C. Biermann, S.N. Lane), 465-483. Palgrave.
- Clifton, C.F., Day, K.T., Luce, C.H., Grant, G.E., Safeeq, M., Halofsky, J.E., Staab, B.P. 2018. Effects of climate change on hydrology and water resources in the Blue Mountains, Oregon, USA. *Climate Services*, 10, 9-19.
- Cronon, W. 1992. A place for stories: Nature, history, and narrative. *Journal of American History*, 78, 1347-1376.
- Griffin, R.C. 2012. The origins and ideals of water resource economics in the United States. *Annual Review of Resource Economics*, 4(1), 353-377.
- Hoekstra, A.Y. 2012. The hidden water resource use behind meat and dairy. *Animal Frontiers*, 2(2), 3-8.
- Hussey, K., Pittcock, J. 2012. The energy-water nexus: Managing the links between energy and water for a sustainable future. *Ecology & Society*, 17(1), 3.
- McGregor, D., Whitaker, S., Sritharan, M. 2020. Indigenous environmental justice and sustainability. *Current Opinion in Environmental Sustainability*, 43, 35-40.
- McKenna, M.L., McAtee, S., Bryan, P.E., Jeun, R., Ward, T., Kraus, J., Bottazzi, M.E., Hotez, P.J., Flowers, C.C., Mejia, R. 2017. Human intestinal parasite burden and poor sanitation in rural Alabama. *American Journal of Tropical Medicine & Hygiene*, 97(5), 1623-1628.
- Milly, P.C.D., Betancourt, J., Falkenmark, M., Hirsch, R.M., Kundzewicz, Z.W., Lettenmaier, D.P., Stouffer, R.J. 2008. Stationarity is dead: Whither water management? *Science*, 319, 573-574.
- Sheil, D. 2018. Forests, atmospheric water and an uncertain future: The new biology of the global water cycle. *Forest Ecosystems*, 5, 19.
- Tickner, D, Parker, H., Moncrieff, C.R., Oates, N.E.M., Ludi, E., Acreman, M. 2017. Managing rivers for multiple benefits: A coherent approach to research, policy and planning. *Frontiers in Environmental Sciences*, 5, 4.
- Vasco, D.W., Farr, T.G., Jeanne, P., Doughty, C., Nico, P. 2019. Satellite-based monitoring of groundwater depletion in California's Central Valley. *Scientific Reports*, 9, 16053.
- Walsh, C.J., Fletcher, T.D., Burns, M.J. 2012. Urban stormwater runoff: A new class of environmental flow problem. *PLoS ONE*, 7(9), e45814.

Description and Valuation of Assessments

This course includes a diversity of assessments that allow students to show their mastery of the material in a variety of ways. The different types of assessments are described below and their point value to final grades are listed in the following Grading Breakdown section.

Labs

There are 12 lab sessions and work packets spread across the semester. These lab experiences are designed to introduce the tools of scientific inquiry and give students practical experience in implementing these tools within the framework of the scientific method. Lab assignments are linked to the lectures and class discussions, but do not duplicate the lecture experience.

Students must register for one lab session in addition to registering for the class itself. Six of the lab meetings are spent on short, standalone projects, and six are spent on the Story Map assignment (see below).

Absences from lab meetings must be requested by sending an email to the lab instructor *prior to the lab meeting you need to miss*. Excused absences from labs will be granted only for valid reasons; please notify us of the reason for your absence in your email.

The mapping software and geospatial data required for the lab assignments will be accessed using students' own machines. A login for ArcGIS Online will be provided by the Spatial Sciences Institute.

The six standalone projects require a written report, each with attached screenshots and map data. The report should be submitted on Brightspace D2L prior to the next lab session. The deadline will vary depending on which of the two lab sessions students are assigned to.

The story map project (see below for additional details) follows a different cadence, based on five weekly progress reports. The lab sessions during this time will consist of demonstrations and applications of the different skills and techniques covered during the first five labs. The final project presentations will be delivered in-person in the final lab session.

Online Discussions

There will be three online discussions conducted on Brightspace D2L. The purpose of the online discussions is to build skills for close reading and critical thinking. In each discussion, every student will make one short post responding to a designated prompt and then make at least two posts responding to other students. Your participation in the online discussions will be individually graded using the Gradebook feature in Brightspace D2L.

Article Summaries

Throughout the semester, students will produce three summaries of articles from peer-reviewed academic journals on one or more water-related issues that respond to all three of the prompts distributed with each of these assignments.

Story Maps

The final lab project is an ArcGIS StoryMap. A StoryMap is an online platform that allows for the integration of digital maps with a variety of content such as audio clips, graphs, photographs, screenshots, text, and video clips. The underlying data often depict the relationships that connect natural and human systems. These may be things like cities, land cover, wetland areas, and census data, and may also include video feeds and live data such as temperature, precipitation, and streamflow. They often present scientific data and analysis, but they are mainly designed for the general public and do not require their users to have special knowledge or skills in geographic information science, software, or services. In this course, you will take the final six laboratory sessions to create a StoryMap that integrates data on natural and social systems around the presence (or absence), quality, and movement of water on or near the Earth's surface.

Final Exam and Other Policies

The final exam is closed book. This exam will cover content learned in course readings and during lecture and laboratory sessions.

No make-up opportunities will be offered for the final exam or laboratory assignments, so mark the appropriate dates on your calendars! If you have a legitimate conflict, per the College policy on Final Exam Scheduling, speak with the instructor as soon as possible. Also, note that there is **no credit for late assignments.**

Grading Breakdown

The table below shows the breakdown of the assessments and their contribution to the final grade. The emphasis is on regularly completing a number of short assignments as well as solid performance on the final examination and StoryMap project.

Assessment	Number	Points Each	Total Points (% of Grade)
Online Discussions	3	4	12
Laboratory Reports	6	5	30
Article Summaries	3	5	15
Story Map Progress Reports	5	1	5
Final Story Map	1	15	15
Final Exam (Closed book)	1	23	23
Totals	19	--	100

Assignment Submission Policy

Unless otherwise noted, assignments must be submitted via Blackboard by the due dates specified in the Course Schedule below and on the assignment instructions.

Strict penalties apply for late assignments as follows:

- All assignments will be penalized 2 points up to seven days late. No points will be given for submissions more than seven days late.
- Additionally, no written work will be accepted for grading after 5 p.m. PT on the last day of classes.

Schedule

Modules

1	Fundamental Properties
2	People & Water
3	Water & Health
4	Water Stocks & Flows
5	Future Management
6	Future Prospects

	Date	Topics	Readings	Deliverables/Due Dates and Times
	Week 1 8/27	Introduction to Course		<i>No Labs</i>
	8/29	Water Fundamentals, Part I	Holden, Ch. 1, pp. 1-6, 12-19 Cronon (1992)	
	Week 2 9/3	Water Fundamentals, Part II	Holden, Ch. 1, pp. 7-12	
	9/5	Virtual Water and the Water Footprint	Holden, Ch. 12 Hoekstra (2012)	
	Week 3 9/10	Global Water Cycle	Holden, Ch. 2, pp. 23-28 Sheil (2018)	<i>Lab Report 1 due 11:59 p.m. the night before your next lab meeting.</i>
	9/12	Climate Variability	Holden, Ch. 2, pp. 29-44 Milly et al. (2008)	
	Week 4 9/17	Screening of "Before the Flood"		<i>Article Summary 1 due Friday, 9/20, 11:59 p.m.</i> <i>Lab Report 2 Due 11:59 p.m. the night before your next lab meeting.</i>
	9/19	Climate Change	Holden, Ch. 2, pp. 44-52 Clifton et al. 2018	
	Week 5 9/24	Physical Water Risk	Holden, Ch. 7, pp. 270-277	
	9/26	Characteristics of Surface Waters	Holden, Ch. 4, pp. 99-116	<i>Online Discussion 1 – Post due Wednesday 9/25, Responses to classmates by Friday 9/27 11:59 p.m.</i>

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				<i>Lab Report 3 Due 11:59 p.m. the night before your next lab meeting.</i>	
Week 6	10/1	Water Use and Water Quality Deterioration	Holden, Ch. 4, pp. 116-142 Walsh et al. 2012	<i>Lab Report 4 Due 11:59 p.m. the night before your next lab meeting.</i>	
	10/3	Human Modification and Management of Aquatic Ecosystems	Holden, Ch. 6		
	Week 7	10/8	Chemical Contaminants	Holden, Ch. 7, pp. 261-270	<i>Lab Report 5 Due 11:59 p.m. the night before your next lab meeting.</i>
		10/10	<i>Fall Recess</i>		
	Week 8	10/15	Infectious Diseases	Holden, Ch. 7, pp. 241-260 McKenna et al. (2017)	Article Summary 2 due Friday, 10/18, 11:59 p.m. <i>Lab Report 6 Due 11:59 p.m. the night before your next lab meeting.</i>
	10/17	Hydrologic Pathways	Holden, Ch. 3, pp. 61-70		
Week 9	10/22	River Flow	Holden, Ch. 3, pp. 70-84	<i>Lab SM Progress Report 1 due 11:59 p.m. the night before your next lab meeting.</i>	
	10/24	River Channel Dynamics	Holden, Ch. 3, pp. 84-94 Tickner et al. (2017)		
Week 10	10/29	Groundwater Flow Principles and Abstraction	Holden, Ch. 5, pp. 151-173	Online Discussion 2 – Post Due Friday 11/1, Responses to classmates by Monday 11/4 11:59 p.m. <i>Lab SM Progress Report 2 due 11:59 p.m. the night before your next lab meeting.</i>	
	10/31	Groundwater Chemistry and Pollution	Holden, Ch. 5, pp. 173-189 Vasco et al. 2019		
Week 11	11/5	Screening of “Mulholland’s Dream”		<i>Lab SM Progress Report 3 due 11:59 p.m. the night before your next lab meeting.</i>	
	11/7	Water Rights, Law, and Governance	Holden, Ch. 11		
	Week 12	11/12	Water Demand Planning and Management	Holden, Ch. 9 McGregor et al. (2020)	Article Summary 3 due Friday, 11/15, 11:59 p.m. <i>Lab SM Progress Report 4 due 11:59 p.m. the night before your next lab meeting.</i>
		11/14	Potable Water and Wastewater Treatment	Holden, Ch. 8 Arce-Nazario (2018)	
	Week 13	11/19	Water Economics	Holden, Ch. 10 Griffin (2015)	<i>Lab SM Progress Report 5 due 11:59 p.m. the night before your next lab meeting.</i>
	11/21	Screening of “Company Town”			
Week 14	11/26	The Water-Energy Nexus	Hussey & Pittock (2012)	No labs	
	11/28	<i>Thanksgiving Holiday</i>			
Week 15	12/3	Water Models and Sustainability	McGregor et al. (2020)	<i>Lab Final Story Map Presentations (due at start of lab session)</i>	
	12/5	The Future of Water	Holden, Ch. 13		
Final Exam – Tuesday, December 17, 9:00 – 10:00 a.m. PT					

Statement on Academic Conduct and Support Systems

Academic Integrity

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas.

Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see [the Student Handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

[Counseling and Mental Health](#) - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[Reporting Incidents of Bias or Harassment](#) - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[Diversity, Equity and Inclusion](#) - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

[USC Emergency](#) - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

[USC Department of Public Safety](#) - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call
Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance