



UC Water Academy, Spring 2017

Directed Group Study, 1-2 Units

ENVE 198 @ UC Merced (Viers), ESPM 150/290 @ UC Berkeley (Grantham)

Units also available through UC Davis (Fogg) and UC Santa Cruz (Fisher)

Virtual Weekly Meetings: Tuesdays at 7pm (February 21st – June 6th)

Summer Field Course: June 18th-30th

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Course Description:

California has a rich and complex historical relationship with water, which is intimately tied to the state's seasonal Mediterranean climate and pronounced geographic variability – encompassing temperate forests on the north coast, alpine ecosystems of the Sierra Nevada, densely populated urban centers along the coast, and deserts in the south. The development of water resources has played a central role in transforming the state into a leader in global agricultural production and the 7th largest economy in the world. The construction of largescale water storage and distribution systems has also transformed the state's natural environments – particularly rivers, floodplains, and seasonal wetlands – and contributed to the deterioration of water quality, decline of fisheries, and extinction of freshwater species.

This course will provide the historical, scientific, legal, and institutional background needed to understand the challenges of providing water for California's growing population, agricultural economy, freshwater ecosystems, and other competing uses. In the spring, students from across the core UC campuses will meet virtually on a weekly basis to discuss relevant readings and establish foundational knowledge around the history of water management and policy in California, the state's natural hydrologic and ecological systems, patterns of water use, and critical water management challenges. In June, students will then embark on an intensive two-week tour of California's water system, visiting key water infrastructure projects and meeting with experts from different water management sectors, including agriculture, municipalities, and the environment. Visits will include Shasta Dam, the Sacramento-San Joaquin River Delta, Central Valley farms, Kern Water Bank Authority, and Mono Lake, culminating with a 3-day rafting trip on the Tuolumne River.

Prerequisites:

Upper-division standing with proven interest in water resources, water resources management, water resources engineering, hydrology, aquatic ecology, limnology, public health as related to water, water law, water history, water geography, or other or other related disciplines. First-year graduate student by exception.



Course Objectives:

- 1) To introduce students to local and state-wide water resource management issues and their impact on human health, welfare, natural systems, natural resources, and the needs of society;
- 2) To develop a basic understanding of California's water system, infrastructure and institutions;
- 3) To instill a basic understanding of hydrological processes operating in landscapes and ecosystems and the role of water linking the myriad components of the environment;
- 4) To define the roles of science, management and policy in addressing water problems.

Course Learning Outcomes:

Upon completion of this course, students will be able to:

- 1) Explain historical and contemporary water management challenges in California;
- 2) Write effective short communications and lead environmental problem discussions addressed to the public

Course Requirements and Grading

General Policies:

Academic honesty is fundamental. Students will be held to the UC Standards of Conduct. It is up to you to know the contents of these standards and policies. Presume that all work in this course is to be conducted and completed independently unless told otherwise for a specific assignment.

Reading:

There is one required text for this class and weekly additional reading- and video-viewing assignments (see class schedule, below). Material from these readings will be discussed during weekly class meetings in the Spring as well as on the field portion of the course. Assigned dates for reading are the class meeting by which reading should have been completed.

Required textbook: Hanak, Ellen. *Managing California's Water: from conflict to reconciliation*. Public Policy Instit. of CA, 2011. Available online [here](#).

Weekly reading assignments (see class schedule): Available on [google drive folder](#).

Weekly Assignments:

Before each class meeting, you are expected to submit at least one question or comment on each assigned reading and video. Responses shall be submitted online no later than Monday at midnight prior to the class meeting on Tuesday.

Credit:

Depending on their home institution, students will receive 1-2 units for this course and must complete an Independent Study form, which will be provided contingent on acceptance to the course.



Grading:

Must be taken on a Pass/No Pass basis. Failure to participate for the complete duration of the course (weekly virtual meetings and field trip) will result in a NP. There is one final written assignment.

Course Fee:

There is a required course fee of \$150 to cover field trip expenses. Payment must be made at the beginning of the spring semester to reserve your spot in the course. Fees may be waived for individuals with demonstrated financial need. Details on the field trip are contained in a separate handout.

Written Assignment:

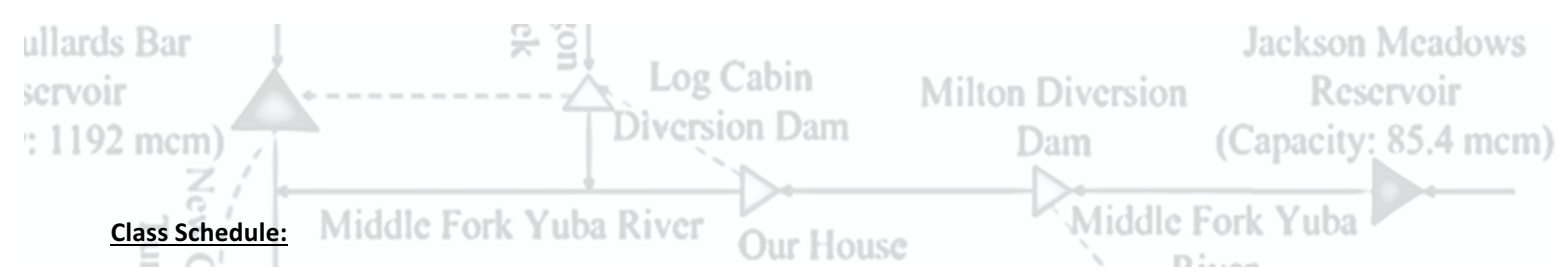
Over the duration of the course, you will be exposed to a variety of viewpoints on California issues, both through reading of primary scholarly articles as well as face-to-face meetings with stakeholders. Your assignment is to reflect on that exposure and write a 1500 word blog-style essay addressing the following question: "what do you think every Californian should know about California's water?" The essay will be evaluated for possible publication in the California Water Blog (<https://californiawaterblog.com>).

UC STANDARD TERMS AND CONDITIONS

Academic Integrity:

- a. Each student in this course is expected to abide by all University of California Codes of Conduct. Any work submitted by a student in this course for academic credit will be the student's own work.
- b. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e mail, an e mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Policy can also be extended to include failure of the course and University disciplinary action.
- c. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

Accommodations for Students with Disabilities: The University of California is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.



Class Schedule:

Meeting	Dates	Topic	Reading: Book	Reading: Paper	Notes	
1	2/21	Course Intro				
2	3/7	Water supply system	Hanak et al 2010. Managing California's Water: From Conflict to Resolution. <i>Public Policy Institute of California (PPIC)</i> . Chapter 1	Lund, J. R. (2016). California's Agricultural and Urban Water Supply Reliability and the Sacramento–San Joaquin Delta. <i>San Francisco Estuary and Watershed Science</i> , 14(3). PPIC Video, "Water & California's Future" [online] first 13 minutes		
3	3/14	Water policy and law	Hanak et al Ch1	Grantham, T.E. & Viers, J.H. 2014. 100 years of California's water rights system: patterns, trends and uncertainty. <i>Environmental Research Letters</i> 9:1-10 PPIC Video, "Water Supply" [online] PPIC Video, "Water Quality" [online]		
4	3/21	California hydrology	Hanak et al Ch2	Mount, J.F. 1995. <i>California rivers and streams: the conflict between fluvial processes and land use</i> . U. California Press. Chapter 1 [online] KQED Video, "Secret Life of a Raindrop" [online] PPIC Video, "Headwaters" [online]		
	3/28	SPRING BREAK				

5	4/4	Snowmelt/Hetchy Hetchy/Tuolumne	Hanak et al Ch3	<p>Null, S.E. and Lund, J.R., 2006. Reassembling hetch hetchy: Water supply without O'Shaughnessy Dam. <i>JAWRA Journal of the American Water Resources Association</i>, 42(2).</p> <p>Yarnell, Sarah M., Joshua H. Viers, and Jeffrey F. Mount. 2010. Ecology and management of the spring snowmelt recession." <i>BioScience</i> 60(2).</p> <p>PPIC Video, "Floods" [online]</p>	Guest speaker, Sarah Null (Utah State)
6	4/11	Environmental flows	Hanak et al Ch 4	<p>Grantham, T.E., Viers, J.H. and Moyle, P.B., 2014. Systematic screening of dams for environmental flow assessment and implementation. <i>BioScience</i> 64(11).</p> <p>Kiernan, J.D., Moyle, P.B. and Crain, P.K., 2012. Restoring native fish assemblages to a regulated California stream using the natural flow regime concept. <i>Ecological Applications</i>, 22(5).</p> <p>PPIC Water Policy Brief: Managing for the Environment</p> <p>PPIC video, "Ecosystems" [online]</p>	Guest speaker, Peter Moyle (UC Davis)
7	4/18	Floodplains/Yolo Bypass	Hanak et al Ch 5	<p>Jeffres, Carson A., Jeff J. Opperman, and Peter B. Moyle. 2008. Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. <i>Environmental Biology of Fishes</i> 83(4).</p> <p>CalTrout video, "No Going Back" [online]</p>	Guest speaker, Jacob Katz (CalTrout) or Carson Jeffres (UC Davis)
8	4/25	California agriculture and the San Joaquin Valley	Hanak et al Ch 6	PPIC San Joaquin Valley Report [forthcoming]	

9	5/2	Groundwater	Hanak et al Ch 7	<p>O'Geen, A.T. et al. 2015. A Soil Survey Decision Support Tool for Groundwater Banking in Agricultural Landscapes, California Agriculture Journal 69(2):75-84</p> <p>Drought on-line seminar series, Thomas Harter on "Groundwater and surface water interactions under water shortage" [online]</p>	<p>Guest speaker, Graham Fogg (UC Davis), Thomas Harter (UC Davis), or Andy Fisher (UC Santa Cruz)</p>
10	5/9	The Delta	Hanak et al Ch 8	<p>Mount, J. and Twiss, R., 2005. Subsidence, sea level rise, and seismicity in the Sacramento–San Joaquin Delta. <i>San Francisco Estuary and Watershed Science</i>, 3(1).</p> <p>PPIC Water Policy Brief: The Sacramento San Joaquin Delta</p> <p>Center for Watershed Sciences video, "Unraveling the knot", episodes 1 – 3 [online]</p>	
11	5/16	Mono Lake	Hanak et al Ch 9	<p>Koehler, C.L., 1995. Water rights and the public trust doctrine: Resolution of the Mono Lake controversy. <i>Ecology Law Quarterly</i>, 22.</p> <p>Gray, B.E. 2011. Ensuring the Public Trust. <i>UC Davis Law Review</i> 45: 973.</p>	<p>Guest speaker, Brian Gray (PPIC) or Mike Kiparsky (UC Berkeley)</p>
12	5/23	Urban Water	Hanak et al Ch 10	<p>PPIC Water Policy Brief: Water for Cities</p> <p>PPIC Video, "Colorado River" [online]</p> <p>PPIC Video, "Water Pricing" [online]</p>	<p>Guest speaker, Ellen Hanak (PPIC)</p>

13	5/30	Water and Climate Change		<p>Dettinger, M., Udall, B. and Georgakakos, A. 2015. Western water and climate change. <i>Ecological Applications</i> 25:2069-2093.</p> <p>Diffenbaugh, N.S., Swain, D.L. and Touma, D., 2015. Anthropogenic warming has increased drought risk in California. <i>PNAS</i>, 112(13).</p> <p>Hanak, Ellen, et al. "California water myths." <i>Public Policy Institute of California</i> (2009).</p> <p>PPIC Water Policy Brief: Climate Change and Water</p> <p>California's Latest Drought (Just the Facts), Climate Change and Water</p>	
14	6/6	Field Course Prep			

Field Trip Schedule (Tentative):

Date	Day of Week	Day	Sites
18-Jun	Sunday	1	Meet up/Orientation at UC Davis
19-Jun	Monday	2	Shasta Dam
19-Jun	Monday	2	Red Bluff Diversion Dam
19-Jun	Monday	2	Hamilton City
20-Jun	Tuesday	3	Fremont Weir
20-Jun	Tuesday	3	Knaggs Ranch
21-Jun	Wednesday	4	Cosumnes River Preserve
21-Jun	Wednesday	4	Rio Vista
21-Jun	Wednesday	4	Jones Pumping Plant
21-Jun	Wednesday	4	Clifton Court Forebay
22-Jun	Thursday	5	San Luis Reservoir/O'Neill Forebay
22-Jun	Thursday	5	Panoche Drainage District
22-Jun	Thursday	5	Delta Mendota Canal
22-Jun	Thursday	5	Kearney REC
23-Jun	Friday	6	Kern Water Bank Authority
23-Jun	Friday	6	Ira J Chrisman Pumping Plant
23-Jun	Friday	6	Owens Lake
24-Jun	Saturday	7	Sierra Nevada Aquatic Research Laboratory (SNARL)
25-Jun	Sunday	8	Mono Lake
26-Jun	Monday	9	Hetch Hetchy
27-Jun	Tuesday	10	Tuolumne Put In
28-Jun	Wednesday	11	Tuolumne River
29-Jun	Thursday	12	Tuolmne River to Takeout and Return to UC Davis
30-Jun	Friday	13	Morning Wrap-Up at UC Davis