Water poses challenging problems to societies around the world. It resonates with profound meanings of life, livelihood, beauty, death, and destruction. It inspires architectural, landscape, and planning innovations. It is a fascinating molecule.

This seminar is for graduate students who have a core interest in the role of water in environmental planning, policy, and design. Students should have a topic in mind that requires systematic water reading and research, e.g., a master’s thesis project, dissertation chapter, design project, or publication. If you are looking for a project, I have ideas for you.

**Common Approach:** Individual projects will vary a great deal—by water issue, hydrologic process, and geographic region. But we will have a shared pragmatist philosophy of problem-driven inquiry that generates alternative courses of action. We shall also follow a shared analytical approach that breaks complex water issues down into *multiple levels and scales of analysis* — from human experience at the household level to larger state, basin, and global levels. We proceed from the local to global scale for three reasons: first, because that is the historical progression of water resources management; and second, because it helps identify bottom-up strategies that complement the better known but problematic top-down approaches; and third, because the evolution of water resources management has involved continuous struggles between local autonomy and regional integration that are best understood through this progression.

Similarly, we will have common readings and tasks organized by these local to global levels of analysis. I will give short talks on the historiography and logic of each level of water inquiry with examples from...
the U.S., Europe, South Asia, and wider Islamic realm. These are the regions I know best, students with interests in other regions are also valuable for the seminar. One or two students will help lead the discussion each week.

*Common research project tasks:* Begin by identifying a water topic you wish to pursue, and write a brief problem statement on why it is important and how we plan to pursue it. You will then prepare a “map” of the levels and scales of inquiry relevant for your project. Use the problem statement and map to design a systematic bibliographic search for your research project. We will develop your research topics, level by level, during the course of the semester. I will seek to demonstrate the process at each level with current water examples in the U.S., India, and Pakistan.

*Thesis/dissertation chapter option:* Those who are completing a thesis or dissertation have somewhat special needs, and it may be appropriate to write a section of the thesis for the seminar. In those cases, the project tasks can be adapted to fulfill the thesis objective.

*Design option:* Similarly, MArch and SMarchS Urbanism students may wish to employ design methods at each level of inquiry, producing a well-structured set of annotated drawings as the final seminar project.

*Evaluation:* Regular participation in seminar meetings (10%); discussion leadership (20%); interim project tasks (30%); and final project document (40%).

*Policies:* Students with disabilities should consult with the Disability Services Office and me at the beginning of the semester to ensure timely support. Students are encouraged to work with the MIT Writing Center as needed. Students must strictly adhere to the MIT Academic Integrity policy. Absence from class and extensions of time for assignments must be requested and approved in advance.

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**Water Seminar Schedule**

**Weekly Topics, Readings and Tasks**

1. **September 9 – Water Experience, Problems, and Inquiry.** This meeting introduces the seminar goals, interests, and syllabus. It starts with devastating problems such as the California drought, and enduring wonders such as Walden Pond. To understand such phenomena, the seminar will employ a pragmatist approach to water inquiry that operates at multiple levels and scales. We will begin by exploring your primary research interests and concerns.

*Common task:* Post an initial 2-page statement and graphic representation of your water research interest on Stellar by September 15th for discussion on the 16th. The document should identify the topic, indicate the aspect of it that is particularly inspiring or problematic, and briefly discuss why it is important for you, others, and your field of study.


2. September 16 – Mapping the Levels and Scales of Water Inquiry & Design. Scale is one of the most interesting, challenging, and contested topics in contemporary water research. Scaling is a key analytical method in hydrology and water resources research, but its concepts and methods vary in different fields of inquiry. It has a range of uses and meanings in design. The term “scale” is also used in water policy, though it is probably more accurate to treat water institutions as “levels” rather than scales of inquiry. Finally, there is a rich literature on the politics of scale in social research on water and related topics. Understanding the relationships among different concept of scales is an important challenge in the theory and practice of water planning, policy, and design. This week’s seminar will engage this challenge through a selected set of readings on scale.

Common readings: Islam and Susskind, 2013, pp. 46-51 and 71-79; Steinitz, “From Project to Global: on Landscape Planning and Scale,” Landscape Review, 2005; Norman, Bakker, and Cook, 2012. What does each author mean by scale? How do they differ? How would you describe the primary levels and scales associated with your water topic?

Supplemental readings: Kelbaugh, 2006; Neuman, 2008; See also the larger list of “Readings on Scale” Word document on Stellar.

Common task: prepare a bibliographic search strategy for your research project, to be posted on stellar by September 30th.

3. September 23 – Water in Bodies, Buildings, and Sites. Water constitutes the bulk of the human body and the bodies of other organisms especially plants which constitute the largest consumptive users of water at all scales primarily through processes of evapotranspiration.¹ Is access to water for these basic physiological needs a right, i.e., a human right, animal right, or plant right? The United Nations and more recently the state of California say yes, while a court case this year in Detroit said no. In other contexts animals have a right to water, and sometimes though less commonly a plant right. Even if basic water access is not a human right, is it a societal duty? In either case, how might you determine the standards of basic access and use? On the flip side, this week’s session will also consider problems of too much water at the scales of the body, dwelling, and site. Vitruvius included a brief discussion of water hazards in his Ten Books on Architecture. Early common law described water as a “common enemy” for purposes of settlement and drainage. Architects still struggle with issues of humidity, seepage, leakage, and mold, while landscape architects strive to maximize water retention and infiltration. Given the breadth of these most basic water processes, we shall organize the discussion in small groups focused on physiology, rights, and design.


¹ Consumptive use is the amount of water evaporated and/or transpired as a volume or a percentage of the total water withdrawn from a water body (i.e., it does not return to the local water system for possible reuse).


Common tasks: Reflect upon the scales of water use in individual bodies, buildings, and landscape sites. Complete your initial bibliographic search and post the results on Stellar for discussion on September 30th. Your search of on-line libraries should include: Books = WorldCat; Journals = Web of Science, Avery, EiCompendex, Scopus, and/or LexisNexis law reviews; Proquest dissertations; and Water Resources Abstracts.

4. September 30 -- Local Water Communities, Cultures, and Contexts. It is arguable that human water management originated at the community rather than individual or household level. Identify the water communities in your project, and try to describe their geographic and cultural context. Our case study readings in the North American context will focus on acequia communities of New Mexico, and compare them with other historical and modern water communities in the U.S., Middle East, and South Asia.


5. October 7 -- Metropolitan Water Design. As cities grow, municipal water organizations develop in a range of infrastructural and institutional patterns. Infrastructural systems encompass engineered and increasingly landscape architectural approaches. A key question is how urban water systems can benefit from blue-green infrastructural approaches. Municipal water institutions take a full spectrum of public and private forms that have long histories. Urban water supply and wastewater are increasingly drawn into creative as well as problematic interactions with suburban, exurban, and rural water systems. In addition to general readings, case study discussions will include Boston, Chicago, Rome, and Mumbai.


6. October 14 – Water as Property I: Riparian Rights. This session begins with philosophical arguments for and against private ownership of water (i.e., water rights as a form of property). These arguments range from justifications based on natural law arguments to social arguments based on utility, fairness, and virtue. We then proceed to riparian water rights, which are based on the spatial contiguity between land ownership and an adjacent water body. This is the primary historical type of water right in the humid eastern and southern U.S. To what extent can riparian water rights help protect basic environmental water levels and flows?


7. October 21 – Water as Property II: Prior Appropriation. This session shifts from riparian water rights based on the place of use to ownership based on the time of use. The prior appropriation doctrine of water rights prevails in the western U.S. Many other regions define water rights through a schedule of timed deliveries. This session will consider hybrid states that attempt to reconcile the riparian and prior appropriation doctrines, and the even more challenging issue of groundwater rights.


8. October 28 – Water Resource Economics & Finance: Values, Pricing, and Privatization. The 1992 Dublin Conference on Water declared that water is an economic good (it was silent on the question of water as a human right). There are longstanding debates about the economic values associated with water. Unfortunately, these debates about economic value are often conflated with issues of water finance, and related concerns about commodification and privatization. Even when the public status of water is maintained, there are increasing trends toward managing water organizations as businesses to ensure their operational effectiveness (commercialization). While the public v. private debates continue, it is important to stress that there are very few pure public or pure private water organizations. This session treats asks you to creatively consider the economic and financial dimensions of your study.


9. November 4 -- State and Interstate Water. In federal systems of governance (e.g., U.S., India, Brazil), the primary constitutional authority over water resources rests at the state level (e.g., Massachusetts, Maharashtra, etc.). But there are limits to a state’s rights, e.g., a state may not obstruct the transfer of water over its boundaries, and interstate disputes must be settled by nationally ratified agreements. What are the state and interstate issues and policies relevant for your project?

Common reading: Getches et al., Water Law in a Nutshell, ch. 9.
Supplemental reading: See the Transboundary Freshwater Dispute Database for interstate compacts in your study region, www.transboundarywaters.orst.edu.

10. November 11 -- Integrated Watershed, River Basin, and Aquifer Planning. Natural hydrologic regions were introduced early in the seminar, and they are taken up in detail this week. These regions are regarded by many as inherently integrative in spatial, functional, and/or cultural ways. Do you agree with John Wesley Powell and his followers that river basins are the most appropriate units for water resources management? What are the similarities and differences between watershed and river basin planning? What are the prospects for conjunctive management of surface and groundwater resources? What new natural regions should be considered? In recent years, there has been growing emphasis on, and criticism of, Integrated Water Resources Management (IWRM). What insights does your project offer for these debates?


Common task: Identify one or more natural hydrologic areas relevant for your project. Review efforts that have been made to use that area to develop an integrated approach to water resources planning. What further innovations along these lines seem promising?

11. November 18 -- National Water Programs, Plans & Policy Reform. Even though states have primary constitutional authority over water, national agencies are highly influential. They have constitutional authority over navigable waters, interstate disputes, and international waters. They also have substantial financial resources. Even so, many nations have difficulty adopting a coherent national water policy, and few have a strong record of implementation. Many have fragmented agencies responsible for different water use sectors. Identify the national water agencies most relevant for your project. Assess the strengths and weaknesses of their programs and policies for designing alternative solutions to water management problems.


12. November 25 – International and Global Water Management. This week’s session includes four related topics at the international level: 1) transboundary water agreements, 2) comparative international water research; 3) global water initiatives; and 4) virtual water trade. Select a U.N. water agency and an international NGO that are relevant for your work. Review the strengths and limitations of these organizations as agents of change.

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2 We will discuss the theoretical literature on types of regions and varieties of regionalization and regionalism in this session.
of their water programs. How might you design a comparative international study to generate creative solutions for your study?

**Common task:** Upload your revised project draft by today for feedback.


**13. December 2 – Transcendental Water Inquiry?** Some scholars are questioning whether the pragmatic and political-economic approaches discussed over most of our seminar can transform water conflicts into new forms of cooperation. Some of these scholars are turning to spiritual and related philosophical aspects of water in human experience, e.g., in the arts and humanities as well as religions. This penultimate session explores these ideas and invites you to speculate about creative cultural approaches to water planning, policy, and design.


**15. December 9 -- Generating Innovative Alternatives across Multiple Levels and Scales.** This final session examines the dynamic relationships among levels and scales of water planning. Present a brief summary of your revised project ideas and associated images in class. How has your understanding of the problem and project evolved? Can you identify gaps and linkages that you have discovered between different levels and scales? What new solutions have come to mind? Be sure to focus on the answers to these questions in your final papers.


Post your final project on Stellar no later than noon on Tuesday December 16.
Selected Readings and References


Tuan, Yi-Fu. 1968. The Hydrologic Cycle and the Wisdom of God. Toronto: University of Toronto, Department of Geography.


 ____________. 2013. The ‘duties of water’ with respect to planting: toward an ethics of irrigated landscapes, Journal of Landscape Architecture, 8:2, 6-13, DOI: 10.1080/18626033.2013.864070


Supplemental Readings


