

INTRODUCTION TO THE STUDY

On November 5, 1913, City of Los Angeles water superintendent William Mulholland inaugurated the city's first aqueduct with a terse command to the expectant crowd: "There it is. Take it." L.A.'s developers and residents proceeded to do so with vigor, producing a sprawling, low-density, lawn-and-swimming-pool-covered metropolis in the decades that followed (Starr 1986). This pattern of development accelerated with the completion of the Colorado River Aqueduct (1941), second L.A. Aqueduct (1970), and State Water Project (1973). In recent years, however, the logic of underwriting and sustaining urban development with infusions of faraway water has taken a beating. A series of droughts, ever-more-dire future river flow predictions due to climate change, state-level bickering over critical repairs to water infrastructure, and judicial confirmation of neighboring states' rights to a share of the Colorado's flow have undermined any sense of security around L.A.'s future access to these supplies. Quixotic methods for bringing new water into the city – towing in Arctic icebergs, tapping Canadian rivers – have occasionally surfaced during this period (Reisner 1993). In general, however, attention has turned to mechanisms for producing supplies within the city's own borders.

This project explores these attempts to capture, harvest, or "make" new, local water supplies in contemporary L.A. The past decade has seen an explosion of such efforts within this semi-arid city of four million. L.A. homes, streets, parks, and water treatment plants are increasingly represented and understood by Angeleños as possible spaces to harvest the resource for future reuse. Given that L.A. currently relies on supplies imported from beyond city limits for a full 89% of its municipal water needs (LADWP 2011), this embrace of hydrological locavorism signals a significant shift in the dominant conceptualization of the city's water network, and of the role of the urban environment in critical resource provision. Everyday water users, environmental activists, local businesses, and L.A.'s municipal government are increasingly rejecting an understanding of the city as an uncomplicated space of water consumption, casting it instead as a viable location to produce water for future use – and its residents, as potential contributors to the public supply.

The politics of Los Angeles's urban ecology increasingly overlap with the politics of its infrastructure, making it a useful site to extend recent ethnographic research examining each as a discrete category (*cf* Anand 2011, Graham & Marvin 2001, Larkin 2008, Larkin 2013, Rademacher & Sivaramakrishnan 2013). Actors' attempts to frame the cityscape as a space for making new municipal water – by capturing rainwater for percolation into below-ground aquifers, for instance – suggest a vision of the urban landscape as both the provider of a vital ecosystem service and as an element of city's water supply network. Though this particular reimagining of the appropriate use and function of this land competes with many others in Los Angeles, its significance for a diversity of local actors underlines its value as an object of ethnographic inquiry. Previous research suggests the importance of attending to the exclusions such a technocratic vision of urban nature might entail (Rademacher 2011), as well as to the ongoing discursive work that legitimating such an assemblage of nature-based water infrastructure requires (Carse 2012). By working with communities mobilizing around the idea of urban-space-as-natural-infrastructure, this project offers the opportunity to investigate the social, political, and material lives of this emergent vision of water management.

Through the study of these efforts to reconfigure flows of water through the city, this project will examine the meanings and values animating these emergent approaches to water management in L.A. Drawing on ethnographic fieldwork with four primary groups of actors – home-scale adopters, installation businesses, urban environmental activists, and city bureaucrats – the research will analyze the disparate but intersecting attempts to "relocalize" Los Angeles's water supply underway today. The 15-month study will be anchored by a central question: *How do contemporary Angeleños understand and manage their city's water supply, and what does this suggest about the values and practices remaking urban environments under conditions of increasing environmental uncertainty?*

Recent events underline the urgency of this research. In May 2013, the California Department of Water Resources (CDWR) announced that the Sierra snowpack (California's main source of surface water) stood at 17% of average volume for the end of the wet season (CDWR 2013). That summer, the L.A. Department of Water and Power (LADWP) announced plans to build a \$600-800 million

groundwater treatment plant complex to decrease the city's reliance on imported supplies and \$2 per square foot subsidy for citizens for ripping out water-intensive lawns (LADWP 2013, Sahagun 2013). As the perceived insecurity of the city's pumped-in water supply intensifies, the scale and number of interventions appear to be exploding. Attending to the shifts in politics, practices, discourses, and imaginaries alongside these material transformations is critical work in a climate of escalating water scarcity, and has the potential to inform activist and policy efforts in arid urban centers for years to come.

THEORETICAL BACKGROUND

Fluid Networks: Political Ecology of Urban Water Systems

Following Caton and Orlove (2010), this project treats water as both a biological reality and a Maussian total social fact (Mauss 1990). Such an approach emphasizes the resource's undeniable essentiality to social, cultural, and political arrangements without slipping into a crudely deterministic understanding of its role in their production common to earlier accounts (*cf* Wittfogel 1981). I aim to combine the strengths – careful ethnographic attention to meanings, values, and social institutions – of older anthropological research on the relationship between rural irrigation systems and local social relations (Fleuret 1985, Geertz 1971, Gelles 2000, Lansing 1991, Lansing 2006) with the focus on political economy and the uneven politics of space that characterize political ecologists' recent writings on urban water networks (Bakker 2010, Gandy 2008, Kaika 2005, Swyngedouw 2004). My framework treats a city's water network as a complex assemblage with differentiated, contingent micropolitics, rather than as a straightforward manifestation of bureaucratic or capitalist interests (*cf* Anand 2011, Strang 2009 for similar approaches).

Foregrounding the microspheres of negotiation within the larger structure (material, institutional, and political) of the city's water system, this project offers an opportunity to extend research on the role of perceptions of environmental risk in reshaping water networks. There is a robust literature on the mobilization of environmental crisis to enable dam financing (Giglioli & Swyngedouw 2008, Kaika 2003) and water system privatization (Bakker 2003), mostly focused on elite articulations of environmental risk in the service of established political-economic interests. Through work with water users, small businesses, and non-profit groups attempting to remake local pieces of the water network to increase overall system resilience, the research will explore the following sub-question: *What political claims is the notion of an environment-based water "crisis" serving to legitimate in contemporary Los Angeles?*

Anthropology of Infrastructure

This study of Los Angeles's water is also a study of its infrastructure, heeding Susan Leigh Star's influential injunction to investigate these "boring" systems ethnographically (1999: 377). Infrastructure, here, is understood to include not only the obvious concrete-and-rebar of big bridges and dams, but also the human, natural, and immaterial dimensions of provisioning systems – all frequently experienced as invisible or quotidian in contexts associated with modernity (Edwards 2003, Graham & Marvin 2001).

There has been a recent push among anthropologists to also analyze these systems as "concrete semiotic and aesthetic vehicles oriented to addressees" (Larkin 2013: 329). Attending to such communicative dimensions of infrastructure has produced subtle analyses of networks' key role in legitimating ideologies of progress and state power (Coronil 1997, Kaika & Swyngedouw 2002, Mitchell 2002). Yet studies centered on the ongoing political, discursive, and material work these networks entail suggest the danger in treating the systems meanings' as stably or universally accepted (Appel 2012, Barnes 2012, Carse 2012). As the networks can be understood as precarious material achievements, so can the meanings and values associated with them. A number of scholars have noted the importance of keeping multiple scales – the massive, not-directly-accessible pieces of infrastructure (such as dams and aqueducts) as well as their quotidian manifestations (like the taps and drains servicing homes) – and their attendant politics in productive tension within a single study (Kaplan 2011, Sofoulis 2005). Ethnographic methods clearly offer unique advantages for studying the social lives of the mundane, "everyday" elements of these networks.

Building on Carse's study of the historical production of the Panama Canal watershed as a particular kind of infrastructural assemblage ("nature" providing a specific set of ecosystem services), this project tracks attempts to reframe the L.A. cityscape itself as "nature" capable of doing the same. *What new visions of Los Angeles's water infrastructure are being mobilized through the local water initiatives, what land uses are these visions promoting, and which ones are they occluding?* In its attention to the power-laden process of translating the material stuff of nature into something governable by the neoliberal state, this thinking intersects with recent political ecology work on schemes to protect landscapes through payments for "ecosystem services" (Robertson 2006, Robertson 2012) or animal populations via harvesting quotas (Holm & Nielsen 2007), suggesting its broad relevance for an emergent field of environmental thinking and practice.

The Production of Urban Environments and Citizens

Ethnographies of Modernist planning (Holston 1989), securitized enclaves (Caldeira 1999, Low 2003), and public plazas and memorials (Hayden 1997, Low 2000) have deftly analyzed the ways that the urban environment shapes social lives while social practices concurrently rework city space. Frequently drawing on the writings of Henri Lefebvre (1991), these studies emphasize the tensions between the structuring force of the capitalist state and the contingent, unpredictable *metis* of individual practices (Scott 1998) in the making of uneven urban landscapes. Many also attend closely to the unstable relationship between the imaginaries of city and countryside (Barracough 2011, Harms 2011), following Raymond Williams (1973) in their attention to the historically produced nature of and ideological work done by the notion of a rural/urban binary.

Yet while these accounts foreground the process of spatial production, analysis of the metropolis as an ecosystem is largely absent. Recent years have seen a dramatic increase in such studies, frequently centered on attempts to prevent or remediate localized pollution (Alley 2002, Brodtkin 2009, Choy 2011, Rademacher 2011). Taken together, these works suggest that the concept of a healthy, sustainable, or desirable urban environment is an immensely unstable category, its definition actively contested from many angles in any given city. In fact, the very definition of an urban environment itself remains uncertain terrain. Early in Anne Rademacher's study of the political life of Kathmandu's Bagmati River, she relates a telling anecdote: in a conversation with a local NGO director, she is first told that his organization is adopting a programmatic focus on "urban ecology," and moments later asked, "Can you please tell me what urban ecology *means*?" (2011: 31). This combination of immense indeterminacy with an understanding of the category "urban ecology" as a highly mobile category with major donor appeal underlines the value of carefully attending to the discourse in other contexts.

This project treats the city itself as a hybrid, socionatural ecology, building on literature that frames the urban environment as an ongoing transformation of nature within and beyond its borders (Cronon 1991, Harvey 1996, Swyngedouw 1996). Such careful attention to the uneven spatial effects gives the approach considerable analytical purchase, refusing to understand a city in aggregate as simply "sustainable" or not, and instead focusing on the "series of urban and environmental processes that negatively affect some social groups while benefiting others" (Heynen et al. 2006: 10).

In addition, this research raises novel questions about the relationship of individual labor and private space to the messy politics of a metropolitan ecology. Many of the initiatives under investigation here treat residents as potential contributors of new water to the city's provision network, through the work of remaking their homes and yards – a substantial shift, and one with parallels in increasingly common urban projects promoting grid-feeding distributed solar production and community gardens. James Holston's (2008) analysis of the role that migrant "autoconstruction" of Sao Paulo's peripheral suburbs has played in the production of ideas of urban citizenship suggests that a sense making the material stuff of the city can have substantial political implications. The Los Angeles case, where citizens are called to remake their private pieces of "nature" in the service of the city, offers an opportunity to build on these findings. I ask: *What happens to understandings of urban nature, resource provision and governance when one's role within them is dramatically reimaged?*

BACKGROUND TO THE RESEARCH

Just shy of four million residents, L.A. is the United States' second-most populous city, and its land area of 469 square miles places it among the most sprawling cities in the country (U.S. Census Bureau 2011). Noted (and promoted by early boosters) for its mild, "Mediterranean" climate the city is located in a semi-arid basin and receives less than 15 inches of rain in an average year (Deverell & Hise 2006). According to archaeologists, before European settlement in 1781 the area supported dispersed Tongva and Chumash settlements, each numbering less than 300 members (Raab 2006).

The scale, extent, and form of the Los Angeles basin's urbanization over the past century have been the subjects of strident commentary, occasionally celebratory (Banham 1971), but more often critical (McWilliams 1973, Wolch et al. 2004). Discussions of this transformation rarely proceed without reference to the hulking infrastructures – the freeways and airports and, of course, dams and aqueducts – on which the contemporary city depends. The imported waters delivered through the systems of provision enabled the particular forms of land speculation and concentrated capital accumulation, as well as the expansive, low-density suburban-style development, that characterize much of the city's spatial configuration (Davis 1990, Fulton 2001). A number of authors have noted the particularly powerful role that such high Modernist projects played in the region's identity during the middle decades of the twentieth century (Nye 1996, Reisner 1986), a phenomenon so pervasive it inspired the assertion that "infrastructure is the only theology that really took hold in the American West" (Varnelis 2008: 8).

Public faith in the uncomplicated efficacy of these networks proved short-lived, however, a decline precipitated by the rise of the dam-critical U.S. environmentalist movement of the 1960s and 1970s (Orsi 2004, Wehr 2004). Recent accounts of the region's infrastructure, its water provision system in particular, suggest the networks are more likely to be popularly associated with shadowy government corruption (Kahrl 1983), haphazard investment and mismanagement (Davis 1998), or even the death of the "California dream" of universally accessible middle class prosperity (Varnelis 2008) than any sense of triumphant technocratic modernism. These intertwining associations of the urban and its infrastructure networks with modernity, progress, disappointment, and abjection have been explored ethnographically in other locales (Ferguson 1999, Gandy 2002, Kaika 2005, Larkin 2008). As in these and other contexts, both L.A.'s cityscape and the provision network that underpins it are increasingly understood as problematic and threatened on many registers – broken spaces in need of a fix.

This context is crucial to keep in mind when considering past and present moments of proclaimed water crisis. Many have examined the historical record and concluded that actually-*experienced* water shortages in Southern California have been rare – it is *projected* shortages that have been mobilized to justify and raise public support for new water imports, typically in the interest of avoiding limits to growth (Erie 2006, Hundley 1992, Zetland 2009). That said, there is little evidence to suggest that the late night reservoir-emptying scenes of *Chinatown* (a film loosely based on the building of the first L.A. Aqueduct) had any parallel in reality. However, critical social scientists have traced the more subtle material and discursive work undertaken by water managers and pro-growth groups to ignite anxiety around water supply and support for more dams and projects in the region (Gottlieb & Fitzsimmons 1991, Nevarez 1996). All this suggests the importance in attending to the particular ways in which a water "crisis" is mobilized here, as this clearly shapes the "solutions" conceived of as possible. Of particular relevance to the proposed research is the city's short-lived first attempt at a water recycling plant, which produced drinkable water from sewage and received no media coverage, a fate sewer historian Anna Sklar (2008) has connected to the city's concurrent attempts to mobilize support for the Colorado River Aqueduct project.

In contrast, L.A. has suffered a number of devastating floods over the past 150 years. These events became increasingly economically destructive between the late 19th and early 20th centuries, as the city's lackadaisical zoning laws led to explosive growth within the L.A. River's flood plane (Gumprecht 1999). As a result, storm waters were increasingly viewed as dangerous and threatening, to be harnessed and kept away from the public as much as possible – an engineering mindset made material in the 1940s with the concretization and fencing in of the Los Angeles River (Orsi 2004). Since the 1980s, local environmentalist groups have fought to reclaim the river as a public recreational space, pressuring the city to take out the concrete and convert adjacent parcels of land into parks (Desfor & Keil 2004). As in other

American cities, L.A.'s "green infrastructure" retrofits of streets, schoolyards, parks, and home yards are framed with the language of controlling destructive storm waters (Karvonen 2011). In their emphasis on the connection between city space and the groundwater basin below it (the intended destination of waters managed by the new projects), however, the L.A. interventions push past a reimagining of space into a rethinking of the nature of the water itself, from threat to resource – a noteworthy shift, and a point of departure for the proposed research. While studies of L.A. have examined the legacies of agricultural (Barraclough 2011, Hayden 1997) and oil (Sabin 2004) production within the city, there has yet to be a scholarly work analyzing what it means to rework space in the interest of making a local water supply.

RESEARCH HYPOTHESES AND OBJECTIVES

Hypothesis 1 – Fluid Networks, (H₁): Broader discourses, politics, and initiatives of urban spatial transformation will accompany projects that promote the city as a space to make water. (H₀) Water supply augmentation will be framed and understood as an apolitical technical issue with no broader spatial or political implications.

Objective 1: To record and analyze the process by which city space is translated into an environment for producing water through discourses and initiatives.

Objective 2: To determine the water practices, meanings, values, and imaginaries mobilized by groups endeavoring to change the water infrastructure through reuse initiatives.

Objective 3: To determine the effects of engagement with these messages and narratives by the public, particularly those adopting home-scale changes, experiencing reworked public spaces, or actively engaging with plant-scale water recycling.

Hypothesis 2 – Anthropology of Infrastructure, (H₁): The groups working towards water "relocalization" and seeing the city's nature as infrastructure consistently promote a particular set of urban land uses over others in their campaigns and projects. (H₂): There is no characteristic prioritization of land uses among "local water" promoters.

Objective 4: To examine the extent to which the uneven (and, frequently, polluted) nature of urban space is engaged within these initiatives, and the broader engagement of this issue with environmental justice concerns.

Objective 5: To determine the extent to which ideas of the "proper role" of the individual water user vis-à-vis infrastructure systems, the state, and the market are understood and articulated by groups promoting different scales of reuse.

Hypothesis 3 – Remaking a (Very) Urban Ecology, (H₁): Angelenos engaging with issues of water reuse are also grappling with broad questions of political and environmental citizenship. (H₀) There is no correlation between involvement with local water "making" initiatives and active consideration of one's role as a citizen or a consumer.

Objective 6: To determine the ways in which these messages are taken up by everyday water users, with an eye to understanding the reasons behind uneven uptake between groups.

Objective 7: To track the particular meanings and values attached by actors to both the specific technologies under consideration here, but also to the spatial transformations they either entail or promote.

Objective 8: To examine the relationship between the different forms of labor, work, and expertise and individuals' understandings of the city's waterscape.

RESEARCH DESIGN

Research Sites: The Co-PI will conduct 15 months of ethnographic fieldwork in the City of L.A. The primary research sites can be roughly aligned with the three main scales of water reuse interventions within the city: private homes, public spaces within the cityscape, and treatment plant projects. While these scales of sites are quite distinct spatially, the discussions, imaginaries, and communities around them frequently combine and cross these scales in their framing of the city's water problematic. The proposed research attends carefully to these cross-scalar processes.

Private Homes: Many initiatives and groups in L.A. are recasting the private home as a space to harvest waters previously treated as wastes. Home-scale water capture, reuse, and infiltration techniques – greywater recycling, rain gardens, curb cuts and bioswales, and pervious driveways – are all being

promoted by activist, non-profit, and business groups, as well by as the city government. The Co-PI will study these efforts by (a) attending public events promoting reworkings at this scale (talks, forums, and home-scale installation demonstrations), (b) assisting small businesses and non-profit groups helping homeowners remake their home water systems, (c) interviewing residents who have reworked their homes, and (d) attending greywater and rainwater capture “industry” gatherings.

A wide variety of organizations host events dedicated to educating Angeleños about and promoting the adoption of technologies and techniques to turn the home into a water-retaining “sponge.” These take place in a wide variety of spaces: city offices, local community centers, corporate campuses, and in private homes themselves. The Co-PI will rely on water agency websites, activist and non-profit listservs, social media (Facebook and Twitter), and her network of water reuse contacts to track all relevant events within the city, conducting participant observation at one to two per month during the research period (n=20). While many of these events take the form of lectures or discussions, some are hands-on training sessions, intended to build skills among attendees interested in adopting reuse techniques within their own homes or integrating them into their businesses. The Co-PI completed one such weeklong home greywater installation training course in June 2013. She has obtained permission from the head of Greywater Action, the leading local activist group sponsoring these workshops, to attend and assist with any such sessions that occur during the research period. Greywater Corps, a small local business specializing in home greywater system installations, also runs daylong training workshops throughout the city. The researcher assisted with one such workshop in July 2013, and has received permission from the company’s principal to do so throughout the fieldwork period.

A growing number of local businesses are offering home greywater and rainwater capture installation as key pieces of their design/build portfolios. Two of these groups – Greywater Corps and Hey!TanksLA – offered the Co-PI the opportunity to assist with installations and site photography in July 2013, and have extended her an invitation to return during the dissertation research period to conduct participant observation on future projects. This work allows her to collect data on both these “green” businesses and the homeowners and landlords who are contracting their labor. Per discussions with the business owners, the Co-PI will identify herself and her research at the outset of any interactions with their clients. She will plan to assist with one to two installations per month over the course of her research (n=25), though this dataset will necessarily depend on the businesses’ workflows. In cases where the homeowners are willing, she will conduct follow up semi-structured interviews to discuss water reuse and their home systems in more depth, with a desired sample group of twenty (n=20). She conducted a small sample of these interviews (n=3) during the summer of 2013, and found the clients willing to discuss in great depth both their homes and water issues more generally.

In addition, the researcher will also seek out individuals adopting these technologies in a “do it yourself” manner. Hiring an installer or buying a prefabricated system is prohibitively expensive for many L.A. residents, while purchasing the necessary parts and autoconstructing a system represents only a fraction of the expense. As such, working with this group of adopters will enable the Co-PI to represent a perspective on these technologies less limited by socioeconomic class. Given the decentralized, individualized nature of these systems, the researcher will initially rely on snowballing to build this sample group, visiting and discussing home systems once permission has been obtained. Aware that individuals might be sensitive to allowing a stranger to examine their house’s plumbing, the Co-PI tested this methodology in summer 2013 with acquaintances made at public water education events (n=5). She was welcomed by all of these self-installers and frequently referred to others, suggesting the viability of the technique in establishing a larger study population (n=20). To the extent possible, the researcher will endeavor to purposively sample from the contacts she makes, building a study group representing the diversity of races, classes, genders, neighborhoods, and types of housing stock characteristic of L.A. In cases where the informants would prefer to speak a language other than English, the Co-PI will employ a translator to assist with the interview.

In addition, the Co-PI will work closely with a project that programmatically links home-scale retrofits with major changes to city streets (for the purposes of water capture and infiltration). The WaterLA pilot project, a collaboration between local environmental non-profits, design/build companies,

and the city government, combines these two scales in the Panorama City neighborhood of the San Fernando Valley. WaterLA offers site analysis and retrofit services to residents on a work-trade basis, and is working closely on the conversion of a major nearby traffic artery to serve as a “green street.” The City Council is presently debating the idea of reproducing this model in every council district across the city. The project’s director has granted the Co-PI permission to attend and provide volunteer labor at site planning and installation events, work she undertook as part of pre-dissertation research in 2013 and plans to continue upon return in 2014. Participant observation in these spaces will provide data on both the promotion and reception of initiatives to remake the home and the streets beyond it for the purposes of water harvesting, in addition to collaborations between the city and politicized, activist groups.

Finally, the researcher will gather data at events targeted to providers of these home-scale retrofits. These events are convened for the purposes of networking, education, and strategic and political discussions. The American Rainwater Catchment Systems Association conference is the most prominent such gathering that addresses rainwater capture. Many practitioners from the L.A. area attend the gathering annually. While there is no formal organization for greywater installers, in 2012 activists sponsored California’s first-ever greywater conference, where many L.A.-based practitioners spoke. Through participant-observation and interviews at relevant gatherings during the research period, the Co-PI will examine the forms of expert knowledge and networks that develop around these gatherings, and how the discourses within these spaces align with those presented to the public.

Public Spaces in the Cityscape: Public parks, schools, and streets are being targeted by the city as spaces for water retention and reuse, particularly in neighborhoods located atop groundwater basins (into which captured water infiltrates). These retrofit projects tend to be grouped under rubrics of “green infrastructure” or “low impact development,” which proponents tout for substantial local social and environmental benefits beyond supply augmentation. The researcher will track non-profit, city agency, and media reports on all of these projects during the research period. In addition, she will conduct observations in and interviews about them, and attend “expert” gatherings where the efficacy of these techniques are promoted or debated.

To gather data on the use of these spaces, the Co-PI will perform structured observation sessions in each of the five completed pilot “green streets,” as well as any others completed before the research period concludes. She will choose comparable (but non-retrofitted) streets within a half-mile of each demonstration street to perform a control set of structured observation sessions. This technique will allow her to compare foot traffic and other public uses of the reworked and regular streetscapes. The Co-PI will also conduct visits and observation sessions at the new or redesigned public parks intended to fulfill water capture functions (n=4), and visit the schools that have adopted these techniques on-site (n=10), most of which offer public tours. Visiting a number of these schools during the pre-dissertation research period, the Co-PI found the school staff willing to discuss the process and politics of the reworking in great detail after the tours, frequently referring her to involved parents or related non-profit groups. Following up in this manner will allow the researcher to offer a textured account of the local social effects of these projects.

In addition, the researcher will attend local meetings, symposiums, and conferences where these green infrastructure techniques are discussed. Fieldwork in summers 2012 and 2013 revealed that these gatherings take many forms: some as strategy sessions for aligned groups promoting different projects using the techniques; some as forums to report and discuss progress and data on local projects; some explaining new initiatives to water managers and technical groups. Through her network of contacts, the Co-PI has been welcomed at all of these gatherings, and intends to attend 1-2 per month (n=20) during the research period to gather data on the ideas about the cityscape being promoted by the activist, non-profit, bureaucratic, and engineering groups present. In addition to one-time events and conferences dedicated to green infrastructure projects and issues, she will also attend the quarterly meetings of the Southern California Water Committee (an organization composed of representatives from Southern California water agencies and environmental engineering firms, whose meetings are accessible to anyone willing to pay the entrance fee) dedicated to the discussion of water recycling and storm water retention. She will also attend the monthly Southern California Water Dialogue meetings at the Metropolitan Water District,

which bring together a broad cross section of actors from all of these groups and frequently engages these topics. Taken together, attendance at these gatherings will give the researcher a clear and nuanced picture of the conversations underway around these issues.

Treatment Plant-Scale Projects: Although L.A.'s Metropolitan Sewer District prepared a comprehensive "water salvage" plan nearly 85 years ago (*L.A. Times* 1930, September 13), the consistent presence of imported supplies has stalled the adoption of water reuse technologies for decades. Public protests against proposed "toilet to tap" water treatment techniques ("potable reuse" is the more staid, industry-standard term) in the 1990s further delayed the adoption of the technologies in L.A. As a result, this scale of technology remains in the pilot or demonstration project phase within the city. These reuse projects will serve as key research sites for this study.

The Donald C. Tillman and Los Angeles-Glendale Water Reclamation Plants currently treat sewage water to "tertiary" (non-potable) standards for landscaping use in local parks and golf courses. According to the city's Urban Water Management Plan, both plants will begin treating wastewater to drinking standards for inclusion in the city's potable supply within the next decade. Both sites currently offer educational tours to familiarize the public with their methods and this plan. To study these promotional techniques and the local response to this outreach, the researcher will attend one public tour per month at each site (n=15), and conduct informal follow-up interviews with the water managers offering the tours. In addition, she will perform monthly structured observations (n=15) at the Tillman plant's adjacent Japanese Garden, a space dedicated to recreation and environmental education, featuring manmade lakes fed with effluent from the plant.

Hoping to avoid the kind of public outcry that stymied the earlier attempts at undertaking potable reuse, the city's Department of Water and Power has been conducting extensive public outreach and listening systems regarding the conversion of the plants. In addition to gathering, reading, and coding reports from these public meetings (available through the City Controller's website), the Co-PI will attend any that occur during the research period, and pursue follow-up interviews with citizens attending and city water managers tasked with running these meetings. Gathering data on these sites and moments of promotion, the Co-PI will gain insight into both the official and the public framings of the city's water problematic, and the efficacy of large-scale infrastructure interventions as a response.

Finally, the researcher will study the communities of expertise around this scale of water reuse through interviews and participant-observation at industry gatherings. Representatives of the water and sanitation agencies considering plant-scale reuse and the engineering firms and equipment purveyors that provide the bulk of the technical expertise and parts for those systems gather frequently at local, state, and national meetings and conferences. In addition, trade groups conduct substantial lobbying at the state and national levels, promoting policies that subsidize this form of reclamation. The most prominent of these is the WaterReuse Association, which has national, California, and L.A.-specific chapters. To collect data on the discourses, practices, and networks established and maintained within these communities of expertise, the Co-PI will conduct participant observation at the annual conferences of all of these groups, as well as the quarterly meetings of the L.A. chapter. She will conduct follow-up interviews with willing participants to gain more textured perspectives on the efficacy and effects of this scale of water reuse, providing particular insights into the way the issue is understood from a technical-managerial perspective.

Study Populations: The research will focus on five principal populations engaged with the promotion or adoption of various forms of urban water reuse: (1) water managers, (2) environmental advocates, (3) trade and lobbying organizations, (4) small water-focused businesses, and (5) home water users.

Research Methodology: The researcher will collect data through interviews, participant and structured observation, focus groups, document analysis, and photography. Interviews will be conducted in peoples' homes, places of work, or agreed upon public spaces, depending on the informants and the context.

Semi-structured Interviews: In-depth, formal, semi-structured interviews will be a key data source for this project. Detailed interview schedules – different for each of the study populations – will be designed and administered by the Co-PI. The majority of the interviews will be conducted in English, and a research assistant capable of translating will be commissioned in cases where informants are more comfortable speaking a different language. Demographic data will be gathered, along with personal

histories of engagement with water issues in general and water recycling in particular. In the cases of informants working with water in a professional or activist capacity, professional narratives will be taken as well. In addition to personal histories of engagement with water issues, these interviews will be designed to collect data on the meanings the subjects attach to water infrastructure, water production, the urban environment, and the proper responsibilities of individuals, businesses, and the government in creating a sustainable city. Conducting interviews with individuals remaking different pieces and scales of the water infrastructure (who approach the issue of water provision from dramatically different positions and communities of expertise) will enable the Co-PI to explore ways in which one's work and affiliations shape understandings of the politics of water and space in the city. In the cases of home water users, a specific suite of questions around home water practices and infrastructure will be administered, and a guided tour of the home's plumbing will be requested (denials will, of course, be respected by the researcher). All interviewees will be presented with informed consent forms, and asked if they are amenable to tape recording (handwritten notes will be taken if they decline).

Participant Observation: As noted above, the researcher intends to undertake extensive participant observation in spaces where information about water reuse is being presented to public and specialist groups, and also where systems of water reclamation are being installed by small businesses or non-profit groups. Fieldnotes will be taken at all sites, as is socially appropriate and comfortable for participants.

Structured Observation: The Co-PI will undertake structured observation sessions in spaces specially designed to retain or recycle water (including wastewater treatment plants and "green" streets, schools, and parks). In the case of the retrofitted streetscapes, she will also conduct observation sessions on nearby streets to enable comparisons of their usage.

Document Analysis: To track media, government, industry, and activist representations of water reuse techniques the researcher will collect and analyze promotional and informational documents, press releases, traditional news media articles, and Internet sources, such as websites and blogs. In cases where the Co-PI has access to the authors of the documents, she will discuss the materials with their creators to better understand the goals and techniques behind the documents. In addition, she will conduct literature searches within the (fully digitized) *L.A. Times* archives to track historical representations of water supply and salvage. She will also undertake short-term archival work in the state's Water Resources Collection and Archives (housed at UC-Riverside), UCLA's Charles E. Young Research Library Department of Special Collections, and the Los Angeles City Archives. Research in these collections during the summer of 2013 provided access to the papers of local water activists and managers, as well as records from relevant public hearings and blue ribbon panels, which have been copied, saved, and organized.

Photography: In cases where she obtains permission to do so, the Co-PI will photograph home-scale water greywater or rainwater capture systems before, during, and after installation. In addition, she will take photos at public events and demonstration projects, particularly the public spaces in which she conducts structured observation.

RESEARCH FEASIBILITY AND ETHICAL CONSIDERATIONS

Academic Training and Projects: The Co-PI began studying water reuse in California as a Master's student in Cambridge University's Environment, Society, and Development program. Her thesis, titled "Constructing a Crisis and Selling a Solution: The Story of Toilet to Tap in Southern California," used archival and media sources, planning documents, and short-term fieldwork to examine the public controversies over water recycling plants in Orange and San Diego Counties. Through visits to operational and pilot-phase plants, interviews with water managers and public relations specialists, journalists, non-profit promoters, and critical analysis of promotional literature and media coverage, the project developed her grasp of the politics of large-scale plant construction across the region. She has built expertise on water and environmental issues in the region through projects during her PhD coursework, including an extended research paper about a L.A. County-based "Water Reliability 2020" initiative, a historiography of the extensive scholarship on water in California, and a history of public discourse around L.A.'s Hyperion Sewage Treatment Plant. This years-long, cross-disciplinary engagement with the region and the resource makes the researcher uniquely positioned to undertake this

investigation. In addition, her doctoral coursework in environmental and political anthropology, ethnographic writing and research methods provides a broad theoretical and methodological toolkit for the issues investigated here.

Preliminary Dissertation Research: The researcher conducted five months of preliminary dissertation fieldwork in Southern California over the summers of 2012 and 2013. In summer 2012, she made initial contacts with L.A.-based water reuse activists and practitioners. She attended numerous public promotional events put on by water agencies, including pilot plant tours and “rain garden” classes. The following summer she reconnected with previous informants and expanded her networks of activist, government, and small business informants. She completed a weeklong Greywater Installation Training Course sponsored by Greywater Action. She is now listed on the group’s website as a certified installer, and is connected to more than 100 others who have completed this course via an active listserv. In addition, she assisted with home greywater and rainwater capture installations Greywater Corps and Hey!TanksLA, small local businesses that specialize in these technologies. All of these organizations have extended invitations to continue assisting with their operations during the extended fieldwork period, and to attend all of their public events. These connections, affiliations and skills combine to make the Co-PI ready to begin this research in earnest when she enters the field.

BROADER IMPACTS

Taken together, the 19 climate models the International Panel on Climate Change based its 2007 report on suggest that the region’s climate will resemble that of the Dust Bowl by midcentury (Seager et al. 2007), while demographers predict that the population in the Colorado River Basin will increase from 50 million in 2000 to 73 million in 2030 (Gober and Kirkwood 2010). These reports suggest that water supply will be falling precipitously as population increases dramatically. Even the scholars most critical of the political work done by manufactured water “crisis” narratives will concede that the combination of these trends will necessitate substantial changes in water distribution, infrastructure, and practice throughout the region. These critics would remind us, however, that a given urban water system is never inevitable, but produced through a messy combination of natural, social, political, and economic entanglements. This research aims to contribute to the complicated process of working out Southern California’s resource future, providing insights into how residents understand their water system and city space, and how new technologies are reshaping those practices and imaginaries. This information has substantial implications for water policy, programming, and activism in L.A., and holds the potential to help nudge the region towards a more socially just and ecologically sustainable resource future.

Notably, the research offers an opportunity to think with communities rejecting a model of environmental politics that frames “ecological” consumption – through the purchase of Fair Trade, organic, or otherwise “ethically” certified goods – as the individual’s greatest potential contribution to sustainability. Greywater activism in this region is about changing individual values and practices within the waterscape, but it also makes aggressive claims on the state, organized around demands for radically different systems of provision (e.g. Wolfe-Erskine, et al. 2005). What possibilities do an environmental politics in the urban global North based not on “better” commoditized consumption but an understanding of oneself as a producer within the waterscape open up? Preliminary research suggests that the answer here is decidedly not “none.” As such, following Gibson-Graham (2008), this research should also be read as a performative form of knowledge production, making visible communities of politics and practice thinking and working through systems of social and material organization the challenge hegemonic capitalist forms.

Additionally, the study will also provide a valuable resource for water agencies, non-profits, and activist organizations undertaking conservation programming. The insights of the study could be of use to environmental and water educators more generally, particularly through its analysis of attendees’ responses to events and publications intended to raise awareness of and interest in these issues. By closely tracking the moments and ways in which residents engage with the waterscape, the project will provide useful data for those attempting to promote such interest – a crucial step towards making water policy that genuinely serves the public interest during this time of socioecological transition.

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