Quantifying the Benefits and Designing Governance Structures for a Water Market in Los Angeles County

One-Page Summary

This project undertakes research which defines an implementation pathway for a new type of water policy for the Southern California region, a regional water market. Such a policy has the potential to address several acute regional problems. Los Angeles County's 215 drinking water systems are fragmented and disconnected. Some systems contain more water resources than they need to meet their local demand, leaving large resources underdeveloped. Meanwhile, other systems have little or no local water resources, leaving them dependent on a single-source of imported water or groundwater aquifer. As a result, systems face unequal access to affordable drinking water, with households in some systems paying as little $200 per year while comparable households in other systems pay over $2000 for the same amount of water.

The research proposed here develops a policy strategy to integrate these fragmented systems, reduce intra-regional inequality, give all systems access to new and often cheaper water supply options while unlocking new financial resources to develop recycled water, storm water and groundwater supplies in systems where such opportunities exist.

The project's proposed research activities focus on better understanding and assessing 1) how to develop governance structures for water trading, 2) what the feasible pathways of market expansion look like, 3) what policy reforms and additional transmission investments might enhance the size and speed of each pathway expansion and 4) the size of the regional benefits of each alternative.

Specifically, we will evaluate feasible market-expansion scenarios based on i) system-level gains from trade, ii) existing water conveyance infrastructure, and iii) regulatory challenges and barriers. Our broader goal is to assess which systems offer the greatest promise in enable county water trading and how to best guide the public discussion about the development and governance of alterative market-expansion pathways. Both the U.S. EPA and the California Water Quality Control Board recognize the lack of this kind of research as a critical gap in our regional system of water governance, and have provided letters of support for this project.

We propose measuring the performance of prospective governance frameworks and associated market-expansion scenarios using the following metrics: 1) the number (or percentage) of customers experiencing water cost savings, 2) total avoided costs for the buying systems in the market, 3) reductions in regional inequality as measured by the spread (variance) in regional water costs across systems, 4) the total amount of new financial investments in generating recycled water, captured storm water and groundwater, 5) the total amount and percentage of new local water supplied relative to imported water.

With the implementation of an urban water market, the first of its kind in the U.S., L.A. County would be viewed as a resource management and sustainability leader. Moreover, the research informing the potential gains from trade, market design and optimization will deliver several scholarly innovations. These innovations will inform our understanding of the potential for urban resource trading mechanisms and can be used as a practical model for similar market formations in urban areas across Southern California.

Quantifying the Benefits and Designing Governance Structures for a Water Market in Los Angeles County: Full Proposal

The Challenge Facing Water Systems in Los Angeles County

Los Angeles County contains 215 community drinking water systems. Including adjacent counties, that number rises to over 400 serving over 19 million people. These systems are characterized by a vastly unequal distribution of water resources. These resources include storm water, drinking water, recyclable water, groundwater, and ground and surface water storage. Some systems contain more water resources than they need to meet their local demand, leaving large resources underdeveloped. Currently, water-resource-rich systems have neither the incentives nor the financing to develop these "surplus" resources. Meanwhile, other systems have little or no local water resources, leaving them dependent on a single-source imported water or groundwater aquifer.

As a result, systems face unequal access to affordable drinking water with households in some systems paying as little $200 per year while comparable households in other systems pay over $2000.[1 2] As shown in Table 1, the top five most expensive systems range from $1,502 to $2,244 while the least expensive systems range from $282 to $145.

Table 1: Most and Least Expensive Residential Water Costs for Los Angeles County Systems

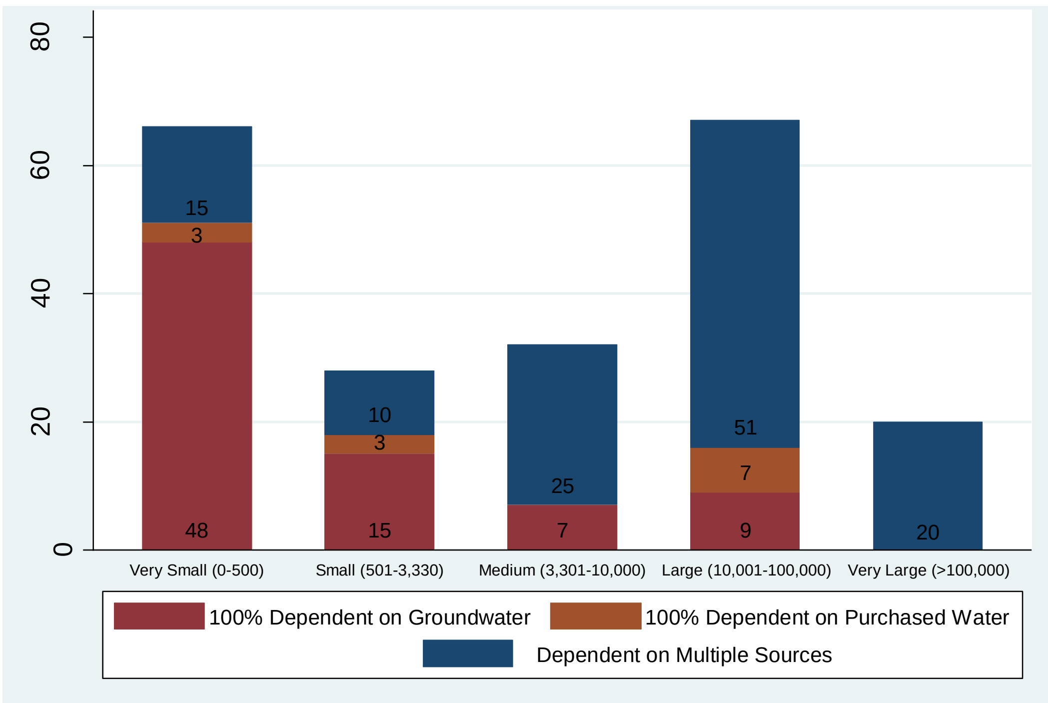
System Name (Population served)	Annualized Cost for 18 CCF
Five Most Expensive Systems	
1. CA Water Service Co.- Lake Hughes (711)	$2,244
2. CA Water Service Co.- Leona Valley (1296)	$1,834
3. LA County Waterworks Dist. #21- Kagel Canyon (991)	$1,658
4. Park Water Company- Bellflower/Norwalk (67,200)	$1,539
5. Park Water Company- Lynnwood/Compton (45,400)	$1,502
Five Least Expensive Systems	
1. Maywood Mutual Water Co. #1 (5,500)	$145
2. Pico Rivera Municipal Water (39,000)	$192
3. Lomita Municipal Water (20,256)	$235
4. City of Industry Waterworks System (7,000)	$278
5. LA County Waterworks Dist. #40- Antelope Valley (9,822)	$282

[1] DeShazo, J.R., Gregory Pierce and Henry McCann. 2015. "Los Angeles County Community Water Systems Atlas and Policy Guide: Supply Vulnerabilities, At-Risk Populations, Conservation Opportunities, Pricing Policies, and Customer Assistance Programs." UCLA: Luskin Center for Innovation.
[2] Gregory Pierce and J.R. DeShazo (2016). "Disparities in Drinking Water Cost Across Los Angeles County." UCLA Luskin Center for Innovation. Policy Brief.

These regional inequalities, inefficiencies and related problems can be traced to a set of highly-fragmented independent water systems that operate as natural monopolies with captive consumers. The water supply options available to each system have been largely determined by geographic and historical processes, rather than allocation on the grounds of equity, efficiency or the environment.

As shown in Figure 1, a large number of the very small and small systems depend exclusively on groundwater. However, a large number of the medium to large sized systems are supplied with imported water directly or indirectly from the Metropolitan Water District (itself a natural monopoly) which conveys its water from the State Water Plan (Bay Delta) and the Colorado River Aqueduct.

Figure 1: Water Supply Sources by Size of Community Water System



The Development of a New Regional Policy Approach

The research proposed here develops a new policy strategy, a OneWater market, designed to integrate these fragmented systems, reduce intra-regional inequality, give all systems access to new and often cheaper water supply options while unlocking new financial resources to develop recycled water, storm water and groundwater supplies in systems where they exist.

Under these conditions, creating the opportunity for systems to trade water with one another would create many potential benefits that include:

> ***Improving regional equity.*** A regional water market could enable those systems with underutilized water resources to develop and supply water to systems facing higher costs, poor quality, and unreliable supplies. This opportunity to trade water expands the lower-costs supply options available to higher-costs systems, thus reducing regional inequality.

Unlocking financing for green infrastructure. A regional water market could significantly increase the financing available for under-developed storm water capture, ground or surface water storage, conservation, and waste water resources that can be recycled. Trading would create a revenue stream that attracts new investment in green infrastructure.

Increasing resiliency (adaptability) to droughts & climate change. Droughts and climate change increase the stress on the region's vulnerable water systems which have access to limited, or increasingly costly, supply options. A policy that facilitated water trading could enable these vulnerable systems to plan for, and have ready access to, lower-cost and more reliable water supplies.

Increasing reliance on local water. The county's importing water systems face drought, climate change, seismic risk, rising energy costs and increased uncertainty about water imported from the Bay Delta. A regional water market could enable water systems without adequate local water resources to increase reliance on local water resources and reduce exposure to the risks of imported water.

Local Policy Significance

Municipal and county leaders are searching for a policy framework that advances the above goals. For instance, the Mayor's office of Los Angeles City has announced a goal of relying on more than 50% local water by 2040 (OneWater LA, 2015) and the broadly-supported UCLA Grand Challenges initiative has targeted 100% local water reliance in Los Angeles County by 2050 (UCLA Grand Challenges, 2015). The City of Santa Monica has pledged the aggressive goal to reach 100% local water by 2020 (City Sustainability Plan, 2014). Other municipalities, such as the City of Long Beach, the City of Glendale, the City of Palmdale, and the City of Torrance have also pledged to reduce their dependency on imported water. (City of Long Beach UWMP, 2010; Greener Glendale Plan for Municipal Operations, 2011; City of Palmdale Strategic Plan Brochure, 2014; City of Torrance UWMP, 2010).[3]

In addition, the Los Angeles Regional Water Control Board and the Environmental Protection Agency (EPA) have set goals to increase green infrastructure and low impact development (LID). The California EPA requires municipalities to maintain storm water management plans for their municipal separate storm sewer systems (MS4s), as well as industrial entities and developers of construction projects to obtain special permits for storm runoff. LID projects use natural features to enhance storm water management, groundwater recharge, and other ecosystem services, such as carbon sequestration and pollution control.

With the passage of Senate Bill 985 (Pavley, 2014), municipalities are required to develop Storm Water Resources Plans in order to receive bond funding after January 2014. However, the State does not

[3] This is not a comprehensive list of Los Angeles County cities that have made plans to reduce imported water dependency. We investigated a sample of approximately 15 cities, the 10 largest cities and an additional 5 cities, to identify whether the cities had articulated general plans for local versus imported water reliance.

provide financing options for plan implementation and associated project costs. Municipal general fund revenues have historically paid for green infrastructure and LID projects but cities are stretched thin financially. Special taxes geared towards raising revenue for green infrastructure are a nominal solution but are politically difficult to implement given the restrictive nature of California's Propositions 13 and 218. A OneWater Market would provide positive incentives for municipalities and other entities to build and support green infrastructure projects, rather than react only to the punitive incentives now in place.

Current knowledge

Studies of large-scale water trading have often focused on re-allocating water either amongst irrigated farms or from agriculture stakeholders to urban areas, where the marginal value of water is frequently higher. Brewer et al. (2005) document the fact that in the Western United States most water trades have been from agricultural interests to urban areas, with fewer agriculture-to-agriculture or urban-to-urban trades. In California, many studies by researchers at UC Davis such as Draper et al. (2003) have used an optimization modeling approach to analyze the effect of various policy and climate scenarios on state-wide use of water as well as the potential benefits from water markets. Given that the vast majority of water used in California is applied to irrigated crops, these studies have naturally tended to focus on changes to the agricultural sector.

Recently, there has been increased interest in using water markets to move water from agriculture to environmental water uses. Much of the policy discussion has taken place in Australia (Wheeler et al., 2013), where at least one study (Connor et al., 2013) has applied an optimization model to this topic. By contrast, there appear to be few, if any, studies that apply an optimization modeling approach to the analysis of urban-to-urban water markets. Specifically, there does not appear to be any previous work comparable in scope and institutional detail to the proposed analysis of a OneWater market in Los Angeles County.

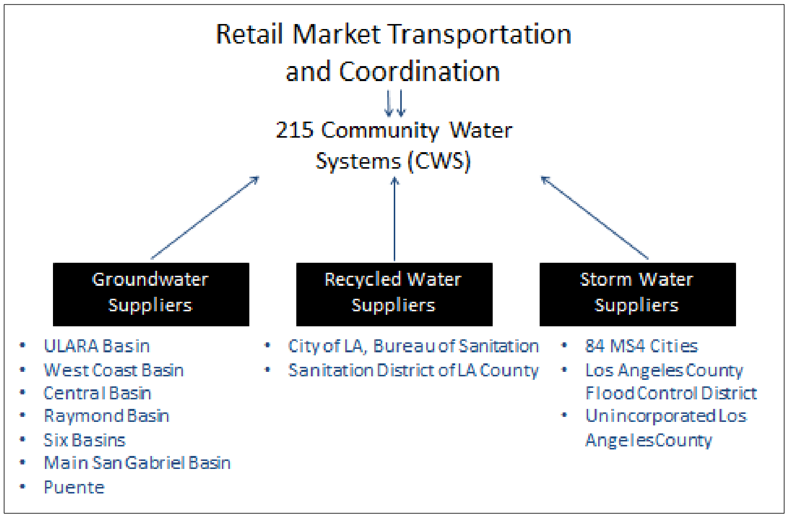
Critical Elements for a Trading Program in Los Angeles County

Los Angeles County has the all of the participants and physical capacity needed to design and successfully operate a OneWater market. We have already outlined the demand for local water presented by community water systems. In this section, we briefly introduce the remaining key participants and sketch out their potential roles in a functional regional water market.

1. Institutions with the capacity to supply new local water resources

There are three possible sources of local water that might be further developed. As shown in Figure 2, these include i) recycled water, ii) captured storm water and iii) groundwater supplies and storage. Each of these sources is controlled by a distinct set of stakeholders (also shown in Figure 2).

Figure 2: Major Stakeholders in a Los Angeles County Market Governance Structure



Below, we briefly describe the size, location and functioning of each of these prospective local water sources. We also discuss the nature of the role that specific institutional actors might play in a OneWater market if it were to be developed. The purpose of the research is to further develop pathways for each of the stakeholders and to identify and overcome regulatory barriers to this opportunity.

Recycled Water

By far the two largest generators of recycled water in the county are the Los Angeles City and Los Angeles County departments of sanitation. These entities are required to incur substantial costs to treat wastewater to tertiary or secondary standards before releasing this volume into receiving waters or allocating to re-use.

The Los Angeles City Department of Public Works, Bureau of Sanitation produces 80 million gallons of reclaimed water per day (Sanitation District of LA County, 2016). Outside of the city, The Sanitation District of Los Angeles County provides recycled water from 10 water reclamation plants to more than 5 million customers within their service area (Sanitation District of LA County, 2016). These county water reclamation plants, along with a Joint Water Pollution Plant, treat approximately 510 million gallons per day (mgd), 165 mgd of which are available for reuse (Sanitation District of LA County, 2016). However, the vast majority of the reclaimed or recycled water generated in the County is not subsequently allocated to high value uses, and in many cases is released into receiving waters with no beneficial use. A market would incentivize both the city and the county to generate more recycled water for trading.

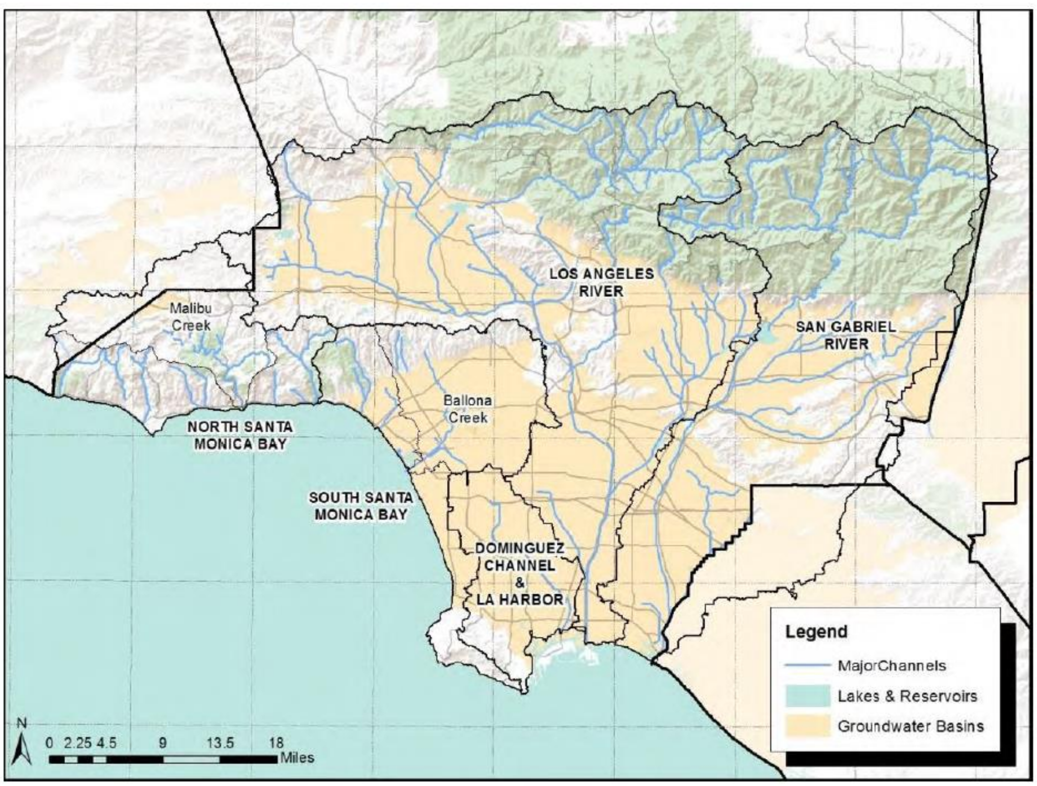
Captured Storm Water

Los Angeles County also maintains one of the nation's largest municipal separate storm sewer systems (MS4), as required by federal and state standards since the 1990s (State Water Resources Control Board, 2011). The LA County MS4 permit covers 86 permittees: the unincorporated County of Los Angeles, the

Los Angeles County Flood Control District, and 84 incorporated cities within LA County.[4] Given the regulatory mandate, storm water capture is thus a high priority for cities across the county. Some cities, like the City of Los Angeles, have developed ambitious storm water master plans to enhance their storm water capture (LADWP, 2015). Still, the potential for storm water capture is vastly under-utilized (Gold, 2015).

Strategies for storm water capture fall into three major categories: decentralized capture for direct use, decentralized capture for groundwater recharge, or centralized capture for recharge. Centralized capture for recharge currently yields by far the biggest opportunity for trading. For instance, on average, LA City captures 27,000 acre feet of water per year in spreading grounds used to recharge the San Fernando Basin (LADWP, 2015). LA County also operates 23 separate spreading basins with conjunctive use and groundwater banking schemes. Among the seven watersheds in LA County (displayed in Figure 3), the Flood Control District estimates that by far the greatest potential for centralized capture until 2095 will be present in the Los Angeles River and San Gabriel River watersheds (see Table 9, LA Flood Control, 2015). Cities in these watersheds thus likely comprise the most important stakeholders in the market with respect to storm water capture supply.

Figure 3: Los Angeles Basin Storm Water Conservation Study Watersheds



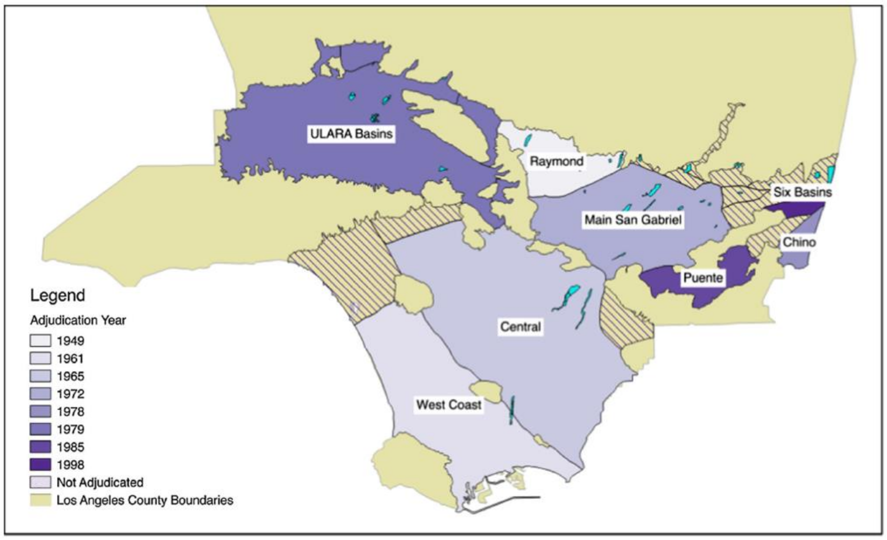
Source: Image from LA Flood Control, 2015.

[4] The City of Long Beach is the only exception as it has held its own MS4 permit since 1991 (State Water Resources Control Board, 2011).

Groundwater supply and storage

There are seven adjudicated water basins in Los Angeles County: West Coast, Raymond, ULARA, Six Basins, Puente, Main San Gabriel, and Central Basin[5] (Porse et al., 2015). As Figure 4 (below) shows, five of these water basins (West Coast, Raymond, Puente, Main San Gabriel, and Central Basin) adjudicate distinct basins while two (ULARA and Six Basins) adjudicate multiple.

Figure 4: Adjudicated Ground Water basins in LA County



Source: Image from Porse et al., 2015

Safe extraction levels are identified for each basin and basin managers set targets based on previous year data to promote long-term sustainability. These targets can change, however, from year to year dependent on rainfall and other conditions affecting the amount of water available in the basin. Public, private, non-profit, and publicly-regulated organizations own rights to the water within each of the basins.

Each basin varies in terms of capacity and rights' holders, and a full accounting of available storage space for each groundwater system has not been updated since 2007 (MET, 2007). However, ULARA and West Coast-Central Basins (collectively, the Water Replenishment district) have the first and second largest groundwater pumping rights and most available storage space of these basins, and thus are the most important stakeholders in the market with respect to groundwater supply.

In a OneWater market, groundwater suppliers could coordinate with each other and trade water based on supply in each basin. Historically, managers could dictate pumping in their basin, but could not access more water from other basins or sell excess water to other potential customers. If a city like Los Angeles needed more water than it could pump from its allocated groundwater sources, it had to purchase

[5] Chino Basin is an eighth LA County water basin but sits only partially within LA County. (Porse et al., 2015). We have not decided whether to include this basin in our analysis as of yet.

imported water to fill that need. However, a recent ruling with respect to West-Central basins has also made groundwater banking and trading possible (U.S. Department of the Interior, 2014).

2. Institutions that may facilitate water trading and market accounting

In addition to supplying new local water, the region will need to develop the capacity to transport traded water across the existing network and to expand this network as demand dictates. The most likely candidates to provide these services are introduced below (also identified in Figure 2 as "Retail Market Coordination and Transportation").

There are several organizations and agencies which could lead the coordination efforts of a OneWater Market. There are seven wholesaler agencies in Los Angeles County. For example, the Metropolitan Water District (MWD) already delivers water to nearly 19 million people in six counties. (MWD, 2015) MWD is a state-chartered cooperative of 26 member agencies, including cities and public water agencies. (MWD, 2016) Its service area includes 5,200 square miles and it provides more than 50% of the region's water. (MWD, 2015)

The Water Replenishment District (WRD) is another potential candidate to lead the coordination effort. WRD is the official groundwater level monitoring entity and Watermaster for the Central and West Coast Basins, two of the most utilized groundwater basins in the state. (WRD, 2016) WRD is also responsible for safe drinking water programs, combating seawater intrusion and groundwater replenishment operations. It manages groundwater for nearly four million residents in 43 cities in Los Angeles County.

3. Identifying potential water trading frameworks

How might systems actually trade with each other? There are three basic approaches or trading frameworks.

Trading via a Pipeline

The seller may send the water to a buyer via a pipeline. This requires that the selling systems' water source be physically connected to a pipeline network that can deliver water to the buying systems.

Virtual Trading via Wholesaler-proxy by Pipeline

Virtual trading relies on the presence of a third-party wholesaler who delivers water to both the selling and the buying system. A virtual trade of specific quantity occurs when the selling system orders the wholesaler to 1) deliver that quantity to the buying system and reduces it own delivered amount by the transacted quantity. The seller may also compensate the wholesaler by delivering water of appropriate quantity and quality into the wholesaler network.[6] The advantage of virtual trading is that it does not require that the selling system be able to physically deliver the water to the buying systems, only that a common wholesaler (or connected set of wholesalers) be connected to the buying and selling system.

[6] We assume the wholesaler will be paid a reasonable wheeling fee for executing these transactions which will cover its transportation and administration costs.

Trading via Shared Aquifer

Systems that overlay a common aquifer may also trade via that aquifer. This is physically possible if several conditions are met. First, the selling systems are able to deliver via injection wells or infiltrated storm water a verifiable quantity of water to that aquifer. Second, the buying system can extract that same quantity of water via wells within a reasonable period of time. Trading via a shared aquifer requires a very well developed understanding of aquifer dynamics and a monitoring system in order to verify the availability and removal of the traded water.

Shaping Effective Governance around Trading Frameworks

The specific trading approaches developed will shape a water trading market in important ways. Most importantly, the geographic size (footprint) of each trading framework will determine which systems can trade with each other. This determines which systems can supply new local water as well as which systems will be able to purchase this water. By influencing participation in the market, these trading frameworks will also influence the size of potential benefits, including the magnitude of customer cost reductions, reductions in inequity and financial investment in local water infrastructure development.

Research Questions, Activities and Methods

Many of our research activities below focus on better understanding and assessing how to 1) develop governance structures for each of the trading systems, 2) what the feasible pathways of market expansion for each look like, 3) what policy reforms and additional transmission investments might enhance the size and speed of each pathway expansion and 4) the size of the regional benefits stemming from these alternatives.

Specifically, we will evaluate feasible market-expansion scenarios based on i) system-level gains from trade, ii) existing water conveyance infrastructure, and iii) regulatory challenges and barriers. Our broader goal is to assess which frameworks offer the greatest promise to enable inter-regional water trading and how to best guide the public discussion about the development and governance of such a market.

Below we identify our key research tasks and the associated methods.

Task 1 Develop high-resolution system-level inventory of marketable water resources

As the empirical foundation of market-scenario modeling, we will develop a high-resolution system-level inventory of locally-available water resources which will include recycled water, captured storm water and groundwater and aquifer storage. To do this we will review existing data from system-level Integrated Resources Plans, the US Geologic Service, the Departments of Flood Control and Sanitation, the Metropolitan Water System, as well as published research papers.

Accomplishing this task will require comprehensively identifying the systems with large underdeveloped water resources that may be sellers of water. We will also collect estimates of how much it would cost to develop these resources. This will be done for water recycling, captured storm water, and the groundwater and storage.

Task 2 Characterize current costs of local water supply for each community water system

We also need to know the local financial costs of developing these local water sources at the community water system level. This enables us to predict which sources of local water will be competitively developed for the region given prevailing wholesale and retail water rates.

Accomplishing this task involves obtaining cost data from community water systems' Urban Water Management Plans, system websites and, if necessary, directly from systems regarding the quantity of each water source used and the cost of each source. These cost estimates can be compared to special reports completed for systems by consulting firms, and state-wide analysis of these costs.

Task 3 Characterize the extent of i) piped networks, 2) system-wholesale water relationships and shared aquifers among systems

We must also understand who has the ability to trade and their potential trading partners. This requires understanding the ways in which systems are connected. Following our approach we will identify whether systems have access to three different types of trading systems. These three include:

1. *Direct pipeline connections*
2. *Pipeline connected via shared wholesaler*
3. *Shared aquifer*

We will obtain data on whether and how systems are connected to the various pipeline networks and which ones share a common or connected wholesaler by mapping (using GIS) the networks of Metropolitan Water District, the Los Angeles Water District, Central and West Basin as well as other important wholesalers.

To determine which systems share a common aquifer (and might use that aquifer to trade) we will underlay the US Geologic Service substrata maps. We must then evaluate whether these systems both have extraction wells that draw on that common aquifer.

Task 4 Develop new Governance Structures on a county-wide basis of each type of water trading system

We will evaluate alternative governance systems which will vary based on each type of water trading system. Specifically, we will identify new regional institutions or joint-powers authorities (JPAs) which need to be created to facilitate the possible expansion of these markets. As part of each possible governance system, we will evaluate the role of the key stakeholders identified above with a specific focus on the Metropolitan Water District and the Water Replenishment District as well as the key groundwater basin masters. For additional discussion of governance issues see the description of Task 7 below.

Task 5 Develop a county-wide model for each type of water trading framework

Once tasks 1-3 are completed we will be in a position to better understand:

i) where local water sources are located,

ii) how much it is likely to cost to develop them and

iii) whether, how and with whom they might be traded.

5a. Define an early and mature market expansion pathway for each framework

Based on analysis of these data we anticipate defining two sets of potential market expansion pathways for each trading system.

The ***early-market expansion pathway*** will involve only those systems that are i) connected to one another in a manner which enables them to currently trade and also ii) share a clearly-defined ability to gain from trade that exceeds their likely wheeling & administrative costs.

The ***mature-market expansion pathway*** assumes that all systems which have significant gains from trade can do so, so long as they pay the associated wheeling and administrative costs. This market-expansion pathway assumes that the problem of facilitating trading has been solved.

5b. Estimate the county-wide benefits of each pathway for each trading framework

The optimization model used in the OneWater market analysis will incorporate data collected in other facets of this project. Data feeding into the model include the capacity of each CWS to store and treat water and all relevant costs, as a function of conveyance, treatment, storage, pumping, and energy use parameters. Given an existing baseline for water supply by source, quality, and the current water supply infrastructure, the model will be used to estimate potential gains from trade under a OneWater market structure. The model will allow each independent unit (community water system or other supplying entity) to trade with other units and the aim of each will be to minimize the cost of meeting consumer water demand. Aside from considering alternate institutional arrangements, the model will allow us to quantify the benefits of trade in terms of reductions in the differences and variability in prices charged to consumers across the county. Additionally, the spatial distribution of community water systems and the infrastructure connecting them will be explicitly represented so that wheeling costs are accurately accounted for. Trade scenarios considered will be based on the connections between the communities, whether they have access to a common aquifer, and both shared connections and aquifer access. Further expansions to the market beyond LA County may also be modeled, thus allowing for a greater understanding of the potential cost reductions from building out the water market.

The analysis will initially be done for a single year with monthly water demand requirements that must be met. Using this framework, we can consider different types of years (e.g., average water availability, wet, mild drought, and severe drought) and how water trading allows water managers to reduce costs to consumers. We can also extend the framework to be optimized over multiple years, allowing us to account for how water trading can help communities stretch limited resources in the face of prolonged drought. A multi-year analysis will give us the ability to rigorously analyze water trade impacts on the ability of communities to adapt to changes in climate and demographic trends. In this way, we can better understand the impact of alternate institutional and infrastructure arrangements on the resilience of community water systems as well as the advantages that may come from further investment in green infrastructure.

Task 6 Compare the benefits (via performance metrics) of each trading system and each expansion pathway to identify the best approach for Los Angeles County

The optimization model can assist us in identifying *which* market expansion pathways employing *which* water trading systems yield the largest benefits for water systems within Los Angeles County. We can even identify which pair-wise trades between specific systems will generate the largest benefits.

We propose measuring the performance of these prospective market scenarios using the following performance metrics: 1) number (or percentage) of customers experiencing water cost savings, 2) total avoided costs for the buying systems, 3) reductions in regional inequality as measured by the spread (variance) in regional water costs across systems, 4) total amount of new financial investments in the development of recycled water, captured storm water and groundwater, 5) total amount and percentage of new local water supplied relative to imported water.

Task 7 Identify policy reforms needed to develop the governance structures for each trading system

We anticipate the need to reform several aspects of existing public sector codes, rules and administrative procedures. At the heart of our proposal is the goal of moving water systems away from their position as natural monopolies which have expressly prohibited the development, and trading, of local water with other systems. In addition, regional institutions such as the Metropolitan Water District, the Water Replenishment District, and large water wholesalers may have to develop new capacities, authorities and business models in order to meet the region's need for a water market.

Anticipating Opposition and Support for a regional water market proposal.

Water systems in the region operate as natural monopolies.

Potential Losers. A policy that creates the option for systems to purchase new lower-cost water from one another will represent a potential financial loss for systems that earn a guaranteed rate of return on invested capital or total costs. The managers of these systems may oppose the creation of, and thus participation in, such a market.

Potential Winners. Municipal, county and mutual systems that can pass these water costs-savings on to their customers without financial loss will benefit. Similarly, systems that will receive new investment and generate new revenue flows from the development of undeveloped water sources will benefit greatly from participating in trading. Finally, most customers in the region should benefit either because they will enjoy lower costs or because their previously un-developed water resources are generating revenues that can offset their own production costs. The regional and state environment will also benefit from reduced ecosystem disruption due to a reduction in imported water

Other support being received by the PI for the proposed work, and/or for related projects

We have received $63,000 in support from the UCLA Grand Challenges Initiative for a Sustainable Los Angeles as seed money to begin the data collection to inform the creation of the OneWater Market.

Along with this seed money, we have also received support from Mark Gold, director of the UCLA Grand Challenges Initiative, to assist in convening the stakeholder process.

Due in part to our existing relationships with state agencies, such as the California EPA and the State Water Board, we are confident in their support. Staff at local and state agencies have expressed interest in our project (see attached letters of support from the State Water Boards and the EPA). We plan to include these entities in our research process both to inform our work as well as to disseminate our findings.

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