Southern California Water Dialogue

The 21st Century of Water in Southern California: Living Within Our Means

April 27, 2022

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CONNER EVERTS

Executive Director

Southern California Watershed Alliance

DEE ZINKE

Assistant General Manager/Chief External Affairs Officer, External Affairs

The Metropolitan Water District of Southern California

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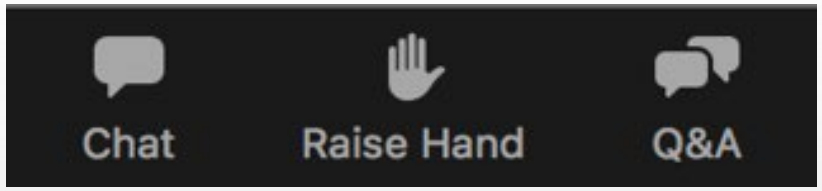
Webinar Ground Rules



- **Technical Difficulties:** Use chat feature to let us know
- **Asking a Question:** Use Q/A feature, type in question, and click send. Questions addressed after presentation.
- **Poor Connection:** Move closer to your wireless router and turn off other services using bandwidth (e.g. Netflix)
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- **Timetable**: Presentation runs apx 60 minutes followed by Q/A session

How to Ask A Question

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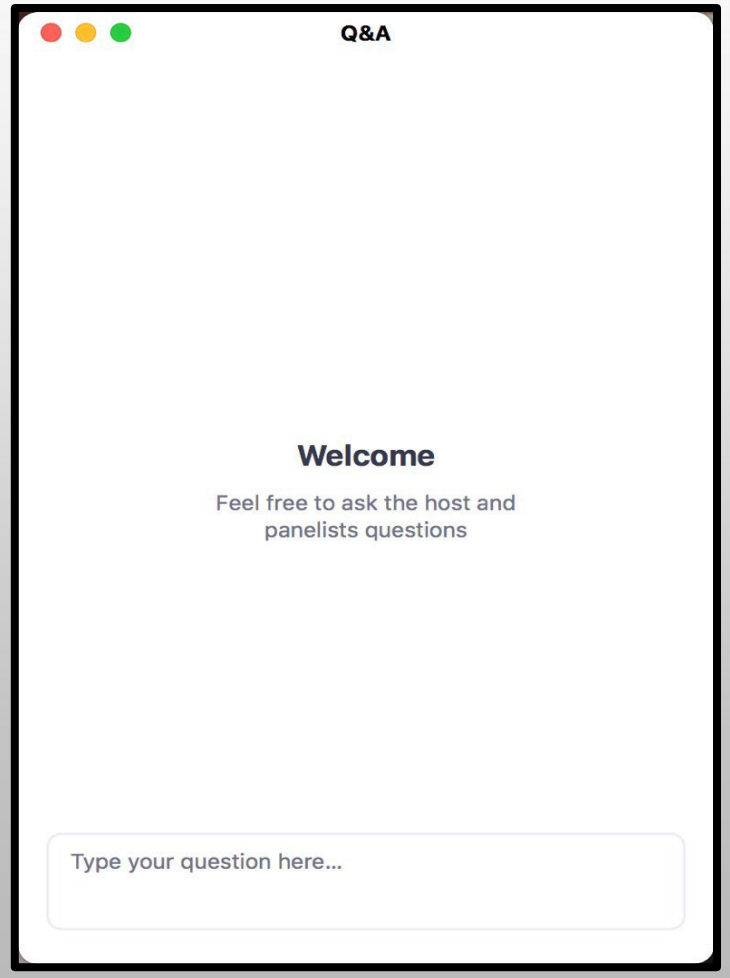
Type in question and then click send



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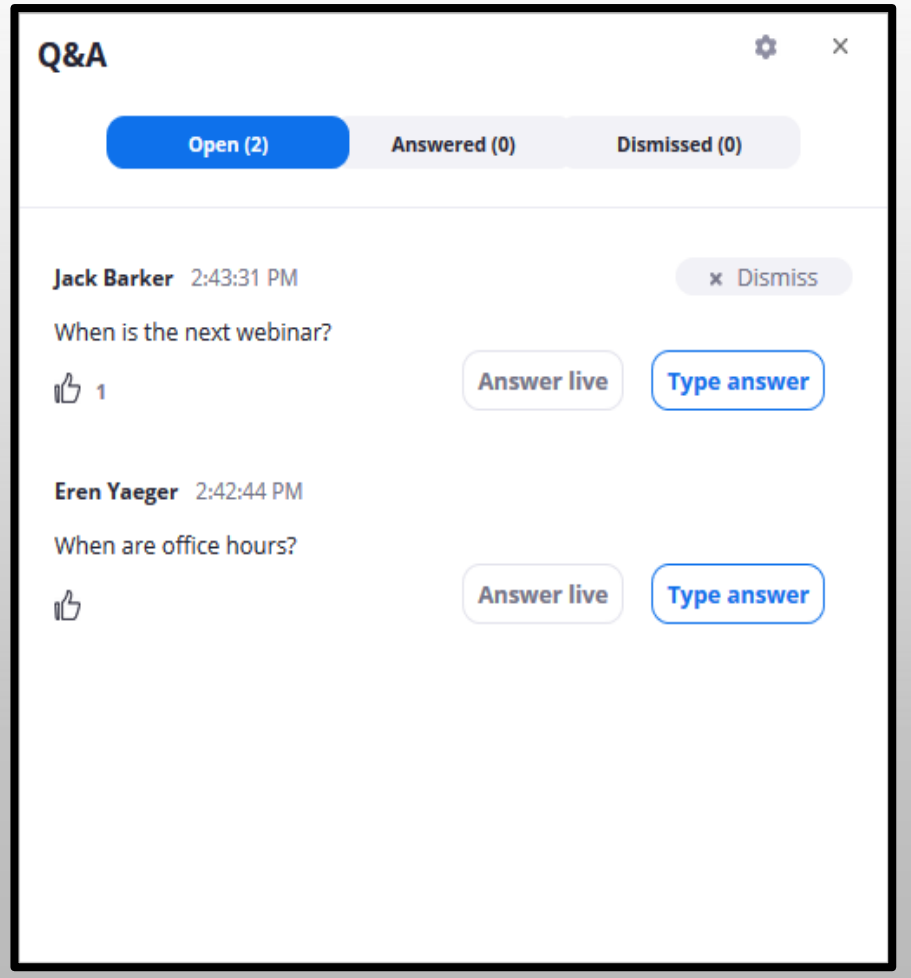

Southern California Water Dialogue

Agenda

- Announcements and Introduction of Speaker
- Topic overview – by Conner Everts
- Discussion
- Dialogue (Q/A) – Led by Dee Zinke
- Concluding remarks

Speakers

Dr. Stephanie Pincetl, Chair, Environmental Science and Engineering, UCLA Institute of the Environment and Sustainability

Dr. Erik Porse, Research Engineer, Office of Water Programs, Sacramento State University and Assistant Adjunct Professor, California Center for Sustainable Communities at UCLA

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The 21st Century of Water in Southern California:

Living Within Our Means

Erik Porse
Research Engineer, Office of Water Programs at Sacramento State
Assistant Adjunct Professor, UCLA Institute of the Environment and Sustainability

Stephanie Pincetl
Professor, UCLA Institute of the Environment and Sustainability
Director, California Center for Sustainable Communities

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WATER PROGRAMS Sacramento State

UCLA Institute of the Environment and Sustainability

Some Themes for the 21st Century

- Resilience, reuse & circularity
- Equity and efficiency
- Solutions beyond technology
- "Complex", not "complicated"
- Adaptation

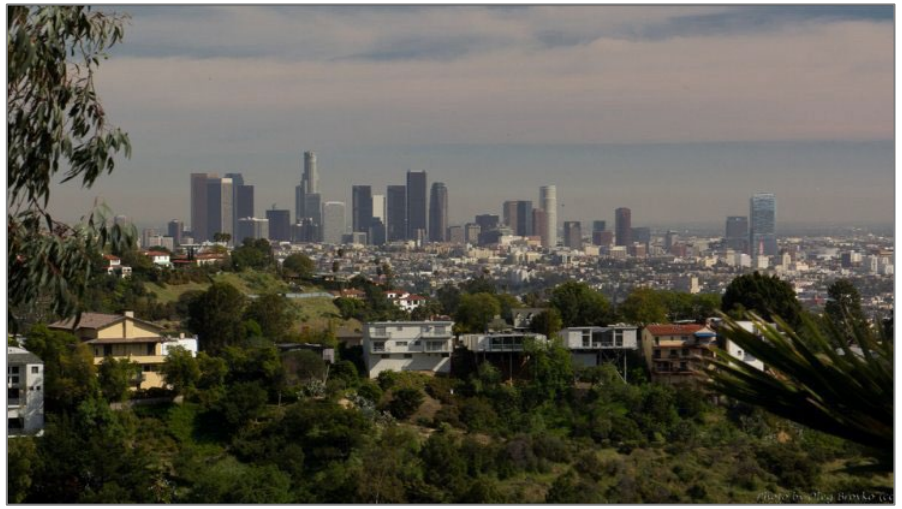


Photo Credits:
Belboo/Flickr, DWR

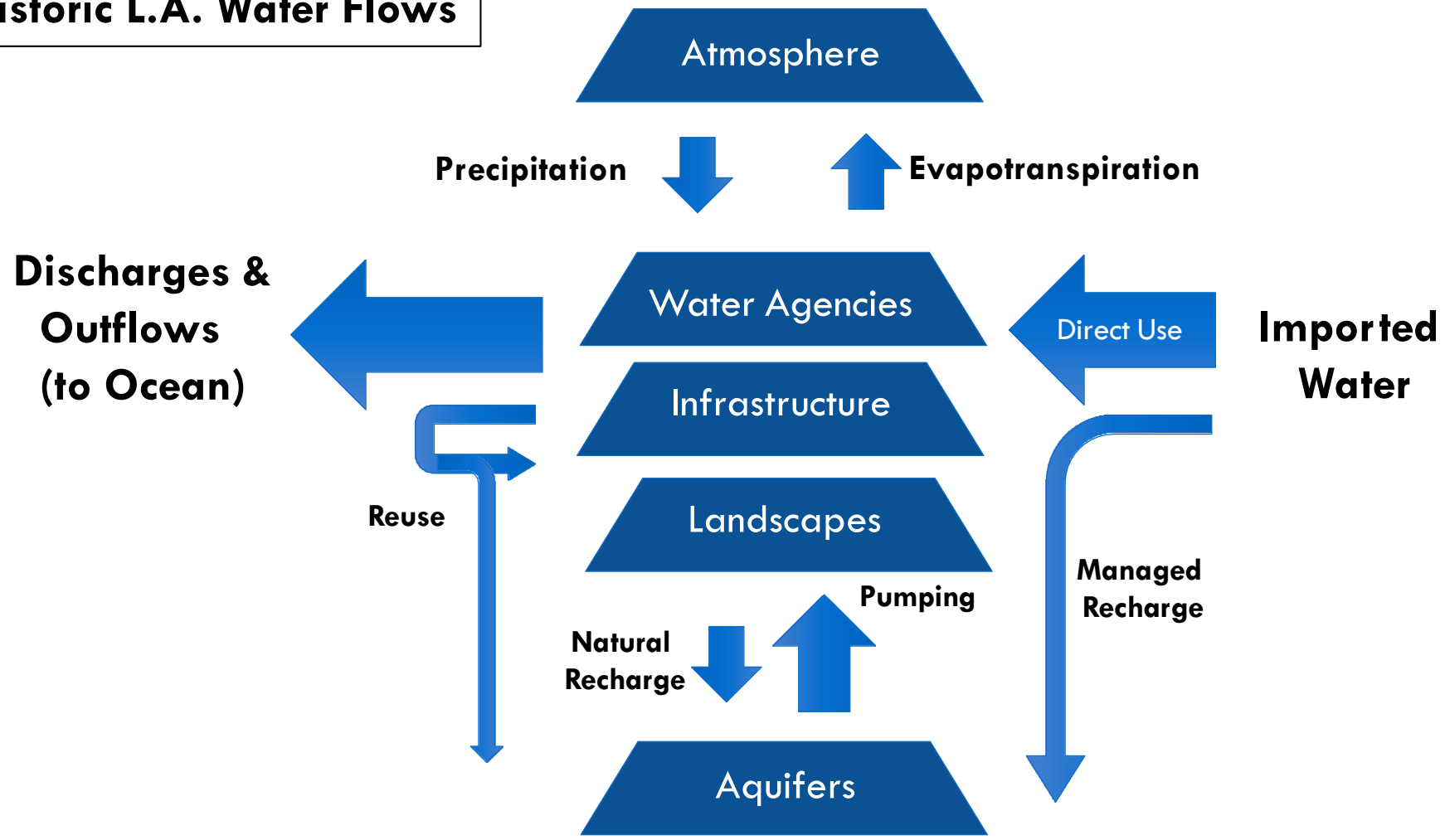
Capacity, Connectivity, and Performance

- Increasing capacity or improving connectivity does not necessarily result in better performance
  - Braess's Paradox: Mathematician Dietrich Braess demonstrated that adding roads can result in slower overall traffic speeds (1968)
- In a system with many self-acting participants, adding more connectivity may not result in the best solution

Photo Credits:
Francois Guillot/AFP, Getty Images

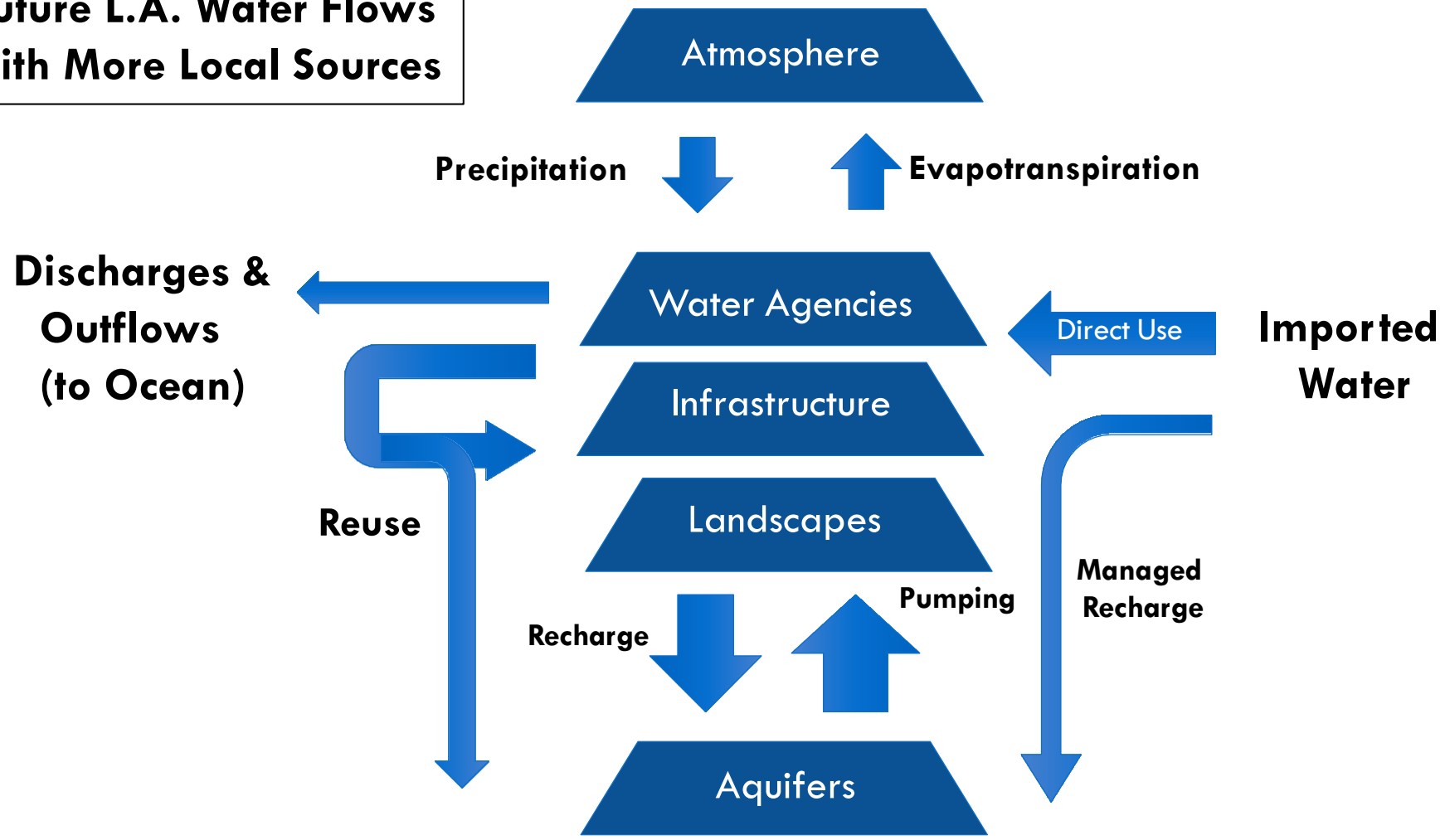
Changing Water Systems in Los Angeles

Historic L.A. Water Flows



Changing Water Systems in Los Angeles

Future L.A. Water Flows With More Local Sources



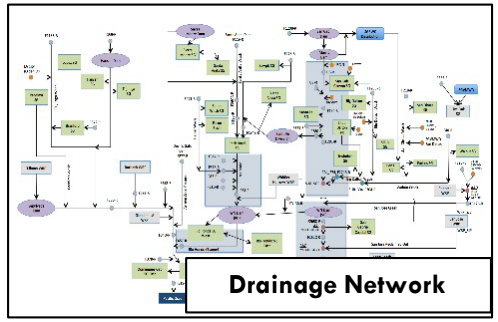
Reducing the "Footprint" of Urban Water

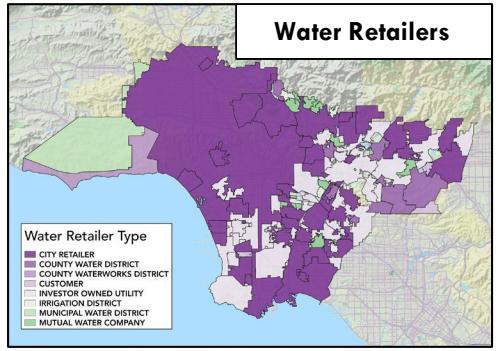
- Living within means: Changing value structures and tracking data
- Strategies:
    1) Track inputs and outputs across linked water systems
    2) Reduce demand and reliance on imported sources
    3) Diversify and democratize water needs
    4) Boost local water resources
    5) Reuse and recycle as much as possible

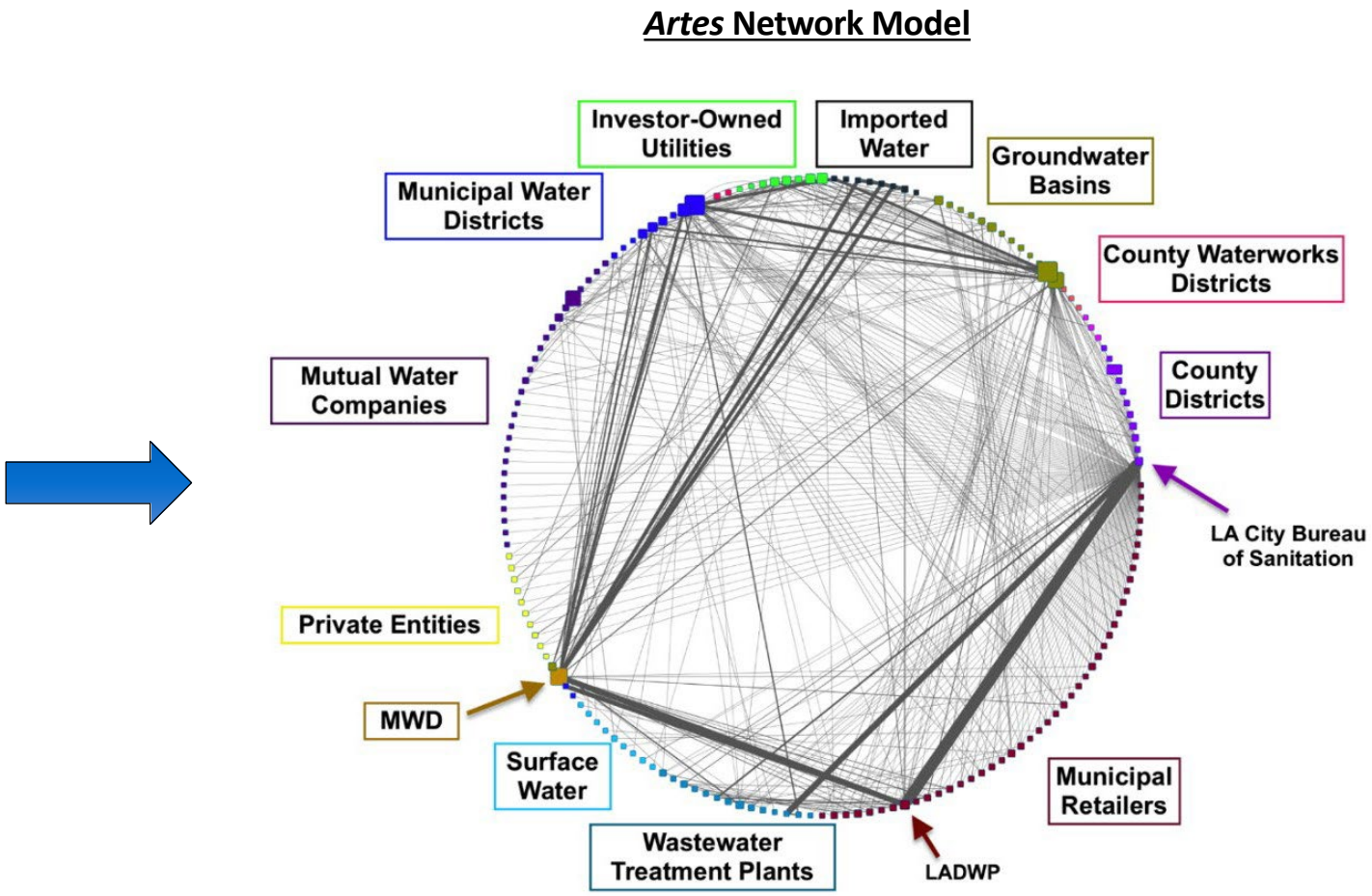
Adapted from: Jonathan Rose (2016), The Well-Tempered City.

Tracking Flows: Local Water Reliance in L.A. County

Artes: A Simulation/Optimization Model for L.A. County Water

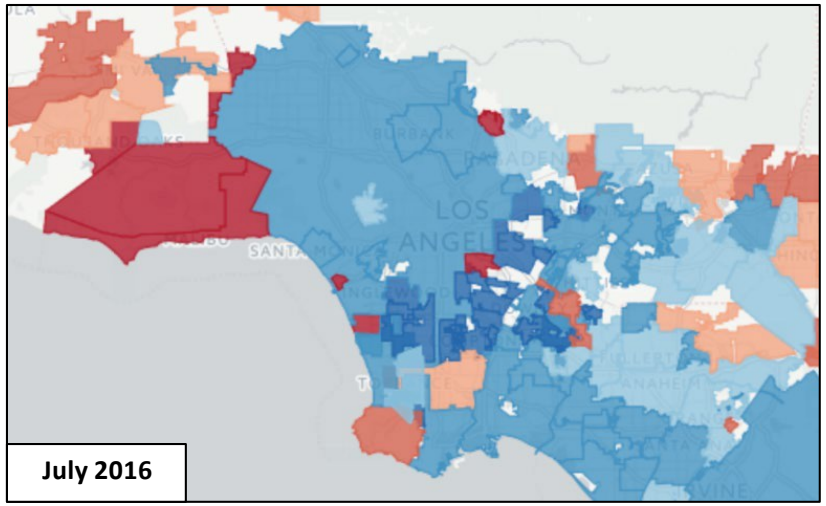


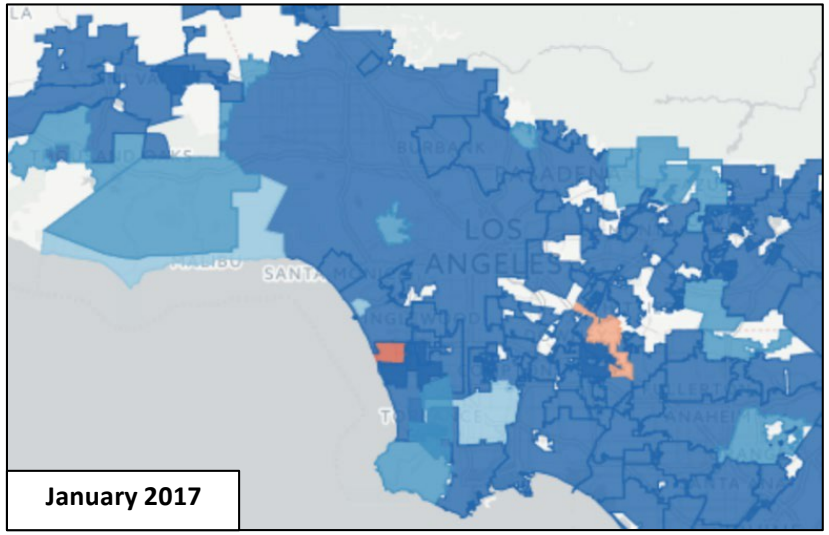


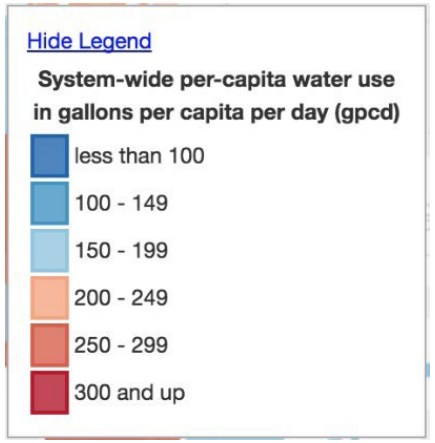


Porse, E., KB Mika, E Litvak., K Manago, K Naik, M Glickfeld, T Hogue, D Pataki, M Gold, & S Pincetl (2017). "Systems Analysis and Optimization of Local Water Supplies in Los Angeles." JWRPM, 143(9).

Demand: Reducing Water Use







<u>Regional Target</u>:

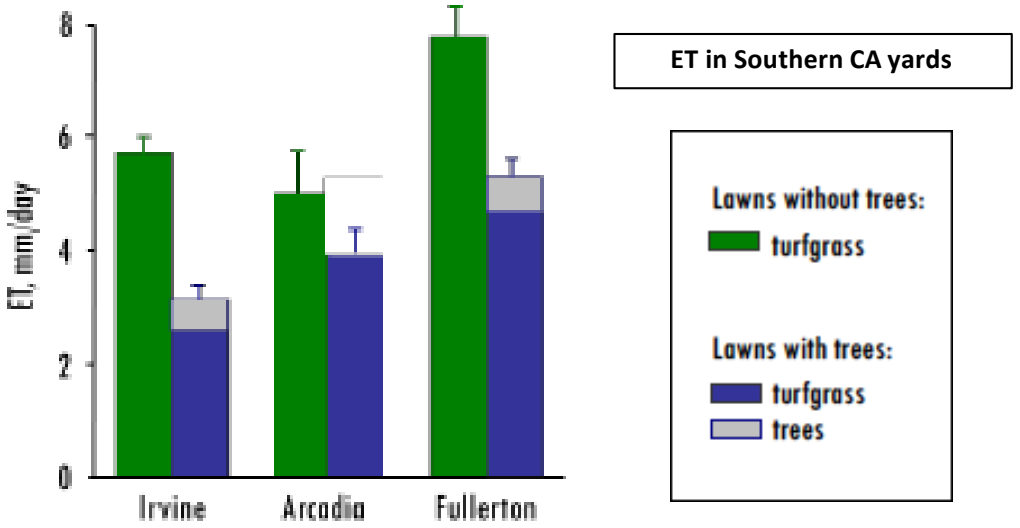
80 – 100 gallons-person-day of total water use

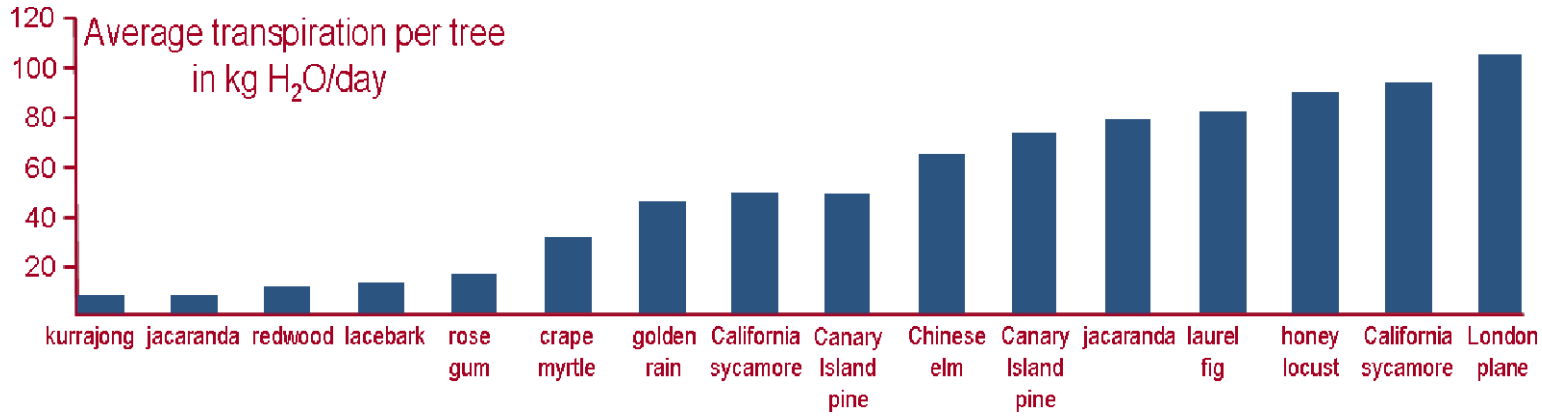
Future demand projections must include drought and on-going conservation

Porse et al (2017); Pincetl et al. "Will LA Go Dry?" (in Review); Porse et al. "Dollars and Sense of Water Supply in Los Angeles." (2017)

<u>Map Sources</u>: SWRCB Water Conservation Reporting Tool, Pacific Institute

Demand: Landscape Transformation





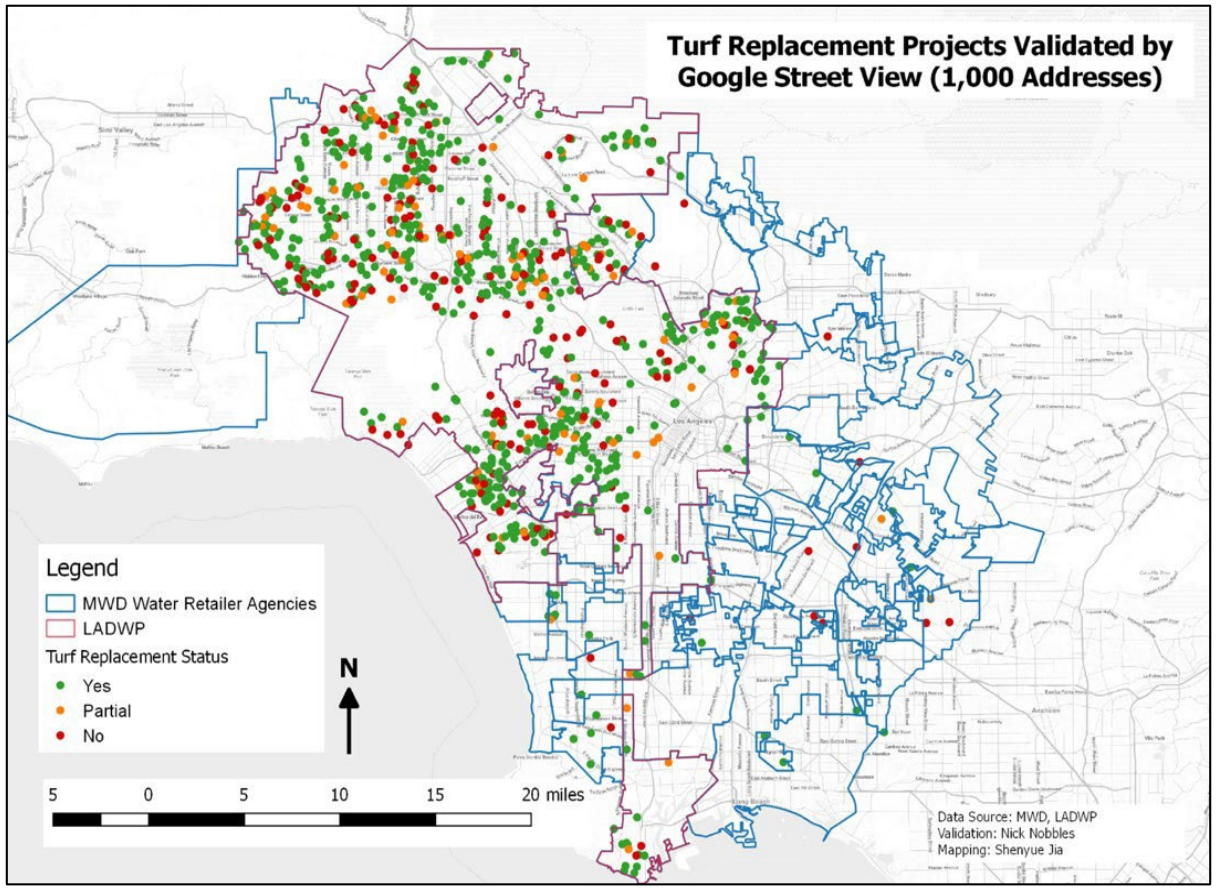
Litvak E., HR McCarthy, and D Pataki, (2017): "A method for estimating transpiration from irrigated urban trees in California." *Landscape & Urban Planning*.

Litvak E., K Manago, TS Hogue, and D Pataki, (2017): "Evapotranspiration of urban landscapes in Los Angeles." *Water Resources Research*, 53.

Turf Replacement in LA County: 2014/15 Program

Outcomes of the 2014-15 MWD program

- Replaced 15.3 million sq-meters of turf
- Post-replacement landscapes had many land cover types
- Some evidence of "neighbor effects"
- Need longitudinal studies



Pincetl, S, T Gillespie, D Pataki, E Porse, et al. (2019) "Evaluating effects of turf-replacement programs in LA." *Landscape and Urban Planning.*

What Did Replaced Yards Look Like?

Google Street View

1. Artificial turf

2. Bare ground

3. Gravels

4. Woodchips

5-1. Evenly-spaced plants w/Wch

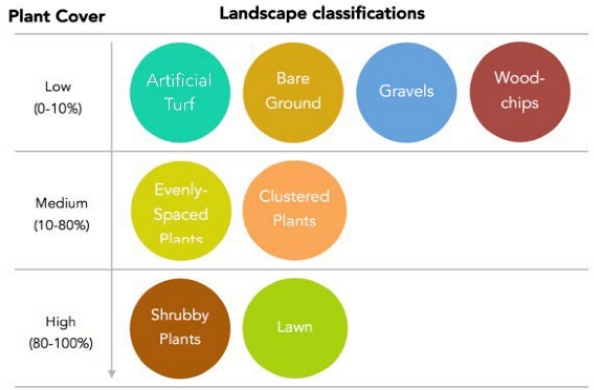
5-2. Evenly-spaced plants w/Grv

6-1. Clustered plants w/Wch

6-2. Clustered plants w/Grv

7. Shrubby plants

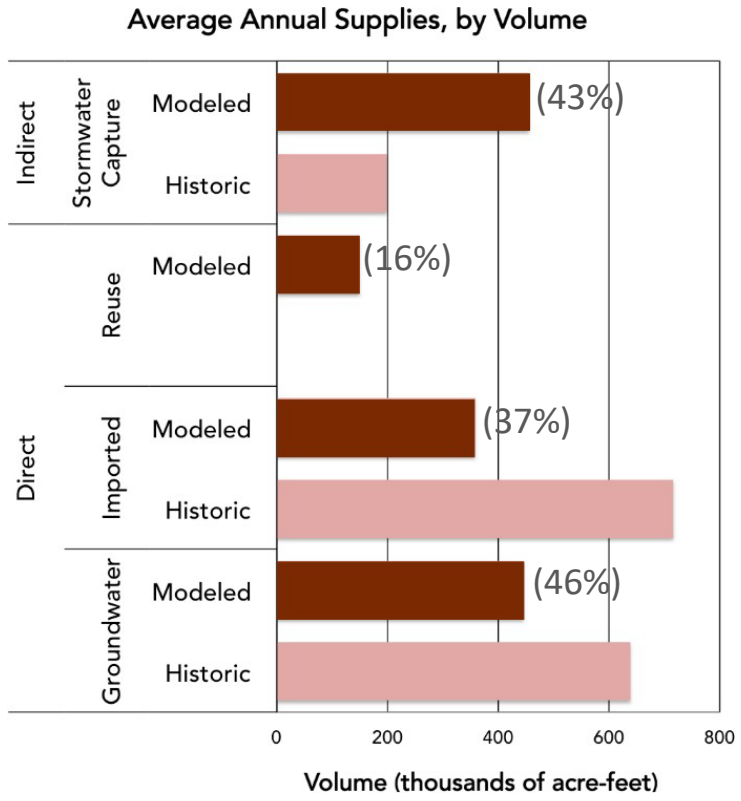
8. Lawn



S. Pincetl, T. Gillespie, D. Pataki, E. Porse, et al. (2019)

Supply: Reducing Imports and Boosting Local Sources

Model results: The "cost-effective" supply portfolio with 90 gallons-person-day



Recharge groundwater with stormwater and recycled water

Recycled water substitutes for imported water, but "lose a bit" each time

Import water during only "wet" years to reduce effects of imports

Porse et al (2017). "Systems Analysis and Optimization of Local Water Supply in Los Angeles"

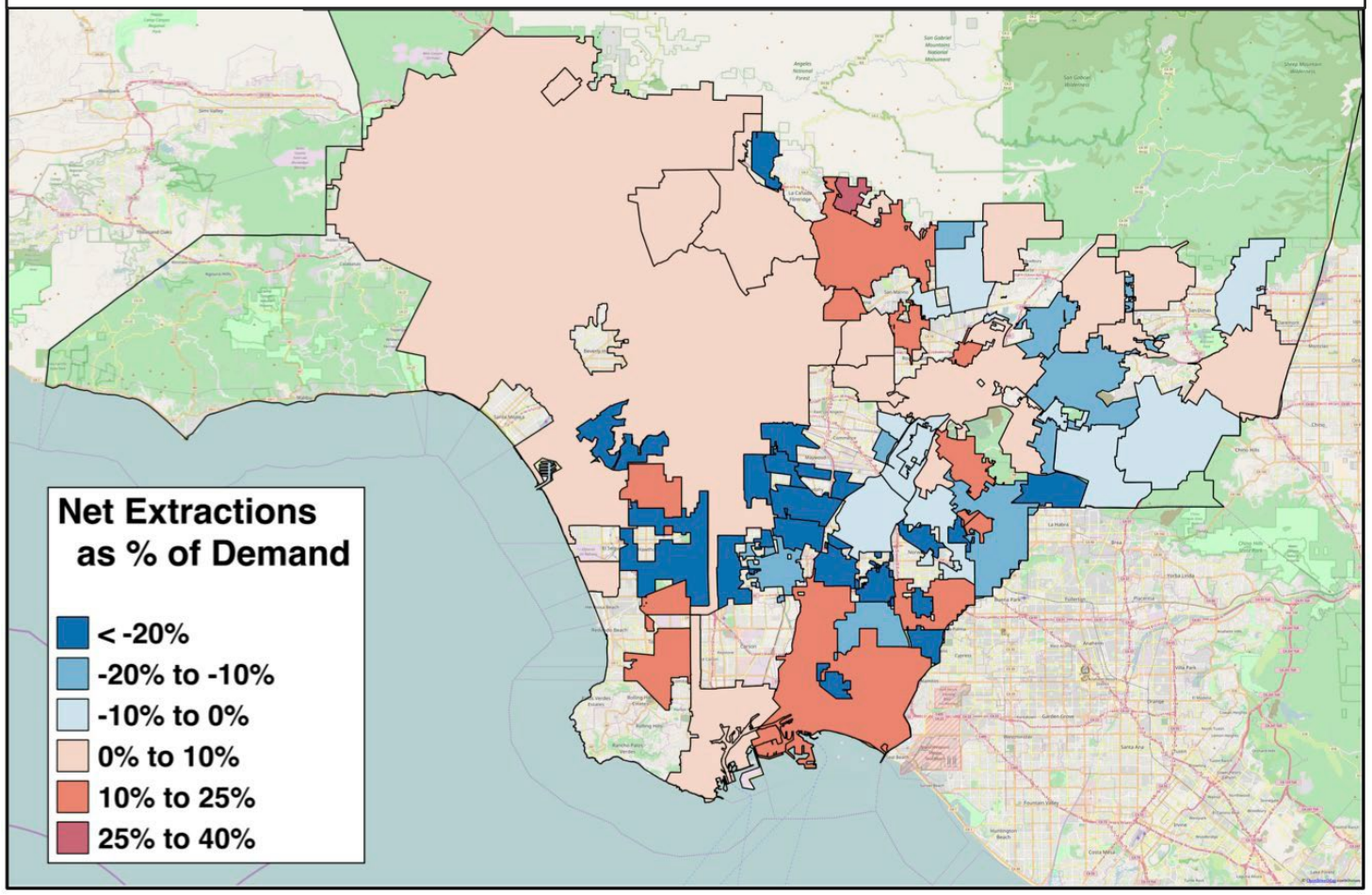
Pincetl et al. (2019). "Adapting urban water systems to manage scarcity in the 21st century: The case of Los Angeles."

Porse et al. (2018). "The Economic Value of Local Water Supply in Los Angeles."

Diversifying and Democratizing Water Management

We can better utilize groundwater through broader access & environmental protection

Modeling groundwater exchange pool use to meet demand.
With no imported water, retailers need exchanges & restructured rights

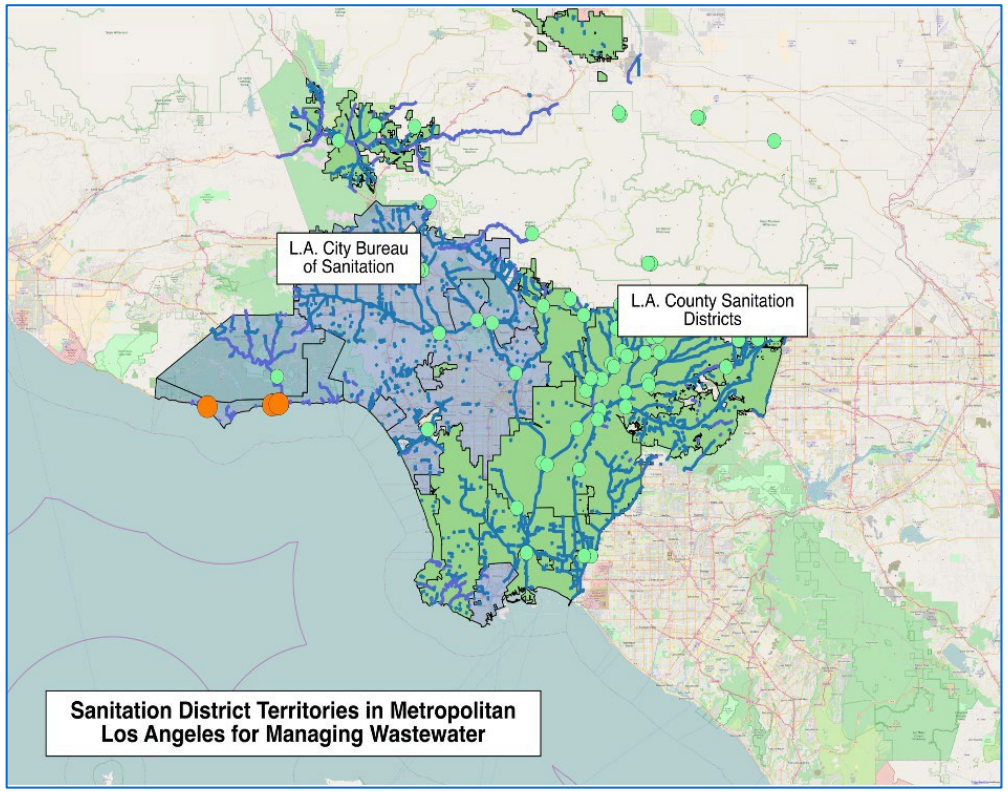


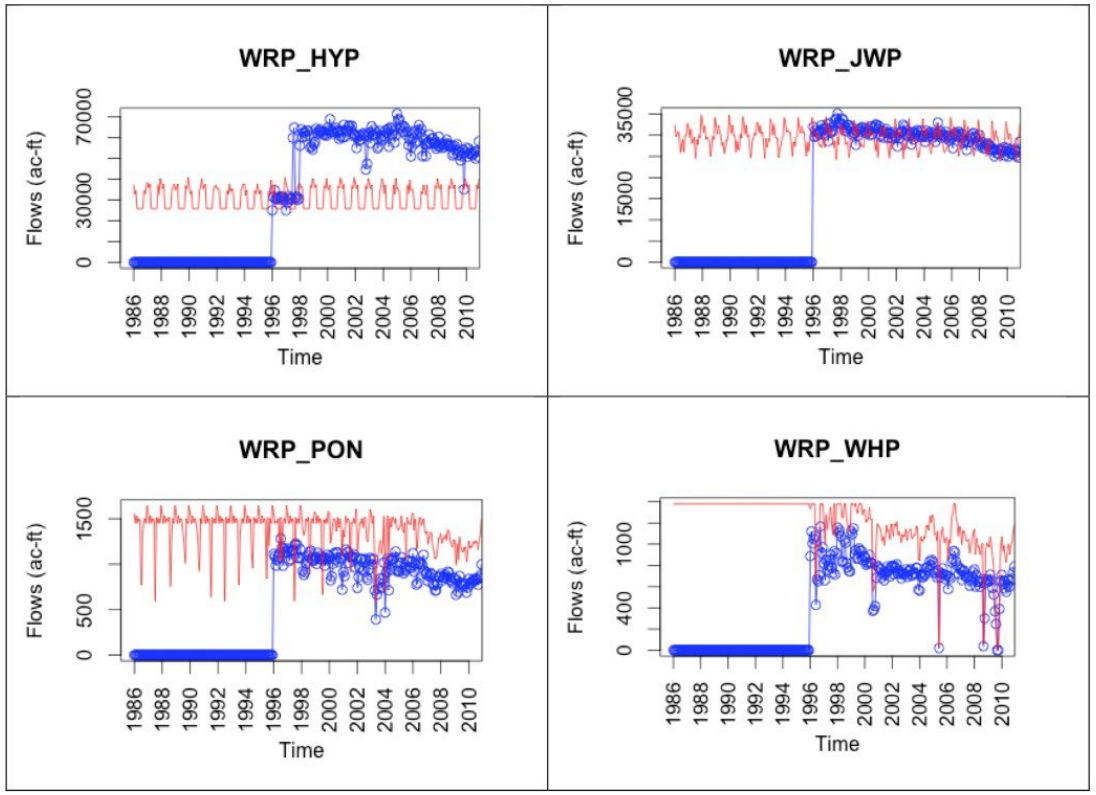
Porse, E, KB Mika, R Williams, M Gold, B Blomquist, & S Pincetl. (2018) "The Role of Groundwater Exchange Pools inUrban Water Supply Sustainability."

Water Reuse and Adaptation

Integrated planning for dynamic system changes

Modeling scenarios show that wastewater treatment plants receive less influent





Red: Modeled, Blue Circles: Historic

Porse et al (2017). "Systems Analysis and Optimization of Local Water Supply in Los Angeles"

Full-Cost Accounting Across the Urban Water Cycle

Supply Train	Estimated Cost ($/ac-ft)
Imported Water for Supply	$1,476-$1,790
Imported Water for Recharge	$1,325-$1,639
Groundwater Pumping	$739
Existing MAR	$995
Proposed New MAR	$1,110-$2,727
Indirect Potable Reuse	$1,551-$2,641
Non-Potable Reuse	$556-$1,646

Comparing current and future cost ranges:

What are the life cycle costs of the whole urban water cycle?

Not the cost of a supply "source", but the cost of a supply "cycle"

Institutional Reforms

Porse et al. (2018). "The Economic Value of Local Water Supply in Los Angeles."

Strategies for "Living Within Means"

- Maximize use of the groundwater basins
- Reduce demand and imports
- Landscape transformation
- Behavioral/social change in water conservation
- Full-cost accounting across the urban water cycle
- Distributing infrastructure: Block- and district-scale projects

Photo Credit:
Paul Andrus/Pinterest

Beyond Institutional Boundaries

Future creative solutions to reduce water consumption will increasingly span institutional boundaries

- Planning across sectors with life cycle costs
- Food waste and embedded water?
- Energy and Ecosystem-Returns On Investments (EROIs)?

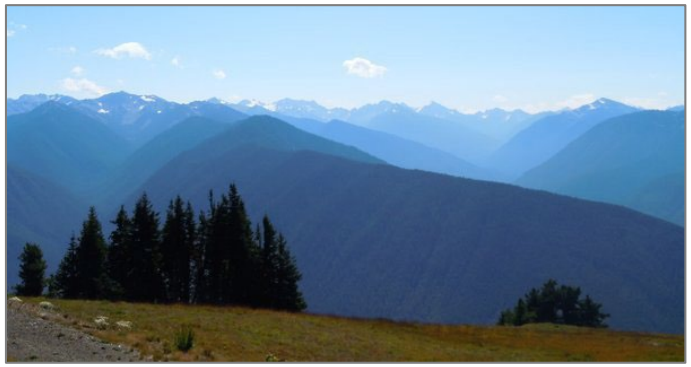


Photo Credits:
Yale360, The Guardian

Welcome to Southern California!

- A century of imported plants and gardening aesthetic made possible by unlimited water has led to landscaping heavily dependent on imported water.
- While arguably expressing a unique southern California style, it has also overridden place, and is a legacy of White migration from the East, importing a preference for ‘green’ landscapes.
- A shift in outdoor landscaping will connect us to where we live: a chaparral ecosystem, punctuated by trees, full of variety, life and color.

Landscape change is essential to live within our water supplies

- Learning to live within the region's water regime knits us with where we live, water parsimony in the summer, sufficiency in the winter when it rains.
- Plants here are adapted to precipitation extremes and heat. Like plants in the East that drop their leaves in the winter, plants here lose their leaves in the summer, or they shrivel, to plump back up with rain. They are adapted.
- Spring is green and vibrant, summer is gray, yellow, brown, odiferous and crackly – these are our seasons.

But, no change is easy, and this one is not either

- Lawns are ubiquitous
  - They are not fussy and grow in sun and shade, over and under watered, on all kinds of soils and slopes
  - They are easy to maintain and whole armies of maintenance crews have the equipment to do so – largely gasoline powered mowers and blowers that are polluting
  - A whole infrastructure of lawn ‘health’ exists as well: fertilizers, pesticides, herbicides, much of which is equally carbon intensive and gravely poisonous
- Native plants are all about location:
  - The soil, slope, the sun or shade, the watering regime
  - They are pickier, but when happy, endure extremes
  - The are intolerant of supplements and chemicals, need no mow and blow
  - They reduce our Earth impacts

The landscape industry

- Is not equipped to support – yet – this shift
  - Nurseries do not carry natives, by and large
    - Nurseries thrive on volumetric sales of easy to grow and maintain plants
    - The knowledge about natives is not there
    - The seed stock is scant, especially if you want to plant the species varieties that are local to that specific place, and thus historically adapted
  - The yard maintenance industry will have less work and the products will not be needed: less fertilizer, pesticide, herbicide sales, less irrigation equipment and more
  - And the labor force that goes out daily is not knowledgeable about native plants and will be less busy with lower maintenance natives

- Changing landscapes costs money and/or time.
- Only in wealthier neighborhoods is this less of a burden
- Wealthier neighborhoods are the ones who have the highest water use so change should start there.

Finally: landscape change means a new aesthetic, new habits, a learning about where we actually live

Some Existing Examples in Los Angeles

Thank you to Theodore Payne Foundation for the photographs

Garden S

Started:

The front
creek be
a place fo
hanging
lovely res
variety of
simple 19

Garden S

Started: 2

Arlington
Instead o
designed
and non-
trails. Ou
prostrate
non-nativ
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are fighti
indigenou
contemp

Examples of City Parks in Dry Climates

San Diego, Seville, Los Angeles, Casablanca. . . .

Mariachi Plaza


alamy
alamy
alamy


Kachina Dr

Links

California Center for Sustainable Communities

https://www.ioes.ucla.edu/ccsc/

Model Source Code and Data

Available on Hydroshare

Contact

eporse@ioes.ucla.edu

spincetl@ioes.ucla.edu

Thanks to:

Question and Answer

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How to Ask a Question

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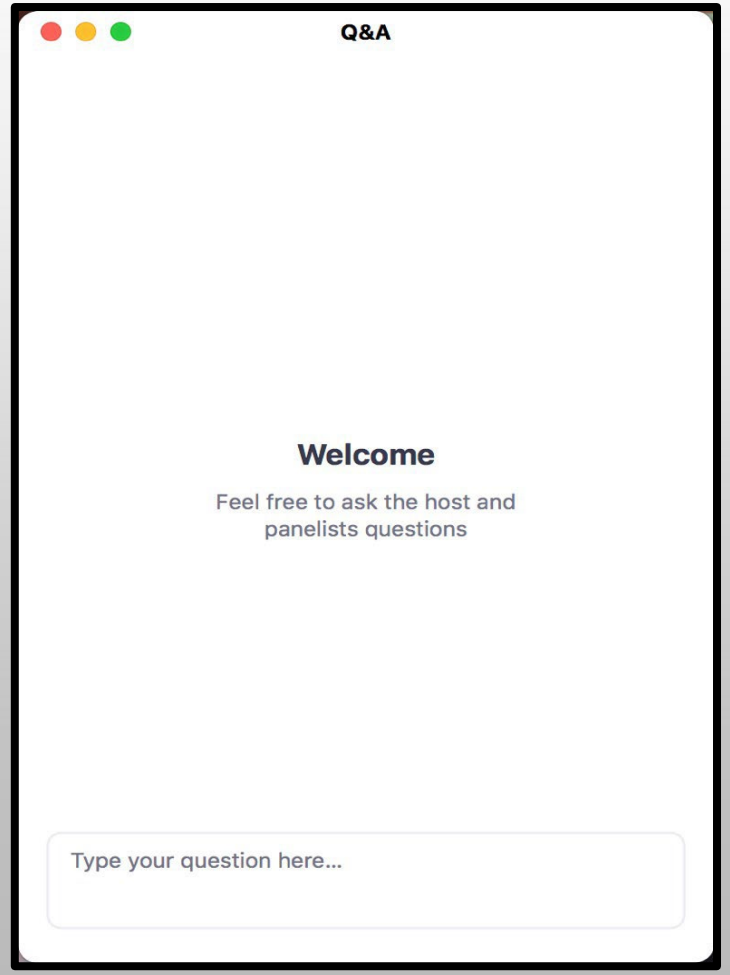
Type in question and then click send



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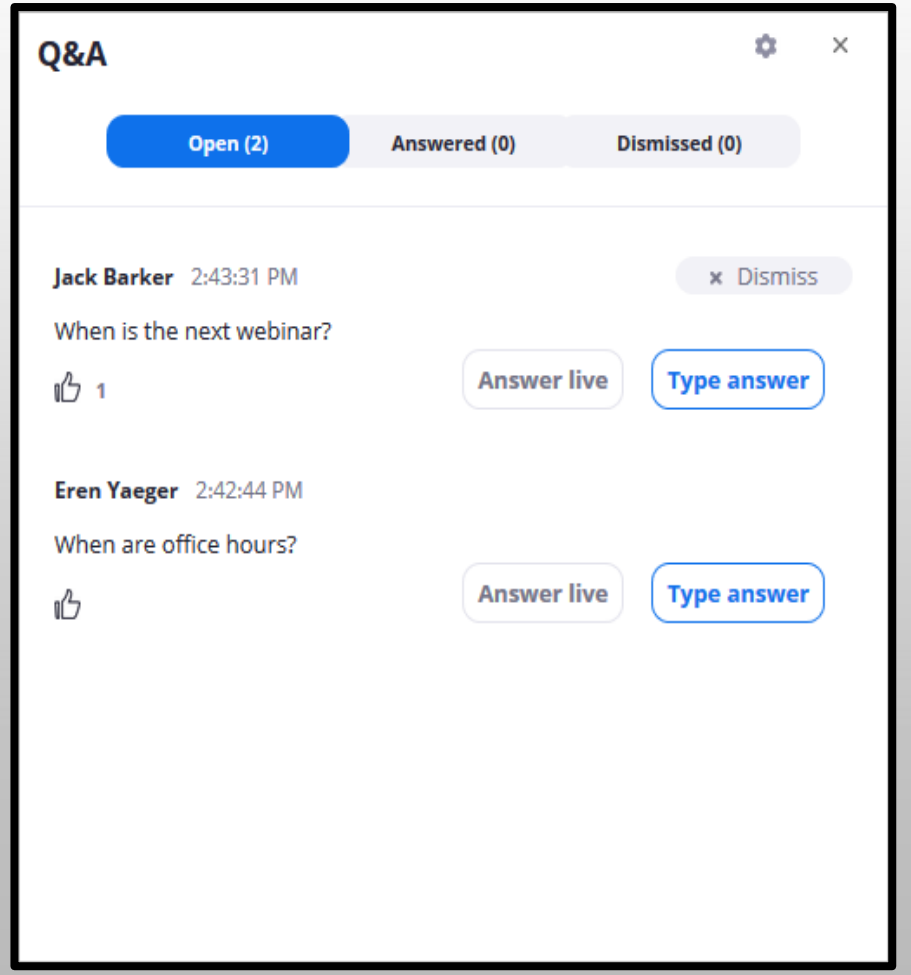

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Next
Southern California Water Dialogue Webinar

Wednesday, May 25, 2022

12:00 – 1:30 pm

Your feedback on today's meeting is important to us. For the next ten minutes, you can use the Zoom Chat feature to send us any comments.

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