# UCLA Grand Challenge: Sustainable LA

GOAL: 100% renewable energy, 100% locally sourced water, & enhanced ecosystem health by 2050

# Water Research Objectives

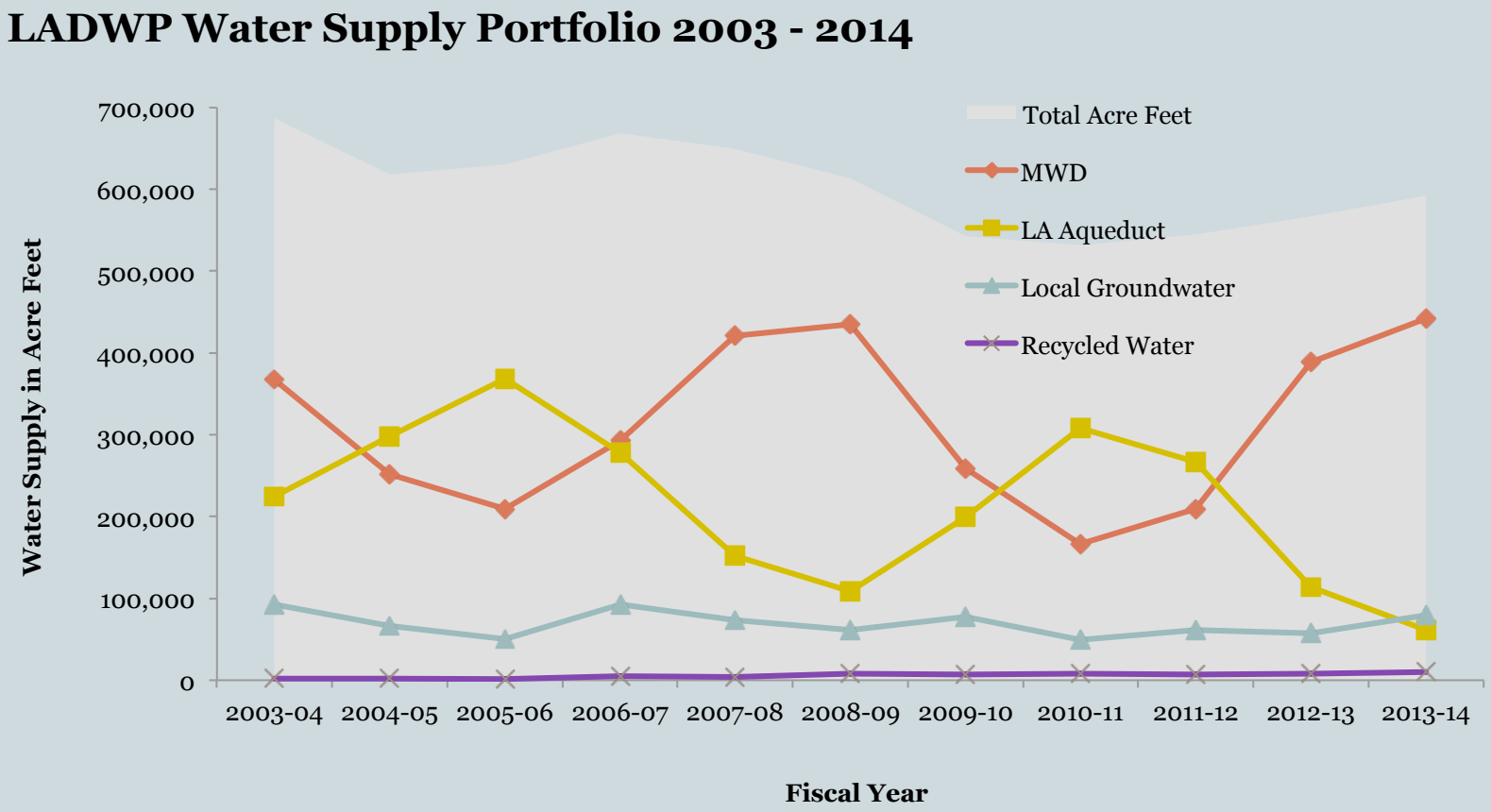
- Objective 1: Maximize Local Water Supplies
- Objective 2: Reduce Water Consumption
- Objective 3: Improve Local Water Resource Management

# Water Research Objectives

- Objective 1: Maximize Local Water Supplies
  - Quantify and characterize existing water supplies
  - Expand available water supplies
  - Encourage adoption of local water sources
  - Enhance water supply resilience and sustainability
- Objective 2: Reduce Water Consumption
- Objective 3: Improve Local Water Resource Management
  - Improve water management infrastructure and technology
  - Improve water governance and policy

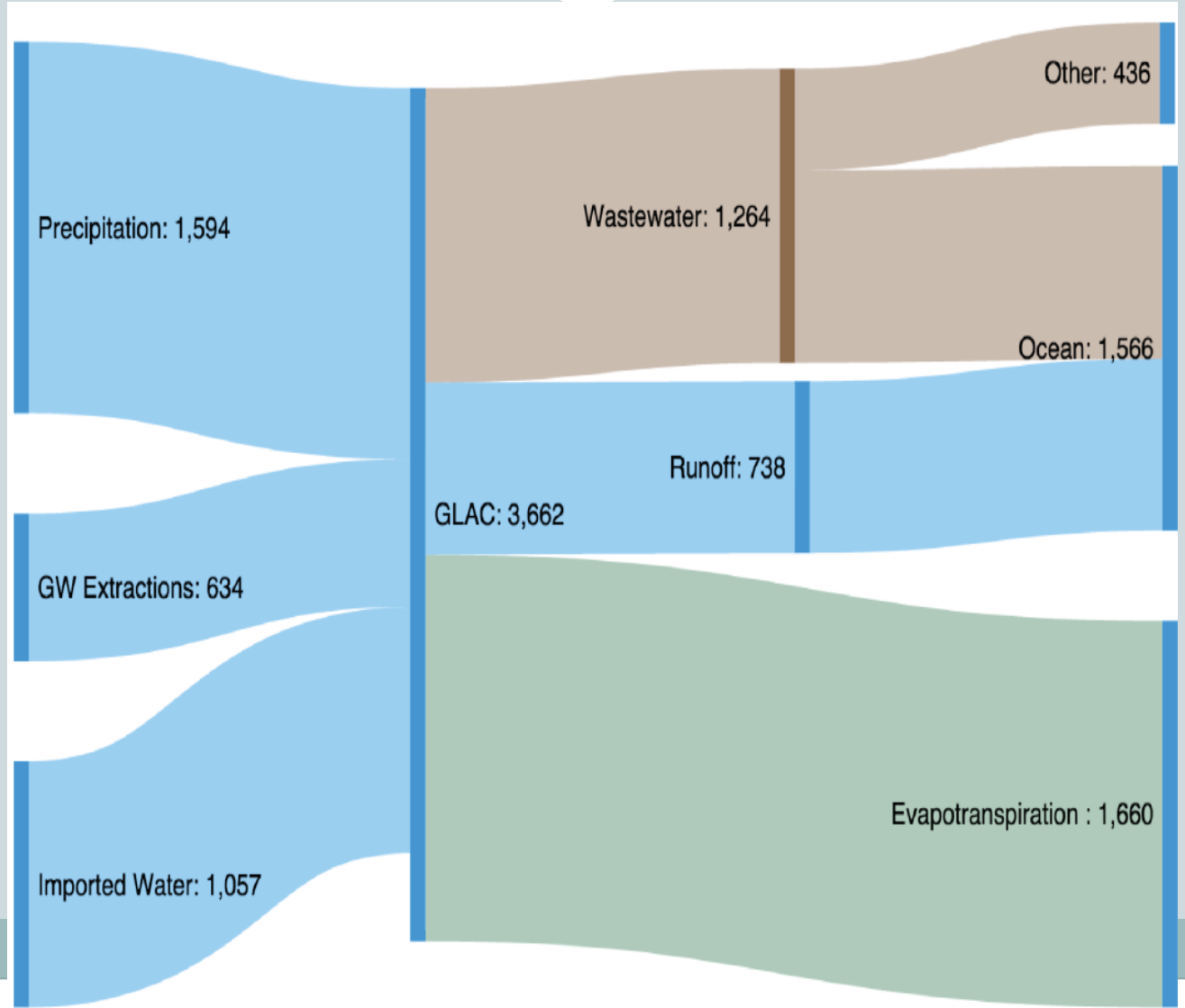
# Sources of Water for LA City






Data source: https://data.lacity.org/A-Livable-and-Sustainable-City/LADWP-Water-Supply-in-Acre-Feet/qyvz-diiw

# Flux Diagram of the Los Angeles County Water Budget in Thousand Acre Feet (Margulis and Cortes - in progress)



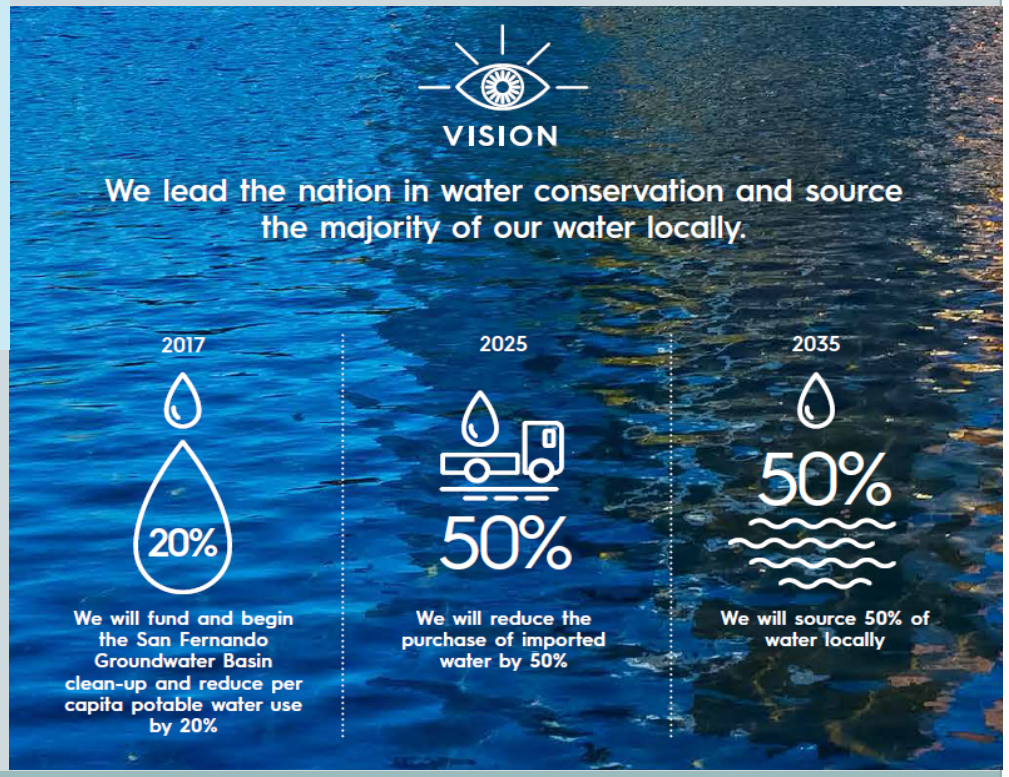
# Approaching a Sustainable Los Angeles



PLAN

TRANSFORMING LOS ANGELES

ENVIRONMENT | ECONOMY | EQUITY



# Approaching Sustainable Water in Los Angeles

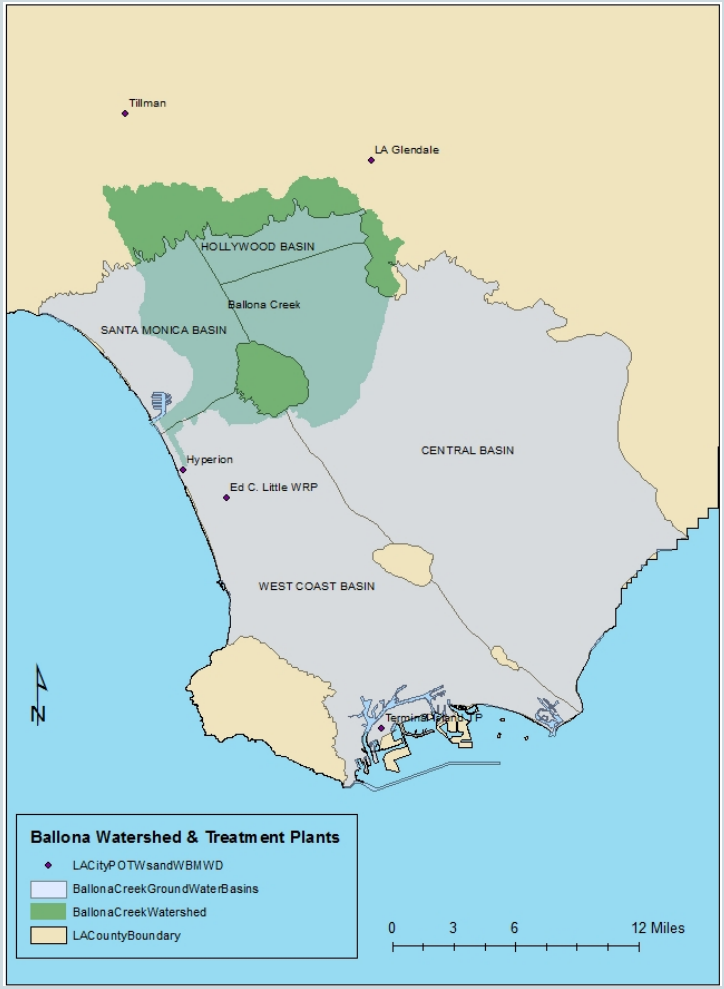
UCLA
Institute of the Environment and Sustainability

UCLA Grand Challenges

Sustainable LA

# Ballona Creek Watershed - Stormwater






- Water Quality Standards
  - Capturing runoff from sig. portion of drainage area & putting thru BMPs approaches compliance
- Potential Local Water Supply
  - Est. recharge in our scenarios 20,000 to 60,000 afy
    - Fewer or different BMPs = less recharge potential
    - How much becomes water supply?

# Stormwater Modelling – Ballona Creek Approach



- SUSTAIN
- Selected BMP types
  - Regional (infiltration trenches & dry ponds)
  - Distributed (vegetated swales, bioretention basins, porous pavement)
- Focus on BMP volume required & cost, not on specific locations to install BMPs
- Modelling regulatory / policy impacts
  - Meeting water quality-based effluent limits
  - Capturing 85$^{th}$ percentile storm (3/4" proxy) across watershed
    - Urban land cover (85%) => regional BMPs (infiltration trenches)
    - Urban land cover (85%)=> regional BMPs (dry ponds)
    - Private land (77%) => distributed LID BMPs
    - Public land (23%) => distributed LID BMPs

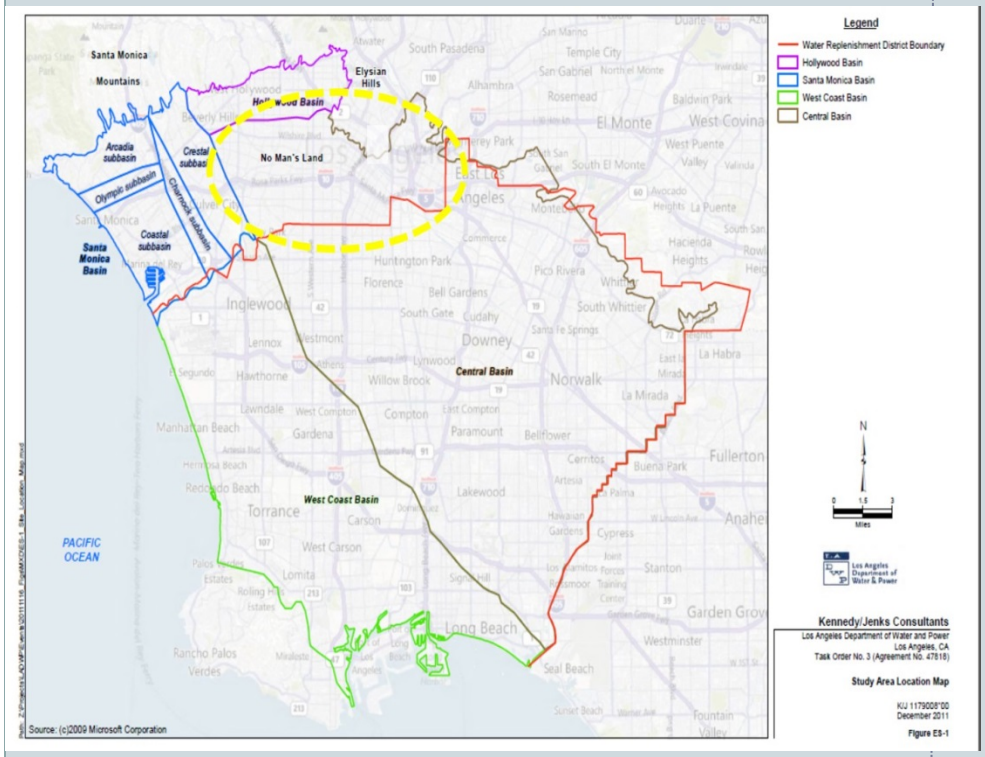
# Ballona Creek Compliance Assessment



- No dry weather Cu exceedances for all modeled scenarios except Public Property Runoff to LID
- Similar reduction in Cu wet weather exceedances (10 or 11 down from 105) for BMP optimization, Urban Runoff Infiltrated, and Private Property Runoff to LID
- Best reduction in Cu wet weather exceedances for Urban Runoff Treat and Release (down to 6 wet weather exceedances)
- Highest potential recharge (66,000 AFY) was in Urban Runoff Infiltrated followed by Private Property to LID (55,000 AFY). Lowest was 20,000 AFY.
- Cost range: $500 million to $1.5 billion
- Post- modelling: Copper Water Effects Ratios (WERs)
  - Cu WER >2 sufficient to remove all Cu TMDL exceedances in baseline scenario

# Ballona Creek Watershed- Groundwater






- West Coast and Central Basins
- Additional storage space in amended adjudication
  - WCB: 120,000 acre-feet
  - CB: 330,000 acre-feet
- Unadjudicated
  - Santa Monica & Hollywood gw basins
  - No Man's land
  - Golf courses, others pumping groundwater for irrigation

# Ballona Creek Watershed - Recycled Water



- MFRO – 2013-2014 flow: 279 MGD, 97% constituents end up in brine, 71% recovery (89% MF, 80% RO) => max production of recycled water @ HTP is 198 MGD.

| | NPDES limits | CA Ocean Plan (84 d.f.) | Eff. Conc @ max AWT | Ocean Conc 84x |
|---|---|---|---|---|
| Ammonia as N (mg/L) | 44. 1 (PG) | 0.6 | 162 | 1.9 |
| TSS (mg / L) | 30 (EL) | | 65 | 0.8 |
| Turbidity (NTU) | 75 (EL) | | 28 | 0.3 |
| Cu (µg / L) | 25 (PG) | 3 | 36 | 0.4 |
| Zn (µg / L) | 31 (PG) | 20 | 70 | 0.8 |
| Pb (µg / L) | 10 (PG) | 2 | 0.5 | 0.01 |
| Ni (µg / L) | 3 (PG) | 5 | 16 | 0.2 |

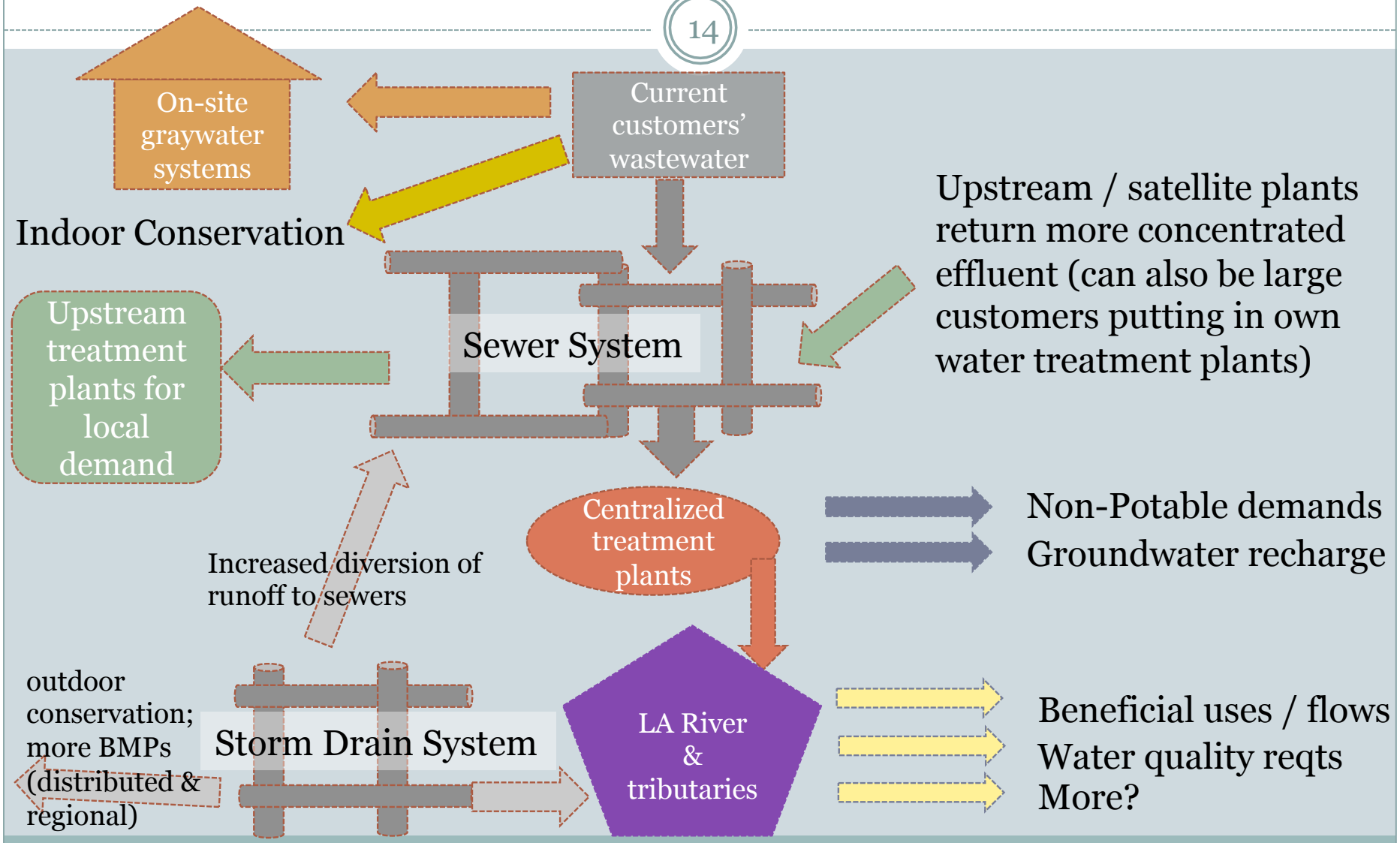
# Dominguez Channel & Machado Lake Watersheds




- WQS Compliance analysis for DC & ML
- Brackish plume in WCB ~600,000 AF as opportunity
- Terminal Island WRP has plentiful local NPR demand

# IWM Flow Feedbacks (LA River)





# Los Angeles River Watershed



- Integrated
- Beneficial use conflicts / Minimum flow requirements
- In-Channel BMPs
- Water supply benefits for infiltrated stormwater and recycled water
- Costs and Benefits
  - Capital
  - O&M
  - Life cycle
  - Ancillary – flood control, open space, recreation, property values, social
- Energy use / GHG emissions
  - Life cycle