

# California's Recent Water Conservation Legislation and the Need for Climate-Ready Trees

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California Nursery Conference October 15, 2024





# Outline

- Research background and UCCE
  program
- CA urban water efficiency legislation
- Potential impacts of legislation on urban trees
- Climate-ready trees & current research
- Importance of nurseries for achieving desirable landscape transitions

# Research Background

- M.A. in geography & Ph.D. in ecology (UC Davis)
  - Changes in tree canopy with urbanization
  - Effects of urban streamflow on plants and soils
- Postdoc & related projects (UC Davis)
  - Green stormwater infrastructure in Baltimore
  - Water-wise landscaping in Sacramento
    - Distribution
    - Effects on thermal comfort
  - Impacts of residential water conservation on urban trees



# Cooperative Extension: Overarching needs in the Capitol Corridor

Transition to<br/>water-efficient<br/>landscapes<br/>with increased<br/>benefitsMaintain<br/>tree canopy in<br/>water-efficient<br/>landscapesSustain and<br/>expand<br/>tree canopy



# New statewide legislation will affect urban outdoor water use and landscaping

- Making Conservation a California Way of Life (AB 1668 – SB 606)
  - A new regulatory framework to establish individualized efficiency goals for each urban retail water supplier
  - Passed in 2018; first compliance by Jan 1, 2027
- Potable Water: Nonfunctional Turf (AB 1572)
  - Prohibits the use of potable water to irrigate nonfunctional turf on commercial, industrial, institutional, and HOA properties.
  - Passed in 2023; first compliance by Jan 1, 2027

### Making Conservation a California Way of Life

 Objective set for each urban retail water supplier (~400 suppliers, serving ~95% of California's population)



## Making Conservation a California Way of Life

- Standards development for outdoor water use has continued through 2024
- Current version has a conservative residential outdoor use standard
  - Landscape efficiency factor (adjusts ET<sub>o</sub>):
    - 0.8 through June 2035
    - 0.63 July 2035-June 2040
    - 0.55 after June 2040
- Big takeaways:
  - Many suppliers will need to reduce water use; they can use any strategy
  - Residential outdoor water use is expected to be a major target for overall reductions



**Proposed Legislation Timeline** Source: California Water Boards Potable Water: Nonfunctional Turf

- Functional turf: a ground cover surface of turf located in a recreational use area or community space.
- Nonfunctional turf: any turf that is not functional turf, including turf located within street rights-of-way and parking lots.
  - Definition somewhat open to interpretation
  - Likely that large amount of turf will be converted
- Ban does not apply "to the extent necessary to ensure the health of trees and other perennial non-turf plantings."
- Staggered implementation timeline:
  - Properties owned by state and local governments and public agencies: Jan 1, 2027
  - Commercial, industrial, and institutional properties: Jan 1, 2028
  - Homeowners' associations: Jan 1, 2029

#### Water-wise



# ource: UC Davis Arboretum and Public Garden





# Increasing changes in landscape irrigation practices are expected



## How could new legislation affect urban trees?

Characteristics of existing urban forests



# Effects of front yard irrigation on street trees



Risk assessment based on water demand



# California's existing urban forests have relatively high water needs

- Analyzed inventories from across the state
- > 3.5 million residential trees
- The majority (including small trees) are species with medium or high water requirements
  - Substantial water inputs would be required to maintain current and future urban forests
  - Trees with higher water needs will be at greater risk of negative impacts from reduced irrigation



## Effects of yard irrigation on mature street trees

London planetree (Platanus x hispanica)





- London planetrees in front of unirrigated yards were more stressed and less healthy
- Drip irrigation was a more promising alternative to lawns

#### Vegetation water demand vs. new objectives: Risk for urban residential trees under three regulatory scenarios



# Summary

- Low-water tree species have not been prioritized in California's urban forests
- Trees with moderate water needs can be harmed by a lack of residential irrigation
  - Need to transition to low-water tree species
- Protecting existing trees will often require irrigation cuts for other landscaping
  - Expect more emphasis on converting lawns to drought-tolerant vegetation
  - Incentives for lawn conversions will have planting requirements





# Provisions for trees

- Recent versions of the Making Conservation a California Way of Life proposed regulations include **variances** for irrigating new and existing trees
- Water suppliers must apply for variances
- Existing trees:
  - Must demonstrate that other water-saving options are infeasible to meet objectives or would cause harm to existing trees

#### • New trees:

- Three years of irrigation for new **climate-ready trees**
- "A climate-ready tree is a tree that can be reasonably expected to survive both present and future climatic challenges such as heat, drought, extreme weather events, and pests within the supplier's service area."

# Climate-Ready Trees Study

- **Objective:** Evaluate the performance of underutilized trees with potentially high resilience to climate change in three California climate zones
- 20-yr study started in 2015
- 12 species per climate zone
- Reference plots & park plantings
- Hope that evidence of good performance will support nursery production and planting



# Current research on climate-ready trees

- Cooling potential
  - Evaluate the ability of different species to cool the ground surface and reduce human thermal stress
    - Climate-ready trees (unirrigated)
    - Traditional shade trees (irrigated)
  - What characteristics are associated with greater cooling?



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- Establishment success
  - Compare survival and growth of climate-ready, common, and native oak trees
    - >1,000 trees planted over 3 years
    - Irrigated and unirrigated contexts
  - **Preliminary results:** Climate-ready trees had the highest survival and growth rates







# Upcoming research on turf replacement

- What turf replacement methods are most successful?
  - Sheet mulching vs. sod removal; mulch options
  - Plant success, soil properties, weed pressure
- How does turf replacement affect mature landscape trees?
  - Sheet mulching vs. sod removal
  - Growth and health indicators

# The essential role of nurseries

- Sourcing quality climate-ready trees & other low-water landscape plants will be crucial for successful implementation of the new legislation
  - Opportunity for nurseries to tap an important emerging market
  - Nurseries can provide regional expertise for customers
  - Collaborate with water agencies and other groups to ensure recommended plants are available
- Let's talk!
  - What are challenges with growing new climate-ready trees, low-water plants, and CA natives?
  - How can UC Cooperative Extension help?
  - What information would be most helpful for selecting and promoting trees and other plants for low-water landscaping?

# Thank you

Research funding: California State Water Resources Control Board & The Britton Fund

#### **Key Collaborators:**

AB 1668-SB 606: Erik Porse, Mary Cadenasso, Bogumila Backiel, Stephanie Pincetl, Julia Skrovan Climate-Ready Trees: Alison Berry, Natalie van Doorn, Matthew Gilbert, Mickie Tang Community Canopy: Yael Franco, Cecilia Walsh, Greg McPherson, Tree Davis Turf replacement: Chris Shogren, Karey Windbiel-Rojas, Sacramento County

#### **Special thanks:**

Matthew Ritter, G. Andrew Fricker, Natalie Love (Cal Poly SLO) Diane Pataki (Arizona State), Liza Litvak (University of Utah) Charlotte Ely, Karina Herrera, Marielle Pinheiro (California State Water Resources Control Board) Amy Talbot & the Regional Water Efficiency Program Advisory Committee (Regional Water Authority)

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