

# Regulatory climate for recycled water reuse in California

Recycled water is defined in the  
California Water Code as

“water which, as a result of  
treatment of waste, is suitable for  
a direct beneficial use or a  
controlled use that would not  
otherwise occur.”

Recycled water is:

wastewater treated as **disinfected tertiary** recycled water,

wastewater receiving **advanced treatment beyond disinfected tertiary** recycled water,

or **secondary treated water**, which has the least permitted uses.

# Annual use

- 1970: ~0.1 million ac-ft
- Current: 0.5 million ac-ft
- 2030: 0.9 to 1.4 million ac-ft

# Uses

- Agriculture: 46 %
- Landscape: 21 %
- Groundwater recharge: 14 %
- Other: 19 %

# Cost

- 300 to 1300 dollars per ac-ft.
  - Factors
    - availability of treatable water,
    - demand
    - water quality of source and treated water
    - beneficial use
    - user proximity

# Use Constraints:

- Plant salt tolerance
- Adequate irrigation to control salinity
- Adequate drainage
- Control and/or mitigation of adverse environmental impacts related to drainage water disposal into underlying soil strata and/or receiving waters.

# Recycled water (RW) use in Santa Clara Valley [e.g. San Jose CA]

- Water qualities
  - Hetch Hetchy:  $EC = 0.2 \text{ dS/m}$ ;  $SAR = 0.8$
  - Palo Alto RW:  $EC = 1.4 \text{ dS/m}$ ;  $SAR = 5.3$
  - South Bay RW:  $EC = 1.2 \text{ dS/m}$ ;  $SAR = 4.0$

# Santa Clara Valley Water District Projects: 2004 to present

- Fresno State University: F. Cassel. EM survey of two golf courses: Benchmark
- University of California, Davis
  - Barnes, Oki and Evans: Salt tolerance of coastal redwoods
  - Beaudette and Singer: Irrigation impacts on soil permeability to water
- Oster and Siegfried: On-site evaluations and recommendations

# Shoreline Links Golf Course

- Next to San Francisco Bay N. of Mountain View
- Underlying 'soil' strata: Clay lined landfill
- Undulating topography – hilly
- Hetch Hetchy water with some well water
- Grass with a few trees

# Soil Salinity/Sodicity (average of four locations)

Depth, inches	ECe	SAR
2 - 5	13	8
10 - 14	8	6
22 - 26	6	6
34 - 38	5	4
46 - 50	8	4

RECOMMENDATION RE. USE OF RECYLCED WATER?

# Wilson School

- Several miles south of Shoreline Golf Course
- Irrigated (RW) grass soccer field, and unirrigated redwood trees **with leaf burn** along the edge of the field.
- ECe ranged from 3 to 5 dS/m
- SAR ranged from 3 to 7
- **Threshold salinity** for **Redwoods** is about an ECe of **0.5 dS/m** with moderate **leave burn** at about an ECe of **1.5 dS/m**, and **severe burn** at an ECe of about an ECe of **3 dS/m** – independent of the salt composition of the water.

Recommendation re. use of recycled water ?

# Villages Golf Course and Country Club

- Southeast of San Jose
- Grass and redwood trees: both irrigated with RW
- Grass condition: Excellent
- Redwood trees: Several dead, others with leaf burn
- ECe ranged from 4 to 8
- SAR ranged from 6 to 8

Recommendations?

# Summary

- What is the most salt-sensitive plant species involved?
- What is the salinity of the applied water?
- How does rain impact infiltration rates and soil salinity?
- Is subsurface drainage adequate to control salinity at acceptable levels?
- Will the death of the most sensitive plants be acceptable?

Thank You

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