

# Science Advisory Panel for CECs in Recycled Water

July 19-21, 2017

Southern California Coastal Water Research  
Project

[http://sccwrp.org/ResearchAreas/Contaminants/  
RecycledWaterAdvisoryPanel.aspx](http://sccwrp.org/ResearchAreas/Contaminants/RecycledWaterAdvisoryPanel.aspx)



# HOUSEKEEPING

- **All meetings will be webcast. For best audio quality, please connect via a permanent landline**
  - Please route all questions/comments/issues through moderator (Alvina)
- **The public portions of all meetings will be recorded. To access recordings, go to the project webpage at**
  - <http://sccwrp.org/ResearchAreas/Contaminants/RecycledWaterAdvisoryPanel.aspx>
- **If you would like to receive project updates, please contact [keithm@sccwrp.org](mailto:keithm@sccwrp.org)**



# EXPERT PANEL REVISIT

- **Panel first convened in 2009**
- **CEC monitoring recommendations delivered in 2010 report**
  - Eight (8) CECs for indirect potable reuse (groundwater recharge) uses
  - No individual CECs identified for Title 22 landscape irrigation practices
- **Panel recommendations adopted and incorporated into CA Recycled Water Policy (amended in 2013)**
- **Panel revisit of recommendations every 5 years to incorporate latest science and monitoring data**

# CORE QUESTIONS FROM 2010

- **What are the appropriate constituents to be monitored, including analytical methods and MDLs?**
- **What is the known toxicological information for the above constituents?**
- **Would the above lists change based on level of treatment and uses? If so, how?**
- **What indicators can be used to represent a suite of CECs?**
- **What concentrations of CECs should trigger enhanced monitoring?**

# RECYCLED WATER USES HAVE EXPANDED

- **NON-POTABLE USES (“TITLE 22”)**
  - specifies level of treatment and bacterial standards for intended use
- **INDIRECT POTABLE REUSE (IPR)**
  - Surface spreading
  - Subsurface injection
  - Surface water augmentation (new!)
- **DIRECT POTABLE REUSE (DPR)**
  - report on feasibility of regulating DPR released in 2016
  - this Panel will NOT address DPR practices

Source: CADWR (2016) *Municipal recycled water, a resource management strategy of the California Water Plan.*

# TITLE 22

- **Overarching regulation for recycled water across State**
- **Treated municipal (domestic) wastewater serves as source**
- **Level of treatment, bacteriological standards define allowable uses**
  - (non-disinfected) secondary to disinfected tertiary effluent
  - total, fecal coliform limits
- **Applications have been extended from original Policy, e.g.**
  - food crop irrigation (processed, no contact, contact)
  - dust control (disinfected secondary)
  - industrial (cooling water) (disinfected tertiary)
  - snow making (disinfected tertiary)

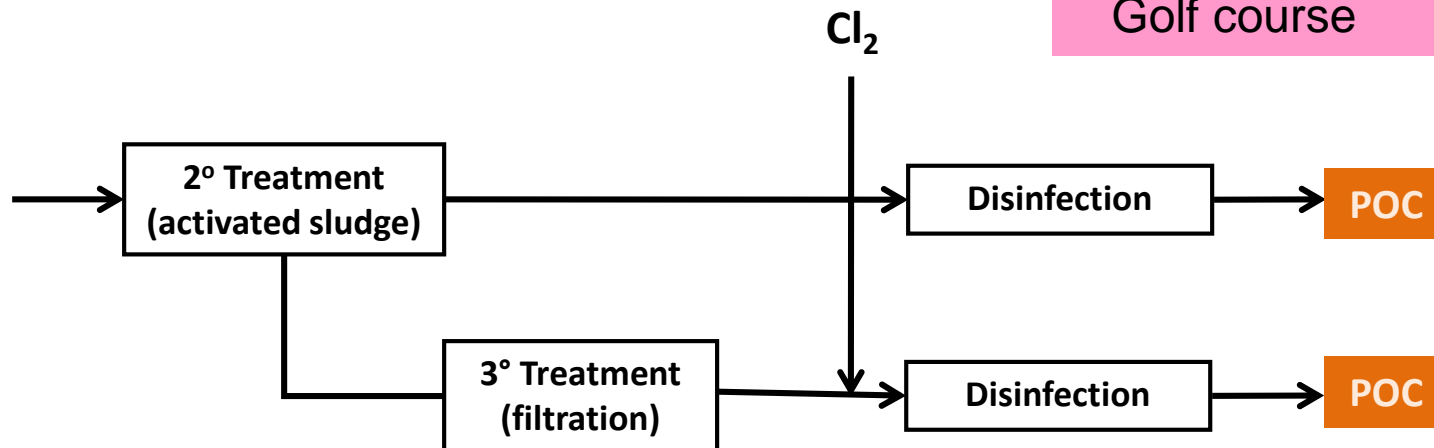
# Title 22 Landscape Irrigation Practices considered by Panel in 2010

Restricted access:

Commercial landscape

Freeway

Golf course



Unrestricted access:

Residential landscape

School yards/parks

Golf Course

POC = point of compliance (monitoring)

# Title 22 Uniform Statewide Recycling Criteria

Municipal Wastewater



Non-disinfected Secondary



- Non food trees
- Non-milk pasture
- Non-human seed
- Pathogen processed food
- Ornamental nursery/sod (restricted)
- Flushing sewers

Disinfected 23



- Cemeteries
- Freeway
- Golf Course (restricted)
- Ornamental/sod (unrestricted)
- Pasture (milk)
- Non-edible vegetation
- Landscape impoundment
- Industrial cooling (no mist)
- Industrial boiler
- Fire
- Backfill consolidation
- Soil Compaction
- Concrete
- Dust control
- Road/sidewalk cleaning

Disinfected 2.2



- Food crop: no contact
- Orchards: no contact
- Vineyards: no contact
- Restricted recreation

Disinfected tertiary



- Food crops: contact
- Parks/playground
- School yards
- Residential landscape
- Golf (unrestricted)
- Any irrigation
- Rec impoundment
- Ind. Cooling (mist OK)
- Flush toilet
- Prime drains
- Industrial w. contact
- Fire (structural)
- Fountains
- Laundries (commercial)
- Backfill (pot water)
- Snow making
- Car wash (comm.)

Disinfected Tertiary Filtered (can include RO)



- Indirect Potable Re-Use:
- Groundwater Replenishment via Surface Application

"Surface Application" means the application of recharge water to a spreading area

Advanced Treatment (RO/Oxidation)



- Indirect Potable Re-Use:
- Groundwater replenishment via Subsurface Application

"Subsurface Application" means the application of recharge water to a groundwater basin by means other than surface application.

Advanced Treatment (RO/Oxidation)



- Direct Potable ReUse:
- Surface Water Augmentation
  - Deliver to Drinking Water Plant
  - Flange to Flange

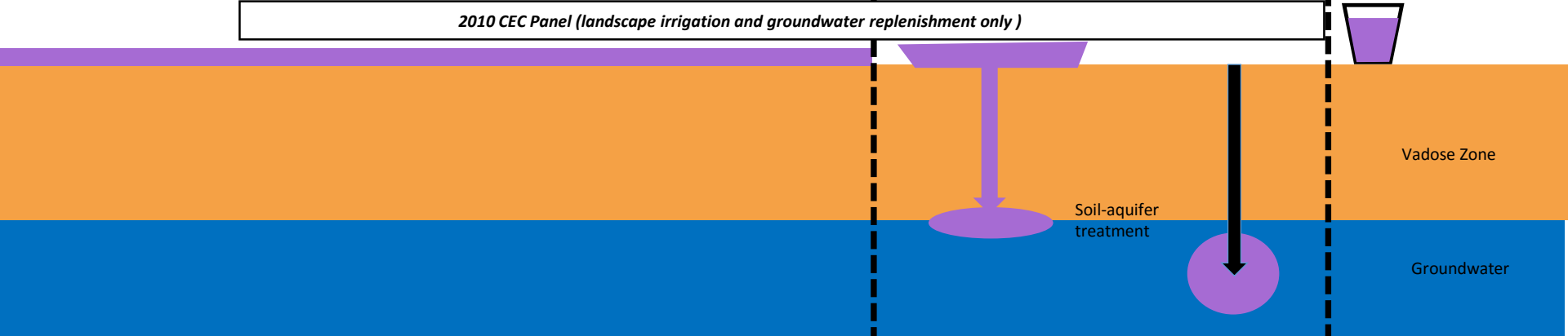
Increased Treatment and Cost

Title 22, Div 4, Ch. 3 "Water Recycling Criteria"

2016 DPR Report

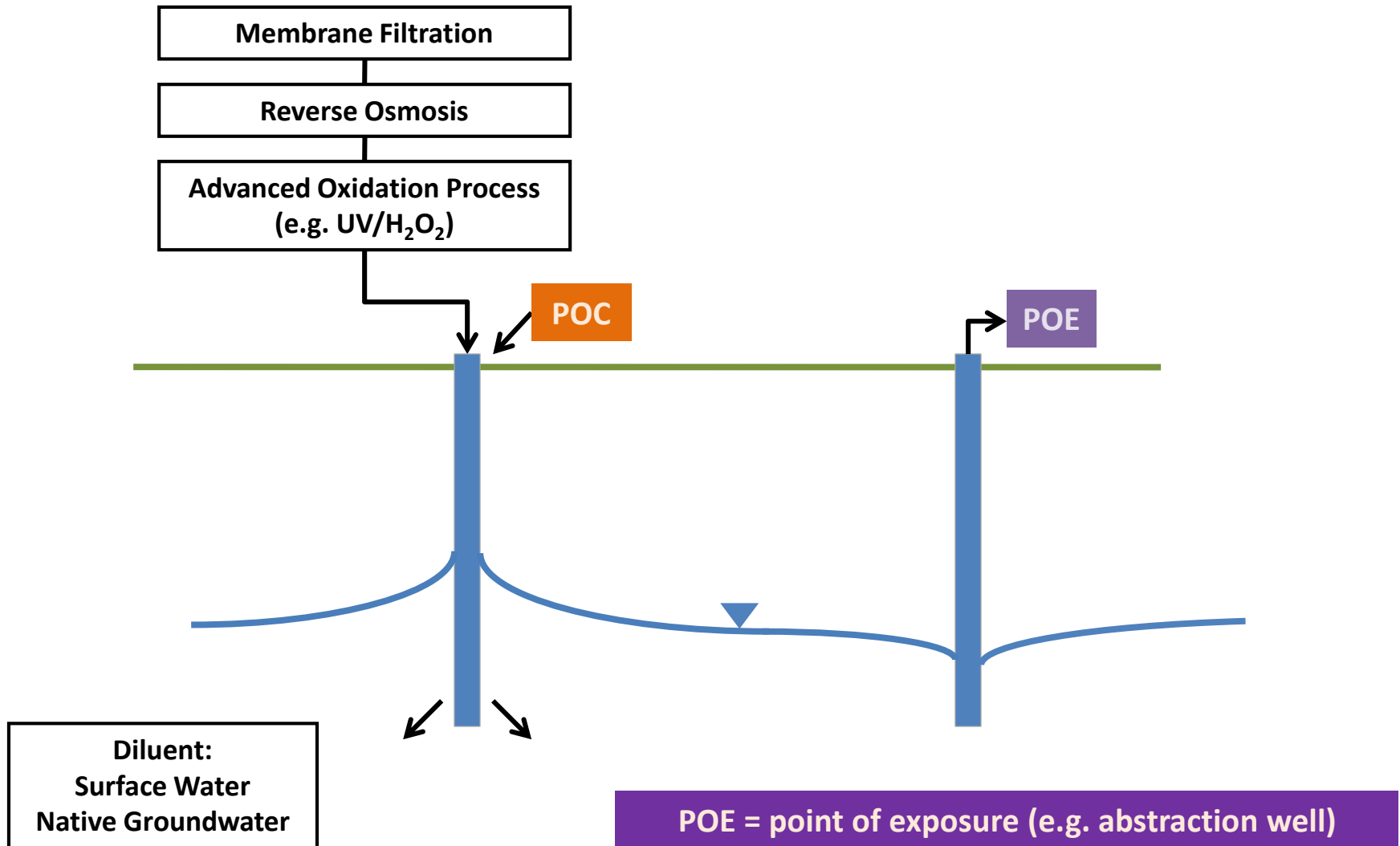
Covered by General Order WQ 2016-0068-DDW (no CEC monitoring)

2010 CEC Panel (landscape irrigation and groundwater replenishment only)

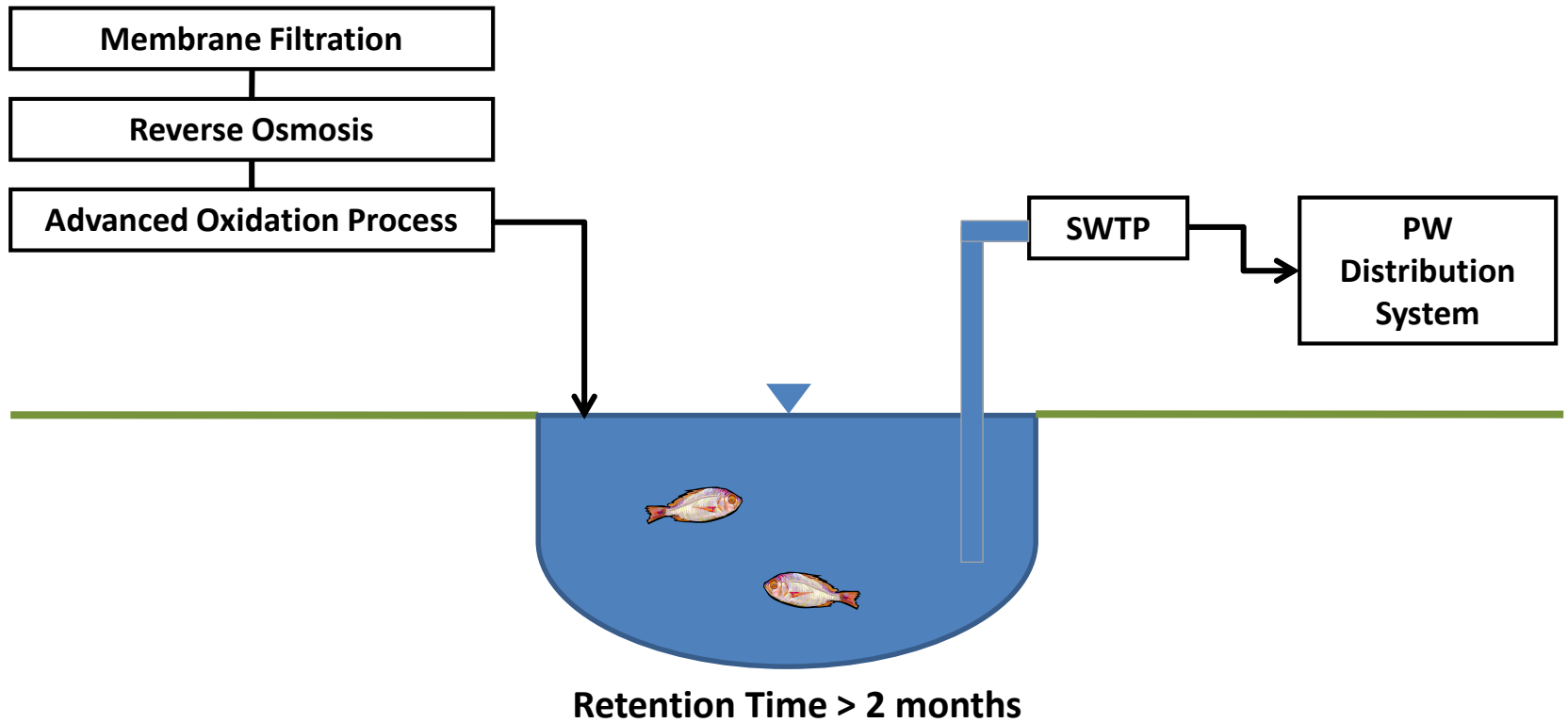




# Indirect Potable Reuse – Groundwater Recharge via Subsurface Injection



# Indirect Potable Reuse - Surface Water Augmentation (NEW!)



# ANTIBIOTIC RESISTANCE

- **Knowledge of ARBs/ARGs in recycled water is incomplete**
  - Most bacteria removed by advanced treatment, but genes can be transferred across species
- **Provide recommendations for research on ARBs/ARGs associated with allowable Title 22 and IPR uses to further understand their potential to impact human health.**
- **Supplement recommendations/findings from Expert Panel for DPR (Olivieri et al. 2016, Chapter 7)**
  - Determine human health risk due to ARBs/ARGs in recycled water
  - Develop standardized tests for ARBs/ARBs
  - Characterize ARB/ARG removal by recycled water treatment processes

# CORE QUESTIONS HAVE NOT CHANGED

- What are the appropriate constituents to be monitored, including analytical methods and MDLs?
- What is the known toxicological information for the above constituents?
- Would the above lists change based on level of treatment and uses *as specified in Title 22 and for surface water augmentation*? If so, how?
- What indicators *or surrogates* can be used to represent a suite of CECs?
- What concentrations of CECs should trigger enhanced monitoring?

# GROUND RULES

- **Protection of human health is the focus of this effort**
  - ecological impacts in waters receiving intentional or incidental runoff of recycled water are not under consideration
- **Primary focus will be on updating recommendations from 2010 (i.e. for IPR and Title 22 Landscape Irrigation)**
  - Panel to consider all allowable Title 22 uses
- **Ingestion of food crops irrigated using Title 22 recycled water will NOT be considered by this Panel**
  - Occupational exposure and consumption of potable water produced by IPR practices are to be addressed

# SCHEDULE

- **Panel Meeting #1: July 19-21**
  - Day 1 Kickoff (open to public)
  - Day 2 Panel Deliberation (closed session)
  - Day 3 Panel Report Out (open to public)
- **Panel Meeting #2: Dec 11-15**
  - Day 1, 3 and 4 Panel Deliberation (closed session)
  - Day 2 Panel Report Out (open to public)
  - Day 5 Final Panel Recommendations (open to public)
- **Draft Panel Report Release: Jan 2018**
  - 30 day public comment period
- **SWB Staff Recommendations: March 2018**
  - Peer Review
  - Workshop

# Meeting #1 Agenda

- **Wed AM: CECs in Recycled Water - State of the Science**
  - *Day 1 Public Meeting - Background presentations*
  - Day 2 Panel Deliberation
  - Day 3 Panel Report Out
- **Wed PM: Stakeholder Perspectives & Public Participation**
  - Impacted communities
  - NGOs
  - Sanitation Agencies
  - Water Supply
  - Recycled Water Research
- **Thursday: Working Session (Panel only)**
- **Friday AM (10:30-noon): Panel Report Out**

**We'll be right back!**

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