Potable Reuse in California: Lessons Learned and the Path Forward

Shane Trussell, Ph.D., P.E., BCEE

San Diego Water Board Meeting
Mission Viejo, CA
February 11, 2015
De facto Potable Reuse
Indirect Potable Reuse (IPR)

Source Control

WWTP

Advanced Water Treatment

Aquifer Injection / Spreading

Surface Water Augmentation

WTP / Distribution
Direct Potable Reuse (DPR)

Existing surface water supply → Raw (or Source) Water Augmentation → WTP / Distribution

Source Control → WWTP → Advanced Water Treatment → Flange-to-flange
Current CA Potable Reuse Projects

• All are **IPR projects** doing **groundwater recharge**
• 7 existing projects
Groundwater Recharge: Surface Spreading

- WWTP
- Spreading basin
- Soil Aquifer Treatment

- Biological Treatment
- Granular Media Filtration
- Disinfection
- Soil Aquifer Treatment
Montebello
Forebay

Map of Montebello Forebay area with locations marked:
- Montebello
- Elysian Hills
- Repetto Hills
- Merced Hills
- Puente Hills
- Baldwin Hills
- Spreading Grounds
- Palos Verdes Hills

Legend:
- West Coast Basin Barrier Project
- Dominguez Gap Barrier Project
- WRD Boundary
- Santa Monica Bay
- Pacific Ocean
- Los Angeles Forebay
- Central Pressure Area
- Montebello Forebay
- Whittier Area
- Los Angeles Basin
- West Coast Basin

Additional areas:
- San Pedro Bay
- San Diego
- Long Beach
- Santa Monica
- Los Angeles
Montebello Forebay

• Operating since 1962
• Surface spreading
  – 560 acres
  – ~44 MGD
• Extensive testing
  – Epidemiology
  – Trace organics
• Expansion now underway
Ground Water Replenishment System
Orange Co., CA
Orange County GWRS

• Preceded by Water Factory 21 (1978-2005)
• GWRS started operations in 2008
• Presently 70 mgd; undergoing a 30 mgd expansion
• Two recharge projects: direct injection and surface spreading
Other Groundwater Recharge Projects
Other Groundwater Recharge Projects

Chino Basin
Other Groundwater Recharge Projects

- West Coast Basin Barrier
- Alamitos Barrier
- Dominguez Gap
# California IPR Overview

<table>
<thead>
<tr>
<th>Facility</th>
<th>Technology</th>
<th>Production (MGD)</th>
<th>Production (AF/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montebello Forebay</td>
<td>Spreading</td>
<td>44.6</td>
<td>50,000</td>
</tr>
<tr>
<td>Groundwater Replenishment System</td>
<td>Spreading / Injection</td>
<td>100</td>
<td>112,000</td>
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<tr>
<td>West Coast Basin Barrier</td>
<td>Injection</td>
<td>22.6</td>
<td>25,315</td>
</tr>
<tr>
<td>Chino Basin</td>
<td>Spreading</td>
<td>18.7</td>
<td>21,000</td>
</tr>
<tr>
<td>Alamitos Barrier</td>
<td>Injection</td>
<td>8</td>
<td>8,970</td>
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<tr>
<td>Dominguez Gap Barrier</td>
<td>Injection</td>
<td>5</td>
<td>5,600</td>
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<tr>
<td><strong>Totals</strong></td>
<td></td>
<td><strong>~200</strong></td>
<td><strong>~220,000</strong></td>
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</tbody>
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Future of Potable Reuse

• Senate Bill 918 was an important milestone
• Established deadlines for regulations
• Requires DDW to inform legislature on feasibility of DPR (end 2016)
• California State Expert Panel
  – Evaluate research and state of science
  – Provide technical guidance on regulations
• WateReuse California/Research Foundation DPR Initiative has raised >$6M
Role of environmental buffer in IPR

- Contaminant removal
- Dilution / blending
- Storage capacity
- Time to detect & respond to failures
Role of environmental buffer in IPR

How do maintain these protections without an environmental buffer?

What are the key issues?

- Contaminant removal
- Dilution / blending
- Storage capacity
- Time to detect & respond to failures
The Transition to DPR from Groundwater

![Bar chart showing the transition to DPR from groundwater. The chart compares Spreading, Injection, and Direct methods in terms of treatment, monitoring, and retention time. Each method is represented by a vertical bar divided into three sections: blue (treatment), red (monitoring), and yellow (retention time). Spreading has the highest treatment and monitoring percentages, Injection has a balanced distribution, and Direct has the highest retention time percentage.](chart.png)
WRRF 14-12 Demonstrating Redundancy and Monitoring to Achieve Reliable Potable Reuse

1 MGD Demonstration Scale Project for DPR
Leverage industry experience and recent DPR research to demonstrate that we can safely implement potable reuse without an environmental buffer
NWRI Expert Panel Meeting
Conclusions

• Potable reuse can be done safely and has been for the past 50+ years in California
• Multiple solutions must be pursued
  – Non-potable reuse
  – Indirect potable reuse
  – Direct potable reuse
• Need to ensure public health protection
• Public acceptance is critical
Thank you for your attention