CALIFORNIA RECYCLED WATER USE IN 2015

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Survey Overview

- 2015 calendar year
- Domestic waste from a municipal wastewater plant
- Planned and permitted reuse
- Title 22 allowable use
- Does not include internal reuse
- Does not have to replace a potable use
- Wetland and instream flow permit requirements
Conducting a Statewide Recycled Water Survey has its Challenges

- No standard reporting method to the regional boards
- Finding the right person who has the data
- Misunderstanding of the term “recycled water” or beneficial uses
- Implementation of recycled water projects varies from location to location
Primary Data Sources

Online Survey to ~250 CA wastewater plants reusing treated wastewater

Urban Water Management Plans from ~400 CA water suppliers

BOTH WERE CRITICAL
California Recycled Water Production and Distribution

City → Wastewater Treatment → City → AG, LS, GC, IND

- Collection
- Treatment
- Distribution
- Uses
CA Recycled Water Use Since 1970

ANNUAL USE (Acre-Feet)

1970: 175,000
1977: 184,000
1987: 267,000
2001: 525,000
2009: 669,000
2015: 714,000

CALENDAR YEAR

Water Region Reference

- San Diego Region
- Central Valley Region
- Santa Ana Region
- Los Angeles Region
- Central Coast Region
- San Francisco Region
- North Coast Region

Map of California with regions highlighted.
Why Was the Total Increase Lower than Expected?

**Negative External Factors**

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
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<td><strong>RECESSION</strong></td>
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<td>• Lower water sales which lowered revenues</td>
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<td>• Limited capital improvements</td>
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<td>• Potable water supply issues</td>
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<td>• Mandatory conservation</td>
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The Future is Positive

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**RECYCLED WATER PROJECTS**

- Projects funded by Drought Grants and Loans and Prop 1 start to come on-line

**DPR**

- DPR Feasibility Report Released
2015 Recycled Water Use:
714,000 acre-feet/881M cubic meters

- Golf Course Irrigation: 56,000 AF (8%)
- Landscape Irrigation: 126,000 AF (18%)
- Groundwater Recharge: 115,000 AF (16%)
- Agricultural Irrigation: 220,000 AF (31%)
- Industrial: 70,000 AF (10%)
- Seawater Intrusion Barrier: 54,000 AF (8%)
- Recreational Impoundment: 28,000 AF (4%)
- Natural System Restoration, Wetlands, Wildlife Habitat: 24,000 AF (3%)
- Other: 2,000 AF (<1%)
- Commercial: 4,000 AF (1%)
- Geothermal Energy Production: 15,000 AF (2%)
1. Golf Course and Landscape Irrigation were combined before 2009
2. Commercial use was included in Other before 2009
3. Seawater Intrusion Barrier and Groundwater Recharge were combined before 2001
Volumetric Changes in Beneficial Uses

ANNUAL USE (acre-feet)


AGRICULTURAL IRRIGATION
LANDSCAPE & GOLF COURSE IRRIGATION
INDUSTRIAL & COMMERCIAL
GEOTHERMAL ENERGY PRODUCTION
SEAWATER INTRUSION BARRIER
RECREATIONAL IMPOUNDMENT
NATURAL SYSTEM RESTORATION, WETLANDS & WILDLIFE HABITAT
GROUNDWATER RECHARGE
OTHER
Beneficial Uses Vary By Region

[Map of California with regions labeled and bar chart showing annual use (acre feet) for each region.]

1: North Coast
2: San Francisco Bay
3: Central Coast
4: Los Angeles
5: Central Valley
6: Lahontan
7: Colorado River Basin
8: Santa Ana
9: San Diego

Regional Total

Beneficial Use:
- Other
- Geothermal Energy Production
- Environmental
- Groundwater
- Commercial & Industrial
- Urban Irrigation
- Agricultural Irrigation

ANNUAL USE (acre feet)

SWRCB Region

<table>
<thead>
<tr>
<th>Region</th>
<th>1</th>
<th>2</th>
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<th>6</th>
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<tbody>
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<td>North Coast</td>
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<td>Lahontan</td>
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<td>Colorado River</td>
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</tbody>
</table>

# Regional Water Quality Control Board

210,000
150,000
120,000
90,000
60,000
30,000
# Treatment Levels Defined in Title 22

<table>
<thead>
<tr>
<th>Treatment Level</th>
<th>General Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>Reverse osmosis, micro- or nano-filtration, ozonation, advanced oxidation.</td>
</tr>
<tr>
<td>Disinfected Tertiary</td>
<td>Oxidized, filtered, and disinfected wastewater to achieve both bacterial and virus removal</td>
</tr>
<tr>
<td>Disinfected Secondary-2.2</td>
<td>Oxidized and disinfected wastewater with total coliform bacteria &lt; 2.2 MPN/100 mL</td>
</tr>
<tr>
<td>Disinfected Secondary-23</td>
<td>Oxidized and disinfected wastewater with total coliform bacteria &lt; 23 MPN/100 mL</td>
</tr>
<tr>
<td>Undisinfected Secondary</td>
<td>Oxidized wastewater</td>
</tr>
</tbody>
</table>

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*a: Based on California Code of Regulations Title 22, Section 60001 et seq.*
# General Beneficial Uses\(^a\) by Treatment Level

<table>
<thead>
<tr>
<th>Treatment Level</th>
<th>Beneficial Uses Permitted by Title 22(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>• GWR by subsurface injection&lt;br&gt; • SWIB by subsurface injection&lt;br&gt; • To be considered as part of the surface reservoir augmentation and DPR.</td>
</tr>
<tr>
<td>Disinfected Tertiary</td>
<td>• URB - residential landscaping, golf courses, school yards&lt;br&gt; • COM - laundries, artificial snow-making.&lt;br&gt; • IND - process water with worker contact, cooling and air conditioning&lt;br&gt; • GWR – by surface application</td>
</tr>
<tr>
<td>Disinfected Secondary-2.2</td>
<td>• AG - food crops with surface irrigation&lt;br&gt; • IMP - restricted recreational impoundments</td>
</tr>
<tr>
<td>Disinfected Secondary-23</td>
<td>• AG - nurseries and sod farms with unrestricted access&lt;br&gt; • URB - freeway landscaping, golf courses with restricted access&lt;br&gt; • COM - boiler feedwater, concrete mixing, soil compaction</td>
</tr>
<tr>
<td>Undisinfecte Secondary</td>
<td>• AG - fodder, fiber, and seed crops; nursery and sod farms irrigation&lt;br&gt; • OTH - sanitary sewer flushing</td>
</tr>
</tbody>
</table>

\(^a\): Based on California Code of Regulations Title 22, Section 60001 et seq.

\(^b\): Uses for increasing levels of treatment also include all uses for lower treatment levels.
Beneficial Reuse by Treatment Level

ANNUAL USE (acre-feet)

GOLF COURSE IRRIGATION
LANDSCAPE IRRIGATION
AGRICULTURAL IRRIGATION
COMMERCIAL
INDUSTRIAL
GEOTHERMAL ENERGY PRODUCTION
SEAWATER INTRUSION BARRIER
GROUNDWATER RECHARGE
RECREATION IMPOUNDMENT
NATURAL SYSTEMS, WETLANDS, WILDLIFE HABITAT
OTHER

TREATMENT LEVEL
- Advanced
- Disinfected Tertiary
- Secondary Disinfected-2.2
- Secondary Disinfected-23
- Undisinfected Secondary

50,000
100,000
150,000
200,000
250,000
What’s Next?

- Develop 2015 Survey web page
- Estimate a reasonable projection for 2020 recycled water use using the UWMPs and the completed 2015 survey
- Continue to evaluate the data set
- Streamline future surveys
- Develop (Water Board) permit language requiring monitoring and reporting recycled water use
- Continue to identify mechanisms for increasing statewide recycled water use
Contact Information

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