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
California Recycled Water Production and Distribution

Collection
Sanitary District
Community Services District
Sanitary District
Regional Collection
Water District
City
Wastewater District
City
Sanitary District

Treatment
Wastewater Treatment Plant
Water Recycling Facility
Water Recycling Facility
Water Recycling Facility
Wastewater Treatment Plant
City

Distribution
City
Irrigation District
Water District
Water District
City
Irrigation District
Water District

Uses
IND, COMM
LS. GC
LS. GC
LS, AG, GC
LS, GC, OTHER

Flow arrows indicate the direction of water movement.
**CA Recycled Water Use Since 1970**

### ANNUAL USE

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>Total Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>714,000 AF</td>
</tr>
<tr>
<td>1977</td>
<td>525,000 AF</td>
</tr>
<tr>
<td>1987</td>
<td>267,000 AF</td>
</tr>
<tr>
<td>2001</td>
<td>669,000 AF</td>
</tr>
<tr>
<td>2009</td>
<td>714,000 AF</td>
</tr>
</tbody>
</table>

### ANNUAL USE

<table>
<thead>
<tr>
<th>Acre-Feet</th>
<th>175,000 AF</th>
<th>186,000 AF</th>
<th>216,000 AF</th>
<th>227,000 AF</th>
</tr>
</thead>
<tbody>
<tr>
<td>100M</td>
<td>175,000 AF</td>
<td>186,000 AF</td>
<td>216,000 AF</td>
<td>227,000 AF</td>
</tr>
<tr>
<td>200M</td>
<td>175,000 AF</td>
<td>186,000 AF</td>
<td>216,000 AF</td>
<td>227,000 AF</td>
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<tr>
<td>300M</td>
<td>175,000 AF</td>
<td>186,000 AF</td>
<td>216,000 AF</td>
<td>227,000 AF</td>
</tr>
<tr>
<td>400M</td>
<td>175,000 AF</td>
<td>186,000 AF</td>
<td>216,000 AF</td>
<td>227,000 AF</td>
</tr>
<tr>
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<td>227,000 AF</td>
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<tr>
<td>700M</td>
<td>175,000 AF</td>
<td>186,000 AF</td>
<td>216,000 AF</td>
<td>227,000 AF</td>
</tr>
<tr>
<td>800M</td>
<td>175,000 AF</td>
<td>186,000 AF</td>
<td>216,000 AF</td>
<td>227,000 AF</td>
</tr>
</tbody>
</table>

### Water Region Reference

- San Diego Region
- Colorado River Region
- Lahontan Region
- Santa Ana Region
- Central Valley Region
- Los Angeles Region
- Central Coast Region
- San Francisco Region
- North Coast Region
Why Was the Total Increase Lower than Expected?

**Negative External Factors**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>RECESSION</strong></td>
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<tr>
<td>• Lower water sales which lowered revenues</td>
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<td></td>
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<td></td>
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<tr>
<td>• Limited capital improvements</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**DR O U G H T**

• Water rate hikes
• Potable water supply issues
• Mandatory conservation
• Less wastewater and lower quality
The Future is Positive

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Drought</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Recycled Water Projects</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Projects funded by Drought Grants and Loans and Prop 1 start to come on-line</td>
<td></td>
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<tr>
<td><strong>DPR</strong></td>
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<tr>
<td>- DPR Feasibility Report Released</td>
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</tr>
</tbody>
</table>
2015 Recycled Water Use:
714,000 acre-feet/881M cubic meters

- **Agricultural Irrigation**: 220,000 AF, 271M m³, 31%
- **Landscape Irrigation**: 126,000 AF, 155M m³, 18%
- **Groundwater Recharge**: 115,000 AF, 141M m³, 16%
- **Golf Course Irrigation**: 56,000 AF, 69M m³, 8%
- **Industrial**: 70,000 AF, 86M m³, 10%
- **Commercial**: 4,000 AF, 5M m³, 1%
- **Seawater Intrusion Barrier**: 54,000 AF, 66M m³, 8%
- **Recreational Impoundment**: 28,000 AF, 34M m³, 4%
- **Natural System Restoration, Wetlands, Wildlife Habitat**: 24,000 AF, 30M m³, 3%
- **Other**: 2,000 AF, 2M m³, <1%

Geothermal Energy Production: 15,000 AF, 18M m³, 2%
Changes in California’s Recycled Water Use

- **1970**: 175,000 AF, 216M m³
- **1987**: 267,000 AF, 329M m³
- **2001**: 525,000 AF, 648M m³
- **2015**: 714,000 AF, 881M m³

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 (cubic meters)

1970
1977
1987
2001
2009
2015

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

Regional Total

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

# Regional Water Quality Control Board

ANNUAL USE (cubic meters)

- 0
- 30,000
- 60,000
- 90,000
- 120,000
- 150,000
- 180,000
- 210,000

ANNUAL USE (acre-feet)

- 0
- 30,000
- 60,000
- 90,000
- 120,000
- 150,000
- 180,000
- 210,000

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

- 210
- 195
- 208
- 12
- 48
- 26
## 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>
</table>
| Advanced                 | • GWR by subsurface injection  
                          • SWIB by subsurface injection  
                          • To be considered as part of the surface reservoir augmentation and DPR.                                                                                                                                                        |
| Disinfected Tertiary     | • URB - residential landscaping, golf courses, school yards  
                          • COM - laundries, artificial snow-making.  
                          • IND - process water with worker contact, cooling and air conditioning  
                          • GWR – by surface application                                                                                                                                                                                                       |
| Disinfected Secondary-2.2| • AG - food crops with surface irrigation  
                          • IMP - restricted recreational impoundments                                                                                                                                                                                            |
| Disinfected Secondary-23 | • AG - nurseries and sod farms with unrestricted access  
                          • URB - freeway landscaping, golf courses with restricted access  
                          • COM - boiler feedwater, concrete mixing, soil compaction                                                                                                                                                                           |
| Undisinfected Secondary  | • AG - fodder, fiber, and seed crops; nursery and sod farms irrigation  
                          • OTH - sanitary sewer flushing                                                                                                                                                                                                           |

\(a\): 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 (cubic meters)

ANNUAL USE (acre-feet)

GOLF COURSE
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
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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