

# **RECYCLED WATER: SAFE, SUCCESSFUL USE IN HUNDREDS OF CITIES IN CALIFORNIA AND THROUGHOUT AMERICA**

## **A summary prepared by the Redwood City Public Works Services Department**

Several City Council members and members of the public have asked for details on:

- Examples of where recycled water is being used in California and across the nation.
- Some examples of use in or near residential areas, including examples of mandatory/compulsory use.
- Some case studies from other states and more jurisdictions from California, including a listing of some communities across the nation that have implemented projects to use purified recycled water to supplement drinking water supplies.
- Listing of where recycled water is used for agricultural purposes in California, including food crops.

This report responds to these requests.

## **Examples of where recycled water is being used in California and across the nation.**

California and Florida are the leading states for recycled water. Texas and Arizona are not far behind, and now virtually every state is getting into the act of saving precious drinking water by using recycled water for irrigation and industrial purposes.

California and Florida are also leaders in presenting statewide statistics on water reuse. California's report does not break down the numeric use of recycled water in or near residential areas, but refers to them most often as landscape irrigation and/or common areas.

Conversely, **Florida does break down its water reuse to include 122,382 residences that receive recycled water in Florida.** More on this and examples of recycled water use in common and residential areas follows.

But first, a synopsis of water recycling in California shows that it is hardly new. Water recycling began in 1889 when the managers of Golden Gate Park began irrigating with semi-treated sewage to make the park soil more productive. The first water reclamation plant was constructed there in 1932. The City and County of San Francisco continue today to include water reuse in their master plan for water resources management.

In 2000, recycled water use in California totaled 401,910 acre-feet. (*Source: California State Water Resources Control Board Office of Water Recycling; [www.swrcb.ca.gov/recycling/recyfund/munirec/index.html](http://www.swrcb.ca.gov/recycling/recyfund/munirec/index.html)*). (*This reflects the amount reported to the state agency in a detailed 51-page report available at the noted website. It shows the specific uses per reporting jurisdiction in every County that has recycling projects. This report is*

*enhanced with information received from several jurisdictions in California and across the nation as a result of phone calls or email exchanges.)*

**While California jurisdictions used nearly 402,000 acre-feet of recycled water, by comparison, the proposed Redwood City Recycled Water Project seeks to use slightly less than 2,000 acre-feet of recycled water each year, less than one-half of one percent of what is now being successfully recycled in California.**

*(An acre-foot of water is equivalent to 326,000 gallons. The 401,910 acre-feet of water recycled in California last year is the equivalent of saving drinking water to supply 1,607,640 homes).*

This is not an all-inclusive list but represents the majority of jurisdictions in California with water recycling projects. **To date, none of them have reported any serious illnesses from recycled water.**

### **California**

1. **Agoura Hills:** parks, medians, freeway, schools, golf course, landscape irrigation.
2. **Amador:** pasture irrigation, toilet flushing, fire protection.
3. **Aliso Viejo:** landscape irrigation, park irrigation, golf course.
4. **Antelope Valley:** park irrigation, recreational ponds.
5. **Angel's Camp:** pasture irrigation, landscape irrigation.
6. **Arcata:** freshwater marsh enhancement.
7. **Arvin:** Duncan Farms cotton and alfalfa irrigation.
8. **Atascadero:** golf course, landscape irrigation.
9. **Bakersfield:** fiber, fodder, and grain crop irrigation, hay irrigation, golf course.
10. **Barstow:** alfalfa irrigation.
11. **Bethel Island:** pasture irrigation.
12. **Bishop:** pasture irrigation, landscape irrigation.
13. **Bodega Bay:** landscape irrigation, golf course.
14. **Burbank:** power plant cooling, landscape irrigation, park irrigation, schools, freeway medians.
15. **Calabasas:** parks, medians, freeway, schools, golf course, landscape irrigation.
16. **Calipatria:** crop irrigation.
17. **Calistoga:** vineyards, landscape irrigation, golf course.
18. **Camarillo:** lemons and seed irrigation, landscape irrigation, pastures.
19. **Cambria:** fodder feed for a cattle operation.
20. **Camp Pendleton:** landscape irrigation, golf course irrigation.

21. **Carmel:** golf course, parks, landscape irrigation.
22. **Carlsbad:** crop irrigation, landscape irrigation.
23. **Carson:** groundwater injection, cooling tower, boiler feed, schoolyard irrigation.
24. **Castroville:** artichoke and other food crops irrigation.
25. **Ceres:** silage irrigation, landscape irrigation.
26. **Chino:** crop irrigation.
27. **Chino Hills:** crop irrigation, industrial process water, parks, schools, landscape irrigation, golf course.
28. **Chowchilla:** cotton irrigation.
29. **Coalinga:** crop irrigation.
30. **Concord:** golf course, landscape irrigation.
31. **Corcoran:** alfalfa and corn irrigation.
32. **Costa Mesa:** golf course, landscape irrigation.
33. **Daly City:** golf course, landscape irrigation.
34. **Dana Point:** landscape irrigation, schoolyard irrigation, medians and streetscapes.
35. **Davenport:** Brussels sprouts irrigation.
36. **Death Valley:** golf course.
37. **Delano:** alfalfa and grain irrigation.
38. **Delmar:** landscape irrigation.
39. **Dublin:** landscape irrigation, parks, schools, medians.
40. **El Dorado Hills:** 2,600 residential homes (planned) irrigation, golf courses, landscape irrigation, log deck watering.
41. **El Segundo:** golf course and landscape irrigation.
42. **Escondido:** industrial irrigation, landscape irrigation, crop irrigation.
43. **Exeter:** plum irrigation.
44. **Farmersville:** pasture irrigation.
45. **Ferndale:** pasture irrigation.
46. **Fresno:** wine grape irrigation, alfalfa and other crop irrigation, landscape irrigation.
47. **Fort Bragg:** vineyard irrigation, landscape irrigation.
48. **Fort Irwin:** crop irrigation.
49. **Galt:** pasture irrigation.
50. **Gilroy:** flower and vegetable seeds, Christmas trees, landscape irrigation.

51. **Glendale:** golf course, landscape irrigation, cooling tower, cemetery, freeway irrigation.
52. **Goleta:** golf course, landscape irrigation, toilet flushing.
53. **Groveland:** golf course, landscape irrigation.
54. **Guadalupe:** pasture, landscape irrigation.
55. **Hanford:** cotton irrigation.
56. **Hayward:** wildlife habitat enhancement, golf course.
57. **Hemet:** food crops, landscape irrigation.
58. **Hidden Hills:** parks, medians, freeway, schools, golf course, landscape irrigation.
59. **Indio:** crop and fodder irrigation.
60. **Industry Hills:** golf course, landscape irrigation.
61. **Inglewood:** parks, medians, freeway, schools, golf course, cemetery, and landscape irrigation.
62. **Irvine:** 1,600 common areas landscape irrigation, 70 private residences landscape irrigation, parks, schoolyards, medians, golf course.
63. **Jamestown:** crop irrigation, landscape irrigation, pastures.
64. **Laguna Beach:** golf course, nursery plant irrigation.
65. **Laguna Niguel:** landscape irrigation.
66. **Laguna Hills:** golf course irrigation, landscape irrigation.
67. **Lake Arrowhead:** crop irrigation.
68. **Lake Elsinore:** golf course, landscape irrigation.
69. **Lake Forest:** cemetery, landscape irrigation.
70. **Lakeport:** pasture irrigation.
71. **Lake of the Pines:** pasture irrigation.
72. **Lancaster:** wildlife refuge, landscape irrigation
73. **Laverne:** golf course irrigation and tree farm irrigation.
74. **Lemoore:** cotton and fodder irrigation.
75. **Lincoln:** pastures, dust control.
76. **Livermore:** golf course, landscape irrigation, fire protection, freeway irrigation.
77. **Lodi:** corn irrigation, boiler feed at power plant, fish rearing ponds.
78. **Long Beach:** golf course, landscape irrigation, parks, playgrounds, school fields, freeway irrigation.
79. **Lompoc:** corn irrigation.

80. **Los Angeles:** ground water recharge, golf course, landscape irrigation, fire protection, freeway irrigation, school yards, parks, dust control, cemetery irrigation, concrete mix, water for carpet dying.
81. **Los Banos:** pasture.
82. **Loyalton:** hay irrigation.
83. **Lucerne Valley:** alfalfa, fodder crop irrigation.
84. **Madera:** crop irrigation, golf course, pasture.
85. **Manteca:** orange groves, dairy feed alfalfa, corn irrigation.
86. **Martinez:** wildlife habitat enhancement.
87. **McFarland:** cotton, grain irrigation.
88. **McKinleyville:** pasture, dairy cattle grazing.
89. **Mendocino:** golf course, pasture.
90. **Merced:** wetland/wildlife enhancement.
91. **Middletown:** golf course irrigation.
92. **Milpitas:** landscape irrigation.
93. **Mission Viejo:** landscape irrigation, greenbelts, common areas irrigation, golf course.
94. **Montague:** hay, alfalfa irrigation.
95. **Montebello:** groundwater recharge.
96. **Monterey:** golf course, parks, landscape irrigation.
97. **Morgan Hill:** flower and vegetable seeds, Christmas trees, landscape irrigation.
98. **Murphys:** pasture irrigation.
99. **Napa:** vineyards irrigation, golf course.
100. **Newport Beach:** golf course, freeway irrigation, schoolyards, parks, and landscape irrigation.
101. **Novato:** pasture
102. **Oakland:** landscape irrigation, golf course, median, freeway.
103. **Oceanside:** landscape irrigation, wetland/wildlife enhancement.
104. **Orange County:** groundwater injection, common area residential landscape irrigation.
105. **Oroville:** cooling tower.
106. **Palmdale:** crop irrigation, Christmas tree farm irrigation.
107. **Palm Desert:** golf course, landscape irrigation
108. **Palm Springs:** golf course, landscape irrigation, parks, schools, freeway, medians.

109. **Palo Alto:** landscape irrigation, golf course irrigation.
110. **Pelican Bay:** landscape irrigation.
111. **Perris Valley:** crop irrigation, wetlands restoration, landscape irrigation.
112. **Petaluma:** crop irrigation, landscape irrigation, tree irrigation, pastures.
113. **Pleasant Hill:** landscape irrigation, golf course.
114. **Plymouth:** pasture irrigation.
115. **Pomona:** groundwater recharge, paper manufacturing, parks and playgrounds, dust control, cooling tower, golf course, strawberry, freeway landscape, schoolyards, and landscape irrigation.
116. **Porterville:** alfalfa irrigation, landscape irrigation,
117. **Poway:** crops, landscape irrigation.
118. **Puente Hills:** cooling tower, golf course, nursery stock, freeway, and landscape irrigation.
119. **Rancho Santa Margarita:** golf course, landscape irrigation.
120. **Rancho Murrieta:** golf course irrigation.
121. **Red Bluff:** freeway irrigation, landscape irrigation.
122. **Redding:** landscape irrigation, schoolyard irrigation, pasture, wash down log decks.
123. **Richmond:** cooling tower, golf course, and landscape irrigation.
124. **Ridgecrest:** golf course irrigation.
125. **Riverside:** golf course, landscape irrigation, crop irrigation, groundwater recharge.
126. **Rohnert Park:** golf courses, schools, parks, landscape irrigation.
127. **Roseville:** golf course, landscape irrigation.
128. **Santee:** recreational lakes, landscape irrigation.
129. **San Bernardino:** steel plant cooling, landscape irrigation, golf course.
130. **San Clemente:** golf course, landscape irrigation.
131. **San Diego:** landscape irrigation, golf course, parks, schools, medians, industrial irrigation.
132. **San Francisco:** Landscape, golf course irrigation.
133. **San Jose:** landscape irrigation, golf course, parks, schools, medians, industrial cooling, toilet flushing.
134. **San Rafael:** cemetery, cooling tower, schoolyard and landscape irrigation, toilet flushing (five buildings).

135. **San Leandro:** landscape irrigation, median, golf course.
136. **San Luis Obispo:** crop irrigation, landscape irrigation, golf course.
137. **San Ramon:** landscape irrigation, parks, schools, medians.
138. **Santa Barbara:** landscape irrigation, parks, schools, medians, cooling towers, toilets, golf course.
139. **Santa Clara:** landscape irrigation, golf course, parks, schools, medians, cemetery irrigation.
140. **Santa Maria:** pasture.
141. **Santa Rosa:** crop irrigation, vineyards, landscape irrigation, greenbelt irrigation, golf courses, pastures.
142. **Selma:** cotton and wheat irrigation, plum orchard.
143. **Shafter:** golf course irrigation.
144. **Solvang:** pasture.
145. **Sonoma:** crop irrigation, vineyards, blueberry irrigation.
146. **South Lake Tahoe:** pasture irrigation.
147. **St. Helena:** vineyards, landscape irrigation, golf course.
148. **Sunnyvale:** landscape irrigation, golf course, parks, schools irrigation.
149. **Susanville:** alfalfa irrigation.
150. **Taft:** alfalfa irrigation.
151. **Temecula:** bean and grain irrigation, potato irrigation, vegetable irrigation, landscape irrigation, medians, golf course.
152. **Tiburon:** landscape irrigation.
153. **Tulare:** food crop irrigation, wheat irrigation, landscape irrigation.
154. **Tustin:** golf course, landscape irrigation, freeway irrigation.
155. **Twentynine Palms:** golf course, landscape irrigation.
156. **Upland:** golf course, landscape irrigation.
157. **Ventura:** food crops, landscape irrigation, golf course irrigation.
158. **Wasco:** alfalfa, cotton, sugar beet irrigation.
159. **Watsonville:** artichokes, lettuce and other food crops, landscape irrigation.
160. **Wawona (Yosemite):** golf course, landscape irrigation.
161. **Westlake Village:** parks, medians, freeway, schools, golf course, landscape irrigation.
162. **Whispering Palms:** pastures.

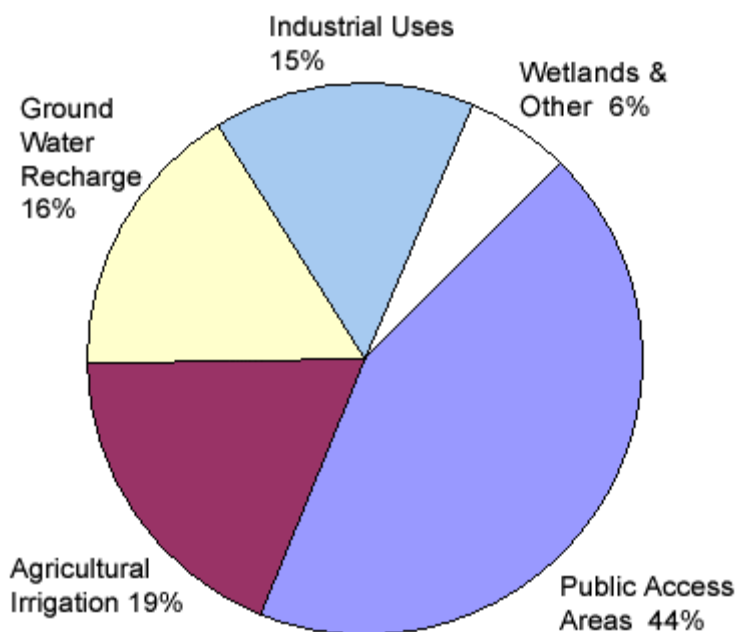
- 163. **Willits**: crop irrigation, hay fields.
- 164. **Windsor**: common residential areas, crops, vineyards, landscape irrigation, sheep grazing.
- 165. **Yountville**: hayfields, landscape irrigation, golf course.
- 166. **Yuba**: golf course, landscape irrigation.

**Florida's Reuse Experience**

Reuse has become an integral part of wastewater management, water resource management, and ecosystem management in Florida. During the past 15 years, Florida has risen to be recognized as a national leader (along with California) in water reuse. Approximately 584 million gallons per day (mgd) of recycled water was reused for beneficial purposes in 2001. The total reuse capacity of Florida's domestic wastewater treatment facilities has grown from 362 mgd in 1986 to 1,151 mgd in 2001, which amounts to an increase of 218 percent. The current reuse capacity represents about 52 percent of the total permitted domestic wastewater treatment capacity in Florida.

Recycled water from these systems was used to irrigate 122,382 residences, 419 golf courses, 405 parks, and 188 schools. Irrigation of these areas accessible to the public represent about 44 percent of the 584 mgd of reclaimed water reused. There are 180 cities in Florida using recycled water. Listing of all cities in Florida recycling: [www.dep.state.fl.us/water/reuse/docs/pdf/APP-A2001.pdf](http://www.dep.state.fl.us/water/reuse/docs/pdf/APP-A2001.pdf)

**Florida Reclaimed Water Utilization Percentages by flow (2001)**



As noted, 122,382 residences receive recycle water in Florida. A table showing all of them is at: <http://www.dep.state.fl.us/water/reuse/docs/pdf/APP-F2001.pdf> and <http://www.dep.state.fl.us/water/reuse/experien.htm>

## **Some examples of recycled water use in or near residential areas**

### **California:**

**Irvine Ranch/Irvine Ranch Water District (serving six jurisdictions):** The Irvine Ranch water recycling program, one of the longest and most successful multi-use recycling projects in California (dating back to 1969), represents the best example for the proposed Redwood City Water Recycling Project. This is because, like Redwood City, the Irvine Ranch community has numerous homeowner associations, common areas, community parks, and beautifully landscaped medians and streetscapes.

Uses of recycled water in the Irvine area include parks, golf courses, school playfields, athletic fields, and many common areas maintained by homeowner associations. Over 2,818 landscape meters receive recycled water, providing irrigation to over 5,650 acres of landscaping, including 1,600 common areas administered by homeowner associations and 70 private residences. Use of recycled water, including residential common areas, is mandatory.

The Irvine Ranch Water District ([www.irwd.com](http://www.irwd.com)) also provides recycled water to the cities of Irvine, most of Lake Forest, partially in Newport Beach, Tustin, Orange, Costa Mesa, and a little in Santa Ana, and unincorporated portions of Orange County. Virtually all new residential development serviced by the district receives recycled water for landscape irrigation as a condition of receiving water, according to Kelly Welch, water resource planner for the IRWD.

According to her, for more than 20 years the common areas of residential areas have been dual plumbed as they developed and have been serviced with recycled water for landscape irrigation. Welch reports **that in 20 years, there have been no reports of illnesses attributed to recycled water in jurisdictions served by IRWD.** In Newport Beach, 200 estate-size homes recently were dual-plumbed for landscape irrigation for both front and back yards, she reports.

The IRWD is now aggressively marketing recycled water for toilet flushing. The district has installed dual-plumbing for any building where reclaimed water is used for toilets.

**Windsor:** Vintage Greens in Windsor, six miles from Healdsburg in Sonoma County, is among the first residential developments along with one noted below in El Dorado Hills in Northern California to be equipped with dual piping that enables homeowners to use recycled water outside and drinking water indoors. The recycled water is supplied for irrigating front and backyard landscaping. Nearby neighborhood parks and soccer fields are also irrigated with recycled water. ([www.ci.windsor.ca.us/3081.html](http://www.ci.windsor.ca.us/3081.html)). At build out more than 4,000 single-family homes will have been dual-plumbed for front and backyard landscape irrigation with recycled water. The use is mandatory.

**The El Dorado Irrigation District** is supplying 1,000 homes now and plans for another 5,000 in the Serrano planned community with recycled water for front and backyard irrigation, according to spokesman Dave Powell [DPOWELL@eid.org](mailto:DPOWELL@eid.org). “The homebuyers are well-aware of the dual-plumbing when they purchase homes,” says Powell. Current, the district provides about 1600 ac-ft annually for golf courses, school playgrounds, soccer fields, dual plumbed homes, etc., first starting in 1979. Since that time, there have been no reports of illness attributable to recycled water, according to Powell.

**The Lamorinda Project:** Central San and East Bay Municipal Utility District (EBMUD) are working together to develop the Lamorinda Recycled Water Project to serve, among other things, common areas in Walnut Creek, Lafayette, Moraga, and Orinda, along with golf courses, median strips, parks, and playing fields. It will ultimately deliver 2.0 million gallons of recycled water per day. The final Environmental Impact Report for the joint project was certified in August 1998. The project is awaiting approval of several key development projects in the area prior to starting design and construction. Central San will wholesale the recycled water to EBMUD who will then deliver it to irrigation customers in Walnut Creek, Lafayette, Moraga and Orinda.

**The City of Carlsbad:** has approximately 26 miles of recycled distribution pipeline serving 58 recycled use sites, including the common areas of numerous homeowners associations. The sites served by recycled water include La Costa Resort and Spa, Four Seasons Resort at Aviara, Legoland of California, Grand Pacific Palisades Hotel, Karl Strauss Brewery and the world renowned Flower Fields. While these are the most recognized sites being supplied with recycled water, it is also supplied to parks, median strips, shopping areas, and freeway landscaping.

Within the next three to five years, the amount of recycled water available to the public will increase by approximately six million gallons per day, according to Bill Laird, Cross Connection Control Technician, at (760) 438-2722 ext. 7152.

**The Padre Dam Water Recycling Facility:** has received international attention since it began operations in 1961 and continues to draw visitors from around the world. The Santee Lakes are an integral part of the recycling project and opened to the public the same year. ([www.padredam.org/recycled.htm](http://www.padredam.org/recycled.htm)) The original project was the subject of a book *The Town that Launders its Water*. The Padre Dam project is believed to be the first facility in the country to use recycled water for aquatic recreational purposes, such as boating and fishing. The recycling facility was originally named the Santee Water Reclamation Plant. It was constructed by the Santee County Water District which was later renamed the Padre Dam Municipal Water District.

Today, more than 140 sites (meters) receive recycled water from the Padre Dam Water Recycling Facility, including several residential common areas in the Santee area, along with street medians, school grounds and sports fields, public parks, and landscaped areas surrounding commercial establishments.

**San Ramon Valley Recycled Water Project:** Soon to be underway, this multi-jurisdiction project will provide recycled water to customers in Dublin, San Ramon, Danville, and Dougherty Valley. Common area landscaping of residential developments with professionally managed homeowners associations also are among the designated customers. Some customers in eastern Dublin already are receiving recycle water. ([www.dsrsd.com/pog-projdesc.htm](http://www.dsrsd.com/pog-projdesc.htm))

**Orange County:** Since 1976, Orange County Water District has been operating Water Factory 21, an internationally renowned groundwater recharge project. This pioneering effort was initiated to protect the groundwater basin from saltwater intrusion – which previously had encroached as far as five miles inland – and to replenish the local aquifers, which supply 75 percent of the water needs for nearly 2.5 million residents. In addition, the District services 575 residential common areas, greenbelts, and streetscapes scattered throughout the District.

**Florida:**

**Examples of Residential Common Area Recycling of More Than 7,500 Units in Longboat Key, FL.**

[http://www.longboatkey.org/Departments/twn\\_mgr/water/LBK%20Resident%20Cost-Unit.htm](http://www.longboatkey.org/Departments/twn_mgr/water/LBK%20Resident%20Cost-Unit.htm)

**TOWN OF LONGBOAT KEY**

**RECLAIMED WATER CUSTOMER PROJECTIONS**

**SARASOTA COUNTY PORTION OF LONGBOAT KEY**

|                               | No. of Dwelling Units <sup>(a)</sup> | Irrigable Acreage <sup>(b)</sup> |
|-------------------------------|--------------------------------------|----------------------------------|
| <b><u>Sarasota County</u></b> |                                      |                                  |
| <b>Multi-Family, Condos</b>   |                                      |                                  |
| Tangerine Bay                 | 90                                   | 3.90                             |
| Sands Point Condo             | 77                                   | 2.58                             |
| L'Ambiance                    | 136                                  | 6.34                             |
| Longboat Key Towers           | 88                                   | 1.97                             |
| The Sanctuary                 | 181                                  | 6.30                             |
| Privateer                     | 116                                  | 1.60                             |
| Beaches                       | 74                                   | 1.89                             |
| Bay Harbour Apartments        | 39                                   | 1.00                             |
| Regent Place                  | 36                                   | 1.42                             |
| Beachplace                    | 336                                  | 9.42                             |
| Promenade Condo               | 112                                  | 2.77                             |
| Water Club                    | 258                                  | 4.79                             |
| Players Club                  | 134                                  | 4.17                             |
| Telcon Beach                  | 10                                   | 1.18                             |
| The Colony                    | 248                                  | 5.95                             |
| Seaplace                      | 457                                  | 13.11                            |
| Aquarius Club                 | 58                                   | 1.49                             |
| Sunset Beach                  | 65                                   | 2.37                             |
| En Provence                   | 21                                   | 2.28                             |
| Villa di Lancia               | 37                                   | 2.73                             |

|                                    |              |               |
|------------------------------------|--------------|---------------|
| Vizcaya                            | 31           | 2.89          |
| Islander Club                      | 134          | 2.26          |
| Beachcomber                        | 61           | 0.55          |
| Sea Gate Club                      | 100          | 2.02          |
| Veranda Beach Club                 | 40           | 1.19          |
| Islands West                       | 87           | 1.37          |
| Four Winds Beach Resort            | 60           | 1.17          |
| Veinte                             | 20           | 0.80          |
| Marina Bay                         | 60           | 2.72          |
| Gulf Tides of Longboat Key         | 21           | 0.56          |
| Neptune Apartments                 | 12           | 0.29          |
| Gulf Key                           | 10           | 0.40          |
| Apollo                             | 4            | 0.17          |
| Starfish/Tree House                | 7            | 0.22          |
| PortoBello                         | 69           | 1.71          |
| Island Court                       | 5            | 0.31          |
| Buttonwood Cove                    | 56           | 3.22          |
| The Diplomat                       | 50           | 0.63          |
| Longboat Bay Club                  | 15           | 0.57          |
| Longboat Arms                      | 45           | 1.13          |
| Dock on the Bay                    | 19           | 0.94          |
| Sea Horse Beach Resort             | 35           | 0.54          |
| Sea Bird                           | 15           | 0.34          |
| Continental's Sea Club             | 49           | 0.55          |
| The Pierre                         | 66           | 2.60          |
| Fairway Bay                        | 287          | 9.92          |
| Harbour Links @LBK Club Harborside | 20           | 1.55          |
| Grand Bay - Harborside             | 272          | 8.55          |
| Longboat Key Yacht and Tennis Club | 11           | 0.43          |
| Beach Harbor Club Apartments       | 133          | 2.09          |
| Silver Beach                       | 51           | 1.70          |
| Bayport Beach and Tennis Club      | 136          | 10.46         |
| <b>Total</b>                       | <b>4,554</b> | <b>141.11</b> |

**TOWN OF LONGBOAT KEY  
RECLAIMED WATER CUSTOMER PROJECTIONS  
MANTATEE COUNTY PORTION OF LONGBOAT KEY**

|  | No. of<br>Dwelling | Irrigable |
|--|--------------------|-----------|
|--|--------------------|-----------|

|                                    | Units <sup>(a)</sup> | Acreage <sup>(b)</sup> |
|------------------------------------|----------------------|------------------------|
| <b><u>MANTEE County</u></b>        |                      |                        |
| <b>Multi-Family, Condos</b>        |                      |                        |
| Longboat Key                       | 25                   | 0.87                   |
| Pelican Harbor & Beach Club        | 66                   | 3.00                   |
| Longboat Harbor North              | 152                  | 10.40                  |
| Longboat Harbor South              | 82                   | 2.27                   |
| First Longboat Harbor              | 300                  | 2.81                   |
| The Castillian                     | 60                   | 2.40                   |
| Longboat Beach House               | 22                   | 0.65                   |
| Tiffany Plaza                      | 42                   | 1.32                   |
| LBK Harbor Towers                  | 73                   | 1.10                   |
| La Playa                           | 22                   | 0.57                   |
| Arbomar Apartments Condominium     | 31                   | 0.66                   |
| The Grande at Longboat Key         | 8                    | 0.33                   |
| Longboat Key Caste de Mara         | 106                  | 2.34                   |
| Sun n Sea                          | 28                   | 1.33                   |
| Longboat Hilton                    | 134                  | 1.01                   |
| Key Cove                           | 60                   | 1.69                   |
| Shore Acres                        | 24                   | 1.03                   |
| Westchester                        | 72                   | 2.89                   |
| Holiday Inn                        | 197                  | 4.10                   |
| White Sands of Longboat            | 30                   | 0.67                   |
| Gulf Front Condo                   | 8                    | 0.36                   |
| Club Longboat Beach                | 86                   | 2.43                   |
| Sea Grape Inn                      | 8                    | 0.37                   |
| The Seascape                       | 8                    | 0.32                   |
| Sarasota Outrigger                 | 10                   | 0.28                   |
| Covert 1,2,3                       | 61                   | 2.45                   |
| Longboat Landing Condominium       | 9                    | 0.50                   |
| Beach Castle                       | 44                   | 1.02                   |
| Longboat Terrace                   | 62                   | 2.46                   |
| Banyan Bay Club                    | 52                   | 1.50                   |
| The Arbors                         | 95                   | 5.08                   |
| St. Judes Apartments               | 36                   | 0.64                   |
| Cedars East                        | 94                   | 3.58                   |
| Cedars West                        | 56                   | 2.00                   |
| Spanish Main YC                    | 247                  | 7.28                   |
| Silver Sands                       | 70                   | 2.71                   |
| Whitney Beach Townhomes            | 137                  | 4.88                   |
| Longboat Pass Apartments           | 88                   | 0.36                   |
| Lands End                          | 41                   | 2.69                   |
| Longbeach Condominium              | 99                   | 2.31                   |
| Harbor Villa Club at the Buccaneer | 60                   | 3.45                   |
| The Shore Condominium              | 53                   | 2.34                   |
| Sea Twin Condominium               | 6                    | 0.42                   |
| Salty Acres Condominium            | 6                    | 0.41                   |

|                            |              |              |
|----------------------------|--------------|--------------|
| Avignon Villas Condominium | 27           | 1.37         |
| <b>Total</b>               | <b>3,055</b> | <b>94.67</b> |

**Sarasota County's (besides the city listed above)** recycled water program currently serves 2,300 single family residential homes, 19 golf courses, a sod farm, 10 multi-family developments, 3 parks, and numerous medians. The County has been serving residential reuse customers since 1994, **with no reports of illnesses attributed to recycled water**, according to Public Works Director Larry Carroll [LCARROLL@co.sarasota.fl.us](mailto:LCARROLL@co.sarasota.fl.us)

“I understand there is opposition using recycled water in a couple of places in California,” says Carroll. “This is not the case here, everyone wants it and we can't meet the demand. Endocrine disrupters are just becoming a cause of concern for some recycled water users. However, our County is very proactive in using recycled water and realize it is basically treated to drinking water standards and there is no health concerns associated with it. We have not really had any opposition to using reuse.”

Sarasota County's facilities started using recycled water in 1989, now using about six million gallons per day of reclaimed water. Use is mandatory. Their current price for recycled water is \$0.44/1,000 gallons whereas the current price for drinking water is \$1.78/1,000 gallons, according to Carroll.

**Hillsborough County (FL)** -- The Southwest Florida Water Management District has approved funding for a key Hillsborough County recycled water project that will provide 160 miles of transmission lines to serve recycled water to more than 7,000 residential and commercial customers for landscape irrigation. The capacity will increase from 700,000 gallons-per-day to three million gpd. The County presently serves 642 residential customers. The design phase is scheduled to begin May 2003 and construction is scheduled to begin in January 2004. The project is expected to be complete by September 30, 2006, reports Public Works Director Randy Sears. ([www.swfwmd.state.fl.us/news/2002/121802r.shtml](http://www.swfwmd.state.fl.us/news/2002/121802r.shtml))

Sears says each residential recycled water customer (with a service connection of 1-inch or smaller) is currently charged a flat monthly user rate. The current rate is \$9.00 per month. Should a residential customer request a service connection larger than 1-inch, a meter would be required. Connections larger than 1-inch are billed the flat rate plus a metered rate. In addition to the monthly user fee, there are two one-time additional costs for homeowners who connect to the reclaimed water system. The connection charge for a dual-check back-flow prevention device is \$60 for a 5/8 or 3/4 inch connection or \$150 for a one-inch connection, and the cost to connect your sprinkler system into the reclaimed water connection box. The homeowner is responsible for this expenditure, which normally costs from \$150.00 to \$200.00.

**St. Petersburg (FL)**, which operates one of the largest recycled water systems in the U.S. – 20 million gallons per day to 6,500 residential customers for landscape irrigation – is about to get bigger. ([www.swfwmd.state.fl.us/news/2002/121802g.shtml](http://www.swfwmd.state.fl.us/news/2002/121802g.shtml))

The St. Petersburg Northwest and Southwest Reclaimed Water Storage Tanks, Pumps and Telemetry Project will accomplish two goals. The project will provide 20 million gallons of

additional storage, which will allow the city to expand its recycled water system. It will also monitor and coordinate control of the city's entire recycled water system from a central location, allowing the city's four treatment facilities to operate as one integrated reclaimed water supplier. When completed, the project will provide storage and pumping capacity for up to an additional 4,600 residential customers, all of them mandatory.

**Pasco County FL** has begun design of a 4.1 million gallons-per-day recycled water project to serve 5,769 residential customers and two golf courses, saving approximately 2.2 mgd of drinking water per day. Construction is scheduled to begin by May 1, 2004 and is expected to take up to a year to complete. ([www.swfwmd.state.fl.us/news/2002/121802c.shtml](http://www.swfwmd.state.fl.us/news/2002/121802c.shtml)).

## **Some case studies from other states and more jurisdictions from California**

**Blended Water for Drinking Water:** Tampa Bay and St. Petersburg began using a blend of groundwater and surface water for their drinking water supply in 2002, and this year (2003) desalinated seawater will be added to the mix. (<http://www.stpete.org/blendfacts.htm0>).

The blended water is as high or higher quality than the water the region has been receiving. And, it meets or is better than all federal, state and local quality requirements, including those required by the United States Environmental Protection Agency's Safe Drinking Water Act. Tampa Bay Water provides the water to its member governments of Hillsborough, Pasco and Pinellas counties as well as the cities of St. Petersburg and Tampa. They, in turn, supply the water to more than 2 million people in the Tampa Bay region, either directly or indirectly through the resale of water to other smaller utilities.

The plan's individual projects include surface water, desalinated seawater, and limited groundwater. These sources were selected to prevent over-reliance on a single source. They also will remain viable, environmentally sound sources of drinking water over time. By tapping into these diverse water resources, Tampa Bay Water will be able to reduce its pumping of stressed wellfields by at least 50 percent over the next five years.

**San Antonio, TX** – With a major expansion recently completed, San Antonio now generates 20% of its water supply from recycled water.

“The recycled water project has a fundamental goal of transferring water withdrawal rights as consideration for delivery of recycled water to customers who own their own wells,” reports Senior Water Planner Ken Diehl of the San Antonio Water Agency. “The decision of a potential customer who owns an Edwards Aquifer well(s) to connect to the recycled water project is contingent on the details of the water rights trade.” [kdiehl@saws.org](mailto:kdiehl@saws.org)

The San Antonio water recycling program delivers 24,000 acre feet to commercial and industrial users throughout the city, as well as to those with wells who buy rights and for municipal landscape irrigation. It has the capacity to deliver 35,000 acre-feet annually. The program consists of a 64-mile pipeline going around the entire city delivering recycled water to customers for non-drinking purposes.

In the 1930's San Antonio's Rilling Road plant was one of the first water recycling systems in the state of Texas. It was replaced by the state-of-the-art Dos Rios facility in 1987. In the 1950's and

60's, San Antonio was a pioneer in the large-scale use of recycled water for cooling electrical power plants. Over 6.5 billion gallons of recycled water are used each year for this purpose.

“Making greater use of recycled water is one of the keys to making more water available for economic growth and development in San Antonio,” says Diehl.

**Denver, CO:** Marking a first in Denver history, city water officials in December 2002 authorized the use of recycled to irrigate the Denver Country Club golf course as well as Washington Park and other south Denver locales. The \$164 million recycling system will save the city 45 million gallons of water a day when it starts operating on a broader basis in 2004. The initial phase of the south Denver recycling system will also serve Stapleton, Xcel Energy, and Denver International Airport.

By 2008, the entire project should be completed, diverting recycled water to Park Hill, the Rocky Mountain Arsenal, and the Lowry redevelopment area. Denver's project will be the largest in the state (45 million gallons per day). Ultimately, the project will provide more than 15,000 acre-feet of new supply, an amount equivalent to the usage of about 30,000 households. The project will provide about 23% of the projected supply needed for the growth in demand in Denver Water's Service area for the next 30 years.

**Tucson, AZ:** Tucson has one of the largest community recycling water systems in Arizona, delivering recycled water to nearly 400 sites, including 13 golf courses, 32 parks, 35 schools (the University of Arizona and Pima Community College included), and more than 300 single family homes.

[www.ci.tucson.az.us/water/water\\_resources/reclaimed\\_water/](http://www.ci.tucson.az.us/water/water_resources/reclaimed_water/)

Using recycled water for irrigation saves precious desert groundwater for drinking. In 2001, recycled customers saved 3.4 billion gallons of drinking water, enough for 31,000 families for a year.

**Aurora, CO** -- The City of Aurora recently completed a major expansion to their water recycling system. The project is an important part of the city's water resource plan, and is an economical means of extending available water resources. The new \$15 million system is capable of producing 5 million gallons of water per day to irrigate parks, golf courses, and greenbelts. The project included reservoirs to store recycled water produced during non-irrigation seasons for use during the summer.

Aurora has been reusing water for almost 20 years at Aurora Hills Golf Course and three city parks and is considered to be one of the water recycling leaders in Colorado. More than 120 million gallons of recycled water is used annually for irrigation. The project provides recycled water to irrigate five additional golf courses, greenbelt areas along the I-225 corridor, and additional city parks.

**Hawaii:** Oahu's drinking water supplies are limited. In fact, a recent report by the U.S. Bureau of Reclamation confirms the need for finding alternative sources. The Board of Water Supply is creating a safe and reliable alternate source of water for Oahu by launching an innovative, state-of-the-art water recycling program. On Oahu, recycled water is used at the Polynesian Cultural Center, The Links at Turtle Bay, and the Kaneohe Marine Corps Base Hawaii.

Other places throughout the state, such as Maui County, use recycled water to irrigate agricultural lands and landscaped areas around tourist attractions, hotels, golf courses, libraries and other public facilities.

**Even the Military:** Fort Sam Houston, Texas, is developing an installation wide recycled water system to reduce its reliance on the most critical source of water in southern Texas, the Edwards Aquifer. The aquifer is the sole source of water for more than 1.5 million people, including those who live and work at Fort Sam Houston. This complex system of underground rock formations is permeated by water and stretches over 11 counties in southern Texas.

The installation will now use more than 800 acre-feet of recycled water for cooling towers and irrigation, reducing its reliance on the Edwards Aquifer and conserving drinking water within the region. In partnership with Fort Sam Houston, water system officials agreed to construct a 36,000-foot distribution system connecting 11 cooling towers, four athletic field complexes, eight facility irrigation systems and two golf courses to the main recycled-water system, with an annual requirement totaling 808 acre-feet. The golf course detention pond will serve as the installation's only on-site storage reservoir and provide full service to the golf course irrigation system.

Fort Sam Houston's main medical complex, Brooke Army Medical Center, will become the first San Antonio hospital to use recycled water for cooling tower operations. The complex design and construction requirements for this four-tower system include a cooling tower plant — the largest on the base — that will draw more than 88 acre-feet of water during operations.

**South Bay Water Recycling Project:** As of 2001, more than 60 miles of recycled water pipelines are delivering recycled water for landscaping, playing fields, golf course, cemeteries, industrial processing, dual plumbing, agriculture and other non-drinking water purposes. Customers include the San Francisco 49ers practice fields and the Great America Theme Park. Program participants and partners with Santa Clara include the cities of San Jose and Milpitas, County Sanitation Districts 2 & 3, West Valley Sanitation District, Burbank and Sunol Sanitary Districts, Cupertino Sanitary District, Santa Clara Valley Water District, San Jose Water Company, and the Great Oaks Water Company.

The program is expected to soon expand. The Santa Clara Valley Water District is giving financial support to a number of recycled water projects in the South Bay that could soon provide funding for projects proposed by the cities of Santa Clara, Gilroy / Morgan Hill, Sunnyvale and San Jose. The projects together would ultimately recycle more than 40,000 additional acre-feet of wastewater per year, helping to conserve freshwater supplies and reducing the flow from wastewater treatment plants to San Francisco Bay.

In 2001, the South Bay Water Recycling Project recycled more than 3,000 acre-feet, or 11 million gallons of water per day. Of this, 853 acre-feet (*the equivalency of providing drinking water to 12,224 homes*) were used for landscape irrigation at 147 sites, similar to that proposed in the Redwood City Recycled Water Project.

**Phoenix, AZ** – Phoenix has long history of recycling its water. In fact, most of the city's water is recycled in some way. The city has contracts to sell recycled water from the Valley's regional 163-million-gallon-per-day (mgd) 91st Avenue Wastewater Treatment Plant to the Palo Verde Nuclear Generating Station and to the Buckeye Irrigation District. The generating station uses the water for its cooling system; the irrigation district uses the water to irrigate cotton crop.

The normally dry channels of the Salt and Gila rivers are used to convey the water to Buckeye and establish a riparian habitat in the river channel

Recently, the city completed its newest water recycling facility - the Cave Creek Water Recycling Plant. Water from that plant, which now has a capacity of 8 mgd and an ultimate capacity of 32 mgd - is supplying water to irrigate large turf facilities such as golf courses, parks and green belt areas. In newer parts of the city recycled water must be used for irrigation of turf areas of five acres or more.

Because of the seasonal variation in supply and demand for recycled water, the city is trying to develop recharge systems to replenish groundwater and constructed wetlands to provide areas for wildlife habitat, recreation and education. In the winter, when inflows to water recycling facilities are greatest, recharge facilities, wetlands and ephemeral waterways use the water not needed for turf irrigation. In the summer, when most of the recycled water is needed for irrigation, less water is available for recharge, and wetlands and the ephemeral streams receive little or no water.

**Los Angeles:** The city anticipates receiving about 10% of its water supplies from recycled water by 2010. The East Valley Water Recycling Project will be the City of Los Angeles' largest water reuse project. The completed project will consist of nearly 13 miles of water pipeline with a 4 1/2-foot diameter, a pumping station and a water tank. The project will ultimately deliver 35,000 acre feet per year of recycled water to meet the City's future water needs. The East Valley Project is the cornerstone of the efforts by the Los Angeles Department of Water and Power to meet the City's goal of using about 80,000 acre feet of recycled water annually by the year 2010, to replace about 10 percent of L.A.'s future fresh water use.

**Cary, NC** became the first city in the state to pump treated wastewater to homes and businesses for irrigation and cooling, beginning with several hundred customers in June 2001. Recycled water costs \$2.74 per 1,000 gallons, a savings rate of \$1.66. Outdoor watering restrictions don't apply to recycled water. Commercial customers include Worldcom, John Deere, and the N.C. Bar Association.

The State is allowing Cary to divert a total of about 5 million gallons of wastewater a day from the North and South plants. The recycled water system is critical to meeting the Town Council's goal of reducing water consumption 20 percent by 2015. Money for the project, which is budgeted at nearly \$11 million, comes from the utility fund.

**San Luis Obispo, CA:** On June 20, 2002, the State Water Resources Control Board approved a low-interest State Revolving Loan in the amount of \$8.41 million for the construction of the City of San Luis Obispo's Water Reuse Project. This completes the financing required for the project. Earlier, the State Water Resources Control Board approved a \$3.39 million Water Recycling Construction Program Grant for this project.

When fully developed, the Water Reuse Project will serve up to 1,200 acre-feet per year of recycled water to customers within the southern portion of San Luis Obispo. Initially, 138 acre-feet per year will be delivered to identified customers. A groundwater exchange program is being developed to exchange approximately 400 acre-feet of recycled water for groundwater that is currently being used by farmers adjacent to the City. An additional 475 acre-feet will be used to irrigate landscaping within areas that are expected to develop as the City grows at an anticipated rate of one percent per year until the population reaches 56,000.

**San Diego:** Water recycling is an important component of the San Diego region's local water resources. A number of agencies in San Diego continue to implement and expand their water recycling projects. Currently, about 12,000 acre-feet of recycled water are beneficially reused within the San Diego and adjoining areas annually. This number is projected to increase to more than 53,000 acre-feet per year by 2020.

**Santa Rosa area of Sonoma County:** The City of Santa Rosa is the managing partner of the Santa Rosa Subregional Reclamation System, which recycles water and distributes it on behalf of the cities of Cotati, Rohnert Park, Santa Rosa, and Sebastopol, and portions of the unincorporated area of Sonoma County. More than 50 percent of this recycled water (nearly 4 billion gallons annually) is used to irrigate approximately 5,700 acres of farmlands, including pastures, hay crops, vineyards, and row crops. The recycled water is also used to irrigate golf courses, parks, school grounds, and both public and private urban landscaping. This is one of the largest recycled water agricultural irrigation systems in the country. Expanded irrigation will decrease the draw down of water in Russian River tributaries, helping to restore habitat for two species listed as "threatened" under the Endangered Species Act-- steelhead and Coho salmon.

**East Bayshore Recycled Water Project:** The first phase of the East Bayshore project will supply 2.3 million gallons of recycled water per day to portions of Alameda, Albany, Berkeley, Emeryville, and Oakland. Types of use will include landscape irrigation, industrial uses, toilet flushing in new commercial buildings, and wetlands restoration.

## **More Examples of Using Recycled Water to Supplement Drinking Water Supplies**

Many other communities across the nation have implemented projects to use purified recycled water to supplement drinking water supplies. Some communities use reverse osmosis and others use less advanced technologies. Here are some examples:

**Orange County, CA** – The Orange County Water District currently injects recycled water into depleted groundwater basins.

**West Basin Water District** – uses microfiltration, reverse osmosis and ultraviolet light technologies to treat recycled water for groundwater injection. A neighboring water district, the **Water Replenishment District of Southern California**, has been inspired to construct a similar water treatment facility.

**Scottsdale, AZ** – The City of Scottsdale's new wastewater treatment plant uses microfiltration and reverse osmosis to purify treated wastewater before it is injected into the groundwater basin.

**Los Angeles County** – Treated wastewater runs through dual media filters at the Montebello Forebay Groundwater Recharge Project and is discharged into the Rio Hondo River. This water is diverted to the groundwater basins. The reclaimed water constitutes 18.7 percent of the groundwater supply, on average.

**Reno, Nevada** – The Tahoe-Truckee Sanitation Agency Water Reclamation Plant combines conventional activated sludge secondary treatment with biological phosphorus removal to treat

the wastewater. The treated water is released into the Truckee River, which is the source of the City of Reno’s water supply.

**Northern Virginia** – The Upper Occoquan Sewage Authority reclaims wastewater before discharging it into the Occoquan Reservoir. This reservoir is an important source of drinking water for about one million people in Northern Virginia.

**El Paso, TX** – The Fred Hervey Water Reclamation Plant recovers and treats wastewater that is then recharged into the groundwater. The water eventually travels to one of El Paso’s potable (drinking) water fields to become part of the drinking water supply – in fact, nearly 65 percent of it.

**Suburban Dallas** – The North Texas Municipal Water District operates a wastewater treatment plant known as Wilson Creek. Treated wastewater is discharged into a stream that is the tributary to Lake Levon, the water supply for the entire district.

**Las Vegas, NV** – Since the 1950s secondary treated wastewater has been discharged into the Las Vegas wash. The wash is located between the Las Vegas Valley and Lake Mead and represents two percent of the flow into Lake Mead. Lake Mead is the primary drinking water source for the Las Vegas Valley.

**Atlanta, GA** – The Clayton County Sanitation District operates a water treatment facility that discharges to forested land with runoff flowing to Pates Creek. Pates Creek is one of three creeks that feed into a reservoir serving Metropolitan Atlanta.

**Clean Water Revival:** Recycling for Groundwater Replenishment is a program of the Dublin San Ramon Services District to purify up to 2.5 million gallons per day of tertiary-treated wastewater through the advanced processes of microfiltration and reverse osmosis. This highly treated water is then injected into the groundwater basin to help replenish and improve the quality of the local groundwater supply. The \$19 million cost to construct groundwater replenishment facilities has already been paid and the plant has been built. The next step toward implementing the Groundwater Replenishment program is approval from the Regional Water Quality Control Board.

### **Summary of Agricultural Irrigation Water Reuse Projects in California**

<http://www.dswa.net/site/reuse/ReuseSummary1.html>

| <b>Project</b>                      | <b>Agency</b>        | <b>Annual Reuse (AFY)</b> |
|-------------------------------------|----------------------|---------------------------|
| Garone Farms Irrigation             | Bakersfield, City of | 18260                     |
| VCI Farms Irrigation                | Bakersfield, City of | 11386                     |
| Santa Rosa 49 Farm Irrigation Sites | Santa Rosa, City of  | 9585                      |
| Modesto Ranch Property Irrigation   | Modesto, City of     | 8227                      |
| Clarklind Farms Irrigation          | Tulare, City of      | 6248                      |
| Woerner's Turf Nursery Irrigation   | Fairfield-Suisun     | 6138                      |
| Petaluma Ag Irrigation              | Petaluma, City of    | 5750                      |
| Madera City Crop Irrigation         | Madera, City of      | 5601                      |

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|--|--|------|
| Monterey 66 Various Farms Irrigation               | <a href="#">Monterey County Water Resources Agency</a> | 4939 |
| STPUD, Various Ranches                             | South Tahoe Public Utilities District                  | 4910 |
| Perris Valley 10 Farm Irrigation Sites             | Eastern Municipal Water District                       | 4882 |
| Hemet/San Jacinto 10 Farm Irrigation Sites         | Eastern Municipal Water District                       | 4836 |
| Moreno Valley 10 Farm Irrigation Sites             | Eastern Municipal Water District                       | 4514 |
| Mount Vernon Farmer Irrigation                     | Kern county public works                               | 4247 |
| Sill Farms Irrigation                              | North of River Sanitary District                       | 3920 |
| Molica Farms Irrigation                            | Delano, City of  | 3052 |
| Nebeker Ranch Irrigation                           | Los Angeles, County San. Districts of                  | 3036 |
| Sanchez Bros. Irrigation                           | Hanford, City of                                       | 3000 |
| Robert Nuckols Farming Irrigation                  | Porterville, City of                                   | 2878 |
| Visalia Walnut Orchard Irrigation                  | Visalia Water Conservation Plant, City of              | 2700 |
| Lodi 2 Farm Irrigation Sites                       | Lodi, City of  | 2661 |
| Laguna Farm Irrigation                             | Laguna CSD   | 2501 |
| Westlake Farms Irrigation                          | Lemoore, City of                                       | 2449 |
| Petaluma 7 Farm Irrigation Sites                   | Petaluma, City of                                      | 2409 |
| Lucerne Valley Crop Irrigation                     | Big Bear Regional Wastewater Agency                    | 2249 |
| Barstow Alfalfa Irrigation                         | Barstow, City of                                       | 2240 |
| Golden State Vintners Grape Irrigation             | <a href="#">Fresno-Clovis Water Reclamation Plant</a>  | 1905 |
| Beeson Cattle Co. Irrigation                       | Lake County San. District                              | 1596 |
| CA Dept. of Fish & Game Wetland/Crop Irrigation    | Eastern Municipal Water District                       | 1538 |
| Dinuba Alfalfa Irrigation                          | Dinuba, City of  | 1534 |
| Crettol Farms Irrigation                           | Wasco Public Utilities District                        | 1488 |
| Willow Creek District Farm Irrigation              | Lake Arrowhood Comm. Serv. District                    | 1473 |
| Novato SD Pasture Irrigation                       | Novato Sanitary District                               | 1455 |
| Cabazon Band of Mission Indians Pasture Irrigation | Valley Sanitation District                             | 1289 |
| Sonora 33 Pasture/Crop Irrigation Sites            | Tuolumne City  | 1232 |
| Coelho & Sons Farming                              | <a href="#">Fresno-Clovis Water Reclamation Plant</a>  | 1222 |
| Kaiser Bros. Irrigation                            | Lamont Public Utilities District                       | 1105 |
| Buena Vida Farms Irrigation & Ponds                | Eastern Municipal Water District                       | 1098 |
| Oakley/Bethel Island Pasture                       | Oakley Bethel Island WRF                               | 1074 |
| Souza Farms  | <a href="#">Fresno-Clovis Water Reclamation Plant</a>  | 1000 |
| South Bay WRP, Ag Use                              | South Bay Water Recycling--San Jose                    | 1000 |
| Bruckor Farms Irrigation                           | Camarillo Sanitation Dept.                             | 943  |
| Fort Irwin Crop Irrigation                         | National Training Center (Fort Irwin)                  | 925  |
| Cal. Poly, Pomona-Kellogg Irrigation               | Los Angeles, County San. Districts of                  | 908  |
| Duncan Farms Irrigation                            | Arvin CSD  | 807  |

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|---|---|-----|
| Machado Farms Irrigation                        | Manteca, City of                                      | 805 |
| Chamberlain Farms Irrigated Pasture             | Napa Sanitation District                              | 792 |
| CA Institute for Men Farm Irrigation            | CA Dept. of Corrections                               | 789 |
| Novato SD Pasture Irrigation -Ignacio           | Novato Sanitary District                              | 767 |
| West Coast Turf Irrigation                      | Eastern Municipal Water District                      | 742 |
| Alta Growers Irrigation                         | Cutler-Orosi Joint Powers Wastewater Authority        | 683 |
| Cutler-Orsini Disposal Facility Irrigation      | Cutler-Orosi Joint Powers Wastewater Authority        | 669 |
| Woodlake Pasture Irrigation                     | Woodlake, City of                                     | 621 |
| Ramona Pasture Irrigation                       | Ramona Mun. Water District                            | 583 |
| Jim Tatum, Pasture Irrigation                   | Eastern Sierra Community Services District            | 574 |
| B. Jones Irrigation                             | Lakeport, City of                                     | 562 |
| McFarland Farmer Irrigation                     | McFarland, City of                                    | 560 |
| Windsor District Disposal Field Irrigation      | Windsor   | 552 |
| Cambria Comm. Serv. District Cattle Operation   | Cambria Comm. Serv. Dist.                             | 533 |
| Floyd Williams                                  | Mendota WTP, City of                                  | 522 |
| Quality Turf Corona Ranch Sod Irrigation        | Rancho California Water District                      | 517 |
| Rancho Las Virgenes Irrigation                  | <a href="#">Las Virgenes Municipal Water District</a> | 497 |
| Galt WWTP Pasture Irrigation                    | Galt, City of   | 483 |
| Temecula Valley 2 Farm Irrigation Sites         | Eastern Municipal Water District                      | 473 |
| Joe Martin Pasture Irrigation                   | CA Dept. of Corrections                               | 470 |
| San Pasqual Academy Crop Irrigation             | San Pasqual Academy                                   | 448 |
| Dutra Farms                                     | Manteca, City of                                      | 445 |
| Fallbrook 5 Plant/Nursery Irrigation Sites      | Fallbrook PUD   | 436 |
| Creekside Farms Irrigation                      | Taft, City of   | 430 |
| US Penitentiary Corn Irrigation                 | US Penitentiary                                       | 424 |
| A&G Sod Irrigation 2 Sites                      | Eastern Municipal Water District                      | 418 |
| San Jose/Santa Clara 4 Pasture Irrigation Sites | San Jose/Santa Clara Water Pollution Control Plant    | 415 |
| Lourenco Dairy Irrigation                       | McKinleyville Community Services District             | 400 |
| Misc Fresno City Property, Ag Irr.              | <a href="#">Fresno-Clovis Water Reclamation Plant</a> | 400 |
| Coalinga School Farm                            | Coalinga, City of                                     | 399 |
| Bishop Farmer, Pasture Irrigation               | Bishop, City of                                       | 398 |
| Las Gallinas Rancher Irrigation                 | Las Gallinas Valley San. District                     | 377 |
| Charles A. Pasquini Pasture Irrigation          | Guadalupe, City of                                    | 363 |
| Las Flores Ranch Irrigation - Houston Creek     | Crestline San. District                               | 362 |
| Gene Drybread Pasture Irrigation                | Quincy Community Services District                    | 359 |

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|---|---|-----|
| Loyalton Farm Irrigation                          | Loyalton, City of                                     | 358 |
| Solk Ranch Avocado Irrigation                     | Ramona Mun. Water District                            | 350 |
| V.P. Baker Ranch Irrigation                       | Los Alisos Water District                             | 348 |
| Charles Joiner Dust Control, Pasture Irrigation   | Lincoln, City of                                      | 338 |
| Kern County Lerdo Facility Irrigation             | Kern County Sheriff's Lerdo Facility                  | 336 |
| Parlier irrigation site                           | Parlier, City of                                      | 307 |
| Camarillo State Hospital Pre-Irrigation Food Crop | Ventura Regional Sanitation Dept.                     | 307 |
| Willits Effluent Irrigation of Fields             | Willits, City of                                      | 276 |
| American Yeast Irrigation                         | Bakersfield, City of                                  | 276 |
| Camrosa Farm Pre-Irrigation                       | Ventura Regional Sanitation Dept.                     | 276 |
| CA Correctional Center Alfalfa Irrigation         | California Correctional Center, Susanville            | 276 |
| City of Angels/Roller Family Pasture Irrigation   | Angels WTP, City of                                   | 271 |
| Emerson Dairy Fields                              | Oakley Bethel Island WRF                              | 270 |
| Ceres Farm Irrigation                             | Ceres, City of  | 263 |
| Los Coyotes 15 Nurseries Irrigation               | Los Angeles, County San. Districts of                 | 237 |
| Cal. Poly State University Pasture Irrigation     | CA Dept. of Corrections                               | 215 |
| Wayne Gardner Pasture Irrigation                  | Shasta Dam Area                                       | 215 |
| Pacific Union College Fodder Irrigation           | Pacific Union College                                 | 214 |
| Kirkland Cattle Company                           | Napa Sanitation District                              | 211 |
| Alta Nursery Irrigation                           | Eastern Municipal Water District                      | 208 |
| Las Flores Ranch Irrigation - Seeley Creek        | Crestline San. District                               | 202 |
| Amador RSA Pasture Irrigation                     | Sutter Creek TP (Amador Reg. San. Authority)          | 196 |
| SKF CSD Irrigation site                           | Selma-Kingsburg-Fowler Comm. Services Dist.           | 182 |
| Roy Mason Pasture Irrigation                      | Plymouth, City of                                     | 174 |
| Huffman and Allen Farms Crop Irrigation           | Calipatria, City of                                   | 172 |
| Lake of the Pines Pasture Irrigation              | Nevada County   | 169 |
| Flying U Farms Irrigation                         | Eastern Municipal Water District                      | 156 |
| Malibu Valley Farms Irrigation                    | <a href="#">Las Virgines Municipal Water District</a> | 153 |
| Roger Zwanziger Alfalfa Irrigation                | Weed, City of   | 153 |
| Mitch Mulas Pasture Irrigation                    | Sonoma County Dept. Public Works                      | 153 |
| Galen E. Bonjour                                  | Selma-Kingsburg-Fowler Comm. Services Dist.           | 142 |
| Quist Dairy                                       | <a href="#">Fresno-Clovis Water Reclamation Plant</a> | 140 |
| Tony Gill Pasture Irrigation                      | Patterson, City of                                    | 135 |
| Tagus Ranch                                       | Orange Cove WTP, City of                              | 133 |

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| Irvine Ranch 8 Agricultural Irrigation Sites       | <a href="#">Irvine Ranch Water District</a> | 131 |
| Willard Waldwell Ranch                             | Weed, City of                               | 122 |
| Napa Count Airport Alfalfa Irrigation              | Napa Sanitation District                    | 122 |
| Hermann/Jensen Nursery Irrigation                  | Santa Margarita WD                          | 120 |
| Manuel Escalante Citrus Irrigation                 | Ventura Regional Sanitation Dept.           | 117 |
| Meamber Ranch Irrigation                           | Montague, City of                           | 116 |
| Sonoma Airport Crop Irrigation                     | Sonoma County Dept. Public Works            | 108 |
| Veterans Home Hay Fields                           | Yountville/CA Veterans Home                 | 104 |
| Paldale Orchards Irrigation                        | Los Angeles, County San. Districts of       | 103 |
| Baker Ranch Pasture Irrigation                     | Tuolumne City                               | 101 |
| Elias P. Sousa, Pasture Irrigation                 | Ferndale, City of                           | 97  |
| Kramer Ranch                                       | Murphys SD WTP                              | 88  |
| Michael Strunk Nursery Irrigation                  | Santa Rosa, City of                         | 82  |
| Hoguenstadt Ranch Grazing Land                     | Willits, City of                            | 71  |
| Maxfield Property Horse Pasture                    | Calistoga, City of                          | 64  |
| Landmark Vineyards                                 | Windsor                                     | 61  |
| Fox Property Horse Pasture                         | Calistoga, City of                          | 60  |
| Lichip, Inc. Vegetable Irrigation                  | Eastern Municipal Water District            | 58  |
| Copper Cove Pasture Irrigation                     | Calaveras County Water District             | 58  |
| F.I. Norman's Nursery Irrigation                   | Los Angeles, County San. Districts of       | 52  |
| Strathmore WWTP Pasture Irrigation                 | Strathmore Public Utilities District        | 46  |
| Pete Cornaggia Farm Irrigation                     | Chowchilla, City of                         | 43  |
| Santa Maria Pasture Flood Irrigation               | santa maria, city of                        | 37  |
| Gardner Ranch Pasture Irrigation                   | Solvang, City of                            | 37  |
| Mule Creek State Prison Pasture Irrigation         | Mule Creek State Prison WTP                 | 35  |
| Bud Morrison Pasture Irrigation                    | Placer, County of                           | 34  |
| Best Western Pasture Irrigation                    | Best Western Ship Ashore Motel STP          | 34  |
| Camanche North Shore Pasture Irrigation            | Camanche North Shore WTP                    | 34  |
| Hoey Christmas Tree Farm Irrigation                | Gilroy and Morgan Hill, Cities of           | 31  |
| Parlier supply to individual farmer                | Parlier, City of                            | 31  |
| San Luis Obispo Rancher, Pasture Irrigation        | <a href="#">San Luis Obispo, City of</a>    | 31  |
| Mario Fioro Farm Irrigation                        | Gilroy and Morgan Hill, Cities of           | 31  |
| Jay Peterson Plum Irrigation                       | Ivanhoe Public Utilities District           | 30  |
| Lockeford Farm Irrigation                          | Lockeford Comm. Serv. District              | 28  |
| Las Flores Ranch Irrigation - Cleghorn             | Crestline San. District                     | 28  |
| Frietas Farm Irrigation                            | Santa Rosa, City of                         | 26  |
| Marino Crinella Pasture Irrigation                 | Sonoma County Dept. Public Works            | 23  |
| Crinklaw, Olive Hill Greenhouse Irrigation 2 Sites | Fallbrook PUD                               | 20  |

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| A. Lodi Pasture Irrigation                        | <a href="#">North Marin Water District</a>         | 20 |
| Del Rayo Racing Stables Pasture Irrigation        | Whispering Palms WPCF                              | 17 |
| Jaurengui Nursery Irrigation                      | Los Angeles, County San. Districts of              | 15 |
| PCM Nursery Plant Irrigation                      | El Toro Water District                             | 15 |
| Arbor Nursery Irrigation                          | Los Angeles, County San. Districts of              | 14 |
| My Hoa Farm                                       | Los Angeles, County San. Districts of              | 13 |
| Westport County WD Pasture Irrigation             | Westport CWD                                       | 12 |
| Graham's Pasture Irrigation                       | Sonoma County Dept. Public Works                   | 12 |
| Rancho Colina Pasture Irrigation                  | Rancho California Water District                   | 11 |
| McCarthy Farms Irrigation 2 Sites                 | San Jose/Santa Clara Water Pollution Control Plant | 11 |
| Los Angeles Dept. of Airports Barley Irrigation   | Los Angeles, County San. Districts of              | 10 |
| Las Flores Ranch Irrigation - Pilot Rock          | Calif. Dept. of Forestry (San Bernardino)          | 9  |
| Anthony Baal Nursery Irrigation                   | Los Angeles, County San. Districts of              | 8  |
| Camacho Strawberry Farm Irrigation                | Los Angeles, County San. Districts of              | 7  |
| Shasta College Alfalfa Irrigation                 | Shasta College                                     | 6  |
| Alta Produce Irrigation                           | Los Angeles, County San. Districts of              | 4  |
| Mission Bell Dairy Animal Feed Irrigation         | Mission Hills                                      | 4  |
| Sunshine Growers Irrigation                       | Los Angeles, County San. Districts of              | 3  |
| Marshall Canyon Tree Farm Irrigation              | LA County Probation Dept.                          | 2  |
| Cachuma Trail's Horse Pasture Irrigation          | Cachuma SD   | 1  |
| Los Banos Pasture Irrigation                      | Los Banos, City of                                 | 0  |
| Terminal Island TP Advanced WW Treatment Facility | <a href="#">Los Angeles, City of</a>               |    |

-End of Report-