



Fewer Drinks for the Links

Ariana Wilfley

Drought Management and Conservation Department



Esri Story Map



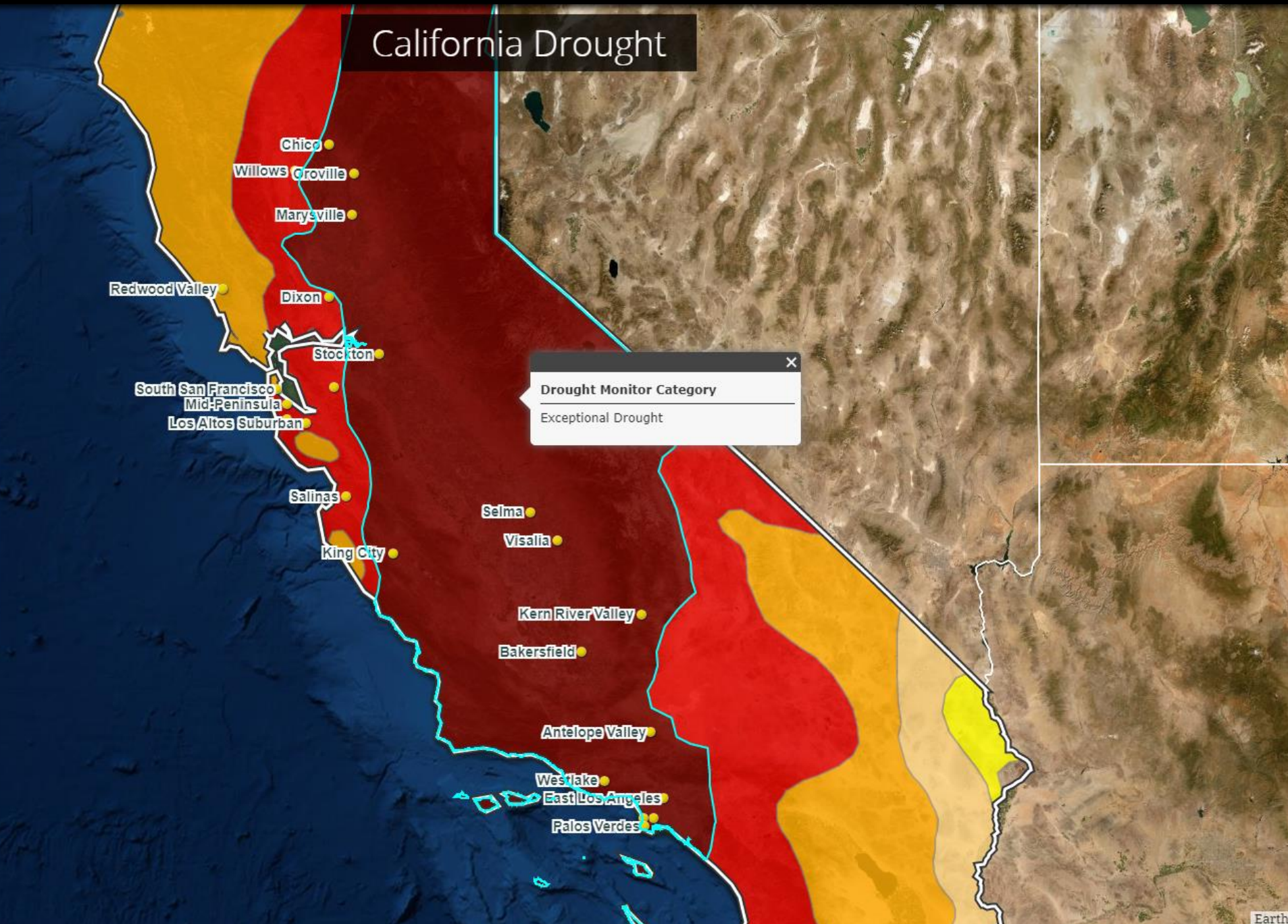
California Drought

Drought Status in California, June 2015

The State Water Resources Control Board set water-use reduction requirements ranging from 8% to 36% for water suppliers to meet this mandate.

Cal Water assembled a dedicated drought team to achieve these targets in our 24 systems. Where Cal Water's Service areas stood in June 2015:

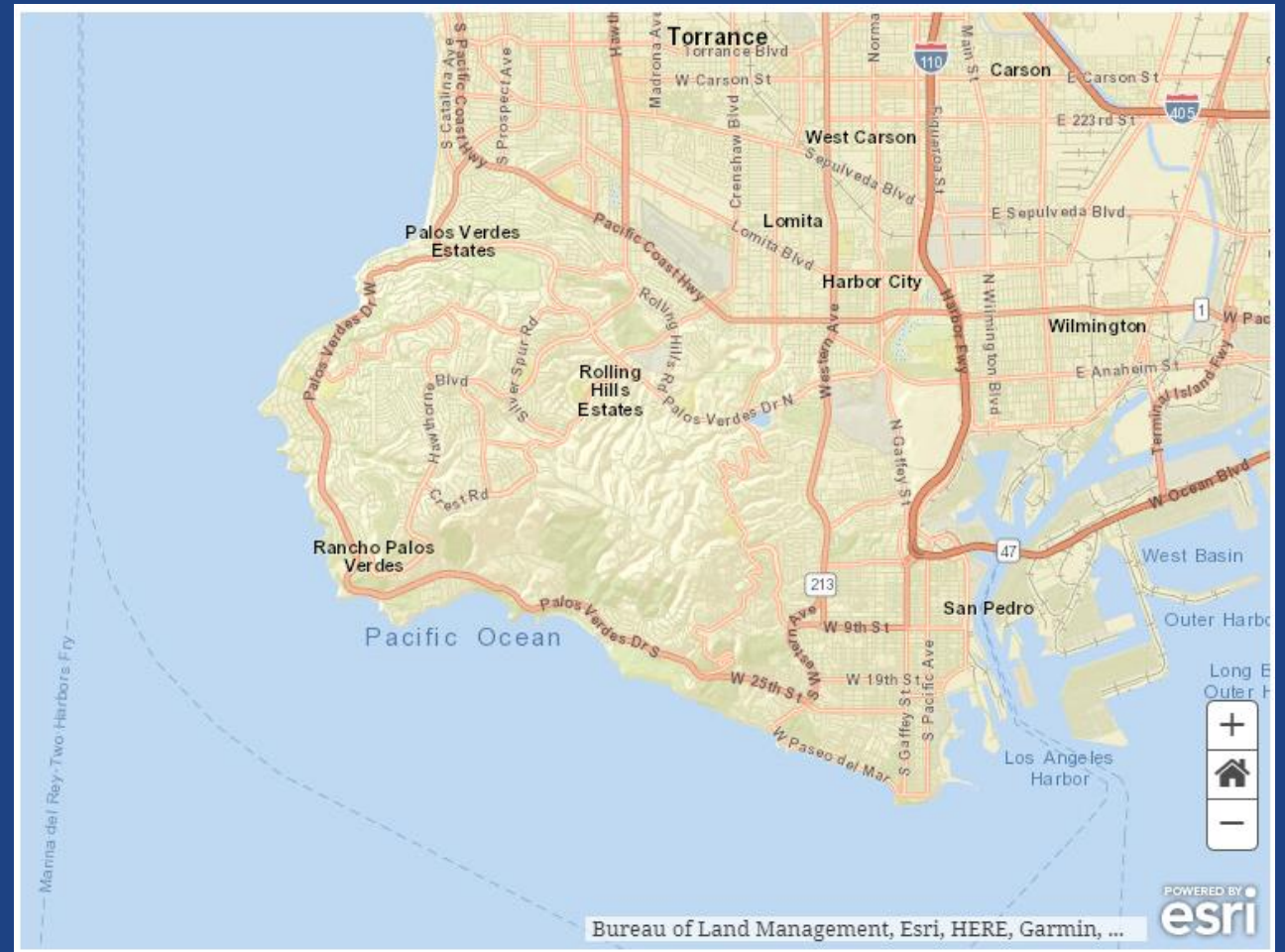
- 2 service areas in severe drought conditions**
- 6 service areas in extreme drought conditions**
- 16 service areas in exceptional drought conditions**





Palos Verdes reduction goal

36%



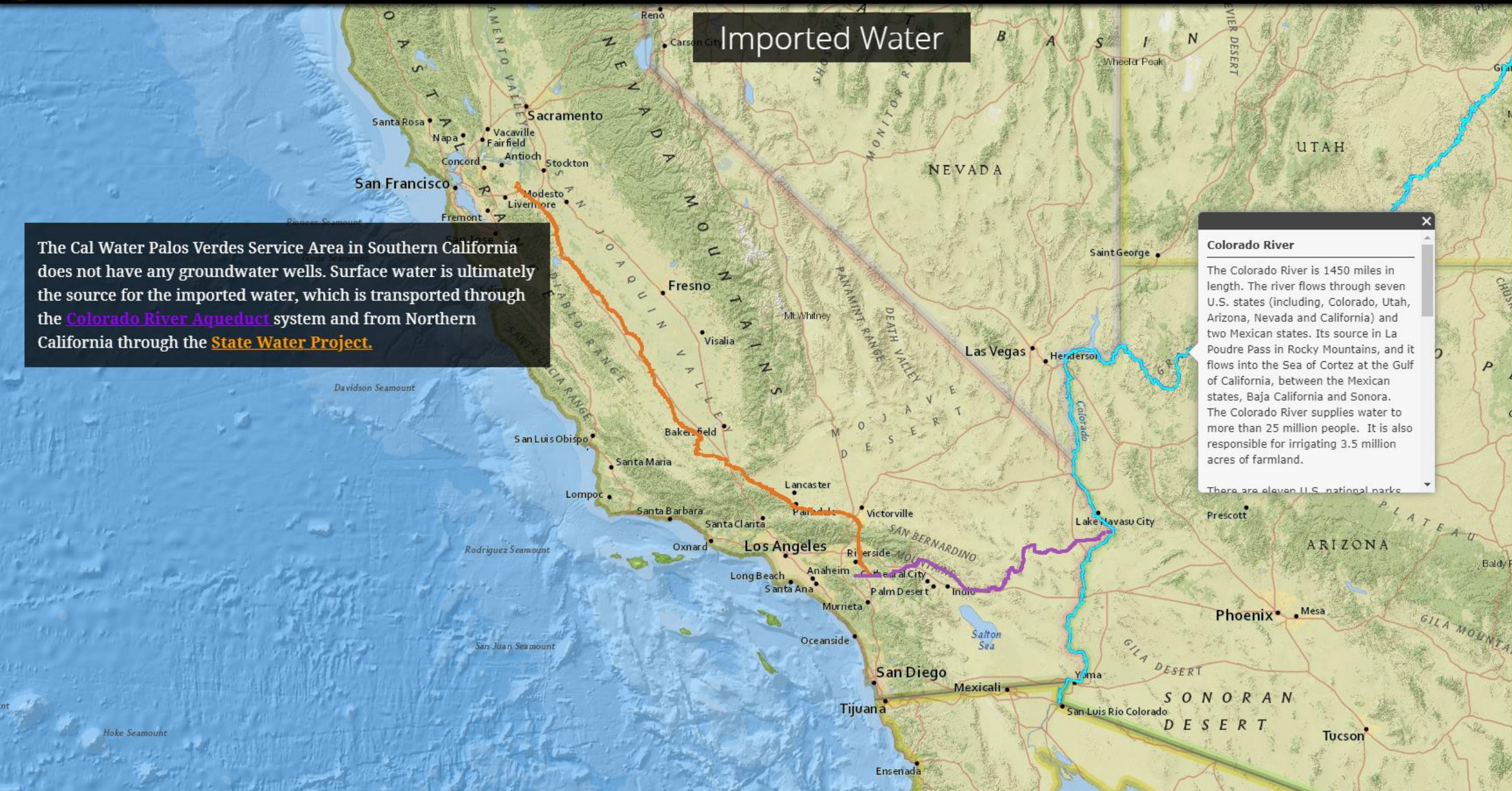
Imported Water

The Cal Water Palos Verdes Service Area in Southern California does not have any groundwater wells. Surface water is ultimately the source for the imported water, which is transported through the **Colorado River Aqueduct** system and from Northern California through the **State Water Project**.

Colorado River

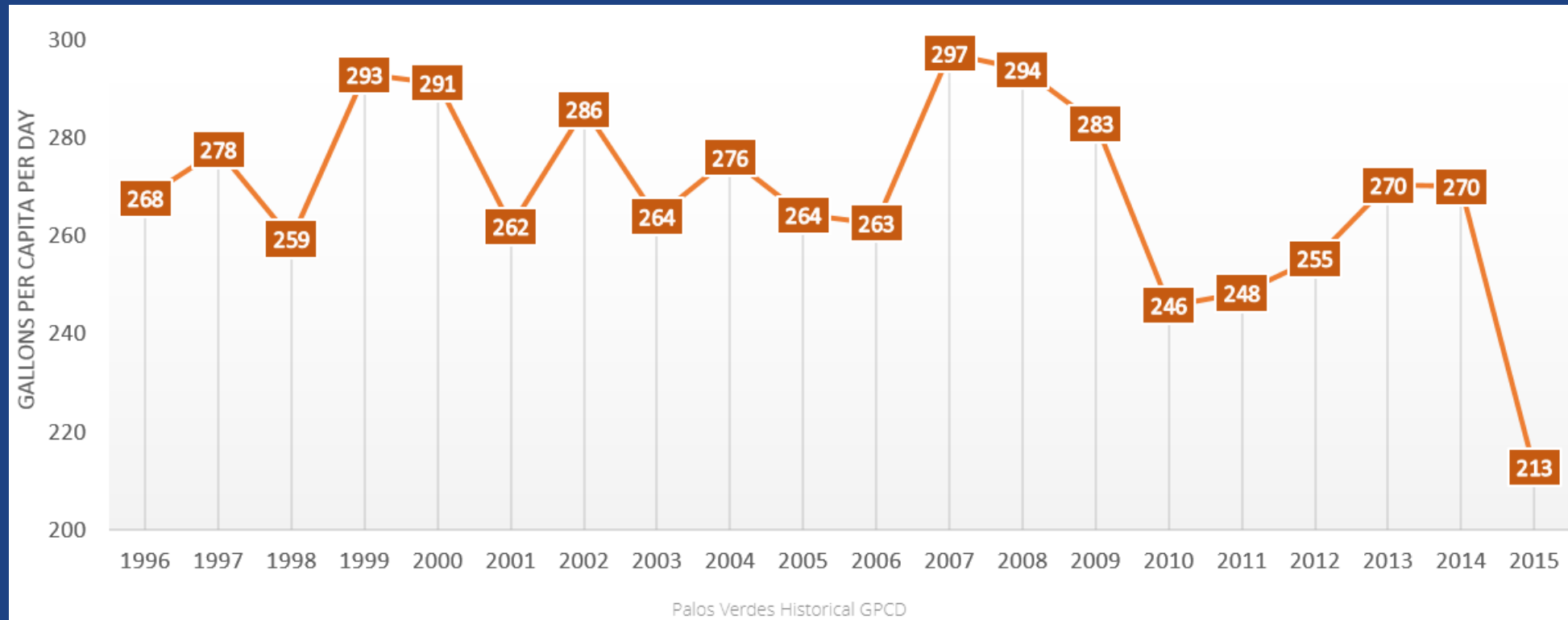
The Colorado River is 1450 miles in length. The river flows through seven U.S. states (including, Colorado, Utah, Arizona, Nevada and California) and two Mexican states. Its source in La Poudre Pass in Rocky Mountains, and it flows into the Sea of Cortez at the Gulf of California, between the Mexican states, Baja California and Sonora. The Colorado River supplies water to more than 25 million people. It is also responsible for irrigating 3.5 million acres of farmland.

There are eleven U.S. national parks





Palos Verdes Service Area Historical GPCD





Cal Water, committed to reducing water use for all service areas, partnered with some of our heaviest-using/highest-consuming customers: **Golf Courses.**

One such golf course, the **Palos Verdes Golf Club**, has made leaps and bounds in reducing their water consumption. Some golf courses in California had to shut their doors because of the drought, but Palos Verdes Golf Club made many efforts toward water conservation.

Palos Verdes Golf Club



Palos Verdes Golf Club

Much can be done at a course to use less water while still making the course playable and maintaining the aesthetic appeal. PVGC has participated in many of Cal Water's Water Conservation incentives, rebates, and upgrades.

Click on the map for details of each water conservation project.

- 1. Pump Station Upgrade
- 2. Real-time Monitoring Devices



Orion Cellular Endpoint

3. Biochar Usage



Sprinkler Heads

PVGC replaced/upgraded 332 sprinkler heads in Summer 2016 and 250 sprinkler heads in late 2016.

An aerial photograph of a coastal town with a golf course. The town features numerous houses with red-tiled roofs and a large white building complex. The ocean is visible in the background, and a cactus is in the foreground. The sky is blue with some clouds.

By partnering with Cal Water's Conservation Team, local golf courses can find areas in which turf can be replaced that will *not* impact the golf game.

Let's map where golfers play on the course.

Palos Verdes Golf Club

The Study began by gathering course information: number of holes, type of course, and marking out course features, such as **hole locations**, **water features**, **bunkers**, and **club house**, as control points.

Control points are important for validating the data and were completed with a precision GPS device - the Trimble Geo-7x.



Trimble Geo 7x



Palos Verdes Golf Club

A golfer places a GPS device into their pocket while they play on the course. The GPS device maps the golfer's location during the round of golf. This, along with other information collected from the golfer, informs the Course of playable turf areas.

The GPS devices are the size of a flash drive and fit easily into a pocket.



Canmore Sports LogBook GT-740FL GPS Data Logger



Palos Verdes Golf Club

Here is the path of one golfer during his game. He starts at the first hole and moves through to the last hole in just over 4 hours.



Palos Verdes Golf Club

Using the GPS devices, the Course can see how different golfers behave on the course. The amount of the course that is utilized is highly dependent on the method used to get around the course. Here you see the difference between **golfers who walked the course** vs. **golfers who road around in carts**.



Palos Verdes Golf Club

A sample of 100 golfers on three separate occasions was collected. A varied sample was important to the study so that we would capture how all different kinds of golfers played the course.

This display is of the path of all golfers who carried the GPS device during the game.



Palos Verdes Golf Club

Take away the places that the golfers traveled on, and you get all of the areas that they *didn't* travel on.

Not all of these areas have an impact on the turf removal guidelines, so we subtract certain categories of land cover, like **trees and large shrubs**, and **impervious surfaces**.



Palos Verdes Golf Club

With those categories no longer shown, the areas that remain are those eligible for renovation - **turf, bare, and sand**.

These areas were given to the golf course to help inform the decision on which turf around the Course to convert.





The screenshot shows the California Water Service website. At the top left is the logo. The navigation bar includes links for 'About Us', 'Find Your District', 'Help', and 'Contact Us'. Below the navigation bar are categories: 'Customer Care', 'Conservation', 'Water Quality', 'Community', and 'Rates'. A banner below the navigation bar reads 'Quality. Service. Value.' followed by a news item: 'ites Precautionary Boil Water Notice February 18, 2017 - Hamilton City - Sacramento River Forecast and Road Conditions February'. The main content area is titled 'Turf Replacement Rebate Program' under the 'Conservation' section. The text describes the program's incentive of \$1.00 per square foot for lawn replacement with drought-tolerant landscaping. It specifies that a minimum of 250 square feet of turf must be removed for eligibility, with a maximum rebate of \$1,000 for single-family residential customers and \$10,000 for multi-family residential and non-residential customers. Applications must be submitted through the website's program page. Additional restrictions apply, and customers are encouraged to read all program specifications. The page also mentions a partnership with a wholesaler in the Los Altos district and encourages environmental stewardship.

Conservation

- Drought Resources
- Report Water Waste
- Local Ordinances
- Conservation Reports
- Rebates and Programs
- Conservation Kits
- H2O Challenge
- Conservation Tips
- Drought-Resistant Plants
- Conservation at Home
- Urban Water Management Plans
- Other Resources

Turf Replacement Rebate Program

Cal Water will pay an incentive of \$1.00 per square foot for lawn that is replaced with climate-appropriate, drought-tolerant landscaping. Artificial turf and warm season turf grasses (bermuda grass, St. Augustine, etc.) do not meet program guidelines.

A minimum of 250 square feet of turf must be removed to be eligible for this rebate. For single-family residential customers, the maximum rebate is limited to 1,000 square feet of turf removed (\$1,000). For multi-family residential and non-residential customers, the maximum rebate is limited to 10,000 square feet of turf removed (\$10,000).

Cal Water will consider applications for turf replaced between January 1 and December 31, 2016, or until rebate funds are depleted, whichever comes first. Applications must be submitted through Cal Water's Program website. Paper applications cannot be accepted.

Additional restrictions apply, so be sure to read all program specifications, terms and conditions, and design guidelines for more information.

Cal Water is partnering with our wholesale water provider in areas where a wholesaler program may offer a larger rebate. Customers in our Los Altos district can apply for such rebates by visiting the **Rebates and Programs** page and selecting their district.

California Water Service (Cal Water) takes our responsibility for environmental stewardship seriously. We encourage customers to seek out healthier and more sustainable alternatives for turf replacement than artificial turf. See **Artificial Turf**.

Latest News

- 02/22 Cal Water Tests For and Confirms No Mercury in Water Supply
- 02/22 Main Replacement Project Will Improve Water Supply Reliability in Chico

Corporate Information

- Corporate Overview
- Stock Information
- Careers
- Investor Relations
- Sustainability Policy

Copyright © 1998-2017 California Water Service
 Accessibility Policy | Privacy Policy
 Contact Us | For Suppliers | Terms of Use

Turf Removal

\$1/square foot

1 sqft = 24 gallons/year saved

Turf Removed

Based on the areas found in the GPS Study, the Course redesigned 8 sections of the playable area to incorporate water-efficient and drought-friendly design with zero turf.

Turf Removal Area - Tee 17
Tee 17
10,000 Square Feet





Turf Removed





Hole 4 turf removal from the south side of the Tee, near the pathway from Hole 3's green.

Total amount of turf removed and replaced at Hole 4 is **2,144 square feet.**



After - Tee at Hole 4





After - near Tee



After - left near path

Together, Cal Water and Palos Verdes Golf Club removed *96,928 square feet of turf!*

This equates to 2,326,272 gallons of water saved per year!





For more information, please visit www.calwater.com

Ariana Wilfley
Water Conservation GIS Analyst
awilfley@calwater.com

The GPS logger study was made possible by the Drought Management and Conservation Department at California Water Service and Pat Gradoville, Director of Course and Grounds at Palos Verdes Golf Club.