California Regional Water Quality Control Board, San Diego Region
Annual Recycled Water Summary Report 2014

California must diversify its water supply sources to meet the needs of a growing population. Importing water to meet demand is not sustainable due to continuing drought conditions, climate change which results in fluctuations in the sources and volumes of water available, increasing population of water consumers in the State, and complex legal issues. Maximizing recycled water is an important part of a diversified and sustainable water supply for the San Diego Region. The State's Recycled Water Policy[1] includes the goals of increasing, above the 2002 baseline year, the total recycled water use in California by 1 million acre-feet per year by 2020, and by 2 million acre-feet per year by 2030. "Recycled water use" is defined as a use that replaces the use of potable water. For reference, the average family of four uses 0.45 acre-feet (ac-ft) of water each year.

The purpose of this report is to provide a regional summary of information on the production, reuse, and quality of recycled water in the San Diego Region. Information analyzed in the report comes from surveys of recycled water facilities. The *Recycled Water Annual Summary Report* raises awareness of the production of recycled water as a resource in the San Diego Region and provides Board members, water purveyors, and the public with region-wide summary of information on the volumes of recycled water actually re-used, volumes of treated wastewater disposed, and quality of recycled water resources in the San Diego Region.

Based on the information reported, slightly over 61,000 acre feet of recycled water was beneficially reused in the San Diego Region in 2014. Annual recycled water use in the Region increased for the fifth straight year with 2014 amounts exceeding 2010 amounts by almost 20,000 acre feet. About 58 percent of the recycled water produced was beneficially reused in 2014.

Recycled water provided only a small fraction of the total demand in the San Diego Region in 2014. According to the San Diego County Water Authority (SDCWA), only four percent of the total water demand in its service area is supplied with recycled water. That water demand in 2014 was reported to be 667,000 acre feet.[2] Agencies in Riverside and Orange counties that provided significant contributions to recycled water use in the San Diego Region include the South Orange County Wastewater Authority (SOCWA), Eastern Municipal Water District, and Rancho California Water District. According to the Rancho California Water District website, five percent of the water it supplied in 2014 was recycled water. While the water supply demand

[1] http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2013/rs2013_0003_a.pdf

[2] http://www.sdcwa.org/enhancing-water-supply-reiability

for Orange County is uncertain, SOCWA reported supplying 28 percent of all recycled water used in the San Diego Region.

Thirty recycled water facilities in the San Diego Region reported that they treated approximately106,000 acre feet (ac-ft) of wastewater, with 28,000 acre feet either sent to the ocean for disposal or stored. In 2013 recycled water agencies reported that they treated approximately 92,000 ac-ft of wastewater. Possible explanations for the increase in the volume of recycled water produced and reused could be emergency drought regulations that encouraged using recycled water whenever possible, and the rising cost of potable water. The volume of beneficially reused recycled water as a percentage of the total produced decreased from 64 percent in 2013 to 58 percent in 2014.

The San Diego Water Board regulates the production and discharge of recycled water through waste discharge requirements, master reclamation permits, water reclamation requirements (collectively referred to as "permits"), and waivers of waste discharge requirements. The master reclamation permits are a tool intended to promote recycled water use by allowing the producer to regulate its users, rather than requiring each user to obtain separate requirements from the San Diego Water Board or the State Water Board.

The facilities also provided information on use type, use location, and compliance with permits. Comparing 2013 to 2014, the San Diego Region increased the number of recycled water use sites by 301 (from 5,358 to 5,659). The number of inspections conducted by recycled water providers increased by 414, (from 4,740 to 5,154), while the number of sites inspected also increased by 897 (from 3,179 to 4,076). The number of violations identified during inspections in 2014 decreased compared to 2013. In 2013, 3,179 sites were inspected with 721 violations identified at 150 sites; while in 2014, 4,076 sites were inspected, with 520 violations identified at 169 sites. The percent of inspected sites with violations decreased from 5 percent to approximately 3 percent. Typical violations included broken sprinkler heads, broken pipes, over-spray of application areas, ponding, unapproved modifications, and runoff of recycled water at reuse sites. Overall, recycled water quality across the Region met effluent limitations specified in applicable permits. Overall recycled water quality met discharge specifications across the Region, despite the violations noted above.

Comparing historical data, there are no discernible trends for individual facilities or constituents, suggesting that the overall quality of recycled water remained consistent for the last two decades. The water quality data indicates that the average concentration of total dissolved solids (TDS), chloride, and sulfate in the source water increased between 2013 and 2014. There was also a corresponding increase in the average concentration of TDS, chloride, and sulfate in recycled water. Other constituents that increased in concentration in recycled water between 2013 and

2014 were nitrate, total nitrogen, fluoride, and color. Concentrations of iron, and percent sodium, however decreased between 2013 and 2014. The concentrations of the other constituents reported remained stable. Selected water quality data from 16 wastewater treatment facilities were compared for the time period 2011 to 2014.

Chairman Abarbanel raised a question at the March 2015 Board meeting about the feasibility of achieving zero discharge to the ocean from publicly owned treatment works (POTWs) by the year 2025 or 2030. There appear to be at least three primary obstacles to achieving this goal; 1) the commonly used and available water treatment technology, 2) limitations of the extent and reach of the recycled water conveyance system, and 3) the lack of viable potable reuse projects which may develop into an essential driver for growing the regional demand for recycled water.

With commonly used available technologies, POTWs may find it difficult to achieve higher than 75 to 80 percent overall recoveries. Large scale water recycling facilities currently rely on membrane technologies such as reverse osmosis (RO), ultrafitration (UF), or microfiltration (MF) to achieve effective wastewater treatment for purposes of wastewater recycling. The treatment processes create concentrated waste streams or "brines" that are commonly discharged to the ocean. Currently applied technologies are limited in their ability to recover more water from these concentrated waste streams.

Many areas are precluded from receiving recycled water for landscape irrigation because of the lack of conveyance facilities. Recycled water produced in the Region is conveyed to use areas through pipelines exclusively used for recycled water, commonly referred to as "purple pipes." Many potential users are unable to receive recycled water because use areas are too far from a recycled water pipeline. The cost of adding on to a pipeline often times prevents users from switching to recycled water from potable water. For example, the City of San Diego has stated that the cost of building conveyance facilities to bring recycled water to Balboa Park and the San Diego Zoo for landscape irrigation is cost prohibitive.

The last major challenge to enhancing regional uses of recycled water is developing, permitting and implementing potable reuse projects. POTWs experience time periods when there is a low demand for recycled water, and with limited storage capacity, must discharge treated wastewater to the ocean, which otherwise would be suitable for beneficial reuse. The State Water Board, Division of Drinking Water is developing draft regulations for surface water augmentation (SWA), which are scheduled to be completed by December 31, 2016. Regulations for direct potable reuse (DPR) are in the early stages of development, with a feasibility report scheduled to be completed by December 31, 2016. Until SWA and/or DPR regulations are promulgated, and projects permitted, the disposal of excess treated wastewater into the ocean seems inevitable in the short-term.

The San Diego Water Board continues to work with the recycled water agencies to ensure a consistent method of gathering and reporting of data included in voluntary and required annual reports. All comparisons are approximations due to variations of measuring, gathering, and reporting data on volumes of recycled water; and uncertainties about the purveyance of recycled water between jurisdictional areas of the San Diego and Santa Ana Water Boards.

ATTACHMENT A- RECYCLED WATER ANNUAL SUMMARY 2014
Data Tables and Charts

Recycled Water Facility Production						
	# of Facilities Reporting	Permitted Flow (mgd)	Total Vol. Treated (ac-ft)	Volume Disposed (ac-ft)	Volume Reused (ac-ft)	Percent Reused (ac-ft)
2009	29	146.9	104,777	49,376	54,928	52%
2010	27	148.8	74,043	32,449	41,594	56%
2011	30	145.6	109,764	62,913	48,955	45%
2012	29	155.9	104,791	38,480	57,397	55%
2013	29	156.3	91,704	33,301	58,454	64%
2014	30	165.1	106,013	27,951	61,161	58%

RECYCLED WATER USE SITE SURVEY Reported User Data								
Year	# of Sites	Total Reuse (ac-ft)	Average Reuse (ac-ft)	Median Reuse (ac-ft)	# Inspections	# Sites Inspected	# Violations	# Sites with Violations
2009	3,981	40,764	10.2	3.8	4,403	2,303	405	72
2010	4,095	42,142	10.3	3.2	3,380	2,430	66	33
2011	4,360	42,415	9.7	2.9	4,105	2,995	341	53
2012	4,376	55,069	12.6	3.2*	4,282	2,693	605	142
2013	5,358	57,223	10.7	3.6*	4,740	3,179	721	150
2014	5,659	62,925	11.1	3.9	5,154	4,076	520	169

* median calculation does not include data from Moulton Niguel Water District

Volume of Recycled Water by Hydrologic Area (Ac-ft)											
Year	901 San Juan	902 Santa Margarita	903 San Luis Rey	904 Carlsbad	905 San Dieguito	906 Penasquitos	907 San Diego	908 Pueblo	909 Sweet-water	910 Otay	911 Tijuana
2009	14,539	2,917	313	4,827	2,839	7,413	1,346	0	1,661	2,815	1,477
2010	13,919	2,968	1,074	5,895	3,085	6,473	678	0	1,237	2,372	NR
2011	12,425	5,676	1,101	3,600	2,693	7,677	687	0	1,269	2,396	4,582
2012	10,235	6,421	1,351	8,311	3,299	12,744	1,296	0	2,308	4,458	4,644
2013	16,553	6,227	1,365	9,251	2,849	8,749	782	0	1,517	2,738	4,328
2014	17,520	6,996	1,072	9,627	3,296	9,211	1,436	0	1,690	2,866	4,719

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SOURCE AND RECYCLED WATER QUALITY

Average Source Water Quality

Year	TDS (mg/L)	Chloride (mg/L)	Sulfate (mg/L)
2011	578	120	150
2012	440	83	135
2013	586	105	164
2014	613	110	178

Average Recycled Water Quality

Year	TDS (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Percent Sodium (%)	Nitrate (mg/L)	Total Nitrogen (mg/L)	Iron (mg/L)	Manga-nese (mg/L)	MBAS (mg/L)	Boron (mg/L)	Turbidity Daily Avg (NTU)	Color (Units)	Fluoride (mg/L)
2011	796	208	186	48.3	16.6	11.5	0.12	0.05	0.14	0.37	0.9	12	0.62
2012	775	209	188	51.0	11.0	10.3	0.83	0.04	0.13	0.41	1.0	11	0.68
2013	794	201	194	55.4	15.0	9.0	0.09	0.04	0.12	0.37	1.0	8	0.67
2014	859	210	218	51.4	17.1	10.4	0.08	0.05	0.13	0.37	1.0	12	0.69

TDS= Total dissolved solids; MBAS= Methylene blue-activated substances

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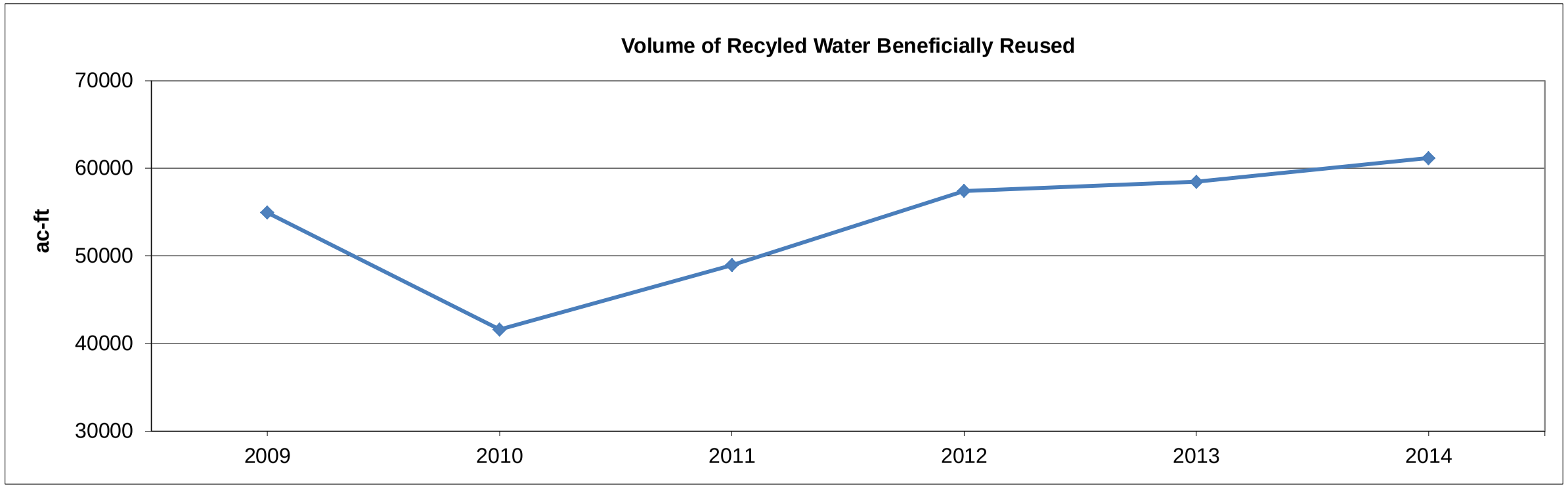

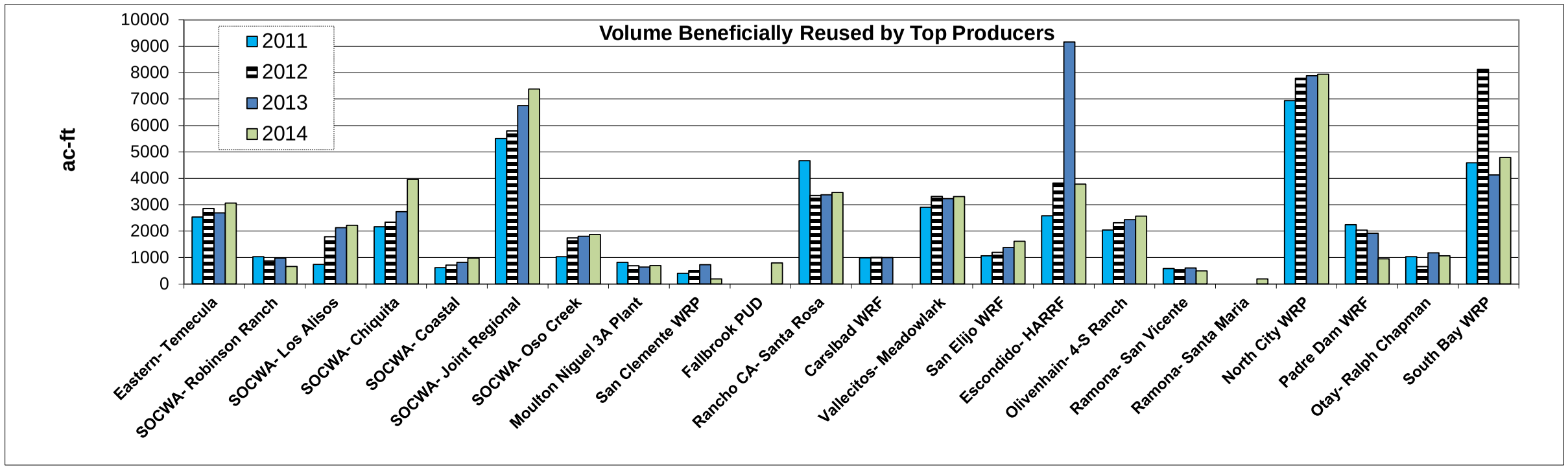

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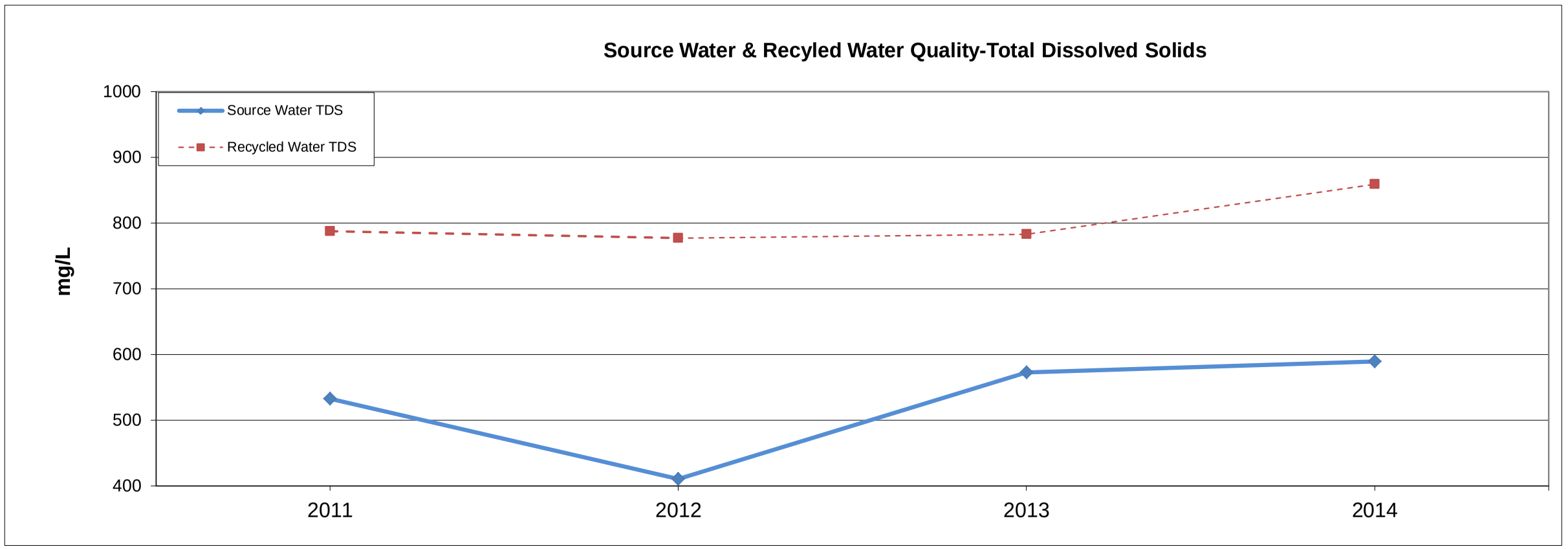

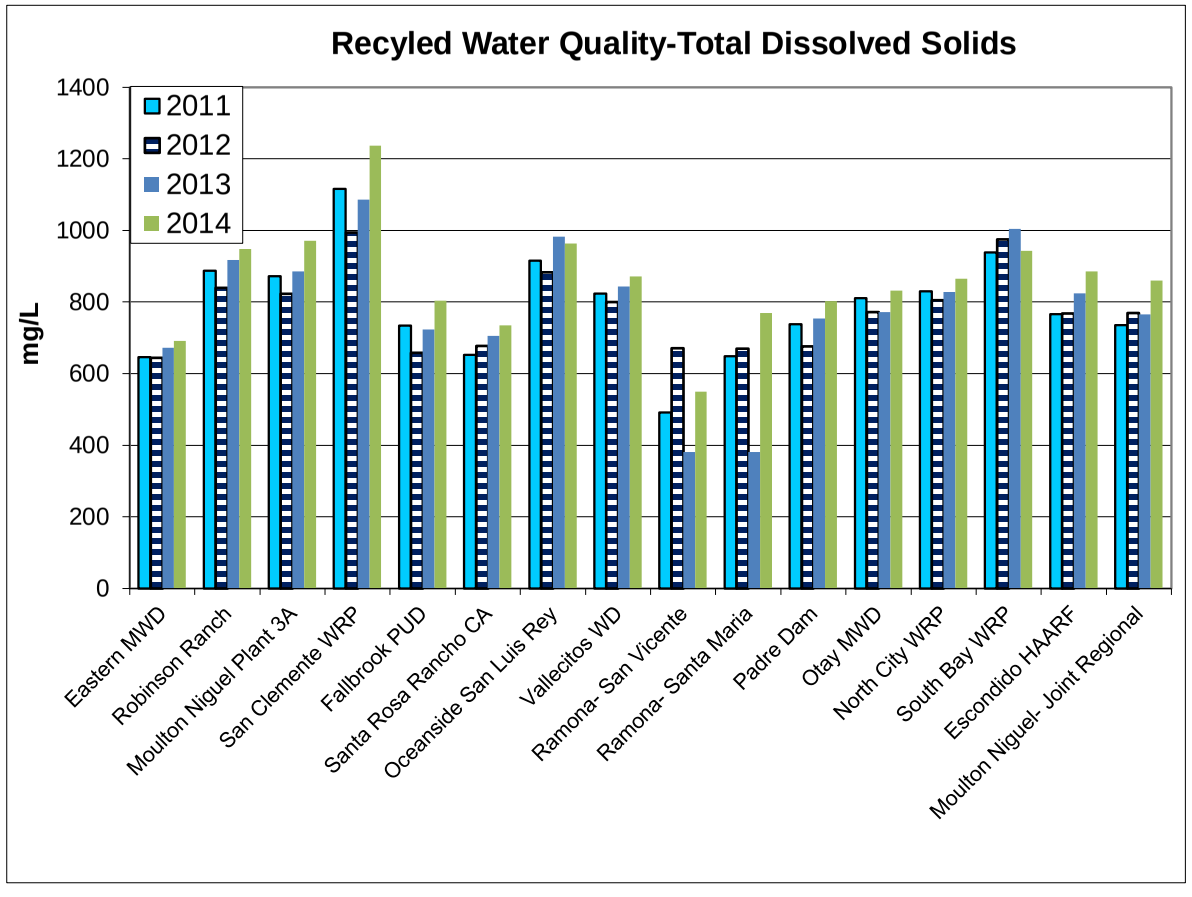

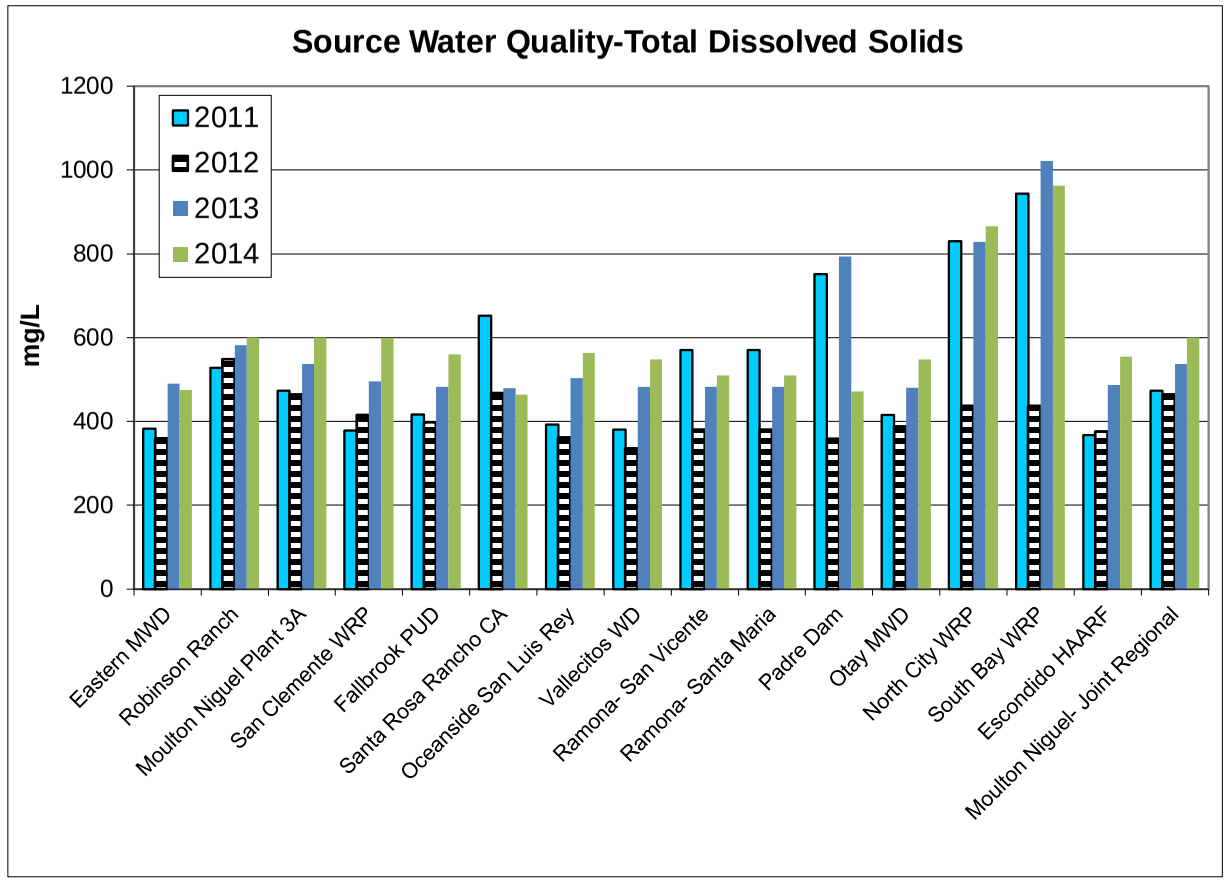

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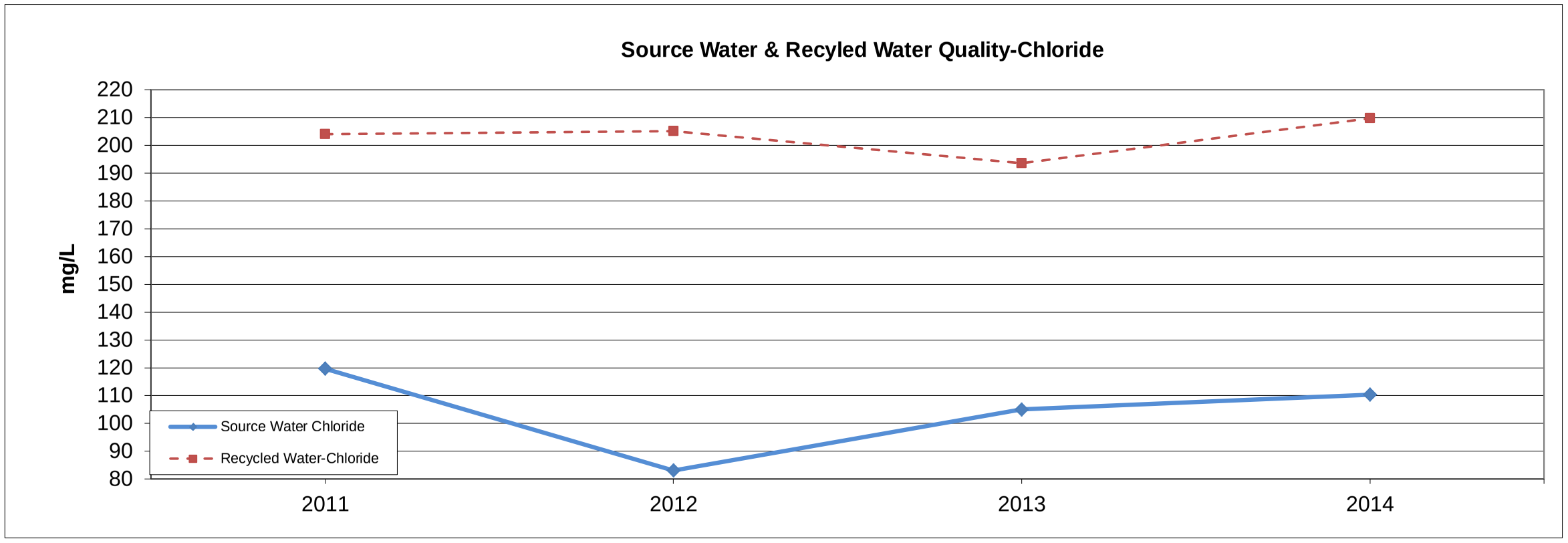

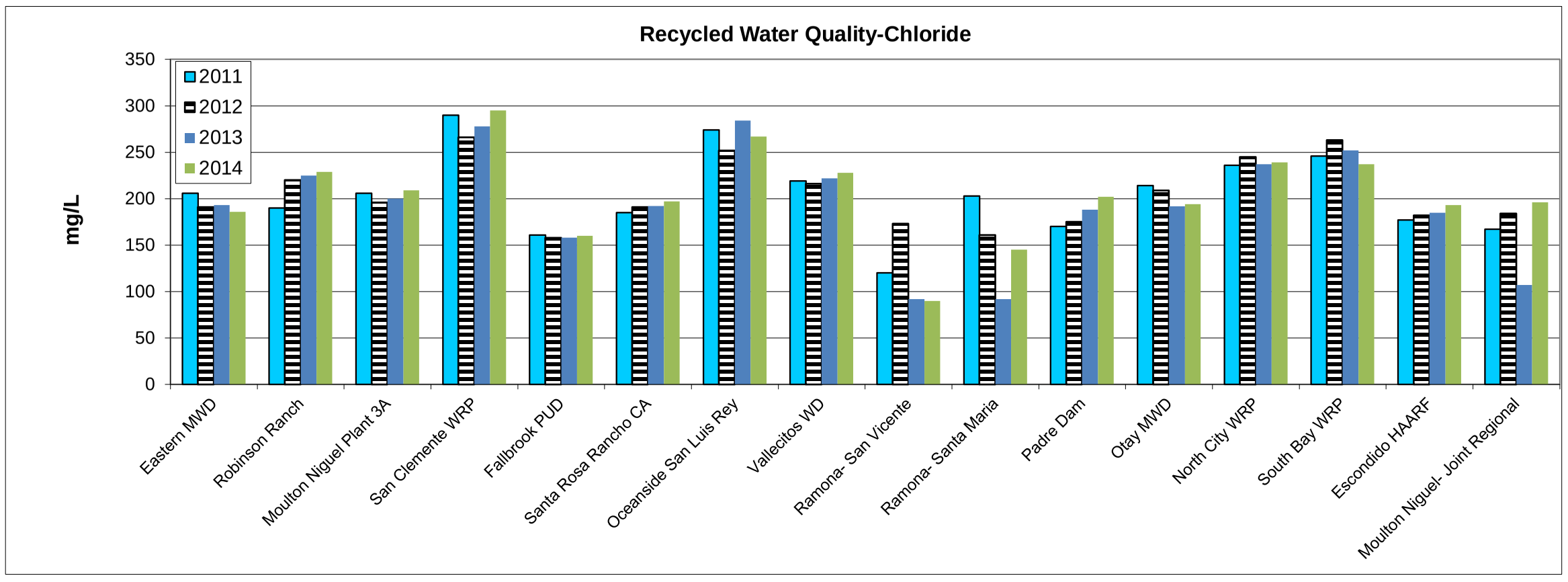

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