

ISSUE BRIEF

# MISMATCHED: A COMPARISON OF FUTURE WATER SUPPLY AND DEMAND FOR THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA AND ITS MEMBER AGENCIES

Even in normal water years, Californians see a large and growing gap between our water demand and the water that is naturally available.<sup>1</sup> The 2012 to 2016 drought saw surface water supplies shrink drastically, sounding a louder wake-up call about the need for more sustainable management of our state's water resources. Furthermore, in a typical year, melting snowpack provides one-third of the water used by California's cities and farms. Unfortunately, though, climate change will intensify future droughts and floods and dramatically reduce snowpack.

Water agencies in Southern California meet demand through a combination of local supplies (e.g., groundwater, stormwater, recycled water) and imported supplies from Northern California and the Colorado River Basin. These imports are purchased from the Metropolitan Water District of Southern California (MWD), the state's largest water supplier. In response to past droughts, the MWD and local water agencies have invested significantly in improving water use efficiency to reduce demand, which increases water held in storage for future dry years. Likewise, local water agencies have heavily invested in local supply sources in recent decades because these sources are generally more cost-effective, and local agencies are planning to ramp up these investments even further. Diversifying supplies by increasing the water available from regional or local water sources reduces the need for imported water. These investments have improved reliability and resilience and have helped the region weather the recent drought with minimal economic impacts.

This analysis examines whether the MWD's water supply and demand projections are consistent with those of its member agencies. To do this, we reviewed the water agencies' 2015 urban water management plans (UWMPs), which describe how they plan to ensure that water supplies can satisfy demand in the future. The 2015 UWMPs

generally include projections for 2020 to 2040. These plans are also commonly used to inform water agencies' capital improvement plans, which include specific projects for the near term (generally within 5 to 10 years). Since the MWD's UWMP encompasses its entire service area, combining data from the UWMPs of water agencies in its service area should yield similar results. Yet our analysis reveals stark differences between the projections of the MWD and those of the local water agencies.

Despite recent trends toward conservation and efficiency and greater use of local water supplies, the MWD anticipates relatively less investment in local water supplies, continued regional reliance on imported water, and ever-growing demand for water. In particular, the MWD's projections of future annual water demands are 335,000 to 554,000 acre-feet (AF) higher than what is predicted by the local agencies over the next 25 years. This is because the MWD assumes higher per capita water use. On the basis of these higher demand projections and the expectation of less local water supply, compared to local agencies' predictions, the MWD anticipates 259,000 to 281,000 AF more in annual imported water sales than the water agencies plan to purchase.

Water agencies in Southern California need consistent assumptions as they consider major investments in

## CLIMATE CHANGE

Higher temperatures, changing precipitation patterns, and rising sea levels will have wide-ranging impacts on California's water resources. Recent research suggests that climate change reduced Sierra Nevada snowpack by an average of 25 percent during the recent extreme drought, and future warming could reduce snowpack by 60 to 85 percent during a similar drought.<sup>10</sup> Snowmelt from the Sierra Nevada feeds the rivers that form the Sacramento–San Joaquin River Delta. Therefore, snowpack reductions will alter streamflow patterns and decrease the amount of water available during the dry summer and fall months.<sup>11</sup> At the peak of the recent drought, customers of the State Water Project, which withdraws from the delta, received merely 5 percent of what they requested. This was the lowest amount in more than two decades.<sup>12</sup>

Climate change has already increased the probability of concurrent hot and dry years, which caused the recent extreme drought.<sup>13</sup> And there is at least a 70 percent risk of a prolonged drought persisting for a decade or longer in this century.<sup>14</sup> Further, sea level rise will worsen saltwater intrusion into coastal freshwater aquifers and the delta, jeopardizing a water supply source for more than 25 million Californians.<sup>15</sup>

water supply projects, especially given limited state and federal funding. As the costs of water supply investments are ultimately paid by taxpayers and customers, water agencies need consistent projections to avoid expensive infrastructure projects that may prove unnecessary. Our analysis shows that the MWD and water agencies must more closely coordinate long-term water management planning before making decisions with wide-ranging implications for not only the region, but the entire state.

### THE MWD'S IMPORTANCE TO SOUTHERN CALIFORNIA

As the largest water supplier in California, the MWD has long played an influential role in state and regional water policy. The MWD's service area encompasses 5,200 square miles of Southern California—an area roughly the size of Connecticut (see Figure A-1 and Table A-9 in the Appendix for more information). Over the past 25 years, the MWD has sold an annual average of nearly 2 million AF of water from two sources: the Colorado River and the State Water Project, which withdraws water from the Sacramento–San Joaquin River Delta.<sup>2</sup> This imported water, transported hundreds of miles over towering mountains and through scorching deserts, makes up approximately 50 percent of the water supply for more than 19 million Southern California residents.<sup>3</sup> The MWD sells this imported water to its 26 member agencies.<sup>4</sup>

The MWD is fast approaching a pivotal moment in its nearly 90-year history as its two water sources face an imbalance between demand and supply. The Colorado River Basin has experienced a decade-long drought, which has reduced natural flows and left the basin on the verge of a shortage.<sup>5</sup> At the same time, decades of excessive water diversions have threatened the Sacramento–San Joaquin River Delta's ability to supply water. The delta is the primary hub for moving water from north to south, and it is a vital ecosystem for hundreds of species of birds, fish, and other wildlife.<sup>6</sup> Scientists generally agree that water flows must increase to restore the health of this estuary and save native fish species from going extinct.<sup>7</sup> In 2009, legislation was passed to reduce reliance on water supplies from the delta.<sup>8</sup> The State Water Resources Control Board—tasked with protecting and restoring California's water resources—is also currently evaluating potential increases in environmental flows in the delta as part of its review of the Bay-Delta Water Quality Control Plan, which establishes water quality objectives and a strategy for achieving them. The plan has not been meaningfully updated in more than 20 years.<sup>9</sup>

The MWD and its member agencies will soon be making significant financial investment decisions, including how much to invest in local water supplies. They will also be evaluating whether to invest in California WaterFix, a \$15 billion proposal to build twin tunnels to expedite water exports from the Sacramento–San Joaquin River Delta. This would require local water agencies to pay even more for imported water for decades to come, potentially hindering investments in more cost-effective local supplies.

### TOTAL REGIONAL WATER DEMAND

Southern California has a long history of implementing water conservation and efficiency programs to meet the demand of a growing population and economy. Because of the region's historical reliance on imported water supplies, significant statewide droughts in the mid 1970s and late 1980s drove many water agencies to adopt measures to improve water conservation and efficiency. These efforts have accelerated in the past decade due to major droughts from 2007 to 2009 and 2012 to 2016. Reducing water withdrawals from rivers, lakes, streams, and aquifers leaves more water supplies available for future uses and benefits wildlife and ecosystems. Further, conservation and efficiency efforts can save energy, lower water and wastewater treatment costs, and eliminate the need for expensive new investments in water infrastructure.<sup>16</sup> Energy is saved by reducing hot water use and the transport of water over long distances, and treatment costs decline as less water and wastewater is treated. Reductions in water and wastewater volumes also can delay or eliminate the need to construct new pipes and treatment facilities. Additionally, conservation and efficiency measures are generally less expensive than developing new water supply sources.<sup>17</sup> Financial incentives for water-efficient fixtures and appliances, updated plumbing and building codes and regulations, water conservation rate structures, and reduced distribution system leaks all save water.<sup>18</sup>

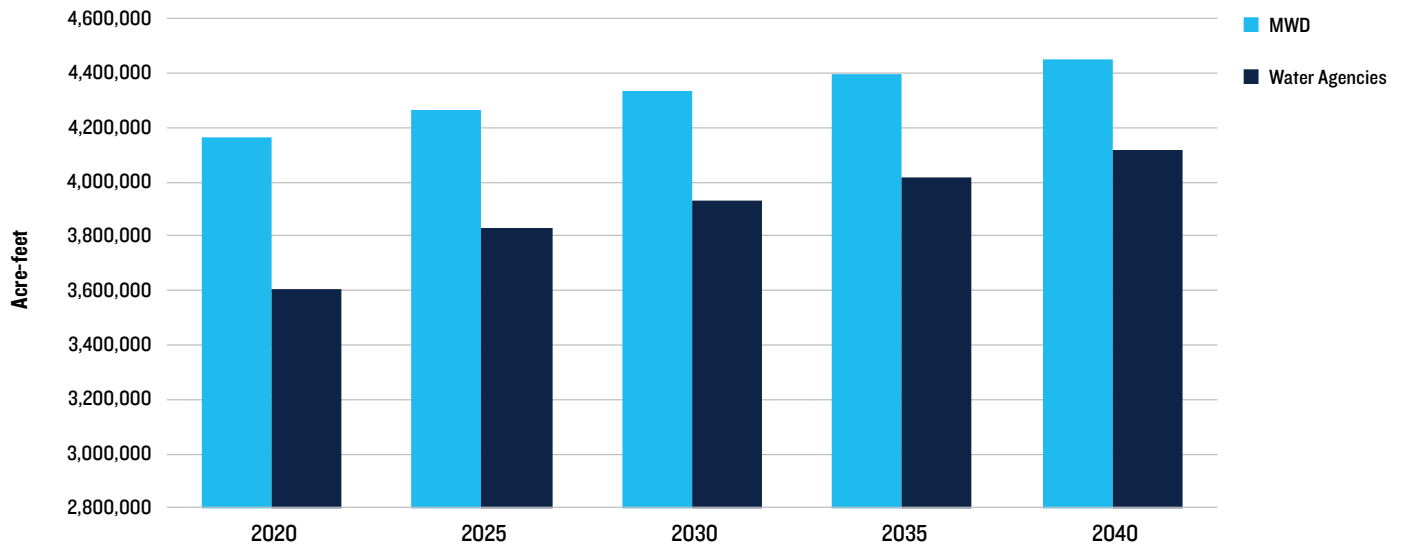
Since 1990, the MWD's investments in regional conservation programs alone have cumulatively saved more than 2.4 million AF of water, which is more than four times the

amount of water the city of Los Angeles uses in an average year.<sup>19</sup> Local water suppliers have implemented additional conservation and efficiency measures to reduce regional per capita water use. For example, the cities of Los Angeles and Long Beach have reduced per capita water use by approximately 35 percent since the 1980s, resulting in lower total water demand today even with higher populations.<sup>20</sup> The city of Los Angeles now uses approximately the same amount of water it did 45 years ago despite adding 1 million more people.<sup>21</sup> Further, the region reduced water use by up to an additional 28 percent during the recent drought.<sup>22</sup>

Investments in conservation and efficiency programs will promote resilient and reliable water supplies as climate change intensifies.

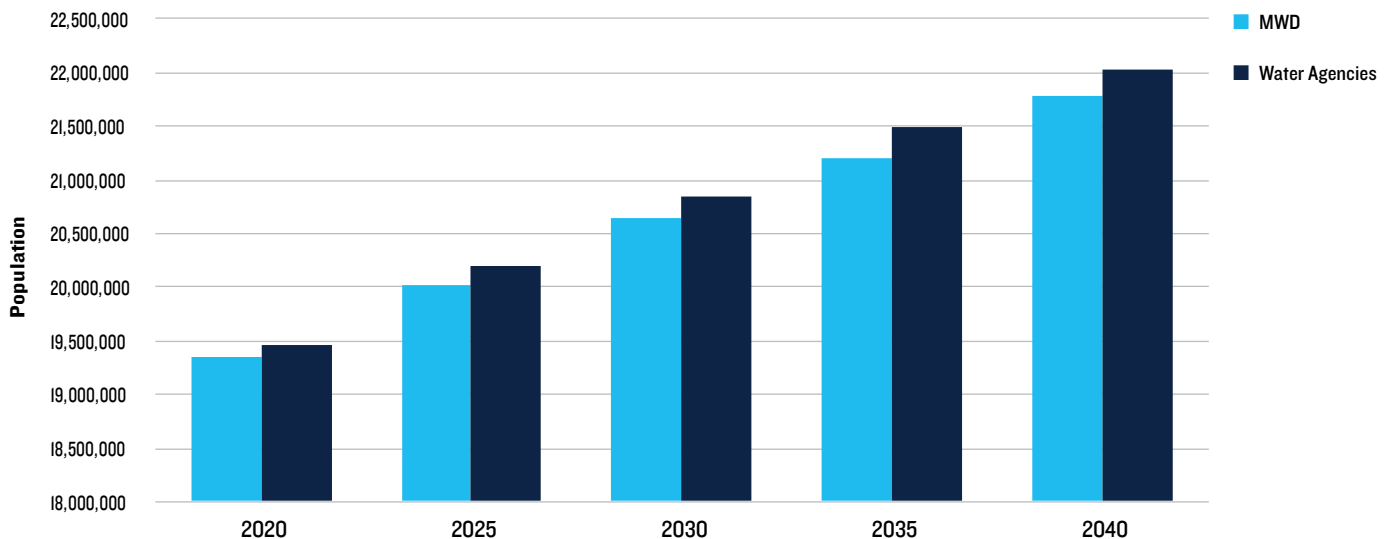
From 2020 to 2040, during years with average hydrologic conditions, local water agencies anticipate using approximately 335,000 to 554,000 AF less water per year than the MWD does (see Figure 1 and Table A-2 in the Appendix). This means water agencies anticipate 8 to 13 percent lower annual regional demand. Table A-11 in the Appendix provides a detailed comparison of water demand by local agency.

**FIGURE 1. TOTAL PROJECTED ANNUAL REGIONAL WATER DEMAND IN YEARS WITH AVERAGE HYDROLOGIC CONDITIONS FOR 2020–2040**



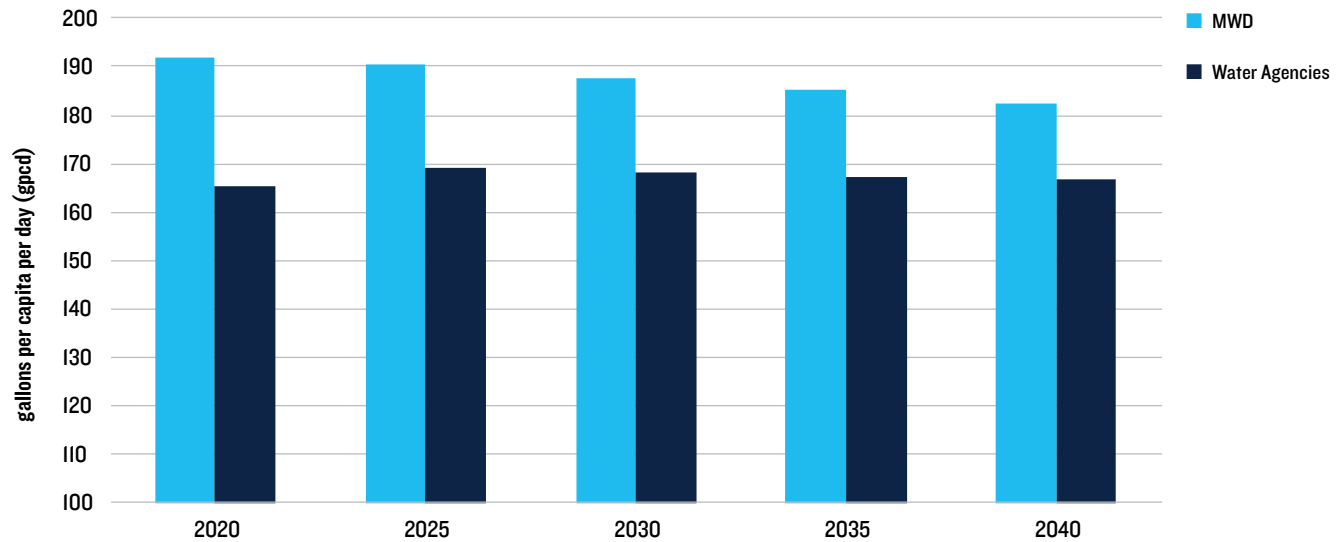
Data sources: 2015 UWMPs of the MWD and local water agencies. For reference, total regional demand was approximately 3.5 million AF in 2015.

**FIGURE 2. COMPARISON OF REGIONAL POPULATION PROJECTIONS FOR 2020–2040**



Data sources: 2015 UWMPs of the MWD and local water agencies.

**FIGURE 3. TOTAL PROJECTED REGIONAL DEMAND IN GALLONS PER CAPITA PER DAY FOR 2020–2040**



Data sources: 2015 UWMPs of the MWD and local water agencies. For reference, the actual regional per capita demand for 2015 was 171 gallons per day.

Different regional population projections and per capita water use projections are responsible for the water demand discrepancies. From 2020 to 2040, water agencies expect the regional population to grow by 110,000 to 278,000 more than the MWD expects (see Figure 2). These discrepancies are greatest in Los Angeles County and Riverside County, where local water agencies forecast greater population growth than the MWD (see Table A-3 in the Appendix). Despite their higher population projections, local water agencies project lower total regional demand because of substantially lower projections for per capita demand.

During the same period, the MWD projects higher per capita water demand (see Figure 3). This difference is greatest in Riverside County and San Bernardino County, where the MWD’s forecasts exceed local water agencies’ forecasts by approximately 40 to 80 gallons per person per day (see Table A-4 in the Appendix).

### TOTAL LOCAL WATER SUPPLIES

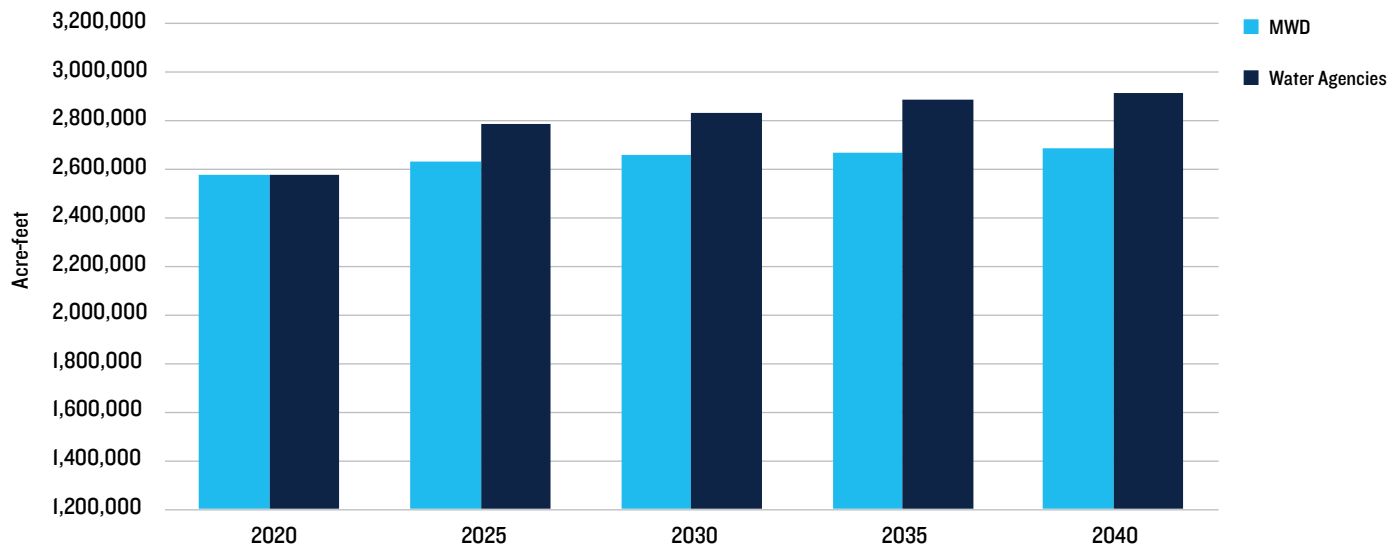
Local water agencies use both local supplies and imported MWD supplies to meet demand. Local water supplies include groundwater, surface water, seawater desalination, recycled water, and stormwater. In addition to conservation and efficiency programs, local water agencies have long made significant investments in local supplies.<sup>23</sup> For example, between 1987 and 2009, recycled water use (or the use of treated wastewater) in Southern California increased from approximately 93,000 AF to 377,000 AF per year.<sup>24</sup> Additionally, many local water agencies have implemented stormwater capture projects to recharge underground aquifers and supply nonpotable uses, such as outdoor irrigation. For instance, the city of Los Angeles currently captures 64,000 AF of stormwater annually and plans to increase this by an additional 68,000 to 114,000

AF by 2035.<sup>25</sup> Similarly, the Orange County Water District, which supplies groundwater to Orange County, has diverted an annual average of 42,000 AF of stormwater flows from the Santa Ana River to recharge its groundwater basin.<sup>26</sup> In 2010 and 2015, local supplies provided approximately 1.73 million AF and 1.68 million AF, respectively, across the region.<sup>27</sup> These values are lower than existing local water supply capacities because recent drought conditions reduced the amount of water available from local surface water, stormwater, and to a lesser extent, recycled water.

Local water agencies expect to grow production from groundwater and recycled water over the next 25 years to improve drought resiliency and reduce reliance on imported water supplies. Yet the MWD and local water agencies have considerably different forecasts for local supplies during years with average hydrologic conditions (see Figure 4 and Table A-5 in the Appendix). In 2020, the MWD and water agencies both anticipate roughly 2.58 million AF in annual local water supplies. However, by 2025, local water agencies estimate approximately 154,000 AF more than the MWD does. By 2040, this difference increases to more than 229,000 AF, primarily due to increased production from groundwater and recycled water sources. Table A-12 in the Appendix provides a detailed comparison of local supplies by water agency and source.

The MWD’s and water agencies’ local water supply projections are likely substantially conservative. The MWD’s 2015 UWMP includes only projects currently producing water, projects under construction, and local supply targets identified in its Integrated Water Resources Plan, another long-term water plan for the MWD.<sup>28</sup> The projections do not include several major projects being planned and evaluated by the MWD and local agencies. For instance, the MWD is weighing a major wastewater

**FIGURE 4. TOTAL PROJECTED ANNUAL LOCAL WATER SUPPLIES IN YEARS WITH AVERAGE HYDROLOGIC CONDITIONS FOR 2020–2040**



Data sources: 2015 UWMPs of the MWD and local water agencies.

recycling project in Los Angeles that would provide up to 168,000 AF per year.<sup>29</sup> The Pure Water San Diego project, currently under consideration, proposes to produce approximately 93,000 AF of highly treated recycled water annually by 2035.<sup>30</sup> In total, the MWD’s 2015 UWMP lists more than 680,000 AF of potential local water supply projects that are in the planning or conceptual phases. Yet, these projects are not included in the MWD’s projections of local water supply.

### TOTAL MWD WATER SALES

MWD prices have more than doubled since 2003 and now approach \$1,000 per AF.<sup>31</sup> Local agencies usually exhaust local water supplies first because they are generally less expensive. Additionally, reduced reliance on imported water improves local water agencies’ resilience in the face of drought risks. During the recent extreme drought, the MWD reduced overall water deliveries by 15 percent and penalized member agencies for exceeding their water allocations.<sup>32</sup> These actions forced local water agencies to implement measures to reduce demand, such as offering incentives for the installation of native landscaping, and/or rely on other sources of water.

Many water agencies are increasing conservation efforts and expanding production from local water supplies to reduce the need for imports. For example, the city of Los Angeles aims to reduce imported water purchases by 50 percent by 2025 and to source 50 percent of its water locally by 2035.<sup>33</sup> The city of Santa Monica aims to eliminate all MWD purchases by 2020.<sup>34</sup>

Within the past decade, the MWD’s water sales generally declined (see Figure 5). Fitch Ratings, a major credit rating agency, noted recently:<sup>35</sup>

“Significant variation in member-agency water sales has occurred over the past 10 years but the overall trend has been downward. Member-agency sales declined from levels of over 2 million acre-feet (maf) prior to 2008 to low points of 1.63 maf in fiscal 2011 and 1.62 maf in fiscal 2016. Both of these low points occurred a few years into a drought period in California when member-agency conservation efforts reduced retail water sales and member agencies ceased purchasing water from Metropolitan. In most cases, Metropolitan’s water supply is the most expensive source in a member-agency’s overall water supply portfolio. Metropolitan expects water sales to decline even further to 1.56 maf in 2017 and 1.5 maf in 2018.”

During average hydrologic conditions, the MWD estimates demand for imported water will increase to 1.765 million AF by 2040. Notably, the MWD’s fiscal documents and various water management plans show discrepancies among its sales figures. The MWD’s FY2016 to 2018 budget projects 1.75 million to 1.80 million AF in annual water sales for FY2019 to 2026, while its 2015 UWMP forecasts approximately 1.6 million AF for this same period.<sup>36</sup> Additionally, the MWD’s 2015 Integrated Water Resources Plan includes forecasts that are approximately 280,000 AF greater than its 2015 UWMP.<sup>37</sup>

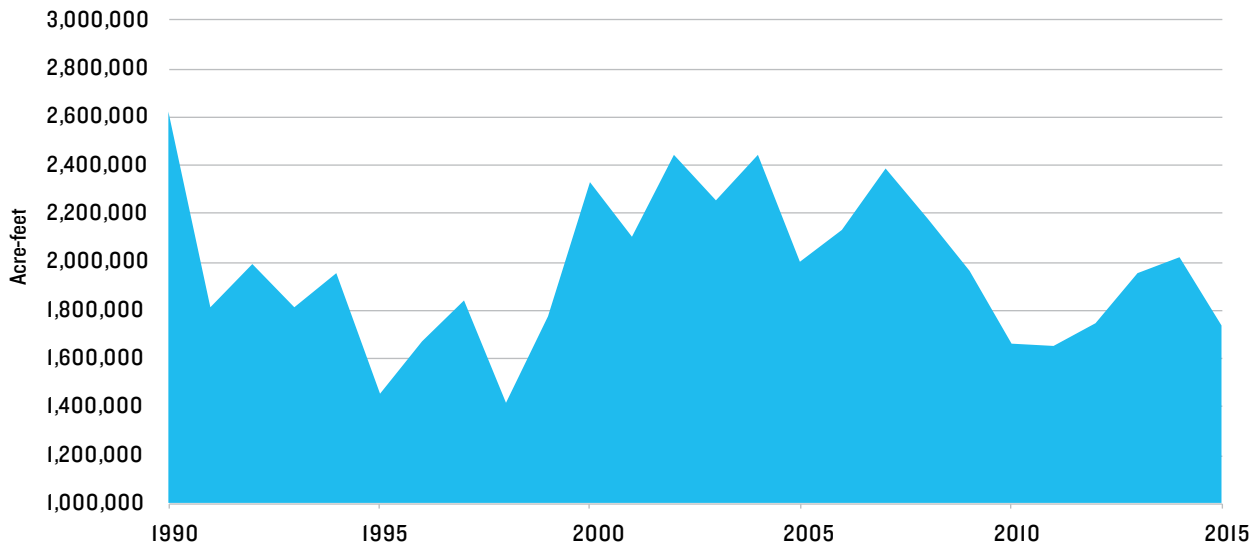
In their 2015 UWMPs, local water agencies project roughly 259,000 to 281,000 AF less in annual MWD purchases from 2020 to 2040 than the MWD does (see Figure 6 and Table A-6 in the Appendix). In other words, the MWD expects to

sell more imported water than local water agencies likely will buy over the next 25 years. Since many local water agencies only report MWD supplies available for purchase instead of how much water they anticipate purchasing, actual imported water purchases could fall even lower in the future. In fact, 14 local water agencies report that their total available annual water supplies exceed forecasted demands (see Table A-12 in the Appendix), suggesting many agencies could maximize use of their local supplies to reduce MWD purchases. If all local water supplies were used before

imported water was purchased, annual MWD sales would be more than 500,000 AF lower than the projections in the MWD’s 2015 UWMP (see Figure 6). Table A-13 in the Appendix shows projected purchases under this scenario.

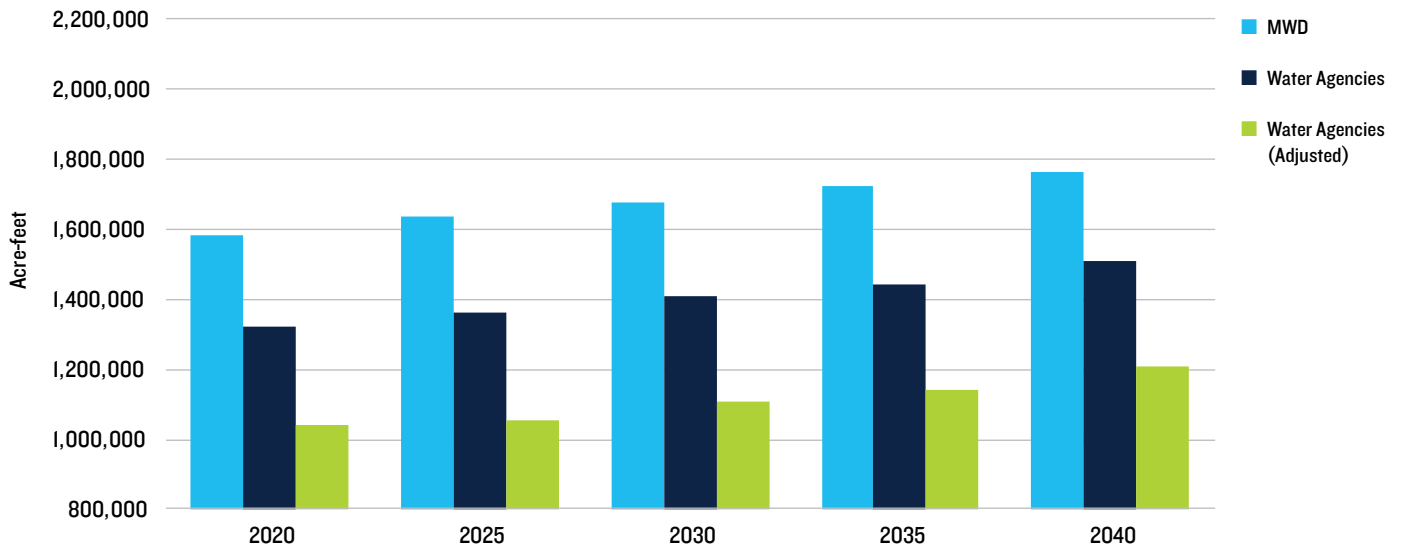
Our results are similar to the findings of a recent study commissioned by the San Diego County Water Authority, a member of the MWD. That study found annual differences of more than 300,000 AF between the MWD’s and local water agencies’ forecasts for MWD purchases under average-hydrologic-year conditions.<sup>38</sup>

**FIGURE 5. TOTAL ANNUAL MWD SALES TO LOCAL WATER AGENCIES FROM 1990 TO 2015**



Data source: 2016 Annual Report of the MWD.

**FIGURE 6. TOTAL PROJECTED ANNUAL MWD WATER SALES TO LOCAL WATER AGENCIES IN YEARS WITH AVERAGE HYDROLOGIC CONDITIONS FOR 2020–2040**



Data sources: 2015 UWMPs of the MWD and local water agencies. Projected sales in light blue are reported by the MWD. Projected sales in dark blue are reported by local agencies and are either supplies available from the MWD or intended purchases from the MWD. In contrast, adjusted projected sales in green assume that all local supplies are used entirely before MWD purchases are made by local agencies.

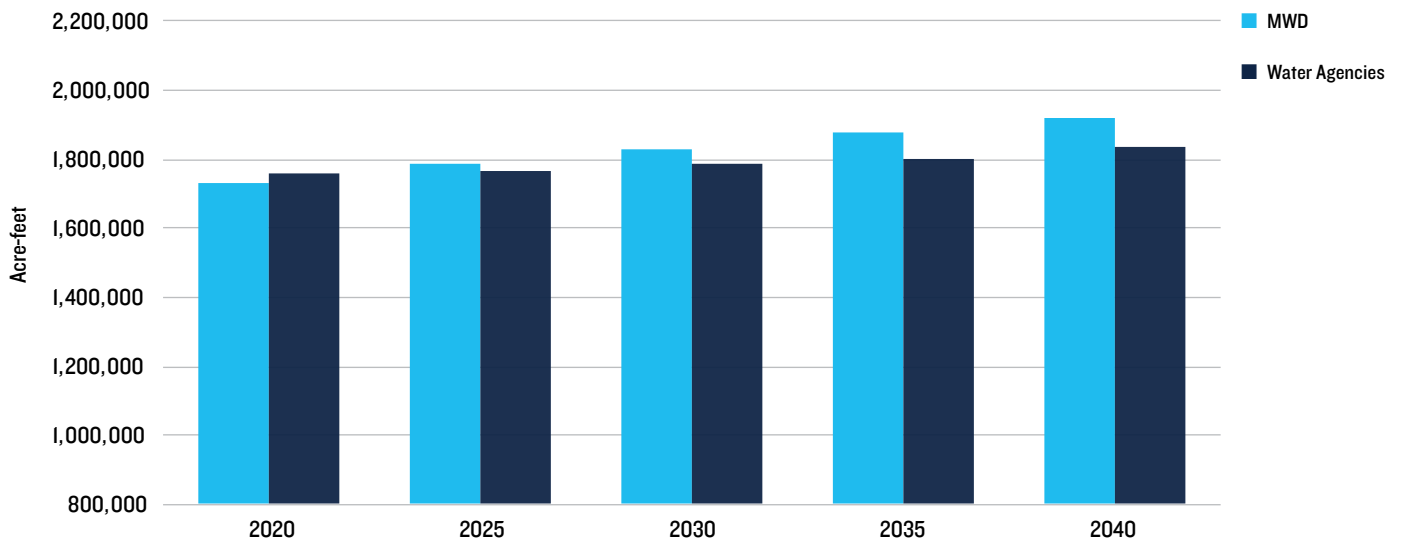
## MWD WATER SALES IN DRY YEARS

During dry years, purchases from the MWD are typically higher because local supplies dwindle and demand increases, particularly for outdoor irrigation. However, during widespread, multiyear droughts, MWD purchases may decrease due to a combination of enhanced conservation and decreased water allocations, which limit the amount of water that member agencies can purchase at prevailing water rates. Water agencies' UWMPs include supply reliability assessments for single-dry-year and multiple-dry-year conditions. Projections for a single dry

year represent the lowest annual water supply historically available to a water agency. For example, the MWD considers the available water supply in 1977 to be the lowest in its history. Projections for multiple dry years are the lowest average water supply available to a water agency historically during a consecutive period of three or more years.<sup>39</sup> The MWD experienced the lowest water supply in consecutive years during the 1990 to 1992 drought.

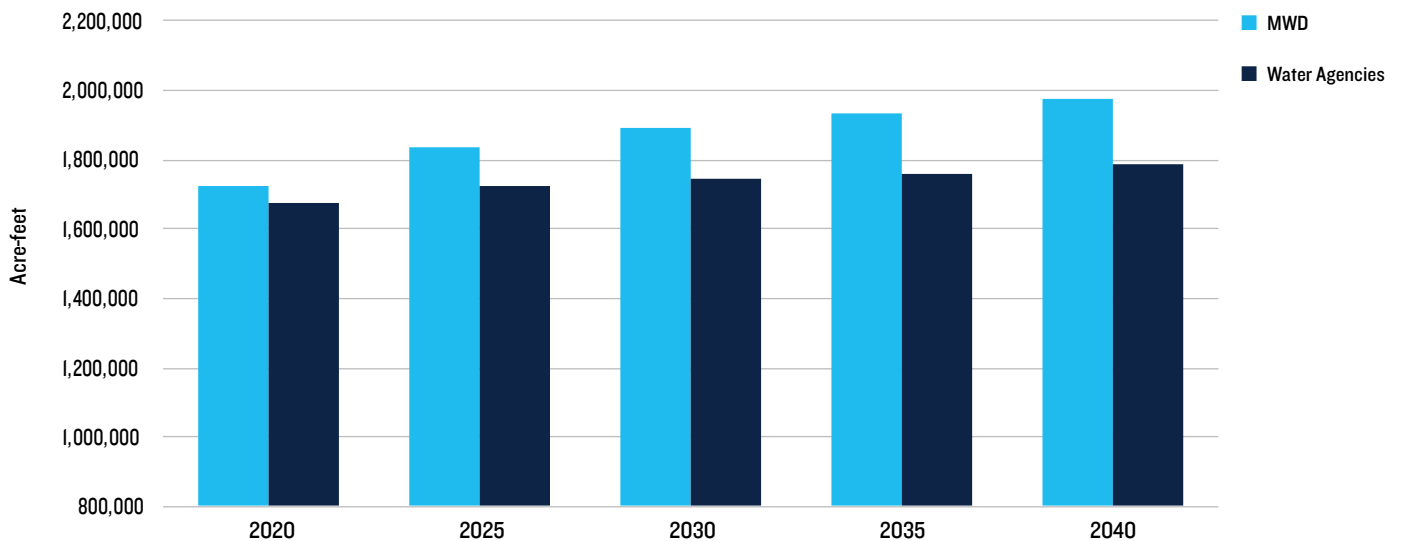
While the difference between the MWD's and local water agencies' anticipated purchases in dry years is lower than it is for years with average hydrologic conditions, it is still

**FIGURE 7. TOTAL PROJECTED MWD SALES DURING SINGLE-DRY-YEAR CONDITIONS FOR 2020–2040**



Data sources: 2015 UWMPs of the MWDs and local water agencies.

**FIGURE 8. TOTAL PROJECTED ANNUAL MWD SALES DURING MULTIPLE-DRY-YEAR CONDITIONS FOR 2020–2040**



Data sources: 2015 UWMPs of the MWD and local water agencies.

substantial. For a single dry year, local water agencies project nearly 31,000 AF more in MWD purchases in 2020 than the MWD anticipates. For 2025 to 2040, local water agencies anticipate 20,000 to 83,000 AF less in annual MWD purchases than the MWD does (see Figure 7). For a multiple-dry-year period, local water agencies project 53,000 to 187,000 AF less in annual MWD purchases than the MWD anticipates for 2020 to 2040 (see Figure 8). Tables A-14 and A-15 in the Appendix show projected annual MWD purchases by local water agency during dry years.

## RECOMMENDATIONS

Before making major investment decisions, the MWD and its member agencies should resolve several key questions:

### ■ Water demand

- Why are the MWD's projections for per capita demand higher than water agencies' projections?
- What are realistic assumptions for the trajectory of per capita water demand, and what are the implications for demand for imported water?
- How do demand models consider changing trends in land use patterns and housing development and shifts toward more-efficient water uses?

### ■ Water supplies

- How will the MWD encourage implementation of projected local water supply projects in urban water management plans, in order to reduce reliance on imported water?
- How will increased local supply development affect demand for imported water?
- How will the MWD and member agencies improve consistency of demand for imported MWD supplies?

California's recent extreme drought gave us a glimpse of what may lie ahead. Southern California's water agencies can better prepare by continuing to invest in local water supplies like groundwater, stormwater, and recycled water and by continuing to reduce per capita water demand. These solutions are more cost-effective and more prudent than investing in expensive and potentially unnecessary imported water supply projects, such as California WaterFix, particularly when there are unresolved discrepancies between the MWD's and local water agencies' water plans.



- 1 Natural Resources Defense Council (hereinafter NRDC) and Pacific Institute, “The Untapped Potential of California’s Water Supply,” June 10, 2014, [www.nrdc.org/resources/untapped-potential-californias-water-supply](http://www.nrdc.org/resources/untapped-potential-californias-water-supply).
- 2 Metropolitan Water District of Southern California (hereinafter MWD), *2016 Annual Report*, 2016, Table 1-3, [www.mwdh2o.com/PDF\\_Who\\_We\\_Are/2016\\_AnnualReport.pdf](http://www.mwdh2o.com/PDF_Who_We_Are/2016_AnnualReport.pdf).
- 3 MWD, *2015 Urban Water Management Plan*, 2016, p. 1-19, [www.mwdh2o.com/PDF\\_About\\_Your\\_Water/2.4.2\\_Regional\\_Urban\\_Water\\_Management\\_Plan.pdf](http://www.mwdh2o.com/PDF_About_Your_Water/2.4.2_Regional_Urban_Water_Management_Plan.pdf).
- 4 The MWD’s members include wholesale and retail agencies. Wholesale water agencies sell water to retail agencies, which then directly supply consumers.
- 5 Since 2000, the level of Lake Mead has dropped by nearly 140 feet to a level of approximately 1,083 feet. At 1,075 feet a shortage is declared, which results in reduced water allocations to users. See U.S. Bureau of Reclamation, “Lake Mead at Hoover Dam, Elevation (feet),” [www.usbr.gov/lc/region/g4000/hourly/mead-elv.html](http://www.usbr.gov/lc/region/g4000/hourly/mead-elv.html) (accessed May 24, 2017). Also see U.S. Department of the Interior, “Drought in the Colorado River Basin,” [www.doi.gov/water/owdi.cr.drought/en/](http://www.doi.gov/water/owdi.cr.drought/en/) (accessed May 24, 2017).
- 6 Delta Stewardship Council, *The Delta Plan*, 2013, [deltacouncil.ca.gov/delta-plan-0](http://deltacouncil.ca.gov/delta-plan-0).
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- 8 Cal. Water Code § 85021.
- 9 State Water Resources Control Board, *Working Draft Scientific Basis Report for New and Revised Flow Requirements on the Sacramento River and Tributaries, Eastside Tributaries to the Delta, Delta Outflow, and Interior Delta Operations*, October 2016, [www.waterboards.ca.gov/waterrights/water\\_issues/programs/bay\\_delta/docs/20161014\\_ph2\\_scireport.pdf](http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/20161014_ph2_scireport.pdf).
- 10 Neil Berg and Alex Hall, “Anthropogenic Warming Impacts on California Snowpack During Drought,” *Geophysical Research Letters* 44, no. 5 (2017): 2511-2518.
- 11 NRDC, “California Snowpack and the Drought,” April 2014, [www.nrdc.org/sites/default/files/ca-snowpack-and-drought-FS.pdf](http://www.nrdc.org/sites/default/files/ca-snowpack-and-drought-FS.pdf).
- 12 California Department of Water Resources, “State Water Project Allocation Increased: Supply Outlook Improves, but State Remains in Drought,” press release, February 24, 2016, [www.water.ca.gov/news/newsreleases/2016/022416.pdf](http://www.water.ca.gov/news/newsreleases/2016/022416.pdf).
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- 15 Matthew Heberger et al., *The Impacts of Sea-Level Rise on the California Coast*, California Climate Change Center, 2009, p. 80, [www.energy.ca.gov/2009publications/CEC-500-2009-024/CEC-500-2009-024-F.PDF](http://www.energy.ca.gov/2009publications/CEC-500-2009-024/CEC-500-2009-024-F.PDF). James E. Cloern et al., “Projected Evolution of California’s San Francisco Bay-Delta-River System in a Century of Climate Change,” *PLoS ONE* 6, no. 9 (2011): e24465.
- 16 NRDC and Pacific Institute, “Urban Water Conservation and Efficiency Potential in California,” June 2014, [www.nrdc.org/sites/default/files/ca-water-supply-solutions-urban-IB.pdf](http://www.nrdc.org/sites/default/files/ca-water-supply-solutions-urban-IB.pdf).
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- 22 California Water Boards, “September 2016 Statewide Conservation Data,” last updated October 2016, [www.waterboards.ca.gov/water\\_issues/programs/conservation\\_portal/docs/2016nov/fs110116\\_%20sept\\_conservation.pdf](http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/docs/2016nov/fs110116_%20sept_conservation.pdf).
- 23 Heather Cooley and Rapichan Phurisamban, “The Cost of Alternative Water Supply Efficiency Options,” at 19.
- 24 Calculated from data for Regions 4, 8, and 9. State Water Resources Control Board, “Plan & Assess: Wastewater Recycling,” in *The California Water Boards’ Annual Performance Report—2010*, last updated November 2011, [www.waterboards.ca.gov/about\\_us/performance\\_report\\_1011/plan\\_assess/12512\\_vw\\_recycling.shtml](http://www.waterboards.ca.gov/about_us/performance_report_1011/plan_assess/12512_vw_recycling.shtml).
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- 27 MWD, *2015 Urban Water Management Plan*, Table A. 2-1.
- 28 *Ibid.*, at 2-8. The local supply target in the MWD’s IRP is 0 in 2016, 3,000 AF in 2020, 8,000 AF in 2025, 12,000 AF in 2030, 16,000 AF in 2035, and 20,000 AF in 2040. See MWD, *Water Tomorrow: Integrated Water Resources Plan 2015 Update*, at 4.6.
- 29 This project is not included in Appendix 5 of the UWMP. MWD, “Regional Recycled Water Program,” [www.mwdh2o.com/PDF\\_About\\_Your\\_Water/Regional\\_Recycled\\_Water\\_Supply\\_Program.pdf](http://www.mwdh2o.com/PDF_About_Your_Water/Regional_Recycled_Water_Supply_Program.pdf) (accessed April 21, 2017).
- 30 This project is included in Appendix 5 of the UWMP. City of San Diego, “Pure Water San Diego Program Fact Sheet,” September 2016, [www.sandiego.gov/sites/default/files/pure\\_water\\_san\\_diego\\_fact\\_sheet\\_9-15-16\\_L.pdf](http://www.sandiego.gov/sites/default/files/pure_water_san_diego_fact_sheet_9-15-16_L.pdf).
- 31 MWD, “Water Rates and Charges,” [www.mwdh2o.com/WhoWeAre/Management/Financial-Information](http://www.mwdh2o.com/WhoWeAre/Management/Financial-Information) (accessed June 15, 2017).
- 32 MWD, “Metropolitan Board Restricts Wholesale Water Deliveries to Member Agencies for Fourth Time in District’s History,” press release, April 14, 2015, [www.mwdh2o.com/PDF\\_NewsRoom/Metropolitan\\_allocates\\_supplies.pdf](http://www.mwdh2o.com/PDF_NewsRoom/Metropolitan_allocates_supplies.pdf).
- 33 For reference, the city of Los Angeles purchased 328,000–440,000 AF of water annually from the MWD from 2012 to 2015. MWD, *2015 Urban Water Management Plan*, Table A. 2-2. Also see Mayor’s Office of Sustainability, City of Los Angeles, “Sustainable City Plan,” 2015, p. 17, [www.lamayor.org/plan](http://www.lamayor.org/plan).
- 34 City of Santa Monica, *Sustainable Water Master Plan*, December 2014, [www.smgov.net/uploadedFiles/Departments/Public\\_Works/Water/SWMP.pdf](http://www.smgov.net/uploadedFiles/Departments/Public_Works/Water/SWMP.pdf).
- 35 Fitch Ratings, “Fitch Rates Metropolitan Water District of Southern Ca Var Rate Water Revs ‘AA+’; Outlook Stable,” February 23, 2017, [www.mwdh2o.com/PDF\\_Who\\_We\\_Are/1.4.7.2\\_Fitch\\_Report.pdf](http://www.mwdh2o.com/PDF_Who_We_Are/1.4.7.2_Fitch_Report.pdf).
- 36 MWD, “Ten-Year Financial Forecast,” in *2016/17 and 2017/18 Biennial Budget*, 2016, p. 169, [www.mwdh2o.com/PDF\\_Who\\_We\\_Are/1.4.7\\_Biennial\\_budget.pdf](http://www.mwdh2o.com/PDF_Who_We_Are/1.4.7_Biennial_budget.pdf).
- 37 MWD, *Integrated Water Resources Plan: 2015 Update*, Table 3-6 (p. 3.24), includes forecast of average-year demands on MWD from 2016 to 2040. Table 3-5 (p. 3.23) also includes approximately 280,000 AF less in total local supply compared with the 2015 UWMP.
- 38 The methodology for the NRDC analysis differs from the GHA analysis in several ways. The GHA analysis focuses primarily on projected MWD water purchases, calculated by subtracting local supplies from total demand, and does not include a comprehensive review of projected local water supplies or regional demand. For MWD member agencies that report projected water supplies exceeding projected water demand, the GHA analysis determines projected MWD purchases by assuming that an agency first uses all of its local water supplies before using imported water purchased from the MWD. In contrast, the NRDC analysis relies on the projected MWD supply values reported by each member agency except where noted. Gordon Hess & Associates, *Comparison of Metropolitan Water District’s 2015 Urban Water Management Plan Projected Demand for MWD Water with Its Member Agencies’ 2015 UWMP Projected Demand for MWD Water* (March 2017), p. B-22, [www.sdcwa.org/sites/default/files/files/board/2017\\_Agendas/2017\\_03\\_23BoardPacket5EC.pdf#page=153](http://www.sdcwa.org/sites/default/files/files/board/2017_Agendas/2017_03_23BoardPacket5EC.pdf#page=153).
- 39 California Department of Water Resources, *2015 Urban Water Management Plans: Guidebook for Urban Water Suppliers*, March 2016, p. 7-4 to 7-5, [www.water.ca.gov/urbanwatermanagement/docs/2015/UWMP\\_Guidebook\\_Mar\\_2016\\_FINAL.pdf](http://www.water.ca.gov/urbanwatermanagement/docs/2015/UWMP_Guidebook_Mar_2016_FINAL.pdf).

## APPENDIX

**TABLE A-1. TOTAL PROJECTED ANNUAL DEMANDS, LOCAL SUPPLIES, AND PURCHASES FOR 2020–2040 FOR THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA (MWD)**

MWD Regional Water Demands—Average Year (acre-feet)	2020	2025	2030	2035	2040
<b>Total Demands</b>	<b>5,219,000</b>	<b>5,393,000</b>	<b>5,533,000</b>	<b>5,663,000</b>	<b>5,793,000</b>
Retail M&I	4,725,000	4,859,000	5,001,000	5,133,000	5,264,000
Retail Ag	130,000	167,000	163,000	161,000	160,000
Seawater Barrier	72,000	72,000	72,000	72,000	72,000
Storage Replenishment	292,000	295,000	297,000	297,000	297,000
<b>Total Conservation</b>	<b>1,056,000</b>	<b>1,127,000</b>	<b>1,200,000</b>	<b>1,263,000</b>	<b>1,339,000</b>
Existing Active (Through 2015)	210,000	196,000	184,000	166,000	159,000
Code-Based	381,000	423,000	462,000	497,000	532,000
Price-Effect	215,000	258,000	304,000	350,000	398,000
Pre-1990 Conservation	250,000	250,000	250,000	250,000	250,000
<b>Net Total Demands</b>	<b>4,163,000</b>	<b>4,266,000</b>	<b>4,333,000</b>	<b>4,400,000</b>	<b>4,454,000</b>

<b>Total Local Supplies</b>	<b>2,578,000</b>	<b>2,631,000</b>	<b>2,657,000</b>	<b>2,674,000</b>	<b>2,689,000</b>
Groundwater	1,303,000	1,301,000	1,301,000	1,301,000	1,302,000
Groundwater Recovery	143,000	157,000	163,000	165,000	167,000
Surface Water	110,000	110,000	110,000	110,000	110,000
Los Angeles Aqueduct	261,000	264,000	264,000	266,000	268,000
Seawater Desalination (Carlsbad)	51,000	51,000	51,000	51,000	51,000
Recycling	436,000	466,000	486,000	499,000	509,000
Other Imported Supplies (IID-SDCWA Transfer & Canal Linings)	274,000	282,000	282,000	282,000	282,000
<b>Total Metropolitan Demands</b>	<b>1,586,000</b>	<b>1,636,000</b>	<b>1,677,000</b>	<b>1,726,000</b>	<b>1,765,000</b>
Consumptive Use	1,415,000	1,468,000	1,509,000	1,558,000	1,597,000
Seawater Barrier	5,000	2,000	2,000	2,000	2,000
Replenishment	166,000	166,000	166,000	166,000	166,000

Data source: Table 2-3 of the MWD's 2015 UWMP. Total Metropolitan Demands is equivalent to MWD purchases/sales.

**TABLE A-2. COMPARISON OF PROJECTED ANNUAL REGIONAL WATER DEMAND FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS**

Total Regional Demand (acre-feet)			
Year	MWD	Water Agencies	Difference
2020	4,163,000	3,609,401	<b>+553,599</b>
2025	4,266,000	3,829,722	<b>+436,278</b>
2030	4,333,000	3,929,601	<b>+403,399</b>
2035	4,400,000	4,019,548	<b>+380,452</b>
2040	4,454,000	4,118,715	<b>+335,285</b>

Data sources: 2015 UWMPs of the MWD and local water agencies

**TABLE A-3. COMPARISON OF TOTAL REGIONAL POPULATION ESTIMATES FOR 2020–2040 BETWEEN THE MWD AND LOCAL WATER AGENCIES BY COUNTY**

County	2020			2025		
	MWD	Water Agencies	Difference	MWD	Water Agencies	Difference
Los Angeles	9,397,000	9,436,201	-39,201	9,636,000	9,689,998	-53,998
Orange	3,246,000	3,258,960	-12,960	3,316,000	3,335,973	-19,973
Riverside	1,825,000	1,875,755	-50,755	1,951,000	2,048,528	-97,528
San Bernardino	889,000	896,533	-7,533	947,000	955,569	-8,569
San Diego	3,341,000	3,340,594	406	3,496,000	3,495,978	22
Ventura	657,000	656,804	196	671,000	671,353	-353
<b>Total</b>	<b>19,355,000</b>	<b>19,464,847</b>	<b>-109,847</b>	<b>20,017,000</b>	<b>20,197,399</b>	<b>-180,399</b>

County	2030			2035		
	MWD	Water Agencies	Difference	MWD	Water Agencies	Difference
Los Angeles	9,875,000	9,918,046	-43,046	10,122,000	10,178,791	-56,791
Orange	3,376,000	3,388,841	-12,841	3,382,000	3,423,727	-41,727
Riverside	2,074,000	2,214,778	-140,778	2,201,000	2,371,725	-170,725
San Bernardino	1,001,000	1,009,349	-8,349	1,059,000	1,067,946	-8,946
San Diego	3,631,000	3,630,542	458	3,746,000	3,745,684	316
Ventura	682,000	681,549	451	696,000	695,854	146
<b>Total</b>	<b>20,639,000</b>	<b>20,843,105</b>	<b>-204,105</b>	<b>21,206,000</b>	<b>21,483,727</b>	<b>-277,727</b>

County	2040		
	MWD	Water Agencies	Difference
Los Angeles	10,332,000	10,394,901	-62,901
Orange	3,507,000	3,454,855	52,145
Riverside	2,309,000	2,519,480	-210,480
San Bernardino	1,103,000	1,125,203	-22,203
San Diego	3,825,000	3,825,041	-41
Ventura	715,000	715,112	-112
<b>Total</b>	<b>21,791,000</b>	<b>22,034,592</b>	<b>-243,592</b>

Data sources: 2015 UWMPs of the MWD and local water agencies.

**TABLE A-4. COMPARISON OF TOTAL PROJECTED PER CAPITA DEMAND (GALLONS PER PERSON PER DAY) FOR THE MWD SERVICE AREA**

County	2020		2025		2030		2035		2040	
	MWD	Water Agencies	MWD	Water Agencies	MWD	Water Agencies	MWD	Water Agencies	MWD	Water Agencies
Los Angeles	165	146	160	147	157	147	155	145	153	144
Orange	188	167	187	172	184	172	182	170	178	168
Riverside	292	217	293	208	289	208	284	207	277	204
San Bernardino	302	240	301	243	295	243	289	243	285	245
San Diego	182	157	182	166	178	166	176	166	174	168
Ventura	225	230	225	231	223	231	219	230	216	227

Data sources: 2015 UWMPs of the MWD and local water agencies. MWD per capita demand calculations assume that non-retail water demands (e.g., seawater barrier and storage replenishment) are allocated evenly across the MWD's service area because the MWD does not provide county-level forecasts of total demand in its 2015 UWMP.

**TABLE A-5. COMPARISON OF TOTAL PROJECTED ANNUAL LOCAL WATER SUPPLIES FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS**

Total Projected Annual Local Water Supplies (acre-feet)			
Year	MWD	Water Agencies	Difference
2020	2,578,000	2,575,145	+2,855
2025	2,631,000	2,785,380	-154,380
2030	2,657,000	2,831,541	-174,541
2035	2,674,000	2,884,816	-210,816
2040	2,689,000	2,918,398	-229,398

Data sources: 2015 UWMPs of the MWD and local water agencies.

**TABLE A-6. COMPARISON OF TOTAL PROJECTED ANNUAL MWD SALES FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS**

Total Projected Annual MWD Sales (acre-feet)			
Year	MWD	Water Agencies	Difference
2020	1,586,000	1,319,265	+266,735
2025	1,636,000	1,362,400	+273,600
2030	1,677,000	1,410,776	+266,224
2035	1,726,000	1,444,547	+281,453
2040	1,765,000	1,506,099	+258,901

Data sources: 2015 UWMPs of the MWD and local water agencies.

**TABLE A-7. COMPARISON OF TOTAL PROJECTED ANNUAL MWD SALES FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS IF ALL AVAILABLE LOCAL SUPPLIES ARE USED BEFORE PURCHASES OF IMPORTED WATER ARE MADE**

Total Projected Annual MWD Sales—Adjusted (acre-feet)			
Year	MWD	Water Agencies	Difference
2020	1,586,000	1,039,239	+546,761
2025	1,636,000	1,051,117	+584,883
2030	1,677,000	1,104,412	+572,588
2035	1,726,000	1,140,631	+585,369
2040	1,765,000	1,205,505	+559,495

Data sources: 2015 UWMPs of the MWD and local water agencies.

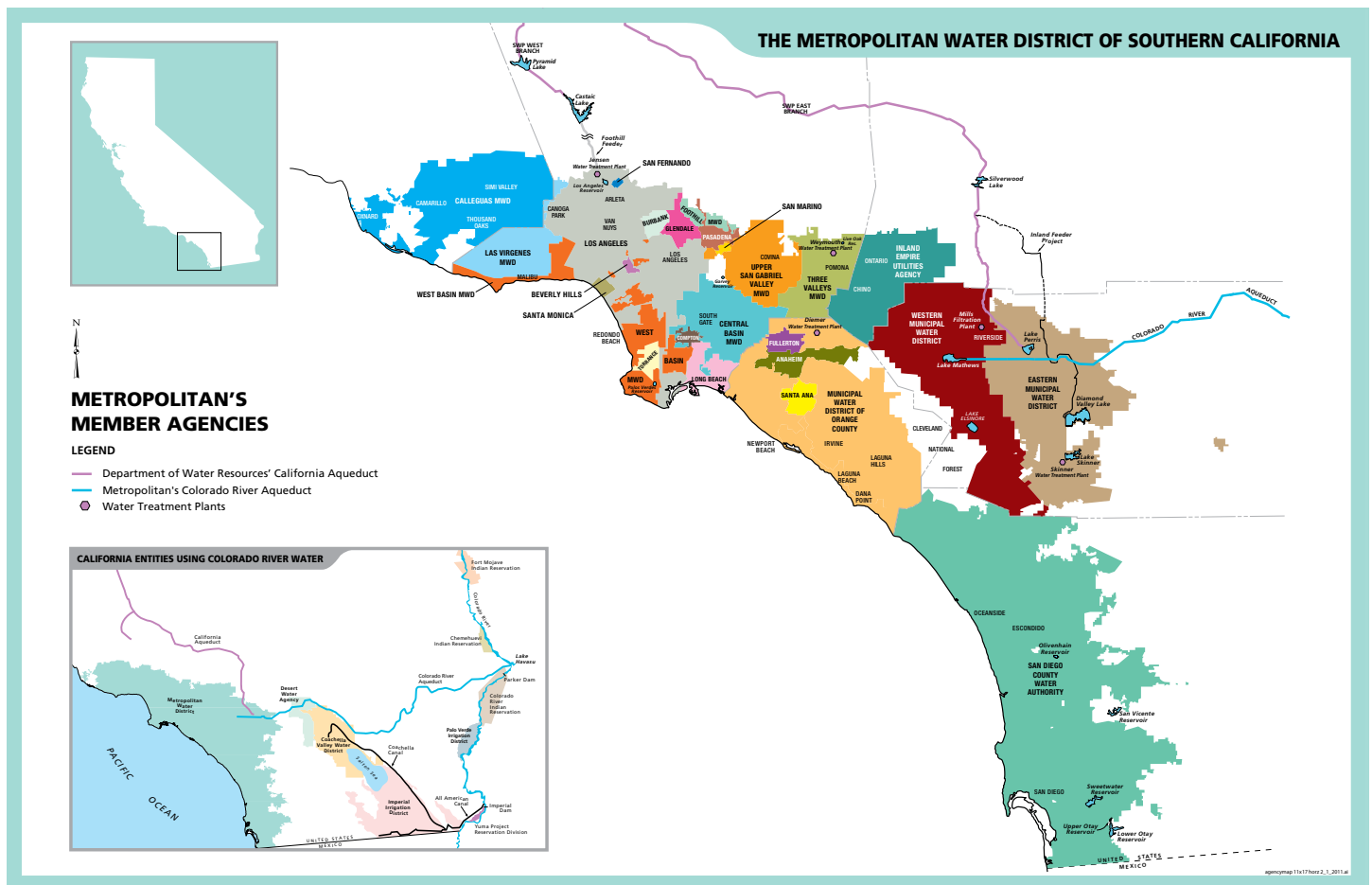
**TABLE A-8. COMPARISON OF TOTAL PROJECTED ANNUAL MWD SALES UNDER SINGLE-DRY-YEAR AND MULTIPLE-DRY-YEARS SCENARIOS**

Total Projected Annual MWD Sales (acre-feet)						
Year	Single Dry Year			Multiple Dry Years		
	MWD	Water Agencies	Difference	MWD	Water Agencies	Difference
2020	1,731,000	1,761,869	-30,869	1,727,000	1,673,701	+53,299
2025	1,784,000	1,763,889	+20,111	1,836,000	1,724,565	+111,435
2030	1,826,000	1,785,588	+40,412	1,889,000	1,744,650	+144,350
2035	1,878,000	1,799,566	+78,434	1,934,000	1,756,694	+177,306
2040	1,919,000	1,836,110	+82,890	1,976,000	1,789,348	+186,652

Data sources: 2015 UWMPs of the MWD and local water agencies.

Single-dry-year values are from Table 2-4, and multiple-dry-year values are from Table 2-5 in the MWD's 2015 UWMP.

**FIGURE A-1. MAP OF THE MWD'S SERVICE AREA, INCLUDING THE SERVICE AREAS OF MEMBER AGENCIES**



Source: [www.mwdh2o.com/PDF\\_NewsRoom/6.4.2\\_Maps\\_MemberAgencies.pdf](http://www.mwdh2o.com/PDF_NewsRoom/6.4.2_Maps_MemberAgencies.pdf).

**TABLE A-9. THE MWD'S MEMBER AGENCIES AND COMMUNITIES SERVED**

<b>Anaheim</b>				
<b>Beverly Hills</b>				
<b>Calleguas Municipal Water District</b>				
Camarillo	Las Posas Valley	Newbury Park	Port Hueneme	Somis
Camarillo Heights	Moorpark	Oak Park	Santa Rosa Valley	Thousand Oaks
Lake Sherwood	Naval Base Ventura County	Oxnard	Simi Valley	
<b>Central Basin Municipal Water District</b>				
Artesia	Compton	La Habra Heights	Norwalk	Vernon
Bell	Cudahy	Lakewood	Paramount	Walnut Park
Bellflower	Downey	La Mirada	Pico Rivera	West Whittier–Los Nietos
Bell Gardens	East Los Angeles	Lynwood	Santa Fe Springs	Whittier
Carson	Florence–Graham	Maywood	Signal Hill	Willowbrook
Cerritos	Hawaiian Gardens	Montebello	South Gate	
Commerce	Huntington Park	Monterey Park	South Whittier	
<b>Compton</b>				
<b>Eastern Municipal Water District</b>				
French Valley	Juniper Flats	Moreno Valley	North Canyon Lake	San Jacinto
Good Hope	Lakeview	Murrieta	Perris	Sun City
Hemet	Mead Valley	Murrieta Hot Springs	Quail Valley	Temecula
Homeland	Menifee	Nuevo	Romoland	Valle Vista
				Winchester
<b>Foothill Municipal Water District</b>				
Altadena	La Cañada Flintridge	La Crescenta	Montrose	
<b>Fullerton</b>				
<b>Glendale</b>				
<b>Inland Empire Utilities Agency</b>				
Chino	Fontana	Ontario	Upland	
Chino Hills	Montclair	Rancho Cucamonga		
<b>Las Virgenes Municipal Water District</b>				
Agoura	Calabasas	Hidden Hills	Malibu Lake	Westlake Village
Agoura Hills	Chatsworth	Lake Manor	Monte Nido	West Hills
<b>Long Beach</b>				
<b>Los Angeles</b>				
<b>Municipal Water District of Orange County</b>				
Aliso Viejo	Fountain Valley	La Habra	Orange	Stanton
Brea	Garden Grove	Lake Forest	Placentia	Tustin
Buena Park	Huntington Beach	Las Flores	Rancho Santa Margarita	Tustin Foothills
Costa Mesa	Irvine	La Palma	Rossmoor	Villa Park
Coto de Caza	Laguna Beach	Los Alamitos	San Clemente	Westminster
Cypress	Laguna Hills	Midway City	San Juan Capistrano	Yorba Linda
Dana Point	Laguna Niguel	Mission Viejo	Seal Beach	
Emerald Bay	Laguna Woods	Newport Beach	South West Anaheim	
<b>Pasadena</b>				
<b>San Diego County Water Authority</b>				
Alpine	El Cajon	Lemon Grove	Rainbow	Solana Beach
Bonita	Encinitas	Leucadia	Ramona	Spring Valley
Bonsall	Escondido	Mount Helix	Rancho San Diego	Valley Center
Camp Pendleton	Fallbrook	National City	Rancho Santa Fe	Vista
Carlsbad	Jamul	Oceanside	San Diego	
Chula Vista	Lakeside	Pauma Valley	San Marcos	
Del Mar	La Mesa	Poway	Santee	

**TABLE A-9. THE MWD'S MEMBER AGENCIES AND COMMUNITIES SERVED (CONTINUED)**

<b>San Fernando</b>				
<b>San Marino</b>				
<b>Santa Ana</b>				
<b>Santa Monica</b>				
<b>Three Valleys Municipal Water District</b>				
Azusa	Covina	Glendora	Pomona	South San Jose Hills
Charter Oak	Covina Hills	Industry	Rowland Heights	Walnut
Claremont	Diamond Bar	La Verne	San Dimas	West Covina
<b>Torrance</b>				
<b>Upper San Gabriel Valley Municipal Water District</b>				
Arcadia	Bradbury	Hacienda Heights	North Whittier	South San Gabriel
Avocado Heights	Covina	Industry	Rosemead	Spy Glass Hill
Azusa	Duarte	Irwindale	San Gabriel	Temple City
Baldwin Park	El Monte	La Puente	South El Monte	Valinda
Bassett	Glendora	Monrovia	South Pasadena	West Covina
<b>West Basin Municipal Water District</b>				
Alondra Park	Hawthorne	Lomita	Rolling Hills	West Athens
Carson	Hermosa Beach	Malibu	Rolling Hills Estates	West Hollywood
Culver City	Howard	Manhattan Beach	Ross-Sexton	Westmont
Del Aire	Inglewood	Marina del Rey	San Pedro	Windsor Hills
El Camino Village	Ladera Heights	Palos Verdes Estates	Topanga Canyon	
El Segundo	Lawndale	Rancho Palos Verdes	Torrance	
Gardena	Lennox	Redondo Beach	View Park	
<b>Western Municipal Water District of Riverside County</b>				
Canyon Lake	El Sobrante	Lake Matthews	Norco	Temecula
Corona	Elsinore	Lee Lake	Perris	Temecula Canyon
Eagle Valley	Jurupa Valley	March Air Reserve Base	Riverside	Woodcrest
Eastvale	Lake Elsinore	Murrieta	Rubidoux	

Source: [www.mwdh2o.com/PDF\\_In\\_The\\_Community/3.3\\_service\\_area\\_map.pdf](http://www.mwdh2o.com/PDF_In_The_Community/3.3_service_area_map.pdf)

**TABLE A-10. SUMMARY OF TOTAL PROJECTED ANNUAL LOCAL WATER SUPPLIES BY SOURCE, MWD SALES, AND DEMANDS (ACRE-FEET) FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS FOR 2020 – 2040**

	2020			2025			2030			2035			2040		
	MWD	Members	Diff.	MWD	Members	Diff.	MWD	Members	Diff.	MWD	Members	Diff.	MWD	Members	Diff.
<b>Total Local Water Supplies</b>	2,578,000	2,575,145	2,855	2,631,000	2,785,380	-154,380	2,657,000	2,831,541	-174,541	2,674,000	2,884,816	-210,816	2,689,000	2,918,398	-229,398
Groundwater	1,303,000	1,359,038	-56,038	1,301,000	1,434,798	-133,798	1,301,000	1,455,138	-154,138	1,301,000	1,491,814	-190,814	1,302,000	1,508,952	-206,952
Groundwater Recovery	143,000	78,503	+64,497	157,000	88,128	+68,872	163,000	88,353	+74,647	165,000	88,410	+76,590	167,000	88,410	+78,590
Surface Water	110,000	102,848	+7,152	110,000	102,748	+7,252	110,000	102,648	+7,352	110,000	102,548	+7,452	110,000	102,448	+7,552
Los Angeles Aqueduct	261,000	275,700	-14,700	264,000	293,400	-29,400	264,000	291,000	-27,000	266,000	288,600	-22,600	268,000	286,200	-18,200
Seawater Desalination	51,000	56,000	-5,000	51,000	77,500	-26,500	51,000	77,500	-26,500	51,000	77,500	-26,500	51,000	77,500	-26,500
Recycling	436,000	431,896	+4,104	466,000	507,246	-41,246	486,000	534,942	-48,942	495,000	553,584	-54,584	509,000	572,128	-63,128
Stormwater	0	960	-960	0	1,360	-1,360	0	1,760	-1,760	0	2,160	-2,160	0	2,560	-2,560
Other Imported Supplies (IID – SDCWA Transfer & Canal Linings)	274,000	270,200	+3,800	282,000	280,200	+1,800	282,000	280,200	+1,800	282,000	280,200	+1,800	282,000	280,200	+1,800
<b>Total MWD Sales</b>	1,586,000	1,319,285	+266,735	1,636,000	1,362,400	+273,600	1,677,000	1,410,776	+266,224	1,726,000	1,444,547	+281,453	1,765,000	1,506,099	+259,901
<b>Total Supplies</b>	4,164,000	3,894,409	+269,591	4,267,000	4,147,780	+119,220	4,334,000	4,242,317	+91,683	4,400,000	4,329,363	+70,637	4,454,000	4,424,497	+29,503
<b>Total Demands</b>	4,163,000	3,609,401	+553,599	4,266,000	3,929,722	+436,278	4,333,000	3,929,601	+403,399	4,400,000	4,019,548	+380,452	4,454,000	4,118,715	+335,285

Data sources: 2015 UWMPs of the MWD and local water agencies.



**TABLE A-II. TOTAL PROJECTED ANNUAL WATER DEMAND (ACRE-FEET) BY MWD MEMBER AGENCY SERVICE AREA FOR 2020–2040 FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS**

Name	Demand Type	2020	2025	2030	2035	2040
<b>Anaheim, City of</b>	<b>Total</b>	<b>62,050</b>	<b>66,608</b>	<b>67,065</b>	<b>67,047</b>	<b>67,143</b>
	Recycled Water	155	155	155	155	155
	Potable and Raw Water	61,895	66,453	66,910	66,892	66,988
<b>Beverly Hills, City of</b>	<b>Total</b>	<b>11,104</b>	<b>11,181</b>	<b>11,261</b>	<b>11,345</b>	<b>11,428</b>
	Recycled Water	0	0	0	0	0
	Potable and Raw Water	11,104	11,181	11,261	11,345	11,428
<b>Burbank, City of</b>	<b>Total</b>	<b>28,521</b>	<b>28,130</b>	<b>27,858</b>	<b>27,440</b>	<b>27,250</b>
	Recycled Water	3,327	5,047	5,047	5,047	5,047
	Potable and Raw Water	25,194	23,083	22,811	22,393	22,203
<b>Calleguas Municipal Water District</b>	<b>Total</b>	<b>169,167</b>	<b>173,139</b>	<b>176,279</b>	<b>179,205</b>	<b>181,902</b>
	Recycled Water	9,485	10,105	10,405	10,605	10,805
	Potable and Raw Water	159,682	163,034	165,874	168,600	171,097
<b>Central Basin Municipal Water District</b>	<b>Total</b>	<b>304,559</b>	<b>306,598</b>	<b>308,995</b>	<b>308,635</b>	<b>309,679</b>
	Recycled Water	53,910	58,171	61,423	62,667	63,911
	Potable and Raw Water	250,649	248,427	247,572	245,968	245,768
<b>Compton, City of</b>	<b>Total</b>	<b>7,953</b>	<b>8,067</b>	<b>8,178</b>	<b>8,289</b>	<b>8,289</b>
	Recycled Water	0	0	0	0	0
	Potable and Raw Water	7,953	8,067	8,178	8,289	8,289
<b>Eastern Municipal Water District</b>	<b>Total</b>	<b>210,900</b>	<b>228,026</b>	<b>244,637</b>	<b>260,357</b>	<b>274,636</b>
	Recycled Water	38,612	40,625	43,261	45,274	46,808
	Potable and Raw Water	172,288	187,402	201,377	215,084	227,828
<b>Foothill Municipal Water District</b>	<b>Total</b>	<b>14,145</b>	<b>14,325</b>	<b>14,486</b>	<b>14,651</b>	<b>14,820</b>
	Recycled Water	90	90	90	90	90
	Potable and Raw Water	14,055	14,235	14,396	14,561	14,730
<b>Fullerton, City of</b>	<b>Total</b>	<b>26,699</b>	<b>28,661</b>	<b>28,858</b>	<b>28,850</b>	<b>28,891</b>
	Recycled Water	0	0	0	0	0
	Potable and Raw Water	26,699	28,661	28,858	28,850	28,891
<b>Glendale, City of</b>	<b>Total</b>	<b>30,555</b>	<b>30,984</b>	<b>31,421</b>	<b>31,864</b>	<b>32,313</b>
	Recycled Water	1,662	1,662	1,662	1,662	1,662
	Potable and Raw Water	28,893	29,322	29,759	30,202	30,651
<b>Inland Empire Utilities Agency</b>	<b>Total</b>	<b>241,358</b>	<b>259,218</b>	<b>275,209</b>	<b>291,264</b>	<b>308,994</b>
	Recycled Water	20,672	20,906	23,232	26,533	29,918
	Potable and Raw Water	220,686	238,312	251,976	264,730	279,076
<b>Las Virgenes Municipal Water District</b>	<b>Total</b>	<b>26,798</b>	<b>27,796</b>	<b>28,838</b>	<b>29,924</b>	<b>31,058</b>
	Recycled Water	4,255	4,269	4,284	4,299	4,314
	Potable and Raw Water	22,543	23,527	24,554	25,625	26,744
<b>Long Beach, City of</b>	<b>Total</b>	<b>63,643</b>	<b>63,410</b>	<b>63,455</b>	<b>63,609</b>	<b>64,136</b>
	Recycled Water	4,723	4,780	4,854	4,938	5,030
	Potable and Raw Water	58,920	58,630	58,601	58,671	59,106

**TABLE A-II. TOTAL PROJECTED ANNUAL WATER DEMAND (ACRE-FEET) BY MWD MEMBER AGENCY SERVICE AREA FOR 2020–2040 FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS (CONTINUED)**

Name	Demand Type	2020	2025	2030	2035	2040
<b>Los Angeles, City of</b>	<b>Total</b>	<b>512,755</b>	<b>560,546</b>	<b>568,026</b>	<b>579,489</b>	<b>594,325</b>
	Recycled Water	46,540	85,740	95,740	98,940	102,140
	Potable and Raw Water	466,215	474,806	472,286	480,549	492,185
<b>Municipal Water District of Orange County</b>	<b>Total</b>	<b>482,879</b>	<b>514,577</b>	<b>517,041</b>	<b>515,477</b>	<b>515,425</b>
	Recycled Water	49,415	58,157	63,546	66,344	66,842
	Potable and Raw Water	433,464	456,420	453,495	449,133	448,583
<b>Pasadena, City of</b>	<b>Total</b>	<b>32,586</b>	<b>32,611</b>	<b>32,719</b>	<b>32,891</b>	<b>33,000</b>
	Recycled Water	700	1,100	3,210	3,600	3,990
	Potable and Raw Water	31,886	31,511	29,509	29,291	29,010
<b>San Diego County Water Authority</b>	<b>Total</b>	<b>587,581</b>	<b>648,124</b>	<b>676,721</b>	<b>694,431</b>	<b>718,773</b>
	Recycled Water	43,759	46,974	49,058	49,418	50,158
	Potable and Raw Water	543,822	601,150	627,663	645,013	668,615
<b>San Fernando, City of</b>	<b>Total</b>	<b>3,753</b>	<b>3,821</b>	<b>3,890</b>	<b>3,961</b>	<b>4,032</b>
	Recycled Water	0	0	0	0	0
	Potable and Raw Water	3,753	3,821	3,890	3,961	4,032
<b>San Marino, City of (California American)</b>	<b>Total</b>	<b>11,639</b>	<b>11,961</b>	<b>12,267</b>	<b>12,588</b>	<b>12,847</b>
	Recycled Water	0	0	0	0	0
	Potable and Raw Water	11,639	11,961	12,267	12,588	12,847
<b>Santa Ana, City of</b>	<b>Total</b>	<b>36,998</b>	<b>39,717</b>	<b>39,989</b>	<b>39,978</b>	<b>40,036</b>
	Recycled Water	320	320	320	320	320
	Potable and Raw Water	36,678	39,397	39,669	39,658	39,716
<b>Santa Monica, City of</b>	<b>Total</b>	<b>12,933</b>	<b>13,010</b>	<b>13,088</b>	<b>13,168</b>	<b>13,246</b>
	Recycled Water	0	0	0	0	0
	Potable and Raw Water	12,933	13,010	13,088	13,168	13,246
<b>Three Valleys Municipal Water District</b>	<b>Total</b>	<b>131,511</b>	<b>132,071</b>	<b>133,455</b>	<b>134,601</b>	<b>137,040</b>
	Recycled Water	7,063	8,055	8,896	9,630	10,172
	Potable and Raw Water	124,448	124,016	124,559	124,971	126,868
<b>Torrance, City of</b>	<b>Total</b>	<b>24,893</b>	<b>25,415</b>	<b>25,950</b>	<b>26,500</b>	<b>27,064</b>
	Recycled Water	6,600	6,640	6,680	6,720	6,760
	Potable and Raw Water	18,293	18,775	19,271	19,779	20,304
<b>Upper San Gabriel Valley Municipal Water District</b>	<b>Total</b>	<b>162,343</b>	<b>172,037</b>	<b>175,013</b>	<b>178,054</b>	<b>181,105</b>
	Recycled Water	13,385	13,735	13,820	13,940	14,180
	Potable and Raw Water	148,958	158,302	161,193	164,114	166,925
<b>West Basin Municipal Water District</b>	<b>Total</b>	<b>167,999</b>	<b>171,637</b>	<b>174,394</b>	<b>176,961</b>	<b>179,057</b>
	Recycled Water	21,894	27,135	27,135	27,135	27,135
	Potable and Raw Water	146,105	144,502	147,259	149,826	151,922
<b>Western Municipal Water District of Riverside County</b>	<b>Total</b>	<b>153,347</b>	<b>165,995</b>	<b>174,743</b>	<b>188,742</b>	<b>197,000</b>
	Recycled Water	18,998	22,791	23,925	30,416	31,087
	Potable and Raw Water	134,349	143,203	150,817	158,325	165,913
<b>MWD SERVICE AREA TOTAL</b>		<b>3,518,669</b>	<b>3,737,664</b>	<b>3,833,836</b>	<b>3,919,320</b>	<b>4,013,490</b>

Data sources: 2015 UWMPs of local water agencies.

**TABLE A-12. TOTAL PROJECTED ANNUAL WATER SUPPLIES (ACRE-FEET) BY MWD MEMBER AGENCY SERVICE AREA FOR 2020–2040 FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS**

Name	Water Supply Type	2020	2025	2030	2035	2040
<b>Anaheim, City of</b>	<b>Total</b>	<b>62,050</b>	<b>66,608</b>	<b>67,065</b>	<b>67,047</b>	<b>67,143</b>
	Groundwater	43,435	46,626	46,946	46,933	47,000
	Recycled Water	155	155	155	155	155
	Imported/MWD	18,460	19,827	19,965	19,959	19,988
<b>Beverly Hills, City of</b>	<b>Total</b>	<b>11,104</b>	<b>11,182</b>	<b>11,262</b>	<b>11,344</b>	<b>11,428</b>
	Groundwater	2,000	4,000	4,000	4,000	4,000
	Imported/MWD	9,104	7,182	7,262	7,344	7,428
<b>Burbank, City of</b>	<b>Total</b>	<b>28,521</b>	<b>28,130</b>	<b>27,858</b>	<b>27,440</b>	<b>27,250</b>
	Groundwater	11,000	11,000	11,000	11,000	11,000
	Recycled Water	3,327	5,047	5,047	5,047	5,047
	Imported/MWD	14,194	12,083	11,811	11,393	11,203
<b>Calleguas Municipal Water District*</b>	<b>Total</b>	<b>170,095</b>	<b>174,076</b>	<b>177,242</b>	<b>180,193</b>	<b>182,913</b>
	Groundwater	42,492	42,074	42,301	42,528	42,755
	Groundwater Recovery	12,350	18,250	18,250	18,250	18,250
	Local Surface Water	9,000	9,000	9,000	9,000	9,000
	Recycled Water	9,485	10,105	10,405	10,605	10,805
	Imported/MWD	96,768	94,647	97,286	99,810	102,103
<b>Central Basin Municipal Water District</b>	<b>Total</b>	<b>304,559</b>	<b>306,598</b>	<b>308,995</b>	<b>308,635</b>	<b>309,679</b>
	Groundwater	186,295	186,867	187,439	188,011	188,107
	Recycled Water	53,910	58,171	61,423	62,667	63,911
	Imported/MWD	64,354	61,560	60,133	57,957	57,661
<b>Compton, City of</b>	<b>Total</b>	<b>7,953</b>	<b>8,066</b>	<b>8,178</b>	<b>8,290</b>	<b>8,290</b>
	Groundwater	7,540	7,540	7,540	7,540	7,540
	Imported/MWD	413	526	638	750	750
<b>Eastern Municipal Water District*</b>	<b>Total</b>	<b>254,552</b>	<b>281,715</b>	<b>300,502</b>	<b>318,228</b>	<b>341,311</b>
	Groundwater	60,989	66,020	66,914	67,796	75,232
	Groundwater Recovery	7,000	10,100	10,100	10,100	10,100
	Local Surface Water	4,500	4,500	4,500	4,500	4,500
	Recycled Water	50,366	57,898	60,791	63,035	64,582
	Imported/MWD	131,697	143,197	158,197	172,797	186,897
<b>Foothill Municipal Water District*</b>	<b>Total</b>	<b>15,352</b>	<b>16,522</b>	<b>16,817</b>	<b>17,097</b>	<b>17,403</b>
	Groundwater	6,982	7,641	7,651	7,651	7,651
	Local Surface Water	285	285	285	285	285
	Imported/MWD	8,085	8,596	8,881	9,161	9,467
<b>Fullerton, City of</b>	<b>Total</b>	<b>26,699</b>	<b>28,661</b>	<b>28,858</b>	<b>28,850</b>	<b>28,891</b>
	Groundwater	18,689	20,063	20,201	20,195	20,224
	Imported/MWD	8,010	8,598	8,657	8,655	8,667

\*Indicates that total supplies exceed demand for member agency's service area.

**TABLE A-12. TOTAL PROJECTED ANNUAL WATER SUPPLIES (ACRE-FEET) BY MWD MEMBER AGENCY SERVICE AREA FOR 2020–2040 FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS (CONTINUED)**

Name	Water Supply Type	2020	2025	2030	2035	2040
<b>Glendale, City of*</b>	<b>Total</b>	<b>39,540</b>	<b>39,540</b>	<b>39,540</b>	<b>39,540</b>	<b>39,540</b>
	Groundwater	11,656	11,656	11,656	11,656	11,656
	Recycled Water	1,662	1,662	1,662	1,662	1,662
	Imported/MWD	26,222	26,222	26,222	26,222	26,222
<b>Inland Empire Utilities Agency*</b>	<b>Total</b>	<b>255,772</b>	<b>269,468</b>	<b>281,044</b>	<b>299,566</b>	<b>311,996</b>
	Groundwater	111,513	120,429	127,512	142,171	144,522
	Groundwater Recovery	17,733	17,733	17,733	17,733	17,733
	Local Surface Water	12,020	12,020	12,020	12,020	12,020
	Recycled Water	44,734	49,534	54,027	57,890	67,696
	Imported/MWD	69,752	69,752	69,752	69,752	69,752
<b>Las Virgenes Municipal Water District</b>	<b>Total</b>	<b>26,798</b>	<b>27,796</b>	<b>28,838</b>	<b>29,925</b>	<b>31,058</b>
	Recycled Water	4,255	4,269	4,284	4,299	4,314
	Imported/MWD	22,543	23,527	24,554	25,626	26,744
<b>Long Beach, City of*</b>	<b>Total</b>	<b>77,291</b>	<b>77,791</b>	<b>78,291</b>	<b>78,791</b>	<b>79,291</b>
	Groundwater	33,001	33,501	34,001	34,501	35,001
	Recycled Water	9,190	9,190	9,190	9,190	9,190
	Imported/MWD	35,100	35,100	35,100	35,100	35,100
<b>Los Angeles, City of</b>	<b>Total</b>	<b>512,740</b>	<b>560,540</b>	<b>568,040</b>	<b>579,440</b>	<b>594,340</b>
	Groundwater	114,670	114,670	114,670	129,670	129,070
	Los Angeles Aqueduct	275,700	293,400	291,000	288,600	286,200
	Recycled Water	46,540	85,740	95,740	98,940	102,140
	Stormwater (Direct Use)	400	800	1,200	1,600	2,000
	Imported/MWD	75,430	65,930	65,430	60,630	74,930
<b>Municipal Water District of Orange County*</b>	<b>Total</b>	<b>520,085</b>	<b>556,592</b>	<b>555,221</b>	<b>551,248</b>	<b>550,799</b>
	Groundwater	240,448	264,323	266,417	266,768	267,232
	Groundwater Recovery	10,840	10,840	10,840	10,840	10,840
	Local Surface Water	3,491	3,491	3,491	3,491	3,491
	Recycled Water	60,174	61,378	61,964	61,930	61,795
	Imported/MWD	205,132	216,560	212,509	208,219	207,441
<b>Pasadena, City of*</b>	<b>Total</b>	<b>34,318</b>	<b>34,770</b>	<b>37,131</b>	<b>37,813</b>	<b>38,291</b>
	Groundwater	12,684	12,684	12,684	12,684	12,684
	Recycled Water	700	1,100	3,210	3,600	3,990
	Imported/MWD	20,934	20,986	21,237	21,529	21,617
<b>San Diego County Water Authority</b>	<b>Total</b>	<b>587,581</b>	<b>648,124</b>	<b>676,721</b>	<b>694,431</b>	<b>718,773</b>
	Groundwater	17,940	19,130	20,170	20,170	20,170
	Groundwater Recovery	12,100	12,500	12,500	12,500	12,500
	Local Surface Water	51,580	51,480	51,380	51,280	51,180
	Seawater Desal	56,000	56,000	56,000	56,000	56,000
	Recycled Water	43,759	46,974	49,058	49,418	50,158

\*Indicates that total supplies exceed demand for member agency's service area.

**TABLE A-12. TOTAL PROJECTED ANNUAL WATER SUPPLIES (ACRE-FEET) BY MWD MEMBER AGENCY SERVICE AREA FOR 2020–2040 FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS (CONTINUED)**

Name	Water Supply Type	2020	2025	2030	2035	2040
<b>San Diego County Water Authority (continued)</b>						
	Imported/MWD	136,002	181,840	207,413	224,863	248,565
	IID Transfer/Canal Linings	270,200	280,200	280,200	280,200	280,200
<b>San Fernando, City of*</b>	<b>Total</b>	<b>7,223</b>	<b>7,325</b>	<b>7,495</b>	<b>7,625</b>	<b>7,661</b>
	Groundwater	3,570	3,570	3,570	3,570	3,570
	Imported/MWD	3,653	3,755	3,925	4,055	4,091
<b>San Marino, City of (California American)</b>	<b>Total</b>	<b>11,639</b>	<b>11,961</b>	<b>12,266</b>	<b>12,587</b>	<b>12,587</b>
	Groundwater	10,440	10,762	11,067	11,388	11,388
	Imported/MWD	1,199	1,199	1,199	1,199	1,199
<b>Santa Ana, City of</b>	<b>Total</b>	<b>36,998</b>	<b>39,717</b>	<b>39,989</b>	<b>39,978</b>	<b>40,036</b>
	Groundwater	25,899	27,802	27,992	27,985	28,025
	Recycled Water	320	320	320	320	320
	Imported/MWD	10,779	11,595	11,677	11,673	11,691
<b>Santa Monica, City of*</b>	<b>Total</b>	<b>20,469</b>	<b>20,469</b>	<b>20,469</b>	<b>20,469</b>	<b>20,469</b>
	Groundwater	12,500	12,500	12,500	12,500	12,500
	Stormwater (Direct Use)	560	560	560	560	560
	Imported/MWD	7,409	7,409	7,409	7,409	7,409
<b>Three Valleys Municipal Water District</b>	<b>Total</b>	<b>131,511</b>	<b>132,071</b>	<b>133,455</b>	<b>134,601</b>	<b>137,040</b>
	Groundwater	43,300	43,300	43,300	43,300	43,300
	Groundwater Recovery	1,946	2,171	2,396	2,453	2,453
	Local Surface Water	6,200	6,200	6,200	6,200	6,200
	Recycled Water	7,063	8,055	8,896	9,630	10,172
	Imported/MWD	73,002	72,345	72,663	73,018	74,915
<b>Torrance, City of*</b>	<b>Total</b>	<b>36,794</b>	<b>36,794</b>	<b>36,794</b>	<b>36,794</b>	<b>36,794</b>
	Groundwater	5,640	5,640	5,640	5,640	5,640
	Groundwater Recovery	4,800	4,800	4,800	4,800	4,800
	Recycled Water	7,150	7,150	7,150	7,150	7,150
	Imported/MWD	19,204	19,204	19,204	19,204	19,204
<b>Upper San Gabriel Valley Municipal Water District*</b>	<b>Total</b>	<b>210,634</b>	<b>221,112</b>	<b>222,806</b>	<b>225,241</b>	<b>227,439</b>
	Groundwater	136,442	147,093	149,261	151,450	153,640
	Local Surface Water	11,772	11,772	11,772	11,772	11,772
	Recycled Water	18,984	19,896	20,332	20,731	21,124
	Imported/MWD	43,436	42,351	41,441	41,288	40,903
<b>West Basin Municipal Water District*</b>	<b>Total</b>	<b>174,613</b>	<b>180,582</b>	<b>180,601</b>	<b>180,841</b>	<b>180,419</b>
	Groundwater	36,293	36,293	36,293	36,293	36,293
	Groundwater Recovery	1,000	1,000	1,000	1,000	1,000
	Seawater Desal	0	21,500	21,500	21,500	21,500
	Recycled Water	38,894	44,135	44,135	44,135	44,135
	Imported/MWD	98,426	77,654	77,673	77,913	77,491

\*Indicates that total supplies exceed demand for member agency's service area.

**TABLE A-12. TOTAL PROJECTED ANNUAL WATER SUPPLIES (ACRE-FEET) BY MWD MEMBER AGENCY SERVICE AREA FOR 2020–2040 FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS (CONTINUED)**

Name	Water Supply Type	2020	2025	2030	2035	2040
<b>Western Municipal Water District of Riverside County*</b>	<b>Total</b>	<b>329,538</b>	<b>361,570</b>	<b>376,839</b>	<b>393,349</b>	<b>403,656</b>
	Groundwater	163,619	179,614	184,414	186,414	190,752
	Groundwater Recovery	10,734	10,734	10,734	10,734	10,734
	Local Surface Water	4,000	4,000	4,000	4,000	4,000
	Recycled Water	31,228	36,467	37,153	43,180	43,509
	Imported/MWD	119,957	130,755	140,538	149,021	154,661
<b>MWD SERVICE AREA TOTAL</b>		<b>3,894,409</b>	<b>4,147,780</b>	<b>4,242,317</b>	<b>4,329,363</b>	<b>4,424,497</b>

\*Indicates that total supplies exceed demand for member agency's service area.

Data sources: 2015 UWMPs of local water agencies.

**TABLE A-13. TOTAL ANNUAL PROJECTED MWD PURCHASES (ACRE-FEET) BY MEMBER AGENCY FOR 2020–2040 FOR YEARS WITH AVERAGE HYDROLOGIC CONDITIONS IF ALL LOCAL WATER SUPPLIES ARE USED BEFORE MWD PURCHASES ARE MADE**

Name	2020	2025	2030	2035	2040	
Anaheim, City of	18,460	19,827	19,965	19,959	19,988	
Beverly Hills, City of	9,104	7,182	7,262	7,344	7,428	
Burbank, City of	14,194	12,083	11,811	11,393	11,203	
Calleguas Municipal Water District	95,840	93,710	96,323	98,822	101,092	
Central Basin Municipal Water District	64,354	61,560	60,133	57,957	57,661	
Compton, City of	413	526	638	750	750	
Eastern Municipal Water District	88,045	89,508	102,332	114,926	120,222	
Foothill Municipal Water District	6,878	6,399	6,550	6,715	6,884	
Fullerton, City of	8,010	8,598	8,657	8,655	8,667	
Glendale, City of	17,237	17,666	18,103	18,546	18,995	
Inland Empire Utilities Agency	55,358	59,502	63,917	61,450	66,750	
Las Virgenes Municipal Water District	22,543	23,527	24,554	25,626	26,744	
Long Beach, City of	21,452	20,719	20,264	19,918	19,945	
Los Angeles, City of	75,430	65,930	65,430	60,630	74,930	
Municipal Water District of Orange County	167,926	174,545	174,329	172,448	172,067	
Pasadena, City of	19,202	18,827	16,825	16,607	16,326	
San Diego County Water Authority	136,002	181,840	207,413	224,863	248,565	
San Fernando, City of	183	251	320	391	462	
San Marino, City of	1,199	1,199	1,199	1,199	1,199	
Santa Ana, City of	10,779	11,595	11,677	11,673	11,691	
Santa Monica, City of	0	0	28	108	186	
Three Valleys Municipal Water District	73,002	72,345	72,663	73,018	74,915	
Torrance, City of	7,303	7,825	8,360	8,910	9,474	
Upper San Gabriel Valley Municipal Water District	0	0	0	0	0	
West Basin Municipal Water District	91,812	68,709	71,466	74,033	76,129	
Western Municipal Water District of Riverside County	34,513	27,244	34,193	44,690	53,230	
<b>MWD SERVICE AREA TOTAL</b>		<b>1,039,239</b>	<b>1,051,117</b>	<b>1,104,412</b>	<b>1,140,631</b>	<b>1,205,505</b>

Data sources: 2015 UWMPs of local water agencies.

**TABLE A-14. TOTAL PROJECTED ANNUAL MWD PURCHASES (ACRE-FEET) BY MEMBER AGENCY FOR 2020–2040 UNDER A SINGLE-DRY-YEAR SCENARIO**

<b>Name</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>
Anaheim, City of	22,184	23,824	23,989	23,982	24,017
Beverly Hills, City of	9,659	8,041	8,125	8,211	8,299
Burbank, City of	14,194	12,083	11,811	11,393	11,203
Calleguas Municipal Water District	107,110	104,209	106,586	109,504	112,183
Central Basin Municipal Water District	65,028	62,230	60,805	58,628	58,335
Compton, City of	2,351	2,447	2,706	2,670	2,670
Eastern Municipal Water District	158,596	173,097	190,497	207,397	223,697
Foothill Municipal Water District	7,947	8,449	8,729	9,004	9,305
Fullerton, City of	9,612	11,692	11,900	11,892	11,935
Glendale, City of	26,222	26,222	26,222	26,222	26,222
Inland Empire Utilities Agency	69,752	69,752	69,752	69,752	69,752
Las Virgenes Municipal Water District	24,797	25,880	27,009	28,188	29,419
Long Beach, City of	35,100	35,100	35,100	35,100	35,100
Los Angeles, City	318,930	307,430	305,030	298,230	310,530
Municipal Water District of Orange County	213,101	225,215	220,921	216,374	215,549
Pasadena, City of	20,934	20,986	21,237	21,529	21,617
San Diego County Water Authority	263,340	264,740	263,340	260,680	258,720
San Fernando, City of	2,151	2,202	2,246	2,298	2,316
San Marino, City of	1,199	1,199	1,199	1,199	1,199
Santa Ana, City of	12,999	13,978	14,076	14,072	14,093
Santa Monica, City of	7,409	7,409	7,409	7,409	7,409
Three Valleys Municipal Water District	73,380	72,725	73,047	73,406	75,309
Torrance, City of	19,204	19,204	19,204	19,204	19,204
Upper San Gabriel Valley Municipal Water District	54,137	53,037	52,108	51,952	51,551
West Basin Municipal Water District	102,576	81,983	82,002	82,249	81,815
Western Municipal Water District of Riverside County	119,957	130,755	140,538	149,021	154,661
<b>MWD SERVICE AREA TOTAL</b>	<b>1,761,869</b>	<b>1,763,889</b>	<b>1,785,588</b>	<b>1,799,566</b>	<b>1,836,110</b>

Data sources: 2015 UWMPs of local water agencies.

**TABLE A-15. TOTAL PROJECTED ANNUAL MWD PURCHASES (ACRE-FEET) BY MEMBER AGENCY FOR 2020–2040 UNDER A MULTIPLE-DRY-YEARS SCENARIO**

Name	2020	2025	2030	2035	2040
Anaheim, City of	22,184	23,824	23,989	23,982	24,017
Beverly Hills, City of	9,659	8,041	8,125	8,211	8,299
Burbank, City of	14,194	12,423	12,136	11,694	11,484
Calleguas Municipal Water District	101,316	97,728	100,033	102,807	104,075
Central Basin Municipal Water District	62,875	65,248	63,546	61,519	60,835
Compton, City of	1,886	2,001	2,113	2,224	2,224
Eastern Municipal Water District	139,563	150,764	165,697	179,997	194,230
Foothill Municipal Water District	7,949	8,452	8,732	9,007	9,308
Fullerton, City of	9,612	11,692	11,900	11,892	11,935
Glendale, City of	26,222	26,222	26,222	26,222	26,222
Inland Empire Utilities Agency	69,752	69,752	69,752	69,752	70,035
Las Virgenes Municipal Water District	25,700	26,821	27,992	29,214	30,489
Long Beach, City of	35,100	35,100	35,100	35,100	35,100
Los Angeles, City of	317,630	306,130	303,630	296,830	309,230
Municipal Water District of Orange County	213,101	225,215	220,921	216,374	215,549
Pasadena, City of	20,934	20,986	21,237	21,529	21,617
San Diego County Water Authority	224,360	245,297	245,537	243,517	241,383
San Fernando, City of	2,151	2,202	2,246	2,298	2,316
San Marino, City of	1,199	1,199	1,199	1,199	1,199
Santa Ana, City of	12,999	13,978	14,076	14,072	14,093
Santa Monica, City of	7,409	7,409	7,409	7,409	7,409
Three Valleys Municipal Water District	71,681	74,212	74,340	74,703	76,312
Torrance, City of	19,204	19,204	19,204	19,204	19,204
Upper San Gabriel Valley Municipal Water District	52,064	55,043	54,088	53,777	53,424
West Basin Municipal Water District	85,000	84,868	84,888	85,140	84,697
Western Municipal Water District of Riverside County	119,957	130,755	140,538	149,021	154,661
<b>MWD SERVICE AREA TOTAL</b>	<b>1,673,701</b>	<b>1,724,565</b>	<b>1,744,650</b>	<b>1,756,694</b>	<b>1,789,348</b>

Data sources: 2015 UWMPs of local water agencies.

## METHODOLOGY

### DATA METRICS, SOURCES, AND CALCULATIONS

Our analysis relies primarily on the projected supply and demand data included in the Metropolitan Water District (MWD) of Southern California’s and its service area water agencies’ 2015 Urban Water Management Plans (UWMPs) for a year with average hydrologic conditions and for single and multiple dry years. The California Urban Water Management Planning Act of 1983 requires urban water agencies to complete a plan every five years.<sup>1</sup> The 2015 plans include projections of future water supplies (including both imported and local supplies) and water demand at five-year intervals for 2020–2040, among other information.<sup>2</sup> Since the MWD considers its Integrated Water Resources Plan (IRP) to be the most comprehensive planning process for ensuring long-term reliability, its 2015 UWMP is heavily based on its 2015 IRP Update.<sup>3</sup>

The California Department of Water Resources (DWR) maintains the Water Use Efficiency Data Tool (WUEdata) web page, which provides access to downloadable standardized Excel worksheets that compile the data reported by urban water agencies in their 2015 UWMPs.<sup>4</sup> Our analysis uses these Excel worksheets as explained in the table below. This web page also allows downloads of all urban water agencies’ 2015 UWMPs.



UWMPs represent the best available data for understanding water agencies' long-term planning. However, not all UWMPs use similar methods or analytical assumptions to generate their data. Any conclusions drawn from the results presented in our analysis should recognize these limitations. Additionally, while UWMPs help guide water agencies' long-term planning, capital improvement plans—which typically are developed in 5- or 10-year increments—are more discrete indicators of which projects water agencies intend to fund and construct in the near term. Detailed analysis of capital improvement plans was beyond the scope of this study.

<b>Data Metric</b>	<b>Description</b>	<b>Data Source</b>	<b>Calculation (one acre-foot = 325,851 gallons)</b>
Total Regional Water Demand	How much potable and nonpotable water will be used in the MWD service area	<b>MWD:</b> Table 2-3 (p. 2-12) of the MWD's 2015 UWMP <b>Water Agencies:</b> Table 4-3 from DWR's WUEdata web page; 2015 UWMPs	<b>MWD:</b> None <b>Water Agencies:</b> Sum of MWD member agencies' projected water demand <b>Note:</b> Some wholesale member agencies, including Upper San Gabriel Valley Municipal Water District, report only wholesale water demands in Table 4-3. Similarly, some water agencies that provide retail and wholesale supplies, including Eastern Municipal Water District, report only retail water demands and do not include service area water demands. For these agencies, projections of total service area demands are determined by reviewing and totaling demand projections from their retail agencies' UWMPs.
Total Population	Number of people living within the MWD service area	<b>MWD:</b> Table A.1-2 (p. A.1-9) from the MWD's 2015 UWMP <b>Water Agencies:</b> Table 3-1 from DWR's WUEdata web page	<b>MWD:</b> None <b>Water Agencies:</b> Sum of MWD member agencies' projected population after member agencies' population aggregated by county.
Total Regional Per Capita Demand	How much potable and nonpotable water will be used per person in the MWD service area	<b>MWD:</b> Total Regional Water Demand; Total Population; Table A.1-6 (p. A.1-11) of the MWD's 2015 UWMP for Retail M&I Demand by County <b>Water Agencies:</b> Total Regional Water Demand; Total Population	<b>MWD:</b> Total Regional Water Demand * 325,851/Total Population/365 <b>Water Agencies:</b> Total Regional Water Demand * 325,851/Total Population/365
Total Per Capita Demand by County	How much potable and nonpotable water will be used in the MWD service area by county	<b>MWD:</b> Table A.1-6 (p. A.1-11) of the MWD's 2015 UWMP for Retail M&I Demand by County; Total Population; Seawater Barrier and Storage Replenishment Demand from Table 2-3 (p. 2-12) of the MWD's 2015 UWMP <b>Water Agencies:</b> Total Regional Water Demand; Total Population	<b>MWD:</b> (Total Retail M&I Demand by County * 325,851/Population by County/365) + ((Seawater Barrier + Storage Replenishment Demand) * 325,851/Total Population/365) <b>Water Agencies:</b> Total County Water Demand * 325,851/Total County Population/365 <b>Note:</b> Since the MWD does not report total demands at the county level, the MWD per capita demand forecasts assume that non-retail demands (e.g., seawater intrusion, replenishment) are allocated evenly across all member agencies.
Total Local Water Supplies	How much water supply is available from groundwater, groundwater recovery, surface water, Los Angeles Aqueduct, seawater desalination, recycling, other imported supplies (i.e., Imperial Irrigation District–San Diego County Water Authority Transfer & Canal Linings)	<b>MWD:</b> Table 2-3 (p. 2-12) of the MWD's 2015 UWMP <b>Water Agencies:</b> Table 6-9 from DWR's WUEdata web page; 2015 UWMPs	<b>MWD:</b> None <b>Water Agencies:</b> Sum of MWD member agencies' projected local water supplies. <b>Note:</b> Some wholesale agencies, including Central Basin Municipal Water District and Inland Empire Utilities Agency, report all regional supplies either in Table 6-9 or elsewhere in their UWMP, whereas other wholesalers and agencies that provide retail and wholesale supplies, including Municipal Water District of Orange County and Upper San Gabriel Valley Municipal Water District, only include projections of water supplies that they produce and/or provide. In the latter case, projections for local supplies are derived by examining the UWMPs of these wholesale member agencies' retailers to determine local supply projections for the entire service area. Additionally, our analysis classifies the use of stormwater capture and recycled water for groundwater recharge as groundwater supplies and not as separate water supply sources.

Total MWD Water Purchases/Sales (Average Year)	How much imported water is purchased by member agencies from the MWD for a year with hydrological conditions that resemble the historical average	<b>MWD:</b> Table 2-3 (p. 2-12) of the MWD's 2015 UWMP <b>Water Agencies:</b> Table 6-9 from DWR's WUEdata web page; 2015 UWMPs	<b>MWD:</b> None <b>Water Agencies:</b> Sum of MWD member agencies' projected MWD purchases <b>Note:</b> Many member agencies only report MWD supplies <i>available</i> for them to purchase in their UWMPs, whereas other member agencies separately report <i>intended purchases</i> from the MWD. For example, Calleguas Municipal Water District's 2015 UWMP includes anticipated annual imported water purchases from the MWD in Table 4-2, which are less than the "reasonably available volume" of water available from the MWD reported in Table 6-9. <sup>5</sup>
Total MWD Water Purchases/Sales (Average Year—Adjusted)	How much imported water is purchased by member agencies from the MWD for a year with hydrological conditions that resemble the historical average if all local water supplies within a member agency's service area are used before MWD purchases are made	<b>MWD:</b> None <b>Water Agencies:</b> Total Regional Water Demands; Total Local Water Supplies	<b>MWD:</b> None <b>Water Agencies:</b> Member agencies' total water demands—total local supplies <b>Note:</b> Adjusted projections for MWD purchases assume that member agencies whose projections of total water supplies exceed demands are able to fully utilize local supplies before making MWD purchases. This scenario is likely overly optimistic as there are logistical and operational challenges that would prohibit retail water agencies within a wholesaler's service area from selling/distributing their local water supplies to other retailers.
Projected MWD Water Sales—Single Dry Year	How much imported water is purchased by member agencies from the MWD if conditions similar to the historically driest year occur	<b>MWD:</b> Table 2-1 (p. 2-10) of the MWD's 2015 UWMP <b>Water Agencies:</b> 2015 UWMPs	<b>MWD:</b> None <b>Water Agencies:</b> Values are from the supply reliability sections of member agencies' UWMPs. Some member agencies, like the City of Beverly Hills and Central Basin Municipal Water District, include detailed projections of availability by supply type including imported water, whereas other agencies, such as the City of Fullerton and West Basin Municipal Water District, only include total demand and supply values. For the latter, it is assumed that any increase in demand over average-year demand is met by imported water supplies.
Projected MWD Water Sales—Multiple Dry Years	How much imported water is purchased by member agencies from the MWD if conditions similar to the historically driest three-year period occur	<b>MWD:</b> Table 2-2 (p. 2-11) of the MWD's 2015 UWMP <b>Water Agencies:</b> 2015 UWMPs	<b>MWD:</b> None <b>Water Agencies:</b> Values are from the supply reliability sections of member agencies' UWMPs. Some member agencies, like the City of Beverly Hills and Central Basin Municipal Water District, include detailed projections of availability by supply type including imported water, whereas other agencies, such as the City of Fullerton and West Basin Municipal Water District, only include total demand and supply values. For the latter, it is assumed that any increase in demand over average-year demand is met by imported water supplies.

Note: Demand projections include water conservation savings from the Water Conservation Act of 2009 (SBx7-7), which mandates a 20 percent reduction in per capita water use by 2020, and from other related efficiency policies. But they do not include additional savings that will result from the implementation of water efficiency standards and targets under Executive Order B-37-16.<sup>6</sup>

Several retail water agencies, such as the Cucamonga Valley Water District, which purchases water from the Inland Empire Utilities Agency, include supply and demand projections only through 2035. For these agencies, projections for 2035 are carried forward to 2040. Additionally, Rancho California Water District purchases water from both Eastern Municipal Water District and Western Municipal Water District of Riverside County. To prevent double counting, its projected local water supplies and demands are allocated to the wholesale water agencies according to the proportion of total imported water supplies historically provided by each agency.<sup>7</sup>

ENDNOTES

- 1 Cal. Water Code § 10610 et seq.
- 2 While water agencies are required to provide estimates only for the next 20 years, many include projections for a 25-year period. Cal. Water Code § 10630-10634.
- 3 Metropolitan Water District of Southern California, *2015 Urban Water Management Plan*, 2016, ES-1, [www.mwdh2o.com/PDF\\_About\\_Your\\_Water/2.4.2\\_Regional\\_Urban\\_Water\\_Management\\_Plan.pdf](http://www.mwdh2o.com/PDF_About_Your_Water/2.4.2_Regional_Urban_Water_Management_Plan.pdf).
- 4 California Department of Water Resources, “WUEdata—Submitted 2015 Urban Water Management Plans (UWMP) Data Exports,” [wuedata.water.ca.gov/uwmp\\_export.asp](http://wuedata.water.ca.gov/uwmp_export.asp).
- 5 Calleguas Municipal Water District, *2015 Urban Water Management Plan – Final, 2016*, 4-3 and 6-14, [wuedata.water.ca.gov/public/uwmp\\_attachments/4778577506/cmwdfinal2015uwmp.pdf](http://wuedata.water.ca.gov/public/uwmp_attachments/4778577506/cmwdfinal2015uwmp.pdf).
- 6 Executive Order B-37-16 (2016) directs state agencies to develop and implement a long-term conservation framework that increases urban and agricultural water efficiency and makes “water conservation a way of life.” See California Department of Water Resources, “Water Use Efficiency: Making Water Conservation a California Way of Life,” last modified June 2017, [www.water.ca.gov/wateruseefficiency/conservation/](http://www.water.ca.gov/wateruseefficiency/conservation/).
- 7 According to Table 6-2, historically 62 percent of total imported water supplies have come from Eastern Municipal Water District and 38 percent have come from Western Municipal Water District of Riverside County. See Rancho California Water District, *2015 Urban Water Management Plan*, 2016, p. 87, [www.ranchowater.com/DocumentCenter/View/2023](http://www.ranchowater.com/DocumentCenter/View/2023).