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# Future-Proof Water for Silicon Valley

## A landscape analysis of water supply and opportunities for resilience

**SPUR White Paper**

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# Summary

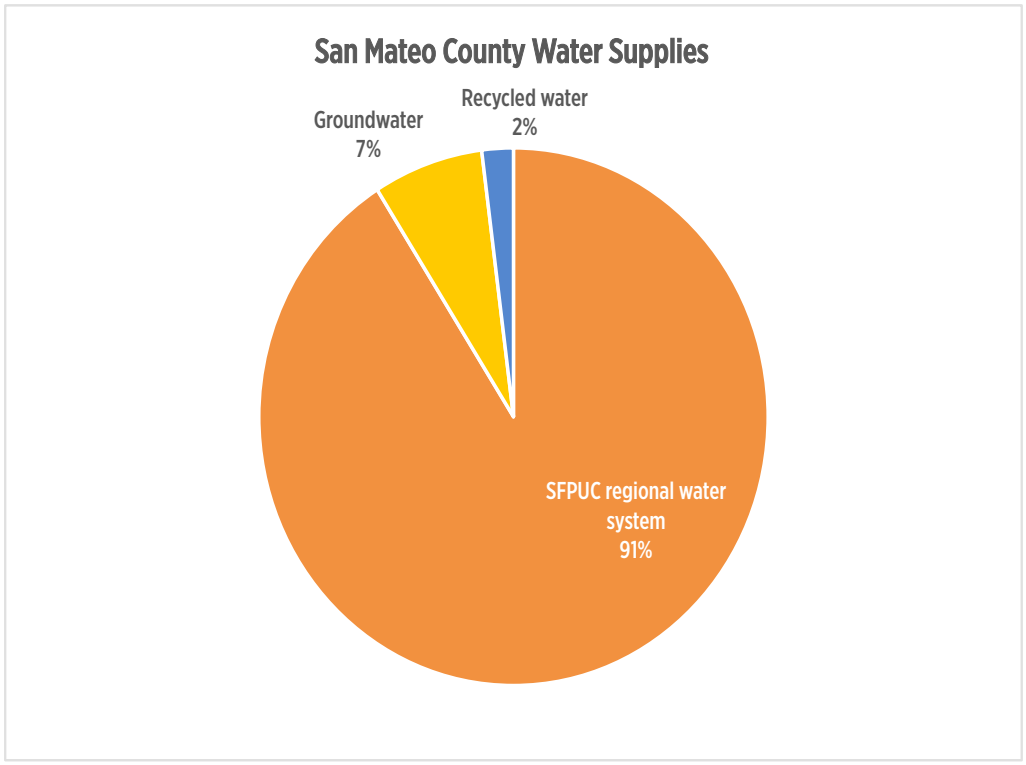
Silicon Valley's historically reliable water supply has been an asset essential to its growth. But the last four years of severe drought have revealed the region's dependence on statewide water availability, raised public awareness of water supply challenges, and heightened interest in resilience. Today, key water leaders and observers in the region see sustained conservation and water recycling as the best sources for building water supply, especially in light of the potential threats of continued drought and escalating climate change. There are many potential pathways to meeting future water needs; likely the region will need a multi-pronged strategy that matches appropriate sources to different uses. The main challenges will be identifying cost-effective choices, assigning responsibilities to pay for new source development or more conservation, and clarifying or changing regulations to permit innovation and attract investment.

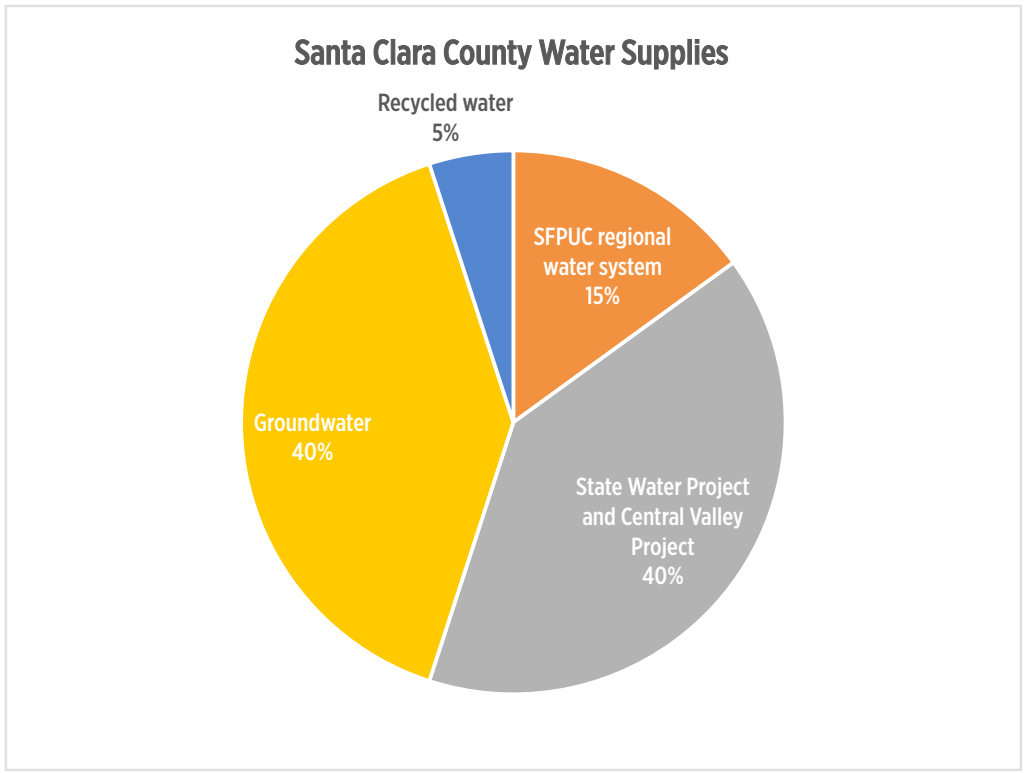
# About This Study

This study was undertaken by SPUR between January and March 2016 with support from Silicon Valley Community Foundation (SVCF). Our methods included reviewing and updating, for San Mateo and Santa Clara counties, the population, employment and water supply data used in our 2013 Bay Area-wide report *Future-Proof Water*. We also conducted telephone interviews with 20 stakeholders to understand how the drought may have affected Silicon Valley communities and what leaders believe about the future of water for San Mateo and Santa Clara counties. This report presents an analysis of these data and comments and concludes by highlighting potential areas of interest for future research and partnerships.

# Water in Silicon Valley Today

For the most part, San Mateo and Santa Clara counties have enjoyed a high-quality and reliable supply of water for decades. The two counties' supplies include water conveyed through the Sacramento-San Joaquin Delta, the Hetch Hetchy aqueduct, local groundwater and surface water and recycled water. (Figure 1 below identifies sources by county.) Over time, the region has made big investments to secure reliable water for its growing population — and reinvested to protect them for the future. Beginning in 2008, San Mateo County water suppliers have participated in the $5 billion earthquake retrofit of the Hetch Hetchy system, and in the late 1990s, Santa Clara County invested in Central Valley water banks to store water for dry years. These investments — along with those made in conservation, groundwater protection, recycled water and more — have helped Silicon Valley weather the last four years of drought, the worst ever experienced in California.




Sources: Bay Area Water Supply and Conservation Agency, Santa Clara Valley Water District

FIGURE 1.

**Sources of Water Supply in San Mateo and Santa Clara Counties**

Over 90 percent of San Mateo County's water is supplied by San Francisco through the San Francisco Public Utilities Commission's Hetch Hetchy Regional Water System. Santa Clara County enjoys one of the most diverse water supply portfolios in the entire Bay Area, with near-equal dependence on imported and local water supplies.

Each source of water supply in the region today varies in how available it is during dry years, what it can be used for and the tradeoffs associated with its use. For example, some supplies conveyed through the Delta via the State Water Project and the Central Valley Project — a significant source of supply for Santa Clara County — were reduced to zero in the last few years of drought. And the growing risk of a large earthquake is a special vulnerability for the Delta, which supports water supplies for over 25 million people in the Bay Area, the Central Valley and Southern California. The Delta conveys water through more than 1,000 miles of unengineered dirt levees. A major rupture in these berms could allow saltwater into the water supply intakes and compromise water quality delivered to the Bay Area and beyond for a year or more. As another example, recycled water — even when it is highly purified — is not yet permitted for drinking in California.

There are more than 30 public and private water utilities that serve the Silicon Valley region, each with a different portfolio of water supplies. Due to especially diverse or historically reliable sources, some are more drought-resilient than others. For example, communities that buy water from the San Francisco Public Utilities Commission — such as most San Mateo County cities — have enjoyed the buffer from drought that the SFPUC's Hetch Hetchy Regional Water System has provided. Rural communities reliant on groundwater — such as Gilroy, Morgan Hill and other parts of southern Santa Clara County — have faced greater difficulties in the ongoing drought. The drought's impact has been felt even more acutely where the quality and availability of groundwater are low or unknown, such as in Pescadero and along the southern coastside of San Mateo County.

Water utilities, which conduct long-term planning and create 25-year water supply plans every five years, have long been aware of the need to diversify sources of supply (including conservation) and add local sources to ensure reliability and accommodate growth. As a result, most of the growth in water demand expected in Silicon Valley through 2035 — which is almost all urban — can be accommodated with existing and planned supplies, including sustained conservation, in historically normal water years. (See Appendix on page 8.) In dry years, and in parts of the region that are expecting to grow more quickly than others, supply may not meet demand in about 15 years without additional action. To meet these pressing needs, planning is underway to develop local groundwater (such as in East Palo Alto) and to extend recycled water and potable reuse (such as in Santa Clara County). Now, water utilities have the attention of the public to support some of these efforts like never before. And advocates in the region are seizing the moment to push for public and private investment in water reuse.

# Silicon Valley and Drought

For most people in San Mateo and Santa Clara counties, the impacts of California's extreme four-year drought have not been as severe as predicted — or remain to be seen. Impacts have been felt more severely in the counties' rural and agricultural communities and have been most apparent in its natural landscapes and ecosystems, especially forests.

Most urban and suburban dwellers in Silicon Valley experienced the drought as a nuisance and not as a severe economic impact. Residents did not like taking shorter showers and having brown lawns, but most people's lives were not significantly disrupted. Few, if any, taps ran dry or dirty; the cutbacks of 20 to 30 percent across the region were implemented in a progressive way, with the biggest restrictions accruing to the biggest users; and fines were handed down only to water wasters. The ease with which these targets were met — the two counties reduced water use an average of 27 percent between 2013 and 2015 — suggests that a significant number of urban water users in the region can reduce their usage when they try. A notable exception is in rural and agricultural communities in parts of south Santa Clara county and on the southern coastside of San Mateo County. Here users had to let fields go fallow or contract for water to be trucked in.

These communities need better water storage and banking solutions if their agricultural economic base is to be sustained during long-term or severe droughts.

The success of water conservation during this historic drought has mixed the signals about how much new supply truly needs to be developed to meet future needs. The savings achieved over the last few years exceeded expectations set in previous droughts, supporting the idea that a significant amount of urban water use in the counties may be discretionary. A sustained investment in conservation or demand management could forestall the need to build new facilities currently called for in long-term plans. As SPUR has written before, conservation is always a more sustainable, and almost always more cost-effective, approach to meeting future water needs than any form of new water supply development. Experts in the region believe that conservation potential is still not exhausted, especially in the commercial, retail, industrial, and institutional sectors.

And it may not be too difficult to sell: Experts think that current levels of restrictions and water savings will probably not be sustained voluntarily, but that water use may not return to pre-drought levels for many years, and some savings will persist. In other words, people are now used to conserving more than in the past, and cultural norms have shifted toward mindful use and less outdoor watering. Somewhere between 0 and 27 percent savings is likely to stick. Per capita water use may remain flat or even continue to decline as it has for over 30 years. This makes it hard to plan for the development of new supplies (and difficult to make the case that they are needed), because the scale and timing of the need is fuzzier.

But if new supplies must be found despite sustained conservation, especially beyond 30 years from now, water stakeholders in Silicon Valley believe it should be sourced from water reuse, recycling, better capture of stormwater, and more conjunctive and managed use of groundwater. In other words, after conservation potential is exhausted, new water supplies should be obtained through reuse and better management of locally available supplies. The South Bay should be doing these things in any case, they argue, to bolster reliability and local control of water sources. There is widespread agreement that it will be expensive if not impossible to find new water to import to the Bay Area through the Sacramento-San Joaquin Delta. And there is significant momentum in the Bay Area for recycled water, for three reasons:

1. Stricter rules on wastewater discharges to San Francisco Bay are forcing utilities to seek alternative ways to dispose of treated wastewater.
2. A new purification facility in Santa Clara County — the first of its kind in Northern California — has demonstrated the viability of advanced purification to treat waste into drinkable water.
3. New permitting processes and requirements for water reuse at the building and district level are being demonstrated, and gaining popularity, in San Francisco.

But three barriers remain. First, the state does not currently permit even highly treated wastewater to be directly placed into drinking water systems. It is possible that these rules will change within the next few years, and continued success demonstrated at the Santa Clara County purification facility may help. Second, water stakeholders do not agree about how to plan for recycled or reused water facilities — or whose responsibility it is to pay for them. Some believe all new development, particularly large corporate campus-type developments, should include onsite water treatment systems. Others think that utilities should develop more centralized facilities to supply recycled water at scale. Some support moving straight to potable reuse, to save costs in recreating a distribution network for recycled (nonpotable) water, also known as “purple pipe.” Others believe it is unnecessary to treat all water to potable standards and we should match water

quality to water needs: For example, landscapes and cooling towers do not need to have the highest quality water. Third, if recycled water, especially of the highly purified sort, is expensive relative to other local and imported sources, people may be unwilling to pay for it and smaller utilities in particular may not be able to afford it on their own.

Likely, Silicon Valley will need many of these types of recycled water in the long run. But more information is needed to support decisions, especially for those smaller utilities who may not have the resources to study the benefits and costs of the many ways to invest in recycled water, and who may significantly benefit from a regionally coordinated approach. Some kinds of information that could be useful include: a demand study for recycled water by city, by county, in areas near either a recycled water network or a concentration of wastewater resources, or even the entire Silicon Valley region; cost profiles of indirect potable reuse vs. direct potable reuse water projects and centralized vs. decentralized approaches; and a regulatory review and clarification of health and water-quality monitoring requirements for those projects that wish to voluntarily implement onsite reuse.

The silver lining of the drought is that people are more aware than ever of the preciousness and value of water. People are eager to see green space again, and could be compelled to take collective action to protect it for the future if presented with opportunities. It is a good time to convince people to make investments in conservation and in building alternative supplies such as recycled water. Some water agencies in San Mateo County that have historically been uninterested in investing in water are now ready to move forward.

## Ten Ways to Advance Sustainability in Silicon Valley Water Systems and Supplies

Based on data analysis and interviews, the following ideas stand out as worth further study and consideration:

1. **Evaluate existing commercial and retail conservation potential**, engage the business sector, develop appropriate and regular audit requirements, and support direct install programs for small business. The region's commercial and retail sectors (e.g., small businesses, restaurants, malls, and older corporate campuses that were built before water-efficient new building codes) may have significant conservation potential, meanwhile their retrofit rate is perceived to be poor, and there is no compulsory retrofitting schedule as in San Francisco. The Bay Area, or just the South Bay, could undertake a regional census and implementation of retrofit-on-resale rules like San Francisco has.
2. **Support lose-your-lawn programs** and other, more-expensive landscape rebates and remove their tax liability. These rebates have been extremely popular, and need more support, but currently rebate values are federally taxable. Some water utilities and advocacy groups are pushing to change these rules.
3. **Advance the regional conversation about recycled water** by conducting a demand study that includes cost information about various scenarios of centralization and levels of treatment. With more support to sort out costs, clarify rules, and identify funding models, Silicon Valley can realize its ambition to get its next increment of water supply from recycled and reused water (after conservation). This would have a host of co-benefits, such as reducing reliance on imported water and improving the water quality in San Francisco Bay.
4. **Understand the potential contribution of stormwater capture and reuse** to the region's water supply portfolio. The potential for urban stormwater capture as a water supply is unknown in the Bay Area, but it is a significant piece of other dry cities'

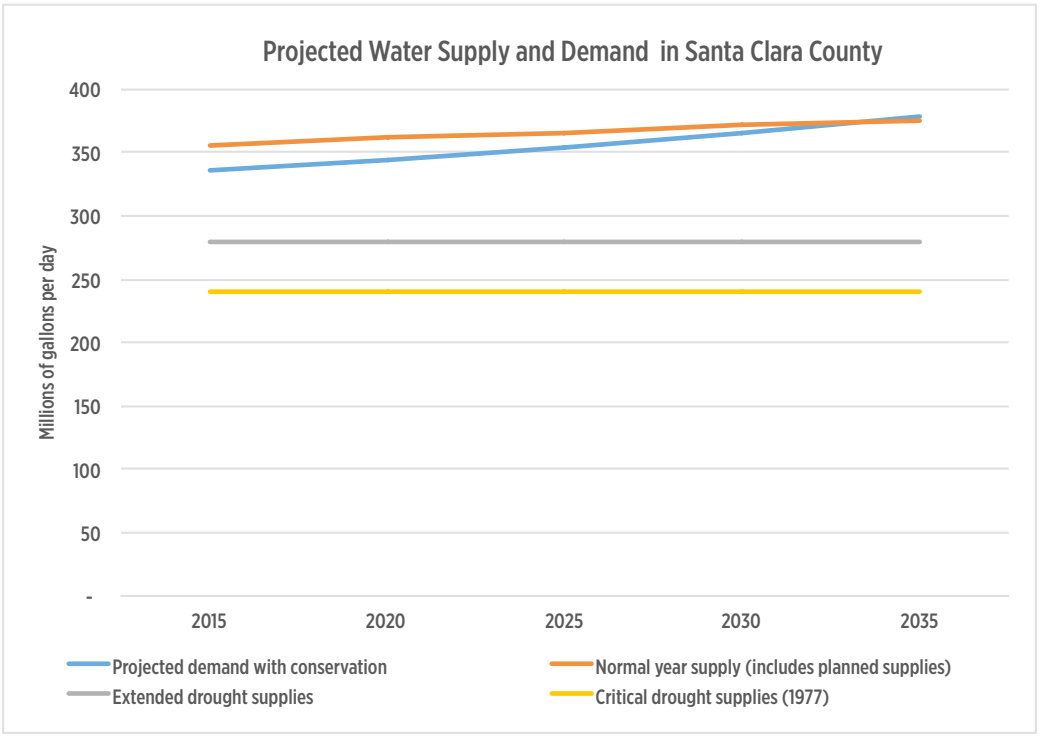
future water portfolios. For example, the City of Los Angeles' 2015 Stormwater Capture Master Plan aims to quadruple intentional rainwater capture on public and private land over the next 20 years. There would be many resilience co-benefits to Bay Area cities if stormwater capture were better prioritized in transportation projects and master plans and on private land. This is also true in rural areas: Better land conservation and ecological land management practices can be one way to increase groundwater recharge. Better soil management in agriculture (and in the application of compost and other organic matter) can hugely sustain riparian resources, while contributing climate and water quality co-benefits.

5. **Develop a coordinated countywide groundwater management plan in San Mateo County.** The lack of a single, clear entity to manage and govern water resources could leave San Mateo County vulnerable to missing opportunities to improve resource planning or attract resources for bigger projects from outside sources. San Mateo County's current situation is very unusual within the Bay Area. Some basins are managed very intensively, while the quality and availability of some (such as those on the coast side) are completely unknown. Unlike Santa Clara County or San Francisco, which have a single water district that oversees all water resources, San Mateo County has no such entity. As a result, it is up to individual utilities and communities to figure out water supplies and build them. In the spring of 2016, San Mateo County launched a two-year resource assessment and planning process for the San Mateo Plain groundwater basin, which has not been actively managed historically. With increasing interest by water suppliers to use more groundwater in the future, this is an encouraging start to a countywide strategy that considers the needs of multiple stakeholders and creates a sustainable plan.
6. **Support innovation and high efficiency in new development.** New development needs to be as water-efficient as possible and should be incentivized to try new technologies such as onsite capture, treatment and reuse. This presents a particular opportunity for campus-type developments. Innovation could be fostered by tying water efficiency and re-use requirements to development agreements, master plans, specific plans, and precise plans.
7. **Help East Palo Alto obtain an ample supply of water to support the housing it wants to build.** Of all the communities on the Peninsula that buy water from the SFPUC, only East Palo Alto has an allocation that will be too low for the city in the near future. As described above, East Palo Alto is the one urban community that is immediately seeking to build new supplies by opening up two new wells to tap groundwater. Many believe it is the only place in Silicon Valley that is truly "running out of water." But neighboring cities such as Palo Alto and Menlo Park, which receive ample allocations from the SFPUC that they do not fully use, could sell their surplus water to East Palo Alto without losing contractual rights.
8. **Align messaging on drought restrictions and other water education information.** For example, in San Jose, water districts that received different drought restrictions got together and decided to invest in a single, unified conservation message that would be clear to everyone. This idea could be scaled up to a regional educational campaign. A high degree of uniformity of requirements is best for residents and businesses.
9. **Reform Proposition 218.** This 1996 voter initiative made many changes to the ways local governments can raise and use taxes and fees. Prop. 218 is believed to make it harder for utilities to adopt conservation-based tiered pricing and to adopt stormwater

fees to pay for better management of this historically unpriced resource (though it has not been put to the test very effectively). By limiting the extent to which classes of ratepayers can cross-subsidize each other, it also has made it harder for utilities to adopt "lifeline" rates, i.e., lower rates for low-income customers. Reforming this law could help Silicon Valley utilities offer even more progressive water and wastewater rates that could help pay the costs of moving to a more sustainable water system.

10. **Invest in additional climate change research.** There is uncertainty and concern about the effects of climate change on water supplies, both local and imported. Water managers need to better understand the projected magnitude of change on their supplies in order to know what to do. SFPUC did work on this years ago, but nobody has updated it recently; long-term structural drought has taken a back seat to immediate severe drought and meeting conservation targets. Besides rainfall and snowpack impacts, both counties need better understanding of the impacts and remedies of saltwater intrusion into aquifers, which could occur under conditions of increased groundwater pumping and sea level rise.

# Appendix



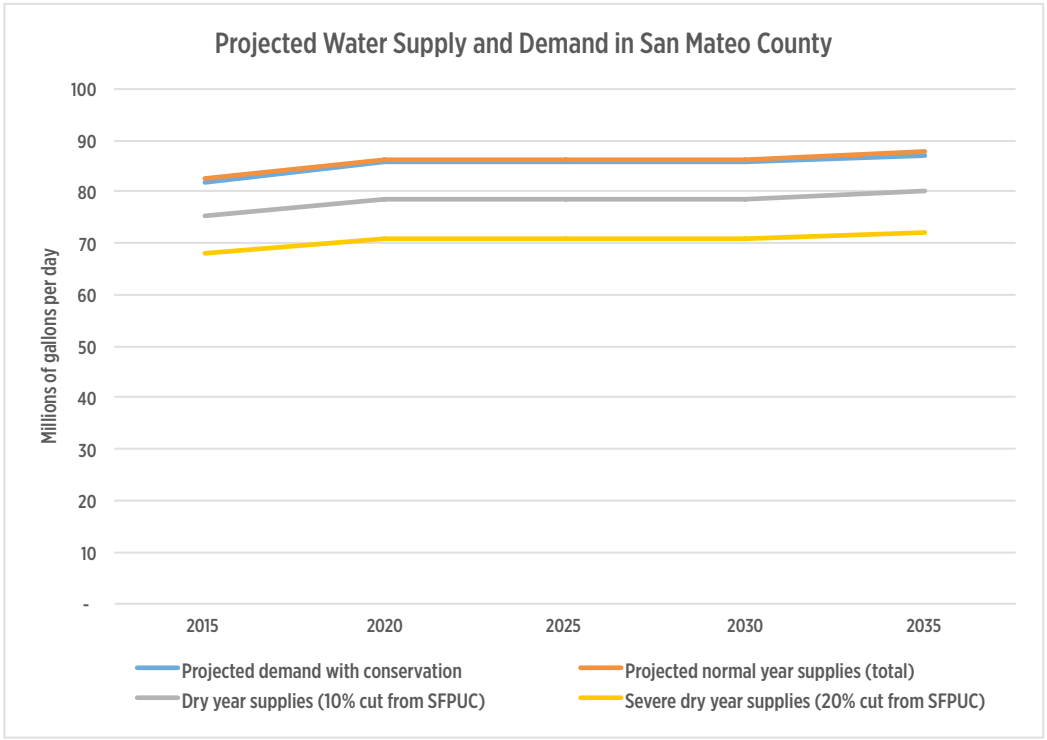




FIGURE 2.

**2015 Water Supply and Demand Projections**

**In millions of gallons per day**

San Mateo County projections include only those utilities who are members of Bay Area Water Supply and Conservation Agency, the entities that by definition receive some (but not all) water supplies from the San Francisco Public Utilities Commission.