Valley Water

Fiscal Year 2020-21

Monitoring and Assessment Program Report

Water Supply Master Plan 2040

SANTA CLARA VALLEY WATER DISTRICT

WATER SUPPLY MASTER PLAN 2040

2020 MONITORING AND ASSESSMENT PROGRAM REPORT

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1.0 INTRODUCTION

The Water Supply Master Plan 2040 (Master Plan) is Santa Clara Valley Water District's (Valley Water) strategy for providing a reliable and sustainable water supply in a cost-effective manner consistent with Board Policy E-2.1 "There is a reliable, clean water supply for current and future generations". The Master Plan was adopted by the Board of Directors (Board) in November 2019 and informs investment decisions by describing the type and level of water supply investments Valley Water is planning to make through 2040, the anticipated implementation schedule, and the associated costs and benefits. This is an on-going process; therefore, a critical piece of the Master Plan is the annual Monitoring and Assessment Plan (MAP).

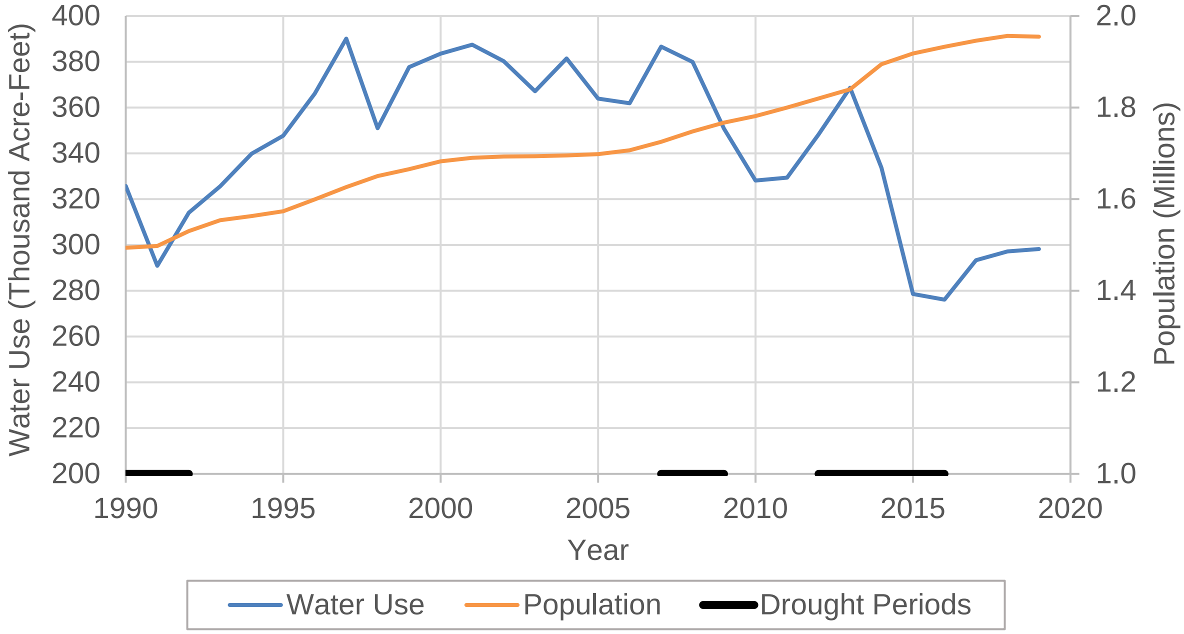
The MAP provides updated information on demands, supplies, and the status of projects and programs identified in the Master Plan to inform the annual water rate-setting process, Capital Improvement Program (CIP), and budget processes. The update gives the Board an opportunity to adjust the Master Plan in response to changing conditions. Such adjustments could include, but are not limited to, accelerating or delaying projects due to changes in the demand trend, changing projects due to project feasibility or implementation challenges, and adding projects due to lower than expected supply trends. The MAP allows Valley Water to continuously assess its current water supplies, current and forecasted demands, implementation of Master Plan projects, and mitigation measures if milestones are not met. MAP helps ensure Valley Water is effectively and efficiently implementing the Master Plan and includes a report to the Board at least annually.

2.0 EXISTING CONDITIONS

Valley Water operates an integrated water supply system based on the conjunctive management and use of surface water and groundwater resources to maximize water use efficiency and meet demands in Santa Clara County. Valley Water supplies include water captured in local reservoirs, water imported from the Central Valley Project (CVP) and State Water Project (SWP), natural groundwater recharge, recycled and purified water, and water conservation and demand management activities. These supplies are augmented with San Francisco Public Utilities Commission (SFPUC) water and other local water captured and treated by local water retailers. Currently, Valley Water maintains and operates 10 dams, 17 miles of raw surface water canals, five water supply diversion dams, 393 acres of groundwater recharge ponds, 91 miles of controlled in-stream recharge, 142 miles of pipelines, three drinking water treatment plants, one advanced water purification center, and three pump stations.

Since the 2012-2016 drought, annual average water use in Santa Clara County has been approximately 300,000 acre-feet per year (AFY). This water includes domestic, municipal, industrial, and agricultural use. Valley Water estimates that water demand would be approximately 75,000 AF higher in 2019 if not for the combined efforts of Valley Water, water retailers, the state of California, and the community to conserve water. Because of Valley Water's investments in water conservation since 1992, water use in the county has remained relatively consistent despite a 25 percent increase in population over the same period (Figure 1). The various significant decreases in water use are associated with the extended droughts of 1987 to 1992, 2007 to 2010, and 2012 to 2016. The 2007-2010 drought also occurred during an economic recession, which can also depress water use.

Figure 1 Historic Water Use and Population in Santa Clara County



To accurately evaluate future needs, Valley Water needs to maintain an accurate understanding of its current water supply system. Since the Master Plan was adopted, staff worked with internal and external stakeholders to ensure the interpretation and analysis of the existing system is complete and up-to-date. For example, staff reviewed physical characteristics and operational rules of the imported water system, local reservoirs, and Valley Water's groundwater sub-basins. In addition, staff worked with a consultant to refine Valley Water's understanding of the cost of shortage and the impacts of the recent 2012-2016 drought (Appendix A). For more detailed information on the existing water supply system, please refer to the Master Plan (available on valleywater.org).

3.0 FUTURE CONDITIONS

To maintain Valley Water's water supply reliability into the future, the Master Plan defines a new level of service goal, provides an investment strategy, and recommends water supply projects that achieve the investment strategy and level of service goal. Valley Water's level of service goal is to "develop water supplies designed to meet at least 100 percent of average annual water demand identified in Valley Water's Water Supply Master Plan during non-drought years and at least 80 percent of average annual water demand in drought years." To ensure Valley Water achieves its level of service goal, the Master Plan recommends the following strategy:

1) Secure existing supplies and infrastructure
2) Expand water conservation and reuse
3) Optimize the use of existing supplies and infrastructure

Valley Water staff partner with internal and external stakeholders to ensure staff maintain an accurate understanding of the existing system and water demands, participate in the development of new water supply projects (Appendix B), and fully evaluate which investments are needed to meet Valley Water's level of service goal. Below is a summary of that work, including a discussion of the new demand forecasts, the status of Master Plan recommended projects, and an evaluation of projects identified that best achieve the Master Plan investment strategy summarized above.

3.1 Forecasted Water Demands

A reliable water demand forecast is needed to determine the level of investment necessary to meet Valley Water's level of service goal. The demand forecasts in the Master Plan were developed in 2016 with the best available data and assumed a rebound to pre-drought water use. Since 2016, the drought rebound has been significantly less than forecasted; in addition, more water use data and new housing and economic development forecasts have become available (e.g., Plan Bay Area). These factors warranted the development of a new Valley Water Demand Model. After a competitive bidding process, Valley Water contracted with Hazen and Sawyer (Consultant) to develop a new demand model. The new demand model provides forecasted demands in 5-year increments out to 2045 to meet our current planning needs.

To support the Consultant in developing the model, Valley Water collected monthly sectoral water use data from local water retailers for 2000-2019 (although certain water retailers did not have data back to 2000) and groundwater pumping data for Valley Water's independent pumpers (i.e., non-retailer well owners). In addition, the Consultant collected historic data on temperature, precipitation, water rates, water shortage restrictions, economic information, and housing information from Valley Water and its water retailers, the US Census, Federal Reserve, and California Department of Finance (CDOF). The historic data were used to determine the relationship between water use and forecasting variables, including housing information, median income, economic information, water rates, drought restrictions and weather. Demand forecasts were then developed using the projected forecasting variables with information from the Association of Bay Area Governments (ABAG), CDOF, and PRISM (provides data on climate projections).

The Demand Model is used to evaluate potential future scenarios by adjusting the forecasting variables. This supports Valley Water's efforts to understand the uncertainty related to water demand forecasts. Recommended demand forecasts for planning evaluations, such as the MAP, focus on using forecasting variable information from regional and state agencies, such as ABAG and CDOF (Table 1).

Table 1 Forecasting Variables Used in the Demand Model

Forecasting Variable	Source
Water rates (by retailer and groundwater zone, inflation adjusted)	Valley Water
Drought Restrictions	Valley Water and retailers
Median income	US Census
Economic indices (e.g., unemployment)	Federal Reserve, Economic Cycle Research Institute (ECRI)
Housing density	Derived from US Census and CDOF
Persons per household	Derived from US Census and CDOF
Housing Units	ABAG
Sectoral employment	ABAG
Weather (temperature and precipitation	Prism

An important modeling assumption in forecasting water demand is related to defining a drought rebound. Valley Water experienced a small rebound in 2017 and since then demands have remained relatively stable through 2018 and 2019. Therefore, the rebound has been relatively muted. Valley Water and the Consultant developed two demand scenarios to consider the range of drought rebounds that could be realistically achieved:

1) No continued demand rebound beyond 2019
2) 50% rebound to pre-drought water use by 2025 and then no further rebound

The new demand forecasts include the planned water conservation goal of 110,000 AF by 2040, with a 1992 baseline. Valley Water currently saves approximately 75,000 AFY through its water conservation program. Modeling of our current programs and implementation of existing regulations (referred to as passive water conservation measures) indicates Valley Water should achieve 99,000 AF by 2030. The additional 11,000 AF is forecasted to occur between 2030 and 2040.

Assuming no continued drought rebound (scenario 1), planned water conservation is forecasted to mitigate increases in water demands with a forecasted 2040 demand of approximately 290,000 AF (Figure 2). Alternatively, assuming a 50% drought rebound by 2025 (scenario 2) translates to a 13% increase (approximately 40,000 AF) in demands by 2025 and results in a 2040 demand forecast of approximately 335,000 AF (Figure 2). In comparison, the Master Plan demand forecast developed in 2016 was 389,000 AF. The new demand model forecasts compared to the Master Plan are approximately 55,000-100,000 AF lower in 2040 than the forecast in the Master Plan (Table 2). The new demand model improved Valley Water's demand forecasting to more accurately reflect expected drought rebound, integrate new water use data, and integrate new growth forecasts.

While water conservation has mitigated the impacts of growth over the past decade (Figure 1), demand rebounds have also occurred historically. However, the drought rebound thus far has been limited for Valley Water and most peer agencies. Therefore, the 50% drought rebound scenario and the modeled growth through 2040 integrate the understanding of historic water use trends and drought rebound. The 50% drought rebound scenario is likely a conservative (i.e., minimizes risk of under-predicting demand) but realistic outlook for demand rebound. Therefore, Valley Water uses the 50% drought rebound scenario for the MAP evaluation.

Figure 2 Historic and Projected Water Use including Planned Water Conservation (rounded to the nearest 5 Thousand AF (TAF))

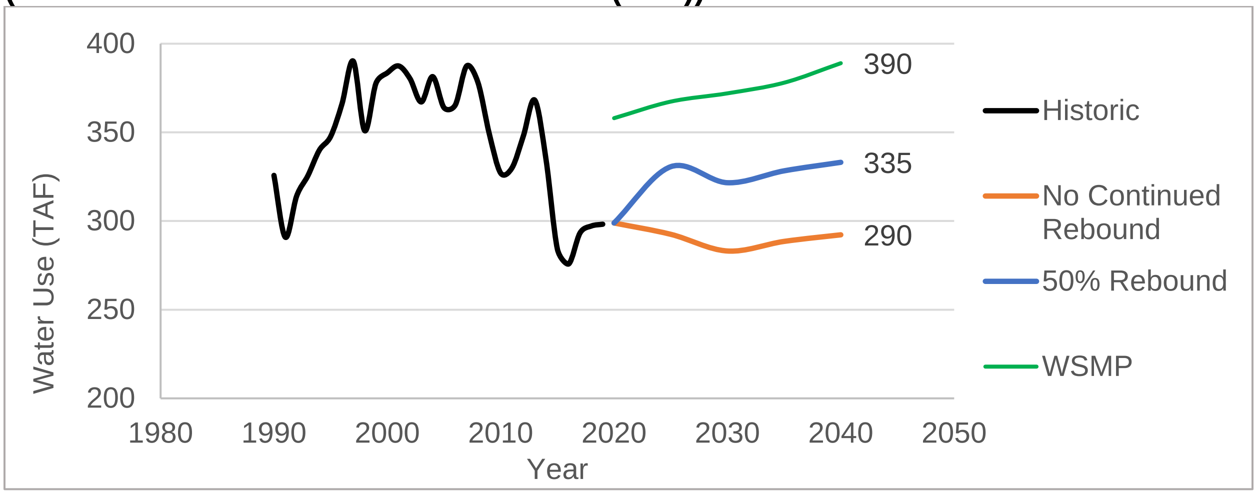


Table 2 Newly Forecasted Demands Compared to the Master Plan Demands, Including Planned Water Conservation (rounded to the nearest 5 TAF)

Demand Scenario	2020	2025	2030	2035	2040
No Continued Rebound	300	295	285	290	290
50% Rebound	300	330	320	330	335
Master Plan	360	365	370	380	390
Difference[1]	60	35-70	50-85	50-90	55-100

[1]The low bookend is the difference between the 50% Rebound scenario and the Master Plan scenario while the high bookend is the difference between the No Continued Rebound scenario and the Master Plan scenario.

3.2 Master Plan “Ensure Sustainability” Strategy

For Valley Water to continue meeting its level of service goal, the Master Plan recommended a three-prong strategy:

1) Secure existing supplies and infrastructure
2) Increase water conservation and reuse
3) Optimize the use of existing supplies and infrastructure

Along with the three-pronged strategy, it provided potential projects that could help achieve each aspect of the strategy. The status of those projects is summarized below.

3.2.1 Secure Existing Supplies and Infrastructure

This strategy element aims to maintain existing supplies and infrastructure that the Board identifies as important to future water supply reliability. Valley Water is developing three coordinated plans that will help inform how best to secure existing supplies and infrastructure, including the Distribution System Implementation Plan, the Water Treatment Plant Implementation Plan, and the Supervisory Control and Data Acquisition (SCADA) Implementation Plan (collectively referred to as the Infrastructure Implementation Plans). The Infrastructure Implementation Plans will evaluate the existing water treatment plants, SCADA infrastructure, and distribution system and recommend and prepare capital projects to strengthen their resilience and reliability into the future. Since the Infrastructure Implementation Plans will evaluate how to secure and optimize the existing water supply system, staff recommend that any projects within this strategy element be considered in conjunction with future demands and the priorities identified in the Infrastructure Implementation Plans.

While the Infrastructure Implementation Plans are being developed, the Board has identified projects that should continue planning and implementation, including the Vasona Pump Plant upgrade, Rinconada Water Treatment Plant Reliability Improvement (RWTP) Project, and dam seismic retrofits for Anderson Dam, Almaden Dam, Calero Dam, and Guadalupe Dam. The Vasona Pumping Plant Upgrade is currently in the planning phase and construction is expected to be completed by 2024. The RWTP Project is currently under construction, with phases 1 and 2 to be completed by the end of 2020 and phases 3-6 expected to be completed by 2027. The dam seismic retrofits are in the planning phase. Anderson is expected to be completed by 2030 while Almaden, Calero and Guadalupe seismic retrofits are expected to be completed by 2035.

<u>Anderson Dam Seismic Retrofit Update</u>

In the Master Plan, analysis assumed use of Anderson at a restricted level during demand year 2025 and use of the full storage volume from 2030 onward. On February 20, 2020, the Federal Energy Regulatory Commission (FERC) ordered Valley Water to draw down Anderson Reservoir to deadpool level by October 1, 2020 as a measure to help prevent going above the seismic restriction. Therefore, staff updated the Master Plan assumptions for this MAP report to assume no usable storage in Anderson during demand year 2025. The MAP report maintains the assumption of full storage from 2030 onward.

<u>Delta Conveyance Project Updates</u>

The Board directed staff to participate in the planning and feasibility analysis of the Delta Conveyance Project (DCP) as a potential investment to secure existing supplies and infrastructure. The DCP aims to develop new diversion and conveyance facilities in the Delta to restore and protect the reliability of SWP water deliveries. The DCP objectives include protecting the SWPs ability to continue to deliver water south of the Delta; improving SWP resiliency to the impacts of climate change and extreme weather events; minimizing the potential public health and safety impacts from reduced quantity and quality of water caused by earthquakes; and providing SWP operational flexibility to improve aquatic conditions and better manage risks of additional future regulatory constraints on project operations.

The California Department of Water Resources (DWR) is the agency leading project development and Valley Water is a project partner. The DCP is currently in the early planning and environmental review stages with a public draft Environmental Impact Statement/Environmental Impact Report expected in mid-2022.

Currently, no agency-specific benefits of the project are available. A preliminary analysis of potential total project water supply benefits conducted for the State Water Contractors looked at a range of potential future scenarios to assess the project's ability to maintain or improve SWP reliability and resiliency. While no single scenario likely represents the true future, the analysis does provide some indication of how the project could perform under a range of potential futures. The analysis evaluated a range of regulatory scenarios, including continuing the existing regulations and considering how the project might perform if future regulations require additional outflow or impose additional restrictions on South Delta operations. That analysis indicates that future regulatory scenarios could reduce SWP systemwide supplies by anywhere from 300,000 AF to over 1 million AF, depending on the regulatory scenario. Under these scenarios, the project could restore available SWP systemwide deliveries by anywhere from 100,000 AF to 1 million AF per year on average, showing the least benefits if future regulations require greater outflows to the Bay and the most benefits with additional South Delta restrictions. The analysis also indicates that late century sea level rise could result in over 1 million AF of reduced supplies without the project. Under this future scenario, the project could potentially restore approximately 900,000 AF of systemwide deliveries.

If Valley Water invests in the DCP, then Valley Water would receive a portion of that water supply reliability benefit. However, the timing and volume of when water is available could impact the level of benefits Valley Water could experience from the DCP project. For example, if most of the reliability/increased delivery is provided during infrequent wet years (as is currently expected from climate change), then it may be difficult for Valley Water to use the water effectively since local supplies will generally also be abundant in wet years. As project planning progresses, Valley Water will continue to evaluate potential benefits of the project. Staff will present a preliminary evaluation of the DCP to the Board at the November 10, 2020 meeting. Since this project is an option for securing existing supplies, if the Board chooses to continue to participate then staff recommend considering its benefits in conjunction with the priorities identified in the Infrastructure Implementation Plans.

3.2.2 Expand Water Conservation and Reuse

Demand management, stormwater capture, and water reuse are critical elements of the water supply strategy. They are resilient to climate change and are local solutions for meeting future demands. The Master Plan recommends increasing water conservation to approximately 110,000 AF annually by 2040 compared to the base year 1992 and recommends developing approximately 24 TAF of reuse by 2040.

Water Conservation
Valley Water has made considerable progress on attaining 110,000 AF annually by 2040, with approximately 75,000 AF achieved in 2019. To achieve the 110,000 AF goal, Valley Water works with the community and retailers to implement over a dozen water conservation programs, such as advanced metering infrastructure (AMI), the Landscape Rebate Program, the Water Wise Survey Program, and the Water Efficient Technologies Rebate Program. In addition, Valley Water is completing a Water Conservation Strategic Plan that will support Valley Water's water conservation goal by providing recommendations to improve existing programs and develop new programs.

Potable Reuse
The Master Plan recommended developing 24,000 AF of additional recycled water by 2040. Valley Water is working with local recycled water producers, retailers, regulators, and other stakeholders to develop a Countywide Water Reuse Master Plan (CWRMP) that will address key challenges in potable water reuse, including: (1) identification of how much water will be available for potable and non-potable reuse expansion, (2) evaluation of system integration options, (3) identification of specific potable and non-potable reuse projects, and (4) development of proposals for governance model alternatives including roles and responsibilities. The CWRMP currently has seven different reuse project alternatives under consideration. The CWRMP is scheduled to be completed in early 2021. Outcomes from the CWRMP will be integrated into future MAPs.

On September 8, 2020, the Board approved the recommended Design-Build-Finance-Operate-Maintain procedures for procurement under a Public/Private Partnership (P3) structure to accomplish purification and delivery to groundwater recharge ponds of the product water. Direction was given to staff to launch a P3 procurement plan as soon as all the necessary elements for a proposed project, including (a) agreement for long-term supply of treated wastewater, (b) agreement enabling management of reverse osmosis concentrate, and (c) agreement for siting of the purification facilities, are sufficiently secured for the proposed project.

Valley Water has actively been pursuing partnerships to secure these elements. In December 2019, Valley Water executed a Partnership Agreement to Advance Resilient Water Reuse Programs in Santa Clara County (Agreement) with the cities of Palo Alto and Mountain View. The Agreement will allow the agencies to further develop water supplies and infrastructure to meet the county's water supply needs. The three main parts of the Agreement, include:

- Funding a local salt removal facility owned and operated by Palo Alto, to provide a higher quality of recycled water for irrigation and cooling towers,
- An effluent transfer option to Valley Water for a regional purification facility owned and operated by Valley Water, to provide advanced purified water for potable reuse, and

- A water supply option for the cities of Palo Alto and Mountain View to request an additional supply if needed.

Valley Water is working with Palo Alto on the additional agreements needed to secure an option for the land needed for the purification facility and an agreed upon concept for reverse osmosis concentrate management. Valley Water is also in discussions with the city of San Jose to secure a partnership agreement similar to the one executed with the cities of Palo Alto and Mountain View.

3.2.3 Optimize the use of existing supplies and infrastructure

This strategy element aims to increase Valley Water's ability to use existing supplies and infrastructure. Valley Water's existing supplies are more than enough to meet current and future needs in all but the driest years. In some years, supplies exceed needs, so additional facilities could increase the flexibility to use those supplies. Additional infrastructure could also help Valley Water convey supplies more effectively during water shortages, such as droughts. The Infrastructure Implementation Plans will evaluate the existing water treatment plants, SCADA infrastructure, and distribution system to recommend and prepare capital projects to strengthen the resilience and reliability of Valley Water's infrastructure into the future. Since the Infrastructure Implementation Plans will evaluate how to secure and optimize the existing water supply system, staff recommend that any projects within this strategy element be considered in conjunction with the priorities identified in the Infrastructure Implementation Plans.

As the Infrastructure Implementation Plans are being developed, the Board has identified projects that should continue planning, including Transfer Bethany Pipeline, a south county recharge project, and Pacheco Reservoir. As planning progresses for these three projects, staff recommend considering their benefits in conjunction with future demands and the priorities identified in the Infrastructure Implementation Plans.

<u>Transfer Bethany Pipeline</u>

Transfer Bethany Pipeline is an element of the Los Vaqueros Expansion (LVE) project that would connect Contra Costa Water District's (CCWD) system to the imported water delivery system. This project is a partnership between CCWD and other Bay Area and Central Valley agencies. Transfer Bethany could provide Valley Water flexibility in how to receive imported water deliveries, potentially improving Valley Water's use of existing supplies. Transfer Bethany is in the planning phase and is expected to be constructed by 2025. Project partners are being requested for an additional cost-share to cover planning and design costs through December 2021, with the first payment occurring in November 2020. Staff is evaluating potential benefits of investing in the Transfer Bethany Pipeline and the associated Los Vaqueros Reservoir Expansion Project. Staff will provide an update to the Board on project benefits and a recommendation on the cost share agreement at the November 10, 2020 Board meeting.

South County Recharge

The South County Recharge project optimizes the use of existing imported supplies by increasing groundwater recharge capacity in the Llagas Subbasin. Valley Water is evaluating potential recharge and in lieu recharge projects (i.e., a south county water treatment plant) (Appendix B) and is continuing to evaluate the need and benefits of additional recharge capacity in the Llagas Subbasin.

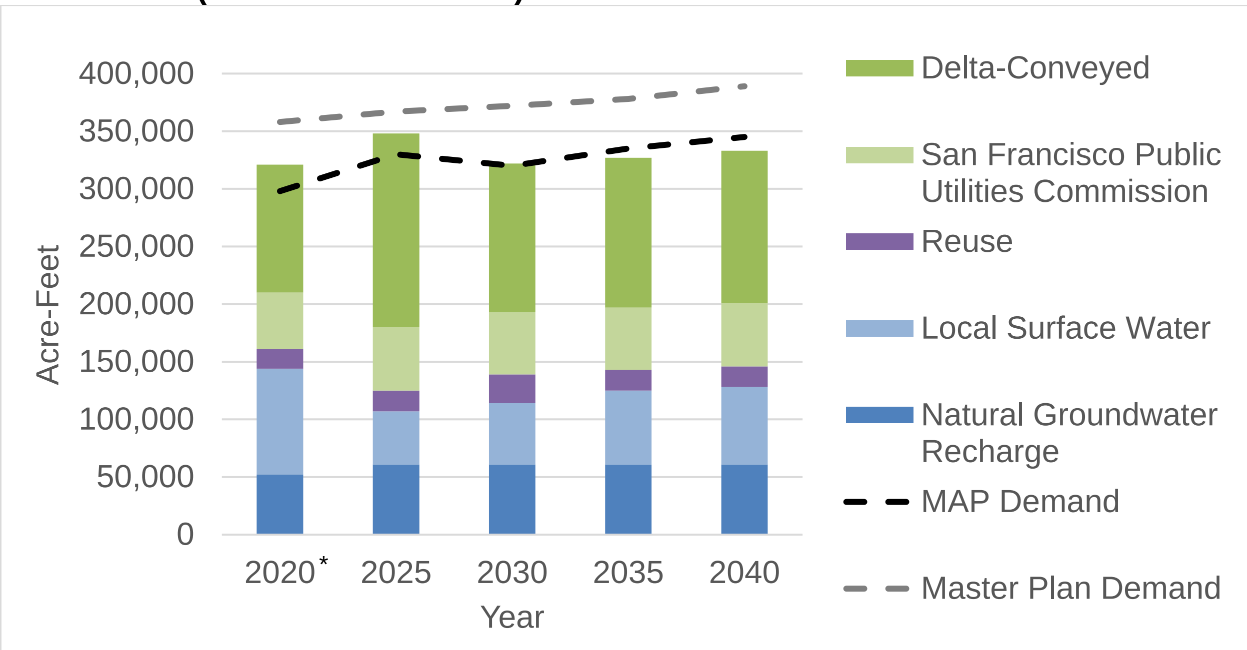
Pacheco Reservoir

Pacheco Reservoir may optimize the use of existing supplies by increasing in-county storage. The project was awarded approximately $484.5 million from the Proposition 1 Water Storage Investment Program (WSIP). The project is currently in the planning phase. To maintain eligibility for the WSIP funding, the project must achieve several milestones before January 1, 2022, including preparing a draft Environmental Impact Report and determining non-State funding. All milestones are currently being addressed in the current planning phase. Staff are also evaluating potential benefits of the project to support operational and investment decisions.

3.3 MAP Analysis of Master Plan Strategy and Recommended Projects

Given that the newly forecasted demands are significantly lower than those used in the Master Plan (Table 2), fewer investments are required to meet Valley Water's level of service goal through 2040. However, there may be other operational or policy reasons for investing in projects now and into the future. With the 50% drought rebound demand forecast and assuming baseline projects are completed, modeling indicates that new investments are not needed to meet the level of service goal until 2035 (Figures 3 and 4). Baseline projects include dam seismic retrofits, the RWTP Project, Vasona Pump Plant Upgrade, and an additional 25,000 AF of water conservation by 2030 (to achieve 99,000 AF of water conservation by 2030). Since new investments are still needed to meet the level of service goal through 2040 (Figures 3 and 4), staff evaluated each Master Plan recommended project and each project in Appendix B that had adequate information to determine how it could help meet the level of service goal (Figure 5).

Figure 3 Average Supplies Used to Meet MAP Demands Assuming No New Investments (Baseline Conditions)



*Data for 2020 are actual numbers for 2019 that are published in the Protection and Augmentation of Water Supplies 2020 Report. Years 2025-2040 are modeled values.

Figure 4 2040 Water Supplies Used During an Extended Drought Assuming No New Investments (Baseline Conditions)

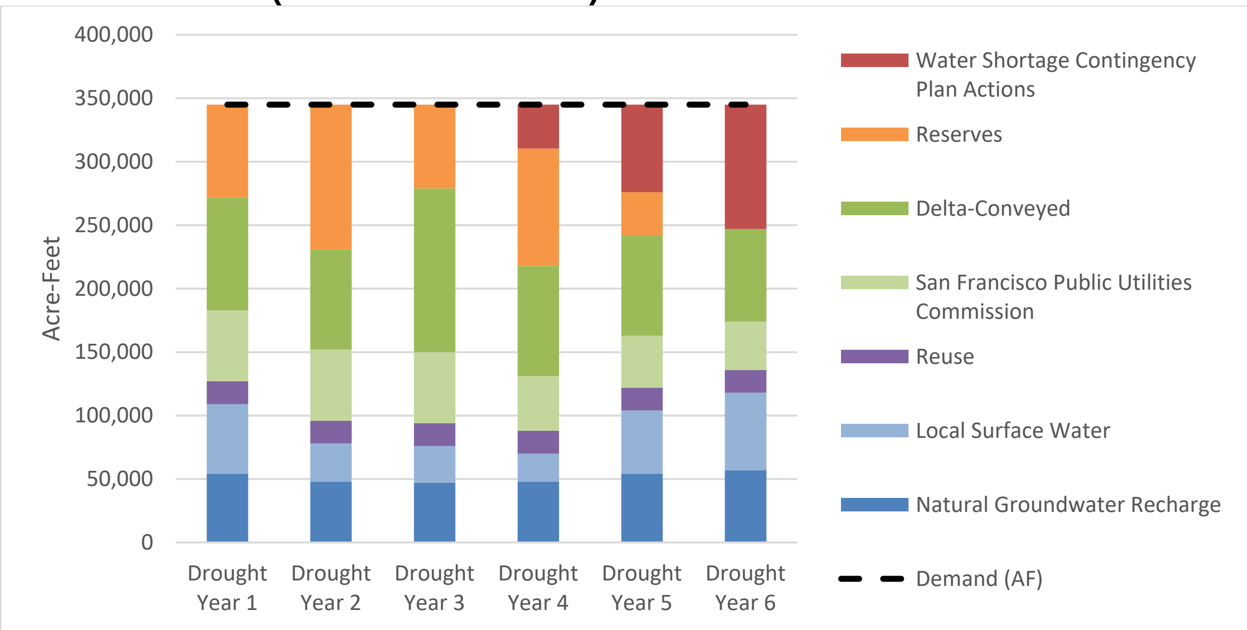


Figure 5 Projects Evaluated to Achieve the Level of Service Goal

Does NOT Achieve Level of Service Goal	**Achieves Level of Service Goal**
• Groundwater banking • Pacheco Reservoir Expansion Project • Transfer Bethany Pipeline • Los Vaqueros Storage • Sites Reservoir – 3.2% share • Additional Centralized In-county Groundwater Recharge	• 10 Million Gallon per Day Potable Reuse Plant • Sites Reservoir – 6.6% share • Lexington Pipeline • Refinery Recycled Water

All projects were evaluated using the 50% Drought Rebound demands forecast and assumed that Valley Water completes the projects in the Capital Improvement Program (dam seismic retrofits, RWTP Project, and Vasona Pump Plant Upgrade) and achieves the 110,000 AF of water conservation by 2040 with 1992 as a baseline. Data and modeling indicate that Valley Water should be able meet the water conservation goal, only needing approximately 35,000 AF more water conservation by 2040. In addition, the analysis assumed imported water deliveries decrease approximately 20% on average by 2030 due to increased regulations and sea level rise and that non-potable recycled water demands remain at the historical average of approximately 18,000 AF per year. Therefore, the analysis took a conservative (e.g., supply limited) approach to how our existing water supply investments may perform in the future.

Staff did not evaluate the DCP because information on its potential benefits for Valley Water is not available. Currently, there is only preliminary analysis of the potential benefits of the DCP for the State Water Project as summarized in Section 3.2.1. If directed by the Board, staff will continue to participate in the DCP and model its potential benefits once information is available.

The Master Plan analysis indicated that additional groundwater recharge may be necessary in the northern portion of the Llagas sub-basin. Given the new demands, staff is analyzing groundwater in the Llagas sub-basin to ensure adequate groundwater storage is maintained throughout the entire sub-basin through 2040.

In general, projects that are primarily for storage of existing supplies did not meet Valley Water's level of service goal because Valley Water already has access to sufficient storage within the County and at the Semitropic water bank for our existing imported water supplies. Therefore, modeling indicated that the additional storage added minimal water supply benefit to the water supply portfolio. However, Valley Water does have potential concerns with the Semitropic water bank related to Sustainable Groundwater Management Act requirements, so staff is evaluating the need to diversify our out-of-county banking. The new water supply associated with Transfer Bethany is a wet year water supply and Valley Water has sufficient wet year supplies. Therefore, the projects that performed best generally provided a new water supply during dry years.

While the Master Plan recommended investing in a 24 MGD potable reuse project, modeling and analysis indicate that investing in a 10 million gallons per day (MGD) potable reuse plant coupled with achieving the 110,000 AF by 2040 water conservation goal will meet Valley Water's level of service goal through 2040 (Figures 6 through 8).

With 35,000 AF of additional water conservation and a 10 MGD potable reuse plant, average supplies are sufficient to meet non-drought year demand (Figure 7). Modeling indicates that Valley Water would only need to call for water use reductions approximately 5 percent of the time and only during extreme drought conditions. Even in an extended drought, such as the one that occurred from 1987-1992, investing in water conservation and 10 MGD reuse will allow Valley Water to meet 100% of demand during most years (Figure 8) and only need to call for water use reductions under the water shortage contingency plan for year five and six of the extended drought. Modeling showed a call for 10% water use reduction in year five and 20% in year six.

Figure 6 Master Plan Demands and Average Water Supply Used with the Master Plan Recommended Projects (adapted from the Master Plan)

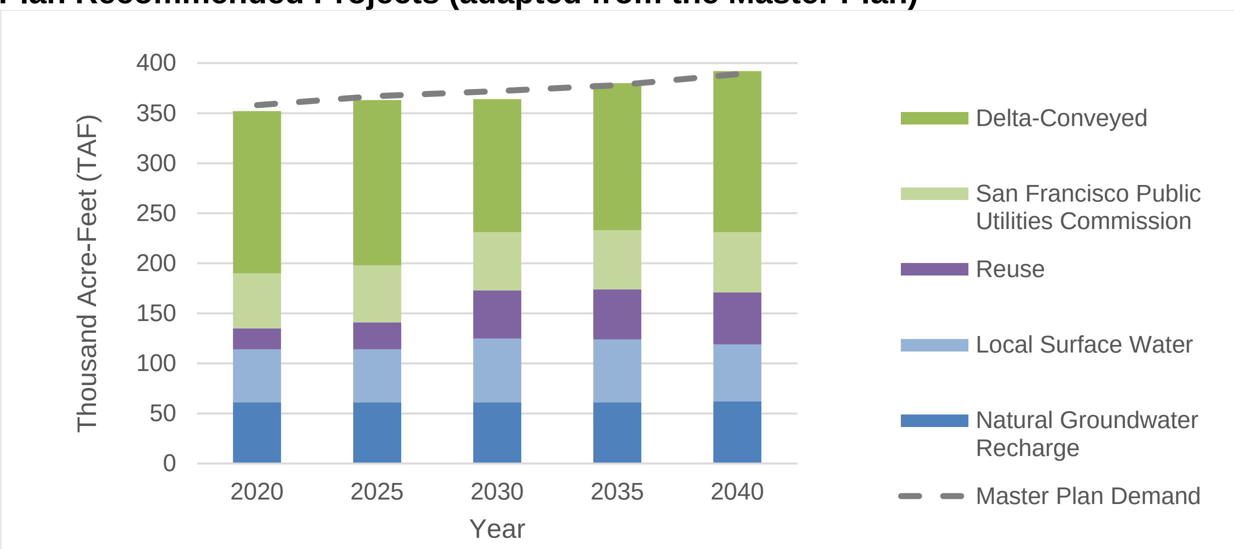
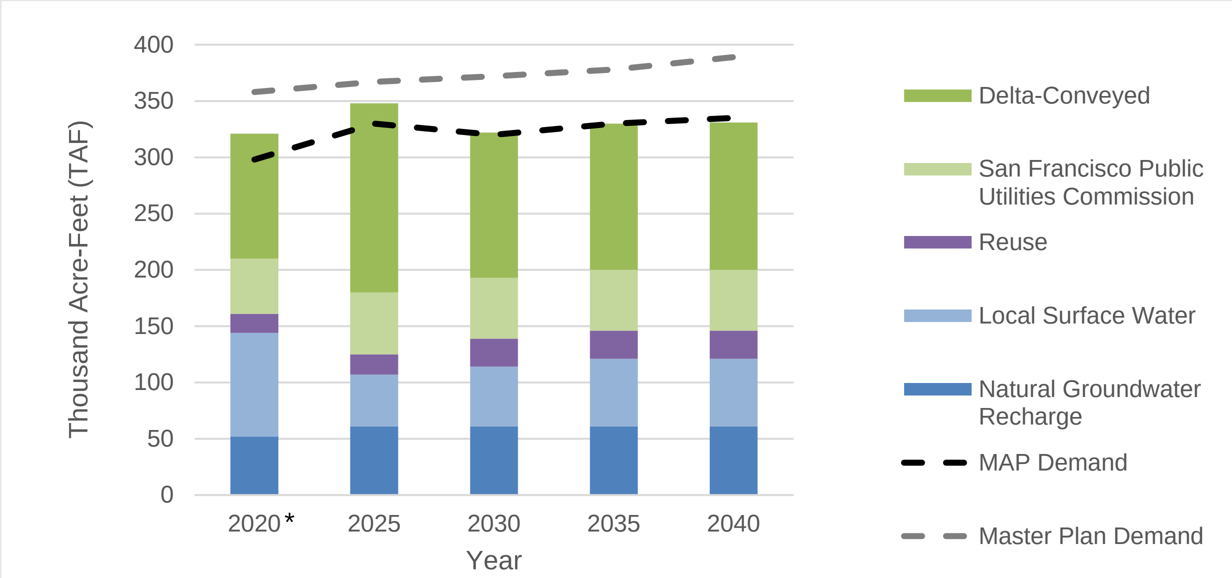
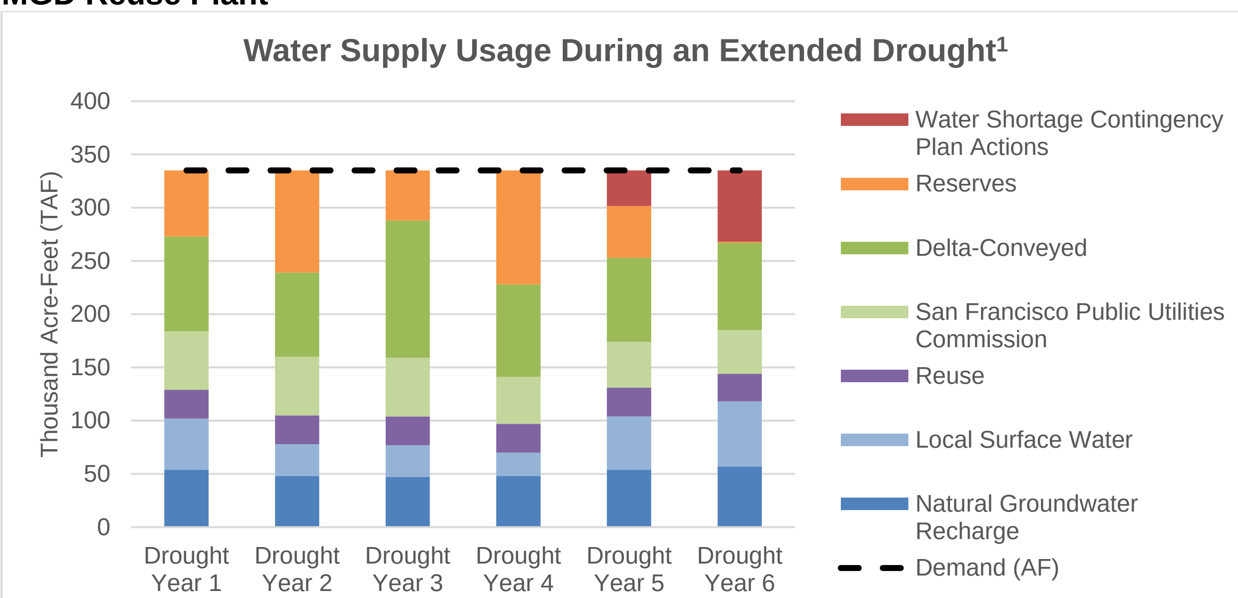


Figure 7 Average Water Supply Used with the MAP Recommended Projects (water conservation and reuse) Compared to MAP and Master Plan Demands



**Data for 2020 are actual numbers for 2019 that are published in the Protection and Augmentation of Water Supplies 2020 Report. Years 2025-2040 are modeled values.*

Figure 8 Water Supply Used During an Extended Drought Based on the Newly Forecasted 2040 Demands with 35 TAF of Additional Water Conservation and a 10 MGD Reuse Plant



[1]The extended drought is based on the historical 1987-1992 drought.

The Master Plan's "Ensure Sustainability" strategy recommends meeting demands with water conservation and reuse and the MAP analysis indicates that water conservation and reuse alone are sufficient in terms of new investments to achieve the level of service goal through 2040. Water conservation and reuse are resilient to climate change, are local solutions for meeting future demands, and support the Board and State policy to reduce reliance on the Delta. The Delta Reform Act of 2009 (California Water Code Section 850221) is to "*reduce reliance on the Delta in meeting California's future water supply needs… Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycled, advanced water technologies…"*

In addition to being local and climate change-resilient, water conservation and reuse have additional benefits. Water conservation is a cost-efficient and environmentally friendly approach for meeting current and future water supply needs. Reuse would further diversify Valley Water's water supply portfolio while increasing operational flexibility by providing an additional local water source. Water conservation and reuse increase our water supply resilience to future uncertainty, including events that could temporarily limit our access to imported supplies such as a Delta levee failure or an earthquake. Overall, water conservation and reuse provide a local, climate change-resilient approach to meeting Valley Water's level of service goal while diversifying Valley Water's water supply portfolio, decreasing reliance on the Delta, and increasing operational flexibility.

There may be other operational or policy reasons to continue consideration of other projects. For example, the Board may decide to continue planning for a 24 MGD potable reuse plant to further reduce Valley Water's reliance on the Delta and increase local resilience. In addition, projects under the strategy elements "Secure Existing Supplies and Infrastructure" and "Optimize the Use of Existing Supplies and Infrastructure," may be considered with the Infrastructure Implementation Plans, which will recommend priorities for maintaining a resilient water supply system over the next 30 years.

4.0 FUTURE UNCERTAINTIES AND NEXT STEPS

Through Valley Water's diverse water supply portfolio and successful water conservation program, Valley Water has provided a reliable, clean water supply to generations of Santa Clara County residents. As discussed in Chapter 4 of the Master Plan, there are on-going uncertainties related to regulations, climate change, demands, and project planning and implementation. Uncertainties are primarily in relation to:

- Imported water deliveries: regulations that could decrease deliveries, aging infrastructure, and changing hydrological patterns
- Water use efficiency: state and local regulations that increase efficiency requirements
- Demands: different growth and water use patterns that result in higher or lower demands than forecasted
- Water Supply Projects: changing costs, funding, stakeholder and political support, and engineering feasibility
- Climate change: changing hydrological patterns, increased temperatures, increased evaporation and evapotranspiration, and changing water quality

Valley Water's "Ensure Sustainability" strategy and recommended investment in water conservation and reuse projects aims to meet Valley Water's level of service goal while mitigating uncertainties. However, it is important that Valley Water continues to actively evaluate and plan for uncertainties. Through MAP, Valley Water will continue to track uncertainties and recommend approaches for adapting to future conditions. Appendix B provides a full list of Valley Water's potential water supply projects that staff is or has evaluated. Valley Water will continue to update the list as new opportunities arise and with direction from the Board. Regular monitoring of specific projects and overall conditions provides Valley Water and its Board the opportunity to adjust the Master Plan strategy and recommended projects as needed. Through MAP, staff will continue to evaluate Valley Water's supplies, demands, and investment opportunities and provide the Board the opportunity to adjust the Master Plan strategy and recommended projects. Staff will prepare the MAP report annually and provide other MAP updates to the Board throughout the year as needed.

APPENDIX A

COST OF SHORTAGE MEMORANDUM

Estimating Water Shortage Costs

David Mitchell, M.Cubed

September 2020

Understanding the economic consequences of water shortages is important for water utility managers and policymakers. For example, the value of improved water supply reliability can be cast in terms of avoided water shortage cost. An important litmus test for whether a proposed project will economically benefit water users is the magnitude of the shortage costs the project would help to avoid. If these avoided costs are large, this may be all that is required to demonstrate the economic feasibility of the project. If they are small, then other benefits generated by the project would need to offset its costs to make it worthwhile. In most cases, investments in new water supply are irreversible and for large water systems may entail hundreds of millions or even billions in cost. The stakes, therefore, may be quite high, making it all the more important to fully enumerate the benefits and costs of the proposed investment.

How can water shortage costs be measured? Direct measurement generally is not feasible for several reasons. First, homes and businesses use water in myriad ways and have many margins at which this use can be adjusted during a shortage. It would be a herculean feat to catalog all the different ways in which homes and businesses could adjust their water use. Second, even if all such adjustments could be identified, it would not be possible in most cases to measure the associated changes in water use. Except in rare situations water is not metered at the point of use. Water going into a home, for example, is metered at the curb not where it is actually being used (e.g., the toilet, dishwasher, etc.). From the utility's vantage point, the home is essentially a black box. This is also the case for most non-residential water uses.[1] Third, even if the myriad changes to water use could be measured, what cost should be assigned to these adjustments? What is the cost of flushing a toilet less often or letting a lawn die or changing the way a product is formulated or produced? Market prices do not exist for most of the things people do to reduce their water use during a shortage.

This means that water shortage costs generally must be inferred. Different approaches for doing this have been proposed. One approach is to ask people what they would be willing to pay to avoid a shortage. In the economics literature, this approach is called contingent valuation, and it relies on

[1] Some commercial and industrial end uses are metered for sewer billing purposes, but this is the exception rather than the rule.

sophisticated surveying techniques to tease out what homes and businesses would be willing to pay to avoid water shortages of varying duration and magnitude. This approach has been heavily critiqued because it relies on hypothetical situations for which those being questioned may have little knowledge or experience.[2]

Another approach is to estimate water demand curves from data on water use and prices and then use these demand curves to value changes in water use. Griffin (1990) was the first to apply this method to the estimation of water shortage costs.[3] This method is widely used in water planning studies, including in the state's benefit-cost assessments of Delta conveyance proposals and the 2015-16 State Conservation Mandate, and it is the method that Valley Water uses to estimate the cost of water shortages in its planning studies.

It is broadly understood that demand curves slope downward while supply curves slope upward. Less well known, however, is that this is a consequence of optimization. In the case of demand, it follows directly from consumers optimizing their consumption choices subject to their available income. In terms of water demand, we can envision each home or business as having a schedule of demands for water that is based on the values they place on different uses. For example, households are likely to place the highest value on water used for drinking and basic sanitation, a lesser value on water used for bathing and laundry, and even lesser value on water used for landscaping and other less essential uses, such as car washing and cleaning outdoor surfaces. Thus, if each household was given the task of ordering their preferences for water from highest to lowest valued, these preferences could be arrayed as a set of demand curves like the ones shown in the left-hand panel of Figure 1. Aggregating these curves would then yield a total demand curve like the one shown in the right-hand panel of Figure 1.

Of course, no household is actually given this task to perform. However, by observing how demand for water adjusts as the price for water service changes, we can infer this relationship – in other words, we can trace out the portion of the demand curve that spans the observed range of water prices and quantities. We can then use this information to calculate the value households and businesses place on different levels of water use.

[2] See, for example, Diamond, Peter A., and Jerry A. Hausman. 1994. Contingent valuation: Is some number better than no number? Journal of Economic Perspectives 8 (Fall): 45-64.

[3] A comprehensive discussion of the method is provided in Chapter 5 of the textbook <u>Water Resource Economics</u> by Ronald C. Griffin. The method is also described in Chapter 7 of <u>Determining the Economic Value of Water: Concepts and Methods</u> by Robert Young.

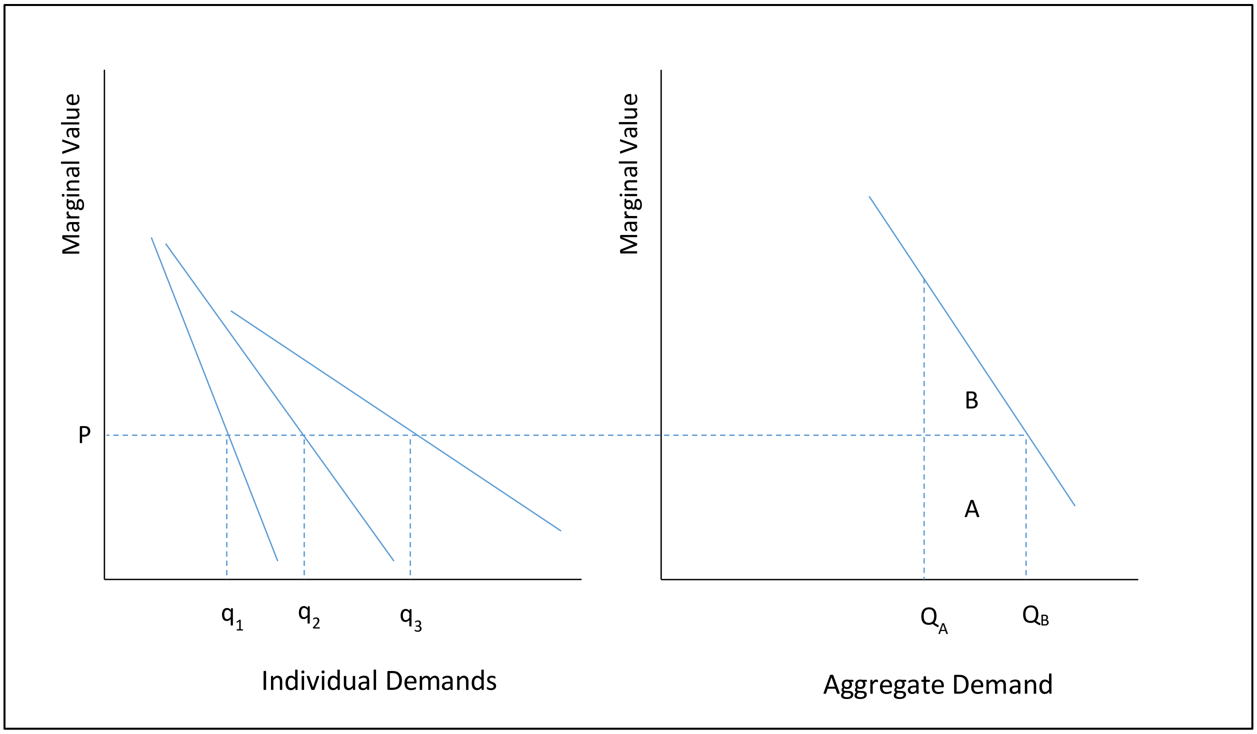


Figure 1. Graphical Depiction of Individual and Aggregate Demand Curves for Water Service

There are several points to emphasize about Figure 1.

- First, a point on the demand curve indicates the marginal value of consumption. If, for example, the first household in the left-hand panel of Figure 1 uses a total of q1 units of water, the value of the marginal unit consumed is P. All the units of water to the left of q1 are worth more than this to the household. We can calculate the total value of consuming q1 units by adding up the values of all the units to the left of q1. This value is equal to the area under the demand curve from 0 to q1. The same calculus can be applied to the aggregate demand curve in the right-hand panel of Figure 1. If aggregate demand is Q_B, then the total value to consumers is the area under the aggregate demand curve from 0 to Q_B.
- Second, the total value is greater than the cost of the water. If there were no surplus value, consumers would have no motivation to purchase water from the utility. They would self-supply or choose an alternative source. The surplus value measures the net benefit consumers get from water use. For example, looking at the right-hand side of Figure 1, it would cost consumers an amount equal to area A to go from Q_A to Q_B while the total amount they would be willing to pay is equal to the area A + B. Area B therefore measures the economic benefit to consumers of the additional water use. By the same token, area B measures the economic cost to consumers if they

are required to cut back water use from Q_B to Q_A. Thus, the economic cost of a water shortage can be measured in terms of the loss in surplus value.

- Third, the magnitude of the shortage cost depends on the slope of the demand curve. The steeper the curve, the less flexible are consumers in their use of water and the more they would be willing to pay to avoid a shortage. Thus, the calculation of shortage cost critically depends on the estimated slope of the demand curve. Valley Water uses slope estimates based on detailed statistical models of water use for each of the retail water suppliers it serves. The primary sources of these estimates is Sunding (2012) and M.Cubed (2018).

So far this discussion has mostly referenced water used by households. But the same logic applies to water used in business and industry. In this case, water is being used as an input to a production process and the surplus value measures the business/industry profit earned on the water use.[4] Thus, if the right-hand side of Figure 1 represents the demand from the utility's industrial customers, the loss in surplus value from cutting back water use from Q_B to Q_A is measuring the loss of profit. So whether the analysis is considering residential or business/industry water use, the same method can be used to compute the shortage cost.

Thus, shortage cost stems from residential and business/industry consumers being unable to consume water at the level they would otherwise freely choose given the price of water service. The cost is measured in terms of the forgone surplus value of this consumption. In the case of residential water users, the income-equivalent change in their economic welfare is being measured. In the case of business/industrial water users, the change in profit or net income is being measured.

It is important to stress that rationing use during a water shortage is fundamentally different from policies designed to help consumers use water more efficiently, such as educational programs and the distribution or subsidy of more efficient water use technology, such as rebates for super-efficient toilets and clotheswashers. The intention behind rationing during a shortage is to rapidly reduce water use to balance available supply with demand. The intention behind water use efficiency policies is to allow consumers to realize the same benefits from water use while using less of it. In the rationing case, consumers are unambiguously made worse off. With efficiency policies, provided they are well-designed, consumers are made no worse off and may be made better off.

[4] Under general conditions, it can be shown that the producer surplus (i.e. profit) that a business earns on the sale of its product is equal to the sum of the consumer surpluses it receives on the inputs used to produce it (see Just, Hueth, and Schmitz (2004)).

This is graphically depicted in Figure 2.[5] The utility's water use efficiency policy shifts the demand curve from D0 to D1. Average production cost falls from P0 to P1 and consumers save an amount equal to area c + d + e + f. Consumers are better off with this policy so long as it costs less than this amount to implement. In tallying up the implementation costs, both the costs incurred by the utility *and* its customers should be counted. Note, however, that it would be incorrect to count area b in Figure 2 as a cost because it is presumed that consumers are able to realize the same benefits as before while using less water. This is what distinguishes policies designed to help consumers use water more efficiently from policies designed to ration water during a shortage. In the former case, the benefits of water use are preserved even though less water is being used. In the latter case, the benefits are lost. These forgone benefits constitute the principal cost of a water shortage.

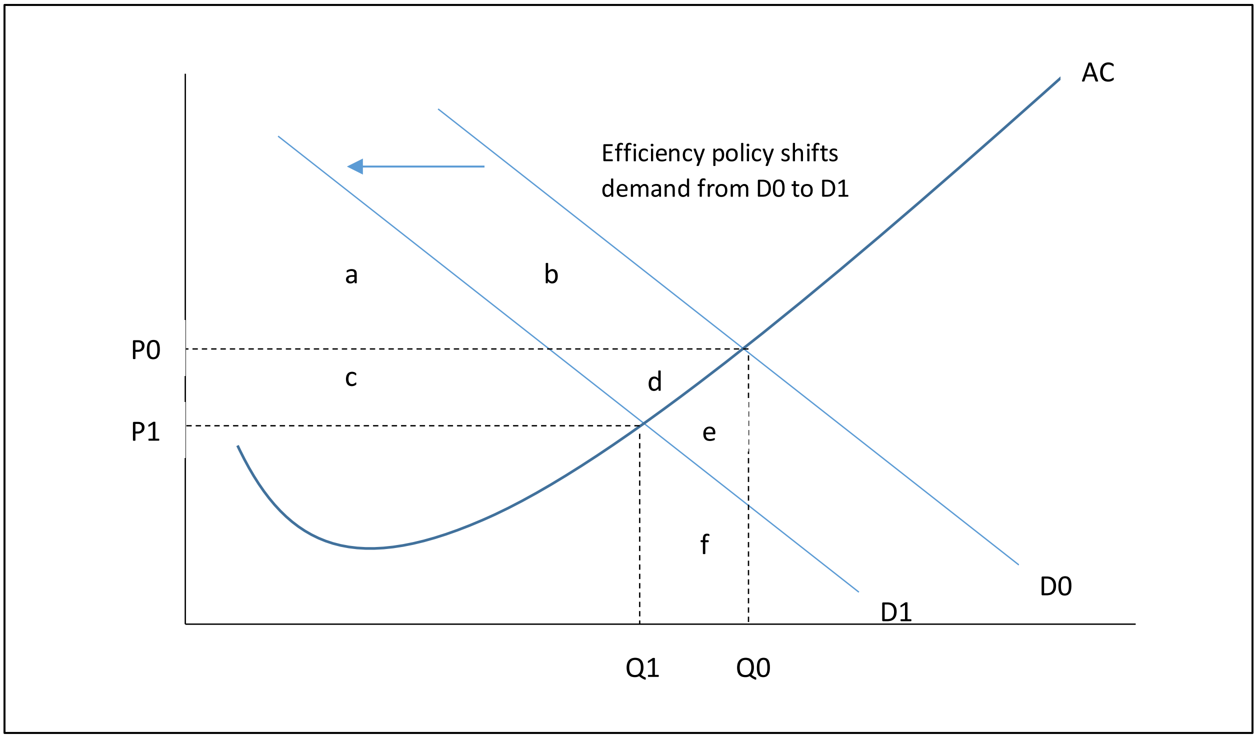


Figure 2. Graphical Depiction of Demand-Shifting Water Use Efficiency Policy

[5] Figure 2 is based on Figure 6.5 in Griffin (2016).

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APPENDIX B

PROJECT LIST

TABLE 1. MASTER PLAN RECOMMENDED PROJECTS			
Project	**Lifecycle Cost (Present Value, rounded 2019$)[1,2]**	**Average Usable Supply (AFY)[3]**	**Cost/AF**
Conservation and Stormwater Projects and Programs			
Advanced Metering Infrastructure (AMI): Implements a cost share program with water retailers to install AMI throughout their service area. AMI would alert customers of leaks and provide real-time water use data that allows users to adjust water use.	$20 million	4,000	$100
Graywater Rebate Program Expansion: Expand Valley Water's existing rebate program for laundry-to-landscape graywater systems to include a direct installation program and/or rebates for graywater systems that reuse shower and sink water. A pilot direct installation program was initiated in 2019 to underserved County residents.	$1 million	< 1,000	$3,100

[1] Lifecycle Cost (Present Value, 2019$) includes capital, operations, maintenance, rehabilitation, and replacement costs, as applicable, for a 100-year period, discounted to 2019 dollars. Only Valley Water costs, after grants and other funding sources, are included. All costs are subject to change pending additional planning and analysis.

[2] Raw water projects (e.g., imported water projects) costs do not include costs for water treatment or conveyance throughout the county. In comparison, projects like potable reuse to account for conveyance and treatment and have no known unaccounted costs.

[3] Yield is calculated by modeling water supplies used assuming 2040 demands and seismic retrofits completed, but no other new projects. The average annual yield of many projects depends on which projects they are combined with and the scenario being analyzed. For example, storage projects such as groundwater banking generally higher yields in portfolios that include additional imported water purchases that can be stored.

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Leak Repair Incentive: Provides financial assistance and/or incentives to identify and/or repair leaks, in addition to contractor training. No objective training certification appears to exist for leak detection and repair for both indoor and irrigation services. Valley Water is collaborating with BAWSCA to develop leak detection and repair certification training as a first phase. This type of service helps repair low-volume leaks that would otherwise continue indefinitely and protects customers from potentially higher water rates. The second phase may involve a leak repair incentive and/or leak detection device.	$1 million	< 1,000	$9,200
Model Water-Efficient New Development Ordinance: Encourages municipalities to adopt an ordinance enhancing water efficiency standards in developments. Components include submetering multi-family residences, onsite water reuse (rainwater, graywater, black water), and point-of use hot water heaters.	$2 million	5,000	$100

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Stormwater - Rain Barrels: Provides rebates for the purchase of rain barrels. In the 18 months since this incentive launched rebates have been provided for 110 barrels at $3,547.90 total, and 32 cisterns storing 32,745 gallons at $16,372.50 total. While this program has a water supply benefit, its greatest benefit is in public education and outreach related to water resources.	$8 million	< 1,000	$17,900
Stormwater - Rain Gardens: Through Valley Water's Landscape Rebate program, incentivize the construction of rain gardens in residential and commercial landscapes. In 18 months to-date, 21 rain gardens have been installed, diverting 12,389 sq. ft. of roof run-off to rain gardens for $4,800. New cost-share agreements with water retailers, such as Palo Alto, provides opportunities to encourage more participation in respective service areas. While this program has a water supply benefit, its greatest benefit is in public education and outreach related to water resources.	$8 million	< 1,000	$3,200

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Project	**Lifecycle Cost (Present Value, rounded 2019$)[1,2]**	**Average Usable Supply (AFY)[3]**	**Cost/AF**
Countywide Water Reuse Master Plan: Valley Water is working with local recycled water producers, retailers, regulators, and other stakeholders to develop a Countywide Water Reuse Master Plan (CWRMP) that will: (1) identify volume available for potable and non-potable reuse, (2) evaluate system integration options, (3) identify specific potable and non-potable reuse projects, and (4) develop governance model alternatives. The CWRMP is scheduled to be completed in 2021 and may identify additional reuse opportunities to incorporate into the Water Supply Master Plan. The CWRMP considers seven reuse portfolios. Below is an example project used as a "placeholder" in analysis until the CWRMP is completed.			

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Project	**Lifecycle Cost (Present Value, rounded 2019$)[1,2]**	**Average Usable Supply (AFY)[3]**	**Cost/AF**
Indirect Potable Reuse (Groundwater Recharge) to Los Gatos Ponds: Uses effluent from the SJ/SC Regional Wastewater Facility to feed a new Advanced Water Purification Facility adjacent to the existing Silicon Valley Advanced Water Purification Center (water from Sunnyvale and Palo Alto is considered in other portfolios). The purified water is then recharged in the existing Los Gatos ponds. Assumes up to 24,000 AFY of advanced treated recycled water would be available for groundwater recharge by FY28. Some of the outstanding issues are agreements with the City of San Jose, environmental consideration of recharging in Los Gatos ponds, and permitting. This is portfolio 1a in the CWRMP.	$1 billion	14,000	$3,000

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Project	**Lifecycle Cost (Present Value, rounded 2019$)[1,2]**	**Average Usable Supply (AFY)[3]**	**Cost/AF**
Delta Conveyance Project: Constructs alternative conveyance capable of diverting up to 6,000 cfs from the Sacramento River north of the Delta and delivering it to the SWP pumps at the southern end of the Delta. The project purpose is to develop new diversion and conveyance facilities to restore and protect the reliability of SWP water deliveries and, potentially, CVP water deliveries south of the Delta, consistent with the State's Water Resilience Portfolio. Project objectives include addressing anticipated sea level rise, minimizing the potential for public health and safety impacts resulting from a major earthquake that causes Delta levee failure, protecting the ability of the SWP to deliver water when hydrologic conditions and regulations allow, and providing operational flexibility to improve aquatic habitat in the Delta. The project has significant implementation complexity and stakeholder opposition. This project is in the early planning phase, so costs and yields have not been determined. Staff will be bringing an update on the Delta Conveyance Project to the Board on November 10, 2020.	TBD	TBD	TBD

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Project	**Lifecycle Cost (Present Value, rounded 2019$)[1,2]**	**Average Usable Supply (AFY)[3]**	**Cost/AF**
Pacheco Reservoir: Through a partnership with Pacheco Pass Water District, San Benito County Water District (SBCWD), and potentially other partners, Valley Water will enlarge Pacheco Reservoir from about 5,500 AF to about 140,000 AF and connect the reservoir to the San Felipe Division of the CVP. Potential project benefits include water for downstream fisheries, emergency storage, managing water quality impacts from low-point conditions in San Luis Reservoir. The project will also deliver water to up to eight south-of-Delta wildlife refuges in Merced County. The primary water sources to fill the expanded reservoir would be natural creek inflows and CVP supplies. Potentially significant environmental and cultural resource impacts.	$1 billion	<1000	-
South County Recharge: A project to provide operational flexibility in the use of imported and/or local supplies to meet future demands in the Llagas Subbasin. Costs and yield based on the Butterfield Channel Project, which would extends the Madrone Pipeline from Madrone Channel to Morgan Hill's Butterfield Channel near Main Street. Would help optimize the use of existing imported supplies. Would need to be operated in conjunction with the Morgan Hill's stormwater operations.	$20 million	<1000	-

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Project	**Lifecycle Cost (Present Value, rounded 2019$)[1,2]**	**Average Usable Supply (AFY)[3]**	**Cost/AF**
Transfer-Bethany Pipeline: The pipeline would connect Contra Costa Water District's (CCWD's) system to Bethany Reservoir, which serves the South Bay Aqueduct and the California Aqueduct. The pipeline is one element of the larger Los Vaqueros Reservoir Expansion Project. As a stand-alone project it would provide deliveries from regional projects, direct delivery of delta surplus water, and CVP / SWP contract water without storage in Los Vaqueros. Benefits and costs are based on delta surplus supplies that could be used. Project partners have not yet determined whether an agency can participate in Transfer-Bethany without participating in Los Vaqueros Reservoir Expansion storage. The Joint Powers Authority, once formed, will ultimately determine participation parameters.	$60 million	2,800	$700

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TABLE 2. OTHER POTENTIAL PROJECTS BUT NOT RECOMMENDED IN THE MASTER PLAN		
Project	**Project Status[1]**	**Lifecycle Cost (Present Value, rounded 2019$)[2,3]**
Anderson Reservoir Expansion: Increases reservoir storage by 100,000 AF (from 90,000 AF to 190,000 AF), increasing Valley Water's ability to capture local runoff and store local and imported supplies. Planning for reconstruction of Anderson Reservoir to meet seismic standards is currently underway. Consideration of expanding the reservoir would likely delay the required seismic work.	Inactive	$1 billion
Bay Area Brackish Water Treatment/Regional Desalination: Through a partnership with other Bay Area agencies, builds a 10-25 MGD brackish water treatment plant in Contra Costa County. Plant capacity will depend primarily on water rights. There are concerns related to permitting and the availability of water rights during dry periods when such a facility would be most needed. Current project partners evaluating feasibility include San Francisco Public Utilities Commission, Zone 7, Valley Water, and Contra Costa Water District.	Active	TBD
Calero Reservoir Expansion: Expands Calero Reservoir storage by 10,000 AF (from 14,000 AF to 24,000 AF). Planning and design for Calero Reservoir Seismic Retrofit project is currently underway. Consideration of expanding the reservoir would likely delay the required seismic work.	Inactive	$200 million
Church Avenue Pipeline: Constructs a new pipeline to provide water from the Santa Clara Conduit to the Church Avenue Ponds. Other recharge projects provide the same or better yields at a lower cost.	Inactive	$30 million

[1] Project status is either "Active" for projects where there is ongoing Valley Water activity and the project could be an alternative project for the Water Supply Master Plan or "Inactive" for projects that could be potential future projects.
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Project	**Project Status[1]**	**Lifecycle Cost (Present Value, rounded 2019$)[2,3]**
Conservation Rate Structures: Water pricing can reduce demand by providing an economic incentive for consumers to conserve water. Valley Water does not directly supply water, so would not implement a conservation rate structure. Given recent court rulings on rate structure, retailers are reluctant to add new conservation rate structures at this time. SGMA and AB1668/SB606 may create new opportunities to encourage retailers to implement rate structures tied to landscape water-use budgets that can be generated through Valley Water's Large Landscape Program currently available to 3,000 properties.	Inactive	-
Dry Year Options / Transfers: Provides 12,000 AF of CVP, SWP, or non-project water transfers during critical dry years through long-term agreements. Annual amounts can be increased or decreased based on conditions. There are uncertainties with both short and long-term costs and availability of transfer supplies in critical dry years. For transfers of non-project water there is uncertainty with potential losses associated with conveyance through the Delta. This project is being considered as a potential project to secure existing supplies and would only become a recommended project if other recommended projects within that strategy element are insufficient to meet the Board's investment goals.	Inactive	$50 million

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Project	**Project Status**[1]	**Lifecycle Cost (Present Value, rounded 2019$)**[2,3]
Groundwater Banking: Provides additional out-of-county banking capacity for CVP and SWP contract water. Does not provide new water. Cost estimate is based on investing in 120,000 AF of storage in the Antelope Valley – East Kern Groundwater Bank (AVEK). AVEK is an example of several banking options under consideration and banking capacity could be increased or decreased. For any bank, Valley Water would send excess contract water to the bank during wet years and times of surplus for use during dry years and times of need. Depending on banking partners and agreements, there are uncertainties with withdrawal capabilities in critical dry years and operational impacts from the Sustainable Groundwater Management Act implementation. This project is being considered as a potential project to optimize the use of existing supplies and infrastructure and would only become a recommended project if other recommended projects within that strategy element are insufficient to meet the Board's investment goals.	Active	$100 million
Lexington Pipeline: Constructs a pipeline between Lexington Reservoir (or Vasona Reservoir) and the raw water system to provide greater flexibility in using local water supplies. The pipeline would allow surface water from Lexington Reservoir to be put to beneficial use elsewhere in the county, increasing utilization of existing water rights. In addition, the pipeline will enable Valley Water to capture some wet-weather flows that would otherwise flow to the Bay. Water quality issues would require pre-treatment/management. This project is being considered as a potential project to optimize the use of existing supplies and infrastructure and would only become a recommended project if other recommended projects within that strategy element are insufficient to meet the Board's investment goals.	Inactive	$80 million

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Project	**Project Status[1]**	**Lifecycle Cost (Present Value, rounded 2019$)[2,3]**
Lexington – Montevina Water Treatment Plant: Water from Lexington Reservoir would be sent to the San Jose Water Company (SJWC)-owned Montevina Water Treatment Plant (MWTP). This would allow the beneficial use of Lexington water in the SJWC service area. The Project would require construction of a pump station and intake pipe from Lexington Reservoir to the Montevina WTP. This project would be in lieu of the Lexington Pipeline Project. SJWC would need Public Utility Commission approval to undertake a planning study report (PSR) as part of its rate case proposal. The PSR would assess all aspects of the proposed project and the potential yield of the project. This project is being considered as a potential project to optimize the use of existing supplies and infrastructure and would only become a recommended project if other recommended projects within that strategy element are insufficient to meet the Board's investment goals.	Active	TBD
Local Land Fallowing: Launches program to pay growers not to plant row crops in droughts. This would primarily save water in the South County. Agriculture land fallowing may be combined with on-farm efficiency conservation programs. Valley Water is conducting an Agricultural Water Use Study that will inform potential conservation programs to support growers. This study can be used to inform the potential for land fallowing during droughts.	Active	TBD

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Project	**Project Status[1]**	**Lifecycle Cost (Present Value, rounded 2019$)[2,3]**
Los Vaqueros Reservoir: Secures an agreement with Contra Costa Water District and other partners to expand the off-stream reservoir by 115,000 AF (from 160,000 AF to 275,000 AF) and construct a new pipeline (Transfer-Bethany) connecting the reservoir to the South Bay Aqueduct. Costs shown assume 30,000 AF of dedicated storage and average deliveries of 16,000 AFY of delta surplus supplies. Valley Water is still considering an appropriate participation level which may result in less storage and/or deliveries of delta surplus water. Would require funding and operating agreements with multiple parties, including formation of a Joint Powers Authority. The storage component of this project is being considered as a potential project to optimize the use of existing supplies and infrastructure.	Active	$500 million
Refinery Recycled Water Exchange: A regional recycled water project between Valley Water, Central Contra Costa Sanitary District (Central San), and Contra Costa Water District (CCWD). The project will allow Central San to provide recycled water to two oil refineries in Contra Costa County in lieu of CCWD's CVP water. CCWD will then provide its freed-up CVP supply to Valley Water. The project may make available up to 11,000 AFY of water on average. Regulatory uncertainties and operational constraints could impact the reliability of Valley Water receiving the project water.	Active	$1 billion
San Pedro Ponds: Implements a physical or institutional alternative to enable the ponds to be operated at full capacity without interfering with existing septic systems in the vicinity.	Active	$10 million

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Project	**Project Status[1]**	**Lifecycle Cost (Present Value, rounded 2019$)[2,3]**
Santa Clara Basin Percolation Pond: Constructs a new percolation pond in the Santa Clara Basin. Assumes 5 acres of ponds. Would be sited near a raw water pipeline for supplies. The cost-effectiveness is low due to the land purchase requirement.	Inactive	$50 million
Shallow Groundwater Reuse: A feasibility study for the recovery and beneficial use of shallow groundwater was completed in 2009. Although potential sites for shallow groundwater reuse were identified, challenges noted include water quality, inconsistent yields, environmental impacts (since flows often go to creeks), and lack of infrastructure for storage and conveyance. Valley Water is working to improve our understanding of dewatering sites with more consistent yield that could support potential reuse.	Inactive	TBD
Shasta Reservoir Expansion: The United States Bureau of Reclamation concluded the project is technically feasible and has conducted preliminary investigations. State law prohibits state funding for the project. Since 50 percent of project funding must come from non-federal partners, Reclamation would need non-federal and non-state agencies to share in project costs. Reclamation is not currently considering participation from Valley Water. Staff will continue to monitor opportunities related to Shasta Reservoir Expansion.	Inactive	-

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Project	**Project Status**[1]	**Lifecycle Cost (Present Value, rounded 2019$)**[2,3]
Sites Reservoir: Partnering with agencies to build an off-stream water supply reservoir (up to 1,500 TAF) north of the Delta that would collect flood flows from the Sacramento River. Potential to provide dry year yield and storage benefits. The project would be operated in coordination with the SWP and CVP, which could improve flexibility of the statewide water system but would likely be subject to operational complexity. This project is being considered as a potential project to secure existing supplies and would only become a recommended project if other recommended projects within that strategy element are insufficient to meet the Board's investment goals.	Active	
	3.2% Participation	$100 million
	6.6% Participation	$200 million
South County Water Treatment Plant: Provides in-lieu groundwater recharge by delivering treated water to the Cities of Morgan Hill and Gilroy. Would require a connection to the Santa Clara Conduit or another raw water pipeline and require pipelines from the plant to the cities' distribution systems. The South County recharge projects provide similar benefits at significantly lower cost.	Active	$100 million
Uvas Pipeline: Captures excess water (e.g., water that would spill) from Uvas Reservoir and diverts the water to Church Ponds and a 25 acre-foot pond near Highland Avenue. The new pond would be adjacent to and connected by a pipe to West Branch Llagas Creek. The South County recharge projects provide similar or better yields at a lower cost.	Inactive	$70 million

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Uvas Reservoir Expansion: Would expand Uvas Reservoir by 5,100 AF (from 9,900 AF to 15,000 AF), reducing reservoir spills. Project would be located on Uvas Creek, which currently provides good steelhead habitat. Other water storage options under consideration provide better yield for the cost.	Inactive	$300 million
Water Contract Purchase: Purchase 20,000 AF of SWP Table A contract supply from other SWP agencies. Would be subject to willing sellers' availability.	Inactive	-

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Valley Water

Clean Water • Healthy Environment • Flood Protection

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