MONITORING AND ASSESSMENT PROGRAM 2021 – PROJECT RISK ASSESSMENT

Table of Contents

INTRODUCTION

The 2040 Water Supply Master Plan (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 for current and future generations. Adopted in November 2019, the Master Plan informs investment decisions by describing the type and level of water supply investments Valley Water is planning to make through 2040, the anticipated schedule, the associated costs and benefits, and how the plan will be monitored and adjusted through the Master Plan's Monitoring and Assessment Program (MAP). Through MAP, Valley Water integrates new data, modeling, and project information as it is available into the Master Planning process to determine if the recommended projects will still achieve the level of service goal by providing Valley Water a reliable water supply that is resilient to future uncertainties. As part of MAP 2021, Valley Water is updating the project risk assessment that was performed to support the Master Plan in 2017 to address Valley Water's updated understanding of water supply projects. **The goal of the risk assessment is to determine where and what types of risk exist for projects so that Valley Water can mitigate or adapt to the risks.**

The risk assessment brings together a diverse team of experts to provide an independent and consistent review of project risks that could reduce project success, including a project's ability to be completed on time and provide the expected benefits throughout its lifecycle. In the risk assessment, Valley Water evaluated risk severity and likelihood for 10 projects or groups of projects in which Valley Water is actively engaging in planning and implementation (Figure 1). For the purposes of the risk assessment, certain projects are being considered as a group if they are similar in form and function and individual project definitions are still being refined (e.g., out-of-county groundwater banking projects and south county recharge projects). This risk assessment is evaluating a diverse array of projects with varying benefits; for example, some projects are conveyance (e.g., Lexington Pipeline) while others develop new supplies (e.g., potable reuse). Therefore, not all projects are interchangeable nor necessarily comparable. This report summarizes the MAP 2021 risk assessment approach and results.

FIGURE 1. PROJECTS CONSIDERED IN THE 2021 RISK ASSESSMENT

- Delta Conveyance Project*
- Lexington Pipeline
- Los Vaqueros Expansion*
- Out-of-County Groundwater Banking
- Pacheco Reservoir Expansion*
- Potable Reuse*
- Refinery Recycled Water Exchange
- Regional Desalination Plant
- Sites Reservoir
- South County Recharge*

* Projects recommended in the Master Plan. The Master Plan only recommends the Transfer Bethany Pipeline portion of the Los Vaqueros Expansion. The Master Plan also recommends water conservation, which was not included in the risk assessment.

APPROACH

The risk assessment evaluates the likelihood and severity of a risk materializing that would negatively impact the benefits a project could provide. The Water Supply Planning and Conservation Unit (WSPC) led the development and implementation of the risk assessment, soliciting feedback from internal Valley Water stakeholders throughout the process. Using the Master Plan risk assessment as a starting point, the WSPC developed a list of risk sources that could impact project success. Those risk sources were then organized into six risk categories, which were used to evaluate each project's risk (Table 1). Project managers shared information about their projects with risk assessment participants so that each participant had a thorough understanding of projects prior to completing the assessment. The risk assessment participants completed an online survey that requested participants to rate risk likelihood and severity on a five-point scale by category for each project.

Risk assessment participants were a subset of the broader MAP internal stakeholder group and included the project owners of the ten projects as well as representatives from units with applicable expertise, including:

- Raw Water Operations Unit
- Groundwater Management Unit
- Asset Management Unit
- Imported Water Unit
- Pacheco Project Delivery Unit
- Recycled and Purified Water Unit
- Treasury and Debt Management Unit
- Water Supply Planning and Conservation Unit
- Treatment Plant Process and Commissioning Unit
- Environmental Monitoring and Mitigation Unit

Once WSPC had a draft risk assessment approach, WSPC held a kick-off meeting on January 6, 2021 with stakeholders to discuss the risk assessment goal; propose an approach including the risk categorization, project information exchange, survey, and project list; and determine what stakeholder actions would be needed. After the kick-off meeting, stakeholders had the opportunity to review and provide comments on the proposed survey approach, risk sources, categories, and request more or different project background information. WSPC integrated all comments to create the final risk elements and sources list and risk survey. WSPC also provided project managers the opportunity to exchange information with risk assessment participants.

Final risk categories included cost, implementation, operations, political/stakeholder, water supply reliability, and climate change (Table 1). Valley Water expanded on the four risk categories used in the 2017 risk assessment to add water supply reliability and climate change to acknowledge the importance they have in impacting a project's ability to meet Valley Water's long-term water supply needs. There is inherently overlap among all six risk categories. The risk sources associated with each category were used by stakeholders in considering risk to minimize the potential overlap among the categories during the assessment.

TABLE 1. CATEGORIZED RISK SOURCES

Risk Category	Risk Sources
Costs	• Uncertainty in cost estimate • Construction, operational and/or maintenance cost increases • Cost-sharing/partner reliability • Financing and funding security • Costs related to uncertainty of regulatory and permitting requirements • Undesirable water rate impacts • Economic fluctuations and instability • Scheduling issues • Potential for stranded assets
Political / Stakeholders	• Public support/perception (includes rate payers, the public, NGO's, environmental groups, etc.) • Internal stakeholder concerns • External stakeholder opposition • Partnership coordination and negotiation • Changes in State or federal goals/participation/negotiation position • Board approval • External media communications

Risk Category	Risk Sources
Implementation	• Maturity of planning and design (e.g., early vs. late stage of implementation) • Land ownership/availability to purchase • Regulatory and permitting requirements altering project benefits and schedule prior to full operation • Lack of phasing potential • Project duration and schedule • Reoperation requirements • Additional infrastructure/capacity needed for existing system • Constructability (e.g., structural issues, technology, complexity) • Partnership agreements • Staff knowledge and resource availability • Water rights uncertainties • Project delivery method (e.g., design-bid-build vs. public-private partnership)
Operations	• Project inter-dependency • Ongoing environmental and water quality regulations and permitting • Lack of local control • Asset failure(s) • Conveyance reliability during droughts or other water shortages • Emergency impacts to water supply system elements (e.g., earthquakes, floods, levee failures, etc.) • Environmental impacts/adaptive management requirements
Water Supply Reliability	• Water quality issues • Volume uncertainty • Timing uncertainty • Delivery reliability • Lack of drought resilience or access during drought • Ongoing regulatory/permitting requirements and adaptive management
Climate Change (Impacts of climate change on project success)	• Warmer temperatures – surface storage evaporation, evapo-transpiration, water quality • Sea level rise • More frequent and/or more extreme droughts • More frequent and/or more extreme wildfires • More frequent and/or more extreme rain events • Hydrological variations (ex. less frequent but larger flows, seasonal variability) • Reduced snowpack volume • Changes in timing and rate of snowpack melt

Stakeholders completed the risk assessment survey considering the shared project information and the categorized risk source table. The survey requested each stakeholder to rate the severity and likelihood of each risk category for each project. The likelihood and severity ratings were each on a five-point scale. Risk severity was defined as the magnitude of consequence to the project while risk likelihood was defined as the probability the risk would materialize. One risk survey was completed per Valley Water unit, with nine responses total.

To obtain a category risk score by project, Valley Water multiplied the median risk scores for likelihood and severity. The total scores across all categories were combined to rank projects as lower, moderate, and higher risk projects.

RESULTS

Each project total risk score for likelihood and severity is reported in Figure 2. Risk score for each project by risk category is in Figure 3.

HIGHER RISK PROJECTS

The risk assessment results indicate that larger infrastructure projects have greater risk based on cost, political, and implementation criteria. In addition, projects which are dependent on imported water were found to have higher risk in the water supply reliability and climate change risk categories. An important exception is Los Vaqueros Reservoir Expansion, which is a large infrastructure project that relies on imported supplies but is rated as a moderate risk. The high-risk projects include the Delta Conveyance Project, Refinery Recycled Water Exchange, Pacheco Reservoir, Regional Desalination, and Sites Reservoir.

Valley Water investments are primarily needed to improve drought year supply reliability, especially in the face of climate change where droughts are expected to be more severe. The quantity of imported water available during multi-year droughts is greatly reduced compared to wet years, which may impact reliability of projects that rely on imported water allocations such as Refinery Recycled Water Exchange. While surface storage projects help mitigate the impacts of drought on imported supplies, particularly when operated in conjunction with other types of projects, their storage capabilities may be limited and thus may not provide sufficient water supplies throughout each year of a multi-year drought. Moreover, increased temperatures from climate change will increase evaporative losses from surface storage reservoirs. To provide sufficient storage to respond to the increased drought severity and reduced imported water allocations during dry years, several storage projects would likely be needed to succeed based on the current proposed project size and Valley Water project share. The Delta Conveyance Project can help protect the imported water conveyance system from sea level rise or future levee failures, which is an important benefit. However, the water supply benefit from the project may be mostly in non-drought years, and thus, the project may need to be paired with storage projects to provide a more

reliable drought year supply. The co-dependency of projects introduces implementation and operation risks since multiple projects will need to succeed and be coordinated among to achieve significant drought benefits.

MODERATE RISK PROJECTS

The risk assessment indicated that Los Vaqueros Reservoir Expansion, out of county groundwater banking, and potable reuse may have moderate risk. Los Vaqueros Reservoir Expansion may be lower risk than other imported water surface storage projects because Valley Water's storage share is relatively small and the reservoir has been expanded before successfully. However, Los Vaqueros Reservoir does have relatively high evaporative losses and may provide less storage capacity than other storage projects. Los Vaqueros may also have risks associated with conveyance capabilities.

Out-of-county groundwater banking was rated as lower risk because it requires significantly less infrastructure than all the projects in the higher risk category, which causes less cost and implementation uncertainty. While groundwater banks do generally require participants to "leave behind" a percentage of the water they store in the bank, that "leave behind" volume can be significantly less than the evaporation that would be experienced in surface water reservoirs. Evaporation from surface storage is expected to increase significantly from climate change. Also, groundwater banking projects generally have greater storage capacities than surface storage projects to store excess wet year supplies, and thus may provide supplies throughout more years of a multi-year drought. However, the risk assessment does indicate it has moderate risk for each risk category, indicating risks will persist throughout its planning and operational lifecycle. Risks are primarily associated with conveyance capabilities for putting and taking supplies from the groundwater bank and groundwater contaminant concerns. Of the groundwater banking risk scores, cost imparted the greatest risk because the projects are early in development.

The risk assessment indicated that potable reuse may have less risk than large infrastructure projects that are dependent on imported supplies. The risk assessment indicated an equal amount of risk for potable reuse and groundwater banking, but with slight differences in the risk attributed to each category. Potable reuse is a drought resilient supply that may be less impacted by climate change compared to the other projects in the risk assessment. Because of its drought and climate change resilience, the risk assessment indicated lower risks for the project once implemented when compared to other projects. However, the risk assessment did indicate that potable reuse may have significant cost and implementation risks on par with the other large infrastructure projects. These risks are primarily related to securing source water supply contracts, cost uncertainties related to plant design and procurement process, and public acceptance. Therefore, project planning and implementation may have the greatest sources of risk for potable reuse.

LOWER RISK PROJECTS

Smaller infrastructure projects that are in-county were found to be lower risk, including Lexington Pipeline and a south county recharge facility. This is primarily because Valley Water may have greater control over the implementation and operations of local projects and the smaller size of the project reduce risks associated with cost increases and project administrative requirements (e.g., easements, regulations/permits, etc.). However, the projects still have potential risks associated with source supply availability. Lexington Pipeline relies on wet year flows into the Lexington Reservoir which could become less frequent because of climate change. The water supply reliability of a new south county recharge facility is dependent on water availability which could be impacted by future regulations and climate change.

FIGURE 2. TOTAL PROJECT RISK

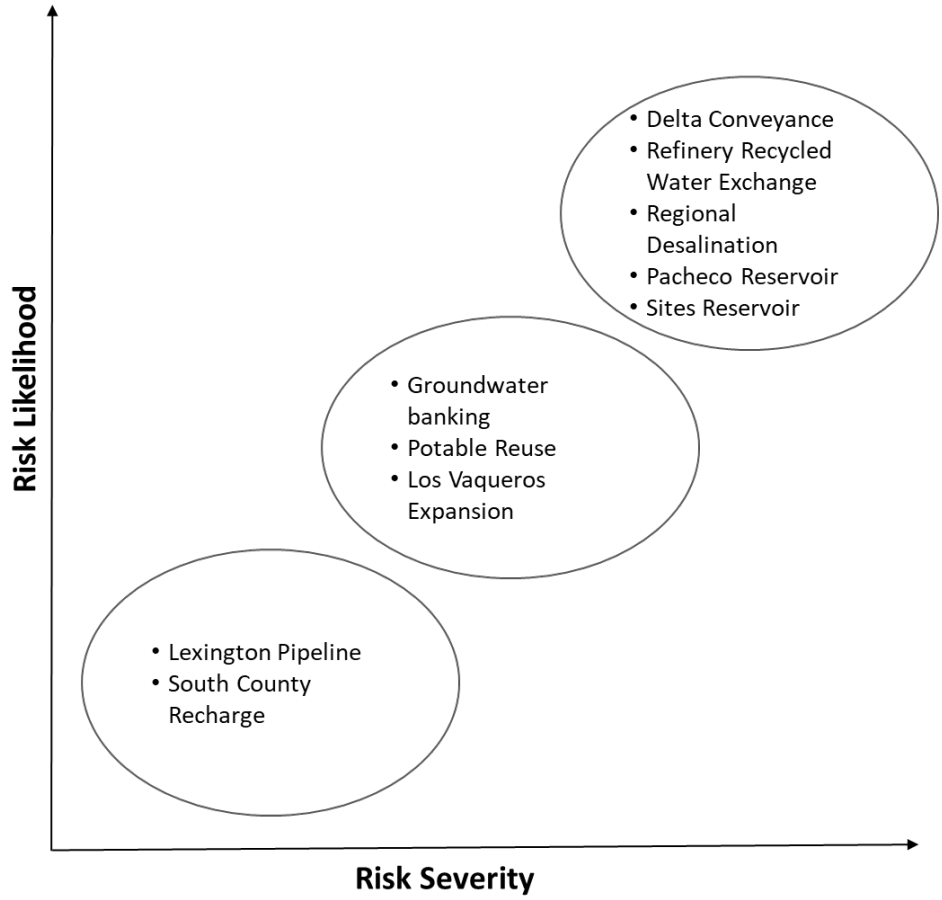
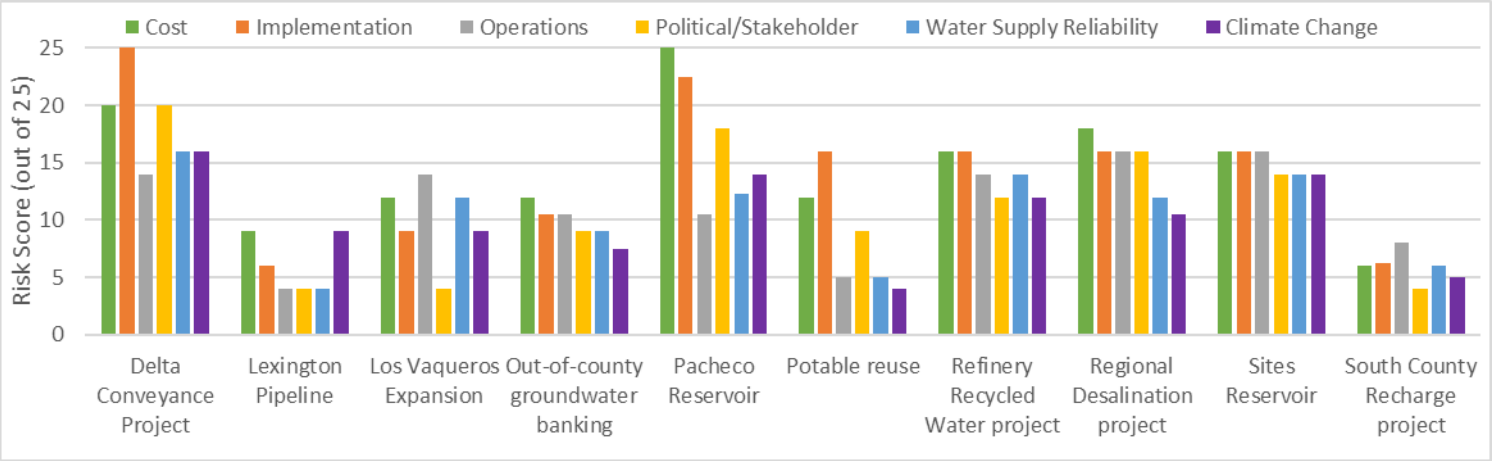


FIGURE 3. PROJECT RISK SCORE BY CATEGORY.



NEXT STEPS

This project risk assessment was performed as part of the annual MAP program that supports the Master Plan implementation. Understanding potential project risks supports Valley Water's project evaluations so that Valley Water can invest in appropriate projects to achieve its mission of securing a reliable water supply for the future. Valley Water will continue to track project risks and inform the Board of any changes in project descriptions through Board committee meetings and full Board presentations. Valley Water will also continue to mitigate potential project risks that were identified through this risk assessment and other risks that may materialize in the future. MAP is presented to the Water Conservation and Demand Management Committee and individual projects are presented to the appropriate Board committee based on project type.