GUADALUPE WATERSHED PLAN

An Integrated Approach to Water Resources Management

Final Report 2024

SANTA CLARA VALLEY WATERSHEDS: COYOTE | PAJARO | **GUADALUPE** | WEST VALLEY | LOWER PENINSULA

ONE WATER
Guadalupe Watershed Plan

Valley Water

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Valley Water, formerly the Santa Clara Valley Water District, manages an integrated water resources system that includes the supply of clean, safe water, flood protection, and stewardship of streams on behalf of Santa Clara County's 1.9 million residents.

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ONE WATER, ONE WATERSHED

CHAPTER 1: ONE WATER, ONE WATERSHED

1.1 WHY A WATERSHED PLAN?

Valley Water has played a critical role in managing water resources in Santa Clara County since 1929, first overseeing the County's water supply, and later adding flood risk mitigation and environmental stewardship to its responsibilities. As the water resources infrastructure built over the last century ages, it has become clear that the cost of repairing and replacing critical infrastructure is very high, monetarily as well as environmentally. How can Valley Water learn from the past and incorporate the best of our current collective knowledge to build a better future for water resources management? The best approach is looking to watersheds.

Watersheds are, by nature, interconnected systems. The water within them must be managed in ways that acknowledge and respond to the local ecosystem, geology, and hydrology. It is within the context of a watershed that communities either have too much water, too little water, or poor-quality water. It is within the watershed context that communities must reconcile their water demands with the imperative to sustain the resource for future generations.

A watershed plan is a way to address water resources and environmental needs holistically. One Water is Valley Water's framework for watershed management, intended to assess existing environmental and physical systems, identify areas needing improvement, and prioritize future actions to address deficiencies. As part of this process, One Water seeks to collaborate with many jurisdictions, agencies, and other stakeholders and firmly establish Valley Water's commitment to multi-benefit projects. One Water will create a Watershed Plan for each of the five watersheds in Santa Clara County. This Watershed Plan addresses the Guadalupe Watershed.

Watershed-level management brings together regional partners from within and beyond the water sector in joint planning and collaborative action to protect our water, the shared natural resource that is essential for health, agriculture, industry, ecosystems, recreation, and life itself. Planning on a watershed-level can be difficult, requiring engagement with a broad range of stakeholders with different proficiencies, priorities, and ways of working, but has the potential to yield highly beneficial outcomes. For that reason, Valley Water is committed to working with diverse communities to improve watershed health and water resources for present and future generations.

1.2 WHERE IS THE GUADALUPE WATERSHED?

The Guadalupe Watershed in Santa Clara County encompasses a 170 square-mile area between the Coyote and West Valley Watersheds. It includes portions of the cities of San José, Los Gatos, Monte Sereno, Campbell, and Santa Clara, as well as Unincorporated Santa Clara County. The southernmost point lies in the Santa Cruz Mountains, near the peak of Loma Prieta. The watershed drains northward, collecting in successively larger tributaries until it reaches the Guadalupe River and drains to the San Francisco Bay.

The watershed is home to 550,000 residents, as well as diverse communities of plants and animals. The northern, downstream portion of the Guadalupe Watershed is referred to as the valley floor. It is heavily urbanized, with relatively flat elevation. The southern, upstream portion of the watershed is less developed, with elevations that gradually increase until reaching Loma Prieta's summit at 3,700 feet.

GUADALUPE WATERSHED

172
Watershed area in square miles

130
Approximate total length in miles of all creeks in watershed

68
Approximate total length of District-owned or easement creek

WHY ONE WATER?

National Context

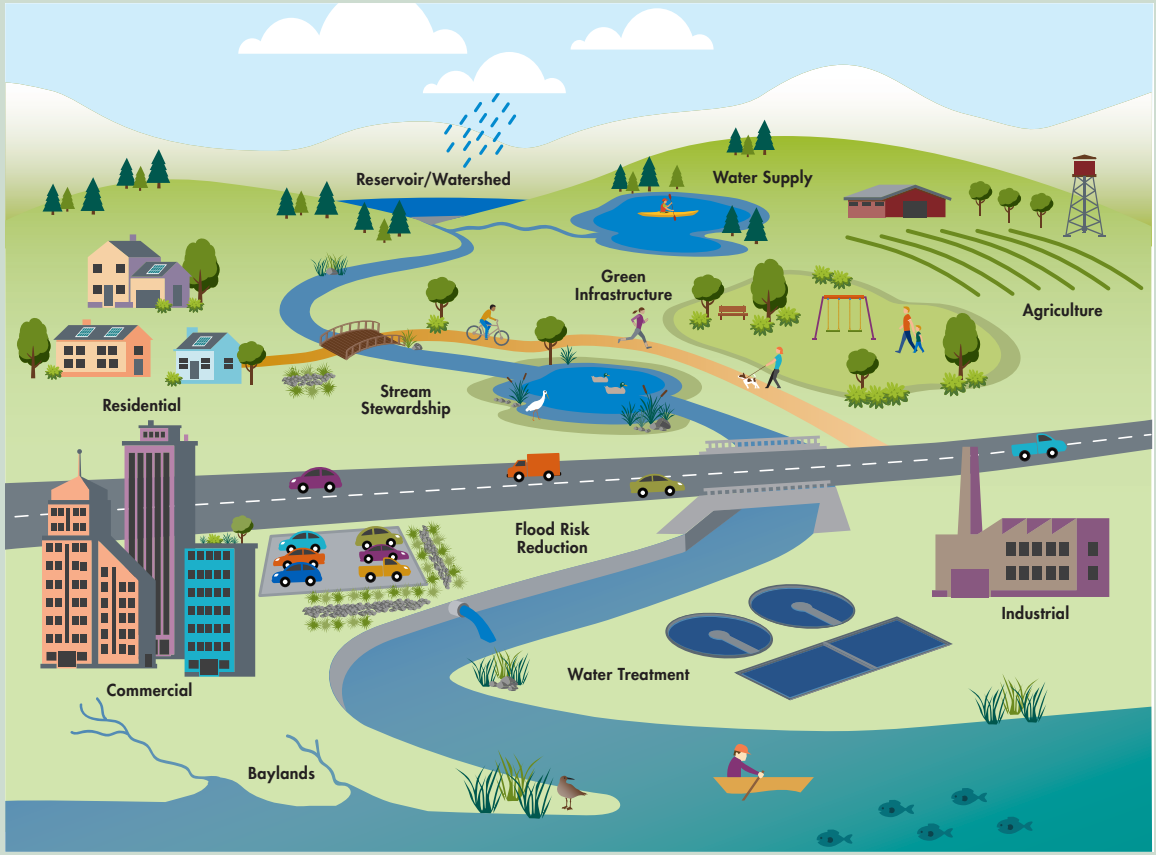
The US Water Alliance's One Water Council, a diverse group of water leaders nationwide, completed a roadmap in 2016. The roadmap reflects many key ideas and approaches relevant to Valley Water one water planning.

According to the roadmap, the hallmarks of One Water are:

1. The mindset that all water has value — from the water resources in our ecosystems to our drinking water, wastewater, and stormwater.
2. A focus on achieving multiple benefits, meaning that our water-related investments should provide economic, environmental, and societal returns.
3. Approaching decisions with a systems mindset that encompasses the full water cycle and larger infrastructure systems.
4. Utilizing watershed-scale thinking and action that respects and responds to the natural ecosystem, geology, and hydrology of an area.
5. Relying heavily on partnerships and inclusion, recognizing that real progress will only be made when all stakeholders have a seat at the table.

The One Water approach recognizes that water must be managed in ways that respect and respond to the natural flows of watersheds and the natural ecosystem, geology, and hydrology of an area. It is within the context of a watershed that communities either have too much water, too little water, or poor quality water. It is within the watershed context that communities must reconcile their water demands with the imperative to sustain the resource for future generations. Watershed-level management brings together regional partners from within and beyond the water sector in joint planning and collaborative action to protect the shared natural resource that is essential for health, agriculture, industry, aquatic species, forests, wildlife, recreation, and life itself.

In some cases, communities are reluctant to pursue watershed-level planning because it calls for engaging with a broad range of stakeholders who may have different expertise, priorities, and ways of working. It can be difficult to bring together all who influence water resources within a drainage basin—municipalities, water utilities, agricultural interests, businesses, social service organizations, consumer groups, and environmental advocates.



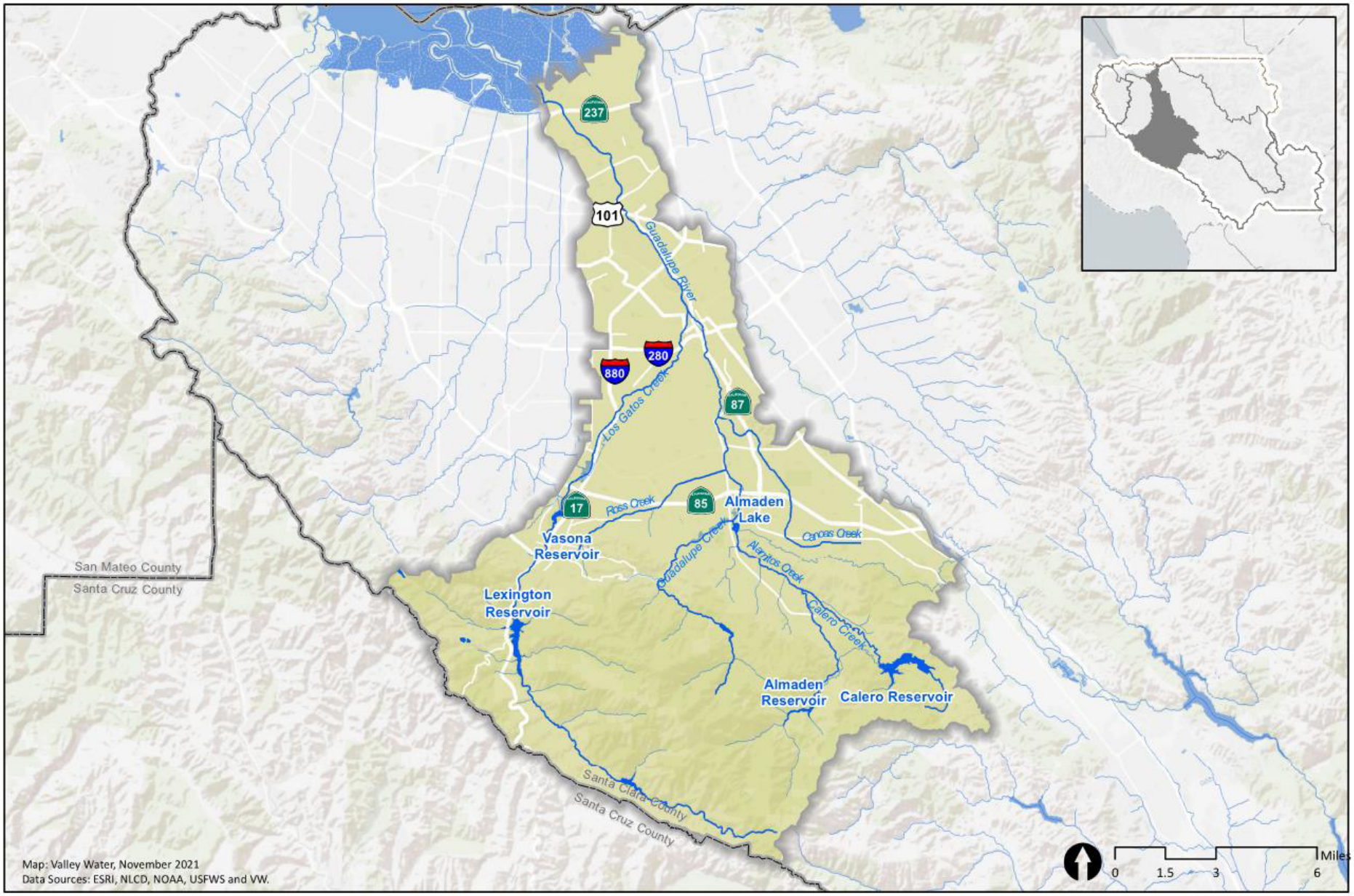


Figure 1-1: Guadalupe Watershed

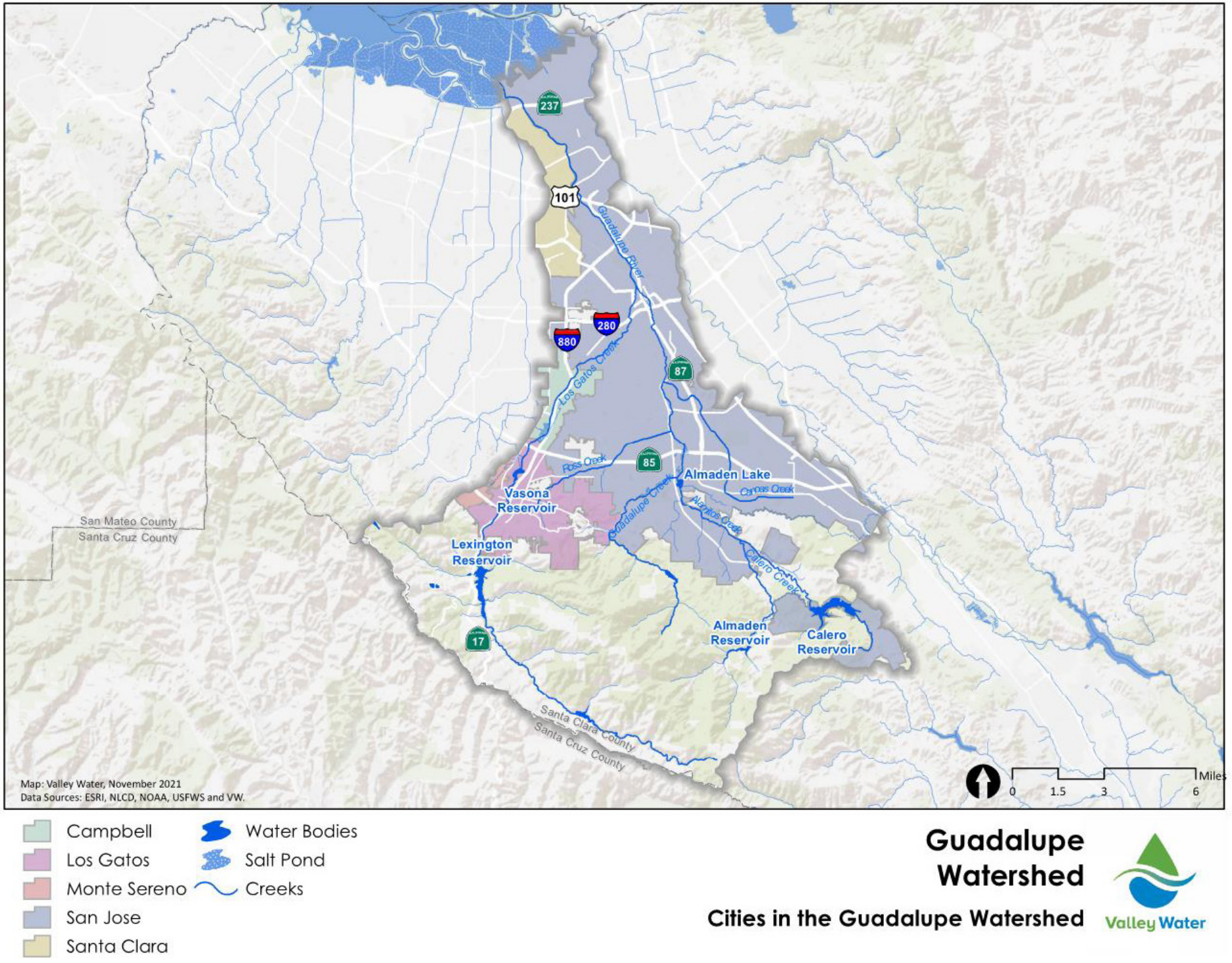


Figure 1-2: Cities in the Guadalupe Watershed

The climate of the Santa Clara Valley is classified as Mediterranean, or semi-arid, with temperatures ranging from 42-62 degrees Fahrenheit in the winter to 56-81 degrees Fahrenheit in the summer (NOAA, 2024). Rainfall has been measured in the watershed since 1874, and the average annual rainfall is about 15 inches. The amount of rainfall varies greatly by elevation, with the mountain region receiving closer to 61 inches annually, and the river basin areas receiving closer to 15 inches annually (PRISM Climate Group, Oregon State University, 2023).

The Guadalupe watershed can be further divided into four subwatersheds named after their main tributaries: Los Gatos Creek, Guadalupe Creek, Alamitos Creek, and Guadalupe River. The subwatersheds are shown in Figure 1-3. The subwatershed designations were used by Valley Water as boundaries for Watershed Management Units to be used as functional geographically based units to assist in monitoring and management (Tetra Tech, Inc., 2006).

Alamitos Creek Subwatershed

The Alamitos Creek subwatershed drains an area of approximately 38.2 square miles through Alamitos Creek and its tributaries. Alamitos Creek is a 7.7-mile-long stream with headwaters at Almaden Dam in the Santa Cruz mountains to the transition to Guadalupe River at Almaden Lake. Calero Creek is a 3.8- mile-long tributary with headwaters at the Calero Dam to the Alamitos Creek confluence. Other major tributaries that drain into Alamitos Creek are Randol, Greystone, and Golf Creeks.

Guadalupe Creek Subwatershed

The Guadalupe Creek subwatershed drains an area of approximately 14.8 square miles through Guadalupe Creek and its tributaries. Guadalupe Creek is a 6-mile-long stream with headwaters in the Santa Cruz mountains to the transition to Guadalupe River at Almaden Lake. The major tributaries that drain into Guadalupe Creek include Hicks, Pleasant, and Shannon Creek.

Los Gatos Creek Subwatershed

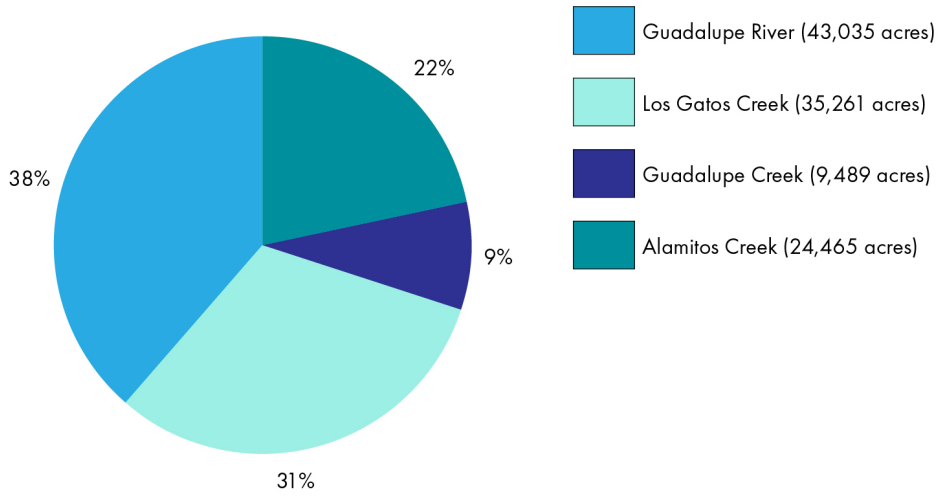
The Los Gatos Creek subwatershed drains an area of approximately 55 square miles. The main stem of Los Gatos Creek is a 12-mile-long stream beginning at Lexington Dam in the Santa Cruz mountains to the confluence with Guadalupe River near downtown San José. The main tributaries that drain into Los Gatos Creek are Trout, Almendra, and Daves Creeks.

Guadalupe River Subwatershed

The Upper Guadalupe River drains an area of approximately 41.4 square miles through Upper Guadalupe River and its two tributaries: Ross Creek and Canoas Creek. Upper Guadalupe River is a 6.4-mile-long stream with headwaters at the south end of Almaden Lake to the crossing of Highway 880 near the south end of downtown San José. Ross creek is a 6.2-mile-long channel from the foothills of the Santa Cruz mountains to the Guadalupe River confluence at Almaden Expressway and Canoas Creek is a 7.4-mile-long channel from Cottle Road to the Guadalupe River confluence at Almaden Expressway.

The Downtown Guadalupe River drains the downtown San José area of approximately 5.1 square miles. This reach of Guadalupe River is a 2.5-mile-long stretch from Highway 280 to Highway 880. Los Gatos Creek is a 12-mile-long tributary with headwaters at Lexington Dam to the Guadalupe River confluence downstream of Highway 87.

The Lower Guadalupe River drains an area of approximately 20.1 square miles. This reach of Guadalupe River is a 11.5-mile-long stretch from Highway 880 down to the San Francisco Bay.



Guadalupe Subwatershed Areas

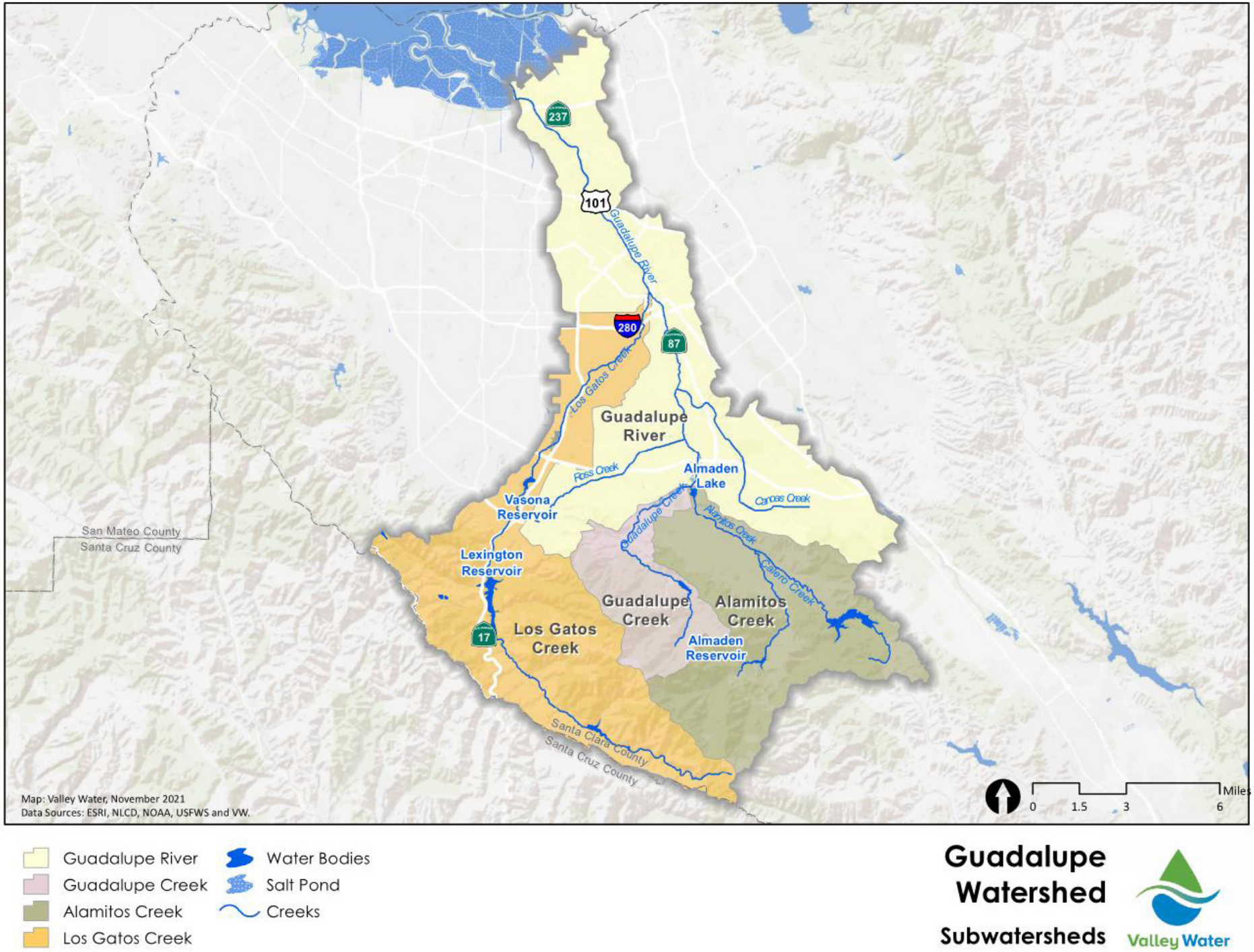


Figure 1-3: Subwatersheds

1.3 HOW IS THE PLAN ORGANIZED?

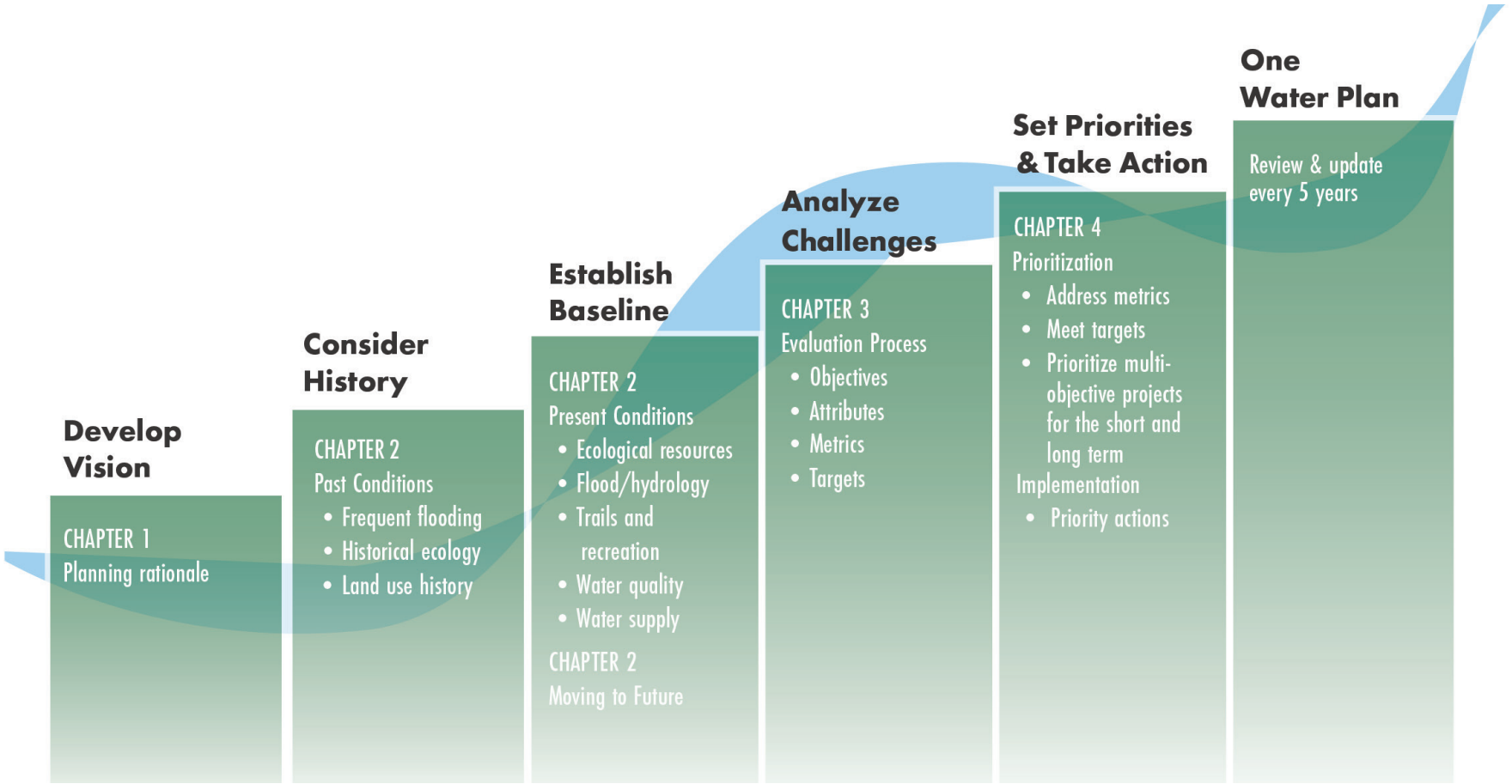
The One Water Guadalupe Watershed Plan recognizes that only by acknowledging the past and evaluating the present can we plan for a better future with integrative water resources management. The diagram below illustrates the process for realizing this vision.

Chapter 1 introduces the Guadalupe Watershed and answers the basic who, what, where, why, and how questions about this watershed plan.

Chapter 2 sets the stage for the watershed, describing past and present conditions.

Chapter 3 outlines Valley Water's framework of One Water objectives, metrics, and targets for the watershed.

Chapter 4 describes opportunities and recommendations for water resources management.



1.4 WHAT IS THE VISION?

One Water's vision and goals were developed for the One Water Countywide Framework to support Valley Water's mission and Board governance policies, which call for integrated water resources services for the community.

This vision is supported by integrated goals and measurable objectives to optimize Valley Water's management of water resources for Santa Clara County.

One Water Vision: *One Water seeks to manage Santa Clara County water resources holistically and sustainably to benefit people and the environment in a way that is informed by community values.*

Alamitos Creek. Photo: Valley Water

1.5 WHAT ARE THE GOALS?

To reach the long term One Water vision, Valley Water developed three goals that transcend individual management disciplines and address all aspects of water resources management within its jurisdiction:

1. Reliable Water Supply

Valley Water seeks to ensure that it can provide reliable water supply for people and the environment, even under uncertain conditions such as climate change, drought, and future legal and regulatory requirements. This means efficiently managing diverse supplies and extensive infrastructure while continuing to implement Valley Water's water conservation program with the community to reduce demand.

2. Improved Flood Protection

This goal aims to reduce flood risk to the community by working with nature to the greatest extent possible. For Valley Water, this means enhancing stream corridors to support the conveyance of flood flows while also providing benefits for natural ecosystems. This also includes maintaining existing facilities, reducing flood risk in vulnerable areas, and keeping the community informed and prepared for potential flood risks.

3. Healthy and Resilient Ecosystems

Valley Water recognizes the importance of healthy and resilient watersheds, riparian and tidal ecosystems, and the species that rely on these habitats to thrive. Making ecosystem health more salient in every management decision is a key concept in One Water planning.

Bay Checkerspot. Photo: Valley Water

DEFINITION OF RESILIENCE

Scientists define a resilient ecosystem or habitat as one that can withstand disturbance without changing self-organized processes and structure (Hodgson, McDonald, & Hosken, 2015). If applied to the Santa Clara Valley, a resilient landscape would have the ability to sustain native biodiversity, ecological functions, and critical physical processes over time in the face of climate change, urbanization, and other stressors (Beller, et al., 2019). The term can also be applied more broadly to social systems (such as emergency preparedness) as the capacity of individuals, communities, and systems to survive, adapt, and grow in the face of stress or shocks.

1.6 WHAT ARE THE OBJECTIVES?

The One Water planning framework developed five objectives to achieve the One Water goals, each with individual metrics and targets to measure success (further discussed in Chapter 3). Each objective aligns with the framework's vision, and are formulated to be SMART (specific, measurable, achievable, realistic, and time based) objectives.

A. Protect and Maintain Water Supplies

This objective aims to protect and maintain a reliable water supply that draws on a diverse mix of water sources — groundwater, local rainwater, surface water, imported water, and recycled and purified water— to supply diverse needs. It also acknowledges the need for expanding local supply, maintaining local groundwater levels, and encouraging water conservation to meet future urban, rural, agricultural, and environmental demands.

B. Protect and Improve Surface and Groundwater Quality

This objective recognizes the importance of maintaining high quality water in reservoirs, creeks, groundwater subbasins, and the Bay to protect public and ecological health. This will involve Valley Water meeting or surpassing applicable regulatory standards for drinking water, preventing pollution, and protecting source water (including groundwater). Meeting this objective will also require Valley Water to partner with other agencies to improve physical, chemical, and biological water quality parameters such as temperature, dissolved oxygen, turbidity, trash, and other pollutants of concern.

C. Reduce Flood Risk

This One Water objective seeks to engage in flood and floodplain management that integrates risk reduction with enhancement of natural creek corridors and floodplain functions. By promoting managed flooding and natural flood protection, Valley Water can also enhance natural riparian functions: increasing water infiltration, diversifying habitats, managing woody debris, providing life-cycle cues to sensitive species, and allowing gravel and fine sediment to move through the system. Creating an integrated flood risk management approach will also help creeks, communities, and shorelines adapt to climate change, extreme storms or heat, sea level rise, and increased urbanization.

D. Protect, Enhance and Sustain the Natural Ecosystem

The One Water approach is designed to help Valley Water balance multiple objectives, including supporting healthy ecosystems, as well as water supply and flood protection objectives. This One Water objective intends to strengthen the resilience of natural environments and ecological resources so they can better withstand stresses and disturbances such as urbanization, drought, climate change, and sea level rise. More resilient environments will, in turn, provide the services that support healthy communities. Meeting this objective will involve building more connections between habitats throughout the watershed and conserving, expanding, and enhancing native habitats.

E. Mitigate and Adapt to Climate Change

This One Water objective is to prepare for and adapt to climate change effects that include temperature increases, precipitation changes, weather extremes, and sea level rise. These effects may increase water supply constraints and uncertainties, increase the severity or duration of droughts, flooding, and wildfire, and create added stress on native species and riparian and wetland ecosystems. Managing whole watersheds, while striving for One Water integration, will be critical in creating the kind of flexibility and resilience in water resources management necessary to mitigate and adapt to uncertainties and unforeseen impacts.

Restoration area sign. Photo: Valley Water

Ulistac Natural Area. Photo: Katie Muller

1.7 WHO WAS INVOLVED?

Valley Water provided multiple opportunities for community engagement in watershed planning throughout the development of the One Water Guadalupe Watershed Plan, including outreach survey, virtual, and in-person meetings. Close coordination with existing plans and programs from Valley Water as well as other local agencies allows One Water to build on previous successful endeavors and incorporate relevant expertise. It also allows One Water and its vision to become integrated into corresponding planning and implementation efforts.

Valley Water Subject Matter Experts

Valley Water engaged a group of internal staff subject matter experts to fully represent the five Objectives of One Water. This group provided significant input in all aspects of the Guadalupe Plan, including past and present information for each objective, data for each metric and target, and the Watershed Actions. The full list of subject matter experts is listed in the beginning of this report.

One Water Steering Committee

The One Water team convened a steering committee to share the draft watershed actions and discuss options for prioritization and implementation. The steering committee included Deputy-level officers from all areas of Valley Water. The list of participants is listed in the beginning of this report.

External Stakeholder Engagement

Valley Water also engaged a large group of external stakeholders comprised of public agencies, local governments, non-profits, community groups, and neighborhood groups. The roster included 248 individuals from 158 different agencies and organizations, with the intention of reaching a diverse representation of individuals that are invested in the Guadalupe watershed. More detail on stakeholder outreach is recorded in the Appendix A.

Board Committees and Advisory Committees

The Guadalupe Watershed planning team met with the Board Policy and Planning Committee as well as the Environmental and Water Resources Advisory Committee to present the Flood Vulnerability Assessment and the draft Watershed Actions.

2

SETTING

Guadalupe River, Airport Reach. Photo: Valley Water

CHAPTER 2: SETTING

2.1 INTRODUCTION

This chapter summarizes existing conditions and identifies challenges and opportunities for the five One Water Objectives. Detailed existing conditions information is provided in the Guadalupe Watershed Setting Report, available on the One Water website.

2.2 LAND USE

2.2.1 *Past Conditions*

Past land use patterns and historical ecology of the watershed is well described in Grossinger, et al 2006, Tetra Tech 2006, and other sources. Several particular historical events and land uses continue to shape the watershed and management options. Notably, in the late 1840's the New Almaden Mining District began removing large amounts of cinnabar from the Alamitos subwatershed, and large-scale mercury mining in the Guadalupe subwatershed began in 1850 at the Guadalupe Mine Works (most of which was eliminated by early 1900's, but some activity continued until 1975).

The flood of 1852-53 created the confluence of Los Gatos Creek and the Guadalupe River, and the surrounding willow groves were removed to make way for farmland. In 1857, Kirk Ditch become the first of many diversions of Los Gatos creek for irrigation. Sometime between 1850 and 1876 (or potentially even earlier), the Guadalupe River was partially diverted to Alviso Slough, which had a naturally deeper channel, making it easier to navigate by ship. In 1888 the confluence of the Los Gatos Creek and the Guadalupe River was straightened and widened to provide increased flood capacity (Tetra Tech, Inc., 2006). Over the next century many more creeks miles were straightened and simplified to make room for and prevent flooding of agricultural lands and later suburban and urban development.

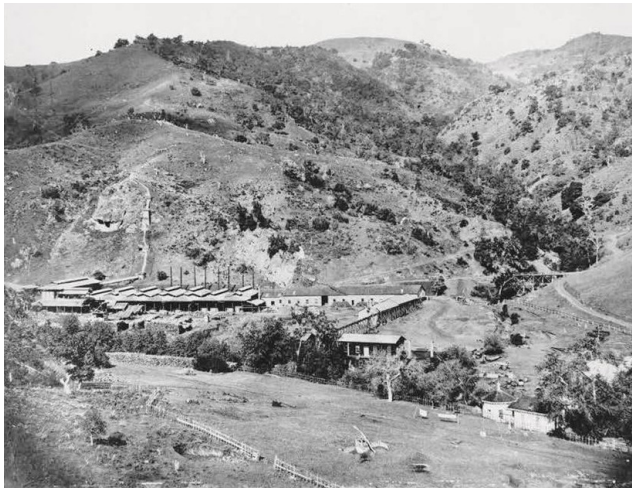


Figure 2-1: Mining furnaces at the Hacienda Furnace Yard at New Almaden in 1877 (Tetra Tech, Inc., 2006).

The following decades were marked by more frequent dry years which, combined with a growing population and shift from grazing and wheat production to orchards and other irrigated crops, increased demand for groundwater pumping and creek diversions to meet the water supply needs of the Santa Clara Valley (Grossinger, et al., 2006). By the 1920's, it was recognized that the groundwater table was declining. In response to a lower groundwater table, and higher demand for water supply, the Santa Clara Valley Water Conservation District was formed in 1929 (Tetra Tech, Inc., 2006). It was the county's first water district, and the predecessor to today's Valley Water. This era also marked the beginning of widespread conversion of tidal wetlands for salt production. Starting in 1898, salt ponds were constructed between Charleston and Guadalupe Sloughs.

Historically, the Guadalupe River watershed supported a diverse array of habitats that were vital to the ecology and culture of the region, from oak woodlands in the south to extensive wetlands in the north. Prior to Euro-American settlement, the creeks and rivers of the watershed were much less connected. Streams in the upper watershed were almost all discontinuous channels, which fanned out and infiltrated into the ground in the pervious soil of the foothills, or flowed into the wet meadows, wetlands, and willow groves in the impervious clay soils of the lower watershed (Beller, Salomon, & Grossinger, 2010).

Figure 2-2: Comparison of historical (top) and contemporary (bottom) lower Guadalupe River, illustrating its channelization and loss of adjacent riparian forest (Beller, Salomon, & Grossinger, 2010)

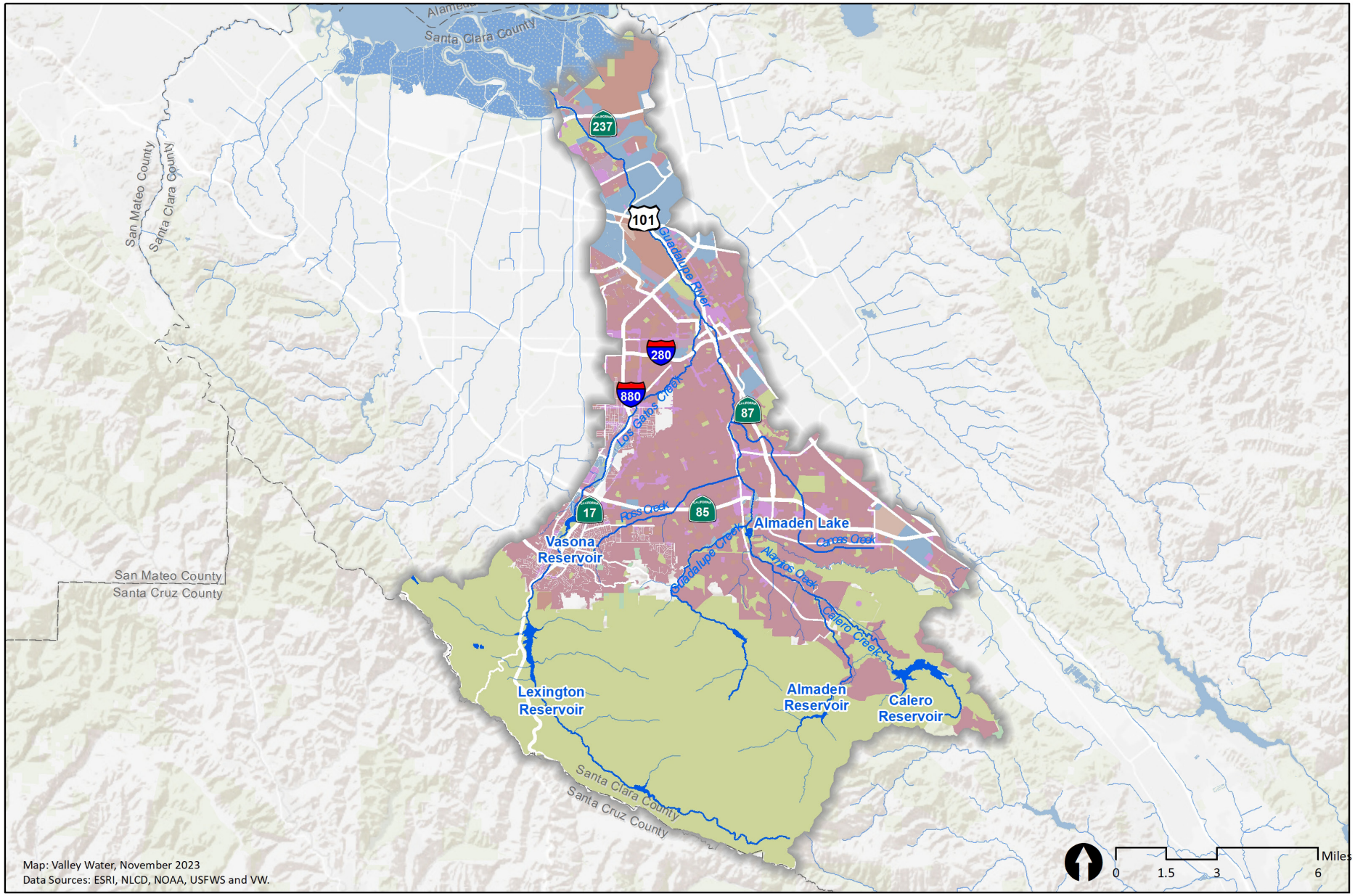


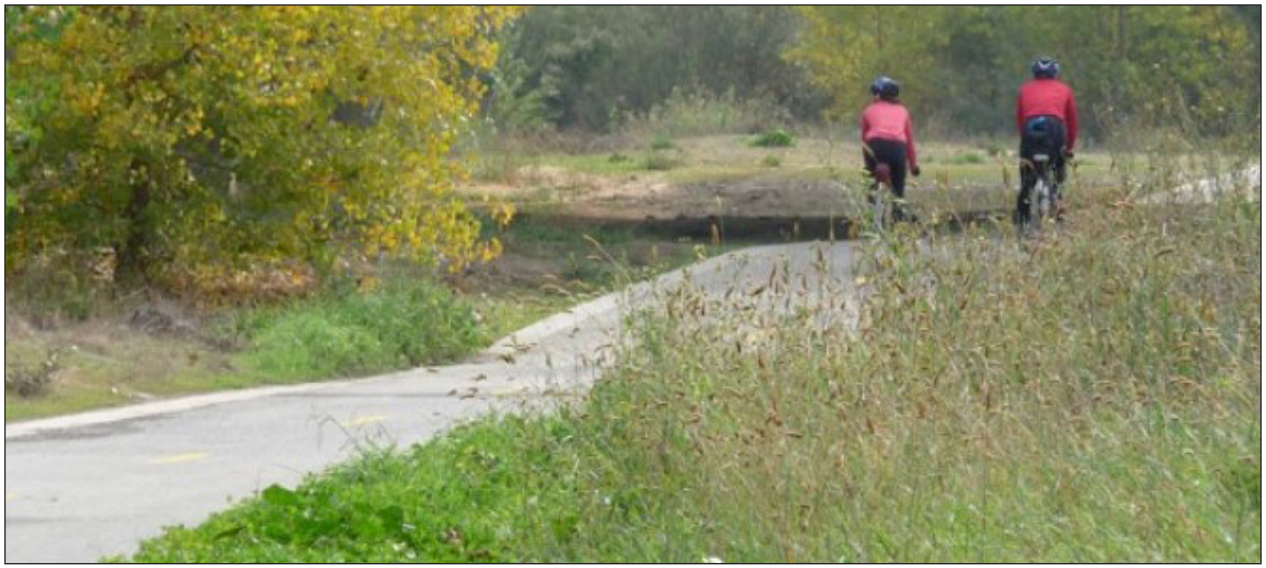
Figure 2-3: Land Use in the Guadalupe Watershed

2.2.2 *Present Conditions*

Presently, approximately 30 percent of the Guadalupe watershed is residential land, with nearly 20 percent commercial, industrial, and other developed uses. Just over half of the watershed remains undeveloped as parkland and open space (Figure 2-3), the majority of which is unincorporated. The City of San José comprises 46,802 acres or 42 percent of the watershed. Santa Clara, Campbell, Los Gatos, and Monte Sereno also occur within the boundaries of the Guadalupe watershed. Each city or municipality, as well as Santa Clara County, has a general plan concerning land use, setting urban boundaries to limit sprawl while preserving open space, agriculture, and other natural resources. Valley Water holds land rights (fee or easement) to only 4,176 acres along creeks and other water bodies in the Guadalupe Watershed. Valley Water coordinates with land-use agencies to align water resources management objectives.

Parks and Trails

More than 40% of the Guadalupe Watershed is open space or parkland, and trails occur along all major creek reaches on the Valley Floor. Valley Water's Public Trails Policy Criteria and Guidance provides objective criteria for partner agencies to construct and operate trails on its lands, and Plans that provide guidelines for trail development and maintenance in the Guadalupe Watershed are described below. These plans inform Valley Water partnerships, joint use agreements, and capital plans concerning trail and recreation components.



Pedestrian and Bicycle Trail along Guadalupe River. Photo: Valley Water

Guadalupe River Park Master Plan (2002)

The Guadalupe River Park was created as part of the Downtown Guadalupe Flood Protection Project. The Guadalupe River Park Master Plan established the park as an aesthetic and recreational resource, combining flood risk reduction and recreational elements to create a unique space for people to feel part of the natural system (San José Redevelopment Agency, 2002). More recently, the Re-Envisioning the Guadalupe River Park effort seeks to transform the Guadalupe River Park from an underutilized space to an asset for the community and the environment (SPUR, 2019).

Santa Clara Countywide Trail Master Plan

The Santa Clara Countywide Trail Master Plan was last updated in 1995 but is now undergoing a revision in 2024. In 1995, the master plan proposed 535 miles of off-street countywide trail routes (105 miles of which were in existence in 1995) and an additional 120 miles of bike trails. The plan links Guadalupe River trails through San José to other cities and parts of the Guadalupe Watershed (Santa Clara County Trails Plan Advisory Committee, 1995).

City of San José Trail Program Strategic Plan

This 2016 plan defines the current state of the City of San José's trail network, offers guidance on how San José can leverage its trail network, and presents options to accelerate the pace and scale of trail development. Many of the remaining miles to be developed are more complex projects involving potential impacts to riparian resources and habitats that will create environmental compliance challenges, and future flood risk reduction projects.

2.2.3 Future Conditions, Challenges, and Opportunities

Challenges

Jurisdictional Complexity

Valley Water does not have authority over city or countywide land use and development patterns. The ability to directly regulate land use lies with individual cities and the County, which establish zoning and general plan designations and have the authority to approve development proposals. As such, Valley Water has little influence over urban development. This represents a fundamental challenge to Valley Water's ability to provide flood protection and stewardship in the Guadalupe Watershed.

Access and Equity

A disadvantaged community is an area whose residents are disproportionately impacted from a combination of economic, health, and environmental burdens, such as poverty, high unemployment, environmental pollution, the presence of hazardous waste, or environmental degradation. These communities often are comprised of people who have suffered historical discrimination based on race, color, national origin, tribe, culture, income, immigration status, or English language proficiency. Disadvantaged communities in the Guadalupe watershed, shown in Figure 2-4 are both a challenge and an opportunity for Valley Water, and are the focus of the Racial Equity Diversity and Inclusion (REDI) Office.

Climate Change

Climate change is recognized as a threat multiplier for natural disasters like drought, wildfire, severe storms, and floods. These natural disasters historically occurred in the Guadalupe Watershed and climate change will increase their levels of risk. As such, promoting land use planning that accounts for climate-related risks and development practices that promote climate adaptation should be central to land use decision-making moving forward.

Opportunities

Land Use Coordination

By identifying linkages between One Water and the General Plans of nearby cities and towns, Valley Water and its partners can work together to support mutual goals. Shared goals for the watershed include water conservation, promoting efficient water use and reuse in new developments by requiring water-efficient fixtures and appliances as well as drought tolerant landscaping, access to open space, riparian protection, and green stormwater infrastructure.

Increased Ecological Connections

Since much of the open spaces and recreational areas in the watershed are not owned by Valley Water, partnerships to enhance ecological connections are a critical piece to making progress. Prioritizing, protecting, and expanding linkages between habitats can have multiple benefits to flood risk reduction and water quality as well as the environment. Similarly, acquiring land for use as open space or recreation in locations near waterways can provide opportunities to expand floodplains and enhance natural processes.

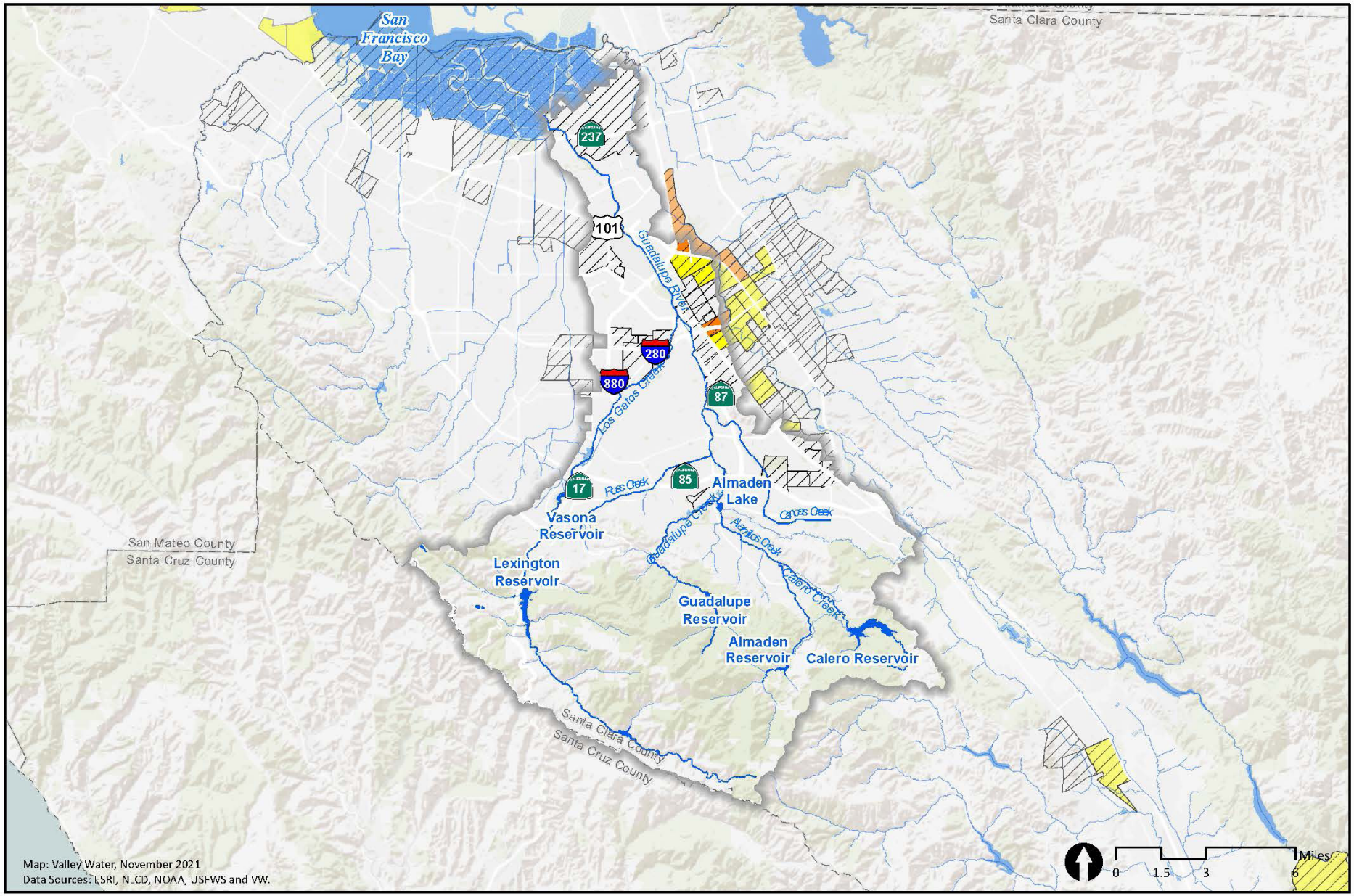


Figure 2-4: Disadvantaged Communities in the Guadalupe Watershed

2.3 ECOLOGICAL RESOURCES

2.3.1 *Present Conditions*

The primary land cover types and associated natural communities found in the Guadalupe Watershed are depicted in Figure 2-5. The diversity and extent of natural communities of the Watershed support about 80 special-status wildlife and plant species. Descriptions of terrestrial natural communities and the special-status species they support are provided in the Guadalupe Watershed Setting Report.

Stream and Riparian Habitat

Streams provide valuable habitat, convey stormwater runoff through developed areas, sustain riparian and bayland ecosystems, and provide aesthetic and recreational resources, among other functions and services. As such, these habitats are protected under a variety of local, state, and federal regulations, and their condition and management are a key concern for Valley Water.

The condition of Guadalupe watershed creeks was measured and assessed in 2012 and again in 2022. California Rapid Assessment Method (CRAM) surveys were conducted at over 50 sites, representing the range of stream and land use patterns in the watershed (San Francisco Estuary Institute & Aquatic Science Center, 2013). Based on the resulting CRAM scores, streams in the non-urban portions of the watershed are in moderately good to good health. These streams generally have undeveloped lands around them which buffer the stream and provide natural flow patterns; include benches or inset floodplains along their channels for flow retention and habitat development; have a variety of aquatic habitat features, such as woody debris, pools, and riffles; and support a diversity of primarily native plants.

In the urban area, about half of the stream miles are in moderately good to good health and the other half are in poor to moderately poor health. These streams have much higher amounts of nearby and surrounding development; flow may be unnatural or highly managed; aquatic habitat is simplified; and vegetation may be missing, sparse, or dominated by non-native species. Approximately 20% of creek channel length in the watershed now supports little to no riparian vegetation (San Francisco Estuary Institute & Aquatic Science Center, 2013).

The presence of water allows for a wide variety of non-native and typically invasive trees and shrubs to establish along creeks. Eucalyptus and highly invasive giant reed are two common non-native species in the watershed that invade and degrade creek habitats.

Despite the dramatic alterations, urban reaches of the watershed continue to support native and special-status fish and wildlife, and the preservation and enhancement of those reaches is necessary to sustain those species. As such, poor condition reaches should be focal areas for enhancement to make substantive improvement in watershed health and support wildlife, but will require additional analysis and planning to identify the most appropriate actions and sites. Figure 2-6 identifies high quality riparian areas that should be protected, as well as lower-quality sites that can be enhanced.

Steelhead/Rainbow Trout Habitat Conditions

Seven native fish species and fourteen non-native fish species occur within the Guadalupe watershed. Steelhead, referred to as steelhead/rainbow trout in this plan, in the Guadalupe River watershed are threatened under the federal Endangered Species Act. Additionally, Central Valley fall-run Chinook salmon, which is designated as a federal and state species of special concern, use stream reaches within the Guadalupe River watershed. These salmonid species are born in freshwater streams and migrate to the ocean to live as adults, a diverse life history strategy known as anadromy. Mature adults then return to their natal creeks and rivers to spawn, and the process starts over again. The non-anadromous, or resident, form of steelhead is known as rainbow trout. Parts of the watershed are designated critical habitat for steelhead/rainbow trout and the species is a valuable indicator of overall aquatic habitat connectivity and health. As such, descriptions of fish habitat conditions in this plan are focused on steelhead/rainbow trout. Due to their overlap in habitat and life history requirements, Valley Water's management efforts for steelhead also support the conservation of Chinook salmon.

Steelhead. Photo: Valley Water

Barriers to passage, poor water quality (e.g., high stream temperatures, turbidity, nutrient impairment, pollution), lack of suitable habitat and food availability for different life stages, and non-native species are the primary challenges that steelhead/rainbow trout face in California. Sediment deposition, altered hydrology, grade control structures, dams and drop-structures, in-channel lakes and large pools, and culverts all contribute to challenging passage conditions. Conditions in the major subwatersheds—Guadalupe River and Los Gatos, Guadalupe, Alamitos, and Calero creeks—for steelhead/rainbow trout are summarized below.

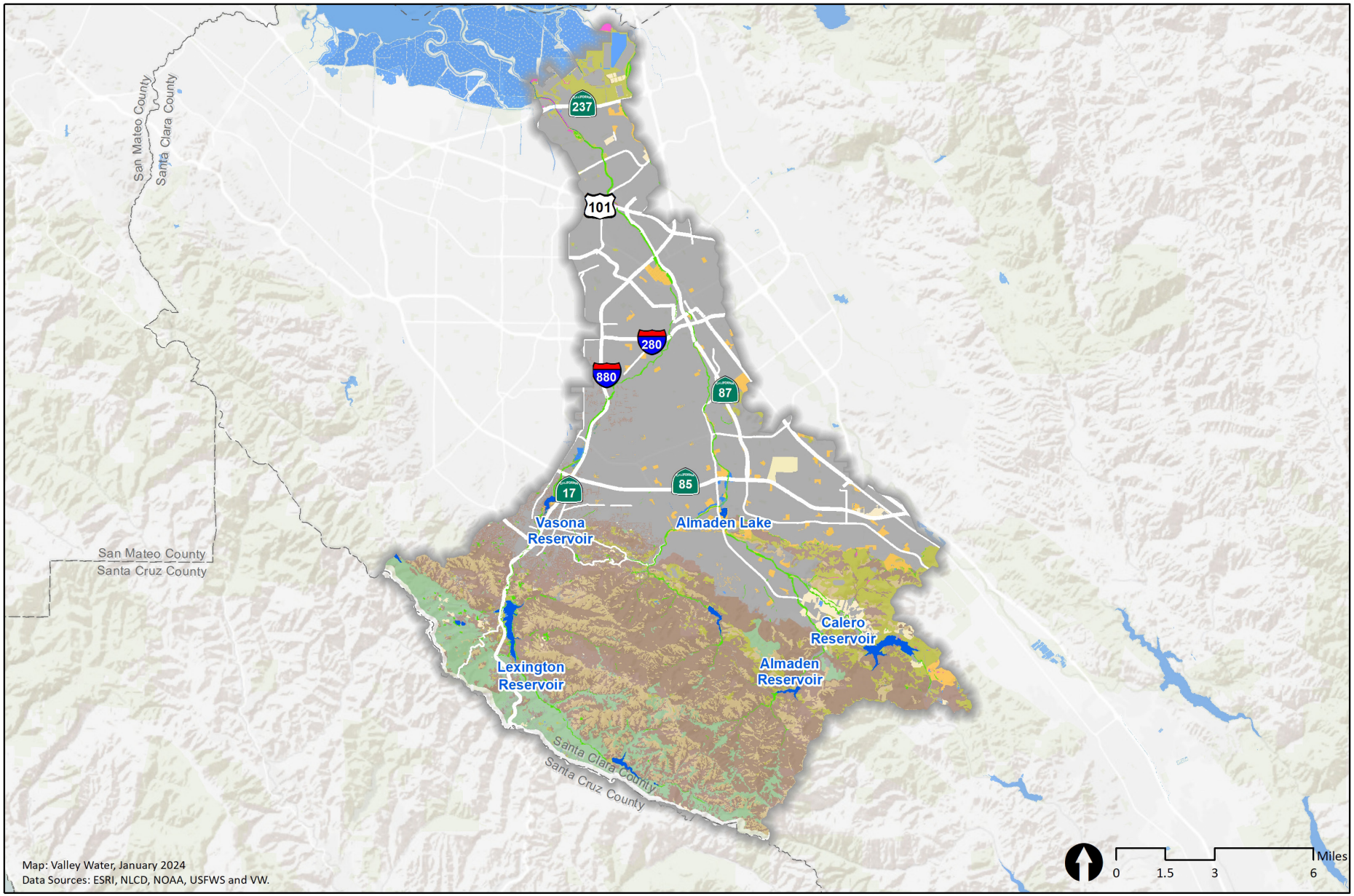


Figure 2-5: Natural Communities in the Guadalupe Watershed

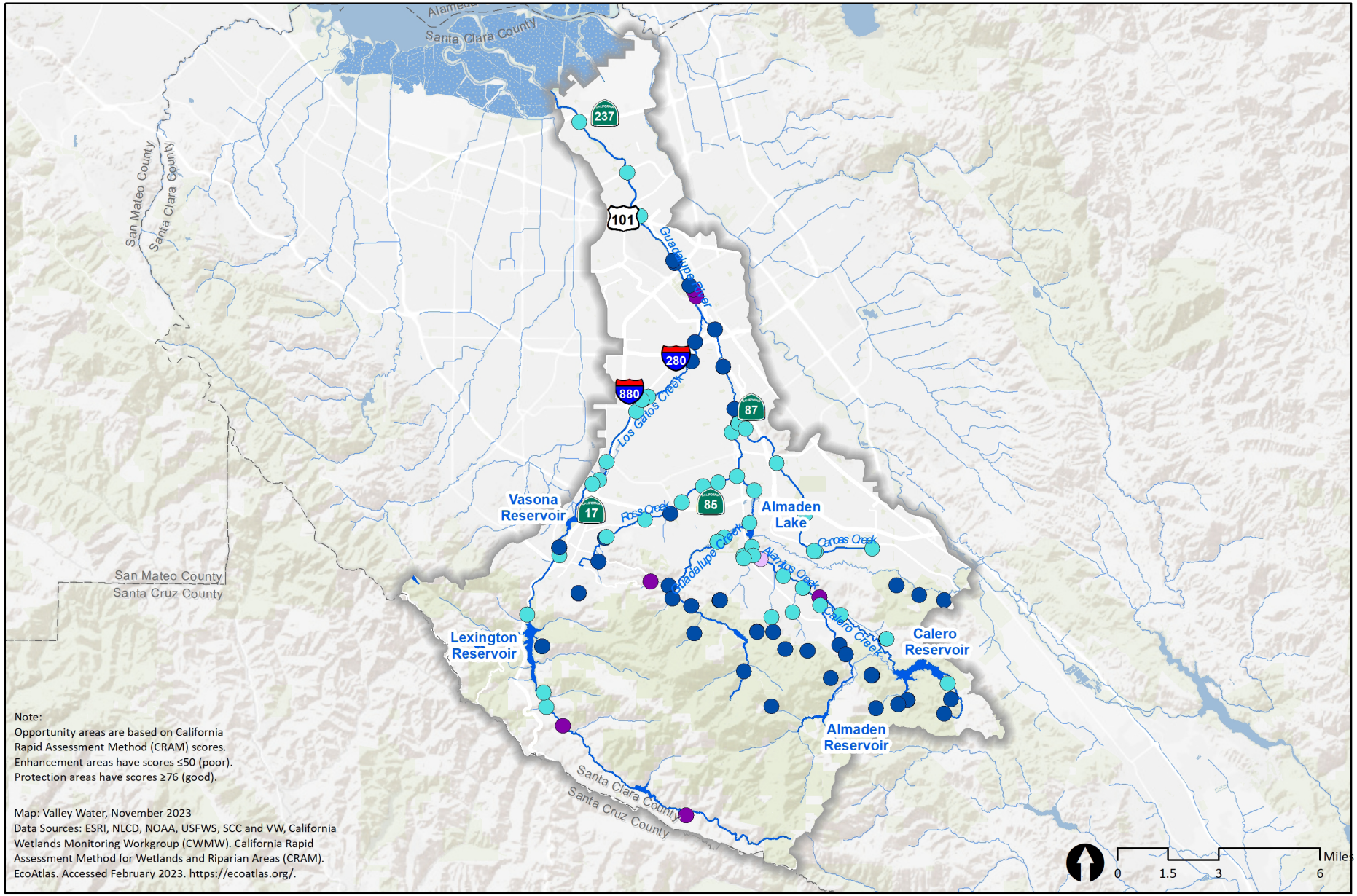


Figure 2-6: Creek Areas Where Good Conditions Could be Protected or Poor Conditions Could be Enhanced in the Guadalupe River Watershed

Table 2-1: Summary of aquatic habitat conditions for steelhead/rainbow trout in Guadalupe River subwatersheds

Condition	Guadalupe River	Los Gatos Creek	Guadalupe Creek	Alamitos Creek	Calero Creek
Steelhead Use	· Mainly used as a migratory corridor · Used for seasonal rearing when and where conditions are suitable · Reduced spawning potential due to watershed position · Designated critical habitat from SF Bay to West Hedding Street	· Can be used for all life history stages when and where conditions are suitable · Undetected below Camden Avenue drop-structure since 2014 · Resident rainbow trout present above Vasona Reservoir	· Used for all life history stages · Cold Water Management Zone from Guadalupe Reservoir to Camden Avenue to support spawning and rearing · Resident rainbow trout present above Guadalupe Reservoir	· Used for all life history stages · Resident rainbow trout present above Almaden Reservoir	· Used for all life history stages
Fish Passage Impediments[1]	· Partial impediments only from sediment and debris accumulation	· Several partial impediments from weirs and a grade control structure downstream of Camden Avenue drop-structure · Full impediment from Camden Avenue drop-structure (end of anadromy) · Additional full and partial impediments from drop-structures, dams, and other structures upstream of Camden Avenue drop-structure	· Partial impediments from aggraded sediment, a wooden flashboard dam at Hicks Road, an old dam below Guadalupe Reservoir*, and the Pheasant Creek culvert* · Full impediment from Guadalupe Reservoir Dam (end of anadromy)	· Partial impediments from Almaden Lake (due to entrainment), weirs, and a drop-structure at Bertram Road bridge* · Full impediment from Almaden Reservoir Dam (end of anadromy)	· Full impediment from Calero Reservoir Dam (end of anadromy, but there is no suitable habitat upstream of the dam for steelhead)
Water Quality Impairments[2]	· Mercury · Trash · Pesticides (diazinon)	· Water temperature · Pesticides (diazinon)	· Mercury	· Mercury	· No listings
Other Habitat Conditions[3]	· Long mid-channel pools degrade water quality, simplify aquatic habitat, limit food production, and concentrate non-native fish · Sediment deposition during high flow events can hinder passage in some reaches · Trash, pollutants, and streambank erosion from encampments · Increase in water temperature from Almaden Lake	· Long mid-channel pools degrade water quality, simplify aquatic habitat, limit food production, and concentrate non-native fish · Little to no coarse sediment or woody debris supply to some reaches · Trash, pollutants, and streambank erosion from encampments ·Increase in water temperature from impoundments	· Little to no coarse sediment or woody debris supply to some reaches · Trash, pollutants, and streambank erosion from encampments in lower reaches	· Little to no coarse sediment or woody debris supply to some reaches · No suitable habitat through Almaden Lake	· Little to no coarse sediment or woody debris supply
Completed Enhancement Projects	· Upper Guadalupe River Reaches 10B and 12 aquatic habitat enhancements · Upper Guadalupe River Reach 6 Aquatic Habitat Improvement Project – Phase 1 · 9 major passage barrier remediations (fish ladder, channel improvements, weir installations and retrofits)	· Los Gatos Creek Instream Habitat Complexity Project (between Highway 17 and Creekside Way)	· Guadalupe Creek Restoration Project (Masson Dam to Almaden Expressway) · 4 major passage barrier remediations (fish ladders, channel improvements, weir retrofit)	· Alamitos Creek Instream Habitat Complexity Project (near Mazzone Drive) · Alamitos Creek Geomorphic Restoration Project (near Greystone Lane) · Passage barrier remediation of the Mazzone Drive drop-structure	
Enhancement Priorities[3]	· Plan and implement gravel and large woody debris augmentation in priority locations[4] · Continue Upper Guadalupe River Reach 6 Aquatic Habitat Improvement Project · Incorporate aquatic habitat enhancements into USACE Upper Guadalupe River Flood Control Project · Assess feasibility of modifying Alamitos drop structure to enhance habitat	· Plan and implement gravel and large woody debris augmentation in priority locations[4] · Remediate passage impediments downstream of Camden Avenue drop-structure · Assess feasibility of beneficial use of large wood and sediment from Lexington Reservoir	· Plan and implement gravel and large woody debris augmentation in priority locations[4] · Remediate passage impediments downstream of the reservoir	· Plan and implement gravel and large woody debris augmentation in priority locations[4] · Remediate passage impediments downstream of the reservoir · Separate and restore Alamitos Creek through Almaden Lake	· Plan and implement gravel and large woody debris augmentation in priority locations[5]

*Indicates a priority barrier under FAHCE.

Sources: (Smith, 2013); (SCVWD et al., 2003); (Hobbs, Cook, & La Luz, 2014); (Valley Water and Stillwater Sciences, 2015); (Valley Water and Stillwater Sciences, 2016); (Valley Water and Stillwater Sciences, 2017); (Tetra Tech, Inc., 2006); (Valley Water, 2019f); (Valley Water, 2020b); Valley Water (Valley Water, 2021a); (Valley Water, 2022a); (Valley Water, 2023a); (Valley Water, 2023b); (Valley Water, 2024).

[1] See Figure 2-7, Figure 2-8, Figure 2-9, Figure 2-10 for locations. List excludes natural barriers. Data source: (California Department of Fish and Wildlife, 2023a). The current status of all total and partial barriers is uncertain as they have not all been assessed by Valley Water staff.

[2] Source: (California State Water Resources Control Board, 2021).

[3] See List of Watershed Actions for more details.

[4] (Balance Hydrologics, 2018).

[5] (AECOM, 2024).

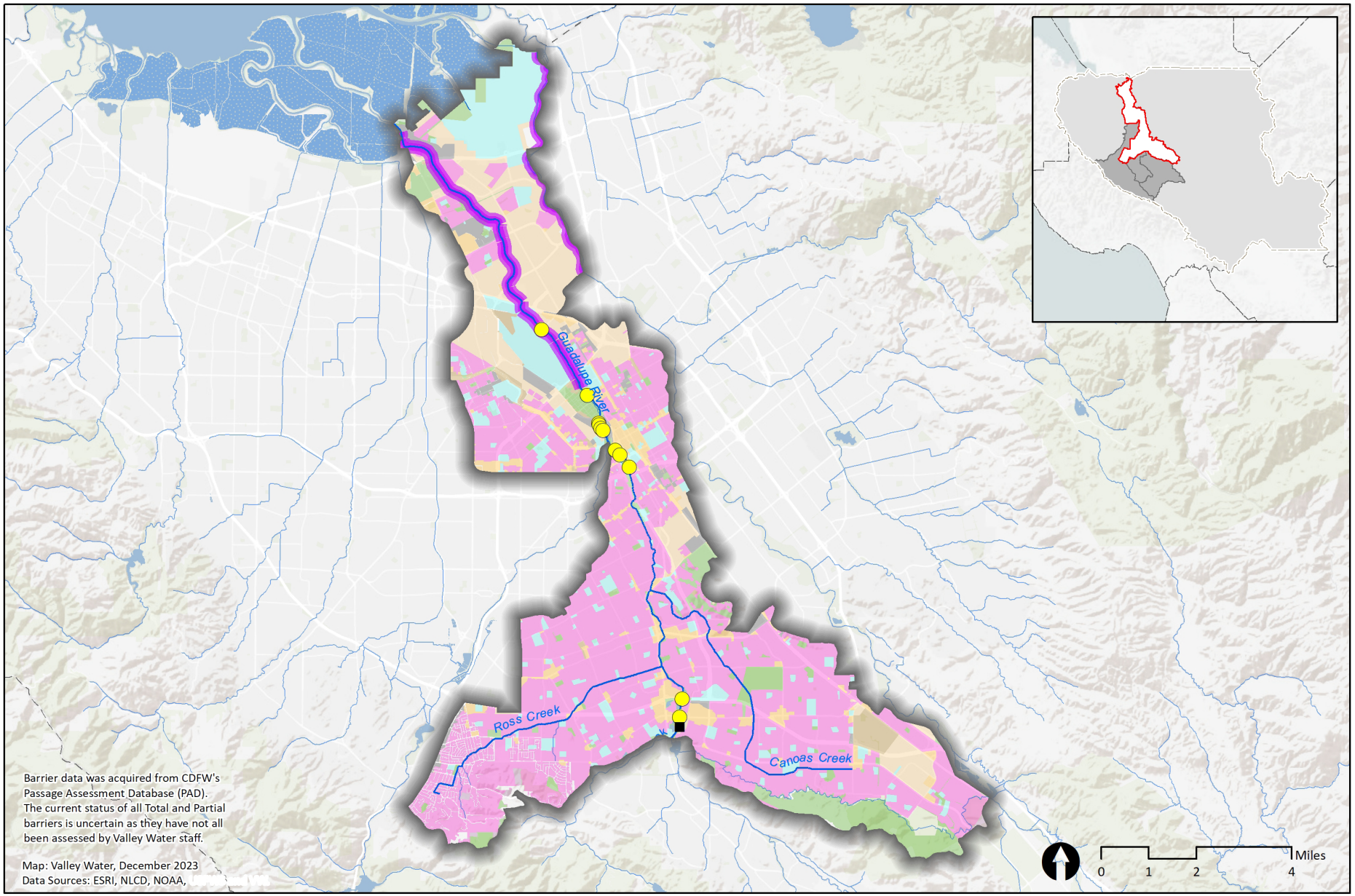


Figure 2-7: Fish Habitat Conditions in the Guadalupe River Subwatershed

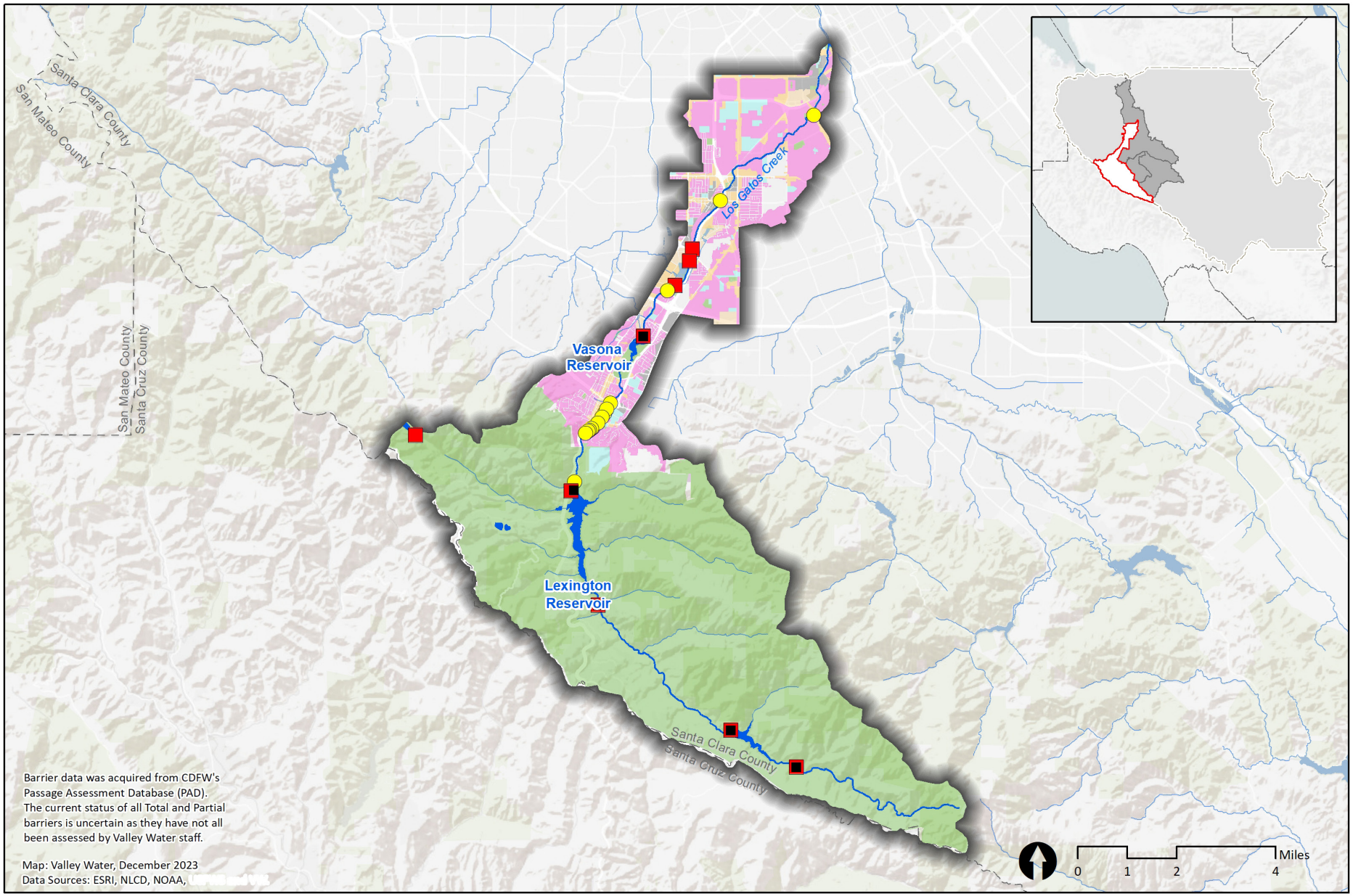


Figure 2-8: Fish Habitat Conditions in the Los Gatos Creek Subwatershed

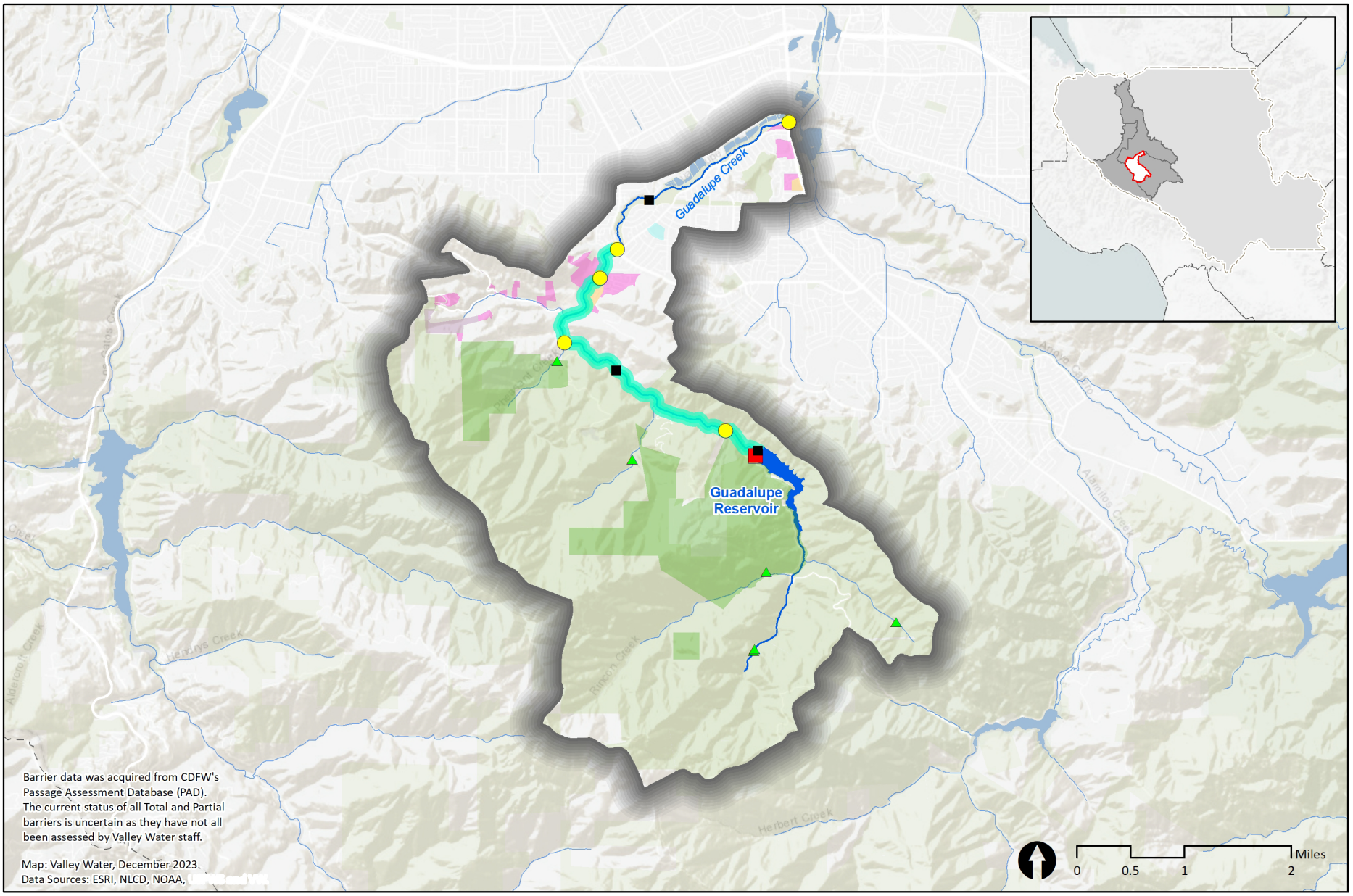


Figure 2-9: Fish Habitat Conditions in the Guadalupe Creek Subwatershed

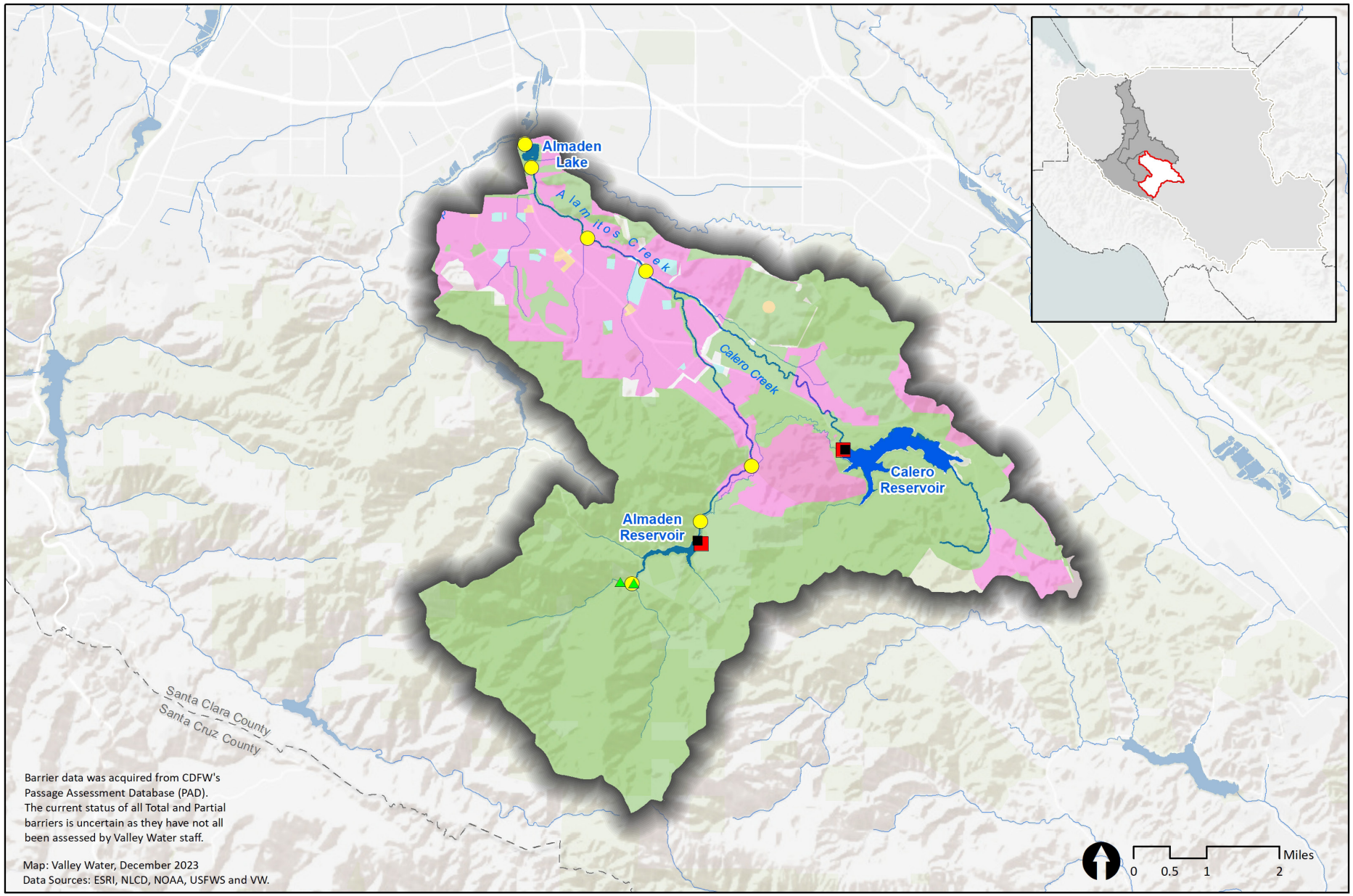


Figure 2-10: Fish Habitat Conditions in the Alamitos Creek Subwatershed

Lakes, Reservoirs, and Ponds

The Guadalupe watershed includes other aquatic habitats, all of which are human-made lakes or ponds. Almaden Lake, Lexington Reservoir, Vasona Lake, and Guadalupe Reservoir are prominent in the watershed. Reservoirs in the Guadalupe watershed are typically dominated by non-native fish species, such as largemouth bass, bluegill, black crappie, common carp, inland silverside, and threadfin shad. Sacramento sucker, prickly sculpin, and resident rainbow trout are native species in Guadalupe watershed reservoirs (SCVWD, 2017); (Valley Water, 2020a); (Valley Water, 2020b); (Valley Water, 2021a); Valley Water unpublished data; (Valley Water, 2022a); (Valley Water, 2023a).

ALMADEN LAKE

Almaden Lake was created by in- and off-stream gravel quarry operations, circa late 1940s to 1960. The off-stream quarry consisted of two main large pits along the east side of Alamitos Creek. After the quarry operations ceased, heavy storm events eroded the levee that separated the creek from the quarry, resulting in discharge of creek waters into the pits, creating the 32-acre lake. Almaden Lake is now jointly owned by Valley Water and City of San José Parks Department, which manages the lake and surrounding area as a popular regional park. The comingling of Almaden Lake with Alamitos Creek results in an impediment to fish passage and conditions that can imperil native fish and degrade aquatic habitat downstream. Migrating fish can be entrained in the lake, making it difficult for anadromous fish to find Alamitos Creek at the upstream end of the lake.

Wetlands

Nearly all wetland habitat remaining in the Guadalupe watershed is along the Baylands where Guadalupe River nears the South Bay, where a transition occurs from a freshwater environment to an estuarine environment. Though greatly reduced in size and highly altered, these baylands still support valuable and functional tidal brackish or salt marsh and mudflats (Tetra Tech, Inc., 2006). Vegetation patterns are highly sensitive to relatively slight changes in topography and tidal inundation. Dominant plant species include cordgrass, pickleweed, marsh jaumea, alkali health, and marsh gumplant. This vegetation and the tidal channels that run through many tidal salt marshes help support many special-status animal species. In addition, an abundance of migratory shorebirds and waterfowl are frequent users of salt marsh, mudflats, and open water along the baylands.

Habitat Connectivity

Numerous separate state, regional, and local connectivity assessments and conservation plans recognize the importance of the Guadalupe Watershed for habitat connectivity between the Santa Cruz Mountains and the Diablo and Gabilan ranges. As shown in Figure 2-11, there are two critical landscape linkages that make up 43% of the watershed. Building more connections between habitats in the watershed, often best achieved along creek corridors, can help sustain native and migratory terrestrial and aquatic species and will be important to achieving One Water goals.

What we mean when we say...

Connectivity:

Increasing ecological attention is toward habitat connectivity as a mechanism of maintaining biodiversity in the face of population growth and climate change (CDFW 2020). Connectivity is defined as "the degree to which the landscape facilitates or impedes movement" (Taylor, Fahrig, Henein, & Merriam, 1993).

Landscape Linkages:

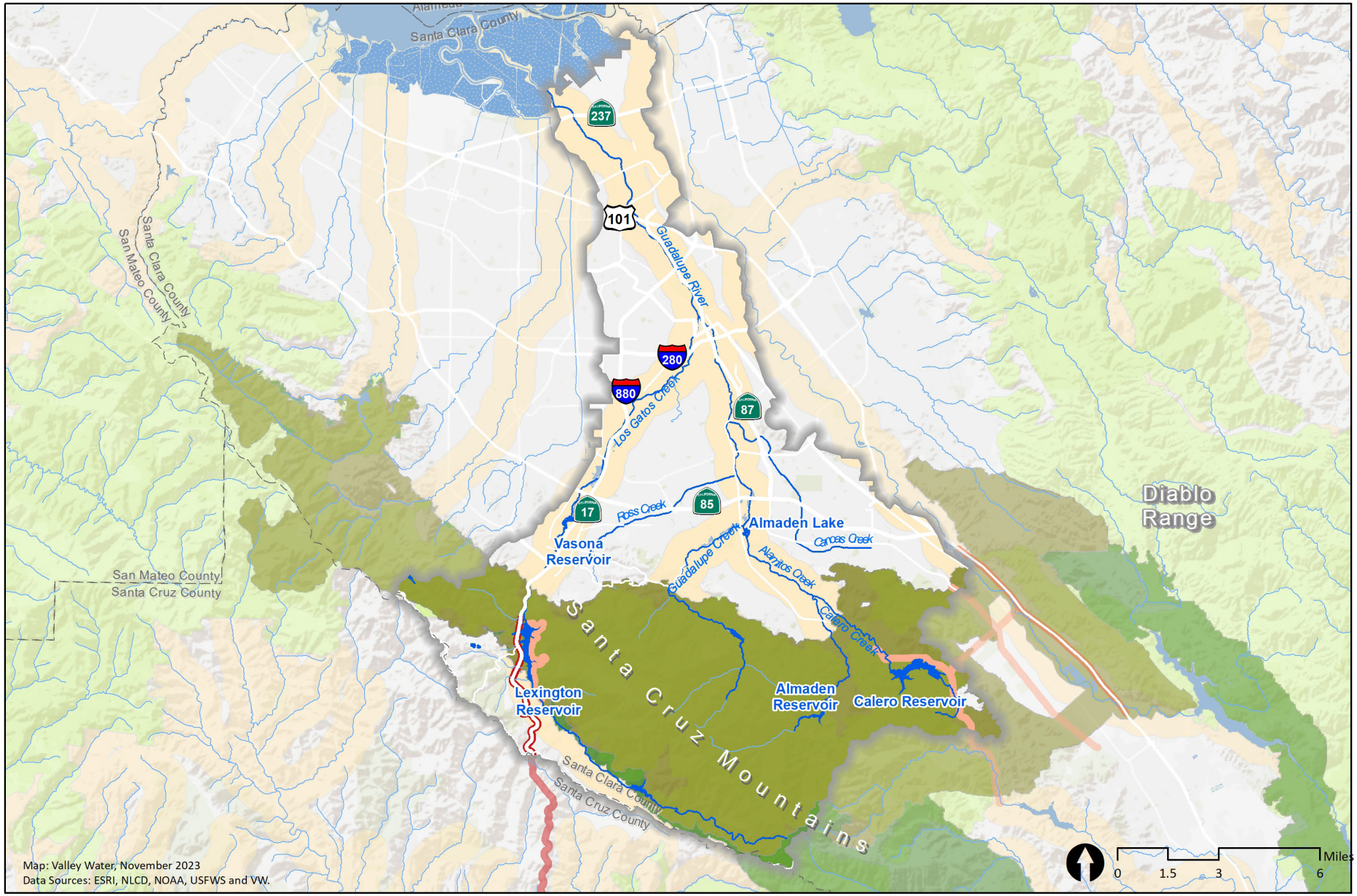
Landscape linkages refer to broad areas that allow for the movement of wildlife and plant species from one area of suitable habitat to another and that support ecological processes (Ament, et al., 2014).

Corridors:

Corridors are distinct linear features whose primary function is to connect two or more significant habitat areas (Beier & Loe, 1992).

Large Landscape Blocks:

Large Landscape Blocks are areas of high ecological integrity that build upon the existing conservation network of lands in the area (Penrod, et al., 2013). Also referred to as core habitats.



Linkage Designs

- Santa Cruz Mountains-Diablo Range
- Santa Cruz Mountains-Gabilan Range
- Large Landscape Blocks
- Riparian Buffer Zones

Wildlife Movement Barriers

- Top Priority Barrier
- Priority Barrier
- Barrier

- Water Bodies
- Salt Pond
- Creeks

Guadalupe Watershed

Wildlife Movement Linkages

Valley Water

Figure 2-11: Landscape Linkages and Wildlife Movement Barriers in the Guadalupe Watershed

2.3.2 *Future Conditions, Challenges, and Opportunities*

The ecological objectives and metrics of One Water can be articulated into a Vision for Future Conditions:

1. Fish can travel freely in the watershed's rivers and streams

a. There is unimpeded access to suitable habitat.

2. Wildlife can move freely in the watershed

a. Natural lands and rangelands are conserved, expanded, enhanced, and connected to facilitate wildlife movement.

3. Streams are healthy and can support aquatic life

a. There is suitable spawning and rearing habitat for steelhead.

b. There should be suitable fish habitat in a variety of accessible reaches to help make fish populations more resilient to drought and climate change.

4. Ecological conditions of streams are consistently improved

a. Modified channels are enhanced to improve ecological condition and human communities

b. The watershed's natural sources and transport of gravel and coarse sediment should be prioritized to build and maintain aquatic habitat.

5. Riparian habitat is increasingly protected and improved

a. Native vegetation communities around creeks are sufficient in width and structural complexity to filter runoff, stabilize banks, contribute to aquatic habitat, provide habitat, and facilitate wildlife movement.

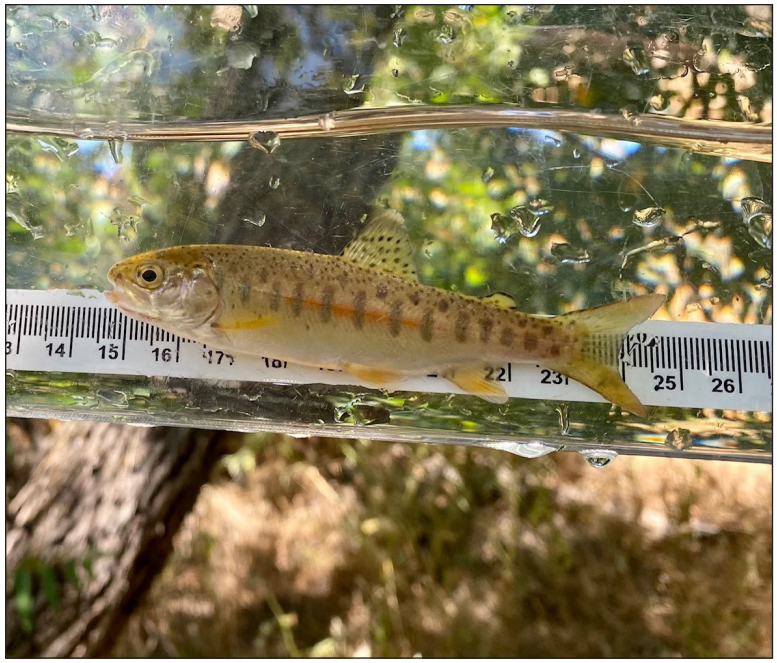
b. Unique natural communities such as alkali meadows, seasonal wetlands, and sycamore alluvial woodland are preserved and protected.

By incorporating the management objectives of the Fish and Aquatic Habitat Collaborative Effort (FAHCE) for the watershed, the vision for several major reaches of the watershed is more specific:

- There is suitable spawning and rearing habitat in Guadalupe Creek from Guadalupe Dam to its confluence with the Guadalupe River, Calero Creek from Calero Dam to its confluence with Alamitos Creek, Alamitos Creek from Almaden Dam to its confluence with Lake Almaden, and Los Gatos Creek from the Camden Avenue drop-structure to its confluence with the Guadalupe River.
- There is adequate passage for migrating adults to reach suitable spawning and rearing habitat and for out-migrating juveniles.

Additional visions for ecological resources were identified at an ecological enhancement-focused workshop that was convened for this One Water plan (further described in Appendix A):

- There should be suitable fish habitat in a variety of reaches to help make fish populations more resilient to drought and climate change. This vision is an extension of FAHCE management objectives and its attainment may justify, for example, rearing habitat enhancements in the mainstem Guadalupe River and/or feasibility assessments of fish passage options on Los Gatos Creek above the Camden Avenue drop-structure since these reaches tend to support wetted habitat for longer periods and in more years; and/or studies into the benefits and feasibility of providing fish access above Almaden Dam where there are tributaries that may support year-round suitable habitat.
- The watershed's natural sources and transport of gravel and coarse sediment should be prioritized to build and maintain aquatic habitat. Although dams trap a significant supply of coarse sediment, several tributaries continue to supply the watershed with coarse sediment. Prioritizing the use of such sources may justify, for example, actions to improve sediment routing and reduce the need for removal for flood protection, and feasibility studies to maximize the potential for sediment reuse.
- We should continue to learn from the investments made in ecological enhancement. Given the cost and complexity of many important enhancement actions (see recommendations in Chapter 4), opportunities to monitor and learn about the effects of actions on habitat and populations should be seized.



Rainbow Trout. Photo: Valley Water

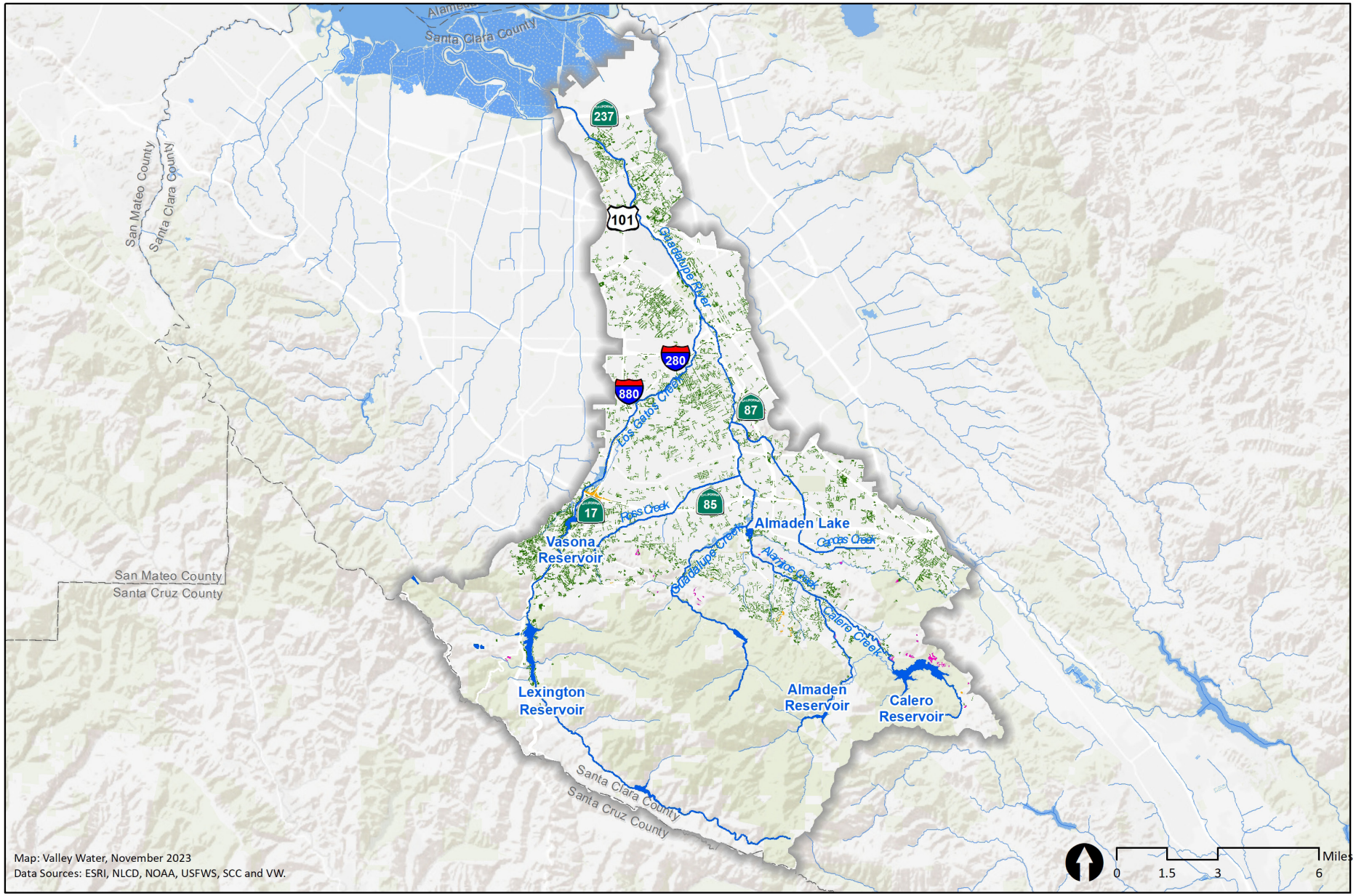


Figure 2-12: Non-Native Invasive Plant Communities in the Guadalupe River Watershed

Challenges

Invasive Species

Because of the more reliable water availability, riparian areas are prone to invasion by non-native plants. Invasive plants tend to thrive and spread aggressively, negatively altering native vegetation distribution, habitat suitability for wildlife, soil stability, and water quality, thus degrading habitat quality and the overall ecological value of a site. In addition, invasive plants can exacerbate flooding and fire danger, undermine structural assets, and obstruct access to roads, levees, and trails. A few examples of invasive plants in the watershed include giant reed, Cape ivy, eucalyptus, and stinkwort. Figure 2-12 depicts occurrences of non-native, invasive plant communities in the watershed that may be appropriate to serve as targets or priorities for removal efforts.

Alamitos Creek. Photo: Valley Water

Sediment Supply

Reservoirs in the hills capture and interrupt the downstream transport of coarser sediment (e.g., gravels and cobbles). The result is downstream channels with lowered bed elevation and armored surface layer (San Francisco Estuary Institute & Aquatic Science Center, 2013). Limited lateral channel migration also cuts off a historical source of coarse sediment, and contributes to channel down-cutting, or incision, that further limits ecologically beneficial floodplain inundation and simplifies aquatic habitat. For example, much of Guadalupe River is characterized by long, deep pools that provide limited habitat value as a result of historical incision. Streambank erosion within entrenched channels can lead to excessive delivery of fine sediment that reduces habitat quality and can impair water quality. Historical floodplain and in-channel gravel mining pits, namely Almaden Lake, also trap sediment. Despite the trapping of sediment in some portions of the watershed, there are also areas of problematic sediment deposition, such as the Guadalupe River through Downtown San José, Randol and McAbee creeks in the Alamitos Creek subwatershed. In these areas, Valley Water must repeatedly remove sediment to maintain channel capacity and fish passage. Sediment removed from reservoirs and problematic depositional areas could provide a cost-effective and less-environmentally-impactful supply of sediment for deep, simple, incised reaches or for building resilience of shoreline habitats to sea level rise. This is not allowable, however, due to the elevated mercury content of sediment from the Guadalupe River watershed and regulations that preclude reuse of such sediment, even where such reuse would be in the same creek or watershed.

Unhoused Encampments

The Guadalupe River and its riparian corridor, particularly within and around downtown San José, has been significantly impacted by encampments of unhoused individuals. Encampment trash is a major pollutant in the watershed. Hazardous waste is regularly encountered at encampments, such as batteries, generators, oils, pesticides, aerosol cans, and various electronics, as is biological waste, which pollutes waterways, spreads disease, and creates unsafe conditions for field staff, volunteers, and the public. In some locations, streambanks have been extensively excavated to create flat areas for encampments, paths, and stairways. These activities weaken creek banks and increase fine sediment supply to creeks. Valley Water and others have undertaken costly efforts to reduce the environmental harm of encampments.

Climate Change

Sea level rise will change vegetation patterns and habitat conditions near the Bay and climate extremes will lead to more extreme temperatures and storms, which will affect wildlife and habitat. Modeling for the region has predicted a longer dry season, greater inter-annual variability, and potentially increased rainfall intensity (Flint & Flint, 2012), such that peak flows are increased. The increased erosive power of these flows could initiate channel incision and head-cutting, especially where the flows are contained by entrenched channels. The effects of these physical changes in landscape form, habitats, and ecological services of the watershed will be many and varied and are already being detected. While water management may offset some climate change impacts in the watershed through, for example, managed groundwater recharge, use of imported water, and storage capacity enhancement, ecological enhancement efforts need to be planned to be successful under these variable and uncertain conditions. In fact, ecological enhancements such as wider, more connected riparian corridors, are important climate change mitigation actions that provide resiliency to habitats and wildlife from climate stressors and that can buffer communities from climate risks.

Critical Infrastructure as Wildlife Barriers

Pieces of human infrastructure such as highways, dams, grade control structures and bridge undercrossings present passage barriers to wildlife. However, considering removal or modification of these structures proves to be complicated. One example of this is the Guadalupe Dam and Reservoir, which presents a formidable fish passage barrier, yet provides water supply benefits and incidental attenuation of flood waters that significantly reduces flooding downstream. Additionally, historic sediment deposits laden with mercury are trapped upstream of the dam within the reservoir, keeping these pollutants from traveling further downstream into the watershed.

Opportunities

Multi-Benefit Actions

Actions to benefit ecological resources can and do benefit other water management priorities as well. Wider floodplains can store more high flow and reduce flood risk. Wider and denser riparian corridors slow and filter stormwater runoff and improve water quality. Water management for groundwater recharge can help sustain natural communities that are groundwater dependent ecosystems. Reservoir and dam operations can be managed to protect and enhance downstream fish and aquatic habitats, while also supplying water and reducing flood risk. Expansion of habitat for wildlife or other ecosystem services has potential to offset greenhouse gas emissions. When management or infrastructure changes are being planned for one of these water management priorities, the others can be considered and included when feasible. The multiple benefits provided should be considered and quantified when evaluating costs.

Stakeholder Interest

There are numerous stakeholders in the watershed with a focus or strong interest in ecological resource protection and enhancement. These include, but are not limited to, local Tribes, non-profit organizations, regulatory agencies, land use planning groups, and municipalities and community groups. Many of these stakeholders are already engaged in related processes and projects, such as this One Water Plan, the Guadalupe River Project Adaptive Management Team, the Guadalupe River Integrated Working Group, Re-Envisioning the Guadalupe River Park, and more. Coordination with and between these stakeholders can bring technical and regulatory expertise to efforts; improve project designs and capture additional benefits; provide additional funding resources; and facilitate project implementation; among other things.

Ecological Enhancements in Future Projects

There are major public works projects being planned for the Guadalupe River watershed, such as seismic retrofitting of dams, flood risk reduction measures, urban renewal and redevelopment, and continued maintenance of previously implemented public works projects, such as the Lower and Downtown Guadalupe River Projects. Opportunities to preserve and enhance ecological conditions should always be sought in conjunction with such efforts. This may require expanding a project's footprint or adding a different element of work, but it can help make stewardship more cost effective, reduce or mitigate a project's environmental impacts, and achieve ecological resource improvement targets.

ADDITIONAL ONLINE RESOURCES

Fish and Aquatic Habitat Collective Effort (FAHCE):

https://www.valleywater.org/project-updates/creek-river-projects/fahce-fish-and-aquatic-habitat-collaborative-effort

Oak Canopy. Photo: Amber Manfree

2.4 WATER SUPPLY

Providing Santa Clara County residents, businesses, and farmers with safe, clean water is a central responsibility of Valley Water. Reliable and sufficient water supply is also important for local fish and wildlife. The following section focuses on water supply infrastructure and operations located in the Guadalupe Watershed.

2.4.1 *Present Conditions*

Valley Water manages a county-wide water supply using a variety of water supply sources, including local surface water, groundwater, recycled and purified water, and imported water conveyed from the Sacramento-San Joaquin River Delta.

Six reservoirs, seven systems of ponds for managed groundwater recharge, and several other supply and delivery facilities are in the Guadalupe watershed and are also connected to Valley Water's network of facilities that supply water throughout Santa Clara County. Valley Water owns and operates a system of local pipelines and ditches to transport and distribute imported and locally conserved raw water for treatment or for groundwater recharge.

GUADALUPE WATERSHED

33,610

Acre-feet per year of reservoir capacity (without temporary restrictions)

16,500

Acre-feet per year of average natural recharge

8,750

Acre-feet of recycled water delivered to customers

Four of Valley Water's thirteen retailers, City of Santa Clara, San José Municipal Water System, San José Water Company, and Great Oaks Water Company, provide water to the residents and businesses within the Guadalupe Watershed. A majority of the watershed is served by San José Water Company, which is Valley Water's largest retailer.

Groundwater

Groundwater supplies about half of the water used in Santa Clara County. Valley Water is the Groundwater Sustainability Agency (GSA) for the county's groundwater subbasins, responsible for sustainably managing local groundwater (Valley Water, 2021b). The Santa Clara Valley has two interconnected groundwater subbasins, the Santa Clara Subbasin and the Llagas Subbasin. The Santa Clara Subbasin has two groundwater management areas, the Santa Clara Plain and Coyote Valley (Valley Water, 2021b). The estimated operational storage capacity of the Santa Clara Plain is 350,000 acre-feet (Valley Water, 2021b). The southern portion of the Santa Clara Plain is suitable for groundwater recharge while the northern portion restricts recharge (Valley Water, 2021b). The Guadalupe Watershed overlies a portion of the Santa Clara Plain groundwater management area.

Valley Water has an extensive managed aquifer recharge program to help maintain groundwater levels and avoid land subsidence. Managed recharge operations occur in two primary recharge systems in the Guadalupe Watershed, including the Guadalupe and Los Gatos Recharge Systems (Table 2-2). Recharge capacities are 25,100 acre-feet per year for the Guadalupe system and 29,700 acre-feet per year for Los Gatos Recharge System.

Table 2-2: Water Supply Management in the Guadalupe Watershed

Water Use (Average Acre-Feet per Year)	
Groundwater Pumping*	27,200
Groundwater Recharge Capacity (Acre-Feet per Year)	
Guadalupe Recharge System	
Alamitos Creek	2,200
Calero Creek	900
Guadalupe River	4,200
Guadalupe Creek	2,900
Ross Creek	2,200
Alamitos Ponds	1,500
Guadalupe Ponds	6,600
Los Capitancillos Ponds	2,900
Kooser Ponds	1,700
Sub-Total Recharge Capacity	**25,100**
Los Gatos Recharge System	
Los Gatos Creek	5,800
Budd Avenue Ponds	5,000
Camden Ponds	2,200
McGlincy Ponds	7,700
Oka Ponds	1,500
Page Ponds	5,300
Sunnyoaks Ponds	2,200
Sub-Total Recharge Capacity	**29,700**
Total Recharge Capacity	**54,800**
Reservoir Storage Capacity (Acre-Feet)	
Almaden Reservoir	1,555
Calero Reservoir	9,738
Guadalupe Reservoir	3,320
Lexington Reservoir	18,534
Vasona Reservoir	463
Total Reservoir Storage Capacity	**33,610**

* Reported as the average annual from 2012 to 2021

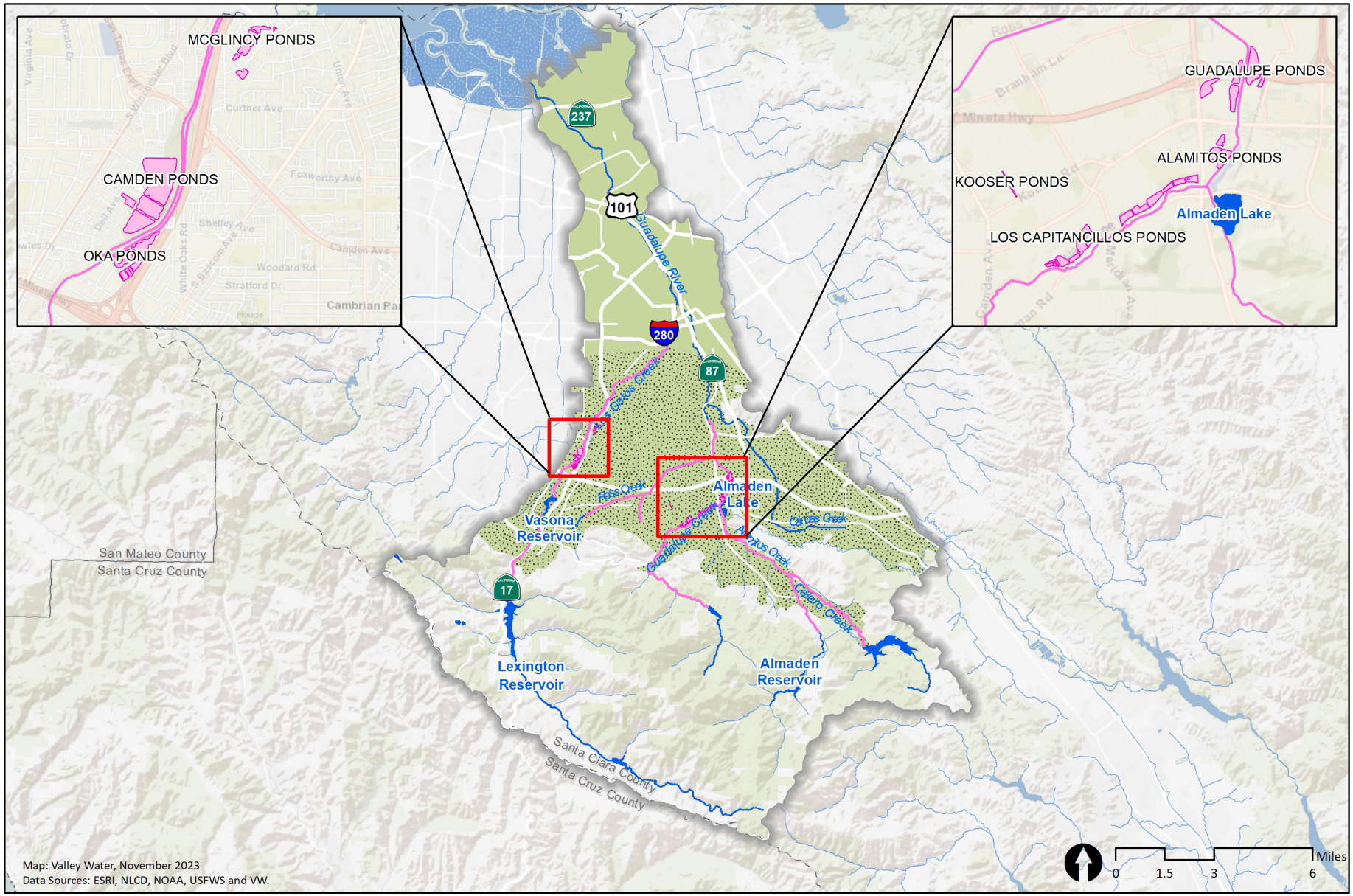


Figure 2-13: Groundwater Resources in the Guadalupe Watershed

Local Surface Water

The Guadalupe Watershed contains 22 creeks and six reservoirs, five of which are District-owned and operated reservoirs designed to capture and store local rainfall runoff for downstream groundwater recharge. Valley Water manages these reservoirs to not only capture runoff, but also to provide carryover storage as a hedge against a dry year or outages.

Valley Water's reservoir operations and water rights in the Coyote Creek, Stevens Creek, and Guadalupe River are governed by the FAHCE Fish Habitat Restoration Plan (FHRP), in response to the 1996 legal challenge to Valley Water's water rights and operations and impact to local fisheries in these three watersheds. The FAHCE FHRP includes managing reservoir operations to maintain flows in the creeks, conducting certain scientific studies, and undertaking restoration work in the creeks including barrier removals, gravel augmentation, and placement of woody debris.

Imported Water

The Guadalupe Watershed receives imported water conveyed through the Delta from the federal Central Valley Project (CVP) and the State Water Project (SWP), and from the San Francisco Public Utilities Commission (SFPUC) Regional Water System (linked to Hetch Hetchy).

Treated Water

Treated water deliveries provide "in-lieu" groundwater recharge, which helps keep groundwater supplies from diminishing and land from subsiding. The Guadalupe Watershed is served by the Santa Teresa Water Treatment Plant and the Rinconada Water Treatment Plant. Valley Water's treated water quality consistently meets or exceeds drinking water standards.

Raw Water Conveyance

Valley Water owns and operates a system of local pipelines and ditches to transport and distribute imported and locally conserved raw water for treatment or for groundwater recharge.

Recycled and Purified Water for Potable and Non-Potable Reuse

Recycled water is an important source of water for irrigation and industrial use. Since 2015 an average of 12,500 Acre Feet (AF) of recycled water produced by the South Bay Water Recycling program is delivered annually to customers residing in the Guadalupe Watershed. Recycled water is produced from wastewater that has been treated to meet strict standards set by the California Division of Drinking Water per regulations under the Title 22 section of California's Code of Regulations. Purified water receives additional treatment to meet drinking water standards. To adapt to climate change uncertainties and secure a reliable, sustainable water supply for the region, Valley Water set a goal to meet 10% of Santa Clara County's total water demands by a combination of recycled and purified water for non-potable and potable reuse.

Water Conservation

Valley Water and all major retail water providers partner in regional implementation of a variety of water-use efficiency programs (water conservation programs) to permanently reduce water use in the county. Valley Water's long-term savings target is to achieve 109,000 acre-feet per year in water savings by 2040 (110,000 acre-feet per year when including stormwater capture projects). Valley Water currently implements approximately 20 different ongoing water conservation programs including incentives and rebates, free device installation, free delivery of water-saving devices and educational resources, one-on-one home visits, site surveys, and educational outreach to reduce water consumption in homes, businesses, and agriculture. These programs are designed to achieve sustainable, long-term water savings.

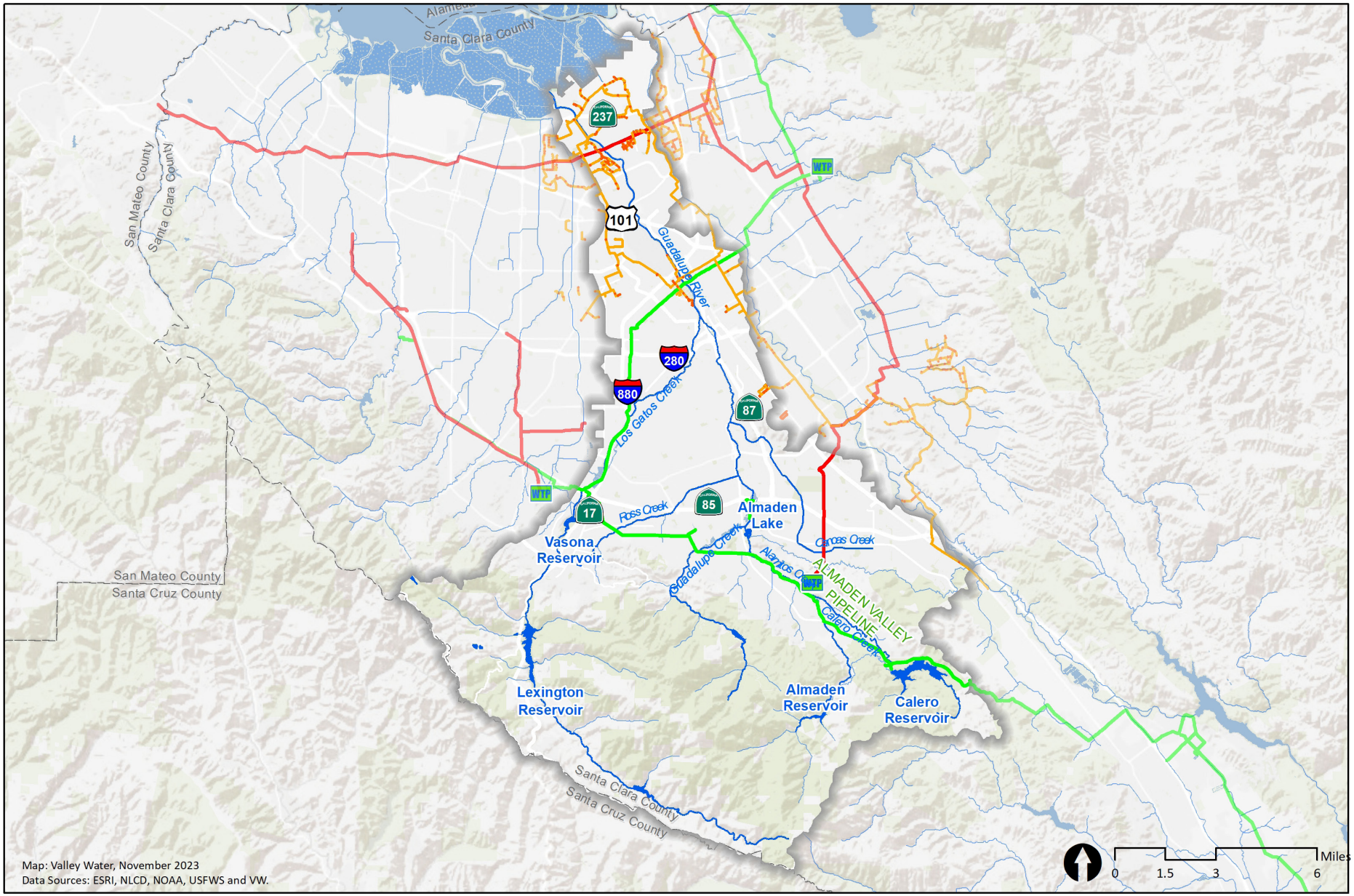
RELATED PLANS

Urban Water Management Plan

The Urban Water Management Plan (UWMP) is a long-range planning document that is required by the California Department of Water Resources. The UWMP is essentially a state-mandated master plan that includes an agency's projected water supplies and demands over the next 25 years, as well as water shortage contingency planning and conservation efforts. The plan is required to be updated every five years, and failure to comply with this legal requirement will jeopardize an agency's eligibility for State funding. The plan was last updated in 2020 and the next update will be in 2025.

Water Supply Master Plan

The Water Supply Master Plan (WSMP) is Valley Water's guiding document for long-term water supply investments to ensure water supply reliability for Santa Clara County. Updated about every five years, this long-range plan assesses future county-wide demands and evaluates and recommends water supply and infrastructure projects to meet those demands to achieve Valley Water's level of service (LOS) goal through the planning horizon. Valley Water's LOS goal is "Meet 100 percent of annual water demand during non-drought years and at least 80 percent demand in drought years." The most recent plan, Water Supply Master Plan 2040, was adopted by the Valley Water Board of Directors (Board) in 2019. Valley Water is currently developing the WSMP 2050, which extends planning horizon to 2050 and is expected to be completed by the end of 2024.



Water Bodies
Salt Pond
Creeks
Treatment Plant

Recycled Water Pipelines
Main
Lateral

Major Pipelines
Raw
Treated

Guadalupe Watershed

Water Supply Infrastructure

Valley Water

Figure 2-14: Water Supply Infrastructure in the Guadalupe Watershed

2.4.2 Future Conditions, Challenges, and Opportunities

The future of Water Supply in the Guadalupe Watershed will be shaped by a unique set of challenges and opportunities, some ongoing, and some to be anticipated in the years to come.

Challenges

Climate Change

Climate change is predicted to bring impacts such as warming temperatures, shrinking snowpack, extreme weather, prolonged droughts, and wildfire. Some of these impacts are already being experienced across California and Santa Clara County. Future projections indicate that the Santa Clara Valley could experience a change in hydrologic patterns and an increase in rainfall averages, as well as an increase in the length and intensity of droughts. This means that extreme events (storms and droughts) could become even more extreme compared to historic conditions, changing the ways that Valley Water manages and utilizes its water supply. The reliability of local and imported water will become increasingly uncertain, and additional climate impacts such as increased wildfires could threaten water supply infrastructure and power supply. Collectively, climate-related impacts have the potential to compound and simultaneously impact multiple aspects of Valley Water's operations. Climate change will make it more challenging to balance priorities such as providing enough water supply to meet demand while maintaining stream flows and water quality amidst severe drought conditions.

Valley Water developed a Climate Change Action Plan (CCAP), which was adopted by the Board of Directors in July of 2021. The plan addresses Valley Water's climate vulnerabilities and provides actions to address them. The 2021 Groundwater Management Plan (Valley Water, 2021b) presents a projected groundwater budget that incorporates future climate change and describes likely operational flexibility to compensate for changes in groundwater storage, and Valley Water's water supply planning team is evaluating how climate change could impact future local and imported water supplies through long-range planning efforts.

Uncertainties Surrounding Imported Water Supplies

Compounded with climate change, uncertainty surrounding state regulations applicable to imported water sourced from the Delta, as well as drought and competing demands from other water users pose challenges to water supply both countywide and within the Guadalupe Watershed. A significant portion of Valley Water's water supply is not local, nor under Valley Water's complete control. Valley Water relies on the CVP and SWP for 40% of its water supplies on average. Consequently, threats to the Delta, such as levee failures, saltwater intrusion, and declining fish populations, pose problems to water supply reliability and water quality for Santa Clara County, thereby within the Guadalupe Watershed as well.

Guadalupe Reservoir. Photo: Valley Water

Constraints on In-stream Recharge

In the Guadalupe watershed, Valley Water has water rights which can be used for in-stream recharge. Alteration of flows and certain potential projects identified by the FAHCE settlement agreement have the potential to reduce the amount of water Valley Water is able to recharge in the Guadalupe Watershed.

Changes in Land Use and Water Demand

Changes in land use and new development can increase demand for water and, if not offset with new supplies or additional water conservation, can create water shortages. The uncertainties in water demand forecasting associated with climate change will make advanced planning for increased development and demand even more challenging. It is important that planned water conservation savings (a One Water metric) are achieved in the Guadalupe watershed and throughout the County. However, effective One Water management will continue to require Valley Water's engagement with land use decisions in areas critical to supply and recharge.

Restrictions on Reservoir Storage

Recent advancements in the understanding of earthquakes and how to best design infrastructure to withstand them has led to design codes for dams that are more robust. One specific concern relevant to the Bay Area is liquefaction, in which the soil underneath dams becomes liquified during ground shaking, causing dams to slump. Although the dams were built to the current standards of the time they were constructed, seismic evaluations on Valley Water's dams with current design standards revealed that there are several dams that need upgrades to meet current design codes. In the Guadalupe Watershed, Almaden, Calero, and Guadalupe Reservoirs are in need of seismic retrofits. For safety reasons, these reservoirs operate with a restricted capacity to reduce the risk of damage to the dam and downstream communities during a large earthquake.

Seawater Intrusion Along the Bayshore and Lower Guadalupe River

Due to historical groundwater pumping and land subsidence, particularly in the middle of the twentieth century, seawater intrusion has been observed in the shallow aquifer of the Santa Clara Plain (Valley Water, 2021b). Currently, the greatest inland extent of the seawater intrusion occurs near the Guadalupe River and leakance of saltwater beneath the tidal stream flow in the Guadalupe River is a likely mechanism that contributes to seawater intrusion in the shallow aquifer (Valley Water, 2021b). Additional details about the current seawater intrusion conditions are provided in section 2.5.1.

Implementation Challenges of Direct and Indirect Potable Reuse

Direct potable reuse is the planned introduction of purified water either directly into a public water system or into a raw water supply upstream of a water treatment plant. Indirect potable reuse is the term for purified water that has passed through an environmental buffer, such as a lake or a groundwater aquifer, before being treated at a water treatment plant for use as drinking water. While a promising way to reduce the need for new water supplies for potable water use, there are regulatory and technical implementation challenges that impact these types of uses in Santa Clara County.

Opportunities

Expanding Water Supplies

Valley Water's Water Supply Master Plan provides a long-term strategy for ensuring Valley Water's water supply sustainability. The strategy includes secure existing supplies and infrastructure, increase water reuse and conservation, and optimize the use of existing supplies and infrastructure. With this strategy, Valley Water has been actively evaluating a variety of projects for investment, including alternative supply projects such as purified water, local and imported surface supply, storage projects, and recharge and pipeline projects.

In addition, Valley Water will continue to promote water conservation to make conservation a way of life, as a cost-effective way to reduce demand and therefore boosting the county's water supply reliability.

Expanding Groundwater Recharge

Flood-Managed Aquifer Recharge (Flood-MAR) is one way in which groundwater recharge could be expanded to increase water supply and potentially reduce stormwater runoff into urban areas. A pre-feasibility study identified that capturing hillside runoff onto open space before it reaches roads and storm sewers may be the most feasible approach to Flood-MAR in Santa Clara County. Valley Water is continuing studies to assess the feasibility of Flood-MAR in Santa Clara County. Unlike our existing managed aquifer recharge or large-scale Flood-MAR contemplated for the Central Valley, Valley Water expects the amount of water captured to be relatively small. Valley Water presents updates on Flood-MAR feasibility in Santa Clara County to the Water Conservation and Demand Management Committee.

ADDITIONAL ONLINE RESOURCES

Water Supply Master Plan:

https://www.valleywater.org/your-water/water-supply-planning/water-supply-master-plan

Alamitos Creek. Photo: Valley Water

2.5 WATER QUALITY

The following section focuses on water quality issues across Guadalupe Watershed, including source and surface waters as well as attributes associated with chemical, biological and physical water quality.

2.5.1 *Present Conditions*

In a well-functioning watershed, natural processes work to sustain good water quality — water in which native fish and other biota thrive and humans can safely use. However, mining, ranching, agriculture, industrial activities, manufacturing, urbanization, and construction of water management infrastructure have all altered the natural dynamics of many streams. In addition to changing natural hydrology, direct and indirect pollution from both human and natural sources undermines the water quality necessary to support beneficial uses.

Valley Water's water quality management is categorized into three types: source water (in reservoirs for eventual treatment for human use, groundwater recharge, or ecological purposes), surface water (in creeks and urban runoff), and groundwater. In general, primary water quality issues in the Guadalupe Watershed include mercury, sediment, trash, pathogens, urban runoff, elevated temperature, pesticides, and algal blooms from excess nutrients. While Valley Water's overall water quality goal remains to protect the beneficial uses of these waters, new thinking about the relationships between water quality, natural flood protection, water supply, and watershed restoration informs One Water planning.

Source Water

Protecting the quality of source water in the five reservoirs in the Guadalupe Watershed, and their associated sources, is central to Valley Water's operations. Calero Reservoir is the only reservoir of the five that directly provides local drinking water and is monitored for source water quality as a result. Almaden Reservoir is also monitored for source water quality since it is connected to Calero Reservoir, while the remaining reservoirs primarily support groundwater recharge and ecological purposes. Every five years, Valley Water conducts the Local Watershed Sanitary Survey (WSS) for Calero and Almaden reservoirs in Guadalupe Watershed and Anderson and Coyote Reservoirs in Coyote Watershed. The latest survey occurred in 2021, covering the years between 2016 and 2020. In general, water quality in Calero and Almaden Reservoirs was good during this period and did not experience significant impacts from potential contaminant sources. Potential contaminant sources to the reservoirs are summarized in Table 2-3. The table lists watershed activities that can contaminate water in the reservoirs, as well as the potential risk of each activity. Risk level is based on treatability and likelihood of contamination.

Pathogens

There were slightly elevated E. coli and Enterococci on Calero Creek, just downstream of Calero Reservoir, based on very few stormwater monitoring samples, but were within historical range. E. coli may be introduced from the upstream private homes with equestrian uses, equestrian use of County Park trails, or wildlife such as feral pigs. Recreational trails can contribute pathogens through storm runoff that can carry pollutants from the trails to the reservoir. The relative contribution of pathogens from the trail system is unknown, but probably minor. Wild animals can contribute pathogens, nutrients, and sediments to the reservoir as well. Feral pigs are often considered the greatest wildlife threat to water quality due to their tendency to cause erosion through their rooting behavior and to their role as carriers of the pathogenic protozoa.

Golf courses can also contribute pathogens, nutrients, and pesticides to source and surface waters. Cinnabar Golf Course is located south of Calero Reservoir along Calero Creek. Cinnabar Golf Course submits regular self-monitoring results to the San Francisco Water Quality Control Board to ensure that it is not contributing pathogens from its wastewater collection and treatment facilities.

Table 2-3: Potential Contaminant Sources and Risk Level

Risk Associated with Contaminant Sources	
Watershed Activities	**Potential Risk**
Geologic Hazards and Inactive Mines	High*
Grazing and Concentrated Animal Facilities	Medium-High
Hazardous Materials	Low
Pesticide and Herbicides	Low
Recreation	Medium
Sewage Systems	High
Urban Runoff/Spill	Low
Wildfires	Medium-High
Wildlife	Medium

*Risk is high in Almaden Reservoir watershed.

Nutrients, Pesticides

Recreational activities (e.g., trails and golf courses) can also contribute nutrients to Calero Reservoir, through storm runoff. High nutrient inputs into Calero from Cinnabar golf course and from imported water previously stored in San Luis Reservoir, combined with large shallow areas within the reservoir, make Calero prone to algal blooms. Excessive algal growth can result in taste and odor problems due to 2-Methylisoborneol (MIB), geosmin and other byproducts of algal growth that have an earthy/musty taste and odor. The death and decay of algal blooms can lead to anoxic conditions in the hypolimnion (the bottom layer of a stratified reservoir) and the subsequent release of sulfide, manganese, and iron from the sediment. Elevated levels of geosmin concentrations were experienced in summer and fall of 2017 and elevated MIB concentrations were experienced at Calero Reservoir in 2020. Valley Water also monitors the Title 22 suite of regulated chemicals within Calero and Almaden Reservoir and has not detected any pesticides.

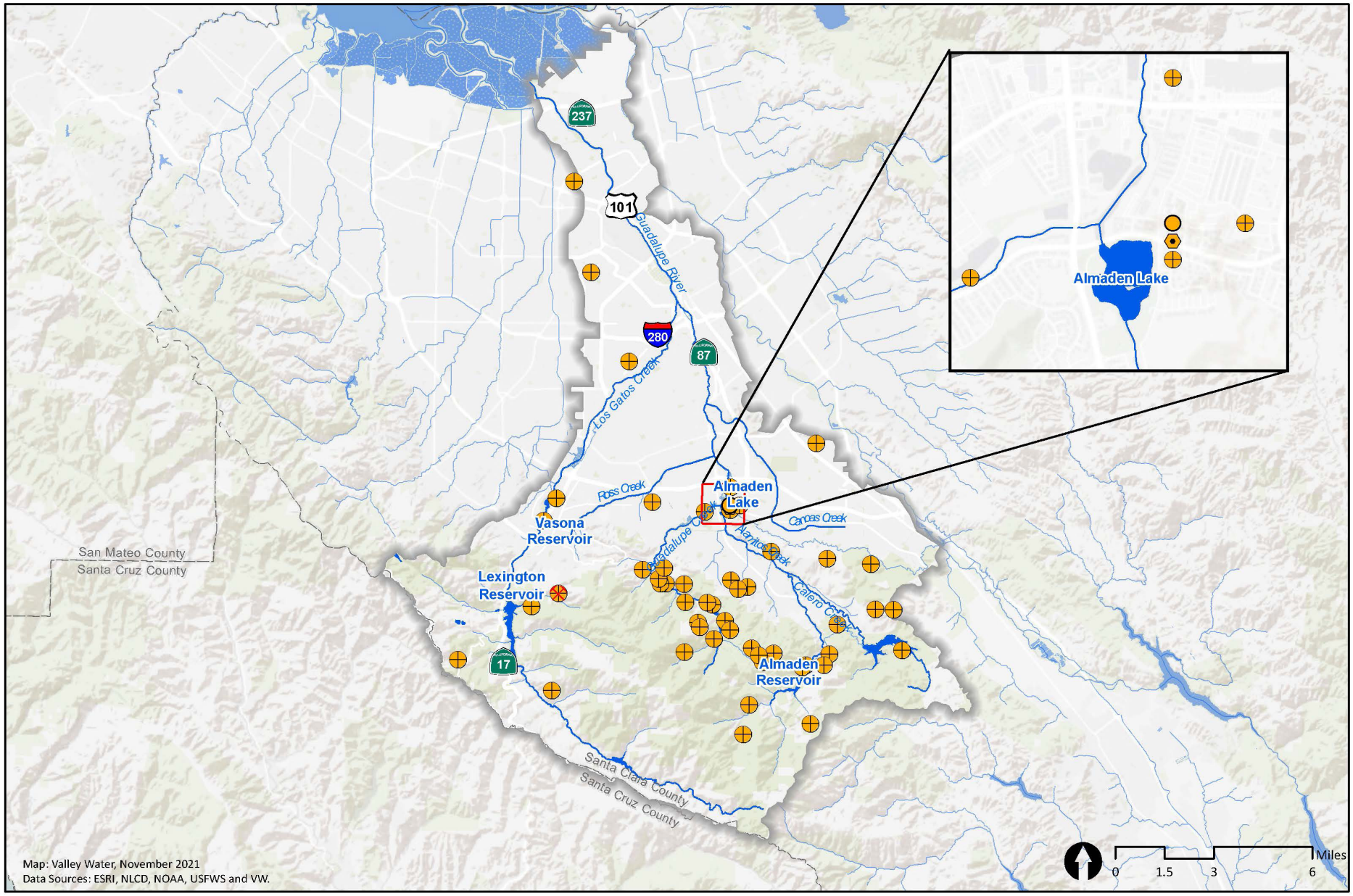


Figure 2-15: Mines in the Guadalupe Watershed

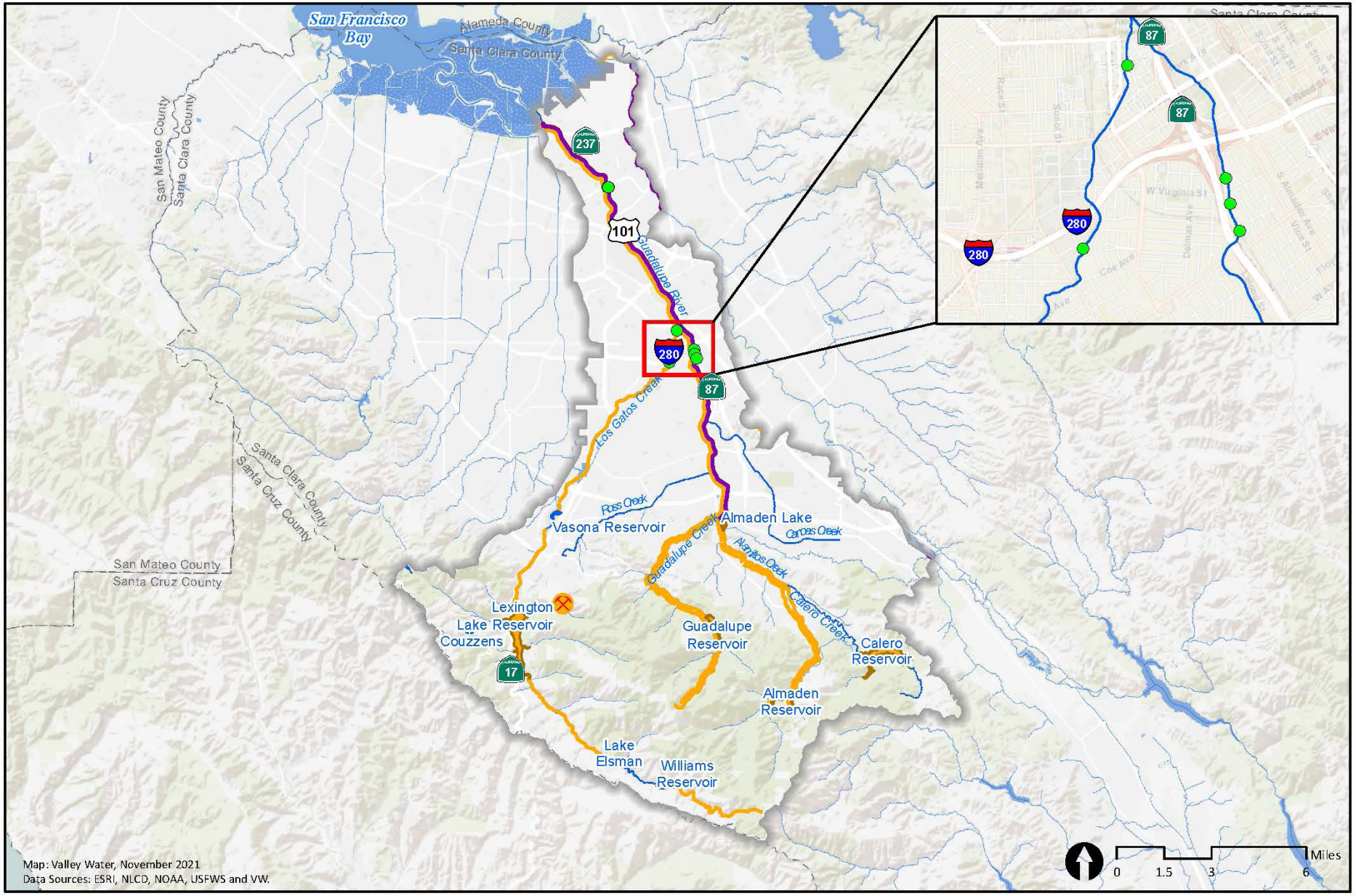


Figure 2-16: Impaired Waterways in the Guadalupe Watershed

Sediment, Turbidity

Wildfires can cause increased erosion and sedimentation in reservoirs. The area surrounding Calero and Almaden Reservoirs is prone to wildfire, though there have been no recent recorded wildfires within the surrounding subwatershed. Storm runoff from erosive soils in the Alamitos subwatershed and from trails and golf courses may cause elevated turbidity, high concentrations of Total Organic Carbon (TOC), and high Total Dissolved Solids (TDS) in the reservoirs.

The Almaden-Calero Canal is open along most of its alignment and much of it is adjacent to public roads and road crossings. Vulnerabilities including steep terrain and impervious surfaces increase the risk of sediment and other contaminants reaching the Canal, which will only increase as the New Almaden area develops and traffic increases.

Drought Impacts, Invasive Species

During extreme drought years, the water quality in Calero Reservoir has been impacted. Since Calero operates as a terminal reservoir to store San Luis Reservoir water, its water quality may be impacted by San Luis Reservoir supplies. For instance, during the high drought years from 2013 to 2016, the water quality in Calero Reservoir was significantly impacted by bromide and chloride, due to the lack of supply from San Luis Reservoir. San Luis Reservoir water quality is degraded during droughts when, for example, lower inflows to the Delta increase Delta salinity levels. Additionally, in the 2014 and 2015 drought years, TOC levels in Calero Reservoir increased, but this trend was not observed during the 2016 or 2020 drought conditions. Another potential wildlife contaminant to the reservoirs are invasive mussel species that can inhibit source water supply systems. Quagga and zebra mussels are monitored monthly at all Valley Water reservoirs (except Vasona Reservoir). To date, no veliger or adults have been detected in any of the local reservoirs.

MERCURY

Mercury in large doses can be debilitating to the human nervous system. It is especially dangerous for pregnant women (developing fetuses), infants, and children, where it is more likely to cause neurological and developmental harm. The form of mercury of concern from a human health perspective is methylmercury from ingestion of mercury-contaminated fish. Fish with elevated mercury have been found in Guadalupe Reservoir, Almaden Reservoir, Alamitos Creek, and Almaden Lake (Tetra Tech, Inc., 2006). Additionally, Guadalupe River, Alamitos Creek, Guadalupe Creek, Almaden Reservoir, Guadalupe Reservoir, Calero Reservoir, Lake Almaden, and Lexington Reservoir are listed for mercury on the State's 303(d) list of impaired water bodies.

Source Water

The inactive quicksilver mines within the Alamitos watershed still pose a pollutant risk to source waters. Valley Water conducts monthly water quality monitoring in Almaden, Calero, Guadalupe, and Stevens Creek Reservoirs as part of the total maximum daily load (TMDL) requirements.

Surface Water

Erosion and runoff from legacy calcine piles, waste rockpiles (unprocessed rock), and road material cause mercury-laden sediment to be transported into nearby surface waterbodies that are tributaries to the Guadalupe River (Tetra Tech, Inc., 2006).

Surface Water

Section 303(d) of the 1972 Federal Clean Water Act requires states to identify water bodies that do not meet water quality objectives and are not supporting their designated beneficial uses. Several surface water bodies are listed on the State's 303(d) list as impaired, and currently implement water quality improvement programs under Total Maximum Daily Load (TMDL) requirements or regulatory stormwater compliance. Primary surface water quality concerns for the Guadalupe Watershed include sediment, trash, mercury, and urban runoff pollutants of concern. The sections below further describe these concerns.

Stormwater

Throughout the Guadalupe Watershed, stormwater runoff is considered the largest pathway of pollutants to aquatic systems. Although stormwater runoff is part of the natural hydrologic cycle, human activities can alter natural drainage patterns, introduce pollutants, and increase erosion, degrading natural habitats. In the urbanized sections of the watershed, runoff can pick up pollutants such as trash, pesticides, pathogens, and various legacy pollutants such as PCBs. To protect surface waters, communities, construction companies, industries, and others within the watershed are regulated under the Clean Water Act through the National Pollutant Discharge Elimination System (NPDES) permits for stormwater discharges. Valley Water, the Cities of Campbell, San José, Santa Clara, Monte Sereno, and Town of Los Gatos within the Guadalupe Watershed are responsible for implementing and complying with the Municipal Regional Stormwater NPDES Permit (MRP) for the San Francisco Bay Region.

Trash

Various urban reaches of all creeks in the Guadalupe Watershed are impacted by trash. This trash can come from illegal dumping, unhoused encampments along the creeks, and untreated storm drain outfalls. Valley Water has a memorandum of agreement to work cooperatively with the City of San José to conduct encampment and trash accumulation cleanups in cooperation with the San José Police Department and the City's Environmental Services and Housing Departments throughout the Guadalupe Watershed within City of San José boundary. Through the Good Neighbor Program's Encampment Cleanup Project, Valley Water staff and agency partners remove trash, debris, and hazardous materials from creeks throughout the county. Additionally, under the MRP, permittees are required to implement trash load reduction actions to reach 100% reduction in trash discharged from the municipal separate storm sewer systems (MS4) by 2025. To reach this milestone, local agencies implement various on-land actions (e.g., street sweeping, on-land cleanups) and install full trash capture devices to capture trash in the MS4 before it enters the receiving waters. Reports on trash load reduction efforts are submitted annually and are available via the Water Board's Stormwater Multiple Application and Report Tracking System (SMARTS).

PCBs

PCBs are a mixture of individual liquid or solid chemicals that are odorless or mildly scented. PCBs are no longer produced in the United States but were once used as flame retardants and in electrical components, and in sealants such as caulk and expansion joints. PCBs-containing oil was also used in some locations for dust control. Due to the nature of their uses, their presence in the landscape is most common in areas of older industrial land use. The regional Water Quality Control Board requires that local agencies reduce the load of PCBs from urban runoff by 90%.

Trash in the Guadalupe River. Photo: Valley Water

PFAS

Per- and Polyfluoroalkyl Substances (PFAS) are a group of thousands of synthetic chemicals that resist heat, oils, stains, and water. They have been widely used in consumer products like nonstick cookware, carpets, waterproofing clothing, furniture fabrics and food packaging. They are also used in industrial processes and firefighting foams. Because of their widespread use, persistence in the environment, and potential health impacts, PFAS are a concern for water resources.

Surface water from Los Gatos Creek was sampled and analyzed for PFAS as part of a site investigation of the former San José Fire Training facility in the Guadalupe River Watershed. Several PFAS were detected in these samples, with the highest values observed downstream of the site. Valley Water has also tested PFAS in stormwater, percolation ponds, and recharge source waters in the Los Gatos Recharge System. PFAS were generally not detected in recharge source waters but were present at generally low levels in various pond and stormwater samples.

Temperature

Los Gatos Creek is listed on the State's 303(d) list of impaired water bodies for elevated temperature. Temperatures in the creek can increase when water resides in pooled areas such as lakes and reservoirs, as well as when the creek is exposed to sunlight with no shaded canopy. Legacy flood and erosion control efforts on the creek with significant amounts of hardscape can also increase temperatures due to surface water runoff.

Groundwater

Valley Water's groundwater protection programs have helped ensure that groundwater is a viable water source for current and future beneficial uses. The managed recharge program has helped to prevent permanent land subsidence since the early 1970s, as well as to mitigate threats of seawater intrusion from the San Francisco Bay. Valley Water's 2021 Groundwater Management Plan (Valley Water, 2021b) outlines the many programs and activities that protect groundwater supplies and quality.

The Santa Clara Plain groundwater management area is the primary source of groundwater for the northern Santa Clara Valley. The Santa Clara Plain generally produces groundwater of good to excellent quality for all beneficial uses identified by the San Francisco Bay Regional Water Quality Control Board, which include, but are not limited to, supply for purposes of municipal and domestic use, industrial service supply, industrial processes, agriculture, and groundwater recharge, and freshwater replenishment to surface waters. There are numerous threats to groundwater quality resulting from commercial, industrial, and residential development, including urban runoff, industrial chemicals, and underground storage tanks. Residential and agricultural use of nitrogen-based fertilizers and pesticides, as well as septic system use in rural areas, can also affect groundwater quality.

Continued efforts to maintain and protect the quality of natural and managed groundwater recharge are critical to providing a reliable supply of high-quality water for Santa Clara County. Some of these programs include reviewing land use plans and encouraging the preservation of natural infiltration and the reduction of impervious surfaces in areas that contribute to groundwater recharge; implementing Valley Water's well ordinance program to protect groundwater resources from contamination; assessing the vulnerability of groundwater subbasins to land use activities; and coordinating with regulatory agencies on groundwater cleanups.

Valley Water conducts ongoing monitoring to assess groundwater quality in the Santa Clara Plain groundwater management area, including regional monitoring, domestic well sampling, and focused monitoring in areas of historic seawater intrusion. Valley Water also obtains groundwater quality data from almost 250 public water supply wells from the State's Division of Drinking Water database every year (Valley Water, 2023c). Groundwater in the Santa Clara Plain continues to have very good quality (Valley Water, 2023c). Public water systems must comply with drinking water standards, which may require treatment or blending prior to delivery. The most common groundwater contaminant found in Santa Clara County is nitrate, which is more of a concern in south county beyond the Guadalupe Watershed. Nitrate can interfere with the blood's ability to transport oxygen and is of greatest concern for infants and pregnant women as it can cause serious illness. The U.S. Environmental Protection Agency is developing drinking water regulations for several specific PFAS. While PFAS do not appear to be widespread in local groundwater, some water retailer wells are expected to be impacted if the EPA regulations are adopted as proposed, which could require treatment or other actions.

Seawater Intrusion

Due to historic high groundwater pumping and land subsidence, particularly in the years following World War II, seawater intrusion has been observed in the shallow aquifer of the Santa Clara Plain adjacent to San Francisco Bay (Valley Water, 2021b). Seawater intrusion (also called saltwater intrusion) refers to the temporary or permanent flux of seawater into coastal freshwater aquifers.

Seawater intrusion is a groundwater management concern because it can degrade groundwater quality and, if severe enough, result in undesirable conditions that may include limiting groundwater as a water supply for municipal and industrial uses, agriculture, and domestic uses, or degrading groundwater dependent ecosystems or infrastructure. Reclaiming freshwater aquifers after seawater intrusion is very costly and time-consuming, if not practically infeasible in many cases. Therefore, sustainable groundwater management programs and actions that prevent or mitigate seawater intrusion are preferred to costly remediation (Valley Water, 2021b).

Valley Water's 2021 Groundwater Management Plan includes a seawater intrusion outcome measure that is based on decades of water quality monitoring in the Santa Clara Plain. Most supply wells in the Santa Clara Plain are screened in the deeper, principal aquifer zone, where no widespread seawater intrusion has been observed (Valley Water, 2021b). Significant increases in groundwater pumping or sea level rise due to climate change could lead to renewed seawater intrusion. Therefore, Valley Water's groundwater quality monitoring program and seawater intrusion outcome measure are designed to characterize the extent of seawater intrusion and be an early-warning indicator of worsening conditions so that appropriate groundwater management actions can be implemented.

Wild Iris. Photo: Lori Gregory

2.5.2 Future Conditions, Challenges, and Opportunities

The future of water quality in the Guadalupe Watershed will be shaped by a unique set of challenges and opportunities, some ongoing, and some to be anticipated in the years to come.

Challenges

Stormwater Runoff

Stormwater runoff is a key pathway contributing to pollutants in the Guadalupe River watershed. In particular, non-point source pollution from urban runoff can raise water temperatures, reduce biological conditions, scour channels, and mobilize various pollutants (e.g., trash, pesticides, sediment, PCBs, nutrients, pathogens, contaminants of emerging concern). Increasing temperatures due to climate change may increase the warming effects of urban runoff, reducing the potential for streams to support sensitive organisms such as steelhead. Continued sediment toxicity from new pesticides continues to be a challenge to control at the watershed level as regulation and use is controlled by the California Department of Pesticide Regulation (DPR). Hydrograph management also is a challenge for water quality in the urban reaches, especially related to sedimentation and erosion, however stormwater regulations have been adopted and implemented to minimize future effects.

Unsheltered Encampments

Homelessness is a problem throughout the country and has a major impact on the amount of trash, erosion, and human pathogens in urban creeks including Guadalupe River and Los Gatos Creek. Joint agency homeless encampment cleanups and supportive services programs continue but at best only keep pace with this significant societal problem.

Climate Change

Changes to the climate will also affect groundwater and water supply. Rising sea levels mean an increasing risk of seawater intrusion along the bayfront, which could be exacerbated by increased groundwater pumping due to increased demand and lack of other water supplies. Sea Level rise also increases the risk of groundwater shoaling (rising) and emergence at land surface, which could mean more nuisance flooding in commercial and residential areas, could affect subsurface and surface infrastructure, and could mobilize contaminants in the subsurface groundwater into other previously unaffected areas. Increased cycles of drought could affect water supply and require new ways of securing and conserving water in times of extended drought.

Calero Reservoir. Photo: Emily Tucker

Ongoing Threats to Calero Reservoir

Calero Reservoir continues to be primarily impaired by mercury contamination from historical mining and other sources in the watershed. It is listed on the State's Clean Water Act section 303(d) list of impaired water bodies due to elevated mercury levels in fish. Additional contaminants that threaten the waterbody include pathogens from livestock and wildlife, and contaminants related to recreational use, rural road runoff, boating, and imported water. Since Calero Reservoir serves as Valley Water's local drinking water supply, these impairments and threats may require additional treatment or monitoring in the future.

Opportunities

Implementing Green Stormwater Infrastructure

Opportunities to implement the Santa Clara Basin Stormwater Resources Plan include regional green stormwater infrastructure projects in collaboration with local municipalities. Significant progress has been made in the past several years to implement green stormwater infrastructure in an individual project/parcel-based manner. Larger "regional" green infrastructure projects in partnership with municipalities could result in significantly more water quality and other benefits at a much lower overall project lifetime cost. Implementing such projects will likely involve cooperation between multiple agencies.

Remediating Mercury Mining

There are opportunities to remediate mercury mining-impacted areas on public and private property. Although a significant amount of work has already been done by the County of Santa Clara and others in the New Almaden Mining District of the Guadalupe Watershed, unabated sources of mercury still contribute to mercury loading to reservoirs and creeks. Work to remediate these sites could result in additional load reductions to creeks and San Francisco Bay.

2.6 FLOOD RISK

2.6.1 *Valley Water Flood Management*

As the primary agency with authority to provide flood protection in the County, Valley Water manages flood risk in partnership with local, state, and federal agencies. Valley Water manages this risk in three keyways: 1) communicating risk to the community through regular communications, preparedness, forecasting, and emergency action plans; 2) maintaining existing infrastructure; and 3) building new facilities to reduce risk.

Flood Communication and Preparedness

Valley Water also partners with municipalities and the County to provide education and information to the public on the risks of flooding, to provide flood warnings, and to coordinate emergency responses during flood events. Valley Water has developed and continues to update a real time, web-based flood warning system for flooding hot-spots within Santa Clara County, including the Guadalupe Watershed. This system helps emergency managers understand immediate flood risks and it will provide the public with flood-prediction maps based on real time rainfall forecasting and radar data.

The Community Rating System (CRS) is a voluntary program created under the National Flood Insurance Program (NFIP) to reduce flood damages through nonstructural activities such as increasing public awareness and preparing for flood emergencies. CRS points earned by Valley Water can be used by any participating community in the County to lower flood insurance premiums via the CRS scoring and rating system. The communities within the Guadalupe Watershed have CRS ratings of seven (7) and their residents therefore receive a 15% discount on flood insurance. The remainder of the Guadalupe Watershed is located within unincorporated Santa Clara County, which does not currently participate in the CRS program, although it has historically.

Stream Maintenance Program - Maintaining existing Flood Protection Infrastructure

Valley Water work crews maintain stream conditions across Santa Clara County to safely convey water during storm events. This critical flood protection work is primarily implemented through the Stream Maintenance Program (SMP). Valley Water is generally allowed to perform regular maintenance of the creeks in Guadalupe Watershed only along reaches that it owns or for which it has easements. The program focuses on streams that have been improved with engineered flood protection projects to provide continued flood protection for homes and businesses. SMP work performed on natural streams without a completed flood project is limited due to potential negative impacts to natural habitat.

There are several additional programs within Valley Water to manage its infrastructure and maintain the level of service originally intended: The Safe Clean Water and Natural Flood Protection F8 program (Sustainable Creek Infrastructure for Continued Public Safety) assesses and prioritizes existing creek and watershed infrastructure, prepares watershed asset management plans, and implements the recommendations provided in the asset management plans. The Watershed Asset Rehabilitation Program (WARP) implements stream maintenance work for projects outside the scope of SMP.

2.6.2 *Past Conditions: Historical Flooding & Existing Flood Protection Infrastructure*

Figure 2-17 maps out the existing flood protection infrastructure in the Guadalupe watershed. It shows whether a concrete structure was built or if it was kept as an earthen channel. The earthen channels may be a reach where the natural channel is expanded, earthen trapezoidal shaped reach, or a reach with earthen levees. The map shows that most of the channels in the watershed have some kind of flood protection project built along them. There is almost an equal mix of concrete and earthen channels with the major Guadalupe River mostly kept earthen and natural.

The Guadalupe River has a long history of flooding, with the earliest recorded event occurring in the winter of 1852-1853. Figure 2-17 shows the footprint of all the documented historical flooding in the Guadalupe watershed since 1952. Between 1952 and 2023, there were 14 years with recorded flood events within the Guadalupe Watershed. The worst floods occurred in 1955 and 1958.

The most significant flooding has occurred along the downtown Guadalupe River and Lower Guadalupe River reaches. Downtown Guadalupe River last flooded in 1995 during the construction of the Downtown Guadalupe River project. Significant flooding along Lower Guadalupe River last occurred in the storms of 1982 and 1983, with significant damages to the Alviso community.

Significant flooding also occurred along Ross Creek downstream of Highway 85 to the Guadalupe River confluence during the 1952 storm event.

Upper Guadalupe River Flooding along Highway 87 at Highway 280 – January 1995. Photo: Valley Water

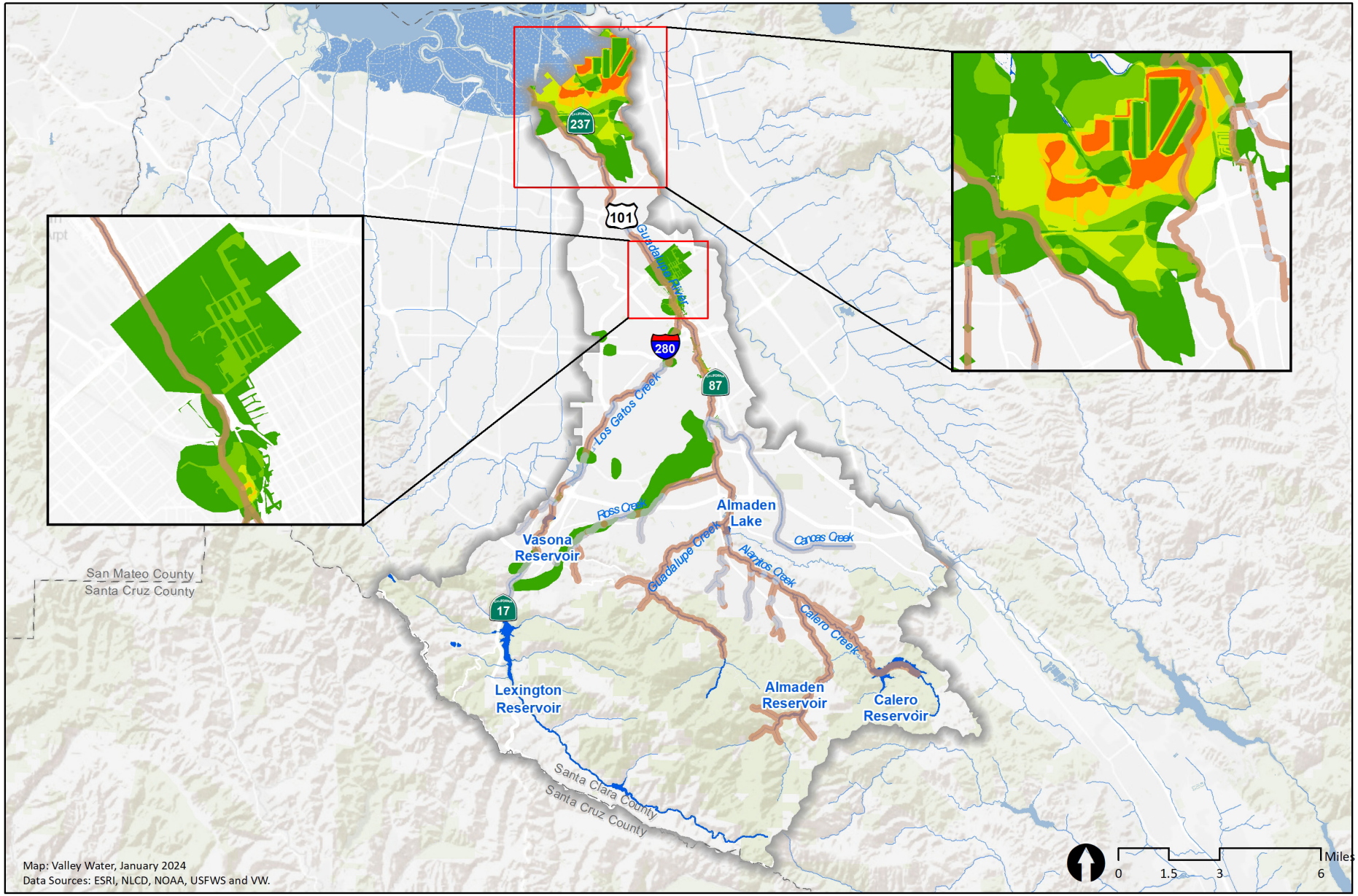


Figure 2-17: Existing Flood Infrastructure and Historical Flooding

2.6.3 Present Conditions: Existing Flood Risk & Vulnerability

With One Water's new Flood Vulnerability Assessment, the focus is on health and safety during frequent flooding events, or the 25-year event. The following channels have 25-year flow capacity or more and therefore would not flood during a 25-year storm event: Los Gatos Creek, Alamitos Creek and its tributaries, Guadalupe Creek, downtown Guadalupe River, and Lower Guadalupe River.

Figures 2-18 and 2-19 show the extents of the estimated 25-year flooding in the whole watershed. Historically, there were estimated to be approximately 10,000 parcels in the 25-year floodplain. That has been reduced with existing flood protection projects and hydrology changes to about 3,155 parcels and 992 acres currently in the 25-year floodplain. Out of those 3,155 parcels, about 40 parcels are within disadvantaged communities. The map shows the flood vulnerability assessment results with low- to high-risk areas.

The following descriptions relate to the potential flooding from a 25-year storm event.

What we mean when we say...

25-year flood event (4% flood event): A flood that has a 4 percent chance of occurring in any given year.

100-year flood event (1% flood event): A flood that has a 1 percent chance of occurring in any given year.

Upper Guadalupe River Subwatershed

Upper Guadalupe River

There have been some flood protection projects already built in Upper Guadalupe River, with over 25-year protection provided for the reach upstream of the Canoas Creek confluence. Although there have been some flood protection projects built in the reach from Highway 280 up to the Canoas Creek confluence, it still does not have 25-year flow capacity. Overbanking would occur from Highway 280 up to Willow Glen Road. This potential overbanking to the east of Upper Guadalupe River would result in low to high flood risk and vulnerability, mainly due to the high flood depths. There is also a small portion of flooding occurring in a disadvantaged community.

Upper Guadalupe River Post Storm. Photo: Valley Water

Ross Creek

Flooding along Ross Creek during a 25-year storm event would mainly occur from Kirk Road down to the Guadalupe River confluence. This flooding is considered low to medium risk due to higher velocities being a potential hazard. There are no disadvantaged communities in this area.

Canoas Creek

Flooding along Canoas Creek would occur due to the backwater affect at the Guadalupe River confluence. The overbanking along Canoas Creek results in low to medium flood risk and vulnerability, mainly due to some high flood depths and the potential to flood frequently at relatively low storm events.

Alamitos Creek Subwatershed

Flood protection levees were constructed along Alamitos Creek and Randol have structural issues as well as limited capacity with updated hydrology, with some areas having less than 25-year capacity. Flooding along Alamitos Creek and its tributaries was assessed to have low risk and vulnerability to flooding.

There is also minor flooding that would occur in the rural areas along Calero Creek. These flood flows do not spread out much further than the riparian corridor.

ADDITIONAL ONLINE RESOURCES

Valley Water Flood Reports:

https://www.valleywater.org/flooding-safety/flood-ready/historical-flood-reports

Flood Vulnerability Assessment

Traditionally, the goal of flood risk reduction has been to reduce the size of the FEMA 100-year floodplain and prioritized costs and economic damage, which would lead to emphasis on protecting affluent areas due to higher property values. With the new Flood Vulnerability Assessment, the focus is on more frequently occurring flood events (25-year), deep and/or fast-moving floodwaters, and social vulnerability where residents are more susceptible to flooding.

Valley Water's Flood Vulnerability Assessment combines physical and statistical hazards and considers socioeconomic conditions to create a holistic assessment of flood vulnerability in the County. Physical hazards in this analysis include flood depths and velocities and locations of critical facilities. Flood depths and velocities were modeled using the U.S. Army Corps of Engineers HEC-RAS software and combined to assess physical hazards to people and structures. Combined depth and velocity values were weighted on a scale based on severity. Critical facilities including hospitals, police stations, and fire stations, were also mapped.

This analysis also incorporated statistical hazards to address areas with continual flood issues. Statistical flood data included historic flood events since 1952 and known problem areas referred to as Flood Hot Spots by Valley Water's Flood Information Team.

Finally, socioeconomic conditions were included to account for an area's ability to access resources and recover from a flood event. The datasets for socioeconomic conditions were CalEnviroScreen 4.0, an environmental health mapping tool created by the Office of Environmental Health Hazard Assessment within the California Environmental Protection Agency, and Area Median Income. CalEnviroScreen incorporates data for various pollution sources, adverse health conditions, educational attainment, housing burden, and other characteristics to produce scores for all census tracts and identify disproportionately impacted communities. Locations with 80% or less of the Area Median Income were mapped as low income.

Physical hazards, statistical flooding, and socioeconomic conditions were given points and then combined to create a ranked hazard map. Areas with the most points contained the highest combined hazard physically, statistically, and socially. The hazard map then displays this ranking by color, with reds and dark oranges indicating a higher flood vulnerability and risk than light orange or yellow.

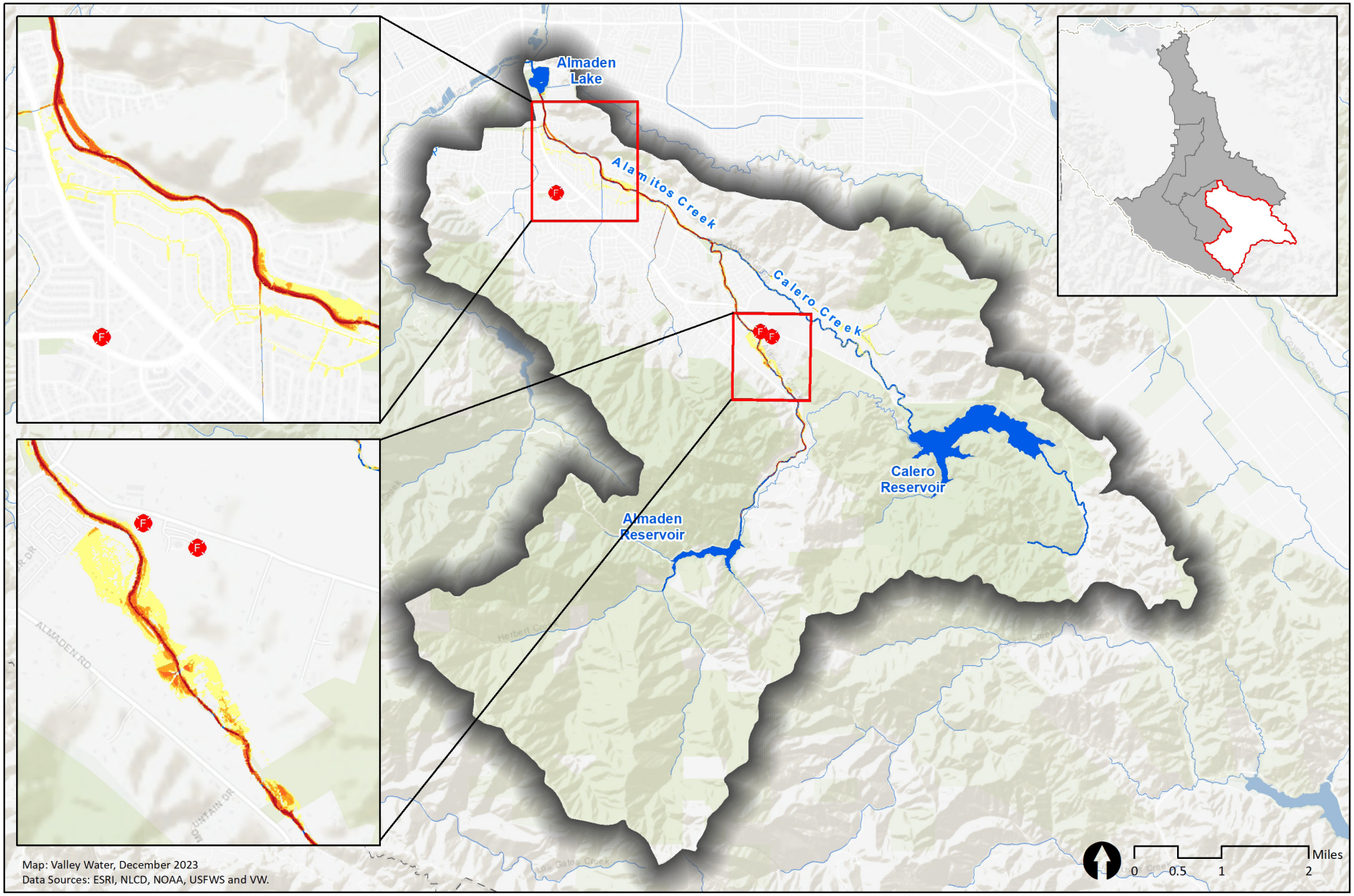


Figure 2-18: 25 Year Flood Risk & Vulnerability Assessment for Alamitos Creek Subwatershed

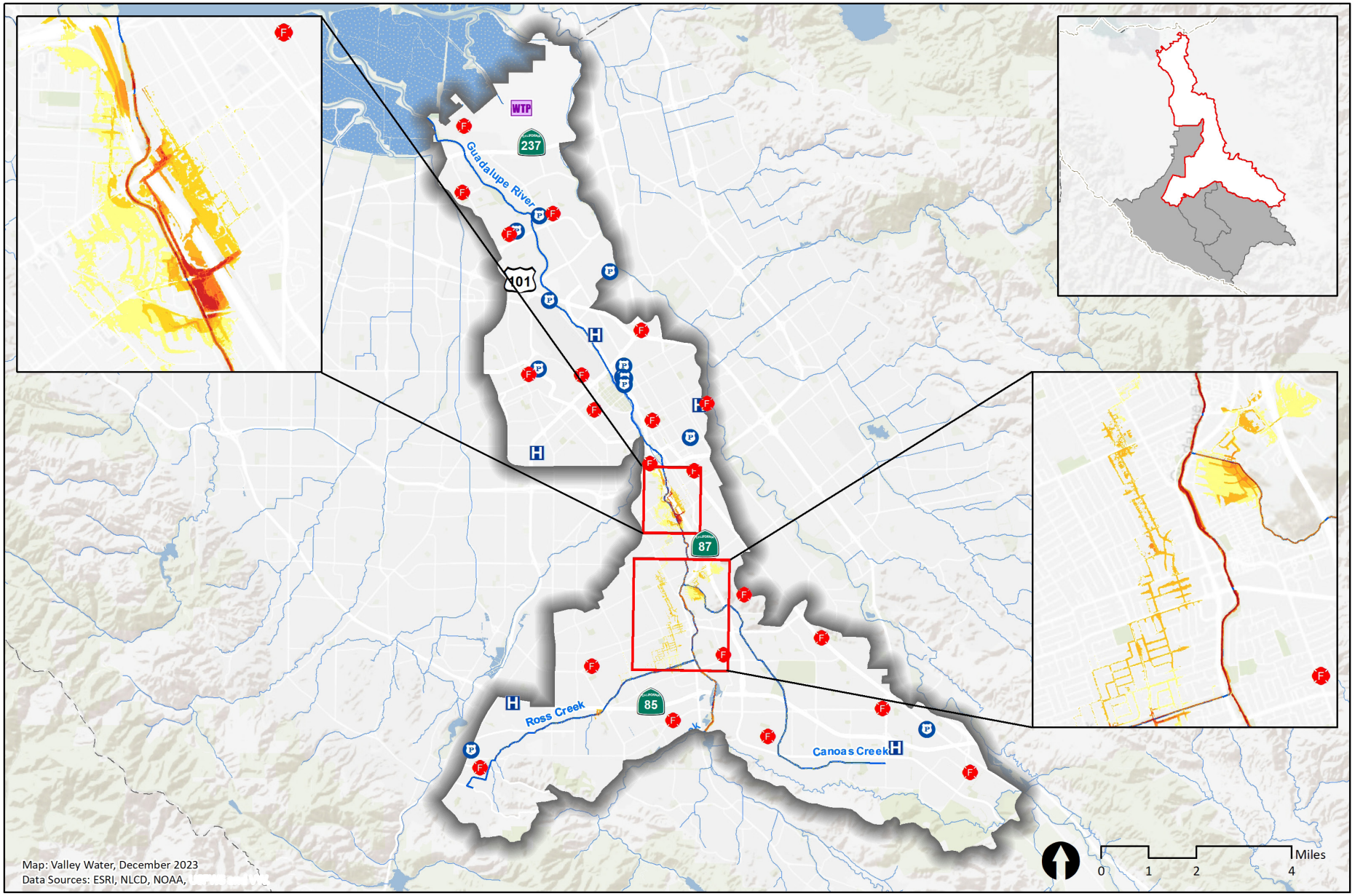


Figure 2-19: 25 Year Flood Risk & Vulnerability Assessment for Guadalupe River Subwatershed

2.6.4 Future Conditions, Challenges, and Opportunities

Challenges

Limited Creek Corridor Right-of-Way and Access

Valley Water has the right to maintain or modify reaches of creeks that it owns or for which it has an easement. Where Valley Water does not own or have easement access for the creek, Valley Water staff cannot access these areas to assess or remove, vegetation, trash, or sediment that may be blocking or slowing flow.

Historically, urbanization in the Guadalupe Watershed led to the development of land within natural floodplains and in many cases occurred immediately adjacent to banks of creeks. These land use patterns physically confine creeks to a narrow corridor, separate the creek from its natural floodplain, and leave little, if any, space to construct flood protection infrastructure. Re-establishing more natural hydrology and hydraulics in these areas would require expensive and logistically challenging real estate acquisitions. This is not often an affordable option in the developed portions of the Santa Clara Valley.

Climate Change

The future is likely to be very different from the past because of climate change, with most models predicting more intense, but possibly less frequent, rainstorms in Santa Clara County. If hydrologic conditions change from those assumed in design, previously constructed projects may not provide their level of protection and may result in increased flooding. The increased erosive power of more intense flows could initiate channel incision and head-cutting, especially where the flows are contained by entrenched channels. Channel incision and other erosion in the catchments of streams that do not drain to any reservoirs would increase sediment yields to streams in the valley, causing them to aggrade (San Francisco Estuary Institute & Aquatic Science Center, 2013). Rising sea levels will also affect flood capacity in rivers and creeks near the San Francisco Bay, especially if king tides occur during the same time as large storm events. This in combination with channel aggradation would likely increase the risk of flooding in some areas of the lower watershed. This reality calls for a new approach in planning for future flood protection measures.

Aging Infrastructure

Most of the flood protection infrastructure in the watershed is approaching its design life of 50+ years. Rehabilitation may become a significant need in the near-term due to higher probability of failure as the infrastructure gets older and more frequent maintenance needs.

Opportunities

Promoting Environmentally Friendly Development

In looking at reducing flood risk holistically in the watershed, there is an opportunity to promote land development techniques, such as promoting building structures outside of the floodplain and Low Impact Development (LID), that support flood risk reduction. These techniques may not only reduce the flood risk but may also help support groundwater replenishment, water quality, green development and impervious area removal, parks and open space for temporary stormwater capture and reuse.

Improvements with Rehabilitation

Rehabilitation of capital projects, while very costly, may create opportunities to redesign older, hardscaped systems and replace them with nature-based systems. New and strategic partnerships could provide financial opportunities, ecological or geomorphic improvements, and increased community support. Rehabilitating hardscaped channels into more natural systems is one of the metrics for measuring One Water's long-term objectives.

Flood Detention (multi-use land and facilities for temporary flood storage)

Flood detention facilities could be used to expand flood storage capacity and reduce peak flows downstream by temporarily storing flood waters in basins of various types and sizes. During non-flood periods, the basins would not be inundated and could serve as natural parks, recreational sports fields or even parking garages, depending on the needs of the public and desires of the landowner or agency who owns the facility. During the flood event, the basin would fill and afterwards naturally drain back to the creek and the recreational land use would be restored.

Expanding Groundwater Recharge with Flood-MAR

Flood-Managed Aquifer Recharge (Flood-MAR) is one way that groundwater recharge could be expanded to increase water supply and potentially reduce stormwater runoff into urban areas. A pre-feasibility study identified that capturing hillside runoff onto open space before it reaches roads and storm sewers may be the most feasible approach to Flood-MAR in Santa Clara County. Valley Water is continuing studies to assess the feasibility of Flood-MAR in all the watersheds in the county.

Planning Studies for Flood-Vulnerable Areas

There are several areas identified through the Flood Vulnerability Assessment that are at risk of flooding (Figure 2-18 and Figure 2-19) including Calero Creek, Alamitos Creek, Upper Guadalupe River, Canoas Creek, and Ross Creek. Most of the areas identified as high-risk will be addressed through the Upper Guadalupe River Project, currently in the design phase in partnership with the U.S. Army Corps of Engineers. For all other areas, new planning studies should be undertaken to evaluate flood risk reduction alternatives and recommend a final project that can be designed and constructed.

3

OBJECTIVES, METRICS AND TARGETS

Sunrise At Alamitos Pond. Photo: James Downing

CHAPTER 3: OBJECTIVES AND METRICS

INTRODUCTION

The One Water Framework included a vision, three goals, and five objectives for Santa Clara County watersheds, all aligned with Valley Water's governance policies set by its Board of Directors. This chapter focuses on the objectives, and how the metrics and targets that support them were developed for the Guadalupe Watershed to be science-based, measurable, and transparent.

Valley Water also developed these metrics to identify watershed resource needs and to highlight priorities to develop into watershed actions (Chapter 4).

Science-Based Metrics

One Water objectives were developed to be SMART (Specific. Measurable. Achievable. Relevant. Time-Based.) wherever possible. This was done by developing attributes (key aspects of any one objective) and metrics for those attributes (measurable component to show status and movement toward a target). Metrics were developed by subject matter experts at Valley Water in alignment with One Water objectives. Additional scientific expertise was solicited through a Science Advisory Hub in coordination with the San Francisco Estuary Institute/ Aquatic Science Center (SFEI). This group included regional experts in hydrology and ecology, who provided input on types of metrics, how to use metrics as indicators of watershed health, and optimal ways to compile and represent data.

Transparent Metrics

The metrics chosen to support the five objectives were developed to clearly show current condition (actual) versus a desired end state (target). Implementing the watershed actions identified by the One Water planning process helps the watershed metrics reach their target condition. Actions may be implemented by Valley Water but also by anyone working in the watersheds, making it important to share progress toward targets, and collaborate with others to report results as priority actions are carried out. Valley Water is working with SFEI to utilize the EcoAtlas website as a host for this data, which will be reported out by watershed with updates each time the watershed plan is updated.

Metrics to Identify Watershed Needs

A key use of the metrics data illustrated in this chapter is to determine where measurable objectives are not being met. For example, if baseline data showed that conditions are at 50% for one metric when the target is 100%, then there is still 50% of the way to go to meet the target and to see a large improvement in that watershed condition. If another condition showed 90% achievement of the target, then perhaps that area would require less resources at this time. While additional factors may be considered in prioritization of actions, such as readiness, cost, and vulnerability, the degree to which a project meets watershed needs is a key element.

The following pages describe the five One Water objectives, each with attributes, metrics and targets specific to Guadalupe Watershed unless noted otherwise. In addition, a graphical depiction of the degree to which targets have been met to date is included to highlight areas that may need additional resources and/or partner support.

Objective A

Protect and Maintain Water Supplies

This One Water objective is to protect and maintain a reliable water supply that draws on a diverse mix of water sources — groundwater, local rainwater, imported water, and recycled water— to supply diverse needs. The objective also acknowledges an ongoing emphasis on expanding local supply, especially recycled water and water conservation, as a means of meeting future demands.

Objective A is tracked by two attributes and a total of five metrics:

ATTRIBUTES AND METRICS

A.1: Protect, maintain, and develop local surface and groundwater supplies

- **A.1.1 - Operational capacity at Valley Water reservoirs.**

  Measures degree to which full operating capacity is restored to Anderson, Almaden, Calero, and Guadalupe Reservoirs through seismic retrofits and other improvements; and reservoirs are safely maintained to ensure Valley Water can maximize its use of local water consistent with its water rights.

  Target: *100% capacity at all reservoirs by 2035.*

- **A.1.2 - Recycled and purified water production.**

  Tracks production of recycled and purified water, which is a local, drought-proof source that reduces demand on potable supplies and reliance on imported water.

  Target: *Recycled and purified water makes up 10% of the county's water supply by 2025*.*

  **Target date will be updated per the Water Supply Master Plan.*

- **A.1.3 - Managed recharge capacity.**

  Measures sufficiency of managed recharge capacity to utilize existing local water rights and available imported supplies, and to ensure sustainable groundwater supplies.

  Target: *Managed recharge capacity of at least 143,500 acre-feet per year in locations supporting sustainable groundwater management objectives.*

- **A.1.4 - End of year groundwater storage.**

  Measures end-of-year groundwater storage, which helps meet annual water supply needs, manage shortages, and avoid undesirable results like subsidence.

  Target: *Total of 300,000 AF: 278,000 AF in the Santa Clara Plain; 5,000 AF in the Coyote Valley; and 17,000 AF in the Llagas Subbasin.*

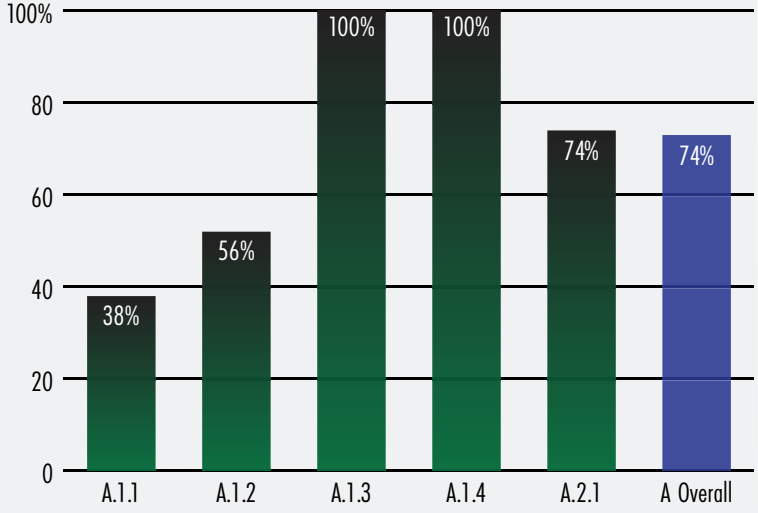
A.2: Support water supply demand management (water use efficiency, water conservation)

- **A.2.1 - Annual water conservation savings.**

  Calculates savings though Valley Water's water conservation efforts, which reduce the need for investments in additional water supplies and infrastructure, against an established baseline.

  Target: *109,000 acre-feet conserved annually by 2040.*

Objective A Metrics - PERCENT COMPLETE



Current degree to which Valley Water activities in the Guadalupe Watershed meet One Water metrics and targets (2023).

Objective B

Protect and Improve Surface and Ground Water Quality

This One Water objective is to maintain high quality water in creeks and groundwater subbasins. The county needs high quality surface water and groundwater to safeguard public and ecological health and to support myriad beneficial uses. Maintaining high water quality involves Valley Water in water quality protection at many scales, ranging from meeting or surpassing regulatory standards for drinking water to preventing pollution and protecting source water, including groundwater.

Objective B is tracked by two attributes and a total of four metrics:

ATTRIBUTES AND METRICS

B.1: Support high quality surface water in streams for applicable human and aquatic life uses

- **B.1.1 - Chemical integrity integrity (e.g. nutrients, chlorine).**

  Measures chemical integrity of surface waters in order to meet and maintain standards to support aquatic ecosystems and human use.

  Target: *Achievement of Applicable Water Quality Objectives and MRP Thresholds 100% of the time.*

- **B.1.2 - Biological integrity (e.g. bioassessment, pathogens, ASCI hybrid).**

  Measures biological integrity of surface waters in order to meet and maintain standards to support aquatic ecosystems and human use.

  Target: *Achievement of Applicable Water Quality Objectives and TMDL Targets 100% of the time.*

- **B.1.3 - Physical integrity (e.g. temperature, pH, dissolved oxygen).**

  Measures physical integrity of surface waters in order to meet and maintain standards to support aquatic ecosystems and human use.

  Target: *Achievement of Applicable Water Quality Objectives and MRP Thresholds 100% of the time.*

B.2: Protect groundwater from existing and potential contamination

- **B.2.1.a - Drinking water standards in water supply wells.**

  Evaluates drinking water standards on an annual basis using 15 years of data from water supply wells.

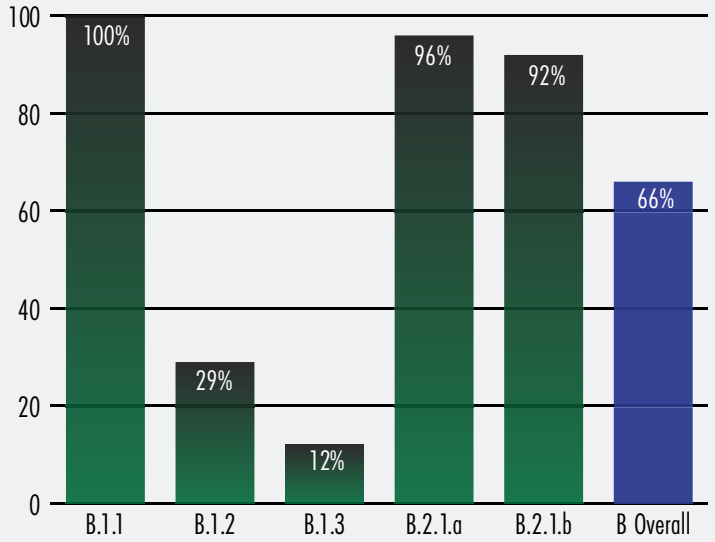
  Target: *95% of water supply wells meet primary drinking water.*

- **B.2.1.b - Trends in total dissolved solids (TDS) in water supply wells.**

  Evaluates long-term trends in groundwater quality for TDS on an annual basis using 15 years of data from water supply wells.

  Target: *At least 90% have stable or decreasing trends for total dissolved solids (TDS).*

Objective B Metrics - PERCENT COMPLETE



Current degree to which Valley Water activities in the Guadalupe Watershed meet One Water metrics and targets (2023).

Objective C
Reduce Flood Risk

This One Water objective is to practice, encourage, and support flood and floodplain management that integrates risk reduction with enhancement of natural creek corridors and floodplain functions. This work begins with maintaining existing facilities and then reducing additional areas with greater flood risk to the community. By promoting managed flooding and natural flood protection, Valley Water can also meet multiple objectives. One Water actions will be developed to not only enhance natural riparian functions, but also to increase infiltration, diversify habitats, manage woody debris, provide life-cycle cues to sensitive species, and move gravel and fine sediment through the system.

Objective C is tracked by three attributes and a total of eleven metrics:

ATTRIBUTES AND METRICS

C.1: Maintain Flood Facilities

- **C.1.1.a - Flood protection facilities are inspected, assessed, and documented.**

  Tracks Valley Water facilities to ensure they are properly inspected and assessed based on identified levels of service.

  Target: *100% of levees are inspected and maintained annually.*

- **C.1.1.b - Flood protection facilities are inspected, assessed, and documented.**

  Tracks Valley Water facilities to ensure they are properly inspected and assessed based on identified levels of service - flood protection assets.

  Target: *50% of all flood protection assets are assessed and documented annually.*

- **C.1.2 - Flood protection facilities are maintained to defined levels of protection.**

  Tracks Valley Water facilities to ensure they are properly maintained and protected over time, starting with an identified level of service. This allows for appropriate flood conveyance capacity and structural integrity of stream banks, while minimizing impacts on the environment and protecting habitat values.

  Target: *100% of flood protection facilities have a probability of failure (POF) of 4 or less.*

C.2: Prepare and inform community of flood risks to improve safety and reduce damage

- **C.2.1 - Community Rating System (CRS) participation and rating of communities in Santa Clara County.**

  Maintains a National Flood Insurance Program CRS total point sum for Valley Water's contribution of at least 1500-1999 points, or a Class 7, which equates to a 15% discount in flood insurance rates.

  Target: *Maintains a National Flood Insurance Program CRS total point sum for Valley Water's contribution of at least 1500-1999 points (Class 7).*

- **C.2.2 - Create, maintain and update Emergency Action Plans (EAPs) that include vulnerable populations and anticipates higher severity and frequency of climate change impacts.**

  Complete flood management plans/procedures (e.g. EAPs and annexes) based on risk priorities to help inform and protect the community. Target is consistent with Valley Water's Safe, Clean Water Program.

  Target: *Complete 2 flood management plans/ procedures per year, selected by risk priority, for the next 15 years.*

- **C.2.3.a - Have available flood forecast locations on waterways to help predict immediate future flood risks.**

  Forecast points help inform possible future outcomes from storms on both streams and reservoirs. 35 points covers the majority of the most flood prone reaches and all reservoirs. The points should also be operational and not in testing.

  Target: *Achieve at least 35 total operational forecast points.*

- **C.2.3.b - Continuously improve upon weather and precipitation forecasts to more accurately predict possible future flooding impacts.**

  Precipitation forecasts feed into models that output forecasted river flows. An accurate precipitation forecast means an accurate river and reservoir forecast.

  Target: *Improved precipitation forecast skill every year for 15 years, as well as when compared to industry standards.*

- **C.2.4 - Public is informed of potential flood risk.**

  Measures how well the public is informed of potential flood risk in the community, based on community survey. The five-year average is based on an annual community survey conducted by a third party that measures the public's awareness of flood risk.

  Target: *An above-average percentage of members of the public living in a flood zone, compared to the five year average, aware of their flooding risk.*

C.3: Reduce risk of flooding from flows overtopping banks (creek and tidal)

- **C.3.1 - Number of parcels subject to frequent flooding (25-year flood event).**

  Accounts for the potential risk of flood damage to developed parcels, including critical facilities, from more frequent flood events.

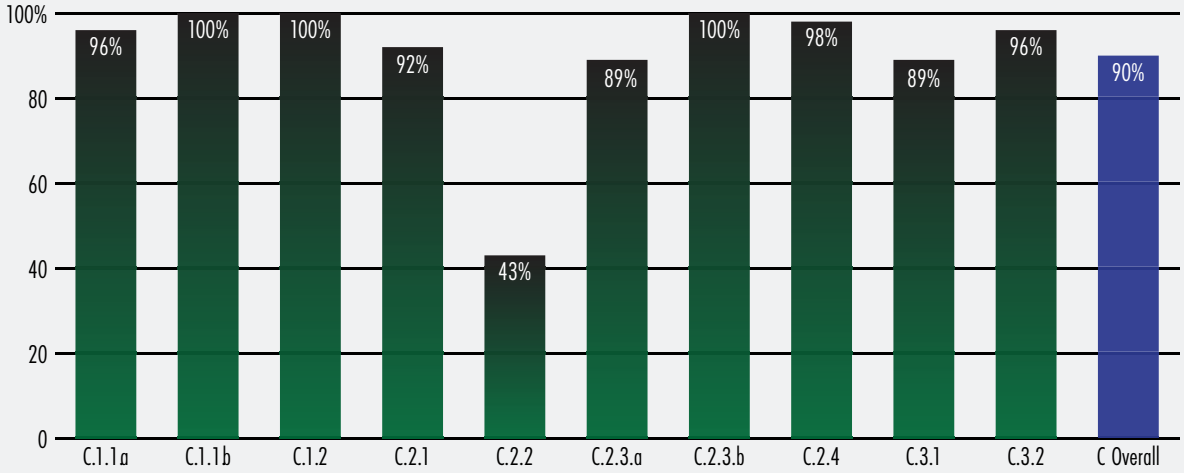
  Target: *Zero developed parcels, subject to flooding from 25-year or lesser flood events.*

- **C.3.2 - Number of parcels in an identified disadvantaged community protected from risk of frequent flooding.**

  Measures the number of parcels subject to frequent flooding, defined as the 25-year flood event, that fall within a disadvantaged community (DAC) designation.

  Target: *Target: Zero parcels located within the 25-year floodplain identified as disadvantaged community subject to frequent flooding.*

Objective C Metrics - PERCENT COMPLETE



Current degree to which Valley Water activities in the Guadalupe Watershed meet One Water metrics and targets (2023).

Objective D

Protect, Enhance and Sustain Natural Ecosystems

This One Water objective is to strengthen the resilience of natural environments and resources so they can better withstand the stresses and disturbances brought about by urbanization, drought, climate change, and sea level rise. From an integrated One Water perspective, resilient habitats may occupy the same spaces as areas used for other important water management functions, such as groundwater recharge, flood risk reduction, and water quality protection. Objective D is tracked by three attributes and fourteen metrics. Most of the Objective D metrics are focused on the portion of the watershed below 1,000 feet elevation, also referred to as the valley or valley floor, as this is where impacts and stressors on ecological resources are typically most acute.

ATTRIBUTES AND METRICS

D.1: Maintain healthy watersheds

- **D.1.1.a - Miles of stream in good to excellent ecological condition at the watershed scale.**

  Measures the miles of streams that are in good to excellent ecological condition based on California Rapid Assessment Method (CRAM) index scores at the watershed scale using Valley Water's ambient stream condition surveys.

  Target: *Increase the proportion of stream miles that are in good ecological condition to at least 40% over the next 50 years.*

- **D.1.1.b - Miles of stream in good to excellent ecological condition at the valley floor scale.**

  Measures the miles of streams below 1,000 ft NAVD88 that are in good to excellent ecological condition based on CRAM index scores using Valley Water's ambient stream condition surveys.

  Target: *Increase the proportion of stream miles that are in good ecological condition to at least 40% over the next 50 years.*

- **D.1.2 - Acres of buffer protected along rivers and their tributaries in the Valley.**

  Measures efforts to prioritize, acquire, or otherwise protect near-water lands in the Valley (i.e., below 1,000 ft NAVD88).

  Target: *Achieve 19,300 acres of protected land for the mainstem and tributary channels in the Valley.*

- **D.1.3 - Number of terrestrial wildlife corridor enhancement efforts.**

  Measures the number of improvements for wildlife corridors, crossings and habitat linkages for wildlife movement that are implemented.

  Target: *100% of identified improvements are implemented.*

D.2: Enhance diverse, healthy riverine habitats

- **D.2.1 - Channel length with riparian habitat in the Valley.**

  Measures the miles of mainstem channels, tributary channels, and reservoirs below 1,000 feet elevation with high functioning, multiple benefit riparian corridors.

  Target: *Increase to 171 miles the length of channels and reservoir shorelines with continuous riparian habitat width > 10 m.*

- **D.2.2 - Area of natural habitat in the Valley.**

  Indicates acres of natural habitat (wetland, riparian, grassland, woodland, and shrubland) that contributes to habitat connectivity, could be used for wildlife movement, and benefits communities.

  Target: *Achieve 47,000 acres of natural habitat in the Valley.*

- **D.2.3.a - Area of non-native invasive non-native forest plant communities in the Valley.**

  Indicates extent of non-native, invasive plant communities in the riparian zone along mainstem and tributary channels throughout the Valley.

  Target: *Control non-native forest to 950 acres or 10% of total riparian zone (whichever is lower).*

- **D.2.3.b - Area of non-native invasive non-native shrub plant communities in the Valley.**

  Indicates extent of non-native, invasive plant communities in the riparian zone along mainstem and tributary channels throughout the Valley.

  Target: *Control non-native shrub to less than 1% of total riparian zone.*

- **D.2.3.c - Area of non-native invasive non-native herbaceous plant communities in the Valley.**

  Indicates extent of non-native, invasive plant communities in the riparian zone along mainstem and tributary channels throughout the Valley.

  Target: *Control non-native herbaceous to less than 1% of total riparian zone.*

- **D.2.4 - Number of unnatural in-channel barriers that prevent or hinder salmonid movement.**

  The remediation of barriers aids the upstream movement of adult salmonids during their migration to reach spawning habitat as well as the downstream movement of juveniles on their way to the ocean. It also facilitates movement within the resident population to help contend with changing environmental conditions.

  Target: *80% of identified passage barriers (excluding reservoir dams) are remediated over the next 50 years.*

- **D.2.5 - Benthic macro invertebrate (BMI) composition in streams.**

  Uses California Stream Condition Index (CSCI) scores, which aggregate several measures of the BMI community, as an indicator of water quality health and availability of instream food for fish.

  Target: *100% of sites have CSCI scores higher than 0.795.*

- **D.2.6 - Stream corridor continuity and buffer in the Valley.**

  Uses CRAM sub-metrics to assess stream corridor continuity, breaks in the upstream and downstream riparian corridor and how those breaks might negatively affect the transmission of water and sediment, the shading of the channel, and the stability of the banks.

  Target: *Increase and/or maintain CRAM Buffer and Landscape Context Attribute scores in streams below 1,000 ft elevation so that 75% of all CRAM assessments achieve Buffer and Landscape Context scores >75.00 over the next 50 years.*

D.3: Enhance diverse, healthy baylands and tidal marsh

- **D.3.1 - Percentage of streams re-connected to bayland tidal marsh.**

  Measures percent of creeks with significant tidal and bayland interactions, allowing exchange of sediment across a wider area, and resulting in a lower flood water surface and improved sediment conveyance onto baylands in support of habitats.

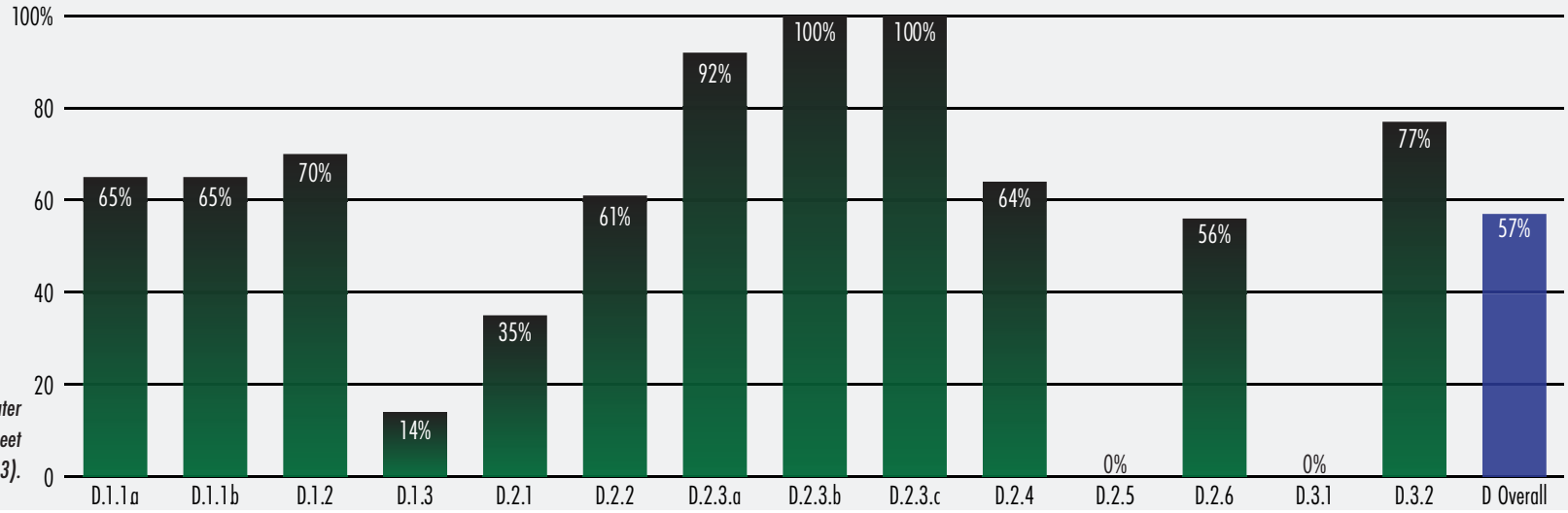
  Target: *Re-connect four creeks total (Sunnyvale East, Sunnyvale West, Calabazas, San Tomas) out of 13 total creeks countywide.*

- **D.3.2 - Total acreage of tidal marsh.**

  Measures tidal marsh extent for both habitat and as a buffer and adaptation for sea level rise.

  Target: *Increase to a total area of 3,000 acres over the next ten years.*

Objective D Metrics - PERCENT COMPLETE



Current degree to which Valley Water activities in the Guadalupe Watershed meet One Water metrics and targets (2023).

Objective E

Mitigate and Adapt to Climate Change

This One Water objective is to prepare for and adapt to global warming and climate change effects that include temperature increases, precipitation changes, weather extremes, and sea level rise. These effects may increase water supply risks and uncertainty; increase the severity or duration of droughts, flooding, and wildfire; and create added stress on native species and riparian and wetland ecosystems.

Objective E is tracked by four attributes and a total of seven metrics:

ATTRIBUTES AND METRICS

E.1: Mitigate Valley Water's contribution to climate change

- **E.1.1 - Net CO2e emitted by Valley Water.**

  Measures net CO2e emissions, which incorporate both direct and indirect emissions, along with potential sequestration from Valley Water projects. Direct emissions include emissions from Valley Water's vehicle fleet and other Valley Water-owned equipment, along with emission sources from Valley Water's properties and projects. Indirect sources include emissions from energy usage, employee commutes, emissions from waste produced by Valley Water, imported water, and construction. Reduction measures include prioritizing projects with lower emissions and those with sequestration potential, enhancing water conservation programs, and expanding waste reduction measures at Valley Water.

  Target: *Update the greenhouse gas accounting methodology and develop a Greenhouse Gas Reduction Plan with the goal to be carbon neutral by 2045.*

E.2: Build climate change resilient water supply resources

- **E.2.1 - Volume of water supply treated by green Infrastructure projects.**

  Tracks volume of stormwater passing through green infrastructure.

  Target: *1000-acre feet of stormwater capture by 2040.*

- **E.2.2 - Average annual water conservation savings.**

  Measures volume of water conserved annually relative to 1992 baseline.

  Target: *109,000 acre-feet conserved annually by 2040.*

E.3: Increase the resiliency of people, property, and ecosystems to increasing riverine and coastal flooding due to climate change

- **E.3.1 - Total miles of shoreline protected.**

  Estimates the number of shoreline miles protected against at least the intermediate level of sea level rise based on the most updated projections from Cal-Adapt. The San Francisco Shoreline Protection Project has plans to protect the entire shoreline in Santa Clara County. This accounts for 18 miles of shoreline, so target is 100% protection. Sea level rise projections are based on USACE estimates, since this project is in partnership with them.

  Target: *18 miles of Santa Clara County shoreline is protected.*

- **E.3.2 - Number of critical facilities subject to a 500-year flood event.**

  Accounts for the potential risk of structural damage to critical facilities from a 100 to 500-year flood event. Over the long-term, Valley Water aims to have zero critical subject to a 100 to 500-year flood event. Protection against larger storm events may take into consideration climate change impacts.

  Target: *Zero critical facilities subject to a 500-year flood event.*

E.4: Build climate change resilient watershed ecosystems

- **E.4.1 - Channel length with continuous riparian native habitat.**

  Indicates degree of high functioning riparian habitat around mainstem channels, tributary channels, and reservoirs. This target aims to keep existing continuous riparian habitat and establish functioning riparian habitat along channels and reservoir shores that currently have very narrow to no riparian habitat.

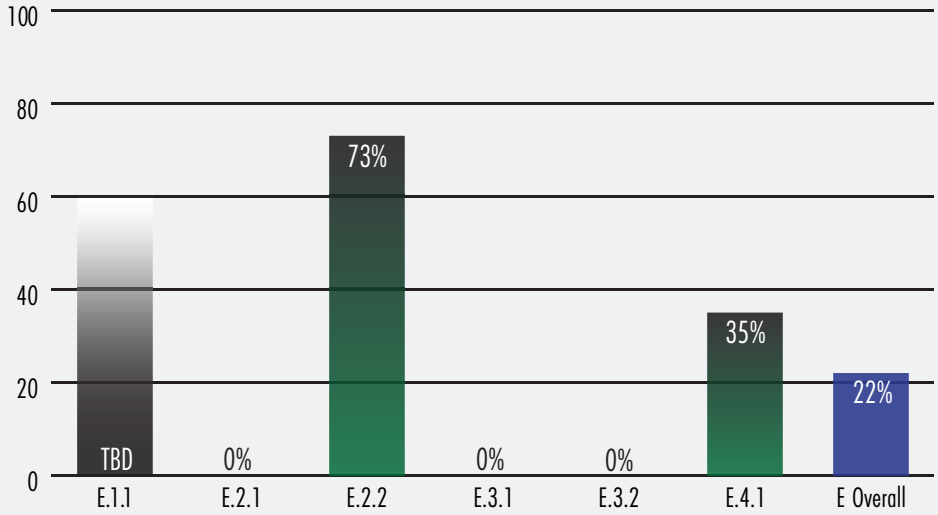
  Target: *Increase to 460 miles the length of channels and reservoir shorelines with continuous riparian habitat width > 10 m.*

ADDITIONAL ONLINE RESOURCES

Eco Atlas:

https://ecoatlas.org/regions/ecoregion/statewide/?lp-onewater=1

Objective E Metrics - PERCENT COMPLETE



Current degree to which Valley Water activities in the Guadalupe Watershed meet One Water metrics and targets (2023). Empty bars refer to metrics for which a measurement method is yet to be determined.

Calero County Park. Photo: Valley Water

4

PRIORITY ACTIONS

CHAPTER 4: PRIORITY ACTIONS

4.1 INTRODUCTION

The Priority Actions are the key outcome of the One Water planning process, and reflect thorough research, evaluation, and outreach led by the One Water Team. Chapter 4 describes the process for identifying and evaluating draft actions and shares the final list of Priority Actions for the Guadalupe Watershed.

4.2 DEVELOPING PRIORITY ACTIONS

Identifying Needs

All prior components of the One Water Planning Process informed and identified the watershed's needs and created a basis to develop Priority Actions. Chapter 2 provides the context of the watershed's setting relative to each One Water Objective and describes challenges and opportunities that should be addressed or evaluated in the future for each of One Water's five objectives. Chapter 3 documents the metrics and targets that form a vision for the watershed and provide a measurable status of how Objectives are being achieved in the Guadalupe Watershed. This method of tracking existing conditions versus targets clearly identifies areas needing improvement. If a specific metric scores low in comparison to other metrics in one objective or across objectives, it indicates need for improvement and potential action.

Identifying Draft Actions

The One Water team began identifying draft priority actions by gathering a list of current and potential future watershed actions from staff and stakeholders based on One Water objectives. The team engaged staff throughout Valley Water, as well as the community, to determine interests and gather additional local and expert knowledge with respect to water resources. Over the course of this outreach, 125 potential actions, ranging from concepts and studies to specific construction projects, were identified for the Guadalupe Watershed.

Evaluating Draft Priority Actions

The One Water team began evaluating draft priority actions by consolidating similar actions and condensing the list down to create specific actions that met watershed needs and identifying discrete locations, where possible. Actions were screened for their alignment with the Objectives, such as a water quality improvement (Objective B), flood risk reduction (Objective C), habitat enhancement (Objective D), with some being multi-objective. This process reduced the list to 70 actions.

Finally, draft actions were further consolidated by identifying similar watershed actions requiring additional study. For example, flood channels needing technical analysis of level of service, or having a high risk of failure, would have been recommended in an action that first required completion of a study. This consolidation also involved removing actions not under the jurisdiction of Valley Water, such as trail development and land use policies, from further consideration. This process reduced the list to 65 actions.

ACTION DEVELOPMENT PROCESS

Step 1: Identify watershed needs based on the five One Water objectives using metrics and targets.

Step 2: Develop draft watershed actions that meet the identified needs.

Step 3: Consolidate and refine identified draftactions.

Step 4: Recommend priority actions for implementation.

Prioritizing Actions

By considering existing Valley Water projects and new concepts that align with One Water Objectives, staff generated a broad list of possible actions. As described above, the process to create the Priority Actions involved extensive review and consolidation with SMEs and was informed by stakeholder input. By working through this process, priorities for the Guadalupe Watershed naturally arose from the interdisciplinary collaboration central to One Water. Recognizing this, Priority Actions presented in this plan are not sorted according to a point-based prioritization scheme. Rather, all Priority Actions are categorized using the following designations that will guide their implementation.

- **One Water Objective:** Each action has a primary One Water Objective that it corresponds to, though Priority Actions may support progress under more than one Objective.
- **Activity Type:** Priority Actions vary considerably in the types of activities they call for. The activity types are assessment/study, project, policy, program, and partnership.
- **Implementation Timeframe:** In creating a holistic watershed plan, staff identified priority actions to implement over ensuing decades. The implementation timeframes are short term (0-10 years to start of action), medium term (11-20 years to start of action), and long term (21-50 years to start of action).

In addition, involved Valley Water departments, partner agencies that may have a role in implementation, and an order of magnitude cost estimate are noted for all actions. Cost estimates are preliminary and reflect staff's best estimate for the total cost based on costs for similar activities and projects at the time that this plan was developed. Cost estimates correspond to the following maximum dollar values: $ = $100 thousand, $$ = 1 million, $$$ = 10 million, $$$$ = 100 million, $$$$$ = 100+ million. Order of

magnitude costs for flood risk reduction and ecological resources actions that are not already included in the Valley Water Capital Improvement Program are discussed below to provide a preliminary indication of costs for plan implementation.

The total order of magnitude cost of short-term (0-10 year start time) flood risk reduction actions within the Guadalupe Watershed is projected to be between $2.2 million and $22.1 million. These order of magnitude estimates are based on comparable recent projects and do not reflect a defined level of service, which is determined during the project definition and planning study phase.

The total order of magnitude cost of short-term water quality and ecological resource actions within the Guadalupe Watershed is projected to be between $9.5 million and $95.3 million. The range of costs includes partnerships; however, Valley Water's role and cost contributions are yet to be determined with specificity (e.g., technical expertise or cost sharing).

GUADALUPE WATERSHED ACTIONS

SHORT TERM ACTIONS

48

MEDIUM TERM ACTIONS

13

LONG TERM ACTIONS

4

Funding of priority actions may be provided by various sources, including water rates, parcel taxes, the Safe, Clean Water and Natural Flood Protection special tax, and external grant funding. The source used to fund actions often depends on the nature of the action itself and limitations on the use of the source funds.

Collectively, the information associated with each action provides a basis for the order in which Watershed Actions may be implemented. This Plan will become a key resource for Valley Water staff and its Board when selecting Watershed Actions to implement. In this sense, the One Water Plans compliment and support existing Valley Water long range planning initiatives, such as the Capital Improvement Program, and provide a centralized process for developing conceptual elements of high priority flood risk reduction and ecological resource enhancement projects.

4.3 COORDINATION WITH EXISTING PLANS AND PROGRAMS

As the Guadalupe Watershed Plan is referenced and its Priority Actions considered for implementation, it bears mentioning the relationship with several Valley Water programs and plans, as well as a few partner plans. Related programs and plans with applicability to Guadalupe Watershed planning include but are not limited to:

Valley Water

- **Water Supply Master Plan** – Guadalupe Watershed includes priorities essential to water supply operations such as improvements to Almaden, Calero, and Guadalupe Dams.
- **Groundwater Management Plan** – Guadalupe Watershed includes priorities that may benefit or impact groundwater resources.
- **Asset Management Program** – Assets in Guadalupe Watershed are carefully considered when it comes to meeting level of service and reducing business risk exposure. Creek reaches that may require maintenance or new capital work are coordinated with this program.
- **Safe, Clean Water and Natural Flood Protection Program** – Guadalupe Watershed priorities help fulfill Measure S obligations for water quality, flood protection, and environmental stewardship. The watershed plan also provides priorities for grantees and partners to consider as they request funding from Valley Water. Measure S may provide the necessary funding to implement several watershed priorities.
- **Capital Improvement Program (CIP)** – Priorities identified across the Guadalupe Watershed may be recommended as future CIP projects.
- **Fisheries Aquatic Habitat Collaborative Effort (FAHCE)** – The Guadalupe River is one of three creeks in the FAHCE settlement agreement and as such the watershed plan plays an important role in helping identify key stewardship actions in the Guadalupe Watershed. Associated actions may include fish barrier removals and creek flow considerations.

Partner Agencies

- **Valley Habitat Plan (Valley Habitat Agency** – As an active partner in the Valley Habitat Plan, Valley Water may find options to use watershed plan priorities for future mitigation related to habitat improvements.
- **San Francisco Estuary Institute/Aquatic Science Center (SFEI-ASC)** – Through an established MOU with SFEI-ASC, Valley Water continues to improve its efforts in data collection, data representation and reporting, and long-range planning through creek visioning. One Water is using their EcoAtlas tool as a way to present our measurable metrics and targets for transparency with our stakeholders.

Table 4-1: Guadalupe Watershed Priority Actions

Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
Ecological Resources Actions (ECO) - Short Term Actions							
ECO-01	Improve suitable spawning and rearing habitat for steelhead trout and salmon on Guadalupe Creek below Guadalupe Reservoir in coordination with the FAHCE Adaptive Management Team.	Most of Guadalupe Creek supports multiple life stages of salmonids. The addition of gravel, other coarse sediment, large wood, pools >1.5 ft deep, and restoration of pool-riffle morphology would improve habitat conditions in this very important salmonid reach and mitigate the effects of Guadalupe Dam on sediment supply. The Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement Santa Clara County, California (Balance Hydrologics, 2018) project #1-1 and 3-1 have already been identified as feasible and appropriate, but still require design and construction. Additional locations will require planning, design, and construction. Any actions should be coordinated with WS-03: Guadalupe Dam Seismic Retrofit.	Project	Resource Conservation Districts, CDFW, NMFS, non-profit organizations	Watersheds	0-10	$$$
ECO-01a	Partner with others to design and construct Guadalupe Creek project 1-1 from the Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement.	The Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement (Balance Hydrologics, 2018) identified Guadalupe Creek project #1-1 (downstream of Guadalupe Dam) as feasible and appropriate, but it still requires design and construction.	Project	Resource Conservation Districts, CDFW, NMFS, non-profit organizations	Environmental Mitigation and Monitoring Unit	0-10	$$
ECO-01b	Partner with others to design and construct Guadalupe Creek project 3-1 from the Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement.	The Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement (Balance Hydrologics, 2018) identified Guadalupe Creek project #3-1 (by Wagner Road) as feasible and appropriate, but it still requires design and construction.	Project	Resource Conservation Districts, CDFW, NMFS, non-profit organizations	Environmental Mitigation and Monitoring Unit	0-10	$$
ECO-02	Improve suitable spawning and rearing habitat for salmonids below Calero and Almaden Dams in coordination with the FAHCE Adaptive Management Team.	Calero Creek and Alamitos Creek support various life stages of steelhead and salmon. Enhancing habitat in these reaches is important for supporting fish populations, and habitat availability in multiple creeks under various flow management regimes provides habitat diversity that can make fish populations more resilient to drought and climate change conditions. The addition of gravel, other coarse sediment, large wood, pools >1.5 ft deep, and restoration of pool-riffle morphology would improve habitat conditions and complement the flow regimes below the dams. The Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement Santa Clara County, California (Balance Hydrologics, 2018) can be used to identify opportunities for this action; planning, design, and construction will be needed.	Project	Resource Conservation Districts, CDFW, NMFS, non-profit organizations	Watersheds	0-10	$$$

**Cost estimates correspond to the following maximum dollar values: $ = $100 thousand, $$ = 1 million, $$$ = 10 million, $$$$ = 100 million, $$$$$ = 100+ million*

Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
ECO-02a	Partner with others to design and construct Alamitos Creek project 1-1 from the Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement.	The Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement (Balance Hydrologics, 2018) identified Alamitos Creek project #1-1 (downstream of Almaden Dam) as feasible and appropriate, but it still requires design and construction. Action would inject gravels at the top of the reach to naturally form bed features downstream.	Project	CDFW, NMFS, Water Board, USFWS	Watersheds	0-10	$$$
ECO-02b	Design and construct Calero Creek sites from the Second Phase Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement Project.	The Second Phase Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement Project (AECOM, 2024) identified 6 Calero Creek sites as feasible and appropriate location to add gravel and large woody debris to increase instream shelter and complexity. Design at these sites includes gravel augmentation through injection piles, gravel bars, and creation of new riffles. Other recommendations include placement of rootwad logs, accelerated riparian recruitment to fell trees, and creation of new permanent access paths. Project still requires further design and construction.	Project	CDFW, NMFS, Water Board, USFWS	Watersheds	0-10	$$$
ECO-03	Complete feasibility study of fish passage at Almaden Dam in coordination with the FAHCE Adaptive Management Team.	Tributaries to Almaden Reservoir support suitable habitat for steelhead and salmonid, but Almaden Dam blocks fish access to them. Almaden Dam provides an important impoundment of mercury laden sediment, preventing contamination downstream and adding complexity to any considered fish passage improvements. A feasibility study that fully considers all benefits and options for providing fish access beyond the dam (e.g., bypass channel, fish ladders, assisted migration) should be investigated in time to inform seismic retrofit planning for WS-01: Complete Almaden Dam Improvements. Other dams are not as important to assess as there is not the same amount of suitable habitat upstream of other unpassable dams in the watershed.	Assessment/ Study	DODS, County Parks, NMFS, CDFW	Watersheds	0-10	$$
ECO-04	Assess feasibility of modifying Alamitos Drop Structure to enhance habitat.	The Alamitos Drop Structure is critical water supply infrastructure and has a ladder to provide fish passage, but there are concerns that it may limit aquatic habitat and geomorphic connectivity with upstream habitat. Modifications of the structure will require analysis of water rights and alternative water supply infrastructure and/or operations and could require extensive upstream and/or downstream channel work to create a functional gradient and more natural morphology through the area. A pre-planning reconnaissance study should be done to fully understand the issue and should be conducted in conjunction with WS-11: Construct Alamitos Dam Replacement and Automation. This action would ideally be done before or concurrently with Alamitos Creek restoration through Almaden Lake (ECO-17).	Assessment/ Study	NMFS, CDFW	Office of Integrated Water Management (both Water Utility and Watersheds)	0-10	$$
ECO-05	Coordinate with other entities to improve fish passage at priority barriers owned by others in coordination with the FAHCE Adaptive Management Team.	Valley Water should remove or remediate those that they own and in partnership with public landowners but should also support the efforts of partners to remediate those on private property. Three such priority barriers that are not owned by Valley Water and would require coordination include the Pheasant Creek culvert, an old dam on Guadalupe Creek, and a drop structure at the Bertram Road bridge on Alamitos Creek. Prioritization depends on landowner permission and funding availability. When possible, these efforts should restore natural pool-riffle morphology and facilitate sediment transport. These efforts will require planning, design, and construction. Valley Water's planned Fish Passage Study on Guadalupe, Alamitos, and Calero Creeks is expected to be completed by the end of June 2026, and may identify additional impediments to be addressed.	Project	NMFS, CDFW, Valley Habitat Agency, Resource Conservation Districts, San José Water Company, native tribes, non-profit organizations	Watersheds	0-10	$$$

**Cost estimates correspond to the following maximum dollar values: $ = $100 thousand, $$ = 1 million, $$$ = 10 million, $$$$ = 100 million, $$$$$ = 100+ million*

Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
ECO-06	Partner to support the Alma Bridge Road Newt Passage Project	Midpeninsula Regional Open Space District and County Roads and Airports, along with many other stakeholders including Valley Water and County Parks, are working together to address the high mortality of newts on Alma Bridge Road that is occurring seasonally each year when the newts are crossing the road. The Alma Bridge Road Newt Passage Project is working towards the goal of installing appropriate road enhancements (e.g., raised section(s) of road, new undercrossings, and directional fencing), some of which would be on Valley Water property. As of 2022, the project is exploring the feasibility of the various road improvement options.	Partnership	Midpen, County Roads and Airports, Santa Clara County Parks	Environmental Mitigation and Monitoring Unit	0-10	$
ECO-07	Partner to support the Highway 17 Wildlife and Trail Crossings Project.	Together with private and public partners, Midpeninsula Regional Open Space District (MidPen) is working towards the goal of installing two independent road crossings across Highway 17 adjacent to Lexington Reservoir, some of which would be on Valley Water property. The wildlife undercrossing and recreational trail overcrossing would link over 30,000 acres of protected lands in the Santa Cruz Mountains. As of 2022, the project is exploring the feasibility of these crossings.	Partnership	Midpen, Caltrans, various other stakeholders	Watersheds (Environmental Mitigation and Monitoring Unit)	0-10	$$$
ECO-08	Develop program to incorporate restoration of areas impacted by unsheltered encampments into Stream Maintenance Program.	Existing and historical creekside encampment locations are tracked and mapped by Valley Water staff. After working with partners to reduce the prevalence of encampments within waterways and provide new housing for unsheltered individuals, impacted areas should be remediated and restored by removing trash and pollutants and replanting disturbed vegetation. A program to restore impacted areas will require planning, design, and implementation.	Program	City of San José, City of Santa Clara, Town of Los Gatos, City of Campbell, Town of Monte Sereno, Santa Clara County, non-profit organizations	Watersheds Operations and Maintenance	0-10	$
ECO-09	Develop and incorporate vegetation cover guidelines to decrease wildfire risk to native habitats.	Complying with permit requirements for vegetation cover can result in plant and canopy densities that exacerbate the risk and severity of wildlife in riparian habitats, which are typically more resistant to wildfire, and nearby residential and commercial areas. Technical information should be evaluated to identify vegetation cover goals that result in environmental benefits without significantly increasing wildfire risks. Permitting agencies should be involved in this evaluation so that there is trust when the guidance is used in mitigation and revegetation plans. Consider connecting with local tribes to learn about traditional burn methods and plan a fire prevention program for the entire watershed, including the urban areas. This action is a study and plan/program.	Policy	Resource Conservation Districts, CAL FIRE, municipal fire districts, Water Board, CDFW, non-profit organizations	Watersheds	0-10	$
ECO-10	Prepare a plan to expand and connect riparian corridors around channels, particularly where they are missing or only very narrow, and identify strategies and priorities to preserve, create, and enhance undeveloped buffers around creeks.	Vegetated buffers around channels, typically referred to as riparian corridors, provide myriad ecosystem services, but have been removed or are only very narrow along many miles of channel. Forest, shrubland, grassland, and wetland communities can all be appropriate to establish, depending upon physical, groundwater, and land use conditions, and could be incorporated into multiple-benefit efforts for wildlife connectivity, groundwater recharge, and/or flood risk reduction. Such efforts would need to be balanced with land uses and landowner needs, and lands that flood frequently could be used to focus landowner outreach efforts. Valley Water should implement this action on its land and in association with other projects but can also support the efforts of partners to implement this action on private property. Undeveloped buffers around creeks allow for flooding and geomorphic processes that do not impact development, farming, or people, and for habitat development, buffering, and wildlife movement. This action builds from existing information resources, and could utilize primarily desk-top analysis to identify where wider riparian corridors, and what vegetation communities, could be supported, undeveloped areas that have the best potential for supporting conservation, and restoration that provides multiple benefits. This action includes planning, design, and implementation.	Project	Valley Habitat Agency, Open Space Authority, County Parks, Resource Conservation Districts, native tribes, non-profit organizations	Watersheds, Environmental Mitigation and Monitoring Unit, Vegetation Field Operations, Community Projects Review Unit, Land Management, and/or Stream Maintenance Program	0-10	$$$

**Cost estimates correspond to the following maximum dollar values: $ = $100 thousand, $$ = 1 million, $$$ = 10 million, $$$$ = 100 million, $$$$$ = 100+ million*

Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
ECO-11	Identify areas to expand and enhance sycamore alluvial woodland.	Sycamore alluvial woodland (SAW) is a rare sensitive natural community that depends on specific ranges of substrate and flow conditions. Opportunities to expand and enhance SAW should be investigated in the watershed. Given the physical conditions necessary to support SAW, these opportunities are most likely to occur in the upper watershed and above dams. This action includes planning, design, and implementation.	Assessment/ Study	Valley Habitat Agency, Open Space Authority, MidPen, County Parks, San José Water Company	Watersheds	0-10	$$$
ECO-12	Enhance rearing habitat in Guadalupe River.	Guadalupe River support various life stages of steelhead and salmon. Enhancing habitat in the mainstem can help directly support fish populations, and habitat availability in multiple creeks and reaches under various flow management regimes provides habitat diversity that can make fish populations in the watershed more resilient to drought and climate change conditions. The addition of gravel, other coarse sediment, large wood, pools >1.5 ft deep, and restoration of pool-riffle morphology would improve habitat conditions. The Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement Santa Clara County, California (Balance Hydrologics, 2018) project #1-1 near the Alamitos Drop Structure has already been identified as feasible and appropriate and needs only design and implementation. Other locations would include planning, design, and implementation.	Project	Resource Conservation Districts, non-profit organizations	Watersheds (FAHCE)	0-10	$$
ECO-12a	Design and construct Guadalupe River project 1-1 from the Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement.	The Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement (Balance Hydrologics, 2018) identified Guadalupe River project #1-1 near the Alamitos Drop Structure as feasible and appropriate, but it still requires design and construction. Inject gravel downstream of Alamitos drop structure. Wood can be installed here as well. Other actions at Alamitos Drop structure include EC0-04 and WS-11.	Project	Resource Conservation Districts, non-profit organizations	Watersheds (FAHCE, Stream Maintenance Program)	0-10	$$
ECO-12b	Include rearing habitat enhancements in the Upper Guadalupe River Project	USACE is re-evaluating and will eventually design and construct the remaining reaches of the Upper Guadalupe River Project (UGRP). As the local sponsor, Valley Water should advocate for the inclusion of salmonid rearing habitat features and enhancement in the re-evaluation design. Information from Valley Water's UGRP Reach 6 Aquatic Habitat Improvement Project should be relayed to USACE in time to inform the UGRP design.	Project	US Army Corps of Engineers, NMFS	Watersheds Design and Construction	0-10	$$
ECO-12c	Design and construct Guadalupe River project 9-2 from the Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement.	The Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement (Balance Hydrologics, 2018) identified Guadalupe River project #9-2 near W San Carlos St. as a site that could benefit from adding large woody debris, however access to the site is challenging.	Project	Resrouce Conservation Districts, non-profit organizations	Watersheds (FAHCE, Stream Maintenance Program)	0-10	$$
ECO-13	As habitat enhancements are implemented, adapt FAHCE monitoring as needed in coordination with FAHCE Adaptive Management Team.	FAHCE has a robust monitoring program in place. As watershed enhancement are being planned and implemented, whether undertaken by FAHCE or not, the fisheries and aquatic habitat monitoring conducted under FAHCE should be strategically adapted to help detect changes resulting from implemented projects. Such monitoring could include additional water temperature monitoring, additional PIT antennaes, or other monitoring determined appropriate by VW and its FAHCE AMT. Related actions include WQ-04: Create or expand existing water quality monitoring program.	Program	CDFW, NMFS, Water Board, USFWS	Watersheds (FAHCE)	0-10	$$

**Cost estimates correspond to the following maximum dollar values: $ = $100 thousand, $$ = 1 million, $$$ = 10 million, $$$$ = 100 million, $$$$$ = 100+ million*

Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
ECO-15	Explore partnerships and feasibility for habitat enhancement on Los Gatos Creek downstream of Lexington Reservoir.	The extent of benefits and feasibility of options for fish habitat enhancement between Lexington Reservoir and the Camden drop structure is uncertain and dependent on numerous land owner, land use, water management, and infrastructure variables. Given the effort and complexity of these efforts, and relatively short reaches of habitat that could become accessible or improved, committing to a plan or even a study is premature without first communicating with key Los Gatos Creek landowners to gauge interest and willingness to partner. This action is to reinitiate and continue initial discussions with partners, and to assess the extent of habitat benefit relative to effort and costs.	Assessment/ Study	Town of Los Gatos, County Parks	Watersheds (FAHCE)	0-10	$$
ECO-16	Facilitate the beneficial reuse of large wood and sediment from Lexington Reservoir.	Reservoirs trap sediment and large wood that could be beneficially reused downstream to mitigate incision and provide aquatic habitat. This is problematic in much of the Guadalupe River watershed due to high mercury levels, but not likely in Lexington Reservoir. The amount of these materials in the reservoir, their condition and relocation risk factors (e.g., mercury and pathogens), and the logistics to remove, store, and relocate them needs to be evaluated to understand if beneficial reuse is feasible and appropriate.	Assessment/ Study	County Parks, Water Board	Watersheds (FAHCE, Environmental Mitigation and Monitoring Unit, and/or Stream Maintenance Program)	0-10	$$
ECO-18	Partner to maximize the native habitat potential of the Guadalupe Gardens.	The Guadalupe Gardens is an underutilized park owned by the City of San José, the uses of which are limited by its proximity to the airport, but that may have relatively high groundwater elevation. This action would evaluate the potential for lowering the ground surface elevation of the park to match an appropriate flood stage of the Guadalupe River or depth to groundwater to allow for flood inundation and/or create wetland habitat. This could create suitable habitat for beaver and encourage natural floodplain and wet meadow integration, in conjunction with public access and recreation. This action is a feasibility study.	Assessment/ Study	City of San José, SPUR, SJ Airport (County Roads and Airports)	Watersheds (FAHCE, Environmental Mitigation and Monitoring Unit, and/or Stream Maintenance Program)	0-10	$
ECO-19	Identify strategies and priorities to enhance the ecological conditions of modified channels.	Straightened, trapezoidal channels, many of which are owned and/or maintained by Valley Water, reduce the ecological condition of riverine habitat in the watershed. The form and function of modified channels and other low scoring riverine/riparian reaches (based on CRAM scores) can be improved by expanding floodplains, adding aquatic habitat complexity, allowing for or planting more native vegetation, reducing invasive plants, and expanding and improving buffers around creeks. Valley Water can prioritize this work where it would also provide community benefits, such as trails, shade, and views of nature, and/or where channels or adjacent access roads are failing or at risk of doing so. This action includes planning and design.	Project	N/A	Asset Management, Environmental Mitigation and Monitoring Unit, Stream Maintenance Program	0-10	$$
ECO-20	Complete studies and agency negotiations to facilitate safe sediment reuse.	Sediment removal to reduce flood risk and facilitate fish passage robs downstream habitats and the Bay of critical sediment supply, is costly, and impacts the environment. In the Guadalupe River watershed, however, such efforts also help reduce the amount of mercury in the environment and that is delivered to the Bay. The reuse of removed sediment can support habitat development, protect against sea level rise, and greatly reduce the cost and effort of securing sediment for restoration projects, but cannot increase mercury exposure risks. Progress must be made on two levels to facilitate safe sediment reuse on a watershed-scale: (1) the necessary regulatory approvals must be sought, technically justified, and secured, and (2) the physical space and equipment necessary for sediment storage, sorting, and cleaning must be secured. A Pilot Study in partnership with SFEI is currently underway in a different watershed, which will help inform this watershed's work. This action includes assessment and planning.	Assessment/ Study	Regional Board, BCDC, SFEI	Planning & Policy, Environmental Mitigation and Monitoring Unit, Stream Maintenance Program, Design & Construction	0-10	$$
ECO-21	Remove and re-treat invasive plants that decrease ecological condition in coordination with the Integrated Invasive Plant Management Program.	Invasive trees, shrubs, and understory plants can degrade ecological condition and should be controlled as feasible and reasonable. Such efforts should be coordinated with Valley Water's new Integrated Invasive Plant Management Program (IIPMP) and can be informed by One Water maps to identify priority locations where invasive trees and/or shrubs dominate the ecosystem. Removal efforts should be prioritized where invasive vegetation increases flood risk, such as many *Arundo donax* stands and weeping willows along the Lower Guadalupe River.	Program	MidPen, City of San José, County Parks	Environmental Mitigation and Monitoring Unit, Vegetation Field Operations	0-10	$$

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Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
ECO-22	Improve suitable spawning and rearing habitat for steelhead trout and salmon on Los Gatos Creek from Camden Avenue to its confluences with Guadalupe River in coordination with the FAHCE Adaptive Management Team.	Los Gatos Creek below Camden Avenue supports various life stages of steelhead and salmon. Enhancing habitat in this reach is important for supporting fish populations, and habitat availability in multiple creeks under various flow management regimes provides habitat diversity that can make fish populations more resilient to drought and climate change conditions. The addition of gravel, other coarse sediment, large wood, pools >1.5 ft deep, and restoration of pool-riffle morphology would improve habitat conditions and complement the flow regimes below the dams. The Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement Santa Clara County, California (Balance Hydrologics, 2018) can be used to identify opportunities for this action; planning, design, and construction will be needed.	Project	Resource Conservation Districts, CDFW, NMFS, non-profit organizations	Watersheds	0-10	$$$
ECO-22a	Design and construct Los Gatos Creek project 1-1 from the Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement.	The Study of Santa Clara County Steelhead Streams to Identify Priority Locations for Gravel Augmentation and Large Woody Debris Placement (Balance Hydrologics, 2018) identified Los Gatos Creek project #1-1 near the Camden Drop Structure as feasible and appropriate, but it still requires design and construction.	Project	Resource Conservation Districts, non-profit organizations	Watersheds (FAHCE, Stream Maintenance Program)	0-10	$$
ECO-22b	Partner to support Los Gatos Creek Streambed Restoration Project.	South Bay Clean Creeks Coalition is planning and securing permission and funding for this gravel augmentation and enhancement project between Campbell Avenue and Highway 17. The project is consistent with FAHCE objectives to enhance habitat downstream of the Camden drop structure.	Partnership	South Bay Clean Creeks Coalition	Watersheds (FAHCE, Stream Maintenance Program)	0-10	$$
ECO-23	Partner to protect and enhance unique and sensitive natural communities and species.	The Guadalupe River watershed still supports unique and sensitive natural communities such as alkali meadows, seasonal wetlands, sycamore alluvial woodland, and serpentine grassland. Although many occurrences of these communities are already protected, enhancement is a continual need to ensure the species and functions of these communities persist. This action would continue funding via Safe Clean Water Priority D2 or other programs for revitalization of sensitive species and habitats, such as grassland revitalization for bat species at Sierra Azul Open Space Preserve and restoration of serpentine grassland at St. Joseph's Hill.	Partnership	County Parks, Open Space Districts, Valley Habitat Agency	Watershed (Safe Clean Water Project D2, D7)	0-10	$$
Flood Risk Reduction (FRR) - Short Term Actions							
FRR-01	Conduct Rodent Study.	Conduct an engineering assessment study of rodent damage Countywide to (1) Quantify the extent to which rodent damage threatens the structural integrity of levees, (2) prioritize locations for repairing rodent damage, and (3) develop a methodology for future inspections and maintenance guidelines in order to rank/prioritize rodent damage to levees. Potential pilot location: Guadalupe River Bay to Tasman - contains rodent damage that could potentially be addressed by O&M and/or WARP. Inspection records show 40% of reach with rodent holes.	Assessment/Study	N/A	Asset Management, Operations & Maintenance, WARP	0-10	$$

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Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
FRR-04	Conduct Canoas Creek flood protection planning study (U/S of Corps project reach).	The Upper Guadalupe River Project, in partnership with USACE, is planning to eliminate overtopping in Canoas Creek near the confluence with the Guadalupe River. However, there are additional breakouts upstream of the confluence along Canoas Creek. Study should also address Asset management concerns: Guadalupe River Confluence to Hillsdale Drive: general erosion due to rodent damage and burrowing (reach-wide issue). Sediment removal is performed every 2-3 years Blossom Hill Road to Calero Avenue: Grading work is needed. Over 80% of assets is in moderate-high risk zone. Potential Alternative: Removing one of the two maintenance roads would increase flood capacity as well as increase ecological habitat in the channel. Also has the potential to be used as stormwater mitigation. Flood Risk (25-Year): 244 Acres; 422 parcels	Assessment/ Study	City of San José	Design and Construction Unit 6	0-10	$$$
FRR-05	Conduct engineering study to assess and repair Los Gatos Creek from Hwy 280 to Lark Ave, Hwy 280 to Bascom Ave, and near Guad River confluence.	Hwy 280 to Lark Ave: General erosion exists due to rodents. Hwy 280 to Bascom Ave: Grading work is needed along the maintenance road. In stream vegetation and herbaceous veg in channel and on both banks will also need to be evaluated for potential removal. Guadalupe River Confluence to Vasona Dam Hwy 280 to the confluences: Excessive vegetation growth is a main concern in the downstream end near Guadalupe confluence. Managing rodent damage is a bigger concern in the upstream end - Camden ponds to Lark Ave. Historically, substantial amount of vegetation (invasive plants) has been removed near Dam multiple times (less than 6") in the last 10 years.	Assessment/ Study	City of San José, Town of Los Gatos	Asset Management	0-10	$$$
FRR-06	Complete Guadalupe River Tasman Dr -I-880.	This project plans, designs, and constructs improvements along the Guadalupe River from Tasman Drive to Interstate 880 to restore the 100-year flood conveyance capacity. The project is considering several alternatives to achieve the Project objectives, including structural alternatives and flow modification alternatives, which could increase climate change resiliency. Implementation steps include Planning (current phase), design, and construction. **Planning Phase** Problem Definition, Opportunities & Constraints; Conceptual Alternative Analysis; Feasible Alternative Analysis; Staff Recommended Alternative & PSR **Design & CEQA Phase** 30% Design; 60% Design; 90% Design; 100% Design – Board Approval; CEQA – Draft to final EIR in Design Phase **Permitting** Initial Coordination with Regulatory Agencies during Planning; Prepare and Submit Applications in Design Phase; Negotiate and Obtain Permits towards end of design phase (before construction) **Construction Phase** RFP; Award Contract; 1st year construction; 2nd year construction, etc.	Project	City of San José, City of Santa Clara	Business Planning and Analysis, Design and Construction	0-10	$$$$
FRR-07	Complete Guadalupe River–Upper, Interstate 280 to Blossom Hill Road (E8).	This project partners with the U.S. Army Corps of Engineers (USACE) to plan, design, and construct improvements along approximately 6 miles of the Guadalupe River, from Interstate 280 to Blossom Hill Road, to provide 1% flood protection, provide long-term net gains of 15 acres in riparian forest acreage, quality, and continuity of wildlife habitat, and conditions favoring Chinook salmon and steelhead trout, provide access to an additional 19 miles of suitable upstream spawning and rearing habitat, coordinate with the City of San José and the community to establish a continuous maintenance road suitable for trail development between Interstate 280 and Los Alamitos Creek, improve water quality by reducing bank erosion and sedimentation-related impacts along the river and tributaries Implementation steps: Permits (current to FY28), Design (current to FY30), Construction (current to F31). **Planning Phase** Problem Definition, Opportunities & Constraints; Conceptual Alternative Analysis; Feasible Alternative Analysis; Staff Recommended Alternative & PSR **Design & CEQA Phase** 30% Design; 60% Design; 90% Design; 100% Design – Board Approval; CEQA – Draft to final EIR in Design Phase **Permitting** Initial Coordination with Regulatory Agencies during Planning; Prepare and Submit Applications in Design Phase; Negotiate and Obtain Permits towards end of design phase (before construction) **Construction Phase** RFP; Award Contract; 1st year construction; 2nd year construction, etc.; As-Builts	Project	City of San José	Business Planning and Analysis Unit, Design and Construction Division	0-10	$$$$$

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Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
FRR-09	Model how environmental restoration projects would reduce flooding downstream.	Initial studies show that adding floodplain "nodes" or small pockets of expanded floodplain area in constrained urban channels improves flood storage and flood risk downstream. Not much is known about how this would work specifically for open spaces in the Guadalupe Watershed that could be converted to floodplain "nodes".	Assessment/ Study	N/A	Hydrology, Hydraulics and Geomorphology, Water Resources Planning and Policy	0-10	$
FRR-10	Complete the South San Francisco Bay Shoreline Project, Phase I (EIA 11, San José / Alviso).	This project is a partnership with the California State Coastal Conservancy, the U.S. Army Corps of Engineers (USACE) and regional stakeholders to provide tidal flood protection, restore and enhance tidal marsh and related habitats, and provide recreational and public access opportunities along Santa Clara County's shoreline. EIA 11 includes the urban area of North San José, the community of Alviso and the San José-Santa Clara Regional Wastewater Facility. Construction work on Reaches 1 through 3 began in December 2021 and is estimated to continue until Summer 2025. Reach 1 extends from Alviso Marina to Union Pacific Railroad and Reaches 2 and 3 stretch from the Union Pacific Railroad to Artesian Slough. Design of Reaches 4 and 5, which extend from the Artesian Slough East to Coyote Creek, are on hold while construction phasing, access points, haul routes, staging, and easements are being addressed with the property owner. USACE and the non-federal partners are looking for alternative measures that meet project objectives and reduce construction costs. **Planning Phase** Problem Definition, Opportunities & Constraints; Conceptual Alternative Analysis; Feasible Alternative Analysis; Staff Recommended Alternative & PSR **Design & CEQA Phase** 30% Design; 60% Design; 90% Design; 100% Design – Board Approval; CEQA – Draft to final EIR in Design Phase **Permitting** Initial Coordination with Regulatory Agencies during Planning; Prepare and Submit Applications in Design Phase; Negotiate and Obtain Permits towards end of design phase (before construction) **Construction Phase** RFP; Award Contract; 1st year construction; 2nd year construction, etc.; As-Builts	Project	California State Coastal Conservancy, US Army Corps of Engineers, City of San José	Watersheds, Design and Construction	0-10	$$$$
FRR-11	Conduct Planning Study for Calero Creek Flood Risk Reduction Project.	Calero Creek – Alamitos Creek confluence up to Calero Reservoir. There are many residential properties along the lower floodplain, but the majority of the floodplain is rural sparsely populated with structures, providing opportunities for nature-based solutions to be incorporated. Santa Teresa Creek is a major tributary of Calero Creek. Flood Risk (25-Year): 72 acres, 91 parcels.	Project	N/A	Design and Construction Unit 6	0-10	$$$
FRR-12	Complete WARP Guadalupe River (Blossom Hill Rd & Malone Road Erosion Repair).	This maintenance project is being proposed to repair the failed concrete slope and gabion basket embankments along Malone Road and under Blossom Hill Road respectively.	Project	City of San José	Watersheds Design and Construction, Watersheds Asset Rehabilitation Program (WARP)	0-10	$$$

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Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
Water Quality (WQ) - Short Term Actions							
WQ-01	Develop program to partner with agencies such as Resource Conservation Districts to facilitate erosion control on private properties.	Erosion from private properties triggers downstream sediment removal for flood risk reduction, mobilizes pollutants, and impairs substrates of salmonids. Valley Water should help fund or provide other support for projects to help reduce this effect on private lands.	Program	Guadalupe Coyote Resource Conservation District	Watersheds S&P	0-10	$
WQ-04	Create or expand existing water quality monitoring program to support One Water metrics.	The Guadalupe Watershed's metrics track critical physical, biological and chemical water quality values, however much of this data still needs to be collected. Establish a new water quality monitoring program or expand existing water quality measuring efforts to correct this data gap and collect this data for future One Water Plan updates. Also consider including any pesticide monitoring and emerging toxins. Some of this action can be supported by partners. Related actions include ECO-13: Adapt FAHCE Monitoring.	Program	SCVURPPP	Environmental Planning Unit/ Water Quality	0-10	$$
WQ-05	Partner with Santa Clara County, cities, and other organizations to reach a functional zero number of unsheltered people residing on Valley Water lands along waterways.	Existing and historical creekside encampment locations are tracked and mapped by Valley Water staff. After working with partners to reduce the prevalence of encampments within waterways and provide new housing for unsheltered individuals, impacted areas should be remediated and restored by removing trash and pollutants and replanting disturbed vegetation. A program to restore impacted areas will require planning, design, and implementation.	Partnership	City of San José, City of Santa Clara, Town of Los Gatos, City of Campbell, Town of Monte Sereno, Santa Clara County, non-profit organizations	Unhoused Task Force, Community Projects Review Unit	0-10	$$$$
Water Supply (WS) - Short Term Actions							
WS-02	Complete Almaden-Calero Canal Repairs	Due to the deteriorating condition of the five-mile-long Almaden-Calero Canal (Canal), improvements to the Canal are being undertaken ahead of the elements of work at the Almaden Dam (elements of work related to the dam include new outlet works and a new spillway). Staff has commenced the design activities related to the rehabilitation of the Canal only. 50% design documentation is expected to be completed in 2024.	Project	N/A	Dam Safety	0-10	$$$
WS-05	Complete Vasona Pump Station Upgrade.	This project designs, and constructs improvements to the Vasona Pump Station, including replacing aging pumps, motors, drives, valves, actuators, flow meters, and electrical and control systems that have reached the end of their useful life; and adds one redundant pump.	Project	N/A	Business Planning and Analysis Unit, Treatment Plants Project Delivery Unit	0-10	$$$$
WS-06	Complete Rinconada Water Treatment Plant - Residuals Remediation.	This project plans, designs, and constructs modifications to the Rinconada Water Treatment Plant (RWTP) residuals management processes	Program	N/A	Business Planning and Analysis Unit, Construction Services Unit	0-10	$$$$
WS-07	Complete Rinconada Water Treatment Plant - Reliability Improvement.	This project plans, designs, and constructs new facilities at Rinconada Water Treatment Plant (RWTP) that will improve plant reliability.	Project	N/A	Business Planning and Analysis Unit, Treatment Plants Project Delivery Unit	0-10	$$$$$
WS-08	Complete Santa Teresa Water Treatment Plant Electrical Improvement.	This project plans, designs, and constructs improvements to ensure the safety, operational reliability and maintainability of electrical systems at Santa Teresa Water Treatment Plant (STWTP).	Project	N/A	Business Planning and Analysis Unit, Treatment Plants Project Delivery Unit	0-10	$$$$

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Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
WS-11	Construct Alamitos Dam Replacement and Automation.	The Alamitos Dam is an existing wooden, flashboard dam that is typically installed and removed once a year to divert local water to nearby ponds for groundwater recharge. During rainy seasons, Valley Water cannot divert water to the recharge ponds due to flooding concerns caused by the flashboard dam, and therefore cannot utilize the annual recharge capacity of 8,100 acre-feet to replenish the groundwater basin. This project would replace the existing wooden flashboard dam with a diversion dam that is automated, allowing it to be lowered quickly ahead of large winter storms. This would increase operational flexibility and improve use of local water rights. This project should be conducted in conjunction with ECO-04 and ECO-12a, which would incorporate ecological enhancements to the dam and drop structure.	Project	N/A	Water Supply Planning and Conservation/ Water Supply Division, Raw Water	0-10	$$$
Climate Change (CC) - Medium Term Actions							
CC-01	Support the development of a single model/map of sea level rise that can be shared with regional agencies.	While sea level rise models already exist, a coordinated standard of seal level rise modeling has not been accepted across all Bay Area cities and counties. Support the development of a single model/map of SLR that can be shared with regional agencies. Evaluate how SLR may change the creek profile at the coastal and fluvial flooding interface.	Partnership	Bay Area Flood Protection Agencies, Resource Agencies, US Army Corps of Engineers	Hydrology, Hydraulics and Geomorphology, Design and Construction	11-20	$
CC-02	Develop policy on integrating Forecast Informed Reservoir Operations (FIRO) into Water Supply and Flood Risk Reduction resilience strategy (at Lexington Reservoir).	Forecast Informed Reservoir Operations have been shown to improve water supply and increase flexibility in reservoirs to provide floor risk reduction. FIRO is a promising solution to the increasing rainfall intensity projected to occur with Climate change. Although this has been used unofficially and in emergency situations at Valley Water already, there may be a benefit to creating an official policy. This is being studies currently through the Guadalupe River - Tasman to I-880 Project for use at Lexington Reservoir.	Policy	N/A	Water Supply Planning, Hydrology, Hydraulics and Geomorphology, Raw Water, Water Utility, Legal	11-20	$$$
Ecological Resources (ECO) - Medium Term Actions							
ECO-14	Partner to support assessment, enhancement, and management of livestock stock ponds for habitat.	Stock ponds are important not only for livestock but also can provide critical habitat for native wildlife that have come to depend on these reliable sources of water and wetland habitat. They help maintain biodiversity and can provide for important habitat areas if designed and managed for native species correctly. Valley Water does not own stock ponds in the watershed, but can support this effort through information and cost sharing and technical support.	Partnership	VHA, County Parks, Open Space Districts, CDFW, USFWS, OSA	Office of Integrated Water Management (both Water Utility and Watersheds)	11-20	$
ECO-17	Seek funding for and complete Alamitos Creek Separation and Restoration Project (formerly Lake Almaden Improvement Project) in coordination with the FAHCE Adaptive Management Team	Separating Alamitos Creek from Almaden Lake is a priority action in the VHP and Santa Clara Valley RCIS, and an important type of action in the NMFS recovery plan for the region and FAHCE. It will improve fish passage, reduce mercury load and methylation, reduce water temperature, and more. Valley Water has prepared 60% designs and an Environmental Impact Report, but the approach to the project needs to be reconsidered to reduce construction costs. Ideally this action would be planned and undertaken in coordination with any assessment efforts for improved fish passage at the Alamitos Drop Structure. This action includes planning, re-design, and construction.	Project	Valley Habitat Agency, CDFW, NMFS, Water Board, City of San Jose	Watersheds (FAHCE, Environmental Mitigation and Monitoring Unit, and/or Stream Maintenance Program)	11-20	$$$$

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Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
		Flood Risk Reduction (FRR) - Medium Term Actions					
FRR-02	Conduct Alamitos Creek Planning Study.	Due to the many sources of flood risk in this area, a more holistic flood risk planning study is needed. Randol Creek Levee is known to have uneven elevations on either side of the creek channel, creating a flooding risk for a local school parking lot. The school also experiences flooding from Alamitos Creek. Additionally, the Camden Avenue culvert in this area is undersized, creating a backwater effect and increasing flood risk. Alamitos Creek contains man-made levees from Almaden Lake up to McKean Road and is densely populated with residential properties. From McKean Road to Beltran Road, the floodplain is very rural and sparsely populated. The project would include the following tributaries: Golf Creek, Greystone Creek, and Randol Creek, and should consider ECO-17: Alamitos Creek Separation and Restoration Project. Flood Risk (25-Year): 171 acres 367 parcels.	Assessment/Study	City of San José	Design and Construction Unit 6	11-20	$$$
FRR-03	Conduct Ross Creek flood protection planning study (U/S of Corps project reach).	The Upper Guadalupe River Project, in partnership with USACE, is planning to eliminate overtopping in Ross Creek near the confluence with the Guadalupe River. However, there are additional breakouts upstream of the confluence along Ross Creek, as well as erosion and sediment deposition issues in certain reaches. A Feasibility Study has already been done for Ross Creek, so the next step is an alternatives analysis or full Planning Study. Potential Alternatives should incorporate Asset Management concerns, which include erosion issues from Kirk Rd to Camden and Union to Camino Del Cerro (45% of assets in moderate-high risk zone), and erosion, sediment and MGR (Grading Work) for the rest of the creek. Potential Alternatives should also consider removing one of the two maintenance roads to increase flood capacity as well as ecological habitat in the channel. This also has the potential to be used as stormwater mitigation. Flood Risk (25-Year): 231 Acres; 1,214 parcels.	Assessment/Study	City of San José	Design and Construction Unit 6	11-20	$$$
FRR-08	Perform Feasibility Study of using existing ponds and lakes to store floodwater when necessary.	Assess the feasibility of expanding the use of existing ponds and lakes (Almaden, etc.) to store floodwater when necessary, considering off channel storage options along the creeks to reduce flood flows and the need for flood protection infrastructure. The use of Valley Water's percolation ponds, lakes and reservoirs comes with a large amount of political and logistical issues. Study should determine if it is worth adding flood storage as an additional option.	Assessment/Study	Santa Clara County Parks	Watersheds, Raw Water	11-20	$$
		Water Quality (WQ) - Medium Term Actions					
WQ-02	Partner to support Santa Clara County Parks in the remediation of legacy mercury mine waste at twenty-three high priority sites designated by the San Francisco Bay Regional Water Quality Control Board in Almaden Quicksilver County Park.	Support Santa Clara County Parks in the remediation of legacy mercury mine waste at twenty-three high priority sites designated by the San Francisco Bay Regional Water Quality Control Board in Almaden Quicksilver County Park (SFBRWQCB, 2022).	Partnership	County Parks, Water Board	Environmental Planning Unit	11-20	$$$$$
WQ-03	Partner to support Private Property Owners in the remediation of legacy mercury mine waste in Upper Watershed.	Support Private Property Owners in the remediation of legacy mercury mine waste in high priority sites designated by the San Francisco Bay Regional Water Quality Control Board in the Upper Watershed.	Partnership	Water Board, Private Property Owners	Environmental Planning Unit/Water Quality	11-20	$$$$$

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Number	Watershed Actions	Description	Activity Type	Potential Partner Agencies	Involved Valley Water Department	Implementation Timeframe (years)	Valley Water Cost Estimate*
WQ-03a	Encourage Waste Management to remediate legacy mercury mining waste along Guadalupe Creek near the site of the former Guadalupe Mine.	Encourage Waste Management to remediate legacy mercury mining waste along Guadalupe Creek near the site of the former Guadalupe Mine. Private property owners may not have the funds or resources needed to remediate the legacy mercury, but it is a source that affects the whole watershed. Consider ways to support remediation.	Partnership	Waste Management, Water Board	Environmental Planning Unit/Water Quality	11-20	$$$$$
WQ-03b	Encourage property owner(s) to remediate mercury mine waste from the former Santa Teresa Mine.	Encourage property owner(s) to remediate mercury mine waste from the former Santa Teresa Mine. Private property owners may not have the funds or resources needed to remediate the legacy mercury, but it is a source that affects the whole watershed. Consider ways to support remediation.	Partnership	Private Property Owners, Water Board	Environmental Planning Unit/Water Quality	11-20	$$$$$
		Water Supply (WS) - Medium Term Actions					
WS-04	Complete Almaden Valley Pipeline Replacement project.	This pipeline is used to supply raw water to Valley Water's water treatment plants and groundwater recharge facilities. This pipeline provides access, with no redundancy, to local raw water sources from Valley Water's Anderson and Calero Reservoirs and imported water from the United States Bureau of Reclamation San Luis Reservoir and San Felipe system.	Project	N/A	Business Planning and Analysis Unit, Pipelines Project Delivery Unit	11-20	$$$$$
WS-12	Construct San José Purified Water Project.	In February 2024, Board adopted staff's recommendation to move forward with a San José Purified Water Project that would include a phased approach toward implementation of a large-scale direct potable reuse (DPR) facility in northern Santa Clara County. In alignment with recently adopted regulations for direct potable reuse, the Board approved the first phase of a San José DPR Project – Phase I – Demonstration Facility and a Phase II – Full-Scale Facility for inclusion in its Capital Improvement Program (CIP). The Phase I Demonstration Facility would ensure that the future large-scale facility would meet these new regulations and provide reliable drought-resistant water supplies for the County.	Project	City of San José, Santa Clara County	Business Planning and Analysis Unit, Recycled Water Unit/Water Supply Division, Raw Water, Groundwater units	11-20	$$$$$
		Water Supply (WS) - Long Term Actions					
WS-01	Complete Almaden Dam Improvements.	This project plans, designs, and constructs improvements to the Almaden Dam outlet works to modify or construct a new intake structure, capable of releasing 246 cubic feet-per-second of water without flushing of sediments through the outlet works, correct existing problems with the outlet energy dissipation structure, piping, and valves, and stabilize and improve maintenance access.	Project	N/A	Dam Safety	21-50+	$$$$
WS-03	Complete Calero and Guadalupe Dams Seismic Retrofits.	This project plans (engineering and environmental), designs and constructs improvements for the Calero and Guadalupe Dams to stabilize the embankments enough to withstand a Maximum Credible Earthquake and implement improvements, as necessary, for the dam systems to safely pass the Probable Maximum Flood (PMF).	Project	N/A	Business Planning and Analysis Unit, Dam Safety	21-50+	$$$$$
WS-09	Construct Indirect Potable Reuse (Palo-Alto) - Los Gatos Recharge System.	Design and construction of an Advanced Water Purification Facility (AWPF) located in Palo Alto, pump station, water conveyance pipelines to the existing Los Gatos Recharge System (LGRS) complex located in the City of Campbell, lateral pipelines and associated facilities.	Project	City of Palo Alto and Mountain View	Business Planning and Analysis Unit, Recycled Water Unit/Water Supply Division, Raw Water, Groundwater units	21-50+	$$$$$
WS-10	Construct a pipeline to connect raw water system to Lexington Reservoir or Vasona Reservoir.	Constructs a pipeline between either Vasona or Lexington Reservoir and the raw water system to provide greater flexibility in using local water supplies. The pipeline would allow surface water from the reservoir to be put to beneficial use elsewhere in the county and increase utilization of existing water rights, especially in combination with the Los Gatos Ponds Potable Reuse Project. In addition, the pipeline will enable Valley Water to capture some wet-weather flows that would otherwise flow to the Bay. Water quality issues would require pretreatment/management. An institutional alternative could include an agreement to use some of Valley Water's reservoir water right at San José Water Company's Montevina Water Treatment Plant.	Project	N/A	Water Supply Planning and Conservation/ Water Supply Division, Raw Water	21-50+	$$$$

**Cost estimates correspond to the following maximum dollar values: $ = $100 thousand, $$ = 1 million, $$$ = 10 million, $$$$ = 100 million, $$$$$ = 100+ million*

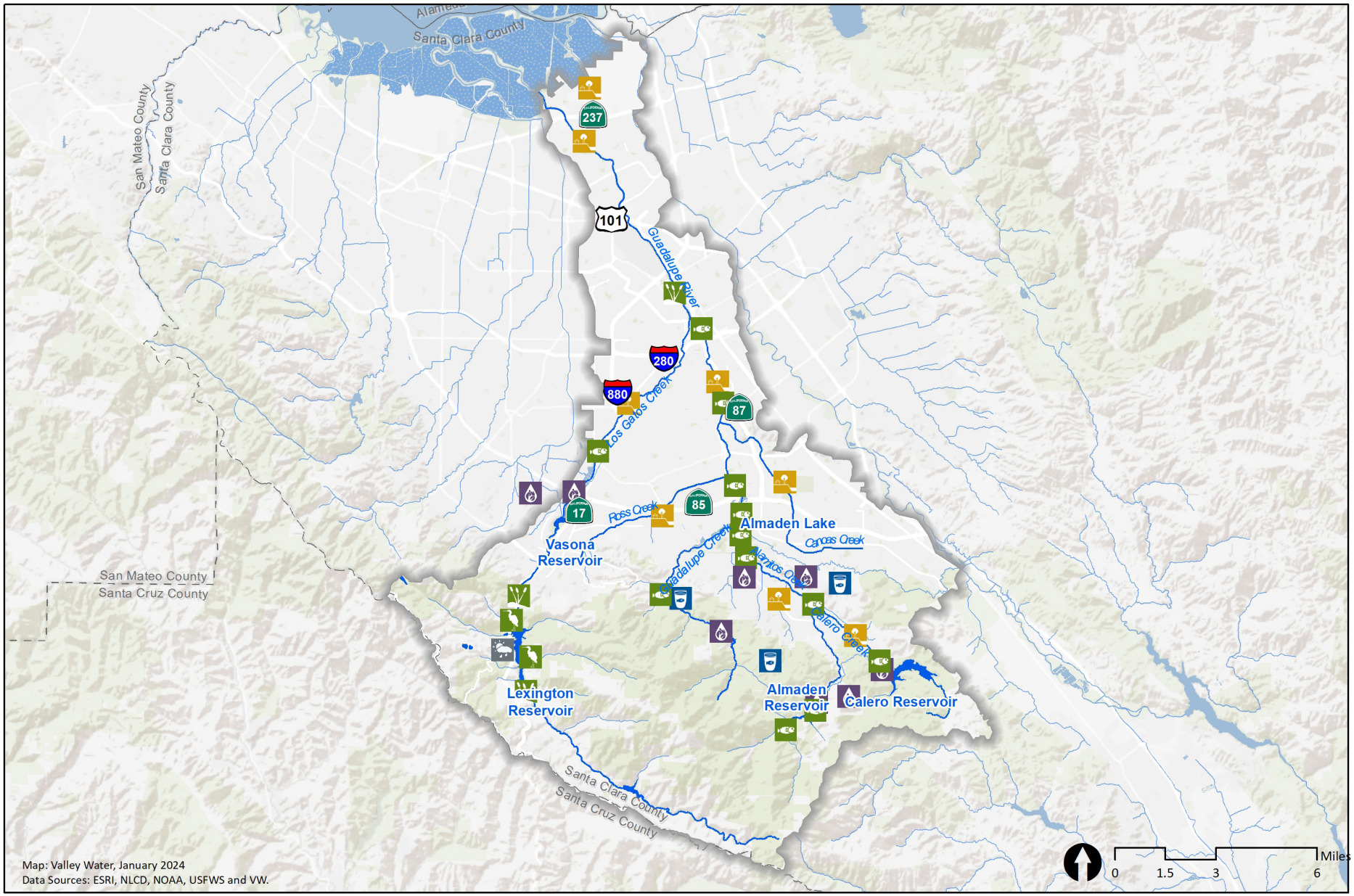

Figure 4-1: Guadalupe Watershed Priority Actions

NEXT STEPS

As an inclusive watershed plan supporting long-range strategic planning for Valley Water, the One Water Guadalupe Watershed Plan now has a variety of purposes. First, this list of Priority Actions will be consulted for future capital and operations and maintenance activities, including incorporation into Valley Water's existing Capital Improvement Program process as appropriate. Second, actions will be considered for future grant funding opportunities from the state and federal government. Third, priorities will be considered for both enhancement and mitigation actions when working with regulatory agencies. And finally, priorities will be shared with grantees and partners seeking to work with Valley Water.

Though completed in 2024, the One Water Guadalupe Watershed Plan is a living document. Valley Water anticipates updating the Plan approximately every five years. These watershed plan updates will be able to incorporate the best available data and provide the latest recommendations to the Board and Valley Water's partner agencies. Once implemented, Valley Water will follow up on One Water Priority Actions to monitor and measure success.

ADDITIONAL ONLINE SUPPORTING DOCUMENTS

Guadalupe Watershed Setting Report

One Water Flood Vulnerability Assessment Technical Report

APPENDICES

Appendix A: Public Participation Process

Hummingbird. Photo: Valley Water

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