Multi-Jurisdictional Hazard Mitigation Plan:

San Diego County Water Authority Annex

San Diego County, California

2023

San Diego County Water Authority

And Its 24 Member Agencies

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1. SECTION ONE: Determine the Planning Area and Resources

1.1. Planning Area: San Diego County Water Authority

The San Diego County Water Authority (Water Authority) was organized on June 9, 1944, under the State of California's County Water Authority Act, for the primary purpose of providing a safe and reliable supply of imported water to its member agencies for domestic, municipal, commercial, military, and agricultural uses. The Water Authority's service area encompasses roughly the western one-third of San Diego County, or approximately 1,490 square miles. As a wholesale water supplier, the Water Authority supplies water to its 24 member agencies, which then deliver water to the region's 3.3 million residents and help sustain the region's $240 billion economy. The member agencies include six cities, five water districts, three irrigation districts, eight municipal water districts, one public utility district, and one federal agency.

As a semi-arid region, the Water Authority relies on a diversified mix of water resources to meet the demands of its member agencies. The region's water supply is provided through a combination of imported water and local water. Those supplies include water from a water transfer agreement with the Imperial Irrigation District, All-American and Coachella Canal lining agreements, seawater desalination, surface water, recycled water, groundwater, San Luis Rey Water Transfers and imported water from the Metropolitan Water District of Southern California (Metropolitan).

Water supplies are delivered to Water Authority member agencies through a system of large diameter pipelines, pumping stations, and reservoirs. The pipelines delivering supplies from Metropolitan are located in two major aqueduct corridors, both of which originate at Lake Skinner in southern Riverside County and run in a north to south direction through the Water Authority service area. Although most of the water conveyed through the aqueduct system is by gravity flow, the Water Authority also maintains several pumping stations and east-west interconnect pipelines that enhance the operational flexibility of the pipeline system to meet daily, seasonal, and emergency needs. Storage facilities are used by the Water Authority to both manage daily operations and provide reserves for seasonal, drought, and emergency storage needs. The largest single-year of imported water sales recorded by the Water Authority was 661,300 AF in fiscal year 2007.

1.2. Community Rating System Requirements

The Community Rating System (CRS) is a FEMA program and rewards communities that go beyond the minimum standards for floodplain management under the National Flood Insurance Program (NFIP). As a special district, the San Diego County Water Authority is not eligible for NFIP.

Community Rating System (CRS) Planning Steps	Local Mitigation Planning Handbook Tasks (44 CFR Part 201)
Step 1. Organize	**Task 1:** Determine the Planning Area and Resources **Task 2:** Build the Planning Team 44 CFR 201.6(c)(1)
Step 2. Involve the public	**Task 3:** Create an Outreach Strategy 44 CFR 201.6(b)(1)
Step 3. Coordinate	**Task 4:** Review Community Capabilities 44 CFR 201.6(b)(2) & (3)
Step 4. Assess the hazard	**Task 5:** Conduct a Risk Assessment 44 CFR 201.6(c)(2)(i) 44 CFR 201.6(c)(2)(ii) & (iii)
Step 5. Assess the problem	
Step 6. Set goals	**Task 6:** Develop a Mitigation Strategy 44 CFR 201.6(c)(3)(i) 44 CFR 201.6(c)(3)(ii) 44 CFR 201.6(c)(3)(iii)
Step 7. Review possible activities	
Step 8. Draft an action plan	
Step 9. Adopt the plan	**Task 8:** Review and Adopt the Plan 44 CFR 201.6(c)(5)
Step 10. Implement, evaluate, revise	**Task 7:** Keep the Plan Current **Task 9:** Create a Safe and Resilient Community 44 CFR 201.6(c)(4)

TABLE 1: FEMA LOCAL MITIGATION PLANNING HANDBOOK WORKSHEET 1.1 DESCRIBES THE CRS REQUIREMENTS MET BY THE SAN DIEGO COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN.

San Diego County Water Authority is a Special District, and therefore not eligible to participate in NFIP per FEMA requirements.

Any jurisdiction or special district may participate in the hazard mitigation planning process. However, to request FEMA approval, each of the local jurisdictions must meet all requirements of 44 CFR §201.6. In addition to the requirement for participation in the process, the Federal regulation specifies the following requirements for multi-jurisdictional plans:

- The risk assessment must assess each jurisdiction's risk where they may vary from the risks facing the entire planning area. (44 CFR §201.6(c)(2)(iii))
- There must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan. (44 CFR §201.6(c)(3)(iv))
- Each jurisdiction requesting approval of the plan must document that is has been formally adopted. (44 CFR §201.6(c)(5))

The hazard mitigation plan must clearly list the jurisdictions that participated in the plan and are seeking plan approval.

The San Diego County Multi-Jurisdictional Hazard Mitigation Plan and annexes meet all requirements.

2. SECTION TWO: Build the Planning Team

2.1. Planning Participants

The following individuals from the San Diego County Water Authority (Water Authority) participated as members of the planning team:

Name	Job Title	Department
Lisa Prus	Supervising Management Analyst	Operations and Maintenance
Eric Rubalcava	Principal Asset Management Specialist	Operations and Maintenance
Anjuli Corcovelos	Senior Water Resources Specialist	Water Resources
Goldamer Herbon	Senior Water Resources Specialist	Water Resources
Jim Zhou	Senior Engineer	Engineering
Andrea Altmann	Senior Management Analyst	Engineering

TABLE 2: WATER AUTHORITY PLANNING TEAM

2.2 Planning Process

Representatives of the San Diego County Water Authority's planning team attended regular County planning meetings as indicated in the County's base plan. The Water Authority's hazard mitigation planning team was formed in October 2021, conducting regular virtual meetings to develop strategy and review work progress. Informal meetings with internal stakeholders (subject matter experts, project managers, senior managers, and executive management) were conducted by planning team members to complete FEMA worksheets, with progressive reviews to document agency capabilities, as well as introduce and refine projects included within the Hazard Mitigation Plan.

The team drew on references from Water Authority plans, studies and assessments including the Water System Risk and Resilience Assessment, Seismic Analyses, Climate Action Plan, and Climate Action Risk Assessment, among others to develop the mitigation strategy and actions.

See the *San Diego County Multi-Jurisdictional Hazard Mitigation Plan's* Section Two for details about the county-wide Planning Process.

3. SECTION THREE: Create an Outreach Strategy

The Water Authority did not prepare a separate outreach strategy for its Hazard Mitigation Plan Annex. Instead, it relied on the County's public outreach strategy for the totality of the Hazard Mitigation Plan including all annexes. See the *San Diego County Multi-Jurisdictional Hazard Mitigation Plan's* Section Three for details about the county-wide outreach strategy.

While the Water Authority did not engage the public directly regarding the Hazard Mitigation Plan, it regularly engages its' customers (the 24 member water agencies) and the public to address hazard mitigation through cooperative meetings, newsletters, public forums, etc.

4. SECTION FOUR: Review Community Capabilities

Local mitigation capabilities are existing authorities, policies, programs, and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities and are described in further detail below.

4.1. Capability Assessment

The primary types of capabilities for reducing long-term vulnerability through mitigation planning are:

- Planning and regulatory
- Administrative and technical
- Financial
- Education and outreach

4.1.1. Planning and Regulatory

Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards. Most topics within the table are not applicable to the Water Authority because we are not a city/county that establishes ordinances for land development. For construction of new facilities or infrastructure we comply with local regulations and ordinances to reduce hazard risks such as storm water, steep slopes, wildfire, and hazard setback. To expand and improve upon our capabilities in this area we may apply increased resources to periodically evaluate and revise existing plans, as well as provide input to pertinent city or county efforts. The following table indicates those the Water Authority currently has in place:

Plans	Yes/No Year	Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Yes 2013	Yes, yes, yes. The Master Plan addresses hazards, identifies projects to include in the mitigation strategy, and can be used to implement mitigation actions. It is updated every 10 years and the 2023 Master Plan update process is currently underway.
Capital Improvements Plan	Yes Bi-Annually	Yes, yes, yes As part of the design for facilities, many natural hazards and some common man-made hazards have been considered and factored in.
Economic Development Plan	No	Not applicable

Local Emergency Operations Plan	Yes 2021	Yes, no, yes The Water Authority has facility specific emergency operations plans and an overall Integrated Contingency Plan (ICP) which addresses hazard specific responses. (Updated annually)
Continuity of Operations Plan	No	Elements of a COOP are incorporated into the ICP.
Transportation Plan	No	Not applicable
Stormwater Management Plan	No	Not applicable
Community Wildfire Protection Plan	No	Not applicable
M. Real estate disclosure requirements	No	Not applicable
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Yes	Yes, yes, yes Climate Action Plan (2019 updated every 5 years; 2023 CAP currently being developed), Programmatic Environmental Impact Report (2013 updated every 10 years; 2023 PEIR being developed), Urban Water Management Plan (2020 updated every 5 years), Natural Community Conservation Plan/Habitat Conservation Plan (2010), Water Shortage Contingency Plan (2021), Aqueduct Communications Master Plan (2022)
Building Code, Permitting, and Inspections	**Yes/No**	**Are codes adequately enforced?**
Building Code	Yes	We follow all CA & local building code requirements
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	Score: not applicable
Fire department ISO rating	No	Rating: not applicable
Site plan review requirements	Yes	Yes, All plans are reviewed to ensure compliance with federal, state, and local regulations.
Land Use Planning and Ordinances	**Yes/No**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	No	As per local and county regulations
Subdivision ordinance	No	As per local and county regulations
Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	No	As per local and county regulations
Growth management ordinances (also called “smart growth” or anti-sprawl programs)	No	As per local and county regulations
Flood insurance rate maps	No	As per local and county regulations
Acquisition of land for open space and public recreation uses	No	As per local and county regulations
Other	Yes	Model Drought Ordinance
How can these capabilities be expanded and improved to reduce risk?		
We could provide input as needed to any city or county effort. Most topics are not applicable to us because we are not a city/county that establishes ordinances for land development. For construction of new facilities or infrastructure we comply with local regulations and ordinances to reduce hazard risks such as storm water, steep slopes, wildfire, and hazard setback.		

TABLE 3: FEMA LOCAL MITIGATION PLANNING HANDBOOK WORKSHEET 4.1 DATA.

4.1.2. Administrative and Technical

This table identifies the Water Authority's administrative and technical capabilities. These include staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. If there are public resources at the County of San Diego that can provide technical assistance, they are indicated in the comments. For the Water Authority to expand our capabilities and reduce risk in this area, additional resources and training area needed.

Administration	Yes/No	Describe capability Is coordination effective?
Planner(s) or engineer(s) with knowledge of land development and land management practices	Yes	Staff in Water Resources & Engineering have knowledge of land development practices and execute projects in accordance with industry standards. Coordination is effective.
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Engineers are licensed in Civil, but not in Structural, Mechanical, Electrical, or Traffic for which we hire professional consultants. Coordination is effective.
Planners or Engineer(s) with an understanding of natural and/or manmade hazards	Yes	Designs performed in-house have mitigated natural hazards including flood, earthquake, wind, and geotechnical issues and some common man-made hazards, e.g., security and personnel safety. This is also supplemented by as-needed consultant services. Coordination is effective.
Mitigation Planning Committee	Yes	There is a committee for the purposes of developing the hazard mitigation plan with the County. Additionally, the Water Authority has an asset management program that mitigates hazards that affect our infrastructure. Coordination is effective.
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Water Authority crews perform facility maintenance, vegetation management, storm drain and road maintenance. Tree maintenance performed via contract labor. Coordination is effective.
Mutual aid agreements	Yes	Multiple interagency mutual aid agreements at the local, regional, and state levels, emergency water agreement to provide water to Mexico. Coordination is effective.
Staff	**Yes/No FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Yes, FT	Yes, yes, yes
Floodplain Administrator	No	Not applicable County resources are available
Emergency Manager	Yes, PT	No, yes, yes
Surveyors	Yes, FT	Yes, yes, yes

Staff with education or expertise to assess the community's vulnerability to hazards	Yes, PT	Yes, yes, yes
Community Planner	No	Not applicable County resources are available
Scientists familiar with the hazards of the community	Yes, PT	Yes, yes, yes
Civil Engineer	Yes, FT	Yes, yes, yes
Personnel skilled in GIS and/or HAZUS	Yes, FT	Yes, yes, yes
Grant writers	No	No, No, Yes Project managers are used as grant writers as opportunities arise.
Other		
Technical	**Yes/No**	**Describe capability Has capability been used to assess/mitigate risk in the past?**
Warning systems/services (Reverse 911, outdoor warning signals)	Yes	We use the County's Blackboard Connect system for staff and public notifications. Also have access to near term atmospheric river warning (N) & National Integrated Drought Information System (N)
Hazard data and information	Yes	2020 Water System Risk & Resilience Assessment (Y), 2018 & 2022 seismic analyses (Y), 2021 climate change risk assessment (Y)
Grant writing	Yes	Grant Administrator & analysts on staff
HAZUS analysis	No	Not applicable County resources are available
Other		
How can these capabilities be expanded and improved to reduce risk?		
These capabilities can be expanded and improved by looking at potential for addition of positions to attend to specific hazard mitigation issues.		

TABLE 4: FEMA LOCAL MITIGATION PLANNING HANDBOOK WORKSHEET 4.1 DATA CONTINUED.

4.1.3. Financial

The following table indicates the funding resources the Water Authority has access to or is eligible to use for hazard mitigation. To achieve improvements within this area, the Water Authority can levy public and private partnerships.

Funding Resource	Access/ Eligibility (Yes/No)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Community Development Block Grants (CDBG)	No	Not used in past. CDBG covers infrastructure, but the low-middle income (80% AMR) requirement makes us ineligible due to our service area.
Capital improvements project funding	Yes	Yes, building facilities & other infrastructure. Yes, could be used for future mitigation actions based on Board approval and funding availability.
Authority to levy taxes for specific purposes	Yes	Yes. Taxes for construction of water infrastructure levied prior to Prop 13. Potentially. Any subsequent levies require approval by 2/3rds of the San Diego electorate.
Fees for water, sewer, gas, or electric service	Yes	Yes, water rates are the Water Authority's primary source of funding and are adopted each year based on the Water Authority's cost of service. Yes, could be used for future mitigation actions based on Board approval and funding availability.
Impact fees for homebuyers or developers for new developments/homes	Yes	Yes, for establishment of service & securing water supply for new demands. No, can only be used for establishment of service & securing water supply for new demands.
Incur debt through general obligation bonds	Yes	The Water Authority is empowered to levy taxes on all taxable property within its boundaries for the purpose of paying its voter-approved general obligation bonds and, subject to certain limitations, for other Water Authority purposes. The Water Authority is authorized to sell general obligation bonds, subject to the approval of a two-thirds majority of those voting in a local election but has not used this since the two-thirds majority requirement has been in place.
Incur debt through special tax and revenue bonds	Yes	Bonds issued under Revenue Bond Act of 1941 must be authorized by a majority vote of the qualified electors of the Water Authority. Due to voter-approval requirements and a number of outdated provisions, the statute is rarely used by any California entity, including the Water Authority.
Incur debt through private activity bonds	Yes	Yes, used in the past as part of the Carlsbad Desalination P3. While possible, given the greater cost and complexity private activity bonds are not regularly used.
How can these capabilities be expanded and improved to reduce risk?		
Levy public-private partnerships to expand/improve.		

TABLE 5: FEMA LOCAL MITIGATION PLANNING HANDBOOK WORKSHEET 4.1 DATA CONTINUED.

4.1.4. Education and Outreach

The following table indicates education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information. In order to expand or improve these capabilities to reduce risk, the Water Authority can continue to update and evolve programs and partnerships to incorporate changing hazards and mitigation strategies.

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Citizens Water Academy to educate civic leaders and water professionals in the San Diego Region on water issues. Participation in Water Utility Climate Alliance (WUCA) to advance climate change adaptation, planning, and decision-making (Water Authority participates in several sub-committees such as Sea Level Rise, Greenhouse Gas Mitigation, Water Demand Forecasting, and Leading Practices). Can be used to leverage support to implement future mitigation activities
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	WaterSmartSD.org to educate and encourage responsible water use including conservation in alignment with Drought Contingency Response Plan which calls for regional outreach to promote conservation in alignment with state goals, Citizens Water Academy to educate leaders and professionals on projects and programs related to water. Can be used to leverage support to implement future mitigation activities
Natural disaster or safety related school programs	No	The Water Authority's educational offerings (workbooks, presentations, videos, etc.) promote understanding of water science and water conservation. This is an activity that could be used to implement conservation message.
StormReady certification	No	The Water Authority is not certified but does meet the requirements. It is not likely this would help us to implement future mitigation activities.
Firewise Communities certification	No	Not applicable to agency function. We coordinate with County as needed.
Public-private partnership initiatives addressing disaster-related issues	Yes	Carlsbad Desalination plant (Partnership with Poseidon to provide local drought-proof water supplies), Potential San Vicente Energy Storage Project (Partnership with City of San Diego to investigate project to avoid power outages and rolling blackouts), Lake Hodges Pumped Storage Project (Partnership with San Diego Gas and Electric to increase grid reliability during high energy demands hours), Potential Battery Storage System, Solar Energy Systems (partnership with Clean Capital to operate solar power systems to provide energy needs of Water Authority and offset the grid demands), 2011 Energy Audit (Partnership with SDG&E to identify energy conservation opportunities, Senate Bill X7-7

		Water Conservation (Partnership with SDG&E and Member Agencies in San Diego County to promote water use efficiency, conservation, education outreach, and provide funding for conservation projects), Water Energy Nexus (partnership with SDG&E to support water efficiency in San Diego Region including funding of water efficiency devices).
Other	Yes	Partnership with Scripps Institution of Oceanography and founding member of its Center for Western Weather and Water Extremes (CW3E) supports better forecasting of atmospheric rivers that could contribute to severe flooding. The Water Authority also facilitates several member agency groups that coordinate interagency issues on operations, communication, emergency preparedness/ response, and hazard mitigation.
How can these capabilities be expanded and improved to reduce risk?		
Continue to update and evolve programs and partnerships to include topics covering evolving hazards and mitigation strategies.		

TABLE 6: FEMA LOCAL MITIGATION PLANNING HANDBOOK WORKSHEET 4.1 DATA CONTINUED.

4.2. Safe Growth Audit

Identify gaps in your community's growth guidance instruments and improvements that could be made to reduce vulnerability to future development:

Comprehensive Plan	Yes	No
Land Use		
1. Does the future land-use map clearly identify natural hazard areas?	X	
In conjunction with maps in climate change risk assessment (supplemental document)		
2. Do the land-use policies discourage development or redevelopment within natural hazard areas?	X	
In conjunction with maps in climate change risk assessment (supplemental document)		
3. Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?	X	
In conjunction with maps in climate change risk assessment (supplemental document)		
Transportation		
1. Does the transportation plan limit access to hazard areas?		
Not applicable		
2. Is transportation policy used to guide growth to safe locations?		
Not applicable		
3. Are movement systems designed to function under disaster conditions (e.g., evacuation)?	X	
Access roads are generally functional during disaster conditions to allow travel by Water Authority crews for purposes of operations and maintenance.		

Comprehensive Plan (continued)	**Yes**	**No**
Environmental Management		
1. Are environmental systems that protect development from hazards identified and mapped?	X	
Yes, resiliency is the primary objective of the comprehensive plan, and these new projects or repair/upgrades to existing projects are identified and mapped		
2. Do environmental policies maintain and restore protective ecosystems?	X	
Yes, our Natural Community Conservation Plan/Habitat Conservation Plan outlines policies to avoid, minimize, and restore native habitats, wildlife, and ecosystems. The plan has been analyzed under CEQA through an Environmental Impact Report to ensure projects do not negatively impact the environment		
3. Do environmental policies provide incentives to development that is located outside protective ecosystems?	X	
Yes, our Natural Community Conservation Plan/Habitat Conservation Plan is performed in conjunction with a programmatic Environmental Impact Report in accordance with CEQA to ensure projects do not negatively impact the environment		
Public Safety		
1. Are the goals and policies of the comprehensive plan related to those of the FEMA Local Hazard Mitigation Plan?	X	
Yes, resiliency and mitigation from natural hazards is an objective of the comprehensive plan. All projects meeting this resiliency objective support the Water Authority's ability to provide safe and reliable water supply to its 3.3 million residents in the Water Authority service area.		
2. Is safety explicitly included in the plan's growth and development policies?	X	
Yes, it is clearly identified as an objective for all new projects or repairs/upgrades to existing projects.		
3. Does the monitoring and implementation section of the plan cover safe growth objectives?	X	
Yes, it is clearly identified as an objective for all new projects or repairs/upgrades to existing projects.		
Zoning Ordinance	**Yes**	**No**
1. Does the zoning ordinance conform to the comprehensive plan in terms of discouraging development or redevelopment within natural hazard areas?		
Not applicable		
2. Does the ordinance contain natural hazard overlay zones that set conditions for land use within such zones?		
Not applicable		
3. Do rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use?		
Not applicable		
4. Does the ordinance prohibit development within, or filling of, wetlands, floodways, and floodplains?		
Not applicable		
Subdivision Regulations	**Yes**	**No**

1. Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?		
Not applicable		
2. Do the regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?		
Not applicable		
3. Do the regulations allow density transfers where hazard areas exist?		
Not applicable		
Capital Improvement Program and Infrastructure Policies	**Yes**	**No**
1. Does the capital improvement program limit expenditures on projects that would encourage development in areas vulnerable to natural hazards?	X	
Yes, the CIP Program is developed in conjunction with the decision planning in the Comprehensive Master Plan and Programmatic Environmental Impact Report. It is additionally informed through hazard specific evaluations performed as part of the Water Authority's Asset Management and Energy Programs.		
2. Do infrastructure policies limit extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards?	X	
Yes, the CIP Program is developed in conjunction with the decision planning in the Comprehensive Master Plan and Programmatic Environmental Impact Report. Resiliency Measures are also identified		
3. Does the capital improvement program provide funding for hazard mitigation projects identified in the FEMA Mitigation Plan?	X	
The CIP program provides funding for projects in the CIP program, which are consistent with projects identified in the FEMA Mitigation Plan		
Other	**Yes**	**No**
1. Do small area or corridor plans recognize the need to avoid or mitigation natural hazards?		
Not applicable		
2. Does the building code contain provisions to strengthen or elevate construction to withstand hazard forces?	X	
Yes. The Water Authority is required to comply with state and local building codes that require projects/structures to withstand natural hazard forces.		
3. Do economic development or redevelopment strategies include provisions for mitigating natural hazards?		
Not applicable		
4. Is there an adopted evacuation and shelter plan to deal with emergencies from natural hazards?	X	
There is a County plan, but the Water Authority does not have our own.		

TABLE 7: FEMA LOCAL MITIGATION PLANNING HANDBOOK WORKSHEET 4.2 DATA.

Questions were adapted from Godschalk, David R. Practice Safe Growth Audits, Zoning Practice, Issue Number 10, October 2009, American Planning Association.

4.3. National Flood Insurance Program (NFIP)

As a participant in the National Flood Insurance Program (NFIP), a community develops capabilities for conducting flood mitigation activities. The hazard mitigation plan must describe each jurisdiction's participation in the NFIP. Participating communities must describe their continued compliance with NFIP requirements. The mitigation plan must do more than state that the community will continue to comply with the NFIP. Each jurisdiction must describe their floodplain management program and address how they will continue to comply with the NFIP requirements. The local floodplain administrator is often the primary source for this information.

Jurisdictions where FEMA has issued a floodplain map but are currently not participating in the NFIP may meet this requirement by describing the reasons why the community does not participate. Plan updates must meet the same requirements and document any change in floodplain management programs.

As a Special District, San Diego County Water Authority is not eligible for the NFIP and the NFIP table is not applicable.

5. SECTION FIVE: Conduct a Risk Assessment

The planning team conducts a risk assessment to determine the potential impacts of hazards to the people, economy, and built and natural environments of the community. The risk assessment provides the foundation for the rest of the mitigation planning process, which is focused on identifying and prioritizing actions to reduce risk to hazards.

In addition to informing the mitigation strategy, the risk assessment also can be used to establish emergency preparedness and response priorities, for land use and comprehensive planning, and for decision making by elected officials, city and county departments, businesses, and organizations in the community.

5.1. Hazards Summary

The Water Authority has identified one high ranking hazard within our service area: **Terrorism/Cyber-Terrorism**. Additionally, we plan to address several other hazards, which could adversely impact system resiliency and disrupt continuity of operations within the Water Authority's service area, including **Climate Change, Earthquake, Erosion, Extreme Heat, and Wildfire.**

Hazard	Location (Geographic Area Affected)	Maximum Probable Extent (Magnitude/Strength)	Probability of Future Events	Overall Significance Ranking
Avalanche	Negligible	Weak	Unlikely	Low
Dam Failure	Significant	Severe	Unlikely	Medium
Drought	Extensive	Weak	Likely	Low
Earthquake	Significant	Severe	Unlikely	Medium
Erosion	Extensive	Weak	Likely	Medium
Expansive Soils	Limited	Moderate	Occasional	Low
Extreme Cold	Negligible	Weak	Unlikely	Low
Extreme Heat	Significant	Moderate	Likely	Medium
Flood	Limited	Moderate	Likely	Medium
Hail	Negligible	Weak	Unlikely	Low
Hurricane	Negligible	Weak	Unlikely	Low
Landslide	Negligible	Weak	Unlikely	Low
Lightning	Limited	Weak	Unlikely	Low
Sea Level Rise	Negligible	Severe	Unlikely	Low
Severe Wind	Limited	Moderate	Likely	Medium
Severe Winter Weather	Negligible	Weak	Unlikely	Low
Storm Surge	Negligible	Weak	Unlikely	Low
Subsidence	Negligible	Weak	Unlikely	Low
Tornado	Negligible	Weak	Unlikely	Low
Tsunami	Negligible	Severe	Unlikely	Low
Wildfire	Significant	Moderate	Likely	Medium
Climate Change	Extensive	Moderate	Likely	Medium
Terrorism/Cyber Terrorism	Extensive	Extreme	Likely	High

TABLE 8: FEMA LOCAL MITIGATION PLANNING HANDBOOK WORKSHEET 5.1 DATA

Definitions for Classifications

Location (Geographic Area Affected)

- **Negligible:** Less than 10 percent of planning area or isolated single-point occurrences
- **Limited:** 10 to 25 percent of the planning area or limited single-point occurrences
- **Significant:** 25 to 75 percent of planning area or frequent single-point occurrences
- **Extensive:** 75 to 100 percent of planning area or consistent single-point occurrences

Maximum Probable Extent (Magnitude/Strength based on historic events or future probability)

- **Weak:** Limited classification on scientific scale, slow speed of onset or short duration of event, resulting in little to no damage
- **Moderate:** Moderate classification on scientific scale, moderate speed of onset or moderate duration of event, resulting in some damage and loss of services for days
- **Severe:** Severe classification on scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months
- **Extreme:** Extreme classification on scientific scale, immediate onset or extended duration of event, resulting in catastrophic damage and uninhabitable conditions

Hazard	Scale / Index	Weak	Moderate	Severe	Extreme
Drought	Palmer Drought Severity Index[3]	-1.99 to +1.99	-2.00 to -2.99	-3.00 to -3.99	-4.00 and below
Earthquake	Modified Mercalli Scale[4]	I to IV	V to VII	VII	IX to XII
	Richter Magnitude[5]	2, 3	4, 5	6	7, 8
Hurricane Wind	Saffir-Simpson Hurricane Wind Scale[6]	1	2	3	4, 5
Tornado	Fujita Tornado Damage Scale[7]	F0	F1, F2	F3	F4, F5

TABLE 5-2: FEMA HAZARD SCALE/INDEX

Probability of Future Events

- **Unlikely:** Less than 1 percent probability of occurrence in the next year or a recurrence interval of greater than every 100 years.
- **Occasional:** 1 to 10 percent probability of occurrence in the next year or a recurrence interval of 11 to 100 years.
- **Likely:** 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years
- **Highly Likely:** 90 to 100 percent probability of occurrence in the next year or a recurrence interval of less than 1 year.

Overall Significance

- **Low:** Two or more criteria fall in lower classifications, or the event has a minimal impact on the planning area. This rating is sometimes used for hazards with a minimal or unknown record of occurrences or for hazards with minimal mitigation potential.
- **Medium:** The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.

- **High:** The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.

  - *Cumulative meteorological drought and wet conditions: http://ncdc.noaa.gov/*
  - *Earthquake intensity and effect on population and structures: http://earthquake.usgs.gov*
  - *Earthquake magnitude as a logarithmic scale, measured by a seismograph: http://earthquake.usgs.gov*
  - *Hurricane rating based on sustained wind speed: http://nhc.noaa.gov*
  - *Tornado rating based on wind speed and associated damage: http://spc.noaa.gov*

Based on this FEMA Standardized evaluation, in accordance with information covered within the HAZUS Data Evaluations, Vulnerability Assessments, Hazard Seminar Series, and input from Subject Matter Experts and the public, the San Diego County Water Authority has prioritized the following hazards into High, Medium, and Low rankings (in no order of prioritization within individual categories):

High	Medium	Low
• Terrorism / Cyber-Terrorism	• Dam Failure • Earthquake • Erosion • Extreme Heat • Flood • Severe Wind • Wildfire • Climate Change	• Avalanche • Drought • Expansive Soils • Extreme Cold • Hail • Hurricane • Landslide • Lightning • Sea Level Rise • Severe Winter Weather • Storm Surge • Subsidence • Tornado • Tsunami

A High ranking indicates the hazard has a “Highly Likely” probability of occurrence and/or a severe impact on the community. The Medium ranking indicated a “Likely” or “Occasional” potential for occurrence or impact. Hazards with a low probability of occurrence but with a potentially high impact were also ranked as Medium. The Low ranking indicates that the potential for the event to occur is "Unlikely” (remote and/or the impact of the event is minimal to the community).

The final list of prioritized hazards for San Diego County Water Authority were hazards with High or Medium Overall Significance. This list of prioritized hazards was determined by the Water Authority’s local planning team using input from HAZUS Data Evaluations, Vulnerability Assessments, Hazard Seminar Series, and Subject Matter Experts and the public (appearing below in alphabetical order):

- Climate Change
    - Probability of Future Events **Likely**: 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years.
    - Overall Significance **Medium**: The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating.
- Dam Failure
    - Probability of Future Events **Unlikely**: Less than 1 percent probability of occurrence in the next year or a recurrence interval of greater than every 100 years.
    - Overall Significance **Medium**: The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.
- Earthquake
    - Probability of Future Events **Unlikely**: Less than 1 percent probability of occurrence in the next year or a recurrence interval of greater than every 100 years.
    - Overall Significance **Medium**: The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating.
- Erosion
    - Probability of Future Events **Likely**: 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years
    - Overall Significance **Medium**: The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating.
- Extreme Heat
    - Probability of Future Events **Likely**: 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years
    - Overall Significance **Medium**: The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating.
- Flood
    - Probability of Future Events **Occasional**: 1 to 10 percent probability of occurrence in the next year or a recurrence interval of 11 to 100 years.
    - Overall Significance **Medium**: The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating.
- Terrorism/Cyber-Terrorism
    - Probability of Future Events **Likely**: 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years

  - Overall Significance **High**: The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with severe strength over a significant to extensive portion of the planning area.
- Wildfire
  - Probability of Future Events **Likely**: 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years
  - Overall Significance **Medium**: The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating.

While Drought is noted as a high significance hazard within the County of San Diego, the Water Authority has already implemented several mitigation actions over the past 20+ years to increase water supply resilience to drought. Due to these actions, the Water Authority has rated the overall significance as low. It is estimated that drought would have a minimal impact on the Water Authority's water supply.

Climate Change will be addressed in this annex as both a hazard and a factor that could affect the location, extent, probability of occurrence, and magnitude of climate-related hazards listed above.

5.1.1. HAZARD OMISSION RATIONALE

During the initial evaluation, the County's Hazard Mitigation Planning Group (HMPG) determined certain hazards were not included in the original plan's profiling step because they were not prevalent hazards within San Diego County or were found to pose only minor or very minor threats to San Diego County compared to the other hazards. The Water Authority concurs with the reasons for exclusion.

The table below gives a brief description of omitted hazards and the reason for their exclusion:

Hazard	Description	Reason for Exclusion
Avalanche	A mass of snow moving down a slope. There are two basic elements to a slide; a steep, snow-covered slope and a trigger	Snowfall in County mountains not significant; poses very minor threat compared to other hazards
Expansive soils	Expansive soils shrink when dry and swell when wet. This movement can exert enough pressure to crack sidewalks, driveways, basement floors, pipelines and even foundations	Presents a minor threat to limited portions of the County
Hailstorm	Can occur during thunderstorms that bring heavy rains, strong winds, hail, lightning, and tornadoes	Occurs during severe thunderstorms; most likely to occur in the central and southern states; no historical record of this hazard in the region.
Land subsidence	Occurs when large amounts of ground water have been withdrawn from certain types of rocks, such as fine-grained sediments. The rock compacts because the water is partly responsible for holding the ground up. When the water is withdrawn, the rocks fall in on themselves.	Soils in the County are mostly granitic. Presents a minor threat to limited parts of the county. No historical record of this hazard in the region.
Tornado	A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm (or sometimes because of a hurricane)	Less than one tornado event occurs in the entire State of California in any given year; poses very minor threat

	and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and wind-blown debris.	compared to other hazards. No historical record of this hazard in the region.
Volcano	A volcano is a mountain that is built up by an accumulation of lava, ash flows, and airborne ash and dust. When pressure from gases and the molten rock within the volcano becomes strong enough to cause an explosion, eruptions occur	No active volcanoes in San Diego County. No historical record of this hazard in the region.
Windstorm	A storm with winds that have reached a constant speed of 74 miles per hour or more	Maximum sustained wind speed recorded in the region is less than 60 miles per hour and would not be expected to cause major damage or injury.

TABLE 9: HAZARD OMISSION

5.2 Hazard Profiles

A hazard profile is a description of the physical characteristics of a hazard and a determination of various hazard descriptors, including magnitude, duration, frequency, probability, and extent. The hazard data that was collected in the hazard identification process was mapped to determine the geographic extent of the hazards in each jurisdiction in the County and the level of risk associated with each hazard.

Because Terrorism/Cyber Terrorism hazards are sensitive issues and release of information could pose further unnecessary threat, the HMPG decided that each of these hazards would be further profiled and assessed in a separate, "For Official Use Only" Appendix and would be exempt from public distribution and disclosure by Section 6254 (99) of the California Government Code.

Hazards were given a risk level of high, medium, or low depending on several factors. The hazards identified for the Water Authority are presented in this section in alphabetical order. This does not signify level of importance.

5.2.1. CLIMATE CHANGE

Nature of Hazard

Climate change is not a hazard in and of itself, but rather is a factor that could affect the location, extent, probability of occurrence, and magnitude of climate-related hazards.

According to the Intergovernmental Panel on Climate Change (IPCC), warming of the climate system is unequivocal, as is now evident from observations of increased global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.[1] The overwhelming majority of climate scientists agree that human activities, especially burning of fossil fuels, are responsible for most of the global warming observed.[2]

The Scripps Institution of Oceanography planning partners define Climate Change as any systematic change in the long-term statistics of climate elements and weather events (such as temperature, pressure, or winds) sustained over several decades or longer.[3] Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by

changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer.

Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use.[4]

Disaster History

More historical information, provided by Scripps Institution of Oceanography (University of California, San Diego), is detailed in the respective Vulnerability Assessment section of this plan.

Climate change impacts are already impacting the region especially as it relates to temperature and extreme heat. Recent weather and climate impacts provide a fingerprint of climate change impacts in San Diego County. These include terrestrial floods, coast sea level extremes, erosion and wave damage, heat waves, and wildfires, such as the 2003 and 2007 conflagrations. Compound extremes should be considered, such as the wildfire-followed-by flood and debris flow event that occurred in Montecito/Santa Barbara County in 2017.

Hazard Impacts

The most vulnerable populations to impacts from extreme events are those who inhabit locations with greatest or most unusual physical effects, those who lack resources, who are uninsured, who are socially isolated, or have already compromised health. Coastal regions are vulnerable to oceanic flooding and the increasing occurrence of heat waves, whose temperatures are likely lower than in inland regions but rarely occurred historically. However, the health impacts of less intense heat waves on those living in the coastal zone may be more severe than elsewhere in the county because the population is less acclimated to the heat.

Implementing appropriate warnings and communication or extremes such as heatwaves and/or smoke from wildfires and developing responses to prepare for these extremes is critically important, especially in the most vulnerable communities. To move forward, the region can assess current measures, such as cooling centers to take refuge from extreme heat, urban greening, residential and commercial structure fire resistance and community fire mitigation and escape routes.

Other ways to prevent and mitigate further impacts include:

- Testing and monitoring adaptation strategies.
- Identifying thresholds to determine when it may be necessary to relocate or redesign infrastructure.
- Continual improvement of extreme forecasts to allow longer lead times to prepare for the extremes.
- The climate is projected to continue to change over this century and beyond.[5] The climate change factor is increasing risk for some natural hazards, and this assessment includes information about how risk will change into the future.

By assessing ongoing changes in risk—in addition to the traditional practice of risk assessment based on observed hazard events—this plan's hazard mitigation strategies can better reduce risk from hazards

expected going forward. In general, to prepare and mitigate impacts of climate change, develop integrated multi-agency, multi-jurisdiction approach that uses best information, best practices, and considers the needs of under-resourced, disadvantaged communities and individuals.

Location & Extent/Probability of Occurrence & Magnitude

According to the Scripps Institution of Oceanography planning partners, Climate Change effects such as heat waves, wildfire, and floods will occur unevenly across San Diego County.

Climate change will occur throughout San Diego County, but the expression of climate change will differ across the complex landscape of the region depending on the type of event, e.g., heat, flooding, drought, or wildfire. Heat waves and wildfire will likely have greatest magnitude over inland regions, and runoff from heavy rainfall will be concentrated in stream channels.

Greenhouse gas mitigation remains important as observations, modeling, and physical principles show conclusively that the accumulation of anthropogenic greenhouse gasses in the atmosphere has driven the rapid warming observed globally over several decades (the last two decades in particular). Because:

- greenhouse gasses such as CO2 have long, several decade lifetimes
- the earth system is still not equilibrated (still warming) to the increased greenhouse gasses already resident in the atmosphere
- global society's fossil fuel (burns carbon, releases CO2) economy is difficult to replace so further accumulation of greenhouse gasses in the atmosphere is inevitable, the Earth's atmosphere, ocean, land, and ice will warm further.

Reducing greenhouse gas emissions is thus a critical immediate and long-range mitigation action (e.g., Franco et al., 2018).

The probability of Climate Change affecting the Water Authority's infrastructure is considered "Likely", meaning 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years. Climate change is virtually certain to continue without immediate and effective global action. According to the National Aeronautics and Space Administration (NASA), the past eight years have collectively been the warmest years since modern recordkeeping began in 1880. Without significant global action to reduce greenhouse gas (GHG) emissions, the IPCC concludes in its Fifth Assessment Synthesis Report (2014) that average global temperatures are likely to exceed 1.5°C by the end of the 21st century, with consequences for people, assets, economies and ecosystems (including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges).[6]

5.2.2. DAM FAILURE

Nature of Hazard

Dam failures can result in severe flood events. When a dam fails, a large quantity of water is suddenly released with a great potential to cause human casualties, economic loss, lifeline disruption, and environmental damage. A dam failure is usually the result of age, poor design, or structural damage caused by a major event such as an earthquake or flood.

Disaster History

While the Water Authority has not experienced any dam failures within our history, two major dam failures, during a single event, have been recorded in San Diego County. The Hatfield Flood of 1916 caused the failure of both the Sweetwater Main and Lower Otay Dams; resulting in 22 deaths. Most of those deaths were attributed to the failure of Lower Otay Dam (County of San Diego Sanitation and Flood Control, 2002).

Hazard Impacts

Since dam failures can result in severe flood events, this sudden release of large quantities of water has great potential to cause human casualties, economic/asset loss, lifeline disruption, and environmental damage.

Location & Extent/Probability of Occurrence & Magnitude

The figure below displays the locations and extent of dam failure hazard areas for the County of San Diego. Dam failures are rated as one of the major “low-probability, high-loss” events. While many dams are located within the Water Authority’s service area, we only own one of these dams, the Olivenhain Dam.

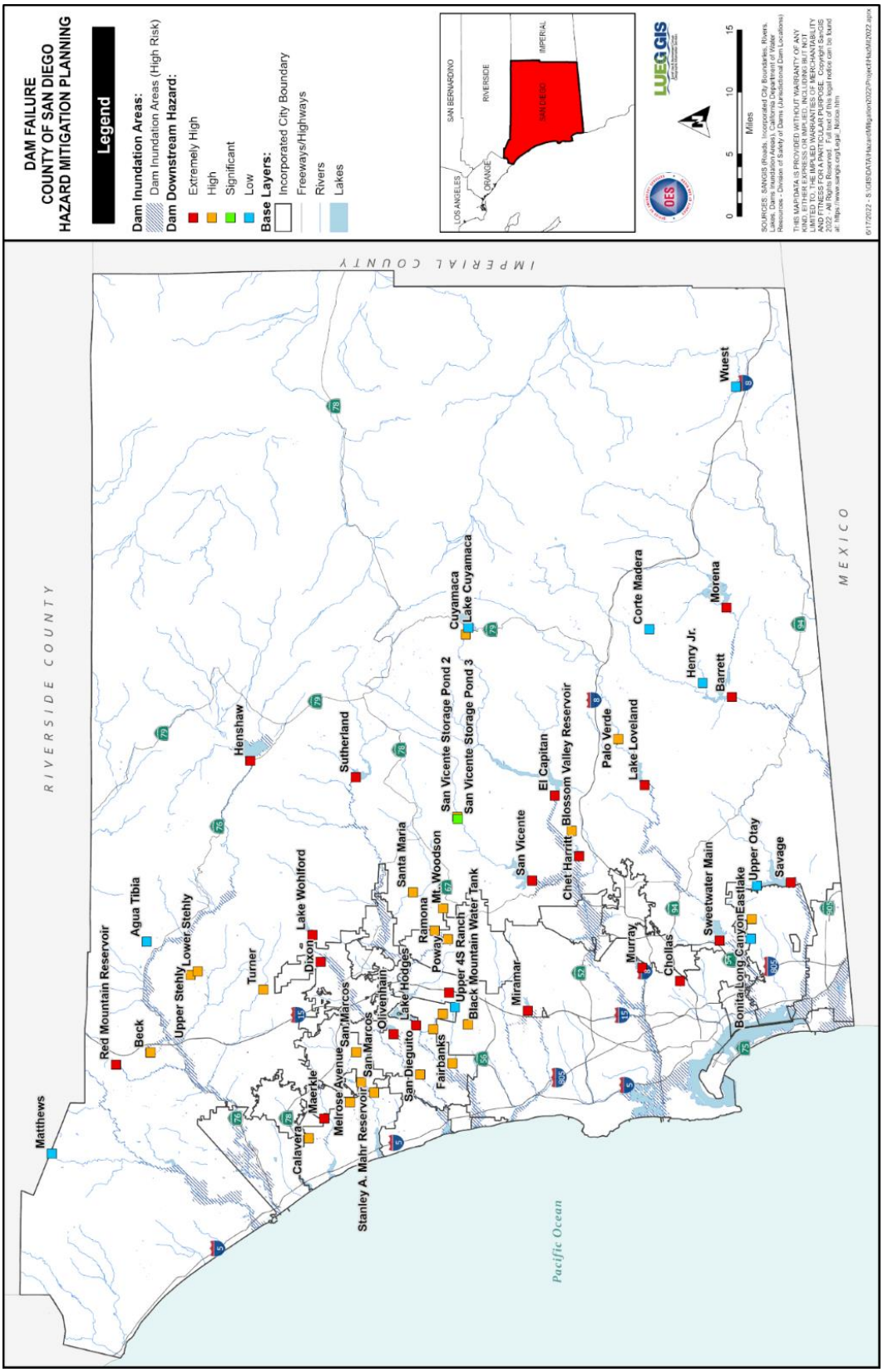

FIGURE 1: MAP OF SAN DIEGO COUNTY DAM INUNDATION AREAS

Dam inundation map data was used to profile dam failure risk levels. The data presented was obtained from SanGIS, a local GIS data repository. The dam inundation map layers show areas that would be flooded in the event of a dam failure. The Olivenhain Dam is characterized as high hazard because it stores more than 1,000 acre-feet of water, is higher than 150 feet tall, has potential for downstream property damage, and potential for downstream evacuation. Ratings were set by FEMA and confirmed with site visits by engineers. (Unified San Diego County Emergency Services Organization Operational Area Emergency Plan, 2014).

The probability of an Olivenhain Dam failure is "Unlikely" (Less than 1 percent probability of occurrence in the next year or a recurrence interval of greater than every 100 years). The HAZUS Data Evaluations, Vulnerability Assessments, Hazard Seminar Series, and input from Subject Matter Experts and the public determined this hazard's Overall Significance rating is "Medium", meaning the criteria falls mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating.

Climate Change Considerations

The most extreme events are going to become more extreme regarding climate change effects. These events are primarily atmospheric rivers and will become more so in the future based on global climate models (Gershunov et al., 2019). The increase in extreme precipitation will increase the risk of dam failure.

The highest priority mitigation actions to reduce Climate Change impacts on this hazard should include conducting dam safety and emergency spill operations.

5.2.3. DROUGHT

Nature of the Hazard

Drought is a slow-onset hazard that can last for months or years. As a hazard, it has the potential to impact many aspects of life, including drinking water and food. Because of the long duration of droughts, the impacts last for years and can ripple through a community over time. Severe droughts are projected for the coming decades and may increase incidences of other events, like wildfires.

Reducing dependence on water imported from outside the San Diego region has been one of the primary goals of the Water Authority since the early 90s. Building a diversified water supply has been critical to building a reliable, drought-resilient water supply. Most of our region's water supply, about 74% is from imported supplies, including the Colorado River and the State Water Project. An additional 26% is from local supplies, which include: sea water desalination (Claude "Bud" Lewis Carlsbad Desalination Plant), water purification or (Pure Water or Advance Water Purification projects), surface water (stormwater runoff), groundwater and recycled water. Reliability assessment results demonstrate that, even when making conservative assumptions about the availability of dry year supplies from Metropolitan Water District of Southern California (Metropolitan), the San Diego region's water resource mix is drought resilient.

Disaster History

Dry conditions trailed the wet end to the calendar year with California experiencing its driest January through April on record, with only 25% of average statewide precipitation based on records dating back to 1895. The current three-year dry period continues the theme of aridity the state has been facing in the 21st century. On March 28, 2022, Governor Newsom issued Executive Order N-7-22, which included banning the irrigation of non-functional turf in commercial, institutional, and industrial sectors. More recently, the Governor released a new strategy document on August 11, 2022, to address ongoing dry conditions. The new document titled *California's Water Supply Strategy, Adapting to a Hotter, Drier Future* – lists actions needed to address a 10% loss of water supplies in the state by 2040.

Hazard Impacts

With longer dry, warm seasons, increases in higher temperatures, and lower daytime humidity there will be stronger dryness in San Diego County landscapes. Increased drought will increase wildfire risk during fire extremes caused by Santa Ana winds. Severe droughts are projected for the coming decades and may increase incidences of other events like wildfires, which are threats to people, structures, and other community assets. These dry conditions contribute to increased frequency of Public Safety Power Shutoffs (PSPSs)

Dry soil conditions contribute to rapid runoff causing flooding and sediment washing across roads and into streams. Possible impacts of drought on Water Authority infrastructure include low reservoir levels impacting ability to operate pumped storage/hydro generation facilities and causing algae blooms that affect water quality. In addition, increased sediment and organic matter from dry soils during rapid runoff can wash into reservoirs.

As the region implements actions required under the governor's latest emergency proclamation, San Diego County continues to have reliable water supplies due to its long-term investments in water supplies and infrastructure, coupled with extensive water conservation efforts and outreach actions.

Location & Extent/Probability of Occurrence & Magnitude

In an arid region such as San Diego County, the probability of recurring droughts with severity is likely. Historical drought data for the County Planning Area and San Diego County indicate there have been five significant multi-year droughts over the last 93 years. This equates to a multi-year drought every 18.6 years on average, or a 5.4% chance of a drought in any given year (probability). Based on this data, droughts will likely affect the Planning Area. A U.S. Drought Monitor, using the Palmer Drought Severity Index, can be found at http://droughtmonitor.unl.edu/.

Climate Change Considerations

According to California's Fourth Climate Change Assessment the San Diego Region will possibly see an intensified drier "shoulder seasons (spring and autumn)". The report discusses that there will be a reduction in the number of wet days leading to more frequent and intense drought.

Drought can increase wildfire risk and lead to fine fuel regrowth after a fire. This type of vegetation is more susceptible to fires, creating a feedback cycle.

Extreme drought has the potential to intensify and change community composition and structure of ecosystems. Drought has severe consequences because it operates at spatial scales larger than other disturbances such as fire (Jennings et al., 2018).

The effect of climate change on overall precipitation and runoff volumes is still unclear and highly uncertain. For example, a number of studies conclude that the flow of the Colorado River may be reduced by climate change, but wide disparity exists on the predicted volume of that change. Yield from local surface water resources could potentially be reduced if annual runoff volumes are reduced due to a decline in precipitation, or if an increase occurs in evapotranspiration in reservoirs. Research has yet to clarify how precipitation levels may be impacted by climate change.

5.2.4. EARTHQUAKE

Nature of the Hazard

An earthquake is a sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of the Earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. They usually occur without warning and, after just a few seconds, can cause massive damage and extensive casualties. Common effects of earthquakes are ground motion and shaking, surface fault ruptures, and ground failure. Ground motion is the vibration or shaking of the ground during an earthquake.

When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. Soft soils can further amplify ground motions. The severity of these effects is dependent on the amount of energy released from the fault or epicenter. One way to express an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. The acceleration due to gravity is often called "g". A 100% g earthquake is very severe.

More damage tends to occur from earthquakes when ground acceleration is rapid. Peak ground acceleration (PGA) is a measure of the strength of ground movement. PGA measures the rate in change of motion relative to the established rate of acceleration due to gravity (980 cm/sec/sec). PGA is used to project the risk of damage from future earthquakes by showing earthquake ground motions that have a specified probability (10%, 5%, or 2%) of being exceeded in 50 years. These ground motion values are used for reference in facility design for earthquake resistance. The ground motion values can also be used to assess relative hazard between sites, when making economic and safety decisions.

Another tool used to describe earthquake intensity is the Richter scale. The Richter scale was devised as a means of rating earthquake strength and is an indirect measure of seismic energy released. The scale is logarithmic with each one-point increase corresponding to a 10-fold increase in the amplitude of the seismic shock waves generated by the earthquake. In terms of actual energy released, however, each one-point increase on the Richter scale corresponds to about a 32-fold increase in energy released. Therefore, a magnitude (M) 7 earthquake is 100 times (10 X 10) more powerful than a M5 earthquake and releases 1,024 times (32 X 32) the energy. An earthquake generates different types of seismic shock waves that travel outward from the focus or point of rupture on a fault. Seismic waves that travel through the earth's crust are called body waves and are divided into primary (P) and secondary (S) waves. Because P waves move faster (1.7 times) than

S waves they arrive at the seismograph first. By measuring the time delay between arrival of the P and S waves and knowing the distance to the epicenter, seismologists can compute the Richter scale magnitude for the earthquake.

The Modified Mercalli Scale (MMI) is another means for rating earthquakes, but one that attempts to quantify intensity of ground shaking. Intensity under this scale is a function of distance from the epicenter (the closer to the epicenter the greater the intensity), ground acceleration, duration of ground shaking, and degree of structural damage. This rates the level of severity of an earthquake by the amount of damage and perceived shaking, as displayed in the table below:

MMI Value	Description of Shaking Severity	Summary Damage Description Used on 1995 Maps	Full Description
I.			Not felt
II.			Felt by persons at rest, on upper floors, or favorably placed.
III.			Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
IV.			Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motorcars rock. Windows, dishes, doors rattle. In the upper range of IV, wooden walls and frame creak.
V.	Light	Pictures Move	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clock stop, start, change rate.
VI.	Moderate	Objects Fall	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked.
VII.	Strong	Nonstructural Damage	Difficult to stand. Noticed by drivers of motorcars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roofline. Fall of plaster, loose bricks, stones, tiles, cornices. Some cracks in masonry C. Small slides and caving in along sand or gravel banks. Concrete irrigation ditches damaged.
VIII.	Very Strong	Moderate Damage	Steering of motorcars affected. Damage to masonry C, partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, and elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Cracks in wet ground and on steep slopes.
IX.	Very Violent	Extreme Damage	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land.
X.			Rails bent greatly. Underground pipelines completely out of services.
XI.			Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into air.

TABLE 10: MODIFIED MERCALLI SCALE

Several major active faults exist in San Diego County, including the Rose Canyon, La Nacion, Elsinore, San Jacinto, Coronado Bank and San Clemente Fault Zones. The Rose Canyon Fault Zone is part of the Newport-Inglewood fault zone, which originates to the north in Los Angeles, and the Vallecitos and San Miguel Fault Systems to the south in Baja California.

The Rose Canyon Fault extends inland from La Jolla Cove, south through Rose Canyon, along the east side of Mission Bay, and out into San Diego Bay. The Rose Canyon Fault is considered the greatest potential threat to San Diego as a region, due to its proximity to areas of high population. The La Nacion Fault Zone is located near National City and Chula Vista. The Elsinore Fault Zone is a branch of the San Andreas Fault System. It originates near downtown Los Angeles and enters San Diego County through the communities of Rainbow and Pala; it then travels in a southeasterly direction through Lake Henshaw, Santa Ysabel, Julian; then down into Anza-Borrego Desert State Park at Agua Caliente Springs, ending at Ocotillo, approximately 40 miles east of downtown.

The San Jacinto Fault is also a branch of the San Andreas Fault System. This fault branches off from the major fault as it passes through the San Bernardino Mountains. Traveling southeasterly, the fault passes through Clark Valley, Borrego Springs, Ocotillo Wells, and then east toward El Centro in Imperial County. This fault is the most active large fault within County of San Diego. The Coronado Bank fault is located about 10 miles offshore. The San Clemente Fault lies about 40 miles off La Jolla and is the largest offshore fault at 110 miles or more in length (Unified San Diego County Emergency Services Organization Operational Area Emergency Plan, 2014).

Disaster History

Historic documents record a very strong earthquake struck San Diego on May 27, 1862; damaging buildings in Old Town and opening cracks in the earth near the San Diego River mouth. This destructive earthquake was centered on either the Rose Canyon or Coronado Bank faults and descriptions of damage suggest that it had a magnitude of about 6.0 (M6).

The strongest recently recorded earthquake in San Diego County was a M5.3 earthquake that occurred on July 13,1986 on the Coronado Bank Fault, 25 miles west of Solana Beach. In recent years there have been several moderate earthquakes recorded within the Rose Canyon Fault Zone as it passes beneath the City of San Diego. Three temblors shook the city on 17 June 1985 (M3.9, 4.0, 3.9) and a stronger quake occurred on 28 October 1986 (M4.7) (Demere, SDNHM website 2003). The most recent significant earthquake activity occurred on June 15, 2004 with a M5.3 on the San Diego Trough Fault Zone approximately 50 miles SW of San Diego. It was reported as an IV on the MMI (Southern California Seismic Network).

Also, there have been more than a dozen of small earthquakes (M2.5 to M4.0) occurred in the last 10 years along the Elsinore fault passing the northeast corner of San Diego County according to USGS database records; the epicenters were about 10 to 15 miles away from the Water Authority's aqueduct facilities. There have been limited to no damages to Water Authority infrastructure from past earthquakes within the San Diego region.

Hazard Impacts

Earthquakes usually occur without warning and can quickly cause massive damage and extensive casualties. Some other earthquake impacts include, but are not limited to, structure doors swinging, persons at risk of being struck by unstable/falling objects, cracks in building structures, persons having trouble controlling heavy machinery/motor vehicles that may pose a life safety risk, underground pipelines out of service, and large rock masses displaced.

Location & Extent/Probability of Occurrence & Magnitude

The figures below display the location and extent of the profiled earthquake hazard areas for San Diego County:

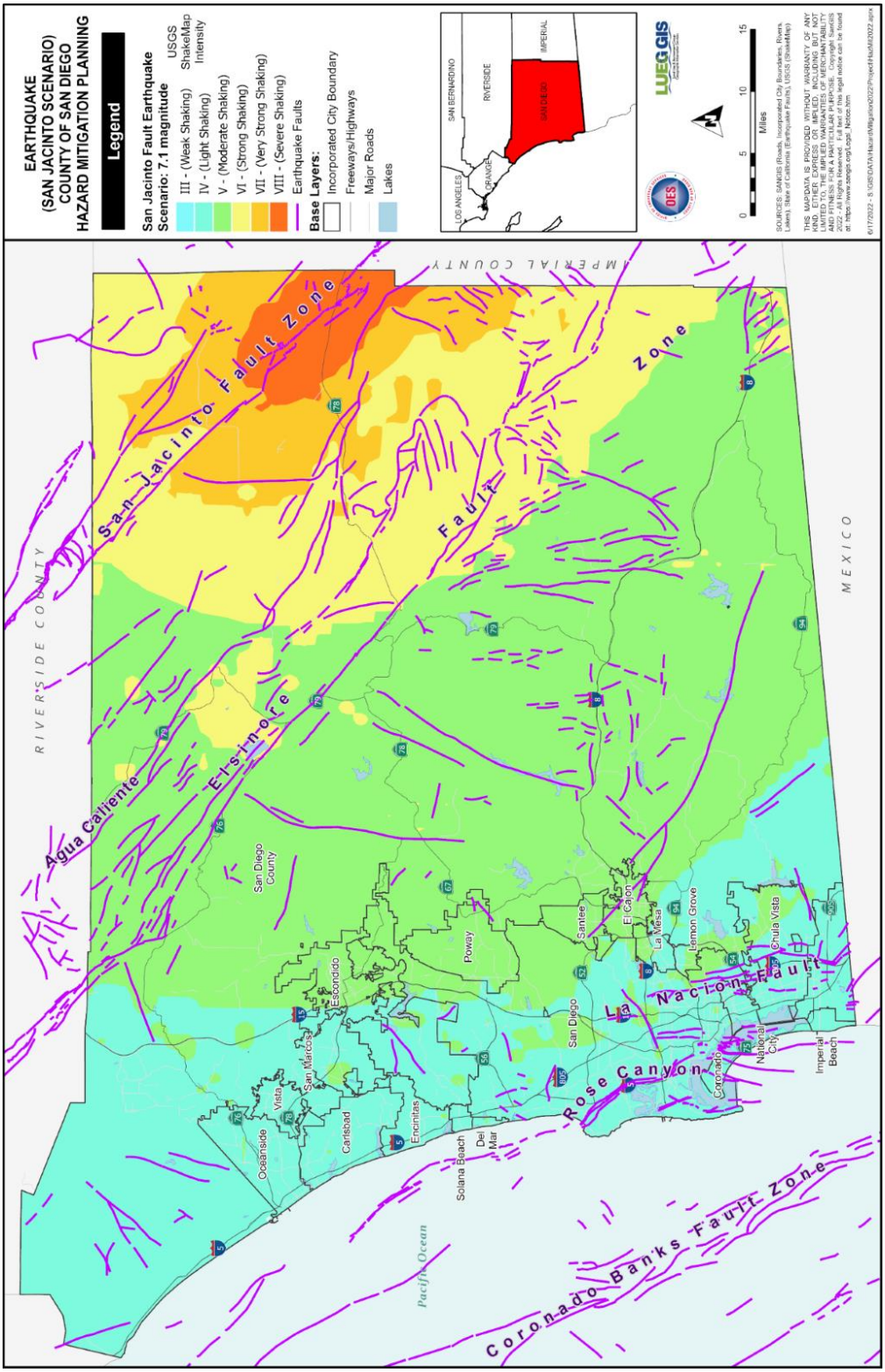

FIGURE 2: MAP OF SAN DIEGO COUNTY SAN JACINTO FAULT EARTHQUAKE SCENARIO

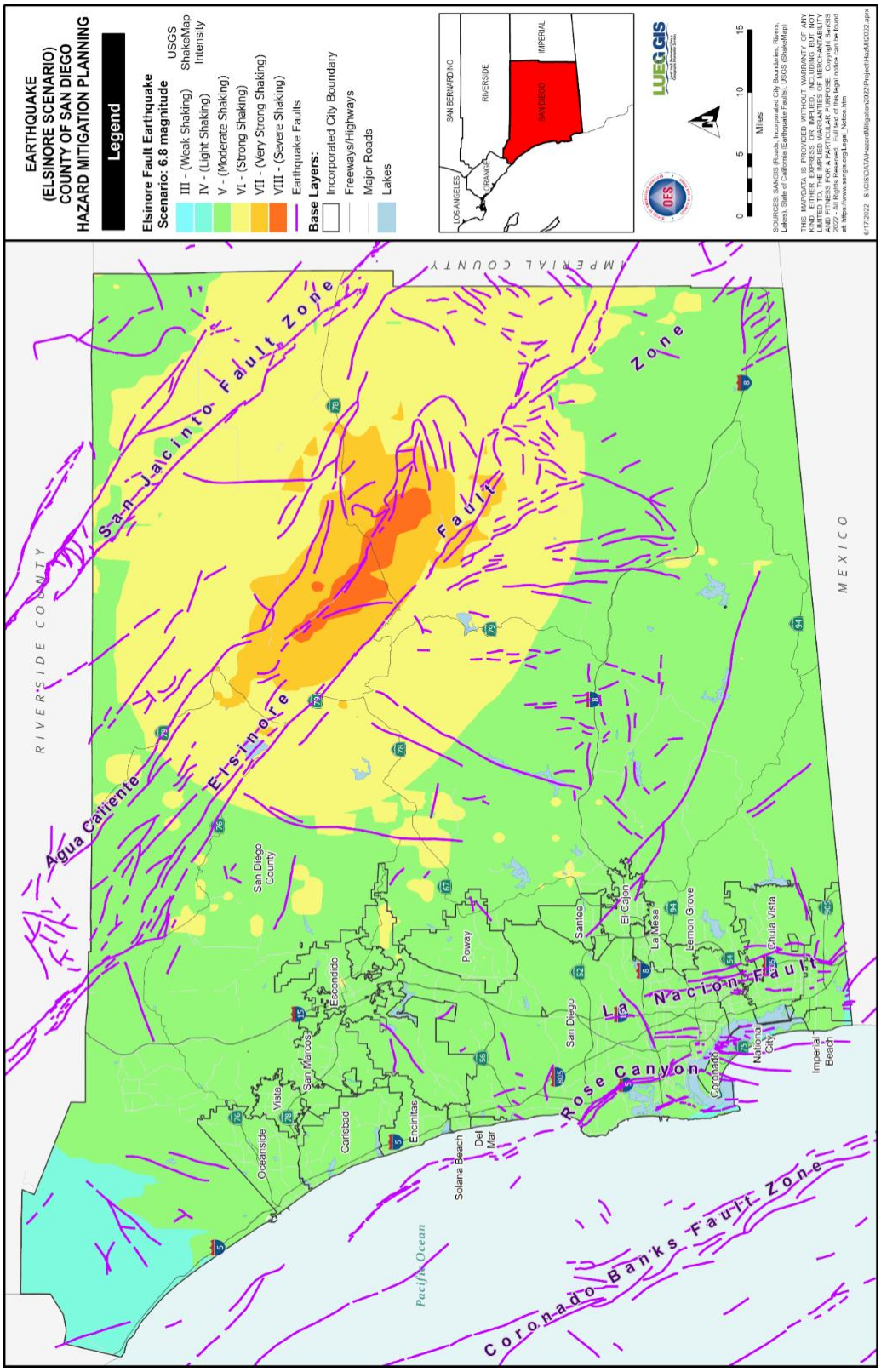

FIGURE 3: MAP OF SAN DIEGO COUNTY ELSINORE FAULT EARTHQUAKE SCENARIO

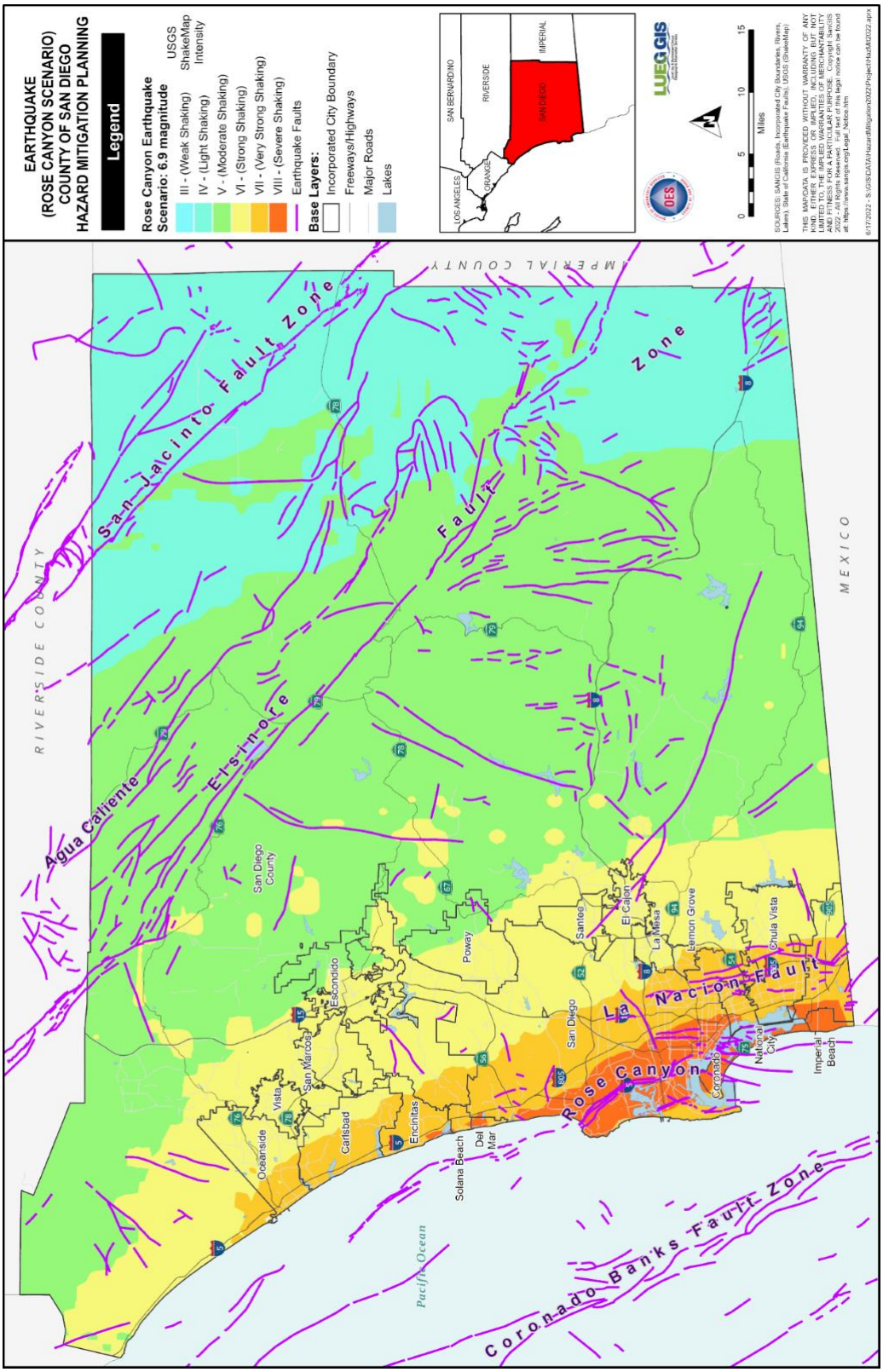

FIGURE 4: MAP OF SAN DIEGO COUNTY ROSE CANYON FAULT EARTHQUAKE SCENARIO

This is based on a United States Geological Survey (USGS) earthquake model that shows probabilistic peak ground acceleration for every location in San Diego County. Since 1984, earthquake activity in San Diego County has increased twofold over the preceding 50 years (Demere, SDNHM website 2003). All buildings that have been built in recent decades must adhere to building codes that require them to be able to withstand earthquake magnitudes that create a PGA of 0.4 or greater. Ongoing field and laboratory studies suggest the following maximum likely magnitudes for local faults: San Jacinto (M6.4 to 7.3), Elsinore (M6.5 to 7.3), Rose Canyon (M6.2 to 7.0), La Nacion (M6.2 to 6.6), Coronado Bank (M6.0 to 7.7), and San Clemente (M6.6 to 7.7) (Demere, SDNHM website 2003).

Data used to profile earthquake hazard included probabilistic PGA data from USGS and a Scenario Earthquake Shake map for Rose Canyon from the California Integrated Seismic Network (CISN). From these data, the Hazard Mitigation Planning Group (HMPG) determined that risk level for earthquake is determined to be high if an area lies within a 0.3 or greater PGA designation. Earthquakes were modeled using HAZUS-MH, which uses base information to derive probabilistic peak ground accelerations much like the PGA map from USGS that was used for the profiling process.

It is estimated that major earthquakes (ranging from a magnitude of 7 to 7.9) occur in California one out of every 10 years. However, strong earthquakes (from magnitudes 6 to 6.9) strike the State about once every two to three years. A strong earthquake can cause major damage depending on the epicenter's location with regards to populated areas and water infrastructure, and can lead to billions of dollars in disasters, deaths, injuries, and disruptions in services and communities' way of life. The United States Geological Survey estimates a 75% probability of one or more magnitude 7.0 earthquakes striking Southern California over a 30-year period, beginning in 2014. While the probability of an earthquake in the San Diego region as a whole is considered "Likely", meaning 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years, the likelihood of it affecting Water Authority infrastructure is "Unlikely".

Over the last 25 years, SDCWA has gradually improved its water infrastructure and increased countywide emergency water storage in case of a severe disruption to our water supply, such as a drought or strong earthquake. With the improvements made to date and the expected intensity as shown in the previous figures where Water Authority facilities are located, the Water Authority has rated overall earthquake significance "Medium".

Climate Change Considerations

Not applicable.

5.2.5. EXTREME HEAT

Nature of the Hazard

In most of the United States, including the entire planning area, extreme heat is a long period (2 to 3 days) of high heat and humidity with temperatures above 90 degrees.[14]

Despite this history, not a single heat emergency was formally proclaimed at the state level or as a federal disaster between 1960 and 2008. The author of an account of a heat wave which killed 739 people in Chicago in July 1995 suggests that the hidden nature of social vulnerability combined with the inconspicuous nature of heat events (unlike floods, fires, and earthquakes) prevent them from being declared as legitimate disasters.[15] However, the California State Hazard Mitigation Plan considers extreme heat a legitimate disaster type.[16]

Disaster History

Following the events of 2006, when there was a prolonged period of extreme heat across the state of California, San Diego County developed an Excessive Heat Preparedness and Response Plan.[17]

According to Spatial Hazard Events and Losses Database for the United States (SHELDUS) there have been four extreme heat events in San Diego in the past 18 years resulting in four heat related fatalities and 28 heat related injuries.

Hazard Impacts

Extreme temperature conditions can impact the daily working conditions of field personnel. Although staff in the hotter communities may become acclimated to the hot temperatures, workers who are exposed to hot conditions for a prolonged period are likely to be affected and possibly become ill.

In reservoirs, extreme heat prolongs the period in which limnology mixes, reducing water quality, and the usefulness of the supplies in reservoirs. Chemicals such as sodium hypochlorite and aqueous ammonia degrade more rapidly in hot climates, and chemical feed systems and holding times will have to be managed accordingly to provide the proper disinfectant residual in the distribution system.

Extreme heat also has secondary impacts, such as power outages and poor air quality. Heat events, and the increased use of air conditioning, can lead to power outages, which makes the events even more dangerous. Potential vulnerabilities to infrastructure include overheating motors and electrical equipment, blower inefficiency, increased occurrence of PSPS, pump station cooling, and lack of redundancy of backup power.

Location & Extent/Probability of Occurrence & Magnitude

The entire planning area is facing an increase in the frequency, duration, and strength of heat waves in the coming decades. While greater warming is expected in inland areas, community members of coastal areas are vulnerable when the temperature spikes, because they are less accustomed to the heat, and they are less likely to have air conditioning.

Research also indicates that heat waves are likely to become more humid in the future and with nighttime temperatures staying high, further stressing public health.[18] Extreme warm temperatures in the San Diego region mostly occur in July and August, but as climate warming takes hold, the occurrences of these events will likely begin in June and could continue to take place into September.[19]

Over the past 15 years, the region has seen increasing temperatures, evidenced by an increased number of excessive Heat Alerts, which are initiated based on heat advisory and excessive heat warnings. Heat Alerts generally occur from May to September. From 2013 to 2021, 98 Heat Alerts were issued in the County of San Diego. The highest numbers of Heat Alerts were issued in 2020 (20) and 2021 (16). In 2021, the County of San Diego had 8 heat events, ranging from 2 to 8 days long, lasting a total of 36 days.

National data on extreme heat can be found through Climate Data Online (CDO) at https://www.ncei.noaa.gov/cdo-web/.

Climate Change Considerations

An increase in the intensity, frequency and duration of extreme heat events is expected in the context of climate change. California's Fourth Assessment provides a review of the historical trends and future predictions for temperatures in Southern California. Figure 5 shows the warming trends in historical and projected future annual average maximum temperatures under the RCP 4.5 and 8.5 emissions scenarios for the San Diego Region. The predictions from 2000 to 2020 have been validated by comparison to records for this period. Figure 6 shows a 3 to 5 degree increase in San Diego County from historical to projected future temperatures of the hottest day of the year a 5 to 6% change in the mid-century. In general, the intensity and frequency of extreme heat events are expected to increase.

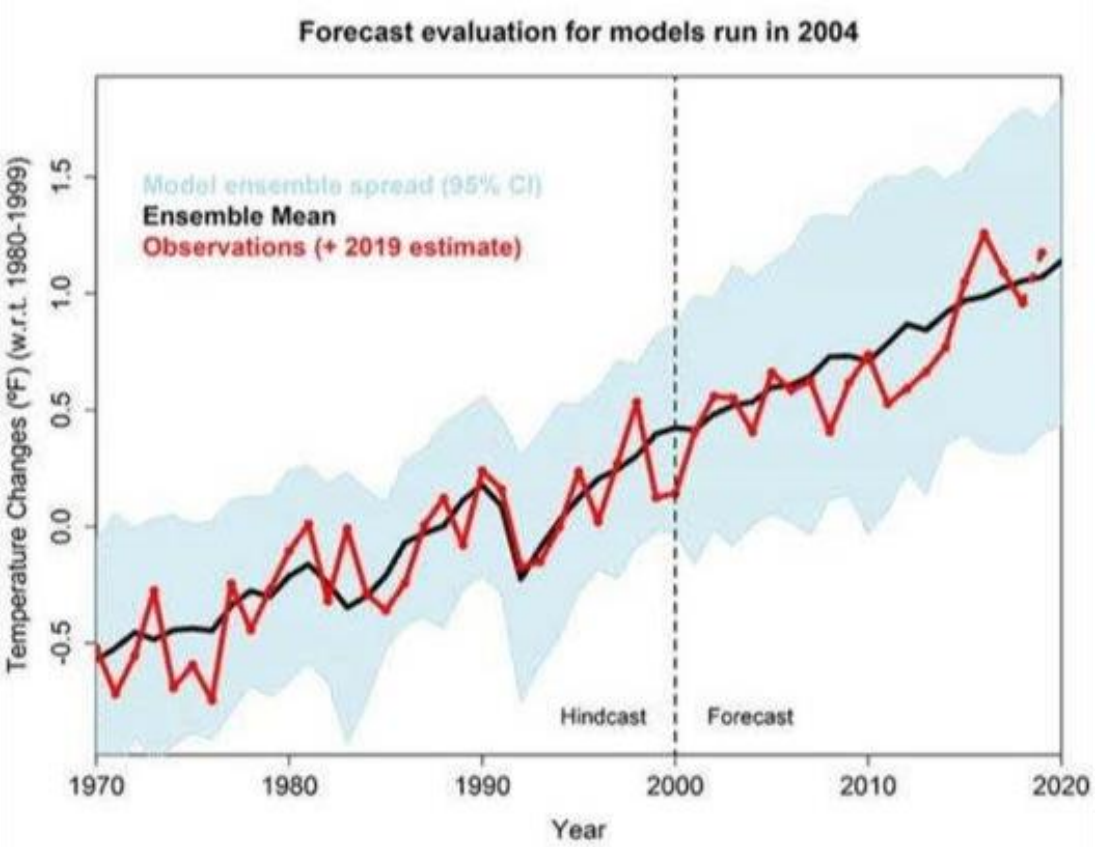

FIGURE 5 NASA 50-YEAR FORECAST VALIDATION FOR TEMPERATURE CHANGES

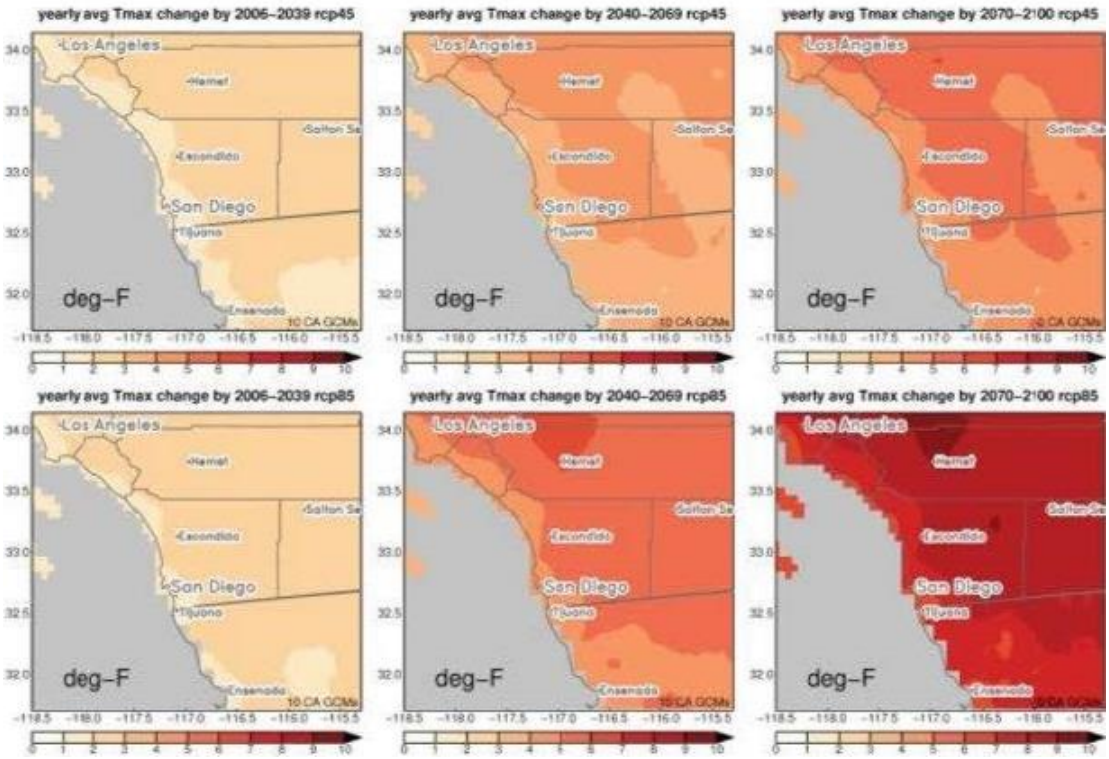

FIGURE 6 SAN DIEGO RCP 4.5 AND 8.5 MAX TEMPERATURE CHANGES

Cal-Adapt provides data for the extreme heat threshold and projected average number of extreme heat days per year under the RCP 4.5 and 8.5 emissions scenarios, as shown in Table 5-5. Observations from 1950 to 1990 were used to establish an extreme heat threshold that was exceeded only 4 to 5 days per year historically. The predictions show a significant increase in the number of extreme heat days in many communities, particularly Escondido, Lakeside, Poway, Valley Center, Ramona and Pauma Valley.

City	Member Agency	Extreme Heat Threshold (°F)	Historical		RCP 4.5	RCP 8.5
			Observed	Model	Model Projections	Model Projections
			1950-1990	1950-1990	2025-2065	2025-2065
Carlsbad	Carlsbad MWD	93.1	4	3	8	11
Del Mar	City of Del Mar	92.1	4	2	8	11
Escondido	City of Escondido Rincon del Diablo Municipal Water District	98.8	4	4	13	17
Fallbrook	Fallbrook Public Utility District Rainbow Municipal Water District	93.3	6	3	11	16
La Mesa	Helix Water District	96.8	4	2	8	11
Lakeside	Lakeside Water District	101.2	4	4	14	18
National City	City of National City	88	4	3	8	10
Oceanside	City of Oceanside	92.6	5	2	7	9
Encinitas	Olivenhain Municipal Water District San Gieguito Water District South Bay Irrigation District	93.3	4	3	9	12
Spring Valley	Otay Water District	94.3	4	2	9	12
Santee	Padre Dam Municipal Water District	99.9	4	2	10	13
Camp Pendelton	Camp Pendelton Marine Corps Base	92	5	2	7	10
Poway	City of Poway	100.5	4	4	14	19
Ramona	Ramona Municipal Water District	101.6	5	5	17	23
San Diego	City of San Diego	89	5	2	6	8
Rancho Santa Fe	Santa Fe Irrigation District	95.9	4	3	10	15
San Marcos	Vallecitos Water District	95.4	5	3	12	16
Valley Center	Valley Center Municipal Water District	96.5	6	5	16	21
Vista	Vista Irrigation District	95.6	4	2	7	9
Pauma Valley	Yuima Municipal Water District	100.8	5	5	22	29

TABLE 11 EXTREME HEAT THRESHOLD EXCEEDANCE DATA

The highest priority mitigation actions to reduce Climate Change impacts on this hazard may include preparation, with revising design standards of equipment and facilities to withstand extreme heat, Heat Illness Prevention Plan, and proper cooling in operator occupied facilities.

5.2.6. EROSION/FLOODING

Nature of Hazard

The Water Authority's Second Aqueduct runs through several creek crossings which are subject to streambed erosion and migration caused by intense flooding and watershed development, which in turn may lead to unbalanced thrusts at bends compromised by streambed erosion and alluvial soils.

Disaster History

The Federal Emergency Management Agency oversees the National Flood Insurance Program and publish Flood Insurance Rate Maps (FIRM) for the coastal, tidal and riverine areas within and around San Diego Water Authority service area. FEMA predicts the 100-year floodplains which are based on historic precipitation and runoff, are used as a regulatory high water for planning and construction of private and public facilities. FEMA also predicts the 500-year floodplain, which is an indicator of potential higher flood levels. Also, the County of San Diego has developed its own flood maps that account for areas of known risk. The County flood maps provide 1% annual chance (100-year) riverine flood elevations for areas beyond those studied by FEMA and are used in conjunction to the FIRM in regulating development. In many areas, the County floodplain maps overlap the FEMA FIRMs and, in these areas, the more stringent of restrictions prevail.

Hazard Impacts

Loss of soil cover caused by flooding can lead to exposure of pipelines to high velocity streamflow as well as unbalanced thrust restraints, potentially impacting structural integrity. In addition, roads can become inundated, below-grade facilities may become submerged temporarily reducing accessibility, electrical feed and components may malfunction due to submergence, water may become contaminated from inadequate seals submerged during flooding, and sediment and silt may deposit build-up at intakes.

Location & Extent/Probability of Occurrence & Magnitude

Erosion occurs near the creek crossings which progress with increased flooding and upstream urbanization. Flood plain maps adopted by the Federal Emergency Management Agency (FEMA) are widely recognized by federal, state, and local jurisdictions as the regulatory requirement for locating buildings and above ground infrastructure above the flood plain. This assessment uses both the 100-year flood plain and 500-year flood plain to identify Water Authority facilities that are within or near flood zones and will be vulnerable to current and future flood risks.

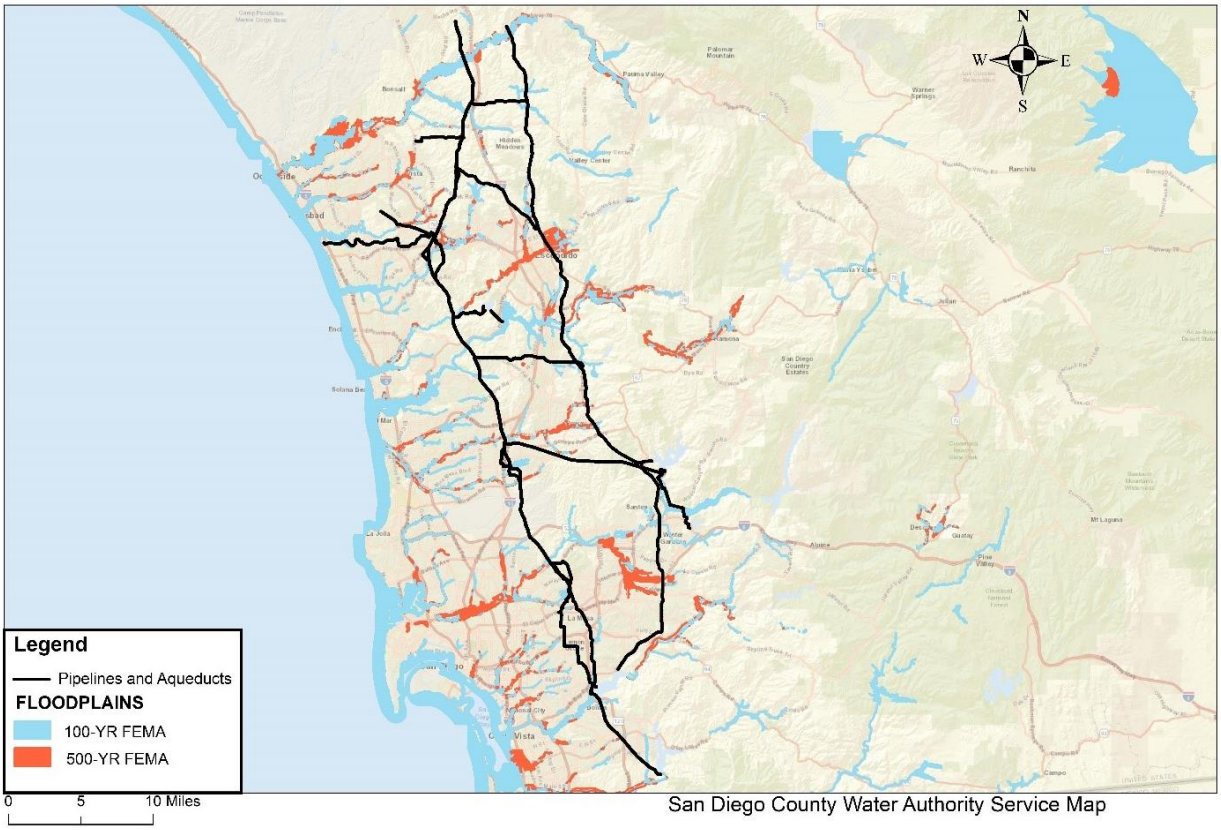

FIGURE 7: MAP OF SAN DIEGO COUNTY WATER AUTHORITY 100-YEAR AND 500-YEAR FLOODPLAINS

High intensity storms will continue to occur on an annual basis in the San Diego County Area, which will increase in the risk of flooding and erosion.

A repetitive loss property is defined by FEMA as an NFIP-insured property that has experienced any of the following since 1978, regardless of any changes in ownership:

- Four or more paid losses more than $1,000
- Two paid losses more than $1,000 within any rolling 10-year period
- Three or more paid losses that equal or exceed the current value of the insured property.

The government has instituted programs encouraging communities to identify and mitigate the causes of repetitive losses. Studies have found that many of these properties are outside any mapped 1 percent annual chance floodplain. The key identifiers for repetitive loss properties are the existence of NFIP insurance policies and claims paid by the policies.

FEMA further designates as severe repetitive loss any NFIP-insured single-family or multi-family residential building for which either of the following is true:

- The building has incurred flood-related damage for which four or more separate claims payments have been made, with the amount of each claim (including building and contents payments) exceeding $5,000, and with the cumulative amount of such claims payments exceeding $20,000

- At least two separate claims payments (building payments only) have been made under NFIP coverage, with the cumulative amount of claims exceeding the market value of the building.

To quality as a severe repetitive loss property, at least two of the claims must be within 10 years of each other, and claims made within 10 days of each other are counted as one claim. In determining SRL status, FEMA considers the loss history since 1978, or from the building's construction if it was built after 1978, regardless of any changes in the ownership of the building.

FEMA-sponsored programs, such as the Community Rating System (CRS), require participating communities to identify repetitive loss areas. A repetitive loss area is the portion of a floodplain holding structures that FEMA has identified as meeting the definition of repetitive loss. Identifying repetitive loss areas helps to identify structures that area at risk but are not on FEMA's list of repetitive loss structures because no flood insurance policy was in force at the time of loss.

Table 5-7 represents property loss due to flood within San Diego County. The Water Authority's service area encompasses all 18 cities and a portion of the unincorporated area within the county, therefore the repetitive loss information, as provided by FEMA, mirrors the County's base plan as shown below.

Jurisdiction	Repetitive Loss Properties	Structure Type	Severe Repetitive Loss Properties	Structure Type	Total Number Mitigated
Carlsbad	1	Nonresidential	0	---	0
Del Mar	15	Residential	0	---	0
Escondido	4	Residential	1	Residential	0
Lemon Grove	0	---	0	---	0
Poway	9	Residential	2	Residential	1
Santee	1	Nonresidential	0	---	0
County of San Diego	20	Nonresidential (4) Residential (15) Commercial (1)	3	Residential (2) Commercial (1)	7
Chula Vista	1	Residential	0	---	0
El Cajon	4	Residential	1	Residential	0
Imperial Beach	4	Residential	0	---	0
National City	3	Nonresidential (2) Commercial (1)	0	---	0
San Diego	47	Nonresidential (11) Residential (27) Commercial (9)	4	Nonresidential (1) Residential (1) Commercial (2)	0
Solana Beach	7	Residential	3	Residential	0
Coronado	1	Residential	0	---	0

Encinitas	2	Residential	0	---	0
La Mesa	2	Residential	0	---	0
Oceanside	13	Nonresidential (5) Residential (6) Commercial (2)	0	---	6
San Marcos	1	Residential	0	---	0
Vista	3	Nonresidential (1) Residential (2)	1	Residential	0
Total	138	---	15	---	14

TABLE 12: REPETITIVE LOSS PROPERTIES DUE TO FLOODS IN SAN DIEGO COUNTY

Climate Change Considerations

High intensity storms driven by climate change can increase erosion and scour of soil cover over time. Figure 2-2 and Figure 2-3 were taken from the Fourth Climate Change Assessment for San Diego and helps illustrate historical wettest days from 1976 –2005 along with future RCP 4.5 and 8.5 wettest days predicted in2070-2100. These projections identify that the Water Authority area that received 1 to 2.5 inches of rain on the wettest day in any 5-year period historically will experience a potential precipitation of 1.5 to 3inches on a wettest day, an increase of 5 to 20%. Mountainous areas east of the Water Authority will experience greater increases of 20-25% under RCP 4.5 and up to 40% under RCP 8.5

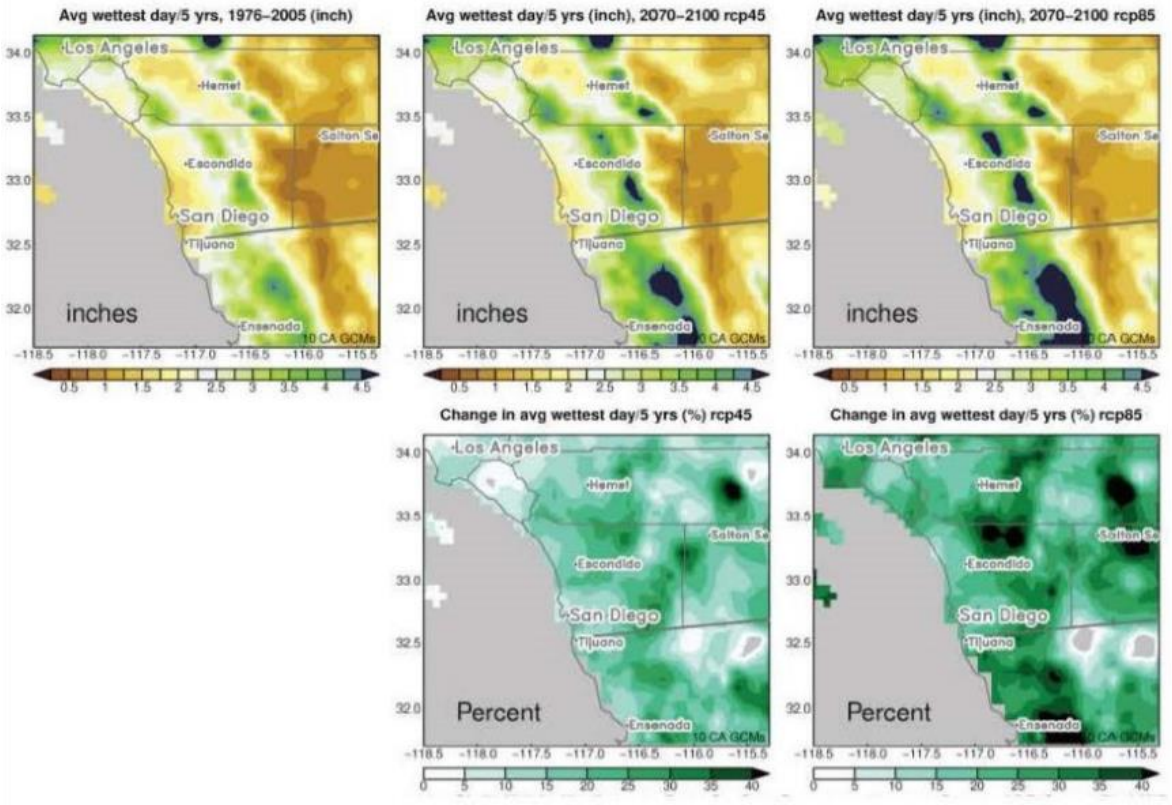

FIGURE 8: WETTEST DAY PROJECTIONS IN SAN DIEGO REGION (HALL 2018)

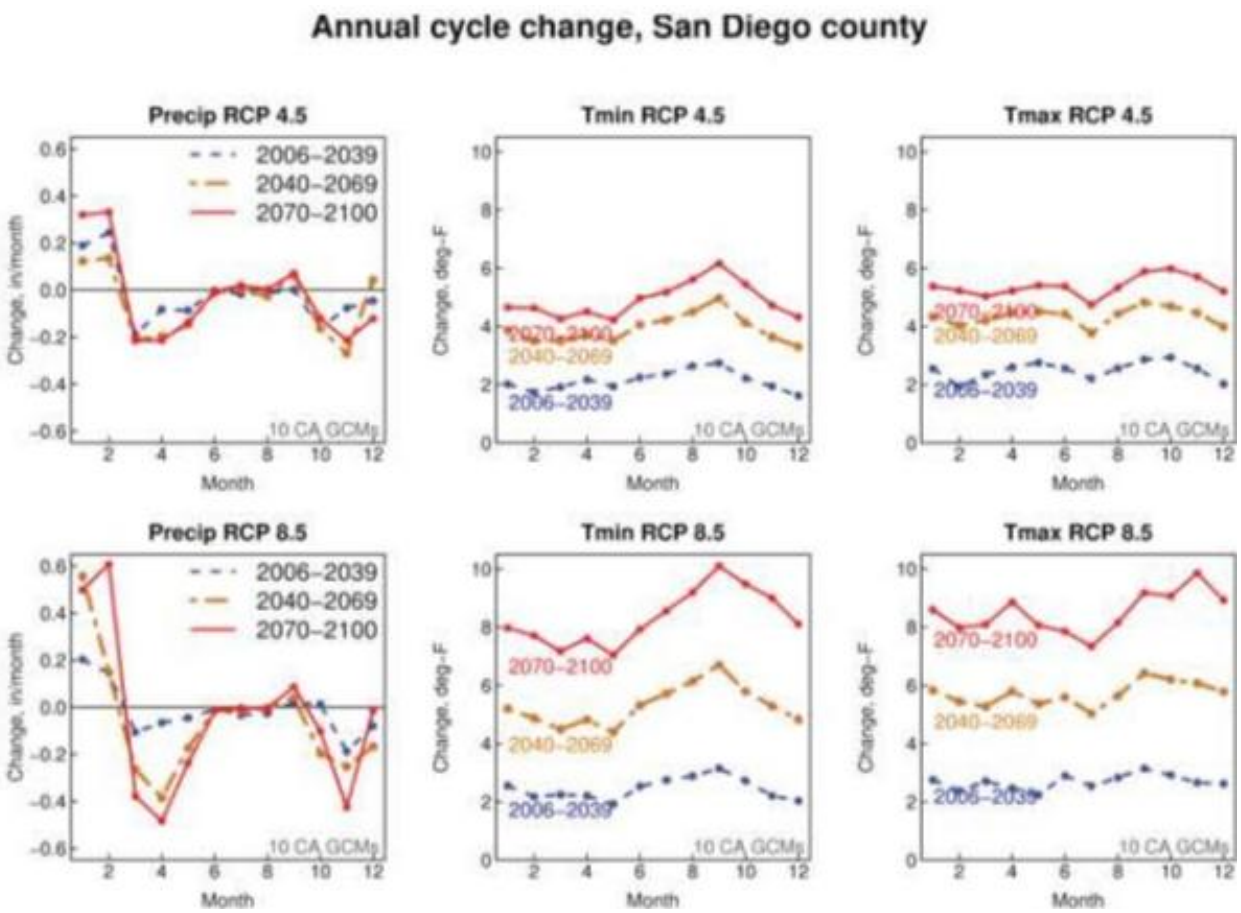

FIGURE 9: HISTORICAL AND PROJECTED MONTHLY PRECIPITATION FOR SAN DIEGO REGION (HALL 2018)

The highest priority mitigation actions to reduce Climate Change impacts on this hazard may include erosion (scour) protection of pipelines that cross streambeds.

5.2.7. HUMAN-CAUSED HAZARDS (TERRORISM & CYBER-TERRORISM)

Nature of the Hazard

Terrorism encompasses intentional, criminal, and malicious acts involving weapons of mass destruction (WMDs) or conventional weapons. WMDs can involve the deployment of chemical, biological, radiological, nuclear, and explosive (CBRNE) weapons. Conventional weapons and techniques include the use of arson, incendiary explosives, armed attacks, intentional hazardous materials release, and cyber-terrorism (attack via computer).

Following serious international and domestic terrorist incidents during the 1990's and early 2000's, citizens across the United States have paid increased attention to the potential for deliberate, harmful terrorist actions by individuals or groups with political, social, cultural, and religious motives. There is no single, universally accepted definition of terrorism, and it can be interpreted in a variety of ways. However, terrorism is defined in the Code of Federal Regulations as "…the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social

objectives" (28 CFR, Section 0.85). The Federal Bureau of Investigation (FBI) further characterizes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization. However, the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences. Terrorists utilize a wide variety of agents and delivery systems.

Disaster History

Terrorism

While San Diego County has not experienced any high-profile attacks by groups or individuals associated with international terrorist organizations, the region has been the site of several incidents with domestic origins. Most notable is the August 1, 2003 arson attack on a mixed-use housing and office development under construction in the University City neighborhood. The blaze, which officials estimate caused around $50 million in damage, was allegedly set by the Earth Liberation Front, a radical environmentalist group.

San Diego has been linked to the 9-11 attacks in New York City and on the Pentagon; two of the confirmed hijackers of the commercial aircraft used in the attacks took flight school lessons while living in San Diego.

San Diego County has received numerous bomb threats to schools, government buildings, religious sites, and commercial facilities over the years. While most bomb threats are hoaxes, authorities have been required to mobilize resources and activate emergency procedures on a regular basis in response.

Other Human-Caused Disasters

On September 25th, 1978, San Diego was the scene of one of the worst air disasters in the United States. A mid-air collision between a Cessna 172 and a Pacific Southwest Airlines (PSA) Boeing 727 caused both planes to crash into the North Park neighborhood below. A total of 144 lives were lost including 7 people on the ground. More than 20 residences were damaged or destroyed.

In 1984, a shooter opened fire in a San Ysidro McDonald's restaurant, killing 21 people. This event was not considered an act of terrorism as no political or social objectives were associated with this event.

In 2019, a shooter opened fire at the Chabad of Poway Synagogue, which killed one person and injured three other people. The same shooter was also linked to a 2019 fire set to the Dar-ul-Arqam Mosque (also known as the Islamic Center of Escondido) in Escondido.[21] The shooter pleaded guilty on July 20, 2021, to murder and multiple charges of attempted murder, with added hate crime classifications in connection with the Chabad of Poway Synagogue shooting and pleaded guilty to a charge of arson in connection with Dar-ul-Arqam Mosque in Escondido. [22]

Hazard Impacts

This hazard's impacts vary according to type, magnitude, location, availability of resources and many other factors that are situationally dependent. Overall, hazard impacts may include, but are not limited to injury, death, environmental/resource impacts, and structure/asset losses.

Location & Extent/Probability of Occurrence & Magnitude

Information related to the probability and magnitude of human-caused hazards is considered sensitive homeland security related information. As a result, this information is provided in a separate confidential document (*Planning Partners, see Attachment A*).

The probability of any human-caused hazard is "Likely", meaning 10 to 90 percent probability of occurrence in the next year or a recurrence interval of 1 to 10 years.

Climate Change Considerations

Not applicable.

5.2.10. WILDFIRE

Nature of Hazard

A wildfire is an uncontrolled fire spreading through vegetative fuels and exposing or possibly consuming structures. They often begin unnoticed and spread quickly. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires.

A wildfire is in a wildland area in which development is essentially nonexistent—except for roads, railroads, power lines and similar facilities. An Urban-Wildland/Urban Interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels. Significant development in San Diego County is located along canyon ridges at the wildland/urban interface. Areas that have experienced prolonged droughts or are excessively dry are at risk of wildfires.

People start more than 80 percent of wildfires, usually as debris burns, arson, or carelessness. Lightning strikes are the next leading cause of wildfires. Wildfire behavior is based on three primary factors: fuel, topography, and weather. The type, and amount of fuel, as well as its burning qualities and level of moisture affect wildfire potential and behavior.

The continuity of fuels, expressed in both horizontal and vertical components is also a determinant of wildfire potential and behavior. Topography is important because it affects the movement of air (and thus the fire) over the ground surface. The slope and shape of terrain can change the speed at which the fire travels, and the ability of firefighters to reach and extinguish the fire. Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity, and wind (both short and long term) affect the severity and duration of wildfires.

San Diego County's topography consists of a semi-arid coastal plain and rolling highlands which, when fueled by shrub overgrowth, occasional Santa Ana winds and high temperatures, creates an ever-present threat of wildland fire. Extreme weather conditions such as high temperature, low

humidity, and/or winds of extraordinary force may cause an ordinary fire to expand into one of massive proportions.

Large fires would have several indirect effects beyond those that a smaller, more localized fire would create. These may include air quality and health issues, road closures, business closures, and others that increase the potential losses that can occur from this hazard. Modeling for a larger type of fire would be difficult, but the consequences of the three largest San Diego fires this century (October, 2003, October 2007 and May 2014) should be used as a guide for fire planning and mitigation.

Disaster History

San Diego County's third worst wildfire in history, known as the Laguna Fire, destroyed thousands of acres in the backcountry in September of 1970. The fire resulted in the loss or destruction of 383 homes and 1,200 other structures.

In October 2003, the second-worst wild-land fire in the history of San Diego County destroyed 332,766 acres of land, 3,239 structures and 17 deaths at a cost of approximately $450M.

San Diego County's worst wildfire occurred in October 2007. At the height of the firestorm there were seven fires burning within the County. The fires destroyed 369,000 acres (13% of the County), 2,670 structures, 239 vehicles, and two commercial properties. There were 10 civilian deaths, 23 civilian injuries and 10 firefighter injuries. The cost of fire exceeded $1.5 billion.

Wildland fires prompted seven (7) Proclaimed States of Emergency, and Urban/Intermix Fires prompted four (4) Proclaimed States of Emergency in the County of San Diego between 1950-2020. The table below lists the most recent major wildfires in San Diego County.

Fire	Date	Acres Burned	Structures Destroyed	Structures Damaged	Deaths
Conejos Fire	July 1950	62,000	Not Available	Not Available	0
Laguna Fire	October 1970	190,000	382	Not Available	5
Harmony Fire (Carlsbad, Elfin Forest, San Marcos)	October 1996	8,600	122	142	1
Viejas Fire	January 2001	10,353	23	6	0
Gavilan Fire (Fallbrook)	February 2002	6,000	43	13	0
Pines Fire (Julian, Ranchita)	July 2002	61,690	45	121	0
Cedar Fire	October 2003	280,278	5,171	63	14
Paradise Fire	October 2003	57,000	415	15	2
Otay Fire	October 2003	46,291	6	0	0
Roblar (Pendleton)	October 2003	8,592	0	0	0
Mataguay Fire*	July 2004	8,867	2	0	0
Horse Fire*	July 2006	16,681	Not Available	Not Available	0
Witch Creek Fire*	October 2007	197,990	1,125	77	2
Harris Fire*	October 2007	90,440	255	12	5
Poomacha Fire*	October 2007	49,410	139	Not Available	0
Ammo Fire*	October 2007	21,004	Not Available	Not Available	0
Rice Fire*	October 2007	9,472	208	Not Available	0

May 2014 San Diego County Wildfires	May 2014	26,000	65	19	0
Border Fire	June 2016	7,609	18	4	2
Valley Fire	September 2020	16,390	66	Not Available	0

** Information gathered from the California Department of Forestry and Fire Protection website*

TABLE 13: MAJOR WILDFIRES IN SAN DIEGO COUNTY LARGER THAN 5,000 ACRES

Hazard Impacts

Hazard impacts can include but are not limited to increased flooding risk over burn scar areas, environmental impacts/damage, air quality impacts, loss of resources such as utilities, asset/structure damage and/or total loss, injury, and death.

Typical wildfire vulnerabilities include wooden roofs, wooden power poles, road closures and public safety power shutoffs (PSPS).

Wildfire also impacts water quality in a watershed. Before a wildfire, a watershed can have healthy ecosystem with stable soil and vegetation. In the after condition, the ash will wash into the reservoir bringing colloidal material into the water and leaving the bare soil vulnerable to rapid runoff. This runoff can affect the water quality of Water Authority's reservoirs in the region, and the ash, sediment, organic material, PFAS in source water can impact treatment processes as well.

Additionally, potential vulnerabilities to Water Authority structures include melting gaskets, melting electrical and instrumentation, embers entering through vents, loss of backup power due to PSPS, and road closures on single ingress and egress routes. Wildfires also caused damage to Water Authority facilities while in construction.

Location & Extent/Probability of Occurrence & Magnitude

The wildfire maps use the California Public Utilities (CPUC) data for fire threat within two tiers: Tier 2 (elevated) and Tier 3 (extreme). The fire threat level is dependent on the likelihood and potential impacts on people and property. The algorithm considers four elements: ignition likelihood, fire growth potential, resource or asset vulnerability and local knowledge of fuel, weather, terrain, and residential and commercial development vulnerability. Facilities in an extreme fire threat area have an increased likelihood of wildfire occurrence and severity. Figure 8 shows the areas in which the Water Authority facilities are located in extreme risk. Portions of the First Aqueduct are in an extreme fire threat area and portions of the Second Aqueduct are in an elevated fire threat area. The San Vicente Pump Station and San Vicente Dam are in an extreme fire threat area. Additionally, several pipelines are located within an extreme fire threat.

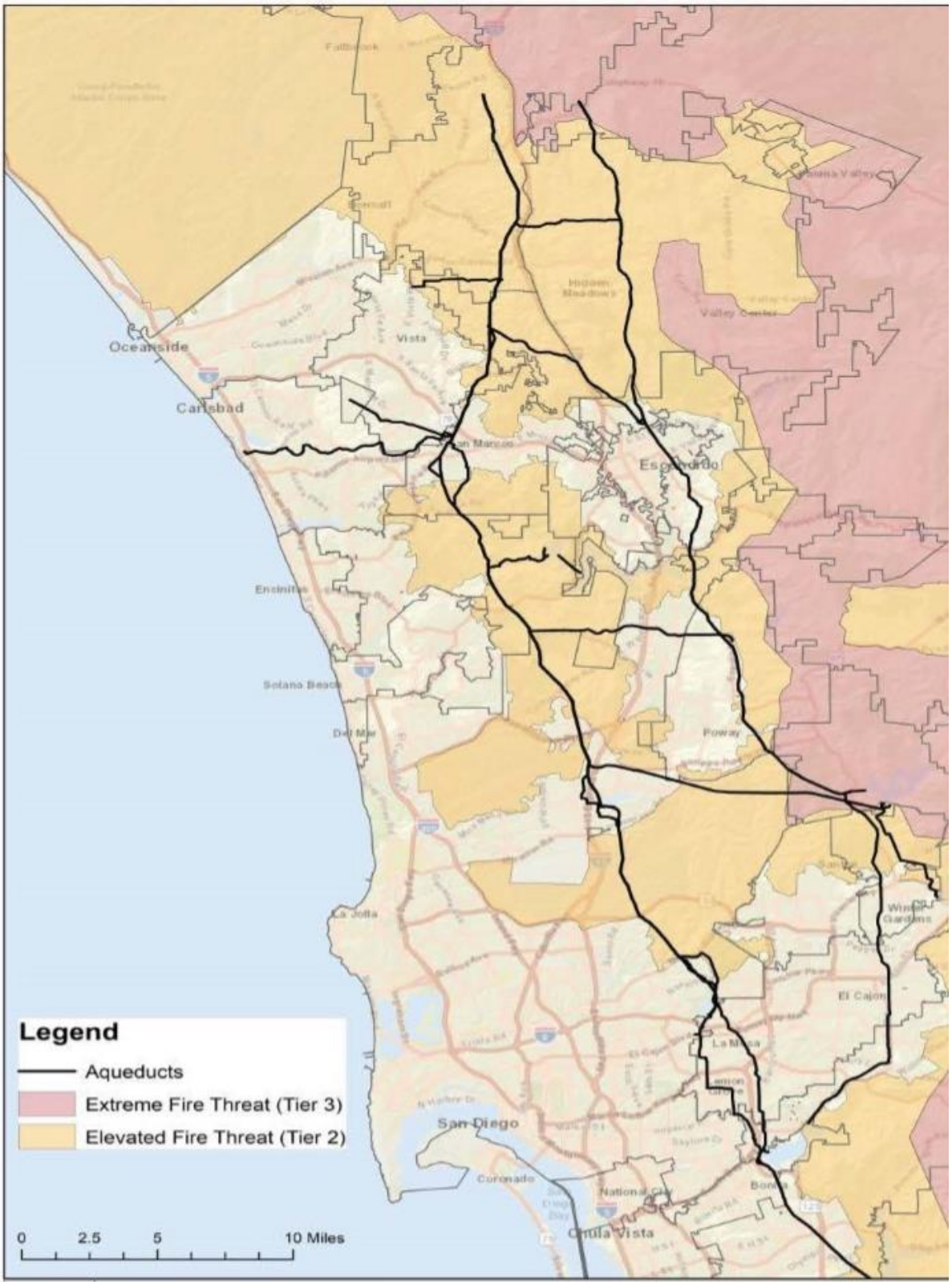

FIGURE 10: CALIFORNIA PUBLIC UTILITIES COMMISSION (CPUC) ELEVATED AND EXTREME FIRE THREAT

Under current climate conditions, the wildfire threat to property, lives, and ecosystems in the San Diego region is very high. With hotter temperatures and possibly fewer rainy days in the coming decades, vegetation could become drier. As a result, it is likely that San Diego region will see an increase in the frequency and intensity of fires, making the region more vulnerable to devastating fires like the ones seen in 2003 and 2007.[28] The fire season could also become longer and less predictable, making firefighting efforts more costly.[29]
From May to October of each year, San Diego County faces a severe wildfire threat. Fires will continue to occur on an almost annual basis in the San Diego County Area, though not all will affect the Water Authority's structures and water system operation. The threat of wildfire and potential losses consistently increase as human development and population increase in the wildland urban interface area in the County. According to the Cal Fire Redbook, there have been 1,113 wildfires recorded for San Diego County between 2015 and 2021. Based on climate and weather in San Diego County and the fuels, topography, past fire history, and the Cal Fire Redbook which indicates an average of 159 wildfires per year, it is likely that wildfires will continue to occur and affect Water Authority infrastructure in the future.

Climate Change Considerations

Using the Cal-Adapt tool, future wildfire risk was projected on Figure 9 to identify the area of land projected to be burned between 2020-2070.Based on this model, facilities in the north region at Rainbow Municipal, Valley Center Municipal, and Vallecitos Water Districts and at Vista Irrigation Districts would be most susceptible to the highest amount of area burned in the event of a wildfire. The Diversion Complex, including the Twin Oaks Valley Water Treatment Plant which is occupied with personnel 24 hours a day and 7 days per week is especially vulnerable throughout 2020-2030 based on these projections and is within this high-risk area. Predictions in 2030-2050 and 2050-2070 are somewhat diminished from 2020-2030 but remain high.

The highest priority mitigation actions to reduce Climate Change impacts on this hazard should include assessing infrastructure fire vulnerability and developing plans to mitigate fire severity and frequency. This may include vegetation control around facilities, ember-proof vents, removal of wooden structures, fire-proofed power poles, redundant access routes, and fire recovery plans. Additional mitigation actions include providing energy resiliency to region through energy resiliency projects and pumped storage projects.

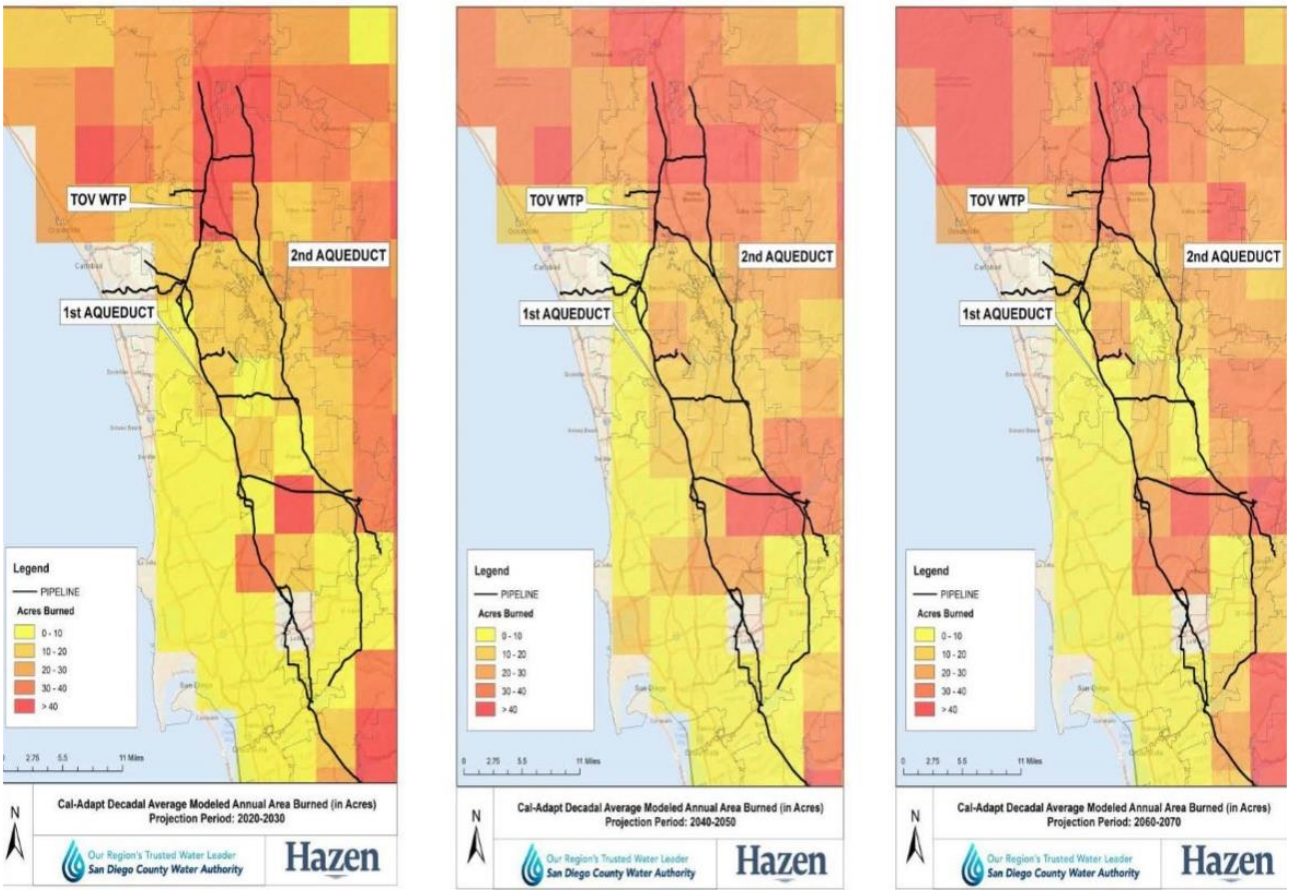

FIGURE 11: CAL ADAPT ANNUAL AREA BURNED PROJECTIONS

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5.3 Potential Hazard Exposure and Loss Estimates

The County of San Diego reviewed a set of jurisdictional-level hazard maps and data including detailed critical facility information and localized potential hazard exposure/loss estimates related to residential, commercial, and critical asset/facilities to identify the top hazards threatening the geographic area where the Water Authority provides service. The Water Authority has summarized these potential hazard exposure/loss estimates in Tables 5-9 and 5-10.

	Residential			Commercial		Critical Facilities	
Hazard Type	Exposed Population	Number of Residential Buildings	Potential Exposure Loss for Residential Buildings (x$1,000)	Number of Commercial Buildings	Potential Exposure Loss for Commercial Buildings (x$1,000)	Number of Critical Facilities	Potential Exposure for Critical Facilities (x$1,000)
Coastal Storm	23,659	30	$11,658	5	$1,512	1	$719,793
Sea Level Rise							
Coastal Flooding	9,452	540	$209,844	153	$46,260	38	$988,091
Mean Higher High Water	12,250	416	$161,658	102	$30,840	27	$882,763
Dam Failure	234,032	76,679	$29,797,459	8,983	$2,716,010	689	$12,273,472
Earthquake (Loss)							
(Annualized Loss - Includes shaking, liquefaction, and landslide components)	32,161	15,665	$9,029,249	9,631	$4,142,044	0	0
100 Year	0	0	0	0	0	0	0
500 Year	501,096	138,019	$53,634,183	377	$14,536,191	0	0
Rose Canyon M6.9 Scenario	1,926,720	454,167	$176,443,880	55,724	$16,848,151	1,881	$72,992,859
Floods (Loss)							
100 Year	101,369	16,590	$6,446,874	2,397	$724,733	415	$5,088,987
500 Year	221,421	56,606	$21,997,092	5,880	$1,777,818	617	$10,061,980
Rain-Induced Landslide							

High Risk	68,465	5,076	$1,972,026	270	$81,635	20	$562,318
Moderate Risk	115,920	103,190	$40,089,315	6,267	$1,894,827	428	$17,312,904
Tsunami	58,040	7,799	$3,030,691	956	$289,047	48	$1,009,117
Wildfire/Structure Fire							
High Fire Hazard	224,927	55,177	$21,436,265	3,591	$1,085,739	180	$7,810,353
Very High Fire Hazard	791,081	203,245	$78,981,007	8,821	$2,667,029	808	$56,268,349

TABLE 14: SUMMARY OF POTENTIAL HAZARD-RELATED EXPOSURE/LOSS FOR SAN DIEGO COUNTY WATER AUTHORITY

Hazard Type	Data	HWY	OIL GAS	RR	TOTAL
Coastal Storm	Total KMs	0.729	0.033	0.059	0.821
	Exposure (x$1,000)	$4,860	$22	$89	$4,970
Sea Level Rise					
Coastal Flooding	Total KMs	54.741	15.172	21.668	91.581
	Exposure (x$1,000)	$365,016	$10,363	$32,502	$407,880
Mean Higher High Water	Total KMs	28.966	10.973	2.632	42.571
	Exposure (x$1,000)	$193,145	$7,495	$3,948	$204,588
Dam Failure	Total KMs	1,510.603	114.515	77.412	1,702.530
	Exposure (x$1,000)	$10,072,703	$78,214	$116,118	$10,267,035
Earthquake (Loss)					
100 Year	Total KMs	0	0	0	0
	Exposure (x$1,000)	0	0	0	0
500 Year	Number	1251.115	129.084	43.553	1423.751
	Exposure (x$1,000)	$8,342,432	$88,164	$65,329	$8,495,926

Flood (Loss)					
100 Year	Total KMs	426.323	63.348	52.831	542.502
	Exposure (x$1,000)	$2,842,718	$43,266	$79,247	$ 2,965,232
500 Year	Total KMs	859.413	89.494	93.734	1042.641
	Exposure (x$1,000)	$5,730,566	$61,124	$140,601	$5,932,291
Rain-Induced Landslide					
High Risk	Total KMs	37.211	6.195	0	43.407
	Exposure (x$1,000)	0	$4,231	0	$4,231
Moderate Risk	Total KMs	1033.036	179.271	58.319	1270.627
	Exposure (x$1,000)	$6,888,284	$122,442	$87,479	$7,098,205
Tsunami	Total KMs	48.984	15.644	18.888	83.515
	Exposure (x$1,000)	$326,623	$10,685	$28,331	$365,639
Wildfire/Structure Fire					
High Fire Hazard	Total KMs	682.940	119.342	0	802.282
	Exposure (x$1,000)	$4,553,847	$81,510	0	$4,635,357
Very High Fire Hazard	Total KMs	3,315.672	292.340	88.925	3,696.938
	Exposure (x$1,000)	$22,108,904	$199,668	$133,388	$22,441,960
Total Number		9,249.734	1,035.412	458.021	10,743.166
Total Exposure (x $1,000)		$61,429,098	$707,186	$687,031	$62,823,315

TABLE 15: INVENTORY EXPOSURE FOR INFRASTRUCTURE FOR SAN DIEGO COUNTY WATER AUTHORITY

6. SECTION SIX: Develop a Mitigation Strategy

The mitigation strategy serves as the long-term blueprint for reducing potential losses identified in the risk assessment. The mitigation strategy describes how the Water Authority will accomplish the overall purpose, or mission, of the planning process.

The mitigation strategy is made up of three main required components: mitigation goals, mitigation actions, and an action plan for implementation. These provide the framework to identify, prioritize, and implement actions to reduce risk to hazards.

Mitigation goals are general guidelines that explain what the Water Authority wants to achieve with the plan. They are usually broad policy-type statements that are long-term, and they represent visions for reducing or avoiding losses from the identified hazards.

Mitigation actions are specific projects and activities that help achieve the goals.

The action plan describes how the mitigation actions will be implemented, including how those actions will be prioritized, administered, and incorporated into the Water Authority's existing planning mechanisms.

6.1. Mitigation Action Evaluation

The Water Authority used FEMA Worksheet 6.1 to help evaluate and prioritize each mitigation action being considered by the planning team. For each action, potential benefits and/or likelihood of successful implementation were evaluated using the criteria defined below.

Rank each of the criteria with a -1, 0 or 1 using the following scale:

- 1 = Highly effective or feasible
- 0 = Neutral
- -1 = Ineffective or not feasible

Example Evaluation Criteria:

- **Life Safety** – How effective will the action be at protecting lives and preventing injuries?
- **Property Protection** – How significant will the action be at eliminating or reducing damage to structures and infrastructure?
- **Technical** – Is the mitigation action technically feasible? Is it a long-term solution? Eliminate actions that, from a technical standpoint, will not meet the goals.
- **Political** – Is there overall public support for the mitigation action? Is there the political will to support it?
- **Legal** – Does the community have the authority to implement the action?

- **Environmental** – What are the potential environmental impacts of the action? Will it comply with environmental regulations?
- **Social** – Will the proposed action adversely affect one segment of the population? Will the action disrupt established neighborhoods, break up voting districts, or cause the relocation of lower income people?
- **Administrative** – Does the community have the personnel and administrative capabilities to implement the action and maintain it or will outside help be necessary?
- **Local Champion** – Is there a strong advocate for the action or project among local departments and agencies that will support the action's implementation?
- **Other Community Objectives** – Does the action advance other community objectives, such as capital improvements, economic development, environmental quality, or open space preservation? Does it support the policies of the comprehensive plan?

Mitigation Action	Life Safety	Property Protection	Technical	Political	Legal	Environmental	Social	Administrative	Local Champion	Other Community Objectives	Total Score
Local Plans and Regulations											
Action 1: Complete the 2023 Water Facilities Master Plan supporting a diverse water supply portfolio for the region and highlight water infrastructure planning recommendations to address near-term and long-term challenges.											
	1	1	1	1	1	1	0	1	1	1	9
Structure and Infrastructure Projects											
Action 2: Complete the design and construction to retrofit and harden aqueduct appurtenance structures found to have seismic and structural deficiencies to minimize the potential for disruption of water delivery.											
	1	1	1	1	1	1	0	1	1	1	9
Action 3: Complete the design and construction to retrofit the eight high priority flow control facilities with seismic deficiencies to minimize the potential for disruption of water delivery.											
	1	1	1	1	1	1	0	1	1	1	9
Action 4: Complete the erosion and seismic protection of high priority pipeline crossing streambed and seismically vulnerable areas to maintain a continuous, uninterrupted supply of water to San Diego County.											
	1	1	1	1	1	1	0	1	1	1	9
Action 5: Identify, purchase, and develop a site for a new operations and maintenance facility to increase operational resiliency and continuity of operations.											
	1	1	1	1	1	1	0	1	1	0	8
Action 6: Complete an energy resiliency study to identify recommend improvements to mitigate loss of power resulting from Public Safety Power Shutoffs driven by wildfire mitigation and grid outages due to extreme heat events.											
	0	0	1	1	1	1	0	1	1	0	6
Action 7: Identify improvements and measures to enhance cybersecurity protection of the business and industrial control systems from evolving cybersecurity threats and vulnerabilities.											
	0	1	1	1	1	1	0	1	1	0	7

TABLE 16: FEMA LOCAL MITIGATION PLANNING HANDBOOK WORKSHEET 6.1 DATA.

6.2 Mitigation Action

A mitigation action is a specific action, project, activity, or process taken to reduce or eliminate long-term risk to people and property from hazards and their impacts. Implementing mitigation actions helps achieve the plan's mission and goals. The actions to reduce vulnerability to threats and hazards form the core of the plan and are a key outcome of the planning process.

The Water Authority's primary goal is to maintain a safe and reliable water supply to the residents of San Diego County through continuity of operations and resilient infrastructure and water supplies. Each of the mitigation actions below has been identified as supporting this goal. Progress towards completion will be tracked as part of the Capital Improvement Program monitoring. Modifications to scope and schedule will be made and documented as warranted over the course of project execution. The FEMA benefit cost analysis tool is used to comply with requirements for projects proposed for FEMA grant funding.

For more information on potential funding sources and grants for mitigation actions, please see the County of San Diego Multi-jurisdictional Hazard Mitigation Base Plan, Section 6.2.

- Action 1: Complete the 2023 Water Facilities Master Plan supporting a diverse water supply portfolio for the region and highlight water infrastructure planning recommendations to address near-term and long-term challenges.
    - Department(s): Water Resources, Engineering, and Operations & Maintenance
    - Potential Funding Source: Capital Improvement Program funds
    - Implementation Timeline: begins February 2022 and ends April 2024
    - Hazard Mitigation for Climate Change and Drought

- Action 2: Complete the design and construction to retrofit and harden aqueduct appurtenance structures found to have seismic and structural deficiencies to minimize the potential for disruption of water delivery.
    - Department(s): Engineering and Operations & Maintenance
    - Potential Funding Source: Capital Improvement Program funds/Grant Funds
    - Implementation Timeline: July 2019 (planning) to February 2027 (complete construction)
    - Hazard Mitigation for Earthquake

- Action 3: Complete the design and construction to retrofit the eight high priority flow control facilities with seismic deficiencies to minimize the potential for disruption of water delivery.
    - Department(s): Engineering and Operations & Maintenance
    - Potential Funding Source: Capital Improvement Program funds/Grant funds
    - Implementation Timeline: September 2021 to December 2031

- Hazard Mitigation for Earthquake

❖ Action 4: Complete the design and permitting phase for erosion (scour) and seismic protection of high priority pipeline crossing streambed and seismically vulnerable areas including but not limited to Moosa Canyon, to maintain a continuous, uninterrupted supply of water to San Diego County.

- Department(s): Engineering and Operations & Maintenance
- Potential Funding Source: Capital Improvement Program funds/Grant funds
- Implementation Timeline: March 2020 (planning) to August 2027 (complete construction)
- Hazard Mitigation for Erosion, Climate Change, and Earthquake

❖ Action 5: Identify, purchase and develop a site for a new operations and maintenance facility to increase operational resiliency and continuity of operations.

- Department(s): Engineering and Operations & Maintenance
- Potential Funding Source: Capital Improvement Program funds/Grant funds
- Implementation Timeline: Beginning July 2021 with estimated completion by December 2029
- Hazard Mitigation for Terrorism/Cyber Terrorism and Flood

❖ Action 6: Complete an energy resiliency study to identify recommended improvements to mitigate loss of power resulting from Public Safety Power Shutoffs driven by wildfire mitigation and grid outages due to extreme heat events.

- Department(s): Engineering
- Potential Funding Source: Capital Improvement Program funds/Grant funds
- Implementation Timeline: June 2022 to June 2029
- Hazard Mitigation for Wildfire, Extreme Heat and Climate Change

❖ Action 7: Identify improvements and measures to enhance cybersecurity protection of the business and industrial control systems from evolving cybersecurity threats and vulnerabilities.

- Department(s): Administrative Services and Operations & Maintenance
- Potential Funding Source: Capital Improvement Program funds, Operating Funds, Grant funds
- Implementation Timeline: Beginning in 2022 with completion by June 2028
- Hazard Mitigation for Terrorism/Cyber Terrorism

6.3 Mitigation Action Planning

There are multiple ways that projects (mitigation actions) can be evaluated, resourced, and prioritized for implementation. The most typical is the bi-annual budget development process, which incorporates a staff evaluation period, documentation in the General Manager's Recommended Budget, and review and approval by the Water Authority's Board of Directors. Another path is seeking grants as they become available. Grant projects may be incorporated into the regular budgeting process or may be approved separately. Prior to inclusion in the budget, projects may be included in planning documents such as the Business Plan, Master Plan, etc. Projects that are incorporated into the budget are tracked regularly to document progress towards completion.

7. SECTION SEVEN: Keep the Plan Current

Hazard Mitigation Plan maintenance is the process the planning team establishes to track the plan's implementation progress and to inform the plan update. The plan must include a description of the method and schedule for monitoring, evaluating, and updating it within a 5-year cycle. These procedures help to:

- Ensure that the mitigation strategy is implemented according to the plan.
- Provide the foundation for an ongoing mitigation program in your community.
- Standardize long-term monitoring of hazard-related activities.
- Integrate mitigation principles into community officials' daily job responsibilities and department roles.
- Maintain momentum through continued engagement and accountability in the plan's progress.

Hazard Mitigation Plan updates provide the opportunity to consider how well the procedures established in the previously approved plan worked and revise them as needed. This annex is part of the most recent *San Diego County Multi-Jurisdictional Hazard Mitigation Plan* update.

The plan was last updated in 2018. See the *San Diego County Multi-Jurisdictional Hazard Mitigation Base Plan* for more information, including County development.

7.1. Mitigation Action Progress

Plan monitoring means tracking the implementation of the plan over time. The plan must identify how, when, and by whom the plan will be monitored.

The San Diego County Water Authority's mitigation actions are new for this plan. Each of the mitigation actions has been established as a project under the Water Authority's Capital Improvement Program. Project managers are responsible for tracking and reporting progress towards completion to executive management at the Water Authority bi-annually as part of the budgeting process or whenever there are significant changes to planned execution. The Water Authority's Hazard Mitigation Planning Lead will be responsible for preparing summary status updates to report progress to the County Office of Emergency Services when developing subsequent updates to the Hazard Mitigation Plan.

7.2. Plan Update Evaluation

The Water Authority will maintain a Hazard Mitigation Planning team consisting of a Hazard Mitigation Planning Lead, Mitigation Action project managers, executive management advisers, and other subject matter experts to monitor progress of the planned mitigation actions, evaluate new projects for inclusion in subsequent plans. The San Diego County Water Authority plans to meet bi-annually or as needed to discuss overall implementation and progress of action items, discuss new hazard mitigation issues and requirements, develop a critical path schedule, and

revise and resubmit an updated report as needed. Additionally, the Water Authority will consider current and future mitigation actions in our 2025 Risk and Resilience Plan update as required by the America's Water Infrastructure Act (AWIA). Finally, the Water Authority will follow applicable recommendations from the County when completing subsequent hazard mitigation plan updates.