

Appendix A
Gap Analysis

DRAFT



American River Watershed Gap Analysis Memorandum

Date:	2/27/2024	Jacobs Engineering Inc.
Project name:	American River Basin Watershed Resilience Plan	2485 Natomas Park Drive
Attention:	Ryan Ojakain, Jim Peifer, Trevor Joseph	Suite 600
Client:	Regional Watershed Authority	Sacramento, CA 95833-2937
Prepared by:	Vijay Kesavan	United States
Reviewed by:	Tapash Das, Ibrahim Khadam	T +1.916.920.0300
Version:	Public Release Draft	F +1.916.920.8463
		www.jacobs.com

1. Purpose and Scope

The American River Watershed Resilience Pilot (ARWRP) project aims to assess and enhance the resilience of the ARW in California and develop a watershed resilience plan. The gap analysis for the ARWRP project serves as a foundation for understanding the current state of knowledge and identifying areas where additional information or research is needed in delivering a multisectoral resilience assessment of the American River Watershed (ARW). This gap analysis supports several key tasks outlined in the project's scope of work, including the compilation of existing climate vulnerability assessments, preparation of an updated historical watershed water budget, and development of adaptation and implementation strategies. It aims to highlight areas where additional work is needed to enhance the region's resilience to climate impacts, with a specific focus on informing the existing climate change vulnerability planning and modeling analysis in the American River Basin region. The table in Attachment 1 provides a full list of reports and studies assessed in this effort.

2. Study Area

The proposed study area encompasses the entire American River, Cosumnes River, and Bear River watersheds, as well as eastside tributaries of the Feather River and Sacramento River between the Bear River mouth and Mokelumne River mouth; it also includes the City of West Sacramento. The studies reviewed encompass all or part of the proposed study area. Detailed discussion about the study area is available in the Watershed Delineation Task Memo.

3. Methodology

The gap analysis drew upon a diverse array of key studies. Approximately 70 reports and studies were assessed as part of this process and were organized broadly into the categories of assessment they support, as presented in Attachment 1. The methodology involved includes the following:

1. Research and inventory: Compiling studies and reports on the ARW, including surrounding areas (such as the Cosumnes and Sacramento River watersheds)
2. Organization: Sorting studies by water sector, category, and geographic study area
3. In-depth review: Conducting detailed analyses of studies most relevant to the project scope

4. Task-by-task alignment: Mapping each of these resources as sources of information to support the project scope, particularly the technical analysis components

3.1 Key Documents Reviewed

Key document types reviewed include the following:

- Groundwater Sustainability Plans (GSPs)
- Local Hazard Mitigation Plans
- Urban Water Management Plans
- Integrated Regional Water Management Plans
- Central Valley Flood Protection Plan (CVFPP)
- Sacramento and San Joaquin Rivers Basin Study

Other documents and efforts reviewed for this project are summarized in the following paragraphs.

The *2025 SAFCA Executive Director Report* is a comprehensive update on the Sacramento Area Flood Control Agency's (SAFCA's) progress towards achieving Urban Level of Flood Protection (ULOP) by 2025. This report details the current status of flood protection projects; provides updated timelines and budgets; and addresses any challenges or changes to the original plans. It serves as a crucial tool for stakeholders to assess SAFCA's advancement in meeting the 2025 ULOP deadline and verifying the safety of Sacramento's urban areas from flood risks.

The *2024 Urban Level of Protection Progress Report* is an annual document required by California Government Code to demonstrate SAFCA's ongoing efforts in improving flood protection. This report outlines updates on the construction of critical flood system features; documents the appropriation and expenditure of at least 90% of scheduled revenues; and explains any delays in project completion. It serves as a transparent account of SAFCA's yearly advancements towards achieving ULOP by 2025, providing crucial information for policymakers and the public.

The *2016 SAFCA Comprehensive Flood Plan* is a foundational document outlining SAFCA's strategy to achieve Urban Level of Flood Protection by 2025. This plan details the scope of flood protection projects; provides cost estimates and funding sources; establishes an implementation schedule; and outlines flood risk reduction strategies. It serves as the baseline for SAFCA's long-term flood protection efforts, guiding the agency's actions and investments to enhance Sacramento's resilience against potential flood events.

The *North American Basin Regional Drought Contingency Plan (RDCP)* is a comprehensive planning document developed to enhance drought resilience in the Sacramento region. This plan builds upon existing regional efforts, including the Sacramento Water Forum Agreement, and addresses vulnerabilities revealed during the severe drought from 2012 to 2017. It serves as a strategic guide for improving water supply reliability and environmental protection in the face of future climate change and drought conditions.

The *Regional Water Reliability Plan (RWRP)* serves as a key planning document to guide water reliability efforts for water management in the Sacramento region. Developed by the Regional Water Authority (RWA) and its member agencies, it aims to improve the overall reliability of the region's water supplies and systems. Its region-specific analysis and recommendations make it an essential reference for any major water projects or planning in the area.

The *American River Basin Study Interior Region 10—California Great Basin (ARBS)* (refer to Attachment 1) serves as a key planning document to guide climate adaptation efforts for water management in the ARW that supplies water to the Sacramento region and beyond. Its basin-specific projections and adaptation strategies make it an essential reference for any major water projects or planning in the American River Basin.

The California Department of Water Resources' (DWR's) *California Watershed Resilience Assessment* (refer to Attachment 1) offers a watershed-scale approach to water management challenges and was prepared as part of DWR's Watershed Resilience Program. Its recent completion and focus on watershed resilience align closely with the goals of the ARW Resilience Pilot project, providing up-to-date methodologies for assessing and enhancing resilience in the face of climate change.

Modeling completed for the Regional Water Authority (RWA) CalSim–CoSANA Integration for Sacramento Regional Water Bank integrates regional water banking operations into broader water system modeling, providing valuable information on groundwater-surface water interactions and regional water management strategies.¹

The 2022 *Central Valley Flood Protection Plan Update* (refer to Attachment 1) presents comprehensive flood management strategies for the Central Valley, including the American River Basin. It focuses on climate resilience, performance tracking, and alignment with other state efforts.

The US Department of the Interior's Bureau of Reclamation (Reclamation's) *Sacramento and San Joaquin Rivers Basin Study* (refer to Attachment 1) provides a basin-wide assessment of climate change impacts on water resources, including detailed projections of changes in runoff, water temperature, and reservoir operations. Its comprehensive approach and focus on the Sacramento and San Joaquin basins offer valuable context for understanding the broader regional water system dynamics that affect the ARW.

Reclamation and DWR's *Long-term Operation of the Central Valley Project and State Water Project* (refer to Attachment 1) is an ongoing consultation process resulting in a new biological opinion expected in 2024, providing updated information on operational constraints and environmental requirements affecting water management in the Central Valley.

The US Army Corps of Engineers' *American River Watershed Common Features 2016 Project* (Attachment 1) is a project focusing on reconstructing the levee system and increasing the capacity of the Lower American River Channel to handle larger flood flows, with expected completion between 2024 and 2026 for various components.

3.2 Primary Technical Tasks for the American River Watershed Resilience Plan

In addition to a broad review of the existing studies and reports, each of these items was reviewed with respect to its ability to support specific tasks associated with the development of the American River Watershed (RWA) resilience plan. The primary technical tasks that studies were mapped to are as follows:

- Assess climate vulnerability and state of watershed.
- Assess climate vulnerabilities and risks.
- Develop adaptation strategies.
- Develop a performance tracking strategy.

These tasks represent key elements of the watershed resilience plan scope of work.

¹ CalSim is a water resources planning model that simulates the operations of California's water projects and infrastructure, and Cosumnes, South American, and North American (CoSANA) is an integrated water resources model that uses the Integrated Water Flow Model.

3.3 Gap Analysis Limitations

While the American River Basin Study and related documents provide a comprehensive assessment of water management challenges and potential solutions in the American River Basin, it is important to acknowledge certain limitations. Future projections, especially those related to climate change and long-term water demand, inherently involve uncertainty. Adaptation strategies, in general, do not cover the breadth of the water resource sectors included in the current scope and most identified adaptation strategies would require more detailed feasibility studies before implementation. In addition, these studies represent a snapshot in time; they may not fully account for very recent developments or policy changes that could impact water management in the region. Many studies were conducted 10 to 15 years ago, potentially limiting their ability to capture current watershed conditions.

4. Summary of Gap Analysis Findings

Table 1 summarizes a review of existing studies, reports, and data for the American River Basin. The following is an overview of some key studies that will be leveraged to support project technical tasks. Table 2 lists these studies by the sectors that they support.

4.1 Assess Climate Vulnerability and State of Watershed

The following list summarizes an overview of the key studies that informed our understanding of climate vulnerabilities in the American River watershed:

- Existing vulnerability assessments, such as those in the ARBS, DWR California Watershed Resilience Assessment, and California's Fourth Climate Change Assessment (refer to Attachment 1), provide a strong foundation but may not fully address all sectors or geographic areas in the expanded study boundary.
- More detailed vulnerability assessments are needed for the Cosumnes River watershed and West Sacramento.
- Assessments of climate impacts on groundwater resources and ecosystems may require updating or expansion for the entire study area.
- While water supply and flood management are well-covered, gaps exist in comprehensive assessments for ecosystems, water quality, and recreation sectors. Gaps also exist for comprehensive wildfire risk and impact assessments for the entire expanded study area, particularly for the following:
 - The Cosumnes River watershed
 - The north slope of the Bear watershed
 - Analysis of potential cascading effects of wildfires on water resources across the entire watershed
 - Integration of wildfire risk into vulnerability assessments and adaptation strategies for all sectors
- The following are equity considerations:
 - Identify and map frontline and Tribal communities across the entire expanded study area.
 - Assess how climate vulnerabilities disproportionately affect low-income and minority populations.
 - Evaluate the adaptive capacity of vulnerable communities to respond to climate impacts.

4.2 Assess Climate Vulnerabilities and Risks

This list summarizes the historical water budget data that exist for much of the ARW. Gaps may exist in data for the Cosumnes River watershed and newly included areas.

- An integrated water resources model of the CoSANA groundwater subbasins that simulates detailed surface water and groundwater budgets for the Cosumnes, South and North American basin may be useful for this purpose.
- Updated data accounting for recent changes in land use, water management practices, and climate patterns is required for a comprehensive water budget.
- Equity considerations are limited in prior work, specifically in the following areas:
 - Water access and affordability issues for disadvantaged communities
 - Analysis of how historical water management practices have impacted different socioeconomic groups
 - Evaluation of the distribution of water resources and infrastructure across communities

4.3 Develop Adaptation Strategies

This list summarizes an overview of the reports and key studies that include the development of adaptation strategies for the project study area:

- Existing adaptation strategies, such as those outlined in the ARBS, *DWR Watershed Resilience Framework and Toolkit — A Guide to Accelerate Resiliency in California's Watersheds*, *Sacramento and San Joaquin Rivers Basin Study*, *El Dorado Water Agency's Upper American Watershed Programmatic Plan*, and the CVFPP (refer to Attachment 1) provide a good starting point but may not cover all sectors or geographic areas in the expanded study boundary.
- There is a need for adaptation strategies specific to the Cosumnes River watershed and West Sacramento.
- Cross-sectoral and multi-benefit adaptation options that address multiple vulnerabilities simultaneously should be developed.

4.4 Develop Implementation Strategies

This list summarizes an overview of the reports and key studies that include the development of implementation strategies for the project study area:

- Most adaptation strategies identified in existing reports lack implementation approaches to move them from concepts to actual projects.
- While some implementation strategies exist, more detailed feasibility assessments (such as technical, financial, and regulatory) are needed for proposed adaptation strategies across the entire study area.
- Information on funding sources, regulatory requirements, and institutional capacities may be lacking for newly included areas.

4.5 Develop Performance Tracking Strategy

This list summarizes an overview of the reports and key studies that include the development of performance tracking strategies for the project study area:

- Existing monitoring and evaluation metrics may not cover the entire expanded study area.
- Standardized metrics (that can be applied consistently across diverse subwatersheds and jurisdictions) are needed.
- The development of more comprehensive vulnerability metrics and thresholds for all major water sectors, particularly for ecosystems, water quality, and recreation is needed.
- Baseline data for performance indicators may be lacking, especially for newly included areas, such as the Cosumnes River watershed and West Sacramento.

4.6 Gap Analysis Summary

Table 1 summarizes gap analysis findings by primary technical tasks. Table 1 shows information available for each task and the main information gaps that will need to be filled in the watershed resilience plan. Table 2 is an overview of the existing studies by the water sector.

DRAFT

Table 1. Summary of Gap Analysis Findings

Task	Information Available	Information Gaps
Assess climate vulnerability and state of watershed	<ul style="list-style-type: none"> ▪ Climate change impact assessments for the American River Basin ▪ Vulnerability assessments for water supply, environmental needs, and flood management ▪ Flood risk assessments for the lower watershed areas ▪ Historical, current conditions, and future with climate change (2040) detailed surface water and groundwater budgets ▪ Regional context for water management and climate vulnerabilities ▪ Flood risk reduction measures for the lower American River ▪ Analysis of climate change impacts on groundwater dependent ecosystems and interconnected surface waters ▪ Current operational strategies for Folsom Dam ▪ Forest lands, especially in upper watershed ▪ Primary aquatic habit on the lower American River ▪ Detailed agricultural water budgets under existing and future climate change conditions 	<ul style="list-style-type: none"> ▪ Detailed climate vulnerability assessments for the Cosumnes River watershed and West Sacramento ▪ Integration of flood risk data with other climate vulnerabilities ▪ Climate change impacts on water quality in newly included areas ▪ Vulnerability assessments for urban water systems in West Sacramento and other newly included urban areas ▪ Catalog of historical weather-related events and impacts
Assess vulnerabilities and risks	<ul style="list-style-type: none"> ▪ ARBS: Historical water budget data for the ARW ▪ Comprehensive water budget data for Cosumnes River watershed and newly included areas ▪ Regional Water Reliability Plan: Water supply and demand projections ▪ Sacramento Water Bank: Groundwater recharge and management info ▪ El Dorado County Water Resources Development and Management Plan: Water budget for El Dorado County ▪ Sacramento Valley Water Management Agreement: Regional water management coordination strategies ▪ Water Budget Handbook: Guidance on developing water budgets with or without models ▪ Sacramento Water Allocation Model: Detailed water allocation model for the Sacramento River Hydrologic Region 	<ul style="list-style-type: none"> ▪ Comprehensive water budget data for Cosumnes River watershed and newly included areas ▪ Integrated groundwater-surface water interaction analysis across multiple groundwater basins ▪ Impacts of climate change on historical water budget trends ▪ Water use and availability data specific to disadvantaged communities ▪ Historical water budget data accounting for environmental water needs and instream flow requirements ▪ Comprehensive assessment of impacts on headwaters, forests, and wildfire

Task	Information Available	Information Gaps
<p>Develop adaptation strategies</p>	<ul style="list-style-type: none"> ▪ ARBS: Some monitoring and evaluation metrics for previously studied areas ▪ Regional Water Reliability Plan: Performance indicators for regional water management ▪ Sacramento Area Flood Control Agency's Storm Drainage Master Plan: Local-scale flood risk assessment metrics ▪ Sacramento Valley Water Management Agreement: Inter-agency water management practice indicators 	<ul style="list-style-type: none"> ▪ Standardized performance metrics applicable across diverse subwatersheds and jurisdictions in the expanded study area ▪ Baseline data for performance indicators in newly included areas (for example, Cosumnes River watershed, north slope of Bear watershed, south slope of Cosumnes watershed) ▪ Long-term monitoring strategies for climate adaptation effectiveness across the entire watershed ▪ Integration of performance tracking across multiple agencies and jurisdictions, including newly added areas ▪ Adaptive management indicators for climate resilience ▪ Equity-focused performance metrics ▪ Community-based monitoring and reporting mechanisms ▪ Indicators for ecosystem health and biodiversity in the expanded study area ▪ Metrics for assessing the effectiveness of groundwater-surface water management integration

DRAFT

Table 2. Overview of Studies and Reports by Sector

Category/Sector	Study/Plan
Climate Change and Resilience	<ul style="list-style-type: none"> ▪ <i>Sacramento and San Joaquin Basins Study Technical Report</i> ▪ <i>California Watershed Resilience Assessment</i> ▪ <i>Risk-Informed Future Climate Scenario Development for the State Water Project Delivery Capability Report</i> ▪ <i>California Water Plan Update 2023 Technical Series – Watershed Hub Resilience Indicators and Metrics</i> ▪ <i>American River Basin Study (Reclamation)</i> ▪ <i>Nevada Irrigation District Water and Climate Change Plan for Water Final Technical Memorandum</i>
Headwaters and Wildfire	<ul style="list-style-type: none"> ▪ <i>Tahoe-Central Sierra Initiative Capacity Needs for Forest Health and Wildfire Resilience</i> ▪ <i>Tahoe-Central Sierra Initiative Blueprint for Resilience</i> ▪ <i>Tahoe-Central Sierra Initiative Assessment of Current Landscape Conditions</i> ▪ <i>California Wildfire & Forest Resilience Task Force Sierra Nevada Regional Profile</i>
Communities	<ul style="list-style-type: none"> ▪ <i>Protecting Californians from Extreme Heat: A State Action Plan to Build Community Resilience</i> ▪ <i>Placer County Sustainability Plan</i> ▪ <i>City of Sacramento Climate Action Plan</i> ▪ <i>City of Roseville Communitywide Sustainability Action Plan</i> ▪ <i>Sacramento County Climate Action Plan</i> ▪ <i>El Dorado County Climate Change Vulnerability Assessment</i>
Ecosystem	<ul style="list-style-type: none"> ▪ <i>Cosumnes Watershed Restoration Landscape</i> ▪ <i>The Lower American River Modified Flow Management Standard</i> ▪ <i>Working Landscapes: The Natural Capital of the Upper American River Watershed (El Dorado Water Agency [EDWA])</i>
Energy (Hydropower)	<ul style="list-style-type: none"> ▪ <i>2030 Zero Carbon Plan (Sacramento Municipal Utility District [SMUD])</i> ▪ <i>Delivering Low Emission Energy (Pacific Gas and Electric Company)</i> ▪ <i>Upper American River Hydropower Summary</i> ▪ <i>El Dorado Hydroelectric Project 184</i> ▪ <i>PCWA Middle Fork Project – FERC Project No. 2079</i>
Flood	<ul style="list-style-type: none"> ▪ <i>Sacramento Area Flood Control Agency 500-year Resiliency Plan</i> ▪ <i>Sacramento County Flood Climate Change adaptation measures (FLOODMeasures (sccounty.net))</i>
Groundwater	<ul style="list-style-type: none"> ▪ <i>North American Subbasin GSP</i> ▪ <i>South American Subbasin GSP</i> ▪ <i>Cosumnes Subbasin GSP</i>

Technical Memorandum

Category/Sector	Study/Plan
Recreation	<ul style="list-style-type: none"> ▪ <i>Folsom Lake State Recreation Area. (California Department of Parks and Recreation)</i> ▪ <i>American River Parkway. (Sacramento County Department of Regional Parks)</i> ▪ <i>Recreation Implementation Plan. Hydro License Implementation, Upper American River Project, Federal Energy Regulatory Commission Project No. 2101 (SMUD)</i> ▪ <i>PCWA Middle Fork Project – FERC Project No. 2079 Recreation Plan</i> ▪ <i>Upper American River Watershed (Sacramento River Watershed Program)</i> ▪ <i>Outdoor Recreation in the Upper American River Watershed: An Analysis of Economic Impact and Value (EDWA)</i>
Water Supply	<ul style="list-style-type: none"> ▪ <i>2020 Urban Water Management Plans</i> ▪ <i>California Water Plan 2023 Update – Sacramento River Hydrologic Region Report</i> ▪ <i>Handbook for Water Budget Development</i> ▪ <i>American Basin Integrated Water Management Plan</i> ▪ <i>Sacramento Regional Water Bank</i> ▪ <i>Water Resources Development and Management Plan (EDWA)</i> ▪ <i>Cosumnes, American, Bear, and Yuba Integrated Regional Water Management Plan</i> ▪ <i>Upper American River Basin Regional Drought Contingency Plan (EDWA)</i> ▪ <i>North American Basins Drought Contingency Plan (RWA)</i> ▪ <i>Regional Water Reliability Plan (RWA)</i>
Watershed Planning	<ul style="list-style-type: none"> ▪ <i>Programmatic Watershed Plan (EDWA)</i> ▪ <i>Bear River Watershed Restoration Plan 2018</i> ▪ <i>American River Basin Storm Water Resource Plan</i> ▪ <i>Implementation of the Programmatic Watershed Plan for the Upper American River Watershed (EDWA)</i> ▪ <i>Review of Groundwater Recharge and Surface Water-groundwater Interactions for the Lower Cosumnes River</i>

Note: Refer to Attachment 1 for more detail about listed documents.

Attachment 1
Regional Water Authority Gap Analysis
Matrix



Gap Analysis Literature Review

Document	Published	Summary	Study Location
Sacramento and San Joaquin Rivers Basin Study Technical Report	March 2016	Overview and comprehensive study of water resources in the Sacramento and San Joaquin Basins, including analysis of historical and projected future water supply and demand under various climate and socioeconomic scenarios.	Sacramento and San Joaquin Basins, including the Central Valley, Sacramento River system, San Joaquin River system, and Tulare Lake region
SAFCA Executive Director's Report for January 16, 2025	January 2025	Six major federally authorized projects are under construction, with a total investment of over \$5 billion. Key initiatives include: The Folsom Dam Raise Project Improvements to the Natomas Basin levees Sacramento Weir widening Erosion control along the American and Sacramento Rivers	Natomas Basin, Sacramento area
Sacramento Area Flood Control Agency's (SAFCA) 2024 Urban Level of Flood Protection Annual Report	August 2024	The report covers the State Plan of Flood Control (SPFC) facilities in SAFCA's jurisdiction, which documents the progress in improving the regional flood protection system over the fiscal year ending June 30, 2024. Summarizes projects such as Folsom Dam Modifications, American River Common Features (ARCF) projects, and improvements to multiple levee systems in the Sacramento area.	Sacramento Area Flood Control Agency (SAFCA)'s jurisdiction including the City of Sacramento and parts of Sacramento and Sutter Counties,
Sacramento's Comprehensive Flood Risk Reduction Program (DRAFT)	2017	Detailed overview of Sacramento's flood risk management strategy, including structural improvements to protect against 500-year flood events, non-structural measures for land use planning and emergency management, and plans for future flood system maintenance and upgrades. The study outlines a three-phase approach to flood protection, incorporating levee improvements, dam modifications, and increased downstream conveyance capacity. It also covers flood preparedness, warning systems, emergency response procedures, and public risk communication efforts.	Sacramento area, focusing on the American and Sacramento Rivers and their tributaries
American River Watershed Common Features WRDA 2016 Project	January 2025	This project includes reconstructing levees along the east side of Sacramento River south of the American River and in North Sacramento, erosion protection in river channels, and widening the Sacramento Weir and Bypass. It involves multiple contracts for Sacramento River East Levee improvements, American River erosion control, and Sacramento River erosion control. The total project cost is estimated at \$1.5 billion.	Sacramento River and American River levee systems, Sacramento area
Lower Elkhorn Basin Setback Levee Project	January 2025	The California Department of Water Resources has initiated a project to widen the Sacramento Bypass and set back seven miles of levees along the Yolo Bypass in the Lower Elkhorn Basin. It includes the Bryte Landfill Remediation Project, LEBLS Interior Drainage Project, and LEBLS Pump Station Project.	Lower Elkhorn Basin, Yolo Bypass, Sacramento area

Gap Analysis Literature Review

Document	Published	Summary	Study Location
California Watershed Resilience Assessment	2024	This report presents a statewide assessment of watershed resilience in California, evaluating the ability of watersheds to maintain key functions and services under climate change. It uses indicators across five categories (water, land, biodiversity, people, and management) to score and rank watershed resilience at the HUC-10 scale.	Statewide assessment of California watersheds at the HUC-10 scale (933 watersheds). Focuses on watershed functions related to water resources and ecosystem services.
Risk-Informed Future Climate Scenario Development for the State Water Project Delivery Capability Report	December 2023	This report describes a new approach for developing climate change scenarios to assess future delivery capability of California's State Water Project (SWP). It uses a hybrid method combining bottom-up stress testing with top-down climate model projections to create risk-informed climate scenarios.	California's State Water Project, focusing on the Central Valley watershed area (approximately 39 million acres)
California Water Plan Update 2023 Technical Series - Watershed Hub Resilience Indicators and Metrics	Aug 2024	Documents the development of a proposed set of indicators and metrics to assess current water resources conditions for watersheds across California. Describes methods used to evaluate water-related indicators and select a subset for statewide use across watersheds.	Statewide
Urban Water Management Plan (2020)	July 2022	Comprehensive plan outlining the City's water supply sources, demand projections, conservation measures, and strategies for water management. Includes analysis of supply reliability, drought risk assessment, and water shortage contingency planning. The UWMP evaluates water supply demands in relation to expected water demands over a 30-year horizon. It also identifies planned water projects that help with reliability and resiliency, including additional water supplies, recycled water and water use efficiency. In addition to the UWMP, the WSCP helps to ensure we have available supplies and plans in the event of shortages due to climate change, population or other uncertainties.	City of Roseville service area
California Water Plan 2023 Update - Sacramento River Hydrologic Region Report	December 2023	The California Water Plan 2023 Update includes an overview of the Sacramento River Hydrologic Region. This includes information on watershed boundaries, water use, critical water resource challenges and considerations, water supply, future climate risks, and key findings from the watershed resilience assessment.	Sacramento River Hydrologic Region, from Modoc County to Solano County, 27,200 sq miles
Handbook for Water Budget Development	February 2020	The purpose of the Handbook for Water Budget Development: With or Without Models (Water Budget Handbook), prepared by the California Department of Water Resources (DWR), is to provide the California water resources community with a resource to develop water budgets for any geographic area and time period, using modeling and non-modeling approaches.	Statewide (Not location based)

Gap Analysis Literature Review

Document	Published	Summary	Study Location
Water Resources Development and Management Plan	October 2019	The WRDMP connects the identified water resource-related challenges to achieving the County General Plan vision with the Agency's implementation programs through an array of resource management strategies. Resource management strategies represent strategic directives that may mitigate the identified challenges through coordinated and collective efforts of all responsible parties. Key actions are established, along with the primary responsible agency(ies), and Agency's corresponding roles in leading, facilitating, or supporting a given activity are also clarified and consistent with its authority and best ways for the Agency to create direct value and benefits for all communities in El Dorado County.	El Dorado County
Integrated Regional Water Management Plan	2021	Defines current water resources issues and conflicts. Identifies and updates management goals and objectives, including those for water supply, water quality, environment and habitat, land use, and recreation. Evaluates and updates alternative water management strategies and identifies opportunities for cooperative actions among water resource management entities and key stakeholder. Incorporates findings from state-mandated needs assessment of the CABY region disadvantaged communities. Provides implementation plan for priority projects. Establishes management framework. Incorporates climate change research.	Cosumnes, American, Bear, and Yuba Watersheds
Urban Water Management Plan (2021)	March 2023	Outlines the water management strategies for the Georgetown Divide Public Utility District, including water supply sources, demand projections, conservation measures, and contingency planning for water shortages. Discusses the primary water source and future water management strategies. The Georgetown Divide Public Utility District (the District) has prepared this 2020 Urban Water Management Plan (UWMP) to be utilized as a resource/planning document for the District and to meet State of California Department of Water Resources (DWR) requirements. The District is classified as an urban water supplier that provides treated water to approximately 3,800 customers and seasonal irrigation water to approximately 400 customers from a single surface water supply, Stumpy Meadows Reservoir.	Georgetown Divide service area
Nevada Irrigation District Water and Climate Change	September 2023	This article, part of a four-part series, is our effort to explain, interpret and explore the implications of climate change for NID and its customers. This article is intended to also help educate the community on NID's operational and planning preparations to mitigate and adapt to a changing climate.	NID Service Area (Upper Watershed)
Plan for Water Final Technical Memorandum	July 2024	The Plan for Water (PFW) is a collaborative process to review NID's historical and projected available water supply and demands. The PFW will support NID's decisions about future investments and changes in water management practices to ensure the community enjoys the same high-quality water and reliable water system it has now and for the coming years. The PFW modeling includes a hydrological model, demand model, and operations model development.	448 sq. mi. located on the western slope of the Sierra Nevada Mountains and covering portions of three counties: Nevada, Placer, and Yuba (see Figure 2-1).The NID watersheds include the upper reaches of the Yuba River, Bear River, and Deer Creek.

Gap Analysis Literature Review

Document	Published	Summary	Study Location
North American Subbasin Groundwater Sustainability Plan	December 2021	North American Subbasin Groundwater Sustainability Plan is a framework to provide for the sustainability of the NASb of the Sacramento Valley Groundwater Basin for the next 20 years. The NASb, designated as subbasin No. 5-021.64 by the DWR, is bounded on the north by the Bear River, on the south by the American River, to the west by the Feather and Sacramento rivers, and on the east by the Sierra Nevada foothills.	535 square-mile subbasin that includes portions of Placer, Sacramento, and Sutter counties (see figure ES-1)
2020 Urban Water Management Plan	June 2021	The 2020 UWMP describes and evaluates the reliability of PCWA's existing and planned water supplies to meet forecast near-term and long-term customer water demands. The plan assesses the availability and sufficiency of surface, groundwater, and recycled water assets and the vulnerability of these supplies to seasonal, climactic, seismic, and regulatory conditions.	Placer County - Service area extends from the community of Alta on the east, westward down the Interstate 80 corridor, and bounded by the Sutter County to the west, Sacramento County and El Dorado County to the south and Nevada County to the north. The service area includes retail treated water deliveries to the communities of Alta, Monte Vista, Applegate, Colfax, Auburn, Loomis, Rocklin, and much of the surrounding unincorporated areas within Placer County. PCWA also provides wholesale treated water to the City of Lincoln, , Cal-Am for use in their franchise area west of Roseville and south of Baseline Road, and to other relatively small mutual water companies and townsfranchise area west of Roseville and south of Baseline Road, and to other relatively small mutual water companies and towns.
American River Basin Integrated Water Management Plan	July 2018	The 2018 American River Basin (ARB) IRWMP Update - Multi-benefit approach to water resources planning. Identifies projects for flood risk reduction, water quality improvement, and potential groundwater recharge. Limited explicit climate change analysis. This plan is the application of the DWR definition of integrated water management within a region with a breadth and focus defined locally by stakeholders. These stakeholders dependent on the natural resources of the greater Sacramento region have been engaged in planning and implementing regional plans and projects to meet water supply demands and protect our environment, as represented in the ARB IRWMP.	Sacramento County except for very southeastern "tail" portion of county, and lower watershed portions of Placer and El Dorado Counties. The Placer County portion covers up to the boundary with Sutter County. Only the most western part of El Dorado County is included. County map with IWRMP boundary is on page 2-5, and watershed map is on page 2-7.
American River Basin Storm Water Resource Plan	May 2018	Describes an ongoing process to identify watershed-based runoff management methodologies for the American River Basin. Contains processes for developing and implementing projects and programs that manage stormwater and dry weather flows to improve water quality, reduce localized flooding, increase water supplies, protect the environment, and enhance communities. A stormwater resource plan (SWRP), describes an ongoing process to identify watershedbased runoff management methodologies for the American River Basin (ARB) in northern California. This SWRP contains processes for developing and implementing projects and programs that manage stormwater and dry weather flows to improve water quality, reduce localized flooding, increase water supplies, protect the environment, and enhance communities. Projects will be developed both for new development and for existing landscapes to restore watershed processes and provide a variety of benefits.	American River Basin

Gap Analysis Literature Review

Document	Published	Summary	Study Location
Sacramento Regional Water Bank	-	Water providers in the Sacramento region are developing the Sacramento Regional Water Bank (Water Bank). The Water Bank is an innovative groundwater storage program that will improve regional water supply reliability in the near-term and into the future. The Sacramento region's unique setting—at the confluence of the Sacramento and American rivers near Folsom Reservoir and overlying the North American and South American groundwater subbasins—is ideal for the Water Bank's development. The Water Bank will allow the region to sustainably increase use of groundwater as a local water source during dry periods, allowing reduced surface water diversions to help meet local environmental needs.	Sacramento and America River Basin
2020 Urban Water Management Plan	June 2021	The 2020 UWMP is an update to SCWA's 2015 UWMP and presents new data and analysis as required by the California Department of Water Resources (DWR) and the California Water Code (CWC) since 2015. The 2020 UWMP is also a comprehensive water planning document that describes existing and future supply reliability, forecasts future water uses, presents demand management progress, and identifies local and regional cooperative efforts to meet projected water use.	Sacramento County Water Agency service area (all within the County of Sacramento and defined in Figure ES-1).
Bear River Watershed Restoration Plan 2018	May 2018	The mission of the Bear River Watershed Group is to provide a structure within which all stakeholders are able to reach consensus on the issues facing the watershed in order to create and implement a collaborative, science-based restoration plan.	The Bear River Watershed
South American Subbasin Groundwater Sustainability Plan	October 2021	The South American Subbasin GSP outlines a 20-year plan for sustainable groundwater management activities that consider the needs of all users in the SASb and ensures a viable groundwater resource for beneficial use by many groups, including potable water purveyors, agricultural, agricultural-residential, domestic, commercial and industrial users, and various environmental services. This GSP is intended to achieve a sustainable regime that balances pumping and recharge and considers the needs of all water users.	South American Subbasin within the larger Sacramento Valley Groundwater Basin. A majority of the SASb is surrounded by rivers including the American River on the northern boundary, the Cosumnes and Mokelumne Rivers on the south, and the Sacramento River forming the western boundary. The eastern boundary is located at the transition between the alluvial sediments of the groundwater basin and the bedrock of the foothills of the Sierra Nevada mountains (see figure ES-2).
Protecting Californians From Extreme Heat: A State Action Plan to Build Community Resilience	April 2024	State action plan focused on addressing extreme heat impacts in California. It outlines strategies across four key action tracks: building public awareness, strengthening community services and response, increasing resilience of the built environment, and utilizing nature-based solutions.	Statewide

Gap Analysis Literature Review

Document	Published	Summary	Study Location
Programmatic Watershed Plan	November 2023	The PWP - presents a holistic approach to leverage natural, built, and social capitals to create and reinforce the expansion of natural, built, and social capacities for watershed sustainability and community resilience. In this context, capital means the physical and nonphysical (e.g., institutional and trust) assets and resources within the associated natural, built, or social environments; capacity means the ability leverage available and accessible capital to create individual and watershed-wide benefits.	Upper American River Watershed
American River Basin Study (ARBS) Interior Region 10 - California-Great Basin	August 2022	Building on the Sacramento-San Joaquin Rivers Basin Study, this American River Basin Study (ARBS) developed data, tools, analyses, and climate change adaptation strategies specific to the American River Basin. The ARBS examined strategies to integrate or better coordinate local and Federal water management practices to improve regional water supply reliability, while enhancing Reclamation's flexibility in operating Folsom Reservoir to meet flow and water quality standards in the Sacramento-San Joaquin Delta (Delta) and to protect endangered fishery species in the Lower American River.	Covers the entire American River Watershed, including Folsom Lake, the lower American River, and surrounding groundwater basins
Placer County Sustainability Plan	January 2020	Comprehensive plan to reduce greenhouse gas emissions and enhance community resilience to climate change impacts in Placer County. Includes GHG inventories, emissions forecasts, reduction targets, and adaptation strategies.	Placer County, CA
Community-Wide and County Operations 2015 Greenhouse Gas Emissions Inventories	January 2018	Detailed GHG emissions inventories for community-wide and county government operations in Placer County for 2015, with comparisons to 2005 baseline. Provides sector-by-sector breakdown of emissions sources.	Placer County, CA
Placer County Local Hazard Mitigation Plan Update	2016	Hazard mitigation plan that assesses risks from natural and human-caused hazards and outlines strategies to reduce vulnerabilities. Includes climate change considerations and analyzes 13 hazard types.	Placer County, CA
Cosumnes Subbasin Groundwater Sustainability Plan	December 2021	Comprehensive plan to achieve groundwater sustainability in the Cosumnes Subbasin by 2042. Includes basin setting, water budget, sustainable management criteria, monitoring network, and projects/management actions.	Cosumnes Subbasin
Technical Memorandum - Cosumnes Subbasin Data Management System	June 2019	Documents the development and contents of the Cosumnes Subbasin Data Management System (DMS), which compiles groundwater and surface water data for the basin	Cosumnes Subbasin
CoSANA Model Report	October 2021	Documents the development of the Cosumnes-South American-North American (CoSANA) integrated hydrologic model used for water budget and projected scenario analysis Cosumnes, South American, and North American Subbasins	Historical (WY 1999-2018) and Projected (WY 2019-2072)

Gap Analysis Literature Review

Document	Published	Summary	Study Location
Integrated Vulnerability Assessment of Climate Change in the Lake Tahoe Basin	2020	Climate change is amplifying the background stressors on natural resources, infrastructure, and communities in the Lake Tahoe Basin (Basin). Land managers and policy-makers are increasing the Basin's resilience and ability to adapt. Doing this now protects people and nature, and saves money. This vulnerability assessment provides residents, visitors, businesses, and public agencies with state-of-the-art information on how patterns of temperature and precipitation will change (called "impacts"), and how these patterns will affect the things people care about (called "implications"). The common scenarios and analyses provided will help public agencies and stakeholder organizations anticipate climate change implications, and better design and maintain their future projects that improve the quality of life, land, and waters in Tahoe. This assessment is written for a technical audience, and will	Lake Tahoe Basin
Integrated Vulnerability Assessment of Climate Change in the Lake Tahoe Basin - Technical Memos	2020	The tech memos cover a range of vulnerability assessments and topics such as aquatic resources, groundwater, soil moisture, forest biology, forest ecosystem, riparian and aspen ecosystems, meadow ecosystems, wildlife connectivity, public health vulnerability, washoe cultural resources, Lake Tahoe Surface Elevation, Recreation resources, Lake Tahoe Basin Infrastructure, etc.	Lake Tahoe Basin
Tahoe-Central Sierra Initiative 10-Year Regional Plan	March 2023	The 10-Year Regional Plan charts the path forward for TCSI and identifies two overarching goals and six strategies for improving social and ecological resilience across 2.4 million acres. These goals and strategies build on the progress the partnership made when it developed a scientific foundation for restoring resilience and integrate the recent state and national strategies. These strategies call for: <ul style="list-style-type: none"> • Restoring resilience to forested watersheds, • Building shared stewardship, • Supporting local economies, and • Establishing healthy and resilient communities that can withstand and adapt to wildfire. The TCSI is taking a systematic approach to restore resilience across a 2.4-million acre	Forest ecosystems and communities in the Sierra Nevada (Central Sierra and Lake Tahoe Basin) across 2.4 million acres. Steppe-Mixed Coniferous Forest Alp ecoregion. Six watersheds: Yoba, Truckee, Lake Tahoe, Upper Bear, North Fork American, South Fork American.
Capacity Needs for Forest Health and Wildfire Resilience	2024	Within the context of TCSI's 10-Year Regional Plan, capacity refers to the individual and combined ability of agencies, organizations, and Tribes to effectively plan, implement, and sustain the foundational activities that enhance forest resilience. Beyond financial resources, capacity in this context encompasses organizational strength in managing internal operations, effective collaboration, community engagement, and partnership building. Additionally, it includes the ability to plan, permit, and prepare for project implementation, successfully execute projects on the ground, and continuously monitor, evaluate, and adapt based on evolving needs. For the purposes of this report, TCSI defined capacity by the following categories: organizational, collaboration and partnerships, landscape strategy and planning, project implementation, community outreach, and monitoring.	Forest ecosystems and communities in the Sierra Nevada (Central Sierra and Lake Tahoe Basin) across 2.4 million acres. Steppe-Mixed Coniferous Forest Alp ecoregion. Six watersheds: Yoba, Truckee, Lake Tahoe, Upper Bear, North Fork American, South Fork American.

Document	Published	Summary	Study Location
Blueprint for Resilience	2023	The TCSI Blueprint is a set of strategy maps that identify opportunities for forest protection and adaptation across the study area. It is the culmination of an effort to improve resilience to anticipated climate change and wildfire as well as beetle- and drought-caused tree mortality. The TCSI group, along with scientists and forest managers versed in the concept of resilience, defined resilience based on 10 ecological and social pillars. The TCSI Blueprint includes evaluations of 30 unique metrics, such as large tree density and probability of high-severity fire, that describe conditions across five of the pillars of resilience: forest resilience, fire-adapted communities, fire dynamics, biodiversity conservation, and carbon sequestration. The TCSI Blueprint uses a novel application of the Ecosystem Management Decision Support tool to evaluate spatial data layers against target conditions that are indicative of resilient landscapes. The TCSI Blueprint integrates assessments of both current and future conditions under climate change to reflect where management can likely make the most impact toward achieving functions on the landscape now and into the future.	Forest ecosystems and communities in the Sierra Nevada (Central Sierra and Lake Tahoe Basin) across 2.4 million acres. Steppe-Mixed Coniferous Forest Alp ecoregion. Six watersheds: Yoba, Truckee, Lake Tahoe, Upper Bear, North Fork American, South Fork American.
Assessment of Current Landscape Conditions		Climate change, high-severity wildfire, and drought threaten the resilience of forests and communities in the Sierra Nevada. The area burned by high-severity wildfires annually is increasing, and prolonged droughts coupled with beetle outbreaks have the potential to result in massive tree mortality, leaving extremely large areas of dead trees. These factors, along with fire suppression and unsustainable logging practices, shaped the forests we know today, which are less resilient to wildfire and drought than pre-European settlement forests. The Tahoe-Central Sierra Initiative (TCSI) is a partnership of state and federal agencies, non-governmental organizations (NGOs), the timber industry, and researchers that was established to improve forest and social resilience to climate change and other stressors across a 978,381-hectare (2.4 million-acre) landscape. Increasing forest heterogeneity and decreasing fuel loads through ecologically based forest management will likely improve the forest and human communities' ability to adapt to future wildfires and drought under a changing climate. To provide a foundation for achieving resilience, TCSI established a four-part Roadmap to Resilience: Framework for Resilience, Assessment of Current Landscape Conditions, Assessment of Future Landscape Conditions, Blueprint for Resilience. This report aims to understand current forest and landscape conditions, including fire and beetle/ drought risk and biomass-processing capacity and sets baseline conditions for key resources within the study area.	Forest ecosystems and communities in the Sierra Nevada (Central Sierra and Lake Tahoe Basin) across 2.4 million acres. Steppe-Mixed Coniferous Forest Alp ecoregion. Six watersheds: Yoba, Truckee, Lake Tahoe, Upper Bear, North Fork American, South Fork American.
Sierra Nevada Regional Profile	September 2022	In the sections that follow we have used the framework from the Pillars of Resilience to describe in detail the nature of each of: healthy and resilient forests, carbon storage, water security, biodiversity conservation, air quality, economically robust communities, and resilient and fire safe communities. The intent is to provide the reader with foundational background information related to each of those pillar categories, share findings from stakeholder surveys and interviews and describe in more detail the underlying make up of each pillar in terms of two to three select metrics being used to describe it.	The Sierra Nevada Region includes the Sierra Nevada, Southern Cascades and Eastside or Inyo region. It is home to over 880,000 people across 23 counties and encompasses one of the largest stretches of protected wilderness in the nation

Gap Analysis Literature Review

Document	Published	Summary	Study Location
City of Sacramento Comprehensive Flood Management Plan	May 2024	The City, like other urban areas, faces risks to life and property from many natural and man-made hazards, including fire, earthquake, terrorism, toxic spills, wind, drought, wildfire, and flood. Most notably, of all these risks, flooding poses the greatest threat to the residents of Sacramento. Given the City's high flood risk and vulnerability, this Comprehensive Flood Management Plan (CFMP) is maintained and implemented by City government to guide the City's flood risk reduction and mitigation efforts. This CFMP, initiated by the City's Department of Utilities (DOU), will serve as the City's strategic plan to reduce flood risk over the next five years (2024-2029).	Sacramento, CA
City of Sacramento Climate Implementation Work Plan	2021	The purpose of this work plan is to identify the City of Sacramento's priority climate initiatives for implementation in the calendar year of 2021. Specifically, this work plan is a road map of critical, near-term climate work, including a new staff position that the City Manager is creating to coordinate, direct, and accelerate City efforts to address climate change through a highly collaborative process that involves all departments.	Sacramento, CA
City of Roseville Communitywide Sustainability Action Plan	October 2010	The main objective of the City of Roseville Communitywide Sustainability Action Plan (SAP) is to set forth a comprehensive strategy to address emerging sustainability issues related to land use patterns, transportation, building design, energy use, water demand, and waste generation. The SAP outlines a road-map to reduce GHGs and air pollutant emissions within the community (i.e., vehicle emissions, emissions related to energy production) and to promote economic growth based on clean technology and sustainable practices.	Roseville, CA
Sacramento County Climate Action Plan	July 2024	The Climate Action Plan (CAP) provides a roadmap to achieve the following objectives for the unincorporated county and the County: 1) Implement County's Final Environmental Impact Report for the Sacramento County General Plan of 2005-2030 (General Plan), adopted in November 2011, Mitigation Measure CC-2 to prepare and adopt a CAP that will reduce greenhouse gas (GHG) impacts from implementing the General Plan. 2) Include reasonably foreseeable projects and population growth in GHG emissions forecasts. 3) Identify GHG emission reduction targets tailored to the unincorporated county and the County's government operations that align with State and County climate goals. 4) Establish GHG emissions reduction measures and actions to achieve the County's GHG emissions reduction targets for communities in the unincorporated county and County operations. 5) Set a framework of sufficiently adaptable long-term strategies that will consider and incorporate, as appropriate, additional GHG reduction strategies that embrace continued innovation, technological advances, and creating high-quality jobs in the county. 6) Provide a mechanism for streamlining project-level GHG emissions analysis consistent with Section 15183.5 of the State California Environmental Quality Act (CEQA) Guidelines. 7) Develop climate adaptation measures to guide the County to a more resilient future.	Sacramento County
El Dorado County Climate Change Vulnerability Assessment	May 2023	The County has prepared this CVA to support the unincorporated County community in preparing for, responding to, and recovering from hazard events intensified by climate change. The CVA provides a framework for understanding climate change science and modelling forecasts and for the consideration of incorporating adaptation and resilience goals and policies to include in the County's General Plan Noise, Public Health, and Safety Element.	El Dorado County

Gap Analysis Literature Review

Document	Published	Summary	Study Location
Consumnes Watershed Restoration Landscape	2023	The Bureau of Land Management is infusing \$161 million for ecosystem restoration and resilience on the nation's public lands, as part of the Biden Harris Administration's Investing in America agenda. The proposed work will focus on 21 "Restoration Landscapes" across 11 western states, restoring public lands, strengthening communities and local economies, advancing climate resilience and furthering our commitment to Tribal collaboration and partnership.	Cosumnes Watershed
The Lower American River Modified Flow Management Standard	2015	The Sacramento Water Forum has developed a Modified Flow Management Standard (Modified FMS) for the lower American River. Designed to protect anadromous salmonids and avoid catastrophic water shortages in the basin, the Modified FMS represents the best path forward for protecting local resources without re-directing negative impacts to other regions. The lower American River is the only urban waterway in the United States to be designated a "Wild and Scenic River" (Figure 1) by state and federal governments. The river is home to 43 fish species, including federally threatened steelhead and struggling fall-run Chinook salmon. Folsom Dam and Reservoir, located at the confluence of the North and South Fork American rivers, provide flood control and drinking water to nearly 1 million residents of the Sacramento region. In particular, about 500,000 people in the cities of Folsom and Roseville and in the San Juan and El Dorado Water Districts depend on diversions directly from Folsom Reservoir as their primary water supply.	Lower American River
Working Landscapes: The Natural Capital of the Upper American River Watershed	2024	Working landscapes and the ecosystem goods and services (EGS) they provide are critical to people's health and wellbeing. Understanding the value of these lands is crucial for informed decision-making, economic development, and conservation efforts. The purposes of this valuation are (1) to estimate the value of EGS that the UARW generates, and (2) to show the distribution of that value locally, within California, and beyond. This effort is part of the planning efforts by El Dorado Water Agency (Agency) to improve sustainable watershed management and community resilience. For more details, see UARW Programmatic Watershed Plan. The valuation process includes the identification of EGS provided by the UARW and the monetization of a subset of the identified EGS where data allows. To help illustrate the benefits of EGS, this report also includes provisioning and beneficiary maps of selective EGS showing where the benefits (e.g., water supply, water quality, hydropower energy, carbon, and beauty) are produced, and where they are used.	Upper American River watershed (UARW)
2030 Zero Carbon Plan		In July 2020, Sacramento Municipal Utility District's (SMUD's) Board of Directors adopted a climate emergency declaration, prompting SMUD to develop a bold and ambitious plan for reaching zero carbon by 2030 while ensuring we continue to provide safe, reliable, affordable and inclusive power to our customers and community. This 2030 Zero Carbon Plan is a flexible road map to eliminate greenhouse gas emissions (GHG) from our power supply by 2030. It was developed following completion of several technical studies.	SMUD

Gap Analysis Literature Review

Document	Published	Summary	Study Location
Upper American River Hydropower Project Summary	2015	The Upper American Project is located on the Rubicon River, Silver Creek, and South Fork American River. The project uses water from both the South Fork American and Rubicon River watersheds, which drain the western slope of the Sierra Nevada Mountains. The project developments span more than 81 river miles and have an elevation change of about 6,000 feet msl from the uppermost Rubicon reservoir to the downstream reach of the Slab Creek/White Rock development. In addition to generation-related facilities, the project includes 47 recreation areas that include campgrounds, day use facilities, boat launches, trails, and a scenic overlook.	The Upper American River Project consists of seven developments located on the Rubicon River, Silver Creek, and South Fork American River in El Dorado and Sacramento Counties in central California. These seven developments occupy 6,190 acres of federal land within the Eldorado National Forest and 54 acres of federal land administered by the Bureau of Land Management (BLM). The proposed The Iowa Hill Development will be located in El Dorado County and will occupy 185 acres of federal land within the Eldorado National Forest.
American River Parkway Plan	2008	The Parkway Concept can be summarized as follows: The American River Parkway is a unique regional facility which shall be managed to balance the goals of: a) preserving naturalistic open space and protecting environmental quality within the urban environment, and b) contributing to the provision of recreational opportunities in the Sacramento area. Overall guidance on the approach to preservation and management of the Parkway are embodied in both the Plan's Goals and the Concept Policies.	The American River Parkway is an open space greenbelt which extends approximately 29 miles from Folsom Dam at the northeast to the American River's confluence with the Sacramento River at the southwest.
Recreation Implementation Plan. Hydro License Implementation, Upper American River Project, FERC Project No. 2101	2015	The Federal Energy Regulatory Commission (FERC) issued SMUD a fifty-year license to operate the Upper American River Project (UARP or Project) on July 23, 2014 (License). FS Condition 41 requires SMUD to develop this Recreation Implementation Plan in coordination with the FS. SWRCB Condition 14 requires the Plan to include provisions for SMUD to consult with the SWRCB and the Central Valley Regional Water Quality Control Board (CVRWQCB) regarding any water quality permits and approvals necessary for the construction or rehabilitation of recreation facilities. This Plan will guide SMUD and FS staff in designing and constructing recreation facilities described in FS Conditions 44 and 45. In addition, the Plan addresses the process for identifying and prioritizing additional recreation measures (see FS Conditions 42, 44, 45, 48).	SMUD
Outdoor Recreation in the Upper American River Watershed: An Analysis of Economic Impact and Value	2024	The upper American River watershed (UARW) is a significant asset for outdoor recreation that serves both locals and visitors from around California and beyond. The UARW's significance in outdoor recreation is largely attributed to its wealth of natural capital. As demand for outdoor recreation continues to grow, placing additional pressure on the UARW's natural capital, a more detailed accounting of visitation and usage of recreational lands in the watershed can inform decision making, resource allocation, and engagement with interested parties. The primary objective of this economic study of outdoor recreation in the UARW (Study) was to evaluate both the economic impacts, stemming from tourist spending, and the broader economic benefits supported by outdoor recreation lands in the UARW. Key components of this study include quantifying visitation patterns, developing expenditure profiles, estimating the economic impact of outdoor recreation-related spending, and quantifying the non-market benefits of such recreation. This study employed advanced data analytics, integrating geospatial and mobile location data to enhance and augment the existing observed visitation data.	Upper American River Watershed

Gap Analysis Literature Review

Document	Published	Summary	Study Location
Folsom Lake Recreation Area & Folsom Powerhouse State Historic Park General Plan/Resources Management Plan	2010	Provides comprehensive direction for management of Folsom Lake SRA and Folsom Powerhouse SHP. Addresses recreation use, resource protection, facilities, interpretation, operations. Proposes modest expansion of camping, improvements to boat launch facilities, trail system enhancements. Emphasizes day use recreation opportunities given proximity to urban areas. Includes direction for protection of natural and cultural resources. Provides for expansion of Folsom Lake Marina. Addresses wildland-urban interface issues with neighboring development	Folsom Lake State Recreation Area and Folsom Powerhouse State Historic Park
Upper American River Basin Regional Drought Contingency Plan	September 2021	The Upper American River Basin (UARB) Regional Drought Contingency Plan (RDCCP) lays out a plan to increase the resiliency of water resources in the face of future climate change conditions and droughts for the El Dorado County area west of the Sierra Nevada Crest (i.e., the West Slope). The ongoing drought, after only a few years of respite from the 2012-2016 drought, is a constant reminder to water managers and consumers in the West Slope of the severe vulnerabilities faced during droughts.	Upper American River Basin
Programmatic Watershed Plan	2019	The WRDMP connects the identified water resource-related challenges to achieving the County General Plan vision with the Agency's implementation programs through an array of resource management strategies. Resource management strategies represent strategic directives that may mitigate the identified challenges through coordinated and collective efforts of all responsible parties. Key actions are established, along with the primary responsible agency(ies), and Agency's corresponding roles in leading, facilitating, or supporting a given activity are also clarified and consistent with its authority and best ways for the Agency to create direct value and benefits for all communities in El Dorado County	El Dorado County
Review of Groundwater Recharge and Surface Water-Groundwater Interactions for the Lower Cosumnes River	February 2021	This document reviews and synthesizes existing research on groundwater recharge processes and surface water-groundwater interactions in the lower Cosumnes River watershed. It provides background on basin conditions, summarizes current understanding of surface water-groundwater interactions and recharge processes, identifies key data gaps, and includes an annotated bibliography of relevant literature.	Lower Cosumnes River watershed from Michigan Bar gage downstream to confluence with Mokelumne River, and associated underlying groundwater basins
Mosquito Fire BAER	November 2022	This document contains an evaluation of the effects of the 2022 Mosquito Fire on the watershed. It includes changes to soils, vegetation, and hydrology.	Middle Fork American upstream of Foresthill
Caldor Fire BAER	October 2021	This document contains an evaluation of the effects of the 2021 Caldor Fire on the watershed. It includes changes to soils, vegetation, and hydrology.	South Fork American and Upper Cosumnes watersheds
North American Basins Drought Contingency Plan	October 2017	The RDCCP focuses on mitigation actions and near-term responses specifically related to drought conditions. The Regional Water Reliability Plan (RWRP) and Regional Drought Contingency Plan (RDCCP) are closely related planning efforts to evaluate the vulnerabilities of the water resources of the region	American River watershed, from Sacramento to the Sierra Nevada mountains, as well as adjacent areas served by American River water in the Bear River and Cosumnes River watersheds.
Regional Water Reliability Plan	May 2019	Regional Water Reliability Plan (RWRP) developed by the Regional Water Authority (RWA) and its member agencies in the Sacramento region aims to improve the overall reliability of the region's water supplies and systems. This plan focuses on high-level identification of vulnerabilities, mitigation actions, regional conjunctive use potential, and interest in establishing a regional water bank.	American River watershed, from Sacramento to the Sierra Nevada mountains, as well as adjacent areas served by American River water in the Bear River and Cosumnes River watersheds.

Gap Analysis Literature Review

Document	Published	Summary	Study Location
500-Year Resiliency Plan		SAFCA (Sacramento Area Flood Control Agency) has developed a Comprehensive Flood Risk Reduction Program with the goal of achieving 500-year level flood protection for the Sacramento area. SAFCA is currently working on nine major projects in collaboration with the U.S. Army Corps of Engineers, totaling over \$2 billion in investments over the next decade	Natomas Basin, Lower Sacramento River/Delta North, South Sacramento County, American River Flood Control Districts, Maintenance Area 9
Sacramento's Comprehensive Flood Risk Reduction Program	2025 (Draft)	Outlines overall flood management strategy for Sacramento area, including structural and non-structural measures for flood protection along American and Sacramento Rivers	American and Sacramento Rivers and their tributaries, Natomas Basin, South Sacramento area. Folsom Dam and Reservoir
SAFCA Executive Director's Report	Jan 2025	Provides detailed updates on ongoing flood control projects in Sacramento area, including construction status, funding, and projected completion dates	Covers flood control projects in the greater Sacramento area, including Natomas Basin, American River. Sacramento River. Folsom Dam and Reservoir. Yolo Bypass. Lower Elkhorn Basin
Urban Level of Flood Protection Annual Report	2024	Tracks progress toward achieving 200-year flood protection for Sacramento area, including project-specific updates, timelines, and funding details	Covers areas protected by State Plan of Flood Control (SPFC) facilities within SAFCA's jurisdiction, including Natomas Levee System, Dry Creek Levee System, Robla Arcade Creek Levee System. American River North Levee System. American River South and Sacramento River East Levee System. South Sacramento Streams Levee System. Folsom Dam and Reservoir. Sacramento Weir and Bypass. Yolo Bypass
Sacramento County Climate Adaptation Measures	2024	The Draft Sacramento County Climate Action Plan (CAP) aims to reduce greenhouse gas (GHG) emissions in the unincorporated County through a variety of quantified and unquantified GHG reduction measures. Although the final CAP is not yet approved, consistent with the Board of Supervisor's declared climate emergency and direction to achieve carbon neutrality, this dashboard shows the County's progress toward achieving the identified measures and other sustainability initiatives.	Sacramento County