American River Watershed Gap Analysis Memorandum

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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.

Table 1. Summary of Gap Analysis Findings

Task	Information Available	Information Gaps
Assess climate vulnerability and state of watershed	▪ 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	▪ 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	▪ 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	▪ 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
Develop adaptation strategies	▪ 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	▪ 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

Table 2. Overview of Studies and Reports by Sector

Category/Sector	Study/Plan
Climate Change and Resilience	▪ *Sacramento and San Joaquin Basins Study Technical Report* ▪ *California Watershed Resilience Assessment* ▪ *Risk-Informed Future Climate Scenario Development for the State Water Project Delivery Capability Report* ▪ *California Water Plan Update 2023 Technical Series – Watershed Hub Resilience Indicators and Metrics* ▪ *American River Basin Study (Reclamation)* ▪ *Nevada Irrigation District Water and Climate Change Plan for Water Final Technical Memorandum*
Headwaters and Wildfire	▪ *Tahoe-Central Sierra Initiative Capacity Needs for Forest Health and Wildfire Resilience* ▪ *Tahoe-Central Sierra Initiative Blueprint for Resilience* ▪ *Tahoe-Central Sierra Initiative Assessment of Current Landscape Conditions* ▪ *California Wildfire & Forest Resilience Task Force Sierra Nevada Regional Profile*
Communities	▪ *Protecting Californians from Extreme Heat: A State Action Plan to Build Community Resilience* ▪ *Placer County Sustainability Plan* ▪ *City of Sacramento Climate Action Plan* ▪ *City of Roseville Communitywide Sustainability Action Plan* ▪ *Sacramento County Climate Action Plan* ▪ *El Dorado County Climate Change Vulnerability Assessment*
Ecosystem	▪ *Cosumnes Watershed Restoration Landscape* ▪ *The Lower American River Modified Flow Management Standard* ▪ *Working Landscapes: The Natural Capital of the Upper American River Watershed (El Dorado Water Agency [EDWA])*
Energy (Hydropower)	▪ *2030 Zero Carbon Plan (Sacramento Municipal Utility District [SMUD])* ▪ *Delivering Low Emission Energy (Pacific Gas and Electric Company)* ▪ *Upper American River Hydropower Summary* ▪ *El Dorado Hydroelectric Project 184* ▪ *PCWA Middle Fork Project – FERC Project No. 2079*
Flood	▪ *Sacramento Area Flood Control Agency 500-year Resiliency Plan* ▪ *Sacramento County Flood Climate Change adaptation measures (FLOODMeasures (saccounty.net))*
Groundwater	▪ *North American Subbasin GSP* ▪ *South American Subbasin GSP* ▪ *Cosumnes Subbasin GSP*

Category/Sector	Study/Plan
Recreation	▪ *Folsom Lake State Recreation Area. (California Department of Parks and Recreation)* ▪ *American River Parkway. (Sacramento County Department of Regional Parks)* ▪ *Recreation Implementation Plan. Hydro License Implementation, Upper American River Project, Federal Energy Regulatory Commission Project No. 2101 (SMUD)* ▪ *PCWA Middle Fork Project – FERC Project No. 2079 Recreation Plan* ▪ *Upper American River Watershed (Sacramento River Watershed Program)* ▪ *Outdoor Recreation in the Upper American River Watershed: An Analysis of Economic Impact and Value (EDWA)*
Water Supply	▪ *2020 Urban Water Management Plans* ▪ *California Water Plan 2023 Update – Sacramento River Hydrologic Region Report* ▪ *Handbook for Water Budget Development* ▪ *American Basin Integrated Water Management Plan* ▪ *Sacramento Regional Water Bank* ▪ *Water Resources Development and Management Plan (EDWA)* ▪ *Cosumnes, American, Bear, and Yuba Integrated Regional Water Management Plan* ▪ *Upper American River Basin Regional Drought Contingency Plan (EDWA)* ▪ *North American Basins Drought Contingency Plan (RWA)* ▪ *Regional Water Reliability Plan (RWA)*
Watershed Planning	▪ *Programmatic Watershed Plan (EDWA)* ▪ *Bear River Watershed Restoration Plan 2018* ▪ *American River Basin Storm Water Resource Plan* ▪ *Implementation of the Programmatic Watershed Plan for the Upper American River Watershed (EDWA)* ▪ *Review of Groundwater Recharge and Surface Water-groundwater Interactions for the Lower Cosumnes River*

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

Attachment 1
Regional Water Authority Gap Analysis Matrix

Document	Published	Summary	Study Location	Boundary Area	Temporal Scale	Sector Focus/Sector-Specific Analysis	Task Alignment	Relevance/Applicability to Tasks	Climate Scenarios Used	Sharepoint Link	Website Link
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	Figure P-1 Page P-1	Historical period (1922-2010) and future projections through 2099	Water supply, water demand, agriculture, urban water use, hydropower, flood control, recreation, ecological resources	Task 7 - Perform Gap Analysis	Task 7: Offers extensive baseline data and analysis for gap analysis. Provides detailed climate projections and impacts specific to the Sacramento and San Joaquin basins (Section 3);	Multiple scenarios including: Reference-No-Climate-Change scenario 5 ensemble climate scenarios (Warm-Dry, Hot-Dry, Hot-Wet, Warm-Wet, Central Tendency) 12 individual downscaled GCM projections from 6 GCMs under RCP4.5 and RCP8.5 emission scenarios	Sacramento and San Joaquin Rivers Basin Study Technical Report	
							Task 8 - Assess Climate Vulnerability and State of Watershed	Task 8: Provides detailed climate vulnerability assessments. Analyzes historical climate trends and future projections (Section 3) Identifies critical historical weather events and impacts (Section 3.1) Includes comprehensive water supply and demand assessments (Sections 3 and 4)			
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								
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.	Statewide	Current conditions assessment using recent historical data (mostly within past 10-20 years). Does not project future conditions.	Primary focus on watershed functions related to water resources and ecosystems Includes indicators related to water supply, water quality, flood regulation, biodiversity, land cover, socioeconomic factors, and management practices Cross-sector analysis integrating water, land, ecology, and socioeconomic factors	Task 8 - Assess Climate Vulnerability and State of Watershed	Task 8: includes detailed quantitative assessments of climate vulnerabilities for water supply, flooding, groundwater, water quality, ecosystems, hydropower, recreation, and wildfire for all watersheds.	20 climate projections from 10 CMIP5 GCMs, RCP 4.5 and 8.5 |	California Watershed Resilience Assessment	https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Docs/Update2023/Supporting-Documents/California-Watershed-Resilience-Assessment.pdf
							Task 9 - Assess Vulnerabilities and Risks	Task 9: IDs vulnerabilities and risks for each watershed across multiple sectors.			
							Task 10 - Develop Adaptation Strategies	Task 10 (Develop Adaptation Strategies): While not providing specific strategies, the study's vulnerability assessments can inform adaptation strategy development.			
							Task 12 - Performance Tracking	Task 12: Outlines assessment approaches and metrics that can be adapted for tracking watershed resilience.			
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)	Figure 5-3 Page 5-12	Scenarios developed for 2043 (20 years into the future from the 2023 report date)	Water resources, specifically focused on State Water Project delivery capability and operations Includes indicators related to water supply, water quality, flood regulation, biodiversity, land cover, socioeconomic factors, and management practices	Task 7 - Perform Gap Analysis	Task 7: Aids in identifying current gaps in climate change scenarios developed for the California SWP to improve future modeling efforts.	Uses CMIP6 global climate models LOCA2 downscaled climate data Three risk-informed scenarios developed representing 50th, 75th, and 95th percentile "levels of concern" for SWP performance in 2043 Incorporates sea level rise projections	Risk Informed Future Climate Scenario	
							Task 8 - Assess Climate Vulnerability and State of Watershed	Task 8: Provides a new method for assessing climate vulnerability using both modeling and risk-informed climate scenarios.			
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	Statewide	Current conditions and trends over time (specific timeframe not specified)	Water supply Flood management Groundwater Ecosystems Water quality Recreation and cultural uses Hydropower Water equity (cross-cutting)	Task 10 - Develop Adaptation Strategies	Can serve as a key reference for identifying existing metrics and data sources, as well as gaps in current monitoring and assessment capabilities.			
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	City of Roseville service area	Figure 3-2 Page 3-6	Projections to 2045	Water supply, demand management, conservation, groundwater, recycled water, climate change adaptation	Task 10 - Develop Adaptation Strategies	Can serve as a key reference for identifying existing metrics and data sources, as well as gaps in current monitoring and assessment capabilities.	Mentions climate projections but doesn't specify scenarios; references American River Basin Study for detailed climate analysis	Roseville Urban Water Management Plan	
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	Figure 3-12 Page 3-30	Past data	water use, critical water resource challenges and considerations	Task 8 - Assess Climate Vulnerability and State of Watershed	Task 8: Discusses future climate risks, including increased air temperatures, flood risks, wildfire risks, and seasonal shifts in streamflow;	discusses future climate risks and vulnerabilities generally, including: increasing air temperatures, maximum temperatures, wild fire risk and flood risk, as well as seasonal shifts in stream flow but doesn't cover specific climate scenarios.	California Water Plan 2023 Update	
							Task 9 - Assess Vulnerabilities and Risks	Task 9: IDs vulnerabilities related to water management, equity, and tribal issues;			
							Task 10 - Develop Adaptation Strategies	Task 10: highlights actions taken by state and partners to address challenges, such as reservoir improvements and habitat restoration efforts, which can inform adaptation strategy development			
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)	Statewide	Guidance for 1-yr to 50-yr analysis	water budget development (to provide guidance for agencies across California)	Task 7 - Perform Gap Analysis	Can aid in identifying gaps between current water budget and available resources for water budget development with and without modeling.	N/A	Water Budget Handbook.pdf	https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Water-Budget-Handbook.pdf
							Task 10 - Develop Adaptation Strategies	Task 10: Can be used as a tool in the development of adaptation and risk-reduction strategies.			
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	Page 6	Projections to 2070	Water supply - demand imbalance; Vulnerability during droughts; Impacts of wildfires; Headwaters management; Stormwater management; Groundwater resources; Vulnerability to flooding.	Task 7 - Perform Gap Analysis	Task 7: Aids in the idenfication of water resource-related challenges in EL Dorado County.	References American River Basin Study for climate scenarios used.	El Dorado Water Resources Development and Management Plan	https://www.eldoradocounty.ca.gov/edwateragency/Programs-Projects/EDWA-Programs-Projects/Water-Resources-Development-and-Management-Plan
							Task 10 - Develop Adaptation Strategies	Task 10: Presents strategies to improve water resources management in El Dorado County.			

Document	Published	Summary	Study Location	Boundary Area	Temporal Scale	Sector Focus/Sector-Specific Analysis	Task Alignment	Relevance/Applicability to Tasks	Climate Scenarios Used	Sharepoint Link	Website Link
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 managment framework. Incorporates climate change research.	Cosumnes, American, Bear, and Yuba Watersheds	Figure 3-1 Page 3-3	Water demand (incl. environmental water demand), supply and quality and population growth predictions over the next three decades.	Water quality, water supply, resource management strategies, climate change, etc.	Task 8 - Assess Climate Vulnerability and State of Watershed Task 9 - Assess Vulnerabilities and Risks Task 10 - Develop Adaptation Strategies	Task 8: Discusses climate change vulnerabilities. Task 9: Discusses DACs, and vulnerabilities related to water management and equity Task 10: Discusses adaptive management strategies. Task 11: Discusses governance structure and plan	In Chapter 12, report discusses research on region's climate setting and vulnerabilities, state and federal actions to prepare for climate change, region-wide adaptation strategies, plans to minimize GHG emissions, future plans for addressing climate within the CABY IRWMP	Georgetown Divide PUD IRWMP	https://www.gd-pud.org/files/61994e911/CABY+IRWMP+-+2021+Update+%281%29.pdf
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.	Georgetown Divide service area	Figure 1	Projections to 2045.	Water supply reliability, demand management, conservation, drought contingency planning	Task 10 - Develop Adaptation Strategies	Task 10: Provides water shortage contingency planning and adaptation strategies such as water conservation targets.	Not specified	Georgetown Divide Urban Water Management Plan	https://www.gd-pud.org/draft-2020-urban-water-management-plan
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)	see NID Plan for Water	Projections to 2070s	Water supply - Detailed analysis of surface Water availability and snowpack changes; Brief discussion of potential impacts on aquatic ecosystems	Task 8 - Assess Climate Vulnerability and State of Watershed	Task 8: Assesses climate change under 18 modeling scenarios and provides overview of climate related risks expected to the NID service area.	18 scenarios initially analyzed, narrowed to 3: low bookend (dryer), high bookend (wet), median condition. Focused on temperature and	NIDWaterandClimateChange	
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.	Figure 2-5 Page 2-13	Projections to 2074 (50-year projection)	Water Supply - water storage and conveyance.	Task 8 - Assess Climate Vulnerability and State of Watershed Task 10 - Develop Adaptation Strategies	Task 8: Assesses climate change under 3 modeling scenarios. Task 10: Provides 7 strategic alternatives to improve water security in the NID service area.	3 scenarios: Dry Future Climate with High Demands, Median Future Climate with Baseline Demands, and Wet Future Climate with Low Demands. 7 strategic alternatives were also investigated to assess their potential to improve water security under projected climate conditions.	NID Plan for Water	https://www.nidwater.com/plan-for-water
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)	Figure ES-1 Page ES-2	Projections to 2041 (20 years from publish date), climate projections to 2070	Groundwater sustainability	Task 9 - Assess Vulnerabilities and Risks	Task 9: Assesses vulnerability metrics and thresholds for groundwater in the North American Subbasin.	5 scenarios: Warm-Wet, Warm-Dry, Hot-Wet, Hot-Dry, and Central-Tendency (from ARBS)	North American Subbasin GSP	
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	Figure 3-1 Page 3-3	Projections to 2045	Water supply - characterization, service reliability and drought risk assessment, water shortage contingency planning.	Task 8 - Assess Climate Vulnerability and State of Watershed Task 10 - Develop Adaptation Strategies	Task 8: Assesses climate change under 3 modeling scenarios. Task 10: Provides water shortage contingency planning and adaptation strategies for water supply improvements.	3 scenarios: normal, single-dry, and multiple dry years	PCWA Urban Water Management Plan	https://www.pcwa.net/about-pcwa/environmental-planning
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.	Overview Page 3	Reviews historical data. Provides a few forward looking timelines, particularly in Ch 2: Projected water demand and supply through 2035. County population projections and other regionalgrowth trends through 2035.	Topics covered include: water supply and demand projections for a minimum 20-year planning horizon (Section 2.9), Current and future water conditions (Section 2.6), sociocultural and economic trends (Section 2.5), Climate Change (see column H), Resource Management Strategies (Ch 5). Theframework also has water resource strategies (e.g. increase surface water treatment capacity to X million gpd by 2035), water quality strategies (e.g. Reduce extent of groundwater contamination) and environmental resource strategies (e.g. restore functional riparian and wetland habitat).	Task 10 - Develop Adaptation Strategies Task 11 - Develop Implementation Strategies Task 12 - Performance Tracking	Task 10: resource management strategies Task 11: governance structure and implementation approach can inform the development of implementation strategies Task 12: approach to monitoring and performance tracking	This is an integrated regional water management report, not a climate change analysis scenario. This document version is from 2018, but in the 2013 version, they conducted a regional assessment of climate change impacts, vulnerabilities and adaptation measures in accordance with EPA and DWR guidelines. The 2018 report broadly discusses regional climate change vulnerabilities and adaptation measures, describes likely climate change impacts on region (2.10), describes regional planning objectives to address climate change adaptation and mitigation (5.5, 5.6), and has resource management strategies which consider climate change (5.6.8). Of note, Table 6-5 is an extensive	American River Integrated Water Management Plan (2018)	https://rwah2o.org/programs/integrated-regional-water-management/american-river-basin-irwmp-2018-update/
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	American River Basin	Figure 2-2 Page 4	Not specified, but focuses on ongoing and future management	Stormwater management, water quality, flood control, water supply, environmental protection	Task 7 - Perform Gap Analysis Task 8 - Assess Climate Vulnerability and State of Watershed Task 9 - Assess Vulnerabilities and Task 10 - Develop Adaptation Strategies Task 11 - Develop Implementation Strategies	Task 7: Provides a baseline of existing stormwater management efforts and projects that can inform gap Task 8 and 9: identifies water quality, supply, flood, environmental and community challenges and Task 10/11: Implementation Strategies; Task 12: Performance Tracking and Metrics	Not specified	ARB_SWRP_Final_5-25-18	
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	Water Bank Insert Page 1	Projections to 2085	Water supply, groundwater management, climate adaptation	Task 10 - Develop Adaptation Strategies	Task 10: Applicability of the Water Bank as a potential strategy ;	Mentions climate projections but does not specify scenarios	Sacramento Regional Water Bank	
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).	Figure ES-1 Page ES-2	Projections to 2045	Water Supply - future supply reliability, future water uses, etc.	Task 8 - Assess Climate Vulnerability and State of Watershed	Task 8: Assesses climate change under 3 modeling scenarios.	3 scenarios: normal, single dry, and five consecutive dry year.	SCWA Urban Water Management Plan	https://waterresources.saccounty.gov/scwa/Documents/Engineering%20Reports/SCWA%202020%20Urban%20Water%20Management%20Plan.pdf

Document	Published	Summary	Study Location	Boundary Area	Temporal Scale	Sector Focus/Sector-Specific Analysis	Task Alignment	Relevance/Applicability to Tasks	Climate Scenarios Used	Sharepoint Link	Website Link
							Task 10 - Develop Adaptation Strategies	Task 10: Provides water planning for future water supply reliability and uses and identifies propsoed effort to meet water supply demands.			
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	Figure 2 Page 11	Not defined	Range of areas of concern. Goals and objectives for water quality & hydrology, fisheries & aquatic life, vegetation communities, and wildlife.	Task 7 - Perform Gap Analysis	Task 7: Aids in identificaiton of data gaps and proposed research project concepts.	N/A	Bear River Watershed Resoration Plan	
							Task 8 - Assess Climate Vulnerability and State of Watershed	Task 8: Assesses climate drivers and vulnerabilities to a range of areas of concern within the Bear River Watershed.			
							Task 10 - Develop Adaptation Strategies	Task 10: Develop watershed-specific adaptation strategies including proposed restoration projects.			
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).	Figure ES-2 Page ES-V	Projections to 2041 (20 years from publish date), climate projections to 2070	Groundwater sustainability	Task 9 - Assess Vulnerabilities and Risks	Task 9: Assesses vulnerability metrics and thresholds for groundwater in the South American Subbasin.	2070 Central Tendency and Hot-Dry Climate Scenarios		https://sasbgroundwater.org/groundwater-plan
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	Statewide	Near to long term actions	Multi-sector approach including public health, urban planning, infrastructure, natural resources, and social services.	Task 8 - Assess Climate Vulnerability and State of Watershed	Task 8: Provides data on projected temperature increases and their impacts on public health and infrastructure;			
							Task 9 - Assess Vulnerabilities and Risks	Task 9: Discusses vulnerable populations and sectors affected by extreme heat.			
							Task 10 - Develop Adaptation Strategies	Task 10: Outlines strategies for urban greening, cool surfaces, and building standards to mitigate heat impacts.			
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	Page 2	Not specified, but includes future projections.	Water supply, flood management, forest management, ecosystem services, community resilience	Task 10 - Develop Adaptation Strategies	Task 10: Provides resources management strategies	N/A	UpperAmRWatershedPlan_Nov2023	
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	Figure ES-2 Page ES-4	Recent study with projections to 2085	Hydrologic modeling, water supply planning; Flood management; Ecosystem impacts; Limited economic impact	Task 8 - Assess Climate Vulnerability and State of Watershed	Task 8: Includes projections for temperature increases, precipitation changes, and snowpack reduction.	5 scenarios: Warm-Wet, Warm-Dry, Central Tendency, Hot-Wet, Hot-Dry for 2050, 2070, 2085	1_ARBS-Study	
							Task 9 - Assess Vulnerabilities and Risks	Task 9: Assesses vulnerabilities in water supply, water quality, flood management, and ecosystems.			
							Task 10 - Develop Adaptation Strategies	Task 10: Proposes strategies for improving water supply reliability, ecosystem protection, and flood management under changing climate conditions.			
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	Placer County	2005-2050	Multiple sectors including energy, transportation, waste, water, agriculture	Task 7 - Perform Gap Analysis	Task 7: Provides baseline GHG inventory and forecasts - 2005 and 2015 GHG inventories and forecasts to 2050	RCP 8.5 scenario	Placer County Sustainability Plan	https://www.placer.ca.gov/DocumentCenter/View/42940/PCSP-ADOPTION?bidId=
							Task 8 - Assess Climate Vulnerability and State of Watershed	Task 8: Includes climate vulnerability assessment analyzing 11 climate exposures			
							Task 9 - Assess Vulnerabilities and Risks	Task 9: Analyzes climate risks and vulnerabilities for populations, infrastructure, buildings, economic assets, ecosystems and services			
							Task 11 - Develop Implementation Strategies	Tasks 10-11: Outlines 66 GHG reduction strategies and 43 adaptation strategies			
							Task 12 - Performance Tracking	Task 12: Includes performance tracking metrics			
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	2005, 2015	Multiple sectors including residential/commercial energy, transportation, solid waste,	Task 7 - Perform Gap Analysis	Task 7: Provides comprehensive baseline GHG inventory data for 2005 and 2015 to support gap analysis. Includes: Community-wide emissions by sector for 2005 and 2015			
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	Placer County	Plan covers 5-year period (2016-2021), with long-term mitigation strategy	Multiple hazards including flooding, wildfire, drought, severe weather, avalanche, landslides	Task 8 - Assess Climate Vulnerability and State of Watershed	Task 8: Provides hazard profiles and vulnerability assessments for 13 hazard types, including climate-related hazards	Does not use specific climate scenarios, but considers climate change impacts qualitatively for each hazard type		
							Task 9 - Assess Vulnerabilities and Risks	Task 9: Analyzes climate-related risks and vulnerabilities, including			
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	Figure PA-1 Page 1	Historical (WY 1999-2018), Current (WY 2015-2018), and Projected (50 years)	Multiple sectors including agriculture, urban, domestic, environmental	Task 8 - Assess Climate Vulnerability and State of Watershed	Includes detailed assessment of groundwater conditions	Historical climate, 2070 Central Tendency climate change scenario	Consumnes Subbasin GSP	https://www.cosumnesgroundwater.org/groundwater/cosumnes-gsp/
							Task 9 - Assess Vulnerabilities and Risks	Analyzes sustainability indicators and undesirable results			
							Task 10 - Develop Adaptation Strategies	Outlines projects and management actions			
							Task 12 - Performance Tracking	Includes implementation plan and monitoring network			
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	See Consumnes Subbasin GSP	Variable, based on data sources	Groundwater levels, groundwater quality, surface water, land use, well construction	Task 7 - Perform Gap Analysis	Task 7: Provides comprehensive compilation of available data to support gap analysis	N/A - Historical data compilation		
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)	Figure 1-1 Page 1-3	Historical (WY 1999-2018) and Projected (WY 2019-2072	Surface water, groundwater, land use, water demand	Task 8 - Assess Climate Vulnerability and State of Watershed	Simulates historical and current groundwater conditions	Historical climate, 2030 and 2070 central tendency climate change scenarios	CoSANA Model Report	https://www.cosumnesgroundwater.org/wp-content/uploads/2022/04/App.-M-CoSANA-Report.pdf
							Task 10 - Develop Adaptation Strategies	Used for water budget and climate change scenario analysis			
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 onhow patterns of temperature and precipitation will change (called "impacts"), and how these patterns will affect the thingspeople 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	Lake Tahoe Basin (shown in Figure 9, Page 19)	2010-2100	Climate vulnerability assessment	Task 8 - Assess Climate Vulnerability and State of Watershed Task 9 - Assess Vulnerabilities and Risks	Task 8: The report is a vulnerability assessment. Task 9: The report is a vulnerability assessment to with climate change scenarios to help public agencies and other actors understand implications of climate change.	• Temperature • Precipitation • Snowpack • Climatic Water Deficit • Runoff • Wind Speed • Kinetic Energy of Raindrops • Wildfire • Lake Level	Integrated-Vulnerability-Assessment-of-Climate-Change-in-the-Lake-Tahoe-Basin_2020.pdf	https://tahoe.ca.gov/wp-content/uploads/sites/257/2020/04/Integrated-Vulnerability-Assessment-of-Climate-Change-in-the-Lake-Tahoe-Basin_2020.pdf
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	See above	Projections generally extend to mid-21st century (2050s) and late 21st century (2080s-2090s)	Multiple sectors analyzed including water resources, forests, wildlife, public health, cultural resources, recreation	Task 3 - Identify and Assess Existing Regional Networks:	The Lake Tahoe Vulnerability Assessment technical memos provide valuable background on existing climate vulnerabilities and networks in the Tahoe Basin that can inform this task.	NA	https://jacobsengineering.sharepoint.com/:b:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/California%20Tahoe%20Conservancy/Lake-Tahoe-	https://tahoe.ca.gov/wp-content/uploads/sites/257/2020/04/Lake-Tahoe-Basin-IVA-SET-Tech-Memos.pdf
							Task 4 - Develop Watershed Network:	Cover multiple sectors and stakeholders that should be considered for inclusion in the watershed network.			

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							Task 8 - Assess Climate Vulnerability and State of Watershed	The Lake Tahoe memos contain detailed climate vulnerability assessments across multiple sectors that can directly inform this task.		Basin-IVA-SET-Tech-Memos.pdf?csf=1&web=1&e=SvEC74	
							Task 9 - Assess Vulnerabilities and Risks	The quantitative vulnerability metrics and modeling approaches used in the Lake Tahoe memos can be leveraged for this task.			
							Task 10 - Develop Adaptation Strategies	The adaptation strategies and recommendations in the Lake Tahoe memos provide a starting point for developing strategies for the American River watershed.			
							Task 11 - Develop Implementation Strategies	The Lake Tahoe memos discuss implementation considerations that can inform this task, though specific implementation plans would need to be developed.			
							Task 12 - Performance Tracking	The indicators and metrics used in the Lake Tahoe assessments can inform development of performance tracking metrics			
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: • 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 landscape that spans multiple ecosystems and ownerships.	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.	Page 15	10 year forward looking strategy to address wildfire crisis in areas where it poses greatest risk to communities. Goal to increase pace of forest-management and wildfire resilience efforts by 2025 and beyond.	Resilient communities and forests; climate-amplified wildfire and drought	Task 8 - Assess Climate Vulnerability and State of Watershed Task 10 - Develop Adaptation Strategies	Task 10: The report develops 10-year goals and strategies for the watershed.	NA	https://jacobsengineering.sharepoint.com/:b:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/Tahoe-Central%20Sierra%20Initiative/TCSI-10-Year-Regional-Plan.pdf?csf=1&web=1&e=uCU51A	https://www.tahoecentralsierra.org/wp-content/uploads/2023/09/1.-TCSI-10-Year-Regional-Plan.pdf
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.	Page 5	2024	capacity (organizational, collaboration and partnerships, landscape strategy and planning, project implementation, community outreach, and monitoring)	Task 8 - Assess Climate Vulnerability and State of Watershed Task 11 - Develop Implementation Strategies	Task 8: The report describes forests and wildfire vulnerability. Task 11: TCSI will use insights from this report as a guide to share resources, capacity, and expertise that advance forest restoration and wildfire resilience work across multiple scales. The partnership will also use insights from this report as it explores funding opportunities to facilitate and support cross-boundary project implementation.	NA	https://jacobsengineering.sharepoint.com/:b:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/Tahoe-Central%20Sierra%20Initiative/CapacityNeedsforForestHealthandWildfireResilience.pdf?csf=1&web=1&e=8UkmRT	https://www.tahoecentralsierra.org/wp-content/uploads/2024/08/TCSI-CAPACITY-REPORT-6.pdf
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 bothcurrent 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.	Page 2	Current (2019) and future (2020–2060) conditions	Forest resilience, Fire dynamics, fire-adapted communities, biodiversity conservation, carbon sequestration	Task 8 - Assess Climate Vulnerability and State of Watershed	Provides an example of a comprehensive assessment of current and future forest conditions that could inform the gap analysis for the American River Watershed. Specifically, its approach to evaluating forest structure, composition, fire dynamics, biodiversity, and carbon sequestration could highlight areas where additional modeling or data collection may be needed for the ARW. Provides assessment of current and future forest conditions under climate change scenarios.. Its approach to modeling future vegetation and fire dynamics could be adapted for the ARW.	Report looks at current and future conditions over the next 40 years and assesses whether path of action is: adapt, monitor, transform, protect	https://jacobsengineering.sharepoint.com/:b:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/Tahoe-Central%20Sierra%20Initiative/Blueprint-for-Resilience-Publication.pdf?csf=1&web=1&e=NAnGOr	https://research.fs.usda.gov/psw/understory/blueprint-resilience-tahoe-central-sierra-initiative
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/	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.	Figure 1 Page 11	2018-2020	Wildfire risk and resilience, beetle risk, drought risk, biomass-processing capactiy, forest resilience, fire dynamics, fire-adapted communities, biodiversity conservation, carbon sequestration, economic diversity, economic diversity	Task 8 - Assess Climate Vulnerability and State of Watershed	Provides insights into regional challenges and opportunities related to forest health and wildfire resilience that may be relevant for characterizing the state of the ARW.	Establishment of climate classes within the study area; characterization of tree density and basal area for each 1-hectare pixel across the landscape; categorization of habitat into CA Wildlife Habitat Relationship habitat types; characterization of current vegetation types (e.g. Douglas fir); calculation of disturbance frequencies for fires and beetle-induced tree mortality, drought vulnerability; wildfire risk and severity risk; species diversity; current carbon sequestration exchange; economic diversity: current conditions and expanded processing infrastructure; cross-pillars benefits analysis	https://jacobsengineering.sharepoint.com/:b:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/Tahoe-Central%20Sierra%20Initiative/assessmentofcurrentconditions.pdf?csf=1&web=1&e=KH1Z2g	https://research.fs.usda.gov/psw/understory/assessment-current-landscape-conditions-tahoe-central-sierra-initiative
							Task 10 - Develop Adaptation Strategies	Identifies regional capacity gaps and opportunities that could inform development of adaptation strategies, particularly around workforce development, biomass utilization, and cross-boundary coordination.			
							Task 11 - Develop Implementation Strategies	Provides recommendations for regional coordination, funding support, and long-term monitoring that could inform implementation planning for the ARW.			

Document	Published	Summary	Study Location	Boundary Area	Temporal Scale	Sector Focus/Sector-Specific Analysis	Task Alignment	Relevance/Applicability to Tasks	Climate Scenarios Used	Sharepoint Link	Website Link
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	Figure 1 Page 1	NA	Healthy and resilient forests, carbon storage, water security, biodiversity conservation, air quality, economically robust communities, resilient and fire-safe communities, economically robust communities, etc.	Task 9 - Assess Vulnerabilities and Risks	The Task Force creates an environmental and social profile of the region.	Current conditions of the pillars are presented (e.g. water security, carbon storage)	https://jacobsengineering.sharepoint.com/:b:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/Californifa%20Wildfire%20Task%20Force/SierraNevadaRegionalProfile_Updated_Aug2023.pdf?csf=1&web=1&e=E8Jsy0	https://wildfiretaskforce.org/sierra-nevada-regional-profile/
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	Sacramento, CA		Flood risk	Task 7 - Perform Gap Analysis Task 9 - Assess Vulnerabilities and Risks	Provides relevance of state and city flood plans, guidelines and protection measures, and describes structures, measures and actions to reduce flood risks. Discusses specific risk reduction tools	N/A	https://jacobsengineering.sharepoint.com/:f:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/City%20of%20Sacramento%20Comprehensive%20Flood%20Management%20Plan?csf=1&web=1&e=NCM1uP	https://www.cityofsacramento.gov/content/dam/portal/dou/utilities/stormwater/flood-preparedness/documents/CFMP%202024%20with%20Appendix%20(1)_Final.pdf
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	Sacramento, CA	Variable, based on data sources	Focus on reduction of GHG emissions	Task 7 - Perform Gap Analysis Task 10 - Develop Adaptation Strategies	Provides comprehensive compilation of available data to support gap analysis. Outlines commitments and unfunded needs	N/A	City of Sacramento Climate Implementation Work Plan	https://www.cityofsacramento.gov/content/dam/portal/pw/climate-action/2021ClimateImplementationPlan_DRAFT.pdf
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	Roseville, CA	Projections to 2020	land use, transportation, building design, energy use, water demand, and waste generation	Task 9 - Assess Vulnerabilities and Risks Task 10 - Develop Adaptation Strategies	Provides a baseline emissions inventory and projecting future emissions, identifies communitywide reduction target. Prepares a plan to identify strategies and measures to meet the reduction target.	N/A	City of Roseville Communitywide Sustainability Action Plan	https://www.roseville.ca.us/government/departments/development_services/planning/citywide_planning_documents
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	Sacramento County	Sacramento County	Planning/goals to 2050	Focus on reduction of GHG emissions and climate change adaptation and resilience including flooding, increased temperatures and extreme heat, sea level rise, wildfire, drought, cross-cutting.	Task 10 - Develop Adaptation Strategies	Outlines water-specific climate adaptation strategies and and recommended actions.	Various Adjusted Business-as-Usual Scenarios and Scoping Plan Scenario alternatives for Greenhouse Gas Emissions Forecast	Sacramento County CAP	https://planning.saccounty.gov/PlansandProjectsIn-Progress/Documents/Climate%20Action%20Plan/SEIR%20Documents/SactoCo.CAP_wApdcs_071224.pdf https://green.saccounty.net/Sustainability/Pages/FLOODMeasures.aspx
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	El Dorado County	Projections for the years 2035-2065 and 2070-2099	Various climate stressors and adaptation methods	Task 8 - Assess Climate Vulnerability and State of Watershed	Identifies primary and secondary climate stressors in El Dorado County		El Dorado County Climate Change Vulnerability Assessment	https://www.eldoradocounty.ca.gov/files/assets/county/v/1/documents/land-use/long-range-planning/granicus-migrated-documents/el-dorado-cva_public-review-draft_05.01.23f.pdf
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	Page 2	NA	Restoration	Task 10 - Develop Adaptation Strategies	Task 10: This document focuses on ecosystem restoration and resilience of public lands.	NA	https://jacobsengineering.sharepoint.com/:b:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/Consumnes%20Watershed%20Restoration%20Landscape/BLM-CA-Cosumnes-Watershed-Restoration-Landscape-Factsheet_05-30-2023v2.pdf?csf=1&web=1&e=CkXbgC	https://www.blm.gov/sites/default/files/docs/2023-05/BLM-CA-Cosumnes-Watershed-Restoration-Landscape-Factsheet_05-30-2023v2.pdf
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 stateand 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	Lower American River	Figure 1 Page 1	NA	Anadromous fish, Water temperature, Flow requirements, Modified flow management approach, Water supply, Habitat and flow	Task 10 - Develop Adaptation Strategies	Task 10: This document protecting anadromous fish species.	NA	https://jacobsengineering.sharepoint.com/:f:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/Lower%20American%20River%20Modified%20Flow%20Management%20Standard?csf=1&web=1&e=aqj0LF	https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/petitioners_exhibit/dwr/dwr_915.pdf

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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	Upper American River watershed (UARW)	Page 2		natural capital, ecosystem function, forests, drinking water, water capture	Task 9 - Assess Vulnerabilities and Risks	Task 9: This document assesses the value of various ecosystem services provide resiliency to ecosystems and human populations.			https://www.eldoradocounty.ca.gov/edwateragency/Programs-Projects/Watershed-Management/Upper-American-River-Watershed-Program
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	N/A	NA	Zero carbon future	Task 11 - Develop Implementation Strategies	Task 11: This document looks towards implementing a zero carbon future.	NA	https://jacobsengineering.sharepoint.com/:f:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/SMUD%202030%20Zero%20Carbon%20Plan?csf=1&web=1&e=Vk1o5b	https://www.smud.org/Corporate/Environmental-Leadership/2030-Clean-Energy-Vision
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.	Figure 1 Page 7			Task 11 - Develop Implementation Strategies	Task 11: This documentdescribes hydropower project permitting and implementation.	NA	https://jacobsengineering.sharepoint.com/sites/CPW8Y34200/ProjTeam_Int/Forms/AllItems.aspx?newTargetListUrl=https%3A%2F%2Fjacobsengineering%2Esharepoint%2Ecom%2Fsites%2FCPW8Y34200%2FProjTeam%5FInt&id=%2Fsites%2FCPW8Y34200%2FProjTeam%5FInt%2FRWA%20ARP%20Task%207%20%2D%20Gap%20Analysis%2FPast%20Studies%2FHydropower%2FUpper%20American%20River%20CA%20%2D%20Upper%20American%20Project%20Summary%20P%2D2101%20Updated%20March%202020%2Epdf&viewid=b63ba750%2De90f%2D45e0%2D82e1%2Dbcc26d0fcc10&parent=%2Fsites%2FCPW8Y34200%2FProjTeam%5FInt%2FRWA%20ARP%20Task%207%20%2D%20Gap%20Analysis%2FPast%20Studies%2FH	
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.	Page 9	2008	Water flows, water quality, flood control, recreation, public access, public safety, land use	Task 11 - Develop Implementation Strategies	Task 11: The document provides a guide for land use decisions.	NA		https://regionalparks.saccounty.gov/Parks/Pages/ParkwayPlan.aspx
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	See Upper American River Hydropower Project Summary	2015	Recreation	Task 11 - Develop Implementation Strategies	Task 11: 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).	NA	https://jacobsengineering.sharepoint.com/:b:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/SMUD%20-%20Recreation/FERC%202101%20Recreation%20Implementation%20Plan.pdf?csf=1&web=1&e=0oN3Ma	https://www.smud.org/-/media/Documents/In-Our-Community/Recreational-Areas/UARP/Hydro-License-Compliance/Recreation-Management-Plans/FERC-2101-Recreation-Implementation-Plan.ashx
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	Upper American River Watershed	Figure 1 Page 2	Study uses 2022 observed visitation data for assessing the economic impact of outdoor recreation	Economic assessment, recreation	Task 8- Assess Climate Vulnerability and State of Watershed	Task 8: report discusses economic and recreations components of the watershed.	NA	https://jacobsengineering.sharepoint.com/:f:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/El%20Dorado%20Water%20Agency%20Outdoor%20Recreation%20in%20the%20Upper%20American%20River%20Watershed?csf=1&web=1&e=XS8ogv	https://www.eldoradocounty.ca.gov/files/assets/county/v/1/documents/water-agency/202402_edwa_uarw-recreation-analysis.pdf
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	Figure I-2 Page I-3	Long-term plan to guide management for 20+ years	Recreation, natural resource management, cultural resource management;	Task 8 - Assess Climate Vulnerability and State of Watershed Task 9 - Assess Vulnerabilities and Risks Task 10 - 11	Provides baseline information on existing conditions and resources; Identifies key issues and management challenge Includes some climate change considerations Outlines goals and guidelines for future management	No specific climate scenarios analyzed. Some general discussion of potential climate change impacts.	https://jacobsengineering.sharepoint.com/:f:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/Folsom%20Lake%20State%20Recreation%20Area%20GP?csf=1&web=1&e=87iOlo	

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Upper American River Basin Regional Drought Contigency Plan	**September 2021**	The Upper American River Basin (UARB) Regional Drought Contingency Plan (RDCP) 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	Figure 1-1 Page 1-3		drought, resiliency	Task 8 - Assess Climate Vulnerability and State of Watershed	Includes vulnerability assessment including approach and outcomes	Highly Restricted Supply Scenario Under Current and 2070 Projected Conditions (not directly tied to climate change)	https://www.eldoradocounty.ca.gov/files/assets/county/v/1/documents/water-agency/uarb_rdcp_publicdraft_sept2021.pdf	https://www.eldoradocounty.ca.gov/files/assets/county/v/1/documents/water-agency/uarb_rdcp_publicdraft_sept2021.pdf
							Task 9 - Assess Vulnerabilities and Risk	Discusses drought-related water supply and economic vulnerabilities			
							Task 10 - Develop Adaptation Strategies	Outlines mitigation actions identification and outcomes			
							Task 11 - Develop Implementation Strategies	Includes repsponse actions for various utility districts			
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	El Dorado County		resource management	Task 8 - Assess Climate Vulnerability and State of Watershed	Includes information of current water management in El Dorado County	5 scenarios: Warm-Wet, Warm-Dry, Central Tendency, Hot-Wet, Hot-Dry (via ARBS)	https://jacobsengineering.sharepoint.com/:f:/r/sites/CPW8Y34200/ProjTeam_Int/RWA%20ARP%20Task%207%20-%20Gap%20Analysis/Past%20Studies/El%20Dorado%20Water%20Resources%20Development%20and%20Management%20Plan?csf=1&web=1&e=obs91w	El Dorado Water Agency - El Dorado County
							Task 9 - Assess Vulnerabilities and Risk	Discusses challenges ahead including water supply, drought vulnerability, wildfire impacts, headwaters management, stormwater use, groundwater limitations, and flood vulnerability			
							Task 10 - Develop Adaptation Strategies	Outlines eleven resource management strategies			
							Task 11 - Develop Implementation Strategies	Discusses potential implementation programs, policies, and guidance			
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	Figure 1 Page 4	Synthesizes studies spanning multiple decades, with focus on current conditions	Hydrology, hydrogeology, geomorphology, ecology	Task 3 - Identify and Assess Existing Regional Networks	Identify and assess existing regional networks: Provides background information on existing studies and research networks focused on the Cosumnes River watershed Identifies key stakeholders and agencies involved in past research efforts		Review of Groundwater Recharge and Surface Water-Groundwater Interactions for the Lower Cosumnes River	https://www.researchgate.net/publication/361649984_Review_of_Groundwater_Recharge_and_Surface_Water-Groundwater_Interactions_for_the_Lower_Cosumnes_River
							Task 8 - Assess Climate Vulnerability and State of Watershed	Assess Climate Vulnerability and State of Watershed: Provides background on watershed conditions, including floodplain and channel morphology, hydrology, and groundwater conditions			
							Task 12 - Performance Tracking	Performance Tracking: Compiles information on past monitoring efforts and data collection that could inform development of performance metrics			
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	Page 4		Wildfire risk and resilience, forest resilience, fire dynamics, flood risk, sediment transport	Task 8 - Assess Climate Vulnerability and State of Watershed	Provides information on impacts of recent fires and their effects on the watershed		Mosquito Fire BAER	https://inciweb.wildfire.gov/incident-information/catnf-mosquito-postfire-baer
							Task 9 - Assess Vulnerabilities and Risks	Can be used to understand impact of future fires			
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	Figure 2 Page 12		Wildfire risk and resilience, forest resilience, fire dynamics, flood risk, sediment transport	Task 8 - Assess Climate Vulnerability and State of Watershed	Provides information on impacts of recent fires and their effects on the watershed		Caldor Fire BAER	https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd963659.pdf
							Task 9 - Assess Vulnerabilities and Risks	Can be used to understand impact of future fires			
North American Basins Drought Contingency Plan	**October 2017**	The RDCP focuses on mitigation actions and near-term responses specifically related to drought conditions. The Regional Water Reliability Plan (RWRP) and Regional Drought Contingency Plan (RDCP) 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.								
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	Current and future flood protection plans through 2035	Flood control, emergency management, land use planning	Task 7 - Perform Gap Analysis,	Task 7: Provides comprehensive overview of current and planned flood protection measures, allowing identification of gaps. Task 8: Describes flood vulnerabilities and planned improvements to increase resilience	Not specified, but mentions consideration of climate change impacts			
						Task 8 - Assess Climate Vulnerability and State of Watershed					
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	Current status as of January 2025, with projections through 2030	Flood control infrastructure, project management	Task 7 - Perform Gap Analysis	Task 7: Offers detailed status updates on flood protection projects, allowing identification of gaps or delays in implementation	Not specified			
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	Current status as of 2024, with projections through 2026 and beyond	Flood control infrastructure, urban development, regulatory compliance	Task 7 - Perform Gap Analysis,	Task 7: Provides detailed progress updates on flood protection projects, allowing identification of gaps. Task 8: Describes current flood vulnerabilities and progress on increasing resilience	Not specified, but mentions consideration of climate change impacts			
						Task 8 - Assess Climate Vulnerability and State of Watershed					
Delivering Low Emission Energy											
EID Hydroelectric Project 184											https://www.eid.org/our-services/hydroelectric

Document	Published	Summary	Study Location	Boundary Area	Temporal Scale	Sector Focus/Sector-Specific Analysis	Task Alignment	Relevance/Applicability to Tasks	Climate Scenarios Used	Sharepoint Link	Website Link
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	Sacramento County		Climate adaptation, flood	Task 9 - Assess Vulnerabilities and Risks	Dashboard identifies vulnerable areas and risks in Sacramento County relating to GHG reduction and climate adaptation	N/A		https://green.saccounty.net/Sustainability/Pages/FLOODMeasures.aspx
							Task 10 - Develop Adaptation Strategies	Strategies at various stages identified			
							Task 12 - Performance Tracking	Tracking provided for stage of each adaptation measure (in progress, started, and not started)			