

4. Implementing Projects and Programs

4.1. Project Review Process

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4.2. Coordination with Water Agencies

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4.3. Impact and Benefit Analysis

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4.4. Financing Plan

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4.5. Technical Analysis

The Integrated Regional Water Management (IRWM) Plan must:

- Document the data and technical analyses that were used in the development of the Plan.

The MAC Plan Update has been developed using sound technical information, analyses, and methods. Information and documents were collected from various sources including AWA, CCWD, EBMUD, and USFS, as well as Amador and Calaveras counties, and the cities within those counties. Multiple local water planning documents were reviewed and used to prepare the MAC Plan. These include Urban Water Management Plans (UWMPs), Water Supply Master Plans (WSMPs) including EBMUD's comprehensive WSMP 2040 (completed in 2011), project Environmental Impact Reports/Environmental Impact Statements (EIRs/EIRs) and feasibility studies, and grant applications for other state and federal programs. Table 4-1 in Section 4.2.2 summarizes some of the key planning reports used in the MAC IRWM planning process and update, while Table 4.2 lists the documents demonstrating the technical feasibility of specific projects included in the Plan Update. Additionally, the documents cited in the References section were reviewed and used in development of the MAC Plan Update.

The technical information included in these plans and studies is very suitable for developing the MAC Plan Update. While some are project-specific documents, others address water management issues on a local or regional basis. This allows for an understanding of regional issues shared by multiple entities in the Mokelumne Watershed as well as more specific, localized issues. Because some of the documents used in the update process are focused on understanding and solving local water resource issues, such as the *New York Ranch Reservoir Conservation and Management Plan*, there is a basis for not only the specific issues, but also potential solutions.

A regional study and management plan heavily relied upon in the update process is the *Upper Mokelumne River Watershed Assessment and Planning Project*, a \$1.3 million milestone project completed by UMRWA in December 2007, was undertaken to advance the understanding of watershed water quality and related environmental issues, and to develop tools which will facilitate the long-term evaluation and management of Upper Mokelumne River watershed water and natural resources. Funding for the project was provided by Authority member agencies (\$317,500) and by grants from Propositions

50 and 84 (\$950,000). Development of this comprehensive watershed project was guided by a Project Advisory Committee (PAC), which included stakeholders representing a diverse set of watershed interests such as water, resource management, environmental resources, agriculture, timber, recreation and national forest lands. The project assessed baseline watershed water quality, providing a reference point for assessing water quality impacts associated with future changes in the watershed. In addition, a physical hydrologic watershed model was developed using the Watershed Analysis and Risk Management Framework (WARMF) tool. The WARMF model was used to analyze the watershed's existing hydrologic and water quality characteristics as to simulate how water quality conditions could change based on changes to land uses and activities. Activities and reports prepared as part of this project included:

- *Wildfire Models* – Fire behavior was modeled throughout the watershed to gain a better understanding of high risk areas and potential impacts from wildfires. *FlamMap* was used to determine the relative hazard and flammability of selected watershed areas. This model enables prediction of fire behavior on a spatial basis by modeling flame length, heat release, rate of spread and type of fire (e.g. surface fire, crown fire). The *FARSITE* model was used to simulate potential fire behavior and predict where and how fast fire would spread from pre-selected burn ignition sites in the watershed. The fire behavior simulation outputs were used to develop three new categories of land use / land cover for the watershed based on burn severity: low, moderate and high. The spatial distribution of the burn severity categories for each selected ignition site was used as an input to the WARMF model to simulate potential effects on water resources resulting from wildfires in specific vulnerable areas of the watershed.
- *Water Quality Vulnerability Zones* – Areas within the watershed considered to have very high to moderate vulnerability to water quality contamination were identified based on key physical characteristics of the watershed including slope, soils, vegetation and proximity to water. A map was developed identifying watershed vulnerability zones.
- *Watershed Assessment* – The water quality in the Upper Mokelumne River watershed was assessed in a three-step process. Guided by the stakeholder PAC, water quality benchmarks were established, specific water quality parameters of concern were identified, and selected parameters exhibiting historical exceedances were analyzed to determine source locations and characteristics.
- *Upper Mokelumne River Watershed Management Plan* – A management plan was prepared, addressing the findings of the watershed assessment by coupling scientifically valid data and technically-based recommendations to maintain and improve source water quality with stakeholder understanding and support. The PAC-guided plan contains a series of recommended management actions designed to reduce sources of contaminants, manage contaminated flows and sediments, and encourage regulatory and institutional controls.

The Plan consists of projects, programs, studies, and planning activities that local and regional planners have found to be technically feasible based on similar projects, pilot studies, technical analyses, benefit analyses, cost estimating, modeling and simulation efforts and data assessments.

As each project moves closer to design and implementation, technical and economic analyses will be conducted to confirm project feasibility and to provide any necessary feedback to modify the project's plan to improve its likelihood of success. The following table summarizes project-specific documentation that supports the technical feasibility of the project included in the MAC Plan Update, and therefore, the technical feasibility of Plan implementation.

Table 4-2: Documents Supporting the Technical Feasibility of MAC Plan Update Implementation

Proponent		Project	Documentation Regarding Technical Feasibility of Project
1	AWA	CAWP & AWS Intertie	Ken Zeier, Amador Canal Potable Water Feasibility Report, 2009
2	AWA	CAWP Gravity Supply Line	1989 – Leedshill-Herkenhoff Study 1995 – HDR CAWP System Master Plan 2007 – AWA In-House Study
3	AWA	Treated Water to Residents Using Untreated Water	Ken Zeier. A Study on the Feasibility of Supplying Potable Water to Customers along the Upper Section of the Amador Canal in Central Amador County, 2009.
4	AWA	Lake Camanche Wastewater Improvement Program	2002 Lake Camanche Village Treated Wastewater Long Term Disposal Work Plan- KASL Engineers 2003- Wastewater Treatment and Disposal Alternatives Feasibility Study for EBMUD Camanche North and South Shore Recreation Areas and Amador Water Agency CSA No.3- URS Corporation 2005- EBMUD/AWA Phase 2 Regional Wastewater Treatment and Disposal Study- Kennedy/Jenks Consultants 2005- AWA WWID #11- Interim WWTP and Effluent Alternatives- Kennedy/Jenks Consultants 2008- California Tiger Salamander Study and other critical species analysis- PBS&J
5	AWA	Small Diameter Pipeline Raw Water Canal to Pipe Conversion Project	Ken Zeier. A Study on the Feasibility of Supplying Potable Water to Customers along the Upper Section of the Amador Canal in Central Amador County, 2009.
7	AWA	AWS Regional Water Treatment Plant	2004-Ione Water Treatment Plant Feasibility Study- Boyle Engineering 2008-Tanner Regional WTP Preliminary Design Report- Stantec Engineering
8	AWA	Lower Amador Canal Project	
9	AWA	Backwash Water Reuse Project	
10	AWA	CAWP Fire Storage	1995 CAWP Master Plan- HDR Engineering, Inc. 1995 Master Plan and Connection Fee for Amador County Water Agency, Improvement District No. 1- Engineering alliance, Inc, Bartholomew Engineering, Inc.
11	AWA	Highway 88 Corridor Wastewater Treatment, Transportation, Disposal	
12	AWA	Ione Treated Water Loop	
13	AWA	Regional Wastewater Project	Amador County Regional Wastewater Management Plan

	Proponent	Project	Documentation Regarding Technical Feasibility of Project
14	AWA	New York Ranch Reservoir Conservation and Management	2007- New York Ranch Reservoir Conservation and Management Plan- Edith Read, Center for Natural Lands Management & Jim Robins, Alnus Ecologic 2008- Technical Report, New York Ranch Reservoir Model, HIS Hydrologic Systems 2010- New York Ranch Reservoir Natural Resource Conservation & Management Plan- Jim Robins, Alnus Ecologic
15	AWA	AWA Low Pressure Flow Improvements	
16	AWA	Lake Camanche Water Storage Tank & Transmission Main	
17	AWA	Lake Camanche Water Service Replacement-Phase II	
19	AWA	Wildwood Leachfield Replacement	
20	AWA	Bear River Reservoir Expansion Project	Bear River Water Supply Alternatives for Amador Water Agency and Calaveras County Water District revised in 2005
21	UMRWA	Septic System Management Program	Upper Mokelumne River Watershed Management Plan - 2007
22	CCWD	Leak Testing and Repair Program	
23	CCWD	New Hogan Reservoir Pumping Project	Evaluating the Potential for Agricultural Development in Calaveras County, June 2011.
24	CCWD	New Hogan Phase II Water Distribution Loop Project	Evaluating the Potential for Agricultural Development in Calaveras County, June 2011.
25	CCWD	Sheep Ranch WTP Compliance Project	
26	AWA-CCWD-EBMUD	Camanche Area Regional Water Supply Project	Predesign Report – Water Treatment Facilities Camanche South Shore Recreation Area – EBMUD and CCWD – 1994 Camanche South Shore Water Treatment Plant Feasibility Study – EBMUD - 1999 Draft Mitigated Negative Declaration – EBMUD’s Camanche Water Treatment Plant Replacement Project – July 2001 Camanche South Shore and North Shore Treatment Plants Evaluation – EBMUD – May 2003
27	CCWD	West Point WTP Drinking Water Compliance Project	
28	Foothill Conservancy	East Panther Creek Restoration Project	
29	Foothill Conservancy	Restoring the Upper Mokelumne's Anadromous Fish	
30	Foothill Conservancy	Amador Household Water Efficiency Project	Amador Water Agency Conservation Plan. 2009.

Proponent	Project	Documentation Regarding Technical Feasibility of Project
31 Stanislaus National Forest, Calaveras Ranger District	Hemlock Landscape Restoration	North, N., P. Stine, K. O'Hara, W. Zielinski, and S. Stephens. 2009a. An ecosystem management strategy for Sierran mixed-conifer forests. General Technical Report, PSW-GTR-220. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. Albany, California. 49 pp.
32 City of Jackson	City of Jackson Wastewater Treatment and Disposal Project	Wastewater Treatment, Storage, Disposal, and Reclamation Options Report" dated August 2010 and prepared by ECO:LOGIC
33 Calaveras County Administrative Office	Ponderosa Way Restoration Project	
34 AWA	Ione Clearwell Cover Replacement	
35 AWA	CAWP Tanks Replacement Project	
36 AWA	Camanche Wastewater System Improvements	June 2001 – Lake Camanche Village Unit 6 Pump Station 'C' Replacement Project Report
37 AWA	CAWP Retail Distribution Domestic and Fire Protection Improvements	1995 Master Plan and Connection Fee Study- Engineering Alliance Inc. & Bartholomew Engineering, Inc.
38 AWA	CAWP Disinfection By-Product Reduction Project	June 2012 DBP & BW Reports