

Section 6 IRWMP Implementation

Sacramento River
Biologic Region

Sacramento

ARB Region



Contents

6.	IRWMP IMPLEMENTATION.....	6-1
6.1.	IRWMP Financing	6-1
6.2.	Project Financing	6-2
6.2.1.	External Funding Sources	6-7
6.2.2.	Other Funding Sources.....	6-14
6.3.	IRWMP Performance Monitoring.....	6-17
6.3.1.	Tracking Progress of the IRWMP	6-17
6.3.2.	Monitoring Plan for Projects.....	6-18
6.4.	Data Management	6-19
6.4.1.	Overview of IRWMP Project Data Needs	6-19
6.4.2.	Frequently Used Data Sources	6-20
6.4.3.	Data Gaps.....	6-26
6.4.4.	Support of Statewide Data Needs	6-26
6.5.	Benefits and Impacts of IRWMP Implementation.....	6-27
6.5.1.	Potential Benefits in the Region.....	6-28
6.5.2.	Potential Impacts in the Region	6-33
6.5.3.	Potential Interregional Benefits and Impacts	6-35
6.5.4.	Benefits and Impacts to DACs and Native Tribes	6-35
6.6.	IRWMP Adaptability to Future Situations.....	6-36

List of Figures

Figure 6-1.	Distribution of Projects Meeting Multiple Objectives	6-29
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List of Tables

Table 6-1.	Current Ongoing ARB IMRWP Implementation Projects	6-5
Table 6-2.	Completed ARB IRWMP Implementation Projects.....	6-7
Table 6-3.	Example Types of Monitoring.....	6-19
Table 6-4.	Sample List of Data Needed for Current and Future IRWMP Projects.....	6-20
Table 6-5.	Frequently Used Data Sources and Their Management Systems	6-22
Table 6-6.	Benefits of Plan Implementation by ARB IRWMP Objective	6-30
Table 6-7.	Potential Impacts of Types of ARB Projects.....	6-34
Table 6-8.	Summary of Likely IRWMP Implementation Actions.....	6-39

Abbreviations and Acronyms

AB 1755	Open and Transparent Water Data Act
AB	Assembly Bill
ARB	American River Basin
ARBS	American River Basin Study
Caltrans	California Department of Transportation
CNRA	California Natural Resources Agency
CVP	Central Valley Project
CVRWQCB	Central Valley Regional Water Quality Control Board
DAC	disadvantaged community
DWR	California Department of Water Resources
EDU	equivalent dwelling unit
EJ	environmental justice
EPA	U.S. Environmental Protection Agency
GSA	groundwater sustainability agency
GSP	groundwater sustainability plan
HCD	California Department of Housing and Community Development
I-Bank	California Infrastructure and Economic Development Bank
IRWM	Integrated Regional Water Management
IRWMP	Integrated Regional Water Management Plan
NAB RDCP	North American Basin Regional Drought Contingency Plan
O&M	operation and maintenance
Proposition 1	Water Quality, Supply, and Infrastructure Improvement Act of 2014
Proposition 84	The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006
RCAC	Rural Community Assistance Corporation
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RWA	Regional Water Authority
RWVG	Regional Water Management Group
RWRP	Regional Water Reliability Plan
SAFCA	Sacramento Area Flood Control Agency
SDWSRF	Safe Drinking Water State Revolving Fund
SGMA	Sustainable Groundwater Management Act of 2014
State Water Board	State Water Resource Control Board
SWRP	Storm Water Resource Plan
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
UWMP	Urban Water Management Plan
WIFIA	Water Infrastructure Finance and Innovation Act of 2014
WINN	Water Infrastructure Improvement for the Nation
WRDA	Water Resources Development Act

6. IRWMP IMPLEMENTATION

This section describes implementation of the American River Basin (ARB) Integrated Regional Water Management Plan (IRWMP) Framework elements. Implementation is achieved by advancing ARB IRWMP projects and monitoring their collective progress toward meeting the vision, goals, objectives, and strategies of the IRWMP, including adapting to the impacts of climate change. This section describes IRWMP project financing, IRWMP performance monitoring, data management, benefits and impacts of implementation, and adaptability of the IRWMP to future situations.

6.1. IRWMP Financing

Agencies in the Region have progressively invested in regional integrated planning efforts over the last two decades, such as: the Water Forum Agreement, American River Basin Cooperating Agencies' Regional Water Master Plan; four subregional groundwater management plans; Regional Water Reliability Plan (RWRP); North American Basin Regional Drought Contingency Plan (NAB RDCP); ARB Storm Water Resource Plan (SWRP), West Slope SWRP; American River Basin Study (ARBS); American River Basin Water Market Strategy Project; and numerous watershed-wide plans in support of water quality, environmental, and flood management issues. Groundwater sustainability agencies (GSA) throughout the Region are also currently preparing Groundwater Sustainability Plans (GSP), pursuant to the requirements of the Sustainable Groundwater Management Act of 2014 (SGMA).

Since beginning the effort to develop and maintain an IRWMP in 2004, the Regional Water Authority (RWA) and its partners have invested more than \$2.38 million. This has resulted in the 2006, 2013, and 2018 ARB IRWMP Updates, as well as associated tools. Recent sources of funding have included:

- RWA IRWMP Project Participants (\$183,000)
- California Department of Water Resources (DWR) Proposition 1 Integrated Regional Water Management (IRWM) Planning Grant (\$250,000)

As the Regional Water Management Group (RWMG), RWA is committed to providing resources to maintain and support implementation efforts of the ARB IRWMP. Funding for the 2018 ARB IRWMP Update was provided through a DWR Proposition 1 IRWM Planning Grant, and an IRWM Fee in the annual RWA budget. Additional funds that are needed for continued IRWMP implementation (e.g., monitoring, administration, stakeholder outreach) will be identified and collected during the annual RWA budget development process.

6.2. Project Financing

Some elements of water resource management, such as water supply and wastewater treatment are predominately funded by ratepayer revenues. Others, such as larger capital investments, are funded through local or statewide revenue (DWR 2018). Certain elements of water resource management, such as flood, stormwater, and ecosystem management, often lack a stable or sufficient source of funding. This is an issue both within the Region and statewide.

Financing projects is always a challenge, and it sometimes prevents projects from proceeding to implementation. Although the Region has experienced steady economic growth in recent years, project financing has not kept up with the growing demands on the Region's water systems. An increasing population and a growing economy have created new demands; aging water and wastewater systems require repairs or replacements; and emerging contaminants of concern and stricter water quality requirements carry new costs. Structural funding gaps are often seen in the areas of flood protection, stormwater pollution, aquatic ecosystem management, and integrated water management. These issues will be exacerbated by the impacts of climate change and extreme weather patterns. The recent drought and flooding revealed many vulnerabilities to the Region's water systems and emphasized the need to implement additional regional resiliency and adaptation strategies. At the same time, water purveyors continue to experience many financial constraints, including increasing construction costs, limitations on water rate increases due to Proposition 218, and reduced revenue related to water use efficiency and conservation.

Water affordability is also a growing issue throughout California. Assembly Bill (AB) 685 was passed in 2012, making California the first state in the nation to legislatively recognize the human right to water. AB 401, signed in 2015, directed the State Water Resources Control Board (State Water Board) to develop a plan for the funding and implementation of a Low-Income Water Rate Assistance Program (the plan is anticipated to be completed in early 2019). Additional bills are currently being considered in the legislature to address water affordability issues. Meanwhile, water purveyors, state agencies, and nongovernmental organizations continue to work together to identify sustainable funding for small water systems and address disparity of water costs. While the Region has few small water systems, water purveyors in the Region recognize that implementing and maintaining projects to serve safe water has an effect on water affordability.

Despite financial constraints and limitations on project financing, the Region has successfully implemented a number of projects to realize progress toward the regionally-accepted vision, goals, and objectives. These successes have been achieved through identifying and implementing cost-effective

projects and taking advantage of a variety of financing options. In the last five years, the Region has been awarded over \$13 million in federal and state grant funds for large regional plans and IRWM and drought-resiliency projects. While extremely helpful in covering costs, grant program funds are dependent on continued success of applications. Grant funds are also better suited to finance construction or a one-time project cost, as opposed to covering operation and maintenance (O&M) costs. Generally, user fees and rates are more secure and reliable, and are better suited to cover O&M costs than relying on grant funding.

Financing for most of the 2018 ARB IRWMP Update implementation projects has not been identified at this time. One of the key roles of the IRWMP is to identify the implementation needs of the Region's stakeholders. RWA will help its stakeholders move projects forward on an ongoing basis, by providing the IRWMP as a vehicle for other ARB stakeholders to identify, vet, prioritize, and promote projects. RWA's expectation is that natural partnerships will emerge for those projects that benefit multiple stakeholders in the Region. As the RWMG, RWA understands that project implementation should not be overly reliant on grants. The ARB project proponents will continue to pursue many types of appropriate funding, both external (e.g., grants and loans) and internal (e.g., user fees and user rates). The following sections describe some of the various methods for financing project implementation.

Table 6-1 lists priority projects that are currently being implemented at completion of this 2018 ARB IRWMP Update. **Table 6-2** lists projects that have been completed as part of the implementation of the ARB IRWMP since completion of the 2013 ARB IRWMP Update.

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Table 6-1. Current Ongoing ARB IMRWP Implementation Projects

Project Name	Lead Agency/Organization	Approximate Total Cost	Funding Source and % of Total Cost	Funding Certainty	O&M Finance Source	O&M Finance Certainty
Shasta Park Reservoir Groundwater Well No. 2 Project	City of Sacramento	\$1,578,454	Prop 84 2011 IRWM Grant (63%); City of Sacramento (37%)	High – Project in Progress	Lead Agency	High
Shasta Park Reservoir and Well Project	City of Sacramento	\$35,564,607	Prop 84 2011 IRWM Grant (3%); City of Sacramento (97%)	High – Project in Progress	Lead Agency	High
Lower Cosumnes River Floodplain Restoration Project	Ducks Unlimited	\$2,561,750	Prop 84 2011 IRWM Grant (16%); Ducks Unlimited (84%)	High – Project in Progress	Lead Agency	High
Lower Cosumnes River Integrated Groundwater Recharge Project	Omochumne-Hartnell Water District	\$1,489,675	Prop 84 2011 IRWM Grant (66%); OHWD (34%)	High – Project in Progress	Lead Agency	High
Sleepy Hollow Detention Basin Retrofit	City of Elk Grove	\$1,736,788	Prop 84 2011 IRWM Grant (13%); Elk Grove (87%)	High – Project in Progress	Lead Agency	High
Lower Cosumnes River Integrated Groundwater Recovery Project	Rancho Murieta Community Services District	\$1,083,684	Prop 84 2011 IRWM Grant (46%); Rancho Murieta (54%)	High – Project in Progress	Lead Agency	High
Hazel/50 Intertie Improvements Project	City of Folsom	\$747,991	Prop 84 2014 Drought IRWM Grant (71%); Folsom (29%)	High – Project in Progress	Lead Agency	High
Main Ditch Piping Project	El Dorado Irrigation District	\$8,750,000	Prop 84 2014 Drought IRWM Grant (12%); Reclamation WaterSMART Grant Folsom (11%); EID (77%)	High – Project in Progress	Lead Agency	High
Agricultural Drought Response Incentives Program	Placer County Water Agency	\$400,000	Prop 84 2014 Drought IRWM Grant (75%); PCWA (25%)	High – Project in Progress	N/A	N/A
Regional Water Efficiency Drought Measures Program	Regional Water Authority	\$1,348,290	Prop 84 2014 Drought IRWM Grant (74%); local partners (26%)	High – Project in Progress	N/A	N/A
Enterprise Intertie Improvements Project	Sacramento Suburban Water District	\$185,986	Prop 84 2014 Drought IRWM Grant (56%); SSWD (44%)	High – Project in Progress	Lead Agency	High
Outingdale Water Intake Project	El Dorado Irrigation District	\$214,800	Prop 84 2015 IRWM Grant (71%); EID (29%)	High – Project in Progress	Lead Agency	High
Well 10 Hexavalent Chromium Treatment Project	Rio Linda/Elverta Community Water District	\$1,667,023	Prop 84 2015 IRWM Grant (30%); RLECWD (70%)	High – Project in Progress	Lead Agency	High
Regional Water Conservation Measures Program	Regional Water Authority	\$1,966,000	Prop 84 2015 IRWM Grant (42%); local partners (58%)	High – Project in Progress	N/A	N/A

Key:
 ARB = American River Basin
 EID = El Dorado Irrigation District
 IMRWP = Integrated Regional Water Management Plan
 N/A = Not Applicable
 O&M = operation and maintenance
 OHWD = Citrus Heights Water District
 PCWA = Placer County Water Agency
 RLECWD = Rio Linda/Elverta Community Water District
 SSWD = Sacramento Suburban Water District

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Table 6-2. Completed ARB IRWMP Implementation Projects

Project Name	Lead Agency/Organization
Assessment and Development of Tools for Managing PCE Contamination in the North Sacramento County Groundwater Basin	Sacramento Groundwater Authority
City of Roseville ASR Program - Phase 2	City of Roseville
Secret Ravine Fish Passage Improvement Project	City of Roseville and Dry Creek Conservancy
Antelope Creek Integrated Flood Control Improvement Project	Placer County Flood Control and Water Conservation District
Regional Water Meter Retrofit Acceleration Project	Regional Water Authority
Regional Indoor and Outdoor Water Efficiency Project	Regional Water Authority
Recycled Water for the SMUD Co-Generation Facility	Sacramento Regional County Sanitation District
North Antelope Booster Pump Station	Sacramento Suburban Water District
Coyle Avenue and Roseview Park Pump Stations and Water Treatment Systems Project	Sacramento Suburban Water District
Willow Hill Pipeline Rehabilitation Project	City of Folsom
Aquatic and Riparian Habitat Enhancement in the Lower American River at River Mile 0.5R	Sacramento Area Flood Control Agency
Antelope Creek Integrated Water Efficiency Project	Placer County Water Agency
Upper Unionhouse Creek Flood Protection Project	Sacramento Area Flood Control Agency
Downtown Combined Sewer Upsizing Project	City of Sacramento
Florin Creek Multi-Use Basin	Sacramento Area Flood Control Agency
Separating Fact from Fiction: Assessing the Use of Dry Wells as an Integrated Low Impact Development Tool to Reduce Stormwater Runoff While Protecting Groundwater Quality in Urban Watersheds	City of Elk Grove
Phase 2B Well Rehabilitations	City of Sacramento
Sacramento River Pump Station Modifications	City of Sacramento
Lower American River Pump Station Modifications	City of Sacramento
Madison Well Construction	Fair Oaks Water District
American River Pump Station Improvements	Placer County Water Agency
Striker Well Upgrades	Sacramento County Water Agency
Antelope Booster Pump Station Phase 2	Sacramento Suburban Water District
Barton Road Intertie	San Juan Water District
North Freeway Well Conversion	Sacramento County Water Agency

Key:
 ARB = American River Basin
 IRWMP = Integrated Regional Water Management Plan
 SMUD = Sacramento Municipal Utility District

6.2.1. External Funding Sources

Throughout the IRWMP process, the Region has been fortunate to find a range of opportunities to help fund many identified priority projects. While the primary source of funds is generally from the more traditional sources (e.g., customer rates), external sources of funds have helped successfully move many projects into implementation. Since completion of the 2013 ARB IRWMP Update, more than 20 projects

Section 6
IRWMP Implementation

have secured funding through the DWR IRWM Grant Program. That brings the number of projects supported by IRWM Grant funding since 2006 to over 50.

One of the roles of RWA in implementing the IRWMP is to track funding opportunity announcements and compare these to the projects included in the IRWMP. As specific opportunities emerge, RWA will work with stakeholders to confirm the project and current financing sources are aligned with the funding opportunity. Additionally, RWA will request that project proponents update their finance information for their projects on at least an annual basis.

Below is a brief description of some of the various supplemental funding opportunities available to the various projects within the ARB Region. This list is not exhaustive, but rather illustrates the diversity and extent of funding opportunities that may be available. Much of the information is from the California Financing Coordinating Committee Handbook, which is publically available at: <http://cfcc.ca.gov/>.

6.2.1.1. State Funding

California has various funding programs that can and do support projects identified in the Region. The most significant state funding sources in the last five years have been the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Proposition 84) and the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1). Proposition 84 authorized \$5.388 billion in general obligation bonds to fund safe drinking water, water quality and supply, flood control, waterway and natural resource protection, water pollution and contamination control, state and local park improvements, public access to natural resources, and water conservation efforts (CNRA 2018). In the Region, Proposition 84 funds have supported implementation of 21 IRWM priority projects.

Proposition 1 was passed by California voters in November 2014. Proposition 1 authorized \$7.55 billion in general obligation bonds to make needed investments in the state's water management systems. This included funding for projects and programs that support ecosystem and watershed protection and restoration, water supply infrastructure (including surface and groundwater storage), and drinking water protection. These funds continue to be distributed through grant and loan opportunities administered by various state agencies including DWR, the State Water Board, and the California Water Commission. There are approximately 30 different Proposition 1 grant and loan administration efforts, all on individual timelines. Proposition 1 funds have supported two efforts: 1) the development of the 2018 ARB IRWMP Update, and 2) Disadvantaged Community (DAC) Involvement in IRWM planning and implementation. Propositions 84, Proposition 1, and other state funding sources applicable to ARB IRWMP projects are briefly described below.

California Department of Water Resources

DWR “protects, conserves, develops, and manages” California’s water resources for natural and human environments. Its goals are broad, ranging from promoting local and regional water planning and education to developing and managing statewide water resources for supply, flood risk, and the environment. As described below, DWR oversees allocation of Proposition 84 and Proposition 1 funds for IRWM Implementation and Planning Grants, and Proposition 1 funds for Sustainable Groundwater Management Planning Grants, Groundwater Sustainability, and other programs. DWR also oversees revolving loan funds, and technical and facilitation services. The Region and its stakeholders have been successful in securing these funds.

- The Region has been the recipient of several recent grants from the IRWM Program, subsequent to adoption of the 2013 ARB IRWMP Update. These IRWM funding awards are summarized below. The Region will continue to seek and apply for IRWM Project funding and financing support. The Proposal Solicitation Package for Proposition 1 IRWM project implementation funds is anticipated to be released in July 2018.
 - \$9.76 million in Proposition 84 Drought Solicitation Grant funds to implement 17 IRWM priority projects that increase the Region’s local water supply reliability and delivery of safe drinking water.
 - \$1.75 million in Proposition 84 IRWM Implementation grant funds four additional priority projects.
 - \$250,000 in Proposition 1 IRWM Planning Grant funds to develop the 2018 ARB IRWMP Update.
 - \$3.7 million in Proposition 1 DAC Involvement Grant funds awarded to the Sacramento River IRWM Funding Area to ensure involvement of DACs, economically distressed areas, and underrepresented communities in IRWM planning efforts. Much of the work on this program will occur following the 2018 ARB IRWMP Update, but it is anticipated that a portion of these funds will be available to address DAC issues in the Region.
- The SGMA Facilitation and Technical Support Services Program provides local agencies with tools and professional facilitators to support development of GSPs. Services offered by the professional facilitators include identifying and engaging interested parties, facilitating meetings,

Section 6
IRWMP Implementation

and conducting public outreach. The West Placer GSA received facilitation support services for GSA formation and stakeholder engagement.

- The Proposition 1 Sustainable Groundwater Planning Grant Program is designed to fund development and implementation of GSPs and projects that support the sustainable management of groundwater resources. In 2017, \$86.6 million in funding was made available for the planning, development, or preparation of GSPs in high- and medium-priority basins. The Sacramento Groundwater Authority, Sacramento Central Groundwater Authority, and Southeast Sacramento County Agricultural Water Authority were awarded almost \$3 million to support development of GSPs for the North American, South American, and Cosumnes subbasins.

State Water Resources Control Board and Regional Water Quality Control Boards

A part of the California Environmental Protection Agency, the five-member State Water Board handles water rights issues, develops statewide protection plans, and establishes water quality standards. The State Water Board's Division of Financial Assistance provides funding for water quality, stormwater, and wastewater-related programs and projects. A portion of the funding provided by the State Water Board originates from Proposition 1, and these funds support programs such as the Clean Water State Revolving Fund, Small Community Wastewater Program, Water Recycling Funding Program, Storm Water Grant Program, and Safe Drinking Water State Revolving Fund. The State Water Board also collects fines to support project development and provides technical assistance. The following is a non-inclusive list of representative funding programs administered by the State Water Board.

- The Clean Water State Revolving Fund Program provides loans to wastewater, water recycling, and expanded use projects.
- The Water Recycling Funding Program issues loans and research grants for projects that promote use of treated wastewater to offset water supplies.
- The Small Community Wastewater Program aids DACs with wastewater project financing.
- The Central Valley Regional Water Quality Control Board (CVRWQCB) manages an ongoing supplemental environmental program that uses collected fines to support various projects.
- The Stormwater Grant Program provides grants to aid multi-benefit stormwater management projects.

- Water or Energy Audit Financial Assistance provides technical assistance to agencies. The agency is encouraged to study water and energy in their audit, but may focus on one or the other. All audits must be related to projects, facilities, or activities that are otherwise eligible for Clean Water State Revolving funding.
- The Proposition 1 Groundwater Grant Program provides grants and loans to cleanup and prevent groundwater contamination for sites that depend on groundwater for their potable water supplies.
- The Safe Drinking Water State Revolving Fund (SDWSRF) provides financial assistance to improve public water systems and drinking water infrastructure that currently pose public health risks and violate federal or state drinking water standards. The SDWSRF receives annual federal grants to finance long-term loans for construction projects and short-term planning grants. Special consideration and rates for DACs apply.

California Infrastructure and Economic Development Bank

The California Infrastructure and Economic Development Bank (I-Bank) was established in 1994 within the California Business, Transportation, and Housing Agency. Governed by five board members, the I-Bank promotes economic revitalization, enables future development, and encourages a healthy climate for jobs in California. They have funding and bonds programs, such as the Infrastructure State Revolving Fund Program, which provides up to 30-year loans of a maximum \$25 million per annum to municipalities for public infrastructure. Drinking and wastewater treatment and distribution/collection systems are eligible under this program.

California Department of Housing and Community Development

This California Department of Housing and Community Development (HCD) is responsible for preserving and expanding safe and affordable housing opportunities and promoting strong communities. Located within the California Business, Transportation, and Housing Agency, the role of HCD ranges from developing housing policy and building codes to assisting housing finance and community economic development. Their Community Development Block Grant provides funding to cities and counties. The Community Development allocation provides for public improvements and public services programs, while the Planning and Technical Assistance helps fund that process, such as by assisting project feasibility studies or environmental reviews. Public water programs and improvements would be eligible for this funding.

California Department of Transportation

The California Department of Transportation (Caltrans) provides safe, sustainable, integrated and efficient transportation systems and manages several California highways. Caltrans oversees the Cooperative Implementation Agreements Program, which develops agreements between Caltrans and other responsible parties to conduct work to comply with a Total Maximum Daily Load (TMDL). The Cooperative Implementation Grant Program funds capital projects in impaired watersheds in which Caltrans has been assigned a Waste Load Allocation or otherwise has responsibility for implementation of the TMDL. The Cooperative Implementation Grant Program is funded by Caltrans but administered by the State Water Board.

California Natural Resources Agency

The California Natural Resources Agency (CNRA) is a state agency responsible for protecting historical, natural, and cultural sites, monitoring and controlling state lands and waterways, and regulating fish and game use. The CNRA is the parent department to a number of other departments, including DWR. In addition to funding opportunities through the CNRA's departments and conservancies, its Bonds and Grants Division provides state bond oversight and administers a number of grant programs. These include the Central Valley Project Improvement Act Grant Program, California Urban Rivers Grant Program, Urban Greening Grant Program, Environmental Enhancement and Mitigation Grant Program, and River Parkways Grant Program. Water agencies and nongovernmental organizations in the Region have received recent CNRA grants. For example, the City of Roseville was awarded \$400,000 from Urban Rivers Grant Program in 2017 for the Dry Creek Stream Restoration and Water Quality Improvement Project.

6.2.1.2. Federal Funding

Over the past five years, the Region has also been successful in securing over \$1.2 million dollars in federal grants, primarily through programs administered by the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) largely because of the strong nexus between the Central Valley Project (CVP) and Region's local water resources. In particular, the Region has been able to garnering support for projects and programs that increase the Region's resiliency to the effects of climate change and drought, which directly benefit CVP operations. Below is a non-exhaustive list of identified federal funding opportunities relevant to the Region.

U.S. Department of Agriculture, Rural Development

The U.S. Department of Agriculture, Rural Development finances programs throughout the country to improve the economy and quality of life in rural areas. For their water-related programs, only towns with

under 10,000 in population are designated as rural. The program supports public service utilities to local banks and credit unions to development of agricultural cooperatives. An example use of these funds for water-related programs includes construction and land acquisition for sewer collection system improvements.

U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) is a federal agency that strives to protect human health and the environment by providing research, standards, and policies that relate to issues such as air pollution, climate change, toxic waste, and drinking water.

- Brownfields grants provide funding for groundwater contamination cleanup projects. Brownfields grants serve as the foundation of the Brownfields Program and support revitalization efforts by funding environmental assessment, cleanup, and job training activities. For example, sites contaminated with petroleum, hazardous substances, pollutants, or contaminants are eligible for up to \$200,000 through the Brownfields Cleanup grant.
- The Water Infrastructure Finance and Innovation Act of 2014 (WIFIA) established a federal credit program for eligible water and wastewater infrastructure projects, to be administered by the EPA. WIFIA provides loans of at least \$20 million for large-scale construction or improvements of water treatment or community water systems; protection of groundwater and surface water sources; implementation of water efficient, energy efficient or renewable generation technologies; and wastewater and stormwater reuse and control. Examples of WIFIA funded projects in California have included water recycling plant expansions, construction of purified water production facilities, and replacement of wastewater treatment plants.

U.S. Department of the Interior, Bureau of Reclamation

Reclamation is a federal agency that operates in the 17 western states and manages, develops, and protects water resources. Their programs provide cost-shared funding to irrigation districts and urban water agencies for conservation or water management improvement-related activities. Some of their financial assistance programs include the following.

- Bay-Delta Restoration Water Use Efficiency Grants usually fund projects such as canal lining, groundwater banking, leak detection, and irrigation retrofits. This program is administered in partnership with the Natural Resources Conservation Service.

Section 6 ***IRWMP Implementation***

- The WaterSMART Program was established in February 2010 to implement the SECURE Water Act. WaterSMART allows Reclamation to work with states, Tribes, local governments, and non-governmental organizations to pursue a sustainable water supply for the Nation by establishing a framework to provide federal leadership and assistance on the efficient use of water, integrating water and energy policies to support the sustainable use of all natural resources, and coordinating the water conservation activities of the various Department of the Interior offices (Reclamation 2018). The Region has received several WaterSMART grants including \$200,000 awarded in 2015 for development of the NAB RDCP and \$400,000 in 2017 for development of the ARB Water Marketing Strategy Project. The Region also received \$650,000 in direct Reclamation assistance in 2017 for development of the ARBS under the WaterSMART Basin Study Program.
- The Title XVI Water Reclamation and Reuse Program identifies and investigates water recycling and reuse of reclaimed waters. Additional funding has been provided under the Water Infrastructure Improvement for the Nation (WIIN) Act. The WIIN Act was enacted in December 2016, to address water resources infrastructure that is critical to the nation's economic growth, health, and competitiveness. Provisions in the WIIN Act allow new water recycling projects to be eligible for funding. Since 2013, the Title XVI program has supported 42 such projects in California.

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) is the largest federal water resources development and management agency. USACE is responsible for administering the Water Resources Development Act (WRDA). WRDA authorizes flood control, navigation, and environmental projects and studies, and often provides congressional authorizations/appropriations to local agencies. The WRDA of 2016 was included as part of the WIIN Act. It contained authorizations for projects that addressed beneficial use of dredged material, desalination, high hazard dam repair, investments in maritime and waterways transportation, and other water resources improvements. Examples of WRDA-funded projects in the Region include \$20 million awarded to Sacramento Area Flood Control Agency (SAFCA) in 2007 for the Natomas Levee Project; as well as the Sacramento River Bank Protection Project General Re-Evaluation Report, completed in June 2018. WRDA of 2018 is currently in development in Congress.

6.2.2. Other Funding Sources

The following sections describe other potential funding sources for implementing projects. Many of these sources are internal to municipalities or water agencies, and result from fees or rates collected from constituents or users. While these funding sources are heavily influenced by economic conditions, these

sources are generally more consistent and reliable. Internal funding sources generally cover O&M costs in addition to supporting new projects. Many of the project proponents have internal revenue sources.

6.2.2.1. New Development Fees

Development fees are used by water agencies almost universally as a measure to achieve and maintain equity among its past, present, and future customers. For a growing water agency, development fees can represent more than half of the total revenue in any given year, and as such are very important to existing as well as future customers. Development fees are typically charged per connection, measured in equivalent dwelling units (EDU). A single connection may encompass more than one EDU. In addition to the connection fee aspect of development fees, water agencies may also assess other fees (e.g., commercial acreage fees and other service fees).

In some cases, if a developer builds a water pipeline or large water facility required by a water agency as a condition of development, then as partial or full payment for the water facility, a water agency may give fee credits to the developer in lieu of the developer paying fees. If the value of the water facility exceeds the amount of credits, a reimbursement agreement is typically executed authorizing payment to the developer of the remaining amount owed over a period of time (this does not typically exceed a defined time period).

6.2.2.2. User Fees

Monthly user fees are assessed by some water agencies where a nexus can be made that new facilities are directly benefiting the existing customers. This is especially true for water agencies that are developing conjunctive use water systems where the existing customers may have paid for the groundwater component when they paid the development fee (through the purchase of the home). The surface water and/or recycled water component is a new water supply for a water agency that is needed for conjunctive use with groundwater supplies. Income from this monthly revenue source is used in many cases to pay debt service on debt-financed assets.

6.2.2.3. User Rates

User rates pay for O&M of a water agency or public utility's system. Within the user rate for a water agency there is a fixed cost component that does not vary with the amount of supplied water, such as labor and overhead expenses, and a variable cost component, such as the electrical and chemical costs, that are based on the amount of pumping and applied chemicals to meet the water demands of the customers. A customer of a water agency pays a monthly fixed rate and a variable rate based on the metered usage. In cases where billing is not based on a metered usage, a single monthly flat rate is assessed that is the combined average of the fixed and variable rates.

6.2.2.4. Bonded Debt Service (Revenue Bonds)

Issuance of revenue bonds to pay for new capital is done in cases where a large facility is needed to support current and future growth. In this way, a large facility can be paid for by bonded debt service at the time of construction with repayment of the debt service over a 20- to 30-year time frame. This is a preferred approach to paying for a high-cost facility because it avoids the perceived over-collection of fees from past customers that go toward facilities that serve past and future customers. The downside to bonded debt is that it cannot be accomplished with development fees alone due to the variability and uncertainty of new development over time. A user fee or rate is needed as a bond document covenant in the event that development fees are not adequate to make the required annual payment for the debt service.

6.2.2.5. Rural Community Assistance Corporation

The Rural Community Assistance Corporation (RCAC) provides financial and technical resources, training, and advocacy to rural communities. This agency administers the Environmental Infrastructure Loans program that helps create, improve, or expand the supply of safe drinking water, waste disposal systems, and other facilities that serve rural communities. RCACs loan program provides small rural communities funding to determine feasibility and pay pre-development costs before receiving state and federal program funding. RCAC may provide interim construction financing, as well as intermediate and long-term loans for system improvements.

6.2.2.6. Volunteer Contributions

Volunteer contributions are typically associated with nonprofit organizations or nongovernmental organizations that work toward a given cause. This revenue source is typically not reliable in terms of paying for capital projects or long-term operations. Volunteer contributions are best used for preservation of native land and implementation of public outreach programs. Both are examples where the cost is incurred only if there are sufficient funds to support the activity. Other opportunities for these organizations are partnerships with other project proponents that have more means of generating funding.

6.2.2.7. Mitigation/Settlement Funds

These funds are provided for mitigation related to a project or settlement of a past lawsuit in the Region. Mitigation funds in the Region are generally associated with flood management projects and structures, which require mitigation for resulting habitat losses (e.g., Folsom Dam). CVP mitigation funds have supported habitat restoration associated with water supply operations at Folsom Dam affecting downstream resources. The Sacramento County Abandoned Wells Program was started using funds derived from a groundwater contamination settlement.

6.2.2.8. Special Assessment Districts

Special assessment districts deliver specific voter-approved services within a limited area. Establishing a special assessment district is a common form of collecting needed projects funds. Districts that address flood issues have been particularly successful in securing special assessments within the Region.

6.3. IRWMP Performance Monitoring

Plan performance monitoring is integral to having an effective and adaptive IRWMP into the future. As described in **Section 6.6**, performance monitoring is used to adapt the IRWMP and projects to changing regional needs, the impacts of climate change, and other uncertainties. As the RWMG, RWA is responsible for monitoring progress on the IRWMP and using that information to guide future changes in the plan. There are two types of monitoring needs: one for progress and adaptation of the core IRWMP document, and another for reporting progress on and evaluating projects. Data management is also integral to plan monitoring, and this is described in **Section 6.4**.

6.3.1. Tracking Progress of the IRWMP

RWA is responsible for tracking the progress of the IRWMP. Conducting stakeholder meetings; monitoring progress on goals, objectives, and strategies; and coordinating with other IRWM regions are examples of activities that will continue into the future. Each project proponent is aware of the ARB Framework, including objectives and strategies. Project evaluations and scores are based on a project's ability to meet regional objectives, including adaptation to the impacts of climate change. The relationship of these current strategies and the 18 objectives is shown in **Section 5.5**. Project proponents are encouraged to provide RWA with progress reports when practical, but at a minimum once per year. Examples of types of monitoring and data to report to RWA are described in **Section 6.3.2**. Each project proponent is responsible for managing and sharing project data as specified in **Section 6.4**.

RWA will continue to revisit progress on implementing strategies annually, following up with relevant stakeholders and project proponents. Progress and lessons learned will then be reported to all stakeholders on the ARB list serve and through the Opti Web site. Reaching out to stakeholders has a twofold purpose:

- To inform the Region of ongoing progress and of those who are actively participating
- To report progress on strategies and projects to stakeholders and ensure relevant efforts are not going unnoticed and to promote continued participation in the IRWMP effort

Progress on strategies implies that progress on objectives is also being made. Objectives related to each strategy will be listed in an annual progress summary that will be distributed to stakeholders. Distributing

and communicating progress will in turn inform stakeholders on possible important projects that still need to be developed and implemented as well as any strategy additions or changes that may be needed.

6.3.2. Monitoring Plan for Projects

Depending on funding source requirements, each ARB project will have a monitoring plan, to measure progress not only for the purpose of the ARB IRWMP but also to ensure success of a specific project. Developing and submitting a project monitoring plan and measures to remedy encountered problems will usually be a requirement when receiving external funding (again, depending on funding source). It is important to note that RWA does not have authority to mandate monitoring plans absent requirements from funding sources. However, RWA will provide examples of monitoring plans when not required by specific funding sources, and will promote the value of these plans to regional stakeholders. From past experience, RWA typically obtains the following information in monitoring plans:

- Reports of any quantifiable data being collected that relates to ARB strategies, including what is being measured, units, and date and location of data collection
- Report of any qualitative information that relates to qualitative ARB strategies with the date of description
- Monitoring schedule and frequency of above data collection
- Funding sources of the monitoring plan
- List of any data that apply to this monitoring plan or procedures on how to manage collected data

Examples of types of monitoring a project proponent could engage in are listed by goal in **Table 6-3**.

Table 6-3. Example Types of Monitoring

ARB Goal Category	Types of Monitoring
Water Resources	<ul style="list-style-type: none"> • Stream flow data • Surface water deliveries • Recycled water deliveries • Groundwater elevation and extraction
Water Quality	<ul style="list-style-type: none"> • Water quality monitoring (surface water, groundwater, recycled water) • Discharge monitoring • Violations of any discharge requirements
Environmental Resources	<ul style="list-style-type: none"> • HCP monitoring • GHG monitoring • CEQA/NEPA compliance
Flood Management	<ul style="list-style-type: none"> • Discharge monitoring • Improved level of flood protection
Community Stewardship	<ul style="list-style-type: none"> • Customer/community participation • Outreach to local officials

Key:
 ARB = American River Basin
 CEQA = California Environmental Quality Act
 GHG = greenhouse gas
 HCP = Habitat Conservation Plan
 NEPA = National Environmental Policy Act

6.4. Data Management

Data management is an important aspect of continued implementation of the ARB IRWMP and projects in the Region. Data management can be characterized by how data are collected, stored or maintained, and disseminated or made available to outside users. This section describes data management for projects and regional programs, starting with an overview of ARB project data needs and a description of common data sources for ARB projects. ARB stakeholders monitor data and also contribute to some of these data systems. Next, data gaps in the Region are identified along with a potential way of addressing them. Finally, the last section specifically discusses data management efforts that support statewide data needs.

6.4.1. Overview of IRWMP Project Data Needs

ARB project proponents and their projects require data to plan, design, implement, and monitor their projects. The natural (e.g., hydrologic) and anthropogenic (e.g., land-use conversion) systems of the Region have been extensively monitored for many years. Many of the historical, current, and future monitoring programs pertaining to the Region are useful to the development and implementation of ARB IRWMP projects. Examples of ARB project data needs are listed in **Table 6-4**.

Table 6-4. Sample List of Data Needed for Current and Future IRWMP Projects

Type of Data	Type of IRWMP Project				
	Water Resources	Water Quality	Environmental Resources	Flood Management	Community Stewardship
Surface Water Flows	X	X	X	X	
Surface Water Deliveries	X				
Recycled Water Deliveries	X	X			X
Groundwater Surface Elevations	X				
Groundwater Pumping	X	X			
Hydrogeological Data	X				
Precipitation	X	X		X	
Water Demand	X				X
Water Related Facilities – Location and Size	X	X			
Surface Water, Groundwater, and Recycled Water Quality		X	X	X	
Discharge Monitoring		X	X	X	
Contaminant Plume Locations and Extents	X	X			
Violations of Discharge Requirements		X	X		
Locations of Sensitive Habitats and Species		X	X		
CEQA/NEPA Compliance			X		
Flooding and Floodplain Information				X	
Demographic Data	X	X	X	X	X
Land Use	X	X	X	X	X
Outreach-related Data (e.g., attendance)	X	X	X	X	X
Outreach to Local Officials	X	X	X	X	X

Note: This table shows general data needs for projects. Specific needs of each project will differ.

Key:

CEQA = California Environmental Quality Act

IRWMP = Integrated Regional Water Management Plan

NEPA = National Environmental Policy Act

6.4.2. Frequently Used Data Sources

The above-identified data are available from various sources, including federal, state, and local agencies.

Table 6-5 lists some of the most frequently used databases, including data that were monitored and collected, as well as data outputs from existing numerical models often owned by these agencies. Many of these databases are managed by federal or state entities, external to the Region and authority of the RWA and ARB stakeholders. Water resource-related datasets reside with numerous state, local, and federal

agencies. Furthermore, collection techniques and quality assurance/quality control procedures depend on each data management system. Recognizing these challenges, the Open and Transparent Water Data Act (AB 1755) was signed into law in 2016. AB 1755 requires DWR, in consultation with the California Water Quality Monitoring Council, State Water Board, and California Department of Fish and Wildlife, to create, operate, and maintain a statewide integrated water data platform; and develop open-data protocols for data sharing, transparency, documentation, and quality control. In March 2018, the CNRA unveiled the Open Data Platform and Portal, a new online source for data on the state’s natural resources, including water. DWR will integrate the Open Data Platform and Portal with other water-data platforms and add state and federal agency datasets related to water. The water-data platform will be operational with state agency datasets by September 2019. Federal agency datasets will be added by August 2020.

Many ARB stakeholders have monitoring and/or reporting requirements. These stakeholders often work with the relevant state or federal agency to collect and add these data to the larger scale databases. Examples include data collection and reports associated with Urban Water Management Plans (UWMP) (DWR requirement) and National Pollutant Discharge Elimination Program permits (EPA and Central Valley Regional Water Board requirement). SGMA requires GSAs to develop groundwater monitoring protocols and submit annual reports to DWR on progress towards achieving groundwater sustainability within the basin. Monitoring and reporting for IRWM projects that address groundwater sustainability may be included as part of these annual reports. This local contribution of data to larger scale, statewide or national databases is identified in the last column of **Table 6-5**. Public information reported to state or federal agencies will be included as part of the AB 1755 water-data system.

Other databases mentioned in **Table 6-5** are maintained by local ARB agencies, such as Sacramento Groundwater Authority’s HydroDMS that monitors groundwater elevations and many other groundwater-related data items. The Sacramento Area Council of Governments is another local agency that compiles, analyzes, and disseminates demographic data for the local six-county (Sacramento, Placer, El Dorado, Yolo, Sutter, and Yuba counties) area.

The information contained in these data management systems, when shared, can provide a more accurate picture of the state of the Region. As the RWMG, RWA will maintain and track progress of the IRWMP, which is also a regional database. As mentioned earlier, progress on IRWMP objectives and strategies will be reported to stakeholders via a list serve as well as through the Opti Web site. Any stakeholder may also post announcements and links pertaining to available data and project information on Opti.

Table 6-5. Frequently Used Data Sources and Their Management Systems

Type of Data	Name of Data Management System	Responsible Party	Location of Data Maintenance and Dissemination Method	ARB Stakeholders Contributing Data
Climatic Data	Western Region Climate Center	Desert Research Institute	http://www.wrcc.dri.edu	N/A
Evapotranspiration	California Irrigation Management Information System	DWR	http://www.cimis.water.ca.gov/	N/A
Watershed Delineations	Watershed Boundary Dataset	USDA, NRCS	http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/water/watersheds/dataset/	N/A
Stream and River Flows and Stages	California Data Exchange Center	DWR	http://cdec.water.ca.gov/	N/A
Stream and River Flows and Quality	Water Data for the Nation	USGS	http://waterdata.usgs.gov/nwis	N/A
Stream and River Water Quality	303(d) Impaired Waters List	U.S. EPA and Central Valley Regional Water Quality Control Board	http://www.swrcb.ca.gov/rwqcb5/water_issues/tmdl/impaired_waters_list/index.shtml	Agencies with NPDES permits
Reservoir Operations Data	CVO Reports	Reclamation	http://www.usbr.gov/mp/cvo/	N/A
Surface Water Deliveries and its Quality; Water Related Facilities— Location & Size; Water Demand	Urban Water Management Plans, Capital Improvement Programs, and other water supply-related plans	Water Supply Agencies	See each plan or document. Contact RWA or each agency for available data.	Water Supply Agencies
Groundwater Surface Elevations and Quality	California Statewide Groundwater Elevation Monitoring	DWR	https://www.water.ca.gov/Programs/Groundwater-Management/Groundwater-Elevation-Monitoring--CASGEM	Groundwater Management Authorities and GSAs

Table 6-5. Frequently Used Data Sources and Their Management Systems (contd.)

Type of Data	Name of Data Management System	Responsible Party	Location of Data Maintenance and Dissemination Method	ARB Stakeholders Contributing Data
Groundwater Surface Elevations and Quality; Hydrogeological Data; Contaminant Plume Locations and Extents	GSPs or Alternatives to GSPs	Groundwater Management Authorities (WPC, SGA, SCGA, SAWC); GSAs	Data exchange among managers has readily occurred. See GMPs, GSPs, and Basin Reports. Contact each agency for available data. Visit the SGMA Portal for copies of GSPs and Alternatives to GSPs, once developed: https://sgma.water.ca.gov/portal/	Groundwater Management Authorities; GSAs
Groundwater Surface Elevations and Quality of North American Groundwater Subbasin	HydroDMS	SGA	Data exchange among managers has readily occurred. Contact SGA for available data.	SGA
Groundwater Surface Elevations and Quality of South American Groundwater Subbasin	HydroDMS	SCGA	Data exchange among managers has readily occurred. Contact SCGA for available data.	SCGA
Underground Storage Tanks (UST) and On-site Wastewater Treatment Systems (OWTS)	N/A	Sacramento County EMD and Central Valley Regional Water Board	http://www.waterboards.ca.gov/water_issues/programs/ust/ ; http://www.waterboards.ca.gov/water_issues/programs/owts/	N/A
Contaminant Plume Locations and Extents	N/A	Former Air Force Bases (e.g., McClellan and Mather Field) and Corporations (Aerojet)	Reports monitoring to Central Valley Regional Water Quality Control Board.	Groundwater Authorities
Cleanup Sites and Hazardous Waste Facilities	EnviroStor	California Department of Toxic Substances Control	http://www.envirostor.dtsc.ca.gov/public/	N/A

Table 6-5. Frequently Used Data Sources and Their Management Systems (contd.)

Type of Data	Name of Data Management System	Responsible Party	Location of Data Maintenance and Dissemination Method	ARB Stakeholders Contributing Data
Groundwater Pumping	UWMPs, GSPs and Alternatives to GSPs	Water Supply Agencies; GSA	See UWMPs, GSPs, and water supply-related management plans. Contact each agency or groundwater sustainability agency for available data. Visit the SGMA Portal for copies of GSPs and Alternatives to GSPs, once developed: https://sgma.water.ca.gov/portal/ .	Water Supply Agencies; GSAs
Locations and information on Sensitive Species	California Natural Diversity Database	CDFW	http://www.dfg.ca.gov/biogeodata/cnddb/	Environmental Resources-related agencies (e.g., TNC, Ducks Unlimited)
Locations and information on Sensitive Habitats	The Vegetation Classification and Mapping Program	CDFW	http://www.dfg.ca.gov/biogeodata/vegcamp/	Environmental Resources-related agencies (e.g., TNC, Ducks Unlimited)
Stormwater infrastructure, flows, and quality	SWMPs, NPDES permits	Counties and Cities, including Sacramento Stormwater Quality Partnership	See Stormwater Management Plans and monitoring requirements associated with NPDES permits. Contact each agency for information.	Counties and Cities

Table 6-5. Frequently Used Data Sources and Their Management Systems (contd.)

Type of Data	Name of Data Management System	Responsible Party	Location of Data Maintenance and Dissemination Method	ARB Stakeholders Contributing Data
Flood infrastructure and flooding data	CVFMPP and SFMPP documents	DWR	See state flood documents (includes information on federal structures)	N/A
Flood infrastructure and flood maps	N/A	Local flood agencies (e.g., SAFCA)	Contact each agency	Local flood agencies (e.g., SAFCA)
Demographic Data	U.S. Census	U.S. Census Bureau	http://www.census.gov/main/www/access.html	N/A
Demographic Data, Land Use Data	SACOG Information Center, California Department of Finance	SACOG, State of California	http://www.sacog.org/demographics/ , http://www.dof.ca.gov/	Counties and Cities
Outreach-related Data (e.g., attendance)	N/A	ARB Project Proponents	Many agencies and projects require outreach and these data should be publically available	ARB Project Proponents

Key:

ARB = American River Basin
 CDFW = California Department of Fish and Wildlife
 Central Valley Regional Water Board = Central Valley Regional Water Quality Control Board
 CVFMPP = Central Valley Flood Management Planning Program
 CVO = Bureau of Reclamation, Central Valley Office
 DMS = data management system
 DWR = California Department of Water Resources
 EPA = Environmental Protection Agency
 GMP = groundwater management plan
 GSA = groundwater sustainability agency
 GSP = groundwater sustainability plan
 NRCS = Natural Resources Conservation Service
 Reclamation = U.S. Department of the Interior, Bureau of Reclamation

RWA = Regional Water Authority
 SACOG = Sacramento Area Council of Governments
 Sacramento County EMD = Sacramento County Environmental Management Department
 SAFCA = Sacramento Area Flood Control Agency
 SAWC = South Area Water Council
 SCGA = Sacramento Central Groundwater Authority
 SFMP = Statewide Flood Management Planning Program
 SGA = Sacramento Groundwater Authority
 TNC = The Nature Conservancy
 USDA = U.S. Department of Agriculture
 USGS = U.S. Geological Survey
 UWMP = urban water management plan
 WPC = Western Placer County

6.4.3. Data Gaps

Holding conversations among multiple stakeholders to develop and then update the ARB IRWMP strategies have continued to make evident some data gaps in the Region. Some strategies are geared towards filling these identified data gaps (e.g., Strategy WQ7 and CS3). Other strategies were placed in a “Parking Lot,” as shown in **Table 5.6**, and stakeholders are currently working together to compile data to form effective strategies. As the IRWMP is implemented, new data gaps will be identified, and each will continue to be addressed by either becoming a strategy itself or by initiating a data compilation effort to inform a strategy. The adaptive characteristic of strategies allows identifying data gaps and addressing them to be both an iterative and collaborative process.

6.4.4. Support of Statewide Data Needs

As noted in **Section 6.4.2**, ARB stakeholders contribute data to some statewide databases, including programs administered by the State Water Board and DWR. ARB stakeholders have supported statewide data needs in the past by voluntary participation in the State Water Board’s Groundwater Ambient Monitoring Assessment program. ARB stakeholders are actively participating in the California Statewide Groundwater Elevation Monitoring program. In addition, data collection will continue to be coordinated and shared with the California Environmental Resource Evaluation System, Surface Water Ambient Monitoring Program, and other statewide efforts when appropriate and feasible.

SGMA placed significant new requirements on local agencies to collect and report water management information to the state to demonstrate sustainable groundwater management through implementation of GSPs. GSPs, which will be submitted to DWR, must include data on recharge areas, groundwater levels, groundwater quality, subsidence, and groundwater-surface water interaction. Multiple GSAs in the same subbasin must also coordinate to ensure that the same groundwater elevation and extraction, surface water supply, and total water use data are used. A single data management system must be developed for each subbasin. GSAs in the Region are currently working to develop a coordinated data management system in each subbasin and share data and other information relevant to development of the GSPs.

The ARB SWRP and West Slope SWRP, incorporated as part of this IRWMP, also include discussions on stormwater data collection and management. The ARB SWRP and West Slope SWRP discuss the mechanisms by which data will be stored and managed, how data will be available to stakeholders and the public, how existing water quality and water quality monitoring data will be made available, how often data will be updated, and how data gaps will be identified. By properly managing data, stormwater project proponents, stakeholders, interested parties, elected officials, and the public will better understand water

quantity and quality issues, be able to assess and develop additional potential projects as solutions, and implement projects efficiently.

6.5. Benefits and Impacts of IRWMP Implementation

There are numerous potential benefits and impacts that will result from implementation of the IRWMP. Participation in an integrated, region-wide effort alone has inherent benefits, such as increased regional understanding, economies of scale, and fostering support. These are described briefly below:

- **Increasing Regional Understanding** – By working together as a cohesive group, each party gains a deeper understanding of the effects of its projects on other parties, as well as the effects of other’s projects on its own organization. This in turn assists in developing projects that minimize the types of interagency conflicts that can ultimately prevent projects from gaining the support necessary for successful implementation. As examples, future stormwater project implementation and ongoing groundwater management efforts in the Region will require cooperation between multiple agencies.
- **Economies of Scale** – Many of the agencies in the Region use common sources, or combinations of sources of water supply. As a result, many agencies share the same water management challenges. By developing integrated regional approaches to water management together, resources can be pooled, maximizing efficiency on a regional scale that can be of importance when the Region is adapting to climate change or confronting drought conditions. In this way, existing resources can be optimized, duplication of efforts can be avoided, and larger scale efforts can be established, potentially providing a greater benefit than from individual efforts alone.
- **Fostering Support** – When planning is conducted on a regional scale, more parties are involved in projects and more diversity of opinion is introduced in the process, which generally yields better, more informed projects. In collaborative processes, each stakeholder brings his or her own values and priorities to the process, which is ultimately reflected in the plan. This results in projects that not only minimize impacts to more stakeholders, but incorporate benefits to more stakeholders as well. When more benefits are realized and impacts avoided, more support follows.

In addition to these overall benefits, there are expected benefits and impacts of ARB IRWMP projects and programs. This section describes the benefits and impacts from plan implementation at a screening level, including:

Section 6 ***IRWMP Implementation***

- Potential benefits in the Region
- Potential impacts in the Region
- Potential interregional benefits and impacts
- Benefits and impacts to DACs and native tribes

Project proponents quantified these project benefits and impacts where possible during the project submission process. While the project submission form asks about them, the ARB IRWMP itself does not require compliance with California Environmental Quality Act, National Environmental Policy Act, or other local, state, or federal permitting requirements. However, if it is determined that environmental compliance is required for individual projects, the project proponent must prepare appropriate documentation. Benefits and impacts are developed in more detail for each project as part of any required environmental documentation process. In addition to consideration of environmental impacts and benefits, project proponents are asked to consider impacts and benefits related to DACs and tribal communities.

6.5.1. Potential Benefits in the Region

By their nature, IRWMPs are implemented through projects. As of June 2018, the Region's stakeholders have added some 315 projects into the Opti project database, of which 185 total projects have been scored. IRWM projects will continuously evolve as project proponents can submit and update projects in Opti at any time.

Based on information provided by ARB project proponents, proposed projects will achieve multiple benefits by helping the Region meet its objectives. Each project proponent will further examine project-specific benefits as each project is implemented. **Figure 6-1** illustrates that of the scored projects that had at least one objective identified, many had identified multiple objectives. Many projects meet two to four objectives.

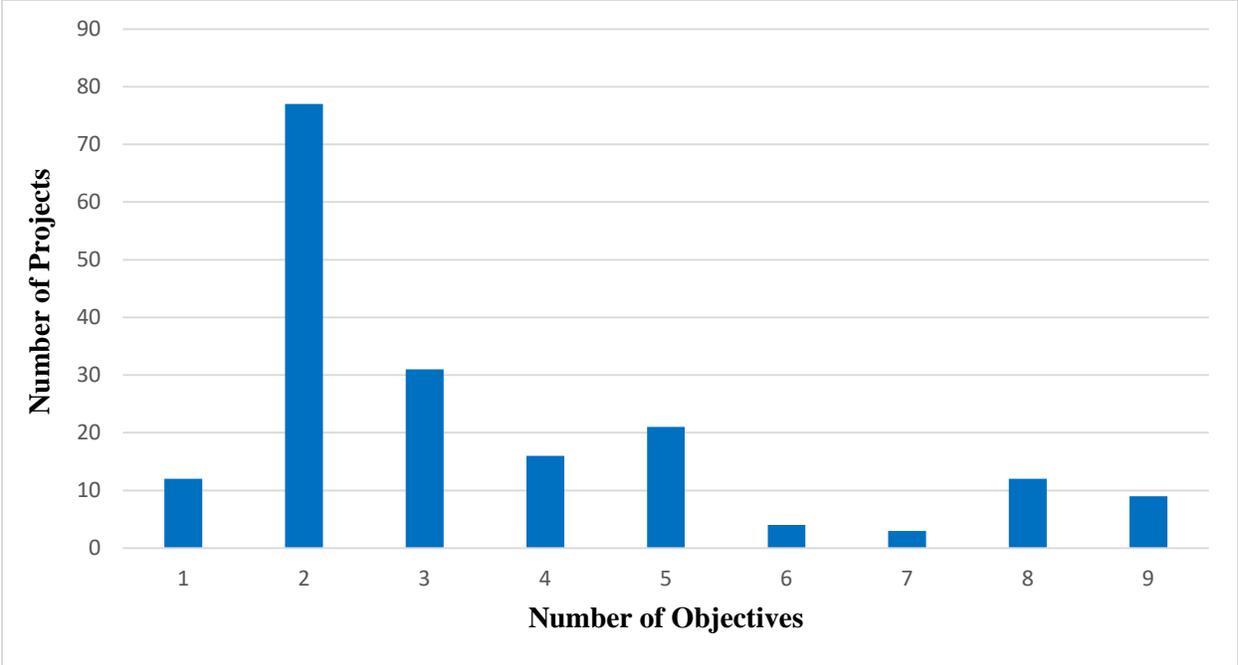


Figure 6-1. Distribution of Projects Meeting Multiple Objectives

Table 6-6 below describes how the set of projects, vetted at the time of this IRWMP adoption, addresses each of the 18 objectives. Refer to **Table 5-2** for a description of each of these objectives.

Table 6-6. Benefits of Plan Implementation by ARB IRWMP Objective

<p>1. Meet current and future water resources needs.</p> <p>Projects help the Region achieve this broad objective from numerous perspectives. Water supply infrastructure maintenance, improvements, expansions, and construction projects increase the Region’s water reliability and create additional opportunities for improved water operation and conjunctive use. Projects that involve resource management plans directly address future water needs. Some projects, such as water metering, improve potable water use efficiency, while others encourage recycled and reclaimed water use to expand the Region’s water portfolio.</p> <p>Many stormwater and flood-related projects approach this objective from perspectives of groundwater recharge and water quality protection, which both help to secure future water resources. A few projects specifically study groundwater contamination and its transport, which addresses groundwater quality concerns.</p>
<p>2. Increase water use efficiency.</p> <p>Projects help the Region achieve this objective by encouraging the use of recycled water for irrigation and industrial demands. This decreases the total amount of water used as a Region. Other projects focus on reducing water losses by upgrading infrastructure to require less operational water or to decrease seepage; by improving monitoring and controlling water transfers; and by decreasing water use by residents, land owners, and small farms.</p>
<p>3. Improve ability to reliably meet water needs during dry or emergency conditions.</p> <p>Projects help improve the Region’s ability to meet water demands during dry or emergency conditions by decreasing water demand, increasing redundancy in water supplies, protecting groundwater as a dry-year resource, and/or promoting drought-proof supplies. Projects that decrease demand emphasize end-user efficiency. Projects that increase redundancy in water supplies involve the construction of emergency interconnections and pumps to create new water wheeling opportunities. Some projects increase surface water storage and treatment capacity for use during dry years. Conjunctive use programs and projects that have groundwater recharge benefits will help dry and emergency situations as well. Groundwater quality protection is also important. Finally, many recycled and reclaimed water projects encourage and develop the use of this reliable resource.</p>
<p>4. Increase the use of recycled water for appropriate uses.</p> <p>Wastewater agencies throughout the Region have proposed projects to expand the use of recycled water. These projects involve the financing and construction of new distribution pipelines and seasonal storage. Other projects focus on improving recycled water quality for wider acceptability. This improvement can occur through the installation of new technology (e.g., biological nutrient removal) or by improving wastewater quality before flows reach the wastewater treatment plant through an effective Fats, Oil, and Grease (FOG) program. Finally, recycled water projects involve finding new uses for this water supply, including power generation plants, wetlands, agriculture, and golf courses.</p>
<p>5. Remediate contaminated groundwater and reuse it to the extent feasible.</p> <p>This objective encourages project proponents to view remediated groundwater as a potential resource. Projects that address this objective will attempt to find partners that can make use of reclaimed water. Pipelines, pumps, and other infrastructure will then be constructed to allow for adequate distribution. Only certain agencies within the Region have the opportunity to use remediated water, but use of this water source would decrease reliance on other water resources.</p>

Table 6-6. Benefits of Plan Implementation per ARB IRWMP Objective (contd.)

<p>6. Improve protection of beneficial uses of surface water and groundwater.</p> <p>This objective addresses water quality issues in the Region. Some projects provide water quality benefits by decreasing source pollution. This includes educating individuals and farmers about best management practices (BMP) to optimize the use of both water and potential runoff contaminants. Low Impact Development (LID) methods decrease urban runoff. Sanitation district FOG outreach programs help remove those constituents from wastewater and potential runoff from landfills. Projects that include improved wastewater treatment decrease nutrient loading into waterways. One project also involves stabilizing spillway channels to decrease sediment loading further downstream.</p> <p>Other projects provide water quality benefits by increasing mitigation or creating a barrier between the contaminant source and waterways. Floodwater detention basins and the habitats they provide can help to physically and biologically treat runoff. Upgrading a water supply canal into a pipe protects raw water from runoff contamination. Projects that destroy abandoned wells effectively eliminate a route for contamination to enter the aquifer.</p> <p>Several projects involve watershed or groundwater modeling studies of contaminants to determine the type of management activities that will be needed in the future. Projects to develop groundwater management plans provide similar benefits as well.</p> <p>Finally, because water quality is influenced by water quantity, recycled water projects and some conjunctive use projects help decrease overall use, thus improving water quality by diluting contaminants in waterways.</p>
<p>7. Recharge and reuse stormwater and urban runoff to the extent practicable.</p> <p>Several projects that promote LID methods, such as detention basins, wetland preservation, and floodplain reconnection, will help to increase groundwater recharge. Similarly, aquifer storage and recovery (ASR) projects artificially store runoff for future use.</p>
<p>8. Maintain and improve the ecosystem function of area streams and watersheds.</p> <p>Ecosystem functions refer to various natural processes, such as stream meandering or nutrient cycling. Projects help maintain or improve ecosystem functions through preservation of open space, vernal pools, or riparian areas and by retiring farmland.</p> <p>Many projects have benefits in hydrological and geomorphological processes by helping to restore surface flows, removing barriers, stabilizing or recontouring river banks, and capturing runoff in detention basins or floodplains.</p> <p>Other projects provide benefits for nutrient cycling and aquatic processes by improving water quality. These projects range from installing better treatment plants to enhancing natural filtration, natural buffers, and BMPs.</p> <p>Further, some projects include benefits to life cycles of species by removing barriers and reducing habitat fragmentation. These projects include benefits such as habitat restoration, management of invasive species, and enhancement of biodiversity. Improving nutrient and life cycles also has carbon sequestration benefits.</p> <p>Finally, some projects involve modeling studies and water management plans, which will allow project proponents to consider ecosystem functions when making future water decisions.</p>
<p>9. Maintain and improve habitat of area watersheds.</p> <p>Projects that produce high-quality recycled water provide an additional water supply for wetlands and conservation easements, which serve as important habitat for many species. These projects also improve habitat quality in the Sacramento-San Joaquin River Delta (Delta) by redirecting treated wastewater flows to beneficial-use locations.</p> <p>Some projects provide increased instream flows by reducing surface water diversions during periods of drought. This helps to maintain aquatic and riparian habitats that provide breeding and foraging habitat for special-status species.</p> <p>Projects that use LID methods, such as detention basins and constructed wetlands, not only treat runoff, but also provide habitat benefits.</p> <p>Finally, other projects involve the direct creation, enhancement, or restoration of habitat areas, such as marches, woodlands, and floodplains, which support a variety of threatened and endangered species.</p>

Table 6-6. Benefits of Plan Implementation per ARB IRWMP Objective (contd.)

<p>10. Conserve natural riparian buffers in undeveloped portions of local watersheds and restore buffers in developed areas when possible.</p> <p>This objective recognizes that conservation, not just restoration, of existing riparian habitat is important. Projects with conservation benefits include those that specifically preserve land adjacent to waterways by implementing conservation easements, creating open space preserves, or placing land under permanent county protection.</p> <p>Projects that include LID methods, such as drainage basins and corridor enhancements, as well as floodplain and riparian area restoration projects, will help to conserve existing native habitat. A project with invasive species management will help conserve native vegetation by removing nonnative competitors. Finally, other projects that restore groundwater levels near rivers or reduce the use of surface water will help restore surface flows.</p>
<p>11. Increase the capacity of the flood management system to meet applicable standards for designated areas and land uses.</p> <p>These projects improve the capacity of the flood management system by increasing channel capacities. This can involve infrastructure improvements of flood structures, but most flood projects involve creating detention basins to store runoff after large storm events or securing land next to waterways to expand the floodplain and diffuse floodwaters. These actions can provide greater protection for downstream communities during periods of flooding.</p> <p>Some of these projects create flood corridors that are reserved for wildlife habitat and flood protection, thus eliminating the possibility of future development in these flood-prone areas.</p>
<p>12. Maintain and improve levees and other flood related infrastructure to reduce flood risk.</p> <p>Some flood projects reduce flood risk by rehabilitating aging levees and channels. This increases conveyance capacity and reduces the possibility of erosion and levee breaches. Infrastructure improvements include levees, detention basins, drainage canals, and weirs. Weirs allow for better management of flood flows.</p>
<p>13. Maintain and restore/reconnect floodplains to provide flood storage and other benefits to reduce flood risk and increase groundwater recharge.</p> <p>Restoration, detention basins, conservation easements, and other projects will reconnect floodplains to adjacent channels by removing barriers and recontouring banks. These projects achieve both increased habitat functionality and flood storage capacity.</p>
<p>14. Improve management of residual flood risks.</p> <p>Residual flood risk is the flood risk that still remains after structural and nonstructural flood management measures have been implemented. This risk is managed by emergency and contingency plans. It may also involve increasing awareness and preparing citizens for such flood events.</p>
<p>15. Increase awareness of the need for, benefits of, and practices for maintaining sustainable water resources.</p> <p>For some projects, direct stakeholder or constituent participation is necessary for implementation, such as water efficiency education classes or a FOG program that collects oil from restaurants. These projects will directly increase awareness. Other projects, such as water metering, target increase in awareness of the public through economic incentives. For projects that create or enhance wildlife and floodplain areas, recreational facilities and interpretive signage will inform the public about the flood management and/or ecosystem benefits of these locations. Finally, other projects, such as recycled water projects, include outreach efforts in forms of brochures to garner support.</p>
<p>16. Improve integration of water resources planning with land use planning.</p> <p>Projects help integrate water resources planning and land-use planning by coordinating with land-use agencies in the project areas. Through this coordination, some projects will preserve floodplain property from development, ensuring that this flood-prone land is used instead as wildlife habitat or recreational fields. Such actions help to decrease the liability and damage that flooding can cause in these areas. Recycled water projects require coordination with land-use planning as well, to plan distribution pipelines.</p>

Table 6-6. Benefits of Plan Implementation per ARB IRWMP Objective (contd.)

17. Increase sharing of information, studies, and reports to further advance integrated regional water management.

Data collected during the implementation of many of the projects will be compiled in studies and reports and will be made available to interested agencies and stakeholders within the Region. Some projects are pilot projects, where one of the purposes of the project would be information sharing. Many projects also have multiple partners, and many of these project proponents are members of multimember authorities or agencies. Information about these projects will be visible and will be accessible to agencies in these circles.

For projects involving regional surface and groundwater modeling, information will be collected from agencies throughout the Region to develop model inputs. Once the modeling is complete, the resulting outputs and analyses will be shared with the entire Region.

18. Manage the Region’s groundwater basins sustainably.

This objective addresses sustainably managing the quantity and quality of the Region’s groundwater resources. GSPs currently being developed for the North American, South American, and Cosumnes groundwater basins will identify specific actions and projects to achieve sustainability no later than 2042. These projects will be implemented by locally-formed GSAs and partner agencies.

Before completion and approval of the GSPs, projects may still support the long-term objective of sustainable groundwater management. LID methods increase water runoff infiltration, while also improving runoff quality. Stormwater runoff capture and use projects can reduce demand for groundwater sources, especially for on-site non-potable uses such as outdoor irrigation. Conjunctive use projects store surface water in groundwater basins in wet years when supplies are plentiful, and withdraw it from basins in dry years.

Key
ARB = American River Basin
IRWMP = Integrated Regional Water Management Plan

6.5.2. Potential Impacts in the Region

Implementation of projects in the ARB IRWMP will also have impacts. Some anticipated impacts are local and temporary, associated with construction. Other potential impacts require appropriate foresight and management to mitigate or minimize them. There also may be financial impacts, related to costs to the community for implementing a project or program. Project-level impacts are unavoidable, but effective IRWM ensures that benefits from multiple projects outweigh the costs and that benefits are shared as equitably as possible. **Table 6-7** identifies potential impacts of different types of ARB projects.

Table 6-7. Potential Impacts of Types of ARB Projects

Project Type	Potential Impacts
Water supply projects	<ul style="list-style-type: none"> Increasing water supplies for human consumption and ensuring supply reliability may increase the challenge of balancing environmental needs.
Water efficiency projects	<ul style="list-style-type: none"> Water efficiency projects may result in decreased aggregate water use, reducing revenue for water supply agencies. This may also lead to a reduced amount of water available for water recycling.
Groundwater projects	<ul style="list-style-type: none"> Improperly implemented, these projects can damage the aquifer, introduce contaminants or further spread contamination plumes, increase greenhouse gas emissions (through energy use for pumping), or may lower the water table at a local or regional scale.
Wastewater and recycled water projects	<ul style="list-style-type: none"> Advanced treatment may require more chemical and energy use, increasing costs and greenhouse gas emissions. Projects that increase recycled water use could detrimentally decrease the amount of wastewater (flow) returning to the environment and impact species that rely on this water. Recycled water projects could increase salt and nutrient loading to groundwater basins.
Projects that involve construction, including restoration projects	<ul style="list-style-type: none"> Construction creates temporal impacts from excavation, which disrupts the surrounding areas.
Environmental resources projects	<ul style="list-style-type: none"> Unless properly managed, environmental projects that create new habitats may also create additional water demands, with potential effects on overall water supply reliability.
Flood and stormwater management projects	<ul style="list-style-type: none"> Projects that only examine local flooding effects may shift risk from the project location to another area in the watershed by changing flow patterns and/or increasing contaminants. Reconnecting and expanding a floodplain area may require taking that land out of current land uses, impacting the landowner. Better flood management may reduce understanding and acknowledgement of actual ongoing flood risks by the public.

Additionally, there could be impacts if the ARB IRWMP and/or its component projects are not well-managed or implemented. These impacts may include:

- Increased project/program costs to agencies and rate payers/constituents
- Delayed construction/operation of planned facilities and programs, and therefore delaying or decreasing intended benefits (e.g., delayed water supply reliability benefits)
- Delayed construction/operation of planned facilities and programs, leading to increased or prolonged negative impacts (e.g., increased impacts on water quality and fisheries)

Specific impacts of projects would need to be identified by project proponents during preparation of environmental and permitting activities before project implementation.

6.5.3. Potential Interregional Benefits and Impacts

Projects contained in the IRWMP not only benefit local agencies but will be beneficial to neighboring areas. This is especially true for projects that affect watersheds or groundwater basins, because these boundaries often extend beyond the Region. Jurisdictional boundaries extend beyond the Region as well, which may transfer project benefits/impacts. Specific interregional benefits and impacts would need to be considered at the time of implementation of projects that may have a relationship to adjacent IRWM management areas. Coordination is documented with these groups in **Section 3.4**. As the RWMG, RWA would ensure that communication of any relevant projects occurs before implementation commences.

6.5.4. Benefits and Impacts to DACs and Native Tribes

As described in **Section 3.1.4 and 3.1.5**, DACs and environmental justice (EJ) concerns in the Region are generally not characterized by isolated communities with water supply, water quality, or wastewater service availability concerns. The exception may be small pockets of the Region served by small water systems and/or private wells. Flood risk issues may also disproportionately affect DACs as well, as many DACs are located in high-risk floodplains. Some projects that will benefit DAC and EJ concerns could include the following:

- Infrastructure improvement projects that benefit DAC pockets in larger service areas
- Groundwater quality projects that improves water quality in small systems
- Flood management projects that help protect high-risk DAC communities

Moving forward, the Region will ensure that implemented projects or programs do not create new DAC or EJ concerns.

Two groups of Native American tribes reside in the Region. Some projects that will benefit tribes could include the following:

- Ecosystem and riparian improvement projects that support traditional uses such as fishing and gathering
- Flood management projects that protect heritage sites

The Region does not believe there to be large tribal water concerns. However, outreach to encourage their participation in this IRWMP is still ongoing, as described in **Section 3.1.5**. Following additional collaboration, tribal-related water concerns and means to address them will be identified during IRWMP implementation.

6.6. IRWMP Adaptability to Future Situations

The 2018 ARB IRWMP Update and associated planning is meant to be a living process that is routinely and continually updated to reflect the evolving needs of the Region and stakeholder communities. In addition, the Region recognizes that there are inherent uncertainties in the planning process, especially those associated with climate change. The Region will adaptively manage implementation of the plan and associated projects to respond to these uncertainties.

The Climate Change Handbook for Regional Water Planning describes adaptive management as “identifying and monitoring the most important uncertainties and translating them into risk triggers or early warning indicators” (EPA and DWR 2011). Adaptive management is a central part of the Region’s IRWM planning and implementation process. As described in **Section 2.10**, the Region has completed a number of studies and technical analyses to identify regional uncertainties, vulnerabilities, and adaptation and resiliency measures. These studies include the climate change assessment conducted for the 2013 ARB IRWMP Update, NAB RDCP, RWRP, and Sacramento and San Joaquin Rivers Basin Study. Other local regional and local planning efforts that address climate change impacts include climate action plans, sustainability plans, general plan updates, local hazard mitigation plans, and urban water management plans.

In addition, the ongoing ARBS and ARB Water Marketing Strategy Project will further identify and refine regional vulnerabilities and adaptation measures and identify a path for implementation. The ARBS will examine strategies to integrate or better coordinate local and federal water management practices, incorporate new scientific information on climate change that are specific to the Region, and address significant recent changes in conditions and regulatory requirements related to the CVP and regional water management. This includes the Biological Opinions for endangered fishery species protection and protection of the Sacramento-San Joaquin Delta, SGMA implementation, and water rights administration in drought conditions. The ARB Water Marketing Strategy Project will evaluate the potential for water market asset development; determine the infrastructure investments needed to realize that market; and formulate an implementation plan that includes recommendations on governance, reporting and monitoring procedures.

The Region will use new information and tools developed as part of the ARBS, ARB Water Marketing Strategy Project, and other future planning efforts to re-assess IRWMP strategies and projects. In addition, the Region will use IRWMP and project performance monitoring, described in **Section 6.3**, to re-assess any uncertainties and, if necessary, re-identify vulnerabilities and adaptation measures. Adapting the IRWMP to future situations will involve the update of specific elements, such as projects and strategies, on a fairly continuous basis. Other more static elements, such as the vision and goals, will require updates less often and at an undetermined frequency.

As described in **Section 5**, the IRWMP Framework and its strategies and projects support adaptability to future situations, as both of these elements are designed to be dynamic and adaptive. The list of IRWMP projects will be updated and reported quarterly. Projects can be submitted on the Opti Website at any time, as described in **Section 5.7**, and other stakeholders will have access to this information in real time. RWA will score these new projects every quarter, (unless the project is under a shorter funding application deadline), and stakeholders will vet the projects and their scores for formal addition to the IRWMP. Therefore, the list of approved projects will always be aligned to regional and statewide priorities. The Opti Website also provides a means for stakeholders throughout the Region to communicate, supporting ongoing awareness and integration. As noted in **Section 5.6**, new strategies can also be modified, suggested, reviewed by stakeholders, and added formally to the IRWMP quarterly. New strategies will likely be needed as older strategies are completed, with new stakeholders, or new needs becoming evident through implementation of the IRWMP.

Whether current projects are appropriate in meeting the set of objectives and strategies and addressing climate change impacts will become evident through consistent monitoring and analysis, as described in **Section 6.3**. Monitoring will also assist in determining the planned vs. actual ‘regional value’ of the project by creating a clear reporting mechanism for stakeholders, water managers, and other regional planners. Thus, monitoring will also inform necessary subsequent strategies or project changes, supporting adaptive management of the Region. Further, RWA has adopted the maintenance of the IRWMP as one of the organization’s core functions (as opposed to a subscription program, which it has previously been), responsible for continued implementation and adaptation into the future.

Another component of the IRWMP subject to update is the narrative components of the plan itself. The IRWMP is to be published as an electronic document, with only a very limited number of hard copies to be made available to stakeholders that do not have access to the electronic version. As new information becomes available (e.g., new water supply and demand information published every 5 years in UWMPs),

Section 6
IRWMP Implementation

the RWMG may choose to update the regional description section (**Section 2**). Updated sections of the IRWMP would be posted to the Web site with appropriate version documentation being provided.

Other triggers may necessitate a larger scale update and readoption of the IRWMP. These triggers include, but are not exclusive to:

- New IRWM Guidelines or requirements
- A need to change the Region's boundary, such as contraction, expansion, or consolidation with another region
- Additional proposed studies or projects (e.g., regional modeling exercise) that may benefit overall planning in the ARB IRWMP
- New information (e.g., updated climate models) or policy/operational changes (e.g., federal or state water operation changes) that could have significant impacts to local water resources.

The NAB RDCP and local Water Shortage Contingency Plans also identify water shortage triggers for agencies to perform assessments of their water supplies. Historically, drought has been the most common of these shortage concerns. The purpose of these assessments is to evaluate if the hydrologic conditions will affect current and future local ability to meet customer demands. If supply projections do not equal or exceed demand projections, an agency could activate its Water Shortage Contingency Plan through an action of its governing body to decrease demand until it matches supply projections (PCWA et al. 2017).

A summary of IRWMP actions or modifications, their anticipated frequencies, and whether or not RWMG approval is necessary is included in **Table 6-8** below. Actions subject to approval by the RWMG would be taken at regular, publicly noticed meetings of RWA.

Table 6-8. Summary of Likely IRWMP Implementation Actions

Action	Frequency	RWMG Approval
Adoption of the ARB IRWMP by additional stakeholders	Open	No
Updates to vision, goals, objectives	As needed	Yes
Updates to strategies and projects	Quarterly	No
Modifications to the project ranking method	As needed	Yes
Updates to ARB IRWMP Boundary	As needed	Yes
Changes to the ARB IRWMP governance structure	As needed	Yes
Changes to write-ups of individual sections of ARB IRWMP	As needed	No
ARB IRWMP Implementation Report	Annual	No, but to be presented to RWMG
Updates to comply with revised IRWMP Guidelines	As needed	Yes
Updates to respond to new information or other policy changes	As needed	Yes
Authorization of new studies that may benefit overall planning in the ARB IRWMP Region	As needed	Yes

Key:
 ARB = American River Basin
 IRWMP = Integrated Regional Water Management Plan
 RWMG = Regional Water Management Group

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