



SECTION 9.0 - DATA MANAGEMENT AND TECHNICAL ANALYSIS

9.1 Overview of Monitoring and Data Management in California

AB 1755 in 2016 – the Open and Transparent Water Data Platform for California

Access to up-to-date data and information is essential to – and the foundation of - effective and cost-efficient management of water; for decision-making, planning, monitoring and project implementation. Historically reliable, timely data has often been lacking. As a result, the legislature approved AB 1755 in 2016 – the Open and Transparent Water Data Platform for California.

The following information is excerpted from the Department of Water Resources Website:

“Information as an Asset: Over the past decade or so, the perceived value of data has changed dramatically. Today, thanks to the prolific use of smart phones and tablets, people are quite accustomed to having the world at their fingertips. Available on demand are up-to-the-minute weather projections, driving routes that avoid traffic, and stock performance reports — all with little or no delay for the user. The ability of the average citizen to access and visualize data is at an all-time high. This level of access is not quite the case when it comes to water-related data sets. For California, water and ecological data is collected, managed, published, and analyzed by any number of sources.

Water-resource-related datasets reside in numerous state, local, and federal agencies, academia, and non-governmental organizations, making it challenging to identify, access, and use data to inform water planning, management, and decision-making. It stands to reason that decisions founded on timely data and science will be reliable and transparent. It also stands to reason that data collected using public funds are the property of the public and should be made publicly accessible. Making data of documented quality both easily accessible and discoverable is a necessary first step to improving water management in California.

Overview of AB 1755: Open and Transparent Water Data Platform for California

The Open and Transparent Water Data Act (AB 1755, Dodd) requires the Department of Water Resources, in consultation with the California Water Quality Monitoring Council, the State Water Resources Control Board, and the California Department of Fish and Wildlife, to create, operate, and maintain a statewide integrated water data platform; and to develop protocols for data sharing, documentation, quality control, public access, and promotion of open-source platforms and decision support tools related to water data.

The values of the Open and Transparent Water Data Platform are listed below:

- Integration of existing water and ecological/fisheries data will support analysis across datasets and disciplines; help water managers operate more efficiently; and help water users make informed decisions based on water availability and allocation.
- State agencies should promote openness and interoperability of water data.
- Increased transparency of public data is good government.
- Water data and information-technology tools and applications developed and gathered using state funds should be made publicly accessible and open-source whenever possible.
- Increased access to data will support better-informed decisions and cost-effective investments.
- AB 1755 will support greater use of data collected and increase awareness of the importance of data in water management.
- Making information accessible, discoverable, and usable by the public can foster entrepreneurship, innovation, and scientific discovery.
- More comprehensive and interoperable datasets will provide unique opportunities to develop data-search and data-packaging products and services.

The strategic vision for development of the Water Data Platform is as follows: Useful data for sound, sustainable water resource management.

Goals

In support of the vision, four goals have been articulated, as follows:

- **Data are sufficient:** Data are sufficient to support water resources management and answer water resource-related questions.
- **Data are accessible:** Data are available for use and discoverable.
- **Data are useful:** Data are available in a form that facilitates use in various models, visualizations, and reports.
- **Data are used:** Data are put to work in decision-making and innovation.

9.2 Data Collection, Management, and Dissemination

The purpose of this section is to address the data used in development of the Watersheds Coalition of Ventura County (WCVC) IRWM Plan and describe the development of a data-management system (DMS) to provide local stakeholders with access to important information or data to help effectively manage water-related resources in the Region. The following types of data and information are important to guide IRWM planning: water quality, water quantity, climate and rainfall patterns, sea-level rise, water-demand trends, infrastructure and facilities, habitat locations and conditions, water distribution, population demographics, treated effluent available for recycling, progress towards meeting goals, project performance monitoring, agricultural practices and crop types, implementation projects, recreation and public access opportunities, and much more.



There are extensive, ongoing monitoring efforts to collect data. This monitoring is conducted by local public agencies (water districts, sanitation districts, cities, County of Ventura, etc.) as well as by non-profit and citizen monitoring groups. State and federal agencies are also engaged in monitoring efforts in the Region. This section provides an overview of the monitoring activities and how data are managed.

9.2.1 Data Sources

Water agencies, cities, sanitary districts, environmental organizations, and state and federal entities in or covering the WCVC Region, collect a significant amount of data. This data are stored in many places and in different time scales and units. Most of this data are available on the Internet, as well as in a variety of published documents. The protocols and standards for data collection and distribution are not always consistent; however, this has been changing in recent years. Statewide repositories of data, such as Surface Water Ambient Monitoring Program (SWAMP), Groundwater Ambient Monitoring and Assessment (GAMA), and California Environmental Data Exchange Network (CEDEN), have established protocols that have resulted in a more standardized approach to data collection.

Stakeholders in the Region are working together to improve the type, quality, and availability of data. Table 9-1 includes the types of data in the WCVC IRWM Region collected by a variety of stakeholder entities. Table 9-2 highlights the key data sources for development of the IRWM Plan.



**TABLE 9-1
Types of Data by Source**

TYPE OF DATA/ DATA SOURCE	Local Water Purveyors	Local Sanitation Districts	County or City Agencies	State Agencies	Federal Agencies	Groundwater Management Agencies	Other: Local Entities, Citizen monitoring, non-profits
Surface Water Supply - By Source							
Rivers and Streams							
Total Flows (including all losses and gains)	X		X	X	X		X
Permitted Diversions	X		X	X	X		
In-stream flow requirements	X		X	X	X		
Non-appropriated Uses	X		X	X	X		
Stormwater Management	X	X	X	X	X		
Surface Water Quality	X	X	X	X	X	X	X
Reservoirs							
Reservoir Storage Capacity	X		X	X	X		
Reservoir Safe Yield	X		X	X	X		
Reservoir losses and gains (recharge, evaporation, withdrawals)	X		X	X	X		
Surface Water Quality	X		X	X	X		X
Production/Use Data	X		X	X	X		
Groundwater Supply							
Basin Storage Capacity	X		X	X	X	X	
Basin Safe Yield	X		X	X	X	X	



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Return flows/recharge	X		X	X	X	X	
Basin Extractions	X		X	X	X	X	
Adjudicated or Managed Basins – Maximum Pumping Allowed	X		X	X	X	X	
Basin Water Quality	X	X	X	X	X	X	
Production/Use	X		X	X	X	X	
Imported Water Supply							
Available Quantity	X		X	X	X		
Imported Water Quality	X		X	X	X		
Entitlements to Imported Water – Now being delivered	X		X	X	X		
Future Entitlements – not yet delivered	X		X	X	X		
Production/Use	X		X	X	X		
Recycled Wastewater Supply							
Treatment Plants		X	X	X			
Level of Treatment of Effluent/Quality		X		X			
Current Beneficial Uses of Effluent	X	X	X	X			



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Production/Use	X	X	X	X			
Water Use/Demand							
Total Demand by Types of Users (includes Urban and Ag)	X		X	X		X	
Per-Capita Use	X		X	X		X	
Consumptive Use Factors by Crop Type			X	X	X	X	
Water Sources to Meet Demand - by category	X		X	X		X	
Total Demand	X		X	X		X	
Geospatial data (GIS maps)	X	X	X	X	X	X	X
Water Costs and Pricing (Including Recycled Wastewater)	X	X		X		X	
Population Forecasts (includes service area population forecasts)	X	X	X	X		X	
Implementation of Best Management Practices - Efficiency	X		X	X	X	X	
Urban Water Management Plans							



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	X			X		X	
Habitat and Environmental Data – Public Trust			X	X	X		X
Land Use Policies and Programs Affecting Water Supply/Use	X		X	X			
Urban Land Uses			X	X			
Agricultural Land Uses			X	X		X	
Climate Data (Includes rainfall, sea level rise)	X		X	X	X		
Emergency Plans	X	X	X	X	X	X	X

“X” Represents Possible Source of Data

Key to Data Sources:

Local Water Purveyors: Includes wholesale and retail water agencies.

Local Sanitation Districts: Includes local sanitation districts that treat and manage wastewater.

County and City Agencies: Land use planning agencies (City and County), County Assessor’s Office, County Environmental Health (EH), County Watershed Protection District (WPD), City utility departments that don’t provide water.



Citizen Monitoring and Non-Profit Organizations: Santa Barbara Channelkeeper, Ventura Coastkeeper, Ventura River Stream Team, Surfrider Foundation, Friends of the Santa Clara River, Friends of the Ventura River.

State Agencies: Department of Water Resources (DWR), State Water Resources Control Board (SWRCB), Regional Water Quality Control Boards (RWQCB), Department of Health Services (DHS), Coastal Conservancy, Department of Finance (DOF), Department of Fish and Game, UC Cooperative Extension, State Park Service.

Federal Agencies: Army Corps of Engineers (ACOE), Bureau of Reclamation (USBR), Geological Survey (USGS), Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA), Forest Service (USFS), National Marine Fisheries Service (NMFS), Natural Resources Conservation Service (NRCS), Fish and Wildlife Service (USFWS), National Park Service (NPS).

Groundwater Sustainability Agencies and Planning Areas: Fox Canyon Groundwater Management Agency (FCGMA) (and sub-basins within the GMA – Las Posas, Oxnard Plain), Ojai Basin Groundwater Management Agency (OBGMA), Santa Paula Basin Pumpers' Association (SPBPA), and GSAs for Fillmore-Piru Basins, Mound Basin, Upper Ventura River Basin, and the Arroyo Santa Rosa Basin.

Other - Resource Conservation District (RCD), Farm Bureau, Nature Conservancy (TNC), Ojai Valley Land Conservancy (OVLC), Ventura Land Trust, Santa Clara River Conservancy.

TABLE 9-2

Data Sources for IRWM Plan Development

Data	Responsible Entity	Purpose	Details
Real-time or recent surface-water, groundwater, or water-quality data	U.S. Geological Survey (USGS)	National Water Information System (NWIS)	The NWIS is a comprehensive and distributed application that supports the acquisition, processing, and long-term storage of water data. NWIS: http://waterdata.usgs.gov/nwis
Routine monitoring of public water systems	Operators of public-water systems	California Department of Public Health (CDPH)	Sampling is conducted at treatment plants, within distribution systems, and at the tap, and monitoring results are evaluated to ensure that applicable drinking water-quality standards are met. For regulated constituents, results are compared to Primary and Secondary MCLs, and unregulated contaminants are evaluated against CDPH Detection Limits for Purposes of Reporting (e.g., color, corrosivity, and odor). For more information on CDPH's Drinking Water Program, visit http://www.cdph.ca.gov/programs/Pages/DWP.aspx
Various GIS layers	County of Ventura GIS Program	Maintain Geospatial data for use by local entities	The County of Ventura maintains a publically-available regional geographic information system (GIS) data warehouse. The data provided by the County of Ventura GIS Program includes a variety of sources of information from local, statewide, and federal databases, and ranging from land-based information (lots, parcels, roads, etc.) to demographic data, and specific water-resources data such as impaired water bodies, groundwater basin locations, floodplains and flood zones, and more.
Routine monitoring of	There are more than 160 small water systems		EH staff inspects small water systems and monitors the reporting of water samples to ensure that they comply with Safe Drinking Water Act and EPA requirements for supplying potable water. Monitoring results



Data	Responsible Entity	Purpose	Details
small water systems	within the Region.	Ventura County Environmental Health Department (EH)	are reported monthly to CDPH. Monitoring for the constituents described above for all water suppliers is conducted every three years, and more frequent monitoring is conducted for bacteria and nitrates. For more information on EH’s Small Drinking Water Systems program, visit http://www.ventura.org/rma/envhealth/community-services/drinking-water/index.html
Streamflow and depth to groundwater data at in the County	United States Geological Survey (USGS) monitoring stations	United States Geological Survey (USGS) National Water Information System	USGS collects streamflow data across the nation, as well as monitors water quality. USGS also partners with local agencies to produce studies and reports on the status of surface and groundwater. For more information about the National Water Information System or to access data, visit http://waterdata.usgs.gov/nwis
“Ambient” surface water monitoring in all County watersheds	Regional Board and organizations collecting water surface water-quality data	State Water Resources Control Board (State Board) Surface Water Ambient Monitoring Program (SWAMP)	The main functions of SWAMP are to accept, manage, and store SWAMP data and to share this data within SWAMP and among stakeholders. The database is designed to transfer data into larger data-exchange networks. Water quality, toxicity, sediment chemistry, microbiological, habitat, biological, fish and shellfish-tissue data and metadata are managed within a central database that is fed from peripheral databases. SWAMP is designed to support and expand water quality assessments, to determine 303(d) listings and de-listings and help prioritize or support site-specific actions. SWAMP works closely with the California Water Quality Monitoring Council (CWQMC). For more information on SWAMP, visit http://www.waterboards.ca.gov/water_issues/programs/swamp/
Water quality monitoring to assess receiving water conditions (surface and groundwater) and verify that	Dischargers as named in permits	Total Maximum Daily Loads (TMDLs), Waste Discharge Requirements (WDRs), and Investigation Orders	Water quality monitoring is conducted as part of TMDL assessments. Additional monitoring by dischargers is at the discretion of the Regional Board, and is often required in support of TMDLs or possible future TMDLs. For more information on the Regional Board’s TMDL program for the Los Angeles Region (4), visit



Data	Responsible Entity	Purpose	Details
targeted load reductions are occurring			http://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/
Water quality monitoring to verify compliance with permit conditions	Permitted parties	Regional Board Point-Source Discharge Permit Compliance Monitoring	Regional Board regulates point-source discharges through WDR or NPDES permits. Both of these permits require monitoring to verify compliance with standards associated with applicable conditions. Data in this category also includes permitting required for ocean dischargers (outfalls). For more information visit: http://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/ventura_ms4/AdoptedVenturaCountym4/Monitoring%20Program.pdf For more information on monitoring through NPDES permits visit: http://www.waterboards.ca.gov/water_issues/programs/npdes/
Extensive monitoring of urban runoff discharges and receiving waters	Permitted parties	Regional Board MS4 Program	As part of the MS4 permit issued by the Regional Board, the Co-permittees have implemented runoff monitoring programs. For more information about the MS4 permit, visit: http://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/ventura_ms4/AdoptedVenturaCountym4/Monitoring%20Program.pdf . For information regarding stormwater management in the IRWM Region, visit: http://www.vcstormwater.org/programs/monitoring
Watershed sanitary surveys of public water systems	Water agencies with surface reservoirs	California Department of Public Health (CDPH)	Per Title 22, § 64665 of the California Code of Regulations, CDPH requires watershed-sanitary surveys be conducted every five (5) years to identify sources of contamination or other factors which might adversely affect quality of water used for domestic drinking water. These surveys are conducted by individual water agencies using surface water reservoirs. More information can be found on agency and city websites.



Data	Responsible Entity	Purpose	Details
			<p>An example from the City of Ventura can be found here: http://www.cityofventura.net/files/file/public-works/water/2010_Ventura_Sanitary_Survey_final_w_appendices.pdf</p>
<p>Marine environmental research</p>	<p>Member agencies</p>	<p>Southern California Coastal Water Research Project (SCCWRP)</p>	<p>SCCWRP is a joint-powers agency for marine environmental research on the Southern California Bight. Its mission is to gather data so that agencies can effectively protect the Southern California marine environment. It focuses on Publicly Owned Treatment Works (POTWs), urban runoff, and surface water quality monitoring. For more information, visit: www.sccwrp.org</p>
<p>Citizen-based volunteer surface water quality monitoring</p>	<p>Citizen scientists working under the supervision of various non-governmental organizations (NGOs)</p>	<p>Santa Barbara Channelkeeper/Ventura Stream Team; Ventura Coastkeeper Water Quality Monitoring Program</p>	<p>Citizen science provides significant, important data sets. Most of these efforts are supervised by local NGOs. More information on citizen monitoring efforts can be found on these organizations' websites: Ventura Coastkeeper volunteers collect data at selected sites in all three local watersheds. For more information see http://www.wishtoyo.org/vck-watershed-monitoring-program.html Santa Barbara Channelkeeper/Stream Team program engages volunteers in conducting monthly water quality sampling at up to 20 sites on the Ventura River itself as well as its major tributaries. Visit their website at: http://www.sbck.org/current-issues/water-quality-monitoring/stream-team/ventura-river/</p>
<p>Groundwater monitoring as part of compliance with Leaking Underground Fuel Tank</p>	<p>County of Ventura</p>	<p>County Environmental Health and Regional Board</p>	<p>Groundwater monitoring is required as part of regulatory compliance for underground tank regulations and is normally limited to near underground tanks to check for leaks. Where leaks have been detected, more extensive monitoring is required. More information can be found on the Regional Board's Underground Storage Tank (UST) Program Website, at</p>



Data	Responsible Entity	Purpose	Details
(LUFT) regulations			<p>http://www.waterboards.ca.gov/losangeles/water_issues/programs/ust/ Or at the County of Ventura’s LUFT Program site at http://www.ventura.org/rma/envhealth/luft/index.html</p>
Biological resource/habitat surveys and biological monitoring programs	Wildlife agencies	Multiple Species Conservation Program (MSCP) Databases	<p>The programs developed as part of the MSCP typically include general habitat monitoring, species specific monitoring and surveys, and other tools such as rapid assessment protocol surveys, vernal pool inventories, photo monitoring, and post-fire recovery surveys.</p> <p>Several habitat conservation plans are being developed in local watersheds.</p> <p>The County of Ventura has a variety of programs and policies to research and protect Critical habitat areas. Visit the website for more information: http://www.ventura.org/rma/planning/conservation/bio-resource-review.html</p>
Natural resources data	Varies	California Environmental Resources Evaluation System (CERES)	<p>CERES is an information system to facilitate access to natural-resource data. CERES’ goal is to improve environmental analysis and planning by integrating natural and cultural resource information from multiple contributors and making it available and useful to a variety of users. CERES: http://ceres.ca.gov/</p>
Assorted water data	Varies	Water Data Library (WDL)	<p>The WDL contains data from monitoring stations across state. Allows users to easily query areas of interest. Includes groundwater levels, water quality, surface water flow, rainfall/climate, and well logs. Links to other data resources.</p> <p>WDL: http://www.water.ca.gov/waterdatalibrary/</p>
Groundwater elevation data	Local water suppliers overlying	California Statewide Groundwater Elevation Monitoring Program (CASGEM)	<p>CASGEM is a collaboration between local organizations and DWR to collect groundwater elevations statewide. Tracks seasonal and long-term trends in groundwater elevations. Data available on the CASGEM Online System.</p>



Data	Responsible Entity	Purpose	Details
	groundwater basins		CASGEM: http://www.water.ca.gov/groundwater/casgem/ Ventura County serves as the CASGEM lead agency on behalf of groundwater users and management agencies in the Region.
Assorted data	California Natural Resources Agency	California Environmental Information Catalog (CEIC)	CEIC is a library of existing data and where to find it. CEIC facilitates identification and access to data and improves efficient use of data. CEIC: http://ceic.resources.ca.gov/
Assorted data	Various entities compiled by State Water Board	California Environmental Data Exchange Network (CEDEN)	CEDEN is a cooperative data exchange program for organizations involved in water and environmental resources in California. Scores of programs have been connected into CEDEN. CEDEN is a central location to find and share information about California's water bodies, including streams, lakes, rivers, and the coastal ocean. Many groups in California monitor water quality, aquatic habitat, and wildlife health to ensure good stewardship of our ecological resources. CEDEN aggregates this data and makes it accessible to environmental managers and the public. CEDEN: http://www.ceden.org/
Assorted data	Various entities, compiled by State Water Board	Surface Water Ambient Monitoring Program (SWAMP)	SWAMP is a statewide monitoring effort to assess the conditions of surface waters throughout California. Some state funding sources require reporting to SWAMP if projects involve surface water monitoring. SWAMP: http://www.waterboards.ca.gov/water_issues/programs/swamp/
Assorted data	Various entities, compiled by State Board	Groundwater Ambient Monitoring and Assessment program (GAMA)	GAMA was created to improve statewide ambient groundwater quality monitoring and assessment and increase the availability of groundwater quality information to the public. It consists of the California Aquifer Susceptibility (CAS) assessment and the Voluntary Domestic Well Assessment Project. GAMA: http://www.waterboards.ca.gov/water_issues/programs/gama/
Assorted data			IWRIS is a data-management tool for water resources data. It utilizes databases such as WDL, CDEC, USGS Streamflow, Local Groundwater



Data	Responsible Entity	Purpose	Details
	Various entities compiled by DWR	Integrated Water Resources Information System (IWRIS)	Assistance Grants, and local agency data to allow users to access and visualize multiple sets of data simultaneously. It was designed to support IRWM efforts. IWRIS: http://www.water.ca.gov/iwrisk/
Assorted data	Various entities compiled by The Climate Registry (TCR)	TCR	The California Climate Action Registry has been integrated into TCR, which collects GHG emissions data from members. Data are verified by third-party organizations before being submitted. The County and a few local cities are TCR members. TCR: http://www.theclimaterregistry.org/
Assorted data	Various entities compiled by California Department of Fish and Wildlife	California Bio-Geographic Information and Observation System (BIOS)	BIOS is a statewide data-management system that allows DFG and partner organizations to manage, exchange, and geographically visualize a variety of environmental/biological data BIOS: http://bios.dfg.ca.gov/
Assorted data	Various entities compiled by California Department of Fish and Wildlife	California Natural Diversity Data Base (CNDDDB)	CNDDDB is a database of rare species and communities. It is maintained and updated by the California Department of Fish and Wildlife, and data can be accessed either directly or through BIOS. CNDDDB: http://www.dfg.ca.gov/biogeodata/cnddb/
Compilation of Data Sites	Department of Water Resources	Tool for stakeholders across California	http://www.water.ca.gov/nav/nav.cfm?loc=t&id=106

* Information adapted from San Diego IRWM Plan 2013 – Section 10 – Data Management and Technical Analysis; Table 10-2

9.2.1.1 Select Water Quality Monitoring Efforts

Table 9-3 below contains further details regarding a selection of the water quality monitoring activities in the Region. Data from these monitoring efforts can be found through links from the WCVC Web Portal (see Section 9.2.3 below).

TABLE 9-3

***Select Water Quality Monitoring Efforts**

Monitoring Program	Type of Water	# of Sites	Monitoring Locations	Frequency
Santa Clara River Watershed				
Ventura County Watershed Protection District, on behalf of Stormwater Monitoring Coalition	Surface	4/yr	2009-2013 was 3 new random sites each year and one "trend" site monitored for the term of the study. Next 5-year term (2015-2019) is still in the design phase.	Annually in spring; 5-year study terms
Ventura County Watershed Protection District, on behalf of Ventura Countywide Stormwater Monitoring Program (MS4)	Surface	5	Mass emission station (SCR at Freeman Diversion) and major outfall stations (Fillmore - North Fillmore Drain, Santa Paula - 11th Street Drain, Oxnard - El Rio Drain, Ventura - Moon Ditch)	3 wet weather and 1 dry weather
Ventura County Watershed Protection District, on behalf of Ventura Countywide Stormwater Monitoring Program (MS4)	Surface	4	Major outfall stations (Fillmore - North Fillmore Drain, Santa Paula - 11th Street Drain, Oxnard - El Rio Drain, Ventura - Moon Ditch) unless dry; then have list of backup sites to try.	1 dry weather
Ventura County Agricultural Irrigated Lands Group	Surface	8	One agricultural drain on the Oxnard Plain, five on tributaries to the Santa Clara River and one background site located upstream of agricultural land.	4 times per year (2 wet, 2 dry)
Ventura County Watershed Protection District, on behalf of	Sediment	2	SCR at Torrey Rd; SCR at Victoria Avenue	Once every three years



Monitoring Program	Type of Water	# of Sites	Monitoring Locations	Frequency
Ventura Countywide Stormwater Monitoring Program (MS4)				
Calleguas Creek Watershed				
Ventura County Watershed Protection District, on behalf of Stormwater Monitoring Coalition	Surface	7/yr	2009-2013 was 6 new random sites each year and one "trend" site monitored for the term of the study. Next 5-year term (2015-2019) is still in the design phase.	Annually in spring, 5-year study terms
Ventura County Watershed Protection District, on behalf of Ventura Countywide Stormwater Monitoring Program (MS4)	Surface	5	Mass emission station (CC near University Dr.) and major outfall stations (Thousand Oaks - N Fork Arroyo Conejo, Simi Valley - Bus Canyon Drain, Moorpark - Walnut Canyon, Camarillo - Camarillo Hills Drain)	3 wet weather and 1 dry weather
Ventura County Watershed Protection District, on behalf of Ventura Countywide Stormwater Monitoring Program (MS4)	Surface	4	Major outfall stations (Thousand Oaks - N Fork Arroyo Conejo, Simi Valley - Bus Canyon Drain, Moorpark - Walnut Canyon, Camarillo - Camarillo Hills Drain) unless dry, then have list of backup sites to try.	1 dry weather
Ventura County Watershed Protection District, on behalf of Ventura Countywide Stormwater Monitoring Program (MS4)	Sediment	2	TBD	Once every three years
Ventura County Agricultural Irrigated Lands Group	Surface	8	6 Agricultural drains and two background sites located upstream of TMDL agricultural land-use sites.	4 times per year (2 wet, 2 dry)
Ventura River Watershed				
Ventura County Watershed Protection District	Groundwater	20	3 in Lower Ventura River Basin; 3 in Upper Ventura River Basin; 11 in Ojai Valley Basin; 2 in Upper Ojai Basin; and 1 in other location.	Annually



Monitoring Program	Type of Water	# of Sites	Monitoring Locations	Frequency
Ventura County Watershed Protection District, on behalf of Stormwater Monitoring Coalition	Surface	7/yr (31 total)	6 new random sites each year and one "trend" site monitored for the term of the study.	Annually in spring, 5-year study
Ventura County Watershed Protection District, on behalf of Ventura Countywide Stormwater Monitoring Program (MS4)	Surface	3	Mass emission station (OVSD) and major outfall stations (Meiners Oaks-Happy Valley Drain and Ojai-Fox Canyon Barranca)	3 wet weather and 1 dry weather
Ventura County Watershed Protection District, on behalf of Ventura Countywide Stormwater Monitoring Program (MS4)	Sediment	2	VR at Robles Diversion; VR at Main Street	Once every three years
Santa Barbara Channelkeeper - Ventura Stream Team	Surface	18	Ventura River Estuary; Ventura River @ Main Street Bridge; Foster Park; Santa Ana Road Bridge; Highway 150; Canada Larga; Camino Cielo; OVSD; SA Creek; San Antonio Creek @ Confluence with Ventura River; Lion Canyon; and Stewart/Fox Creek; Lower Canada Larga Creek; Lion Canyon; Stewart/Fox Creek; N. Fork Matilija Creek; Upper Matilija Creek; Upper North Fork Matilija Creek; N. Fork Matilija at Wheeler Gorge	Monthly
Ventura County Agricultural Irrigated Lands Group	Surface	2	Thacher Creek @ Ojai Ave.; San Antonio Creek @ Grand Ave.	4 times per year (2 wet, 2 dry)

* Additional monitoring efforts are conducted by water districts, cities, and sanitary districts.

9.2.1.2 Future Coordinated Monitoring

It is likely that in the future monitoring programs required by the Regional Water Quality Control Board (RWQCB) - i.e. NPDES Permits, Ag Waiver, TMDLS - will have the option to develop a Coordinated Integrated Monitoring Program (CIMP) in lieu of the specific, and sometimes duplicative, requirements written in the individual monitoring plans. The CIMP offers the option to implement alternative approaches to meet monitoring objectives as long as sufficient justification is provided and approval by the Regional Board Executive Officer is granted. Integrating the

monitoring and reporting requirements and coordinating the field efforts will result not only in increased efficiency and cost reductions, but increased comparability of the data collected across the watersheds. A well designed CIMP will provide the information necessary to guide management decisions for all stakeholders in addition to providing a means to measure compliance with all applicable requirements.

Data needs, available data, and emerging data are being coordinated and integrated as much as possible. Efforts to integrate and link data and expand the availability of data on the web portal (see below) will continue.

9.2.2 Data Needs and Gaps

Despite the extensive amount of information available in the Region as a result of monitoring, research and planning studies – there are gaps or unmet data needs particularly on a regional scale. Many studies are conducted for specific purposes within a given organization or to address a specific problem or project rather than at a regional level. There is a need for better coordination of data in order to understand and synthesize it on a regional level to improve program and project development and enhance integration.

Some critical data needs on a regional scale include:

- ◆ Data is based on actual pumping records in some areas where there is lack of meters or reporting.
- ◆ Enhanced comprehensive modeling of surface/groundwater interactions.
- ◆ Data regarding groundwater storage, movement, and pumping capacity in some areas.
- ◆ Improved data on location of recharge areas and infiltration rates.
- ◆ Need for more fine-scale water supply and demand figures for the Region.
- ◆ Better understanding of greenhouse gas uses for specific projects.
- ◆ A more precise understanding of the relative amount of nutrients contributed by the various natural and anthropogenic sources is needed.
- ◆ A better understanding of how individual projects help the Region adapt to climate change.

Recent Focused Studies Designed to Address Data Gaps

In recent years, several studies focused on closing the data gaps identified above.

On behalf of the County of Ventura, WVCV received two Proposition 84 IRWM Planning Grants. The Round One Planning Grant included funding to update the 2006 WVCV IRWM Plan and two special technical studies: 1) The Biodigester Feasibility Study for the Ventura River Watershed; and 2) The Regional Groundwater Flow Model Update in the Santa Clara River Watershed. The final results of these two special studies can be found in Appendix H. The results of these two studies have helped fill data gaps identified above and informed decisions in the WVCV IRWM Region regarding recent TMDL implementation, future actions for water quality enhancement and water supply management, and selection of projects for implementation. These study results have been incorporated into the IRWM Plan.

The Round Two Planning Grant included two additional special technical studies: 1) The Regional Salt and Nutrient Management Plan for the Lower Santa Clara River Watershed; and 2) The Las Posas Basin Conjunctive Use Study.

In 2018 the Region received funding from the Resources Legacy Fund to downscale and assess global climate model projections in order to more precisely project future climate changes in Ventura County. This study is described in detail in Section 13. These projections are helping to guide adaptation strategies including the types of projects needed to address the critical vulnerabilities in the Region.

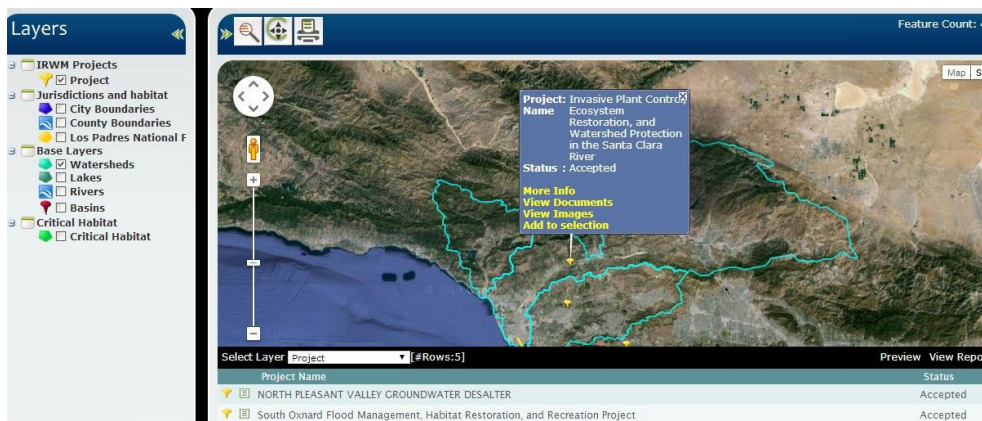
Those results of these studies have been incorporated into the WVCV IRWM Plan. The results help address data gaps described above and guide development of recycled water projects and other future projects, as well as guiding future actions for water quality enhancement and water supply management in the WVCV IRWM Region.

Groundwater sustainability plans being developed across the Region - as required by the Sustainable Groundwater Management Act - will produce data regarding groundwater pumping levels, sustainable yields, and water quality information.

The State Water Resources Control Board is conducting a study on in-stream flows in the Ventura River Watershed; the results of this study will be available in 2020 and will provide much needed data to better manage water and enhance ecosystems within the River.

One recent study funded by the LA Regional Water Quality Control Board was conducted to determine the impacts of septic systems on water quality. These results will be available later in 2019.

9.2.3 - Data Dissemination - WVCV Web Portal



As described above, there are many sources of data and information available to stakeholders and decision makers in the Region. This information is available in many different places – primarily websites and documents produced by individual entities. To improve accessibility of data, EcoLayers Consultants developed a web-based data platform. The resulting WVC Web Portal facilitates information and data sharing among stakeholders and the public. The web portal is a one-stop resource for local stakeholders including the public. The portal has a geo-spatial - Geographic Information System (GIS) interface and interactive capabilities allowing stakeholders to upload information on water-related projects they are planning, developing, and implementing, data links, documents, meetings, and other important resources.

The geo-spatial tool allows users to view layers such as government boundaries, creeks and streams, and groundwater basins. Project proponents can plot potential projects on the map and link it to details about the project including updates on project status. This will allow interested stakeholders to stay up to date and informed on projects and programs in the Region and facilitate project planning and implementation for future IRWM activities. See below for further details about the web-portal functions.

The web portal is hosted by EcoLayers, and the WVC is the responsible entity for overseeing data management. The portal can be found at: <http://ventura.ecolayers.net/>

Portal Elements and Functions:

The web-based platform offers an accessible mechanism for information sharing among stakeholders that includes geo-spatial data, graphics, photos, databases, project updates, resources, reports, links, and other information.

- Maintain various types of IRWM project information.
- Maintain and track plan performance of IRWM plan implementation.
- Share information between stakeholders and encourage public involvement.
- Improve collaboration between principal stakeholders.
- Help improve IRWM planning and decision making.

Various functions of the web portal are described in further detail below:

Adding New IRWM Projects

- Input project information substantially through project data forms.
- Show project locations on map as point features. Also supports watershed or regional projects that do not have a specific spatial reference.
- Categorize projects by watershed(s), IRWM objective, stakeholder, IRWM program (Prop 50/84), funding status, and other criteria that must be provided by WVC for each project.
- Link individual projects with associated documents and links to other websites.
- Provide tools (forms) for project evaluation and assessment per IRWM criteria.
- Allow lead administrators of each watershed to review and authorize projects submitted by authorized stakeholders prior to being displayed on map.



Uploading or Linking Documents

- Documents associated for each IRMW project.
- Document inventory with metadata for each watershed. Link documents from this inventory to IRWM projects provided the list includes references to IRWM projects.

Links to Other Resources, Websites, and Data Sites

- Inventory of links to other websites with associated metadata.
- Links may be associated to IRWM projects and watershed(s). Project IDs or names should match across different submissions for the same project.

Spatial Layers

- In addition to above content, portal will display spatial layers provided by Ventura County ISD. A preliminary list of layers is shown below:

These layers will be available as REST services.

Political boundaries/ jurisdictions

- County boundaries (including neighboring counties)
- IRWM Region boundary
- Regional Water Quality Control Board boundary
- City boundaries
- Water agency/ purveyor service areas boundaries
- USFS – Los Padres National Forest boundary

Natural features

- Watersheds
- Floodplains and flood-hazard areas
- Invasive species areas
- Slope/topography
- Land use designations
- Sea-level rise projections
- Surface-water bodies
- Groundwater basins and recharge areas
- Recreational areas (trails, parks)
- Soil types (prefer cached or tiled layers for soils and slopes)
- Biological areas of significance, critical habitats, wetlands, wildlife corridors

Assets or facilities

- Water-related infrastructure (major pipelines)
- Levees and other flood-control structures
- Dams
- Water treatment facility locations

Users

- Public: No sign-in required. Portal content that WCVV grants permissions for public access will be available to the public. Public users have simpler interactions (e.g., querying) and reporting capabilities.
- Advanced users: Sign-in required. These users have access to additional data, functionality (e.g., complex queries), and reports (e.g., plan performance reports).
- Admin Users: Sign-in required. Only admin users will have permissions to submit and edit project information, documents and related metadata, and schedule meetings.
- Specific permissions are determined by WCVV.

Outputs and Reports

Tabular Reports

- Most outputs are simple forms or tabular reports for a single project or a collection of user-selected projects. Links to download documents and visit other websites will be included in tabular reports.
- Different reports may be designed to display different aspects about projects, document inventory, inventory of links to other websites, etc. Specific fields to be displayed may be decided during implementation. Up to 3 or 4 reports per data category can be provided. Data categories include spatial layers (attribute data-table reports only), project information, performance measures, meeting documents, and links to other websites.
- List of items in tabular report may be queried by displayed fields.

Export to Excel

- Tabular reports may be downloaded to Excel as a CSV file.

Export to KMZ

- User-created maps through the EcoLayers user interface may be exported to a KMZ file which may be downloaded and emailed or used with Google Earth on a desktop PC.

9.3 Technical Analysis

The WCVV IRWM planning effort and development of the IRWM Plan has been guided by extensive amounts of technical information. The knowledge base can be found in a wide variety of documents, studies, hydrologic models, monitoring data, plans, and the expertise of the many local technical experts that comprise the stakeholder groups in WCVV. Technical analysis is an ongoing effort at the local and regional level. This analysis occurs through development and review of urban water management plan updates, hydrologic models, city and County general plans and other land use plans, environmental-impact reports, habitat-conservation plans, feasibility studies for specific projects, water-demand forecasting, climate change impact assessments, stormwater and flood management (hazard mitigation) plans, water-quality plans, water-master plans, TMDLs, NPDES permits, the California Water Plan Update, recreation and parkway plans and many others. This information comes from numerous local, state, and federal sources.



Technical analysis is also conducted as part of the stakeholder process. A rich local knowledge base resides not only in written documents, databases, and websites, but also in the common pool of knowledge and experience shared by local stakeholders. Information is shared and used to address challenges that face the Region as a whole or individual watersheds. This is a dynamic process and results from meetings of different groups including WCVC committees, the Association of Water Agencies of Ventura County, water district and other agency boards, groundwater management agencies, non-governmental organization leadership teams, special task forces created to solve problems, and in fact whenever stakeholders meet to address the challenges facing the WCVC IRWM Region. This expertise also serves as a foundation for integrated regional water management. Section 11 (Relation to Water Planning) and the Relevant References Section include a comprehensive list of the documents and plans that helped provide a foundation for the development of this IRWM Plan.