



2019 San Diego Integrated Regional Water Management Plan

10 Data and Technical Analysis

This chapter addresses requirements set forth in the Data Management Standard included in the 2016 IRWM Program Guidelines (DWR, 2016).

10.1 Overview

The intent of this chapter is to document various aspects of data management and technical analysis that were completed for the 2019 IRWM Plan and will continue for the IRWM Program. Specifically, this chapter includes information regarding:

- The process of data collection, storage, and dissemination of information to IRWM stakeholders, participants, members of the public, and the State.
- The data and technical analyses that were used to develop the 2019 IRWM Plan.

10.2 Data Management

A considerable variety of water and environmental resource data are collected throughout the Region. The overall intent of the Region's IRWM data management strategy is to augment these existing efforts in a way that allows regional leaders, stakeholders, and the public to effectively use data and information to support planning, decision-making, and public education and involvement.

The 2019 IRWM Plan builds upon existing data management systems in the Region to provide efficient use of and access to available data. The Region's online project database, OPTI, in conjunction with its Geographic Information System (GIS) database, will act as the regional Data Management System (DMS) to manage the Region's data in a way that is consistent with DWR's Data Management Standard. The DMS as originally envisioned in the 2013 IRWM Plan is no longer a viable option for the Region. A feasibility study was completed using a Proposition 84-Round 1 Implementation Grant with the intent to provide a framework for how to implement the DMS as envisioned in the 2013 IRWM Plan. The feasibility study concluded the Region's limited resources could not support the development, implementation, and ongoing maintenance of a new DMS that proposed to include a federated database management system. However, an updated version of OPTI, coupled with the WaterGIS section of the San Diego IRWM Program's website, can meet the Region's DMS needs without building a costly new federated database.

To understand the framework for the DMS, it is important to understand existing data and information available in the Region. The following sections provide an overview of existing regional data needs and data collection efforts and data sources, which provide the information necessary to develop the DMS.

10.2.1 Data Needs

Despite the extensive ongoing water resources monitoring and data-collection efforts within the Region, opportunities exist for additional data gathering to close data gaps. Monitoring is generally conducted to support specific organizational, regulatory, or research objectives rather than within a

regional or integrated framework. As a result, many of the gaps discussed here are related to a general lack of regional, integrated planning and concomitant data support strategies. Since a primary purpose of IRWM planning is to provide that regional focus, it is expected that this assessment of gaps will be updated and refined over the next several years.

Data gaps will continue to be identified through IRWM planning efforts, primarily through the implementation of the planned IRWM DMS. A single, consolidated location for data – the San Diego IRWM website (www.sdirwmp.org) – will make identification of data gaps easier and reduce occurrences of unnecessary overlap or duplication of efforts. The DMS will also make it easier to direct users to a comprehensive source of information, increasing the likelihood of knowledge sharing across groups.

Support for addressing data gaps exists in the form of projects included in the 2019 IRWM Plan (refer to Chapter 9, *Project Evaluation and Prioritization* for information about project selection). Projects that have been funded through the IRWM Program seek to address some of the data gaps relating to monitoring. Further, given the adaptable nature of the project selection and evaluation process, it is possible that the RAC and the RWMG will amend project selection criteria to prioritize future projects that address identified data needs. Additional support is provided through the IRWM Plan Objectives, which include Objective C: Effectively obtain, manage, and assess water resource data and information, and Objective D: Further scientific and technical foundation of water management (see Chapter 2, *Vision and Objectives*). These two objectives address the need for increased science-based management as identified by IRWM stakeholders. The project scoring criteria gives preference to projects that address multiple objectives, and together with Objectives C and D, serve to increase the likelihood that projects included in funding proposals will also contribute to addressing data gaps. Through implementation of the 2013 IRWM Plan, some data gaps have begun to close, and the Region's priorities have been revised to reflect progress made in addressing Regional needs.

The following sections summarize the specific data gaps that have been identified throughout the 2019 IRWM Plan development process. These data gaps fall into four general categories: sustainable water development; valuing stormwater as a resource; investing in underserved water systems; and enhancing infrastructure. Through an extensive stakeholder process, the 2019 IRWM Plan identified these key Technical Development Areas (TDAs) on which to focus. Although the 2019 IRWM Plan development process revealed specific data gaps, several stakeholders have also noted that there is a need for data that can be used to facilitate effective decision-making. Stakeholders have noted that general data collection is not always preferable given that more data does not necessarily lead to effective or efficient conclusions. Therefore, the focus of the DMS for the IRWM Program will focus on collecting specific data that can be efficiently used to improve water management.

As part of the 2019 IRWM Plan development process, a series of stakeholder and RWMG meetings was conducted to focus the IRWM Program's priorities, or TDAs. Regional needs, priorities, and data gaps were used to create four TDAs: 1) Sustainable Water Development, 2) Value Stormwater as a Resource, 3) Invest in DAC-EDA-EJ-URC Water Systems, 4) Enhance Infrastructure.

Sustainable Water Development

A major component of increasing the sustainability of the Region's water portfolio is emphasizing the importance of local water supplies. The reliability of imported water through the State Water Project (SWP) and the Colorado River Aqueduct (CRA) is expected to decrease as impacts of climate change, such as drought and changing precipitation patterns, are more likely to occur in the future. Additionally, the distance between the Region and its major supply sources presents risks associated with threats to the conveyance system, including seismic events and pipeline failures, while the energy demands of imported water conveyance contribute to the causes of climate change. The

Region seeks to increase the availability and reliability of local water supplies, such as groundwater and seawater desalination. In addition, a greater emphasis on water conservation and reuse will help to manage demands for water in the Region. The implementation of potable reuse within the Region has become a high priority, and information sharing about the effectiveness of new technologies will help inform policies and decision making, potentially allowing agencies to implement new solutions to local supply development sooner and more sustainability.

Addressing issues relating to knowledge-sharing within sustainable water development will increase collaboration between agencies or organizations and will enable more efficient use of water management resources. Communication and knowledge-sharing will be improved through implementation of the updated OPTI database and WaterGIS. Sharing technical data, approaches, and results of projects is essential for expanding the knowledge base of water resource managers within the Region, particularly related to new and emerging technologies such as advanced water treatment for potable reuse.

Value Stormwater as a Resource

Stormwater (water that either falls as precipitation or enters the Municipal Separate Storm Sewer System [MS4]) is becoming an increasingly valuable water resource to the Region. The Region contains 24 reservoirs with a combined capacity of approximately 744,000 acre-feet that have long collected stormwater, several dating to the 19th century. These reservoirs also serve an important flood management function. Some of the reservoirs are connected to the Water Authority's imported water pipelines; the amount of water in the reservoirs that are not connected varies widely depending on recent rainfall totals. The Region now is exploring ways to leverage stormwater as a more reliable local water supply. The completion of the 2017 *Storm Water Resources Plan* (SWRP) and the 2018 *Stormwater Capture and Use Feasibility Study* (SWCFS) is considered an initial step to furthering the understanding of stormwater as a viable water resource. Data surrounding the economic feasibility and potential habitat and environmental benefits of stormwater projects remain the biggest gaps around stormwater. The Region also recognizes that there is a disconnect with the public about the importance of stormwater management and surface water quality. The County of San Diego has conducted two surveys in the last ten years to improve its understanding of public awareness of the value of stormwater. While the public increasingly understands the value of stormwater, there remains room for additional outreach.

Sharing information on actual benefits of stormwater projects included in the SWRP and SWCFS will provide the basis for improving on regional stormwater solutions. Allowing more stormwater data to be accessible to the public will help to increase public knowledge of stormwater for both water resource management and watershed and water quality protection. As part of the SWRP, stormwater projects must identify and quantify their proposed benefits. These quantified benefits are entered into the OPTI system when stormwater projects seek inclusion in the SWRP and the IRWM Plan.

Several data gaps have been identified within the Region's programs to monitor pollutants and sources. These data gaps pertain to: characterization of nonpoint sources, characterization of agricultural runoff and sources, characterization of pathogen impacts and loading, and evaluation of source load reductions.

Invest in DAC-EDA-URC-EJ Water Systems

Politically, economically, and socially underserved areas of the Region – Disadvantaged Communities (DACs), Economically Distressed Areas (EDAs), Underrepresented Communities (URCs), and Environmental Justice (EJ) communities – are in need of critical water system improvements, even in some communities that receive municipal water and wastewater services. Identifying these water

systems and their specific needs will be necessary to understanding how the Region can best invest and/or assist in these improvements. There is also a need for knowledge building within the underserved areas. Identifying key competency areas in which to focus (i.e. financial, technical, or managerial knowledge) will help facilitate the transfer of information. Expanding knowledge sharing to these communities will help to improve water resource management in the Region and increase effectiveness of water resource management programs. Building capacity of small system operators, improving understanding of DAC water system needs, and targeting DAC investments are key goals of the Water Needs Assessment that is currently underway and anticipated for completion in 2019.

Enhance Infrastructure

Asset management across the Region has been fragmented and siloed. Infrastructure projects funded through the IRWM Program have been selected to encourage cross-agency and regional coordination. For example, several Hodges Reservoir projects are designed to improve water quality so that the water can be distributed through the regional supply system, rather than limiting use to only a few local agencies. Continued monitoring of the Region's reservoirs can identify uses with multiple benefits and integrated solutions to water quality and water supply management. In addition, a hazard risk assessment of the Region's water infrastructure is needed to understand the impacts of climate change, particularly sea level rise and changes in precipitation patterns.

These data gaps could be addressed through modifications to existing monitoring and assessment approaches. For instance, monitoring approaches that focus more on water quality or environmental "risk," rather than static regulatory benchmarks such as chemical concentrations, could more effectively and cost-efficiently focus management efforts toward solutions. Likewise, considerable benefit, including cost-savings, could be achieved through data gathering approaches that are designed to assess cumulative impacts rather than those of a single source or project.

10.2.2 Data Collection and Sources

Many of the Region's monitoring programs and activities provide data that are useful to IRWM planning and management in the Region. Data collected to support the 2019 IRWM Plan will facilitate the development of local water management programs in a manner that ensures consistency with the standards established through statewide data management systems.



Water quality monitoring is conducted by citizens through San Diego CoastKeeper's Water Pollution Source Tracking Program.

Photo credit: Travis Prichard, San Diego CoastKeeper



Water quality monitoring data collection site at the Biofiltration Wetlands (San Diego Zoo Safari Park), partially funded through the IRWM Program.

Photo credit: Rosalyn Prickett, Woodard & Curran

Table 10-1 provides an overview and description of efforts thought to be of particular importance to IRWM planning, but is not intended as a comprehensive survey of all programs and activities. In addition, a substantial amount of data is collected pertaining to stormwater for purposes of the MS4 permit.

The IRWM Program will support statewide data activities by serving as a repository for regional compilation of water resources data and information, in the form of project reports, and by requiring that data collected to support project performance assessment is collected in a manner consistent with continuing statewide data collection programs. Consistency with Statewide monitoring programs is critical to ensuring that regional projects contribute to efficient,

uniform, and comprehensive study design and data collection. Data collected as part of Plan implementation will be required to be comparable with applicable statewide data collection programs such as the Surface Water Ambient Monitoring Program (SWAMP) and Groundwater Ambient Monitoring and Assessment (GAMA) Program. All projects implemented with IRWM funding must follow state mandated protocols for data collection and reporting, and must also send regular reports to DWR. Through IRWM funding, the IRWM Program will facilitate data collection in accordance with statewide standards, and can also help to encourage project proponents and other stakeholders to contribute data to statewide databases.

10.2.2.1 Typical Collection Techniques

Data are collected using common, standard techniques appropriate to the type of data collected, collection site conditions, resource availability, and how the data will be analyzed. Data collection techniques are typically described in reports associated with each dataset. Methodology will be the responsibility of the individual organizations, but are expected to be described in proposed Project Monitoring Plans required by DWR under the IRWM Implementation Grants. Substantial concerns relating to appropriateness of methodology may be addressed through removal from DMS, at the discretion of the RAC and the RWMG.

Table 10-1: List of Potential Data Sources for IRWM Planning

Monitoring	Collected by	Reported to	Notes
Various GIS datasets	San Diego Association of Governments (SANDAG)	San Diego Geographic Information Source (SanGIS)	SanGIS, a joint project of the County of San Diego and SANDAG, is a publicly-available regional geographic information system (GIS) data warehouse. The data provided by SanGIS includes a variety of sources of information from local, statewide, and federal databases, and ranging from landbase 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. SanGIS: http://www.sangis.org/
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	State Board's Division of Drinking Water (DDW)	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 DDW's Detection Limits for Purposes of Reporting (e.g., color, corrosivity, and odor). For more information on DDW's Drinking Water Program, visit https://www.waterboards.ca.gov/drinking_water/programs/
Routine monitoring of small water systems (i.e., community water systems that serve 199 connections or less from groundwater supply wells)	There are over 150 small water systems within the Region.	San Diego County Department of Environmental Health (DEH)	DEH Land Use Program 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 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 DEH's Small Drinking Water Systems program, visit https://www.sandiegocounty.gov/content/sdc/deh/lwqd/lu_sws.html
Chemical contaminants in oysters and mussels and in sediments	National Oceanic and Atmospheric Administration (NOAA)	National Oceanic and Atmospheric Organization (NOAA) Status and Trends Program, Mussel Watch Project	NOAA collects and analyzes samples of bivalve tissue biennially and sediments every decade to track long-term trends in organic and inorganic contaminants along the coast. These data are used to assess changes in water quality and provide context for local regulators. Tissue banks are maintained from all sampling efforts to allow retrospective analyses for new or emerging contaminants of concern. For more information on the Mussel Watch program, visit http://ccma.nos.noaa.gov/about/coast/nsandt/musselwatch.aspx
Streamflow data at 94 stations in the County; Depth to groundwater at 20 stations 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

Monitoring	Collected by	Reported to	Notes
"Ambient" surface water monitoring in all County watersheds	San Diego Water Board and organizations collecting water surface water quality data using funding from Propositions 13,40,50, and 84	State Water Resources Control Board (State Board) Surface Water Ambient Monitoring Program (SWAMP)	<p>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.</p> <p>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).</p> <p>For more information on SWAMP, visit http://www.waterboards.ca.gov/water_issues/programs/swamp/</p>
Water quality monitoring to assess receiving water conditions (surface and groundwater) and verify that targeted load reductions are occurring	Dischargers as named in permits, the Water Quality Control Plan for the San Diego Basin (Basin Plan), and San Diego Water Board Orders	Total Maximum Daily Loads (TMDLs), Waste Discharge Requirements (WDRs), and Investigation Orders	<p>Water quality monitoring is conducted as part of TMDL assessments. Additional monitoring by dischargers is at the discretion of the San Diego Water Board, and is often required in support of TMDLs or possible future TMDLs.</p> <p>For more information on the San Diego Water Board's TMDL program, visit http://www.swrcb.ca.gov/rwqcb9/water_issues/programs/tmdl/index.shtml</p>
Water quality monitoring to verify compliance with permit conditions	Permitted parties	San Diego Water Board Point-Source Discharge Permit Compliance Monitoring	<p>San Diego Water 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).</p> <p>For more information the point-source discharge monitoring via WDR permits visit: http://www.swrcb.ca.gov/sandiego/water_issues/programs/ground_water_basin/recycled_subsurface/recycledwater_subsurfacedisposal_programs.shtml</p> <p>For more information on monitoring through NPDES permits visit: http://www.waterboards.ca.gov/water_issues/programs/npdes/</p>
Extensive monitoring of urban runoff discharges and receiving waters	Permitted parties	San Diego Water Board MS4 Program	<p>As part of the MS4 permit issued by the San Diego Water Board, the Copermittees have implemented runoff monitoring programs. Monitoring has been conducted since the 1993-94 wet season, but evolved to address monitoring goals and management questions.</p> <p>For more information about the MS4 permit, visit: http://www.swrcb.ca.gov/sandiego/water_issues/programs/stormwater/sd_stormwater.shtml</p> <p>For information regarding stormwater management in the IRWM Region, visit: http://www.projectcleanwater.org/html/copermittees.html</p>
Beach water quality at 110 locations as part of AB411 requirements	Cities, wastewater agencies, DEH	DEH Ocean and Bay Recreational Water Program and individual city/wastewater agency programs	<p>Water quality samples are collected at 78 beaches (110 locations) weekly from April through October every year. Samples are collected from a smaller number of beaches from November through March commensurate with beach use and budget.</p> <p>For more information, visit http://www.sdcounty.ca.gov/deh/water/beach_bay.html</p>

Monitoring	Collected by	Reported to	Notes
Watershed sanitary surveys of public water systems	Water agencies with surface reservoirs	CDPH	Per Title 22, § 64665 of the California Code of Regulations, CDPH requires watershed sanitary surveys be conducted every 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. An example from the City of San Diego can be found here: http://www.sandiego.gov/water/quality/environment/sanitarysurvey.shtml
Marine environmental research	Member agencies	Southern California Coastal Water Research Project (SCCWRP)	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
Areas of Special Biological Significance (ASBS) information management	Scripps Institution of Oceanography (SIO), City of San Diego, San Diego Coastkeeper	SIO Coastal Observing Research and Development Center (CORDC)	CORDC is the lead for ASBS information management. The CORDC system includes automatic data transfer and ingestion, data archiving and backup, public display of data and historical data download. It uses a modified SWAMP template, and allows for users to query and view data. The goal is to establish infrastructure needs and generate conceptual design required for long-term assessment of ASBS performance and management decisions. For more information, visit: https://cordc.ucsd.edu/projects/asbs/
Characteristics of Southern California Bight	Research organizations, such as SIO	Southern California Coastal Ocean Observing System (SCCOOS)	SCCOOS maintains databases of surface currents, satellite imagery, wave condition and forecasts, meteorological conditions and forecasts, water quality, ocean temperature, salinity, chlorophyll, and density. It also presents and manages data in various data interfaces and products, utilizing web-based mapping to provide localized interactive data displays. For more information on SCCOOS or to access data, visit: http://sccoos.org/
Citizen-based volunteer surface water quality monitoring	Citizen scientists working under the supervision of various non-governmental organizations(NGOs)	San Diego Stream Team; San Diego CoastKeeper Water Quality Monitoring Program; San Diego River Park Foundation's RiverWatch Team	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: San Diego CoastKeeper has a data portal that contains field screening data collected by volunteers. The data portal contains field screening data collected by volunteers that were trained in accordance with State Water Resources Control Board and EPA field methods. CoastKeeper: http://www.sdcoastkeeper.org/learn/swimmable/san-diego-water-quality The Common Grounds Project is conducted by the City of San Diego, San Diego State University and San Diego CoastKeeper to incorporate data from regional water quality monitoring programs and integrate the data on a watershed level using a web-based interactive application. Common Grounds: www.sdbay.sdsu.edu The San Diego River Watershed Data Portal is an online resource for citizen-based monitoring programs. Currently the Data Portal has compiled data for the San Diego River Park Foundation's RiverWatch program. These data have been collected at 15 sites on a monthly basis since 2004. San Diego River Watershed Data Portal: http://www.ecolayers.biz/sdrpf-riverwatch/
Groundwater monitoring as part of compliance with underground storage tank regulations	County of San Diego	DEH and San Diego Water Board	Groundwater monitoring is required as part of regulating compliance with 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 San Diego Water Board's Underground Storage Tank (UST) Program Website, at http://www.waterboards.ca.gov/sandiego/water_issues/programs/ground_water_basin/ust_program.shtml Or at the County of San Diego's UST Program site at http://www.sdcounty.ca.gov/deh/hazmat/ust.html

Monitoring	Collected by	Reported to	Notes
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 rapid assessment protocol surveys, vernal pool inventories, photo monitoring, and post-fire recovery surveys.</p> <p>The County of San Diego is developing a comprehensive database to track and more efficiently manage monitoring activities. When complete, the database will provide information such as past monitoring activities, future monitoring requirements, locations of preserved lands within the County's MSCP Subarea, and locations of monitoring sites. For more information on the MSCP, visit: http://www.sdcounty.ca.gov/pds/mscp/</p> <p>The City of San Diego (www.sandiego.gov) has also developed an integrated Management and Monitoring Database that tracks their MSCP biological monitoring and management activities. It includes a GIS component, field data collection using a pocket personal computer, and field and office demonstration to other agencies. Future phases may include a web-based internet application made available to the public for education and information.</p>
Status and distribution of bird populations	Local birders	San Diego Audubon Society's Christmas Bird Counts	<p>The annual Christmas Bird Count, conducted by the Audubon Society through its local chapters, monitors the status and distribution of bird populations in the Western Hemisphere. The results are compiled into the longest running database in ornithology. Trends seen in these data can indicate habitat fragmentation or signal an environmental threat.</p> <p>More information about the Christmas Bird Count can be found at http://birds.audubon.org/christmas-bird-count</p>
Outdoor research and education activities	Field Station Program staff, visiting researchers	San Diego State University (SDSU) Biological Field Stations	<p>The SDSU Field Stations Program supports outdoor research and education activities. Three of the Program's sites are located within the IRWM Region. The field stations are established as reserves, totaling over 5,000 acres, and provide visitor access, education and outreach, and sites for scientific research.</p> <p>More information can be found at http://fs.sdsu.edu</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 integrated natural and cultural resource information from multiple contributors and making it available and useful to a variety of users.</p> <p>CERES: http://ceres.ca.gov/</p>
Variety of 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 groundwater basins	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> <p>CASGEM: http://www.water.ca.gov/groundwater/casgem/</p>
Variety of data	California Natural Resources Agency	California Environmental Information Catalog (CEIC)	<p>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.</p> <p>CEIC: http://ceic.resources.ca.gov/</p>

Monitoring	Collected by	Reported to	Notes
Variety of data	Various entities, compiled by State 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. Projects are underway to extend data exchange to additional standards. CEDEN: http://www.ceden.org/
Variety of data	Various entities, compiled by State 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/
Variety of 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/
Variety of data	Various entities, compiled by DWR	Integrated Water Resources Information System (IWRIS)	IWRIS is a data management tool for water resources data. It utilizes databases such as WDL, CDEC, USGS Streamflow, Local Groundwater 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/
Variety of 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. All three RWMG member agencies and the Metropolitan Water District of Southern California (Metropolitan) are TCR members. TCR: http://www.theclimateregistry.org/
Variety of 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/
Variety of 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/

10.2.3 IRWM Data Management System

Rather than duplicate existing data management systems in the Region, the 2019 IRWM Plan proposes to build on them through the augmentation of the San Diego IRWM website (<http://www.sdirwmp.org>). The San Diego IRWM data management system comprises three primary components:

- San Diego IRWM website (www.sdirwmp.org)
- WaterGIS, accessible through website
- OPTI project database, accessible through website

As part of the 2019 IRWM Plan development process, the San Diego IRWM website will be comprehensively updated such that it contains up-to-date information about workgroups, workshops, and other meetings held in relation to the planning process. The website also contains work products from the various planning studies and technical efforts undertaken for the 2019 IRWM Plan, as well as information about project selection and solicitation associated with IRWM grant opportunities. Finally, the website also contains updated information about projects that have been funded through the IRWM Program (Proposition 50, Proposition 84, and Proposition 1), including project overviews, budgets, and major project amendments. The San Diego IRWM website provides a venue through which stakeholders can learn about IRWM Plan implementation and progress.

WaterGIS, accessible through the San Diego IRWM website, provides GIS-based maps and datasets specific to the Region. These datasets were used in development of this 2019 IRWM Plan, are used during development of the Region's grant applications, and are uploaded for use by citizens into the web-based GIS map within the OPTI project database. Anyone interested in water management can download these datasets.

The OPTI project database is also accessible through the San Diego IRWM website. The Region is currently in the process of updating OPTI to better fit the needs of a regional DMS. In addition to providing users with basic project information, OPTI will be updated to include information about the implemented projects, their associated benefits, and annual monitoring reports. Project completion reports, which summarize the analysis of project data, will also be accessible on the OPTI project database. Projects submitted to the SWRP are also housed on the OPTI database.

In 2011, a Report Card was created to assess progress on implementation of the 2007 IRWM Plan. As discussed in Chapter 11, *Implementation*, the Report Card is available on the San Diego IRWM website for review by stakeholders and other interested parties.

Future IRWM Program activities will include further updates to the San Diego IRWM website, as needed.

10.2.4 Data Management Objectives and Goals

The Region's DMS is intended to address three primary data and information management goals, which are described below. Data and information management is an essential element of the IRWM planning and management process. An effective data management strategy must address several key objectives:

- *Support for IRWM Planning* – Data and information must support ongoing IRWM planning and decision-making processes. Through the planning process, a basis can be established for evaluating the performance of individual projects, programs, the 2019 IRWM Plan, and the IRWM Program as a whole, as well as for supporting statewide data needs and integration with regional and statewide programs.
- *Evaluation of Project, Program, and Plan Performance* – Projects and programs must be periodically evaluated according to established criteria to monitor their progress and evaluate their success. Collective 2019 IRWM Plan progress and performance must also be evaluated, and the results of these evaluations used to provide feedback into the ongoing planning process.
- *Facilitation of Public Participation* – Dissemination of data and information to stakeholders and the public is critical to ensuring their ongoing participation in IRWM planning and implementation activities.

In support of these objectives, three data management goals have been developed for the IRWM Program. These goals and details regarding how these goals will be implemented are discussed in below.

Goal 1 – Provide Simplified Access to Existing Sources of Data and Information

A considerable amount of water management data and information is provided through numerous existing monitoring and research efforts. Although many agencies and organizations have developed useful web-based resources for disseminating data and information, users often lack the specific knowledge necessary to find and effectively use this information. The IRWM Program gathers data relevant to its direct activities (planning and funding efforts). The Region's DMS is comprised of three components:

- IRWM website provides a central location for users looking for IRWM-related data,
- WaterGIS provides easy access to downloadable region-specific GIS data, and
- OPTI project database provides narrative and geographic project information.

Written and electronic work products will also continue to be a key part of the data and information dissemination process. In addition to providing contact information for obtaining these products in the 2019 IRWM Plan, documents and reports will be posted or linked through the San Diego IRWM website. Examples of such documents and reports include project completion reports, annual monitoring reports, and studies and plans developed as part of project deliverables.

Goal 2 – Provide Direct Access to IRWM-Generated Data and Information

As described in Chapter 11, *Implementation*, performance data will be tracked to allow the RWMG to assess the progress of implementation and the success of individual IRWM projects and programs, as well as the 2019 IRWM Plan and IRWM Program as a whole. Through the San Diego IRWM website, stakeholders can directly access data and information on all IRWM initiatives. The San Diego IRWM website hosts detailed information about the IRWM planning process such as meeting dates, agendas, and notes for workshops, workgroup meetings, Regional Advisory Committee (RAC) meetings, and other public/outreach meetings. The website will also continue to provide information on the 2019 IRWM Plan development process and relevant documents such as the Report Card that was produced to comprehensively assess IRWM Program implementation and progress.

Plan stakeholders and the general public will continue to be informed of the IRWM planning process and online data availability through email announcements and in-person announcements made during regular RAC and other stakeholder meetings. Local press will also continue to be informed as future work is completed and data become available online. Specifically, newspaper announcements will continue to be made, as necessary, in accordance with requirements set forth in California Water Code §10541.

In addition, it is anticipated that future work will continue to build upon the extensive public outreach that was conducted for the 2013 and 2019 IRWM Plans. For additional information on existing and anticipated future stakeholder outreach and involvement activities, please refer to Chapter 6, *Governance and Stakeholder Involvement*.

Goal 3 – Provide User-Defined Interactive Access to Key Data Sets

Selected data sets are available through WaterGIS, a centralized GIS database of key georeferenced data specific to the San Diego IRWM Region. This feature is intended to increase the overall access and utility of water resource and planning data for the Region.

WaterGIS provides a central repository for data related to water management. Such data may include monitoring activities from IRWM projects, water agency jurisdictional boundaries, planning boundaries, population information, and water-related infrastructure, among others.

OPTI project database provides information on projects submitted to the IRWM Plan. Once users are logged in, it is possible to view a map of submitted projects, which can be filtered by type. The map also has different layers that may be turned on or off, such as watershed boundaries and location of DACs. As part of the 2019 IRWM Plan Update cycle, the database will be updated to show which projects have been funded through the IRWM Program, as well as house data reported by the funded projects as part of their project deliverables and monitoring under the terms of the funding agreement with DWR. These data will be available to all database users.

Entity Responsible for Maintaining DMS

The San Diego RWMG, with leadership from the Water Authority, is responsible for implementing and maintaining the DMS as described in this 2019 IRWM Plan. The RWMG's current Memorandum of Understanding commits to maintaining the San Diego IRWM website and available data through June 2019, but is currently being revised to extend services through 2020.

Stakeholder Contribution to DMS

Stakeholders are welcome to send updated data layers to the IRWM Program at any time for upload to WaterGIS. All members of the public are free to download WaterGIS layers at any time. Stakeholders are expected to submit materials to populate the OPTI project database with project submittal, completion, and monitoring data. The process by which stakeholders contribute data to the DMS will involve automated submittal process through the OPTI website, and stakeholders can download project information from OPTI through the OPTI website. Available data layers on WaterGIS are listed in Table 10-2 above.

QA/QC Measures

Quality Assurance/Quality Control (QA/QC) measures will primarily be the responsibility of the party that collects the data or requires the collection of data. Project monitoring data reported by the project sponsors in post-project annual reports will be consistent with the Project Monitoring Plan (or its equivalent) submitted to DWR as a deliverable under the IRWM grant agreements. Potential concerns with proposed monitoring mechanisms are anticipated to be identified during review and approval of the Project Monitoring Plans. It is also anticipated that DMS users who identify problems with data will be able to report these problems to the IRWM Program Manager. It is not anticipated that any of the likely data suppliers will present QA/QC problems, given their long history of data collection and analysis, their frequent need to report data to various regulatory agencies, and the use of standard sampling methodologies.

Sharing Data

The purpose of the DMS is to provide a central clearinghouse for regionally-relevant water data to facilitate data sharing and increased integration of data collection and analysis. The DMS will be advertised through the San Diego IRWM website. The DMS is designed for public access, and is anticipated to be user-friendly, with clear instructions for use readily available. Included in the OPTI project database will be data collected through IRWM funded projects. This is a requirement for all projects included in IRWM funding packages, as legally appropriate.

Data will be transferred and shared with stakeholders through downloadable GIS-based data layers. The purpose of WaterGIS is to provide public access to water resources datasets and to support the RWMG's efforts to share collected data with all interested stakeholders.

Table 10-2: Data Layers Available on WaterGIS (www.sdirwmp.org)

Data Layer	Original Data Source
Integrated Flood Management Data	Potential flood hazard zones developed for the 2013 IRWM Plan (refer to <i>Chapter 7, Regional Coordination</i> for more information)
Watershed boundaries	Compiled by IRWM Program
Water agency boundaries	Compiled by IRWM Program
Sanitation district boundaries and sewersheds	Compiled by IRWM Program
Municipal boundaries	County Assessor via SanGIS Data Warehouse: www.sangis.org
Groundwater basins	DWR via SanGIS Data Warehouse: www.sangis.org
Impaired water bodies	State Board 303(d) List: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
Disadvantaged communities and economically distressed areas	Processed by IRWM Program using 2011-2015 American Community Survey data (February 2017)
Community Planning Areas	City of San Diego, County of San Diego; via SanGIS Data Warehouse: www.sangis.org
Land uses in Region	SANDAG, County of San Diego, Cleveland National Forest, Bureau of Land Management, State Parks, compiled by SANDAG; via SanGIS Data Warehouse: www.sangis.org ; U.S. Fish and Wildlife Service: http://www.fws.gov/gis/data/national/index.html#NWRS_BOUNDARY ; BLM: http://www.geocommunicator.gov/ARCGIS/REST/services/SMA/MapServer ; California State Parks: http://projects.atlas.ca.gov/projects/calstprksbndys . Land uses consolidated by IRWM Program
Precipitation in Region	SanGIS Data Warehouse: www.sangis.org
Water infrastructure	Compiled by IRWM Program; County Assessor via SanGIS Data Warehouse: www.sangis.org
Tribal Nations	SanGIS Data Warehouse: www.sangis.org
Natural Resources	U.S. Fish and Wildlife Service: http://criticalhabitat.fws.gov/ ; State Board: http://www.swrcb.ca.gov/water_issues/programs/oceans/asba_areas.shtml ; ArcGIS Baselayers (waterbodies)
Integrated Flood Management Data	Compiled by IRWM Program
IRWM Boundaries (Regions and Funding Area)	Compiled by IRWM Program
IRWM-Funded Projects	Compiled by IRWM Program

10.3 Technical Analysis

The 2019 IRWM Plan is based on sound technical information reviewed by the RWMG, members of the RAC, and other interested SDIRWM stakeholders. Published documents such as regional plans, studies, and technical reports were reviewed, experts were consulted, and meetings with various interest groups were held to understand the short-term and long-range needs of the Region. Stakeholder outreach efforts are detailed in Chapter 6, *Governance and Stakeholder Involvement*, and include soliciting input on the water needs of the Region. Descriptions of the technical information reviewed during development of the 2019 IRWM Plan are provided in the following sections.

10.3.1 Technical Information

The needs identified in the 2019 IRWM Plan were developed through an extensive review of literature, consultation with experts and interest groups, assessment of 2013 IRWM Plan Implementation Actions, the 2016 IRWM Program Summit, and an assessment of IRWM-funded projects. Examples of literature reviewed for IRWM Plan development and updates include regional plans such as urban water management plans, groundwater management plans, and land use plans. Many of the sources are themselves reviews of literature or studies, such as the *California Water Plan Update 2013*. Wherever possible, the source of data analyzed in relevant portions of these plans, reports, or studies are noted in Table 10-3.

Whenever possible, regional data, reports, or studies were used to build the foundation for the needs and management direction in the 2019 IRWM Plan. This improves the ability of the IRWM Plan Update to identify and address the unique water needs of the Region, and provides for a more accurate and thorough analysis of the Region. Primary sources of data are the San Diego Water Board, the Water Authority, the County of San Diego, the City of San Diego, the CDFW (previously the California Department of Fish and Game), and other local agencies. Utilizing data from these sources ensures reliable, consistent, and complete information that has been collected and analyzed following accepted standards. Data were also frequently provided by SANDAG, the regional transportation planning agency in San Diego, which is led by a Board of Directors comprised of representatives from the eighteen cities that lie within the Region, and the County of San Diego. This emphasis on local and regional data supports the ability of the IRWM Plan Update to address region-specific needs.

Data gaps identified during IRWM Plan Update development and update are described in *Section 10.2.1*, above. *Section 10.2.3* details how the IRWM Program activities will work towards bridging the identified data gaps.

10.3.2 Technical Analysis and Methods

Table 10-3 represents a selection of the primary technical sources used during the writing of the IRWM Plan Update, though may not include every study used. In addition to detailing the type of data used, Table 10-3 also describes how the data were analyzed, the relevant results from the analysis, how the data were used in the IRWM Plan Update, and the source of the data. Much of the technical information used in the creation of the 2019 IRWM Plan stems from UWMPs and other similar planning documents. These documents are updated frequently (every five years), and undergo extensive public review. The SWRP and SWCFS, which also went through extensive public review, have helped to broaden the discussion around stormwater as a resource in the Region. A Water Needs Assessment, currently underway, is identifying regional DAC, EDA, URC, and EJ community water resource needs through an intensive stakeholder process. These processes, along with the local and regional focus of these documents, helps to ensure an accurate source of information for local and regional planning. While it is not always possible to identify how data were analyzed in order to write these planning documents, an effort has been made to further define the data that were used in preparation of the documents that form the basis for the planning decisions made in this IRWM Plan Update.

Table 10-3: Technical Analysis and Methods Used in the 2013 IRWM Plan

Data Used to Support Plan				
Data or Study	Reference or Source	Analysis Method	Results/Derived Information	Use in IRWM Plan
Region Description – Boundaries, Jurisdictions, etc.				
2050 Regional Growth Forecast	SANDAG	Existing demographic and economic trends; local land use plans; forecast model utilizing existing development, future land use plans, proximity to existing job centers, past development patterns, travel times to project location of future growth; consultation with local land use planners	Future land use; future population	Used to determine existing and projected land use, also used to discuss water use and demand
Western U.S. Climate Summaries	Western Regional Climate Center	NOAA coop stations –average annual total rainfall	Rainfall pattern in Region over 150+ years	Used to describe climate, local water source from precipitation
2015 Urban Water Management Plan	Water Authority	SANDAG 2050 Regional Growth Forecast vetted through the Water Authority and the Water Authority's member agencies	Future population within Water Authority service area	Used to determine how many people are served by Water Authority, and in discussion of future water demand
San Diego IRWM Region Acceptance Process (RAP)	RWVG in association with the RAC	Analysis of the Region's unique water management issues to determine an appropriate boundary	Water agency jurisdictional boundaries; Wastewater agency service areas; County boundaries; Physical/hydrologic characteristics	Used to describe appropriate Region boundaries as approved of by DWR in the RAP
San Diego Regional Municipal Separate Storm Sewer System Stormwater Permit (2007)	San Diego Water Board	Permit terms	Duties of Copermittees and principal Copermittee required by MS4 permit	Description of stormwater and urban runoff management responsibilities – this guides how the plan addresses urban runoff and stormwater, and affects project selection, 2013 IRWM Plan objectives, and the Resource Management Strategies Used to determine appropriate Region boundaries
Region Description – Water Supply				
2016 Annual Financial Report	Water Authority	Review of existing records	Water supply volumes or purchases	Used to describe source of water supplied to or by Water Authority member agencies
Bulletin 118	DWR	Review of all Bulletin 118 documents for the Region's groundwater basins	Groundwater yield data, and groundwater balance data (as applicable)	Used to determine groundwater basin locations, limitations of groundwater availability outside Water Authority service area, and establish potential need for protection of groundwater supplies through groundwater management or project selection

Data Used to Support Plan

Data or Study	Reference or Source	Analysis Method	Results/Derived Information	Use in IRWM Plan
2015 Urban Water Management Plan	Water Authority	IWR-MAIN computer model modified to meet Region's parameters and renamed CWA-MAIN	Uses SANDAG 2050 Regional Growth Forecast for input data; Water demand related to income, water prices, and weather	Used to discuss water demand in Region in the context of use type and volume. Also used to link population growth/development with increased water demand.
	Water Authority	Review of information presented in the UWMP	Location of groundwater resources for municipal supply, demineralization treatment capacity for groundwater	Used to discuss groundwater resources used for municipal supply
	Water Authority	Review of information presented in the UWMP	Reservoir capacity	Used to discuss capacity of water storage in reservoirs
	Water Authority, City of San Diego	Review of information presented in the UWMP for the Water Authority and the City of San Diego	Water treatment capacity	Used to discuss potable water production capacity, as well as identify source of raw water for treatment facilities
	Water Authority	Review of projected water supply information	Projected surface water supply, reservoir capacity	Projected Water Supply Table: used to determine water supply reliability in various weather years, provides information in order to develop plan to minimize impacts of drought-related water shortages. Used to produce the California Water Plan Update 2013
2003 Colorado River Quantification Settlement Agreement (QSA)	Water Authority	Terms of the QSA agreement	Volume of water transferred from the Imperial Irrigation District	Used to describe source of imported water in Region
Streamflow monitoring	United States Geological Survey (USGS)	Streamflow gauges	Streamflow information	Used to calculate streamflow volume annually, monthly, to demonstrate availability and timing of surface water from streams, as well as influence of urbanization on streamflow
California Water Plan Update 2013	DWR, Water Authority	Review of Resource Management Strategies (RMS) and information pertaining to water supply availability	Identifies short-term and long-term issues that may impact water supply availability	Used to inform <i>Strategic Plan</i> that emphasizes diversification of Region's water portfolio. This priority is used in project selection, BMPs, RMS and other parts of the 2019 IRWM Plan

Data Used to Support Plan

Data or Study	Reference or Source	Analysis Method	Results/Derived Information	Use in IRWM Plan
Region Description – Recycled Water				
2015 Urban Water Management Plan	Water Authority and member agencies	Review of recycled water supply and demand information Water use records; permits	Projected recycled water supply and demand Volume of recycled water use; capacity of recycled water facilities	Used to describe recycled water demand and projected future demand in the Region. Also used to describe the recycled water capacity in the Region
Tertiary treatment capacity permits	San Diego Water Board	Permit language	Permitted recycled water capacity in million gallons per day	Used to locate existing recycled water capacity
Recycled water discharge permits	San Diego Water Board	Permit language	Permitted discharge flows	Used to discuss discharge of recycled water through existing outfalls
Region Description – Water Quality				
California Toxics Rule	San Diego Water Board	US EPA methodologies to protect human health and aquatic life (as referenced in US EPA 40 CFR Part 131, Derivation of Criteria)	Water quality criteria for cyanide, metals, toxic organics	Used to establish water quality standards
Water Quality Control Plan for Ocean Waters of California	State Board	Review of established objectives for ocean waters	Water quality objectives for ocean waters	Used as reference for information on receiving water standards
303(d)-Listed Waters	San Diego Water Board, State Board	Review of 303(d)-listed water bodies in the Region	List of 42 impaired inland waters in Region, 40 impaired coastal waters	Used to discuss water impairment, provide context for priorities, opportunities for improvements, etc. Used to establish constituents of concern for the Region
TMDL studies	San Diego Water Board	Review of TMDLs in the Region	Adopted and initiated studies	Used to discuss progress on establishing TMDLs for impaired waters in the Region.
2004-2005 Regional Urban Runoff Monitoring Program Update	San Diego County Municipal Stormwater Copermittees	Core monitoring, baseline long-term effectiveness assessments	Constituents of concern in the Region	Used to describe constituents of concern for Region, by watershed
1997 San Diego County Groundwater Report	Water Authority	Review of information presented on the Region's groundwater basins	Water quality issues within groundwater aquifers	Used to establish constituents of concern in the Region's principal groundwater aquifer

Data Used to Support Plan

Data or Study	Reference or Source	Analysis Method	Results/Derived Information	Use in IRWM Plan
Region Description – Beneficial Use Protection				
Water Quality Control Plan for the San Diego Basin	San Diego Water Board	Review of Areas of Special Biological Significance	ASBS designation and impact	Determination of 2 ASBSs in Region, which must be protected from change due to human activity
Water Quality Control Plan for the San Diego Basin	San Diego Water Board	Review of Beneficial Uses	Beneficial Use designation	Used to explain the designated beneficial uses for water in the Region
Water Quality Control Plan for the San Diego Basin	San Diego Water Board	Review of water quality objectives	Water quality objectives (surface and groundwater)	The water quality objectives from the Basin Plan are designed to protect beneficial uses. Used to describe surface water quality standards.
Region Description – Flood Management				
Multi-Hazard Mitigation Plan	County of San Diego, Rancho Santa Fe Fire District, all incorporated cities in the Region, FEMA, California Emergency Management Agency	Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) data, Base flood elevations in the HAZUS-MH model	Location and extent of flood hazard areas	Used to discuss areas at risk from flooding in the Region.
Region Description – Stormwater Management				
Region Storm Water Resource Plan (2017)	County of San Diego	Review of water quality issues in each of the Region's 11 watersheds.	Identification of opportunities to enhance utilization of stormwater	Used to discuss high priority water quality issues in the Region. Information from the SWRP also helped to inform the broader discussion of stormwater as a resource.
Stormwater Use and Capture Feasibility Study (2018)	County of San Diego	Review of 303(d)-listed water bodies in the Region	Quantification of potential stormwater capture and prioritization of potential stormwater projects	Used to inform the broader discussion regarding efforts to leverage stormwater resources in the Region.
San Diego Regional Municipal Separate Storm Sewer System Stormwater (MS4) Permit (2007)	San Diego Water Board	Permit terms	Duties of Copermittees and principal Copermittee required by MS4 permit	Description of stormwater and urban runoff management responsibilities – this guides how the plan addresses urban runoff and stormwater, and affects project selection, 2019 IRWM Plan objectives, and RMS

Data Used to Support Plan

Data or Study	Reference or Source	Analysis Method	Results/Derived Information	Use in IRWM Plan
Tentative San Diego Regional Municipal Separate Storm Sewer System Stormwater Permit (2013)	San Diego Water Board	Permit terms	Changes to the 2007 MS4 permit, requirement of the Water Quality Implementation Plans	Used to discuss potential changes in stormwater management that will occur during the life of the 2019 IRWM Plan.
Region Description – Climate Change				
Climate Change Planning Study	Climate Change Workgroup, San Diego IRWM RAC.	Review of scientific literature. A selection of key sources used in this study is provided below.	Study provides climate change data analysis relevant to the Region, describes relevant policies and legislation, provides a vulnerability analysis for the Region, describes the effects of climate change on the Region, and provides management strategies and recommendation for addressing climate change and its likely impacts.	Used to develop recommendations for the Plan to include regarding climate change mitigation and adaptation.
Regional Focus 2050 Study	San Diego Foundation	Review of scientific literature, consultation with climate change experts and local scientists	Effects of climate change on San Diego region. Key impacts: Climate hotter and drier, sea level rises 12-18 inches, water shortage in County, more frequent and intense wildfires, increased public health risks, loss of native species, inability to meet energy needs.	Used in Climate Change Planning Study as a primary source of information on local impacts of climate change as well as local efforts to address climate change.
Focus 2050 White Paper	Coastal Data Information Program	LIDAR for elevation mapping, and projected sea level rise	Maps of projected inundation levels for mean sea level in 2050.	Used to show the impact of sea level rise on beaches and low-lying coastal communities, as well as the risks they face from inundation levels.
Climate Change Handbook for Regional Planning	DWR	Review of scientific literature	Summary of climate change impacts, methods for assessing climate change in individual regions	Used to describe the threats to local and regional water resources from climate change in the Climate Change Planning Study. Methodologies used to assess climate change vulnerabilities in Region.
Energy Aware Planning Guide	California Energy Commission	Review of scientific literature	Links between energy and water use, strategies to reduce energy use in the water sector	Used in the Climate Change Planning Study to discuss the role water use in the Region plays in GHG emissions. It provides the basis for claims of emissions reductions from Plan actions.

Data Used to Support Plan

Data or Study	Reference or Source	Analysis Method	Results/Derived Information	Use in IRWM Plan
California Water Plan Update 2013; Progress on Incorporating Climate Change into Management of California's Water Resources	DWR	Review of scientific literature	Summary of probable climate change impacts	Used to identify which changes may impact the Region and how these impacts may be felt. This provides a selection of needs that the plan addresses through its objectives, project selection, and management plans.
Region Description – DACs				
Median Household Income	American Community Survey, US Census Bureau	Review of census tracts within the Region	Median Household Income (MHI)	Used to determine location of DACs in the Region
Water Needs Assessment (2019)	American Community Survey, US Census Bureau, U.S. EPA EJSCREEN; CalEPA EnviroScreen	Review of census tracts, and environmental justice areas within the Region	Median Household Income (MHI), areas of potential environmental quality issues	Used to determine location of DACs, EDAs, URCs, and EJ communities in the Region and correlate with water resource needs
Region Description – Wildlife and Habitat				
Multiple Habitat Conservation Program (MHCP) and Multiple Species Conservation Program (MSCP)	County of San Diego	Review of location of sensitive resources in the Region, particularly those within relation to water resources	1,075 square miles covered, additional 2,907 square miles to be covered in MSCPs being developed	Conservation plans to protect sensitive resources Habitat linkages
San Diego County Multiple Species Conservation Plan EIR/EIS	United States Fish and Wildlife Service , California Department of Fish and Wildlife (DFW)	Review of vegetation communities within the Region	Information about vegetation communities in the Region, particularly those associated with water resources	Used to describe Vegetation communities in the Region
San Diego County Multiple Species Conservation Plan EIR/EIS	USFWS, DFW	Review of wildlife and threatened species within the Region	Information about wildlife and threatened species in the Region, particularly those associated with water resources	Wildlife and threatened species

10.4 References

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