Section J
DATA MANAGEMENT

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J. DATA MANAGEMENT

Section J Summary *– Many governmental and non-governmental organizations currently collect surface water quality, surface flow, groundwater, habitat, and water use data within the Region. Regional stormwater data collection efforts have been coordinated and managed by the regional NPDES stormwater Copermittees, but no central or organized data management structure exists for the majority of the Region's water management data. Significant data gaps exist in the collection and assessment of regional surface water quality, groundwater quality, groundwater availability, and habitat data. Filling the data gaps and coordinating data collection and management within the Region will be required to assess regional water management needs and to assess the effectiveness of implemented water management projects.*

J.1 Data Management Objectives

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. Through the planning process, a basis can be established for evaluating the performance of individual projects, programs, and the Plan 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 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.

J.2 Existing Monitoring Efforts

Many of the Region's monitoring programs and activities provide data that are useful to IRWM planning and management in the Region. This section provides an overview and description of efforts thought to be of particular importance to integrated, regional planning, but is not intended as a comprehensive survey of all programs and activities.

Water Supply Monitoring. Operators of public water systems conduct routine monitoring to ensure that the water they produce complies with Safe Drinking Water Act standards. Results are reported to the State of California Department of Health Services (DHS). Monitoring broadly encompasses several categories of constituents. These are summarized in Table J-1.

Table J-1
Water Supply Monitoring Constituents

Constituent Type	Description
Microbial contaminants	Includes viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife
Inorganic contaminants	Includes salts and metals, that can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming
Pesticides, herbicides and fungicides	Can result from such sources as agriculture, urban runoff, and residential uses
Radioactive contaminants	Can be naturally occurring or be the result of oil and gas production and mining activities
Organic chemical contaminants	Includes synthetic and volatile organic chemicals that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff and septic systems

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 DHS Detection Limits for Purposes of Reporting (e.g., color, corrosivity, and odor).

Small water systems (i.e., community water systems that serve 199 connections or less from groundwater supply wells) are also required to conduct routine monitoring and report to the

County Department of Environmental Health (DEH). There are 162 small water systems within the Region. 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 DHS. 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.

Surface Water Quality Monitoring. Numerous federal, state, and local agencies and organizations have conducted surface water quality monitoring in the Region over the past several decades. Numerous regional and site-specific surface water quality monitoring efforts are currently underway within the Region.

Federal Programs

National Oceanic and Atmospheric Organization Status and Trends Program, Mussel Watch Project. Since 1986, the Mussel Watch Project has monitored chemical contaminants in oysters and mussels and in sediments. Sites are selected to be representative of large coastal areas and to avoid small-scale patches of contamination, or "hot spots." Data can be used to compare contaminant concentrations across space and time to determine which coastal waters are at greatest risk in terms of environmental quality. Over 280 U.S. coastal and estuarine sites are sampled for bivalve biennially and for sediments once every decade. Samples are collected from three stations at each site. The Mussel Watch Project provides an ongoing long-term database of sediment and bivalve tissue chemistry of over 80 organic and inorganic contaminants, bivalve histology, and sewage marker data.

United States Geological Survey (USGS). The USGS National Water Information System (NWIS) is a comprehensive and distributed application that supports the acquisition, processing, and long-term storage of water data. Through the NWIS, USGS provides streamflow data at 94 stations in the County, and real-time data at 29 of these. Real-time data are typically recorded at 15-60 minute intervals, stored onsite, and then transmitted to USGS offices every 1 to 4 hours via satellite, telephone, and/or radio and are available for viewing within minutes of arrival.

The USGS has also conducted water quality sampling at more than 1,000 sites in the County since the 1970s. Analytical parameters vary, but can include physical measures (e.g., pH and temperature) nutrients, major inorganics (e.g., chloride, potassium, and sulfate), and minor inorganics (e.g., boron and manganese). The USGS also conducts research and special

studies to further the development of scientific knowledge and its application to real world management problems. For instance, a study was initiated in cooperation with the Sweetwater Authority in 1998 to assess the overall health of the Sweetwater watershed with respect to chemical contamination, and to monitor changes resulting from the construction and operation of State Route 125 near the Sweetwater Reservoir.

State Programs

State Board Surface Water Ambient Monitoring Program. The Surface Water Ambient Monitoring Program (SWAMP) is a statewide monitoring effort designed to assess the conditions of surface waters throughout the State of California. The State Board established the SWAMP program in 2000. Under the SWAMP program, "ambient" monitoring refers to any activity in which information about the status of the physical, chemical, and/or biological characteristics of the environment is collected to answer specific questions about the status and trends in water quality or beneficial uses.

The Regional Board implements the SWAMP in the Region. The program is designed to support and expand water quality assessments (Clean Water Act Section 305(b)), to determine whether water quality standards are met to support listings or de-listings of water quality limited segments (Clean Water Act Section 303(d)), and to provide information to help prioritize or support site-specific actions. Additional objectives are to identify long term trends in water quality, beneficial uses and habitat; support development and refinement of the Index of Biotic Integrity (IBI); develop lasting partnerships with stakeholders; and, to disseminate information.

The SWAMP has rotated through all watersheds in the past years, completing one round of monitoring in all watersheds in 2005. In 2006, SWAMP monitored one random location in each watershed. Currently the Regional Board is having all watershed related data analyzed and prepared into reports to assess the magnitude and extent of existing data and to identify existing data gaps. Monitoring was conducted for conventional water chemistry, water and sediment toxicity, fish tissue contamination, and bioassessment. Future SWAMP monitoring will evolve to address the results of these assessments.

Under the SWAMP, Regional Board staff is also collaborating to capture monitoring information collected through other State and Regional Board Programs such as TMDLs, Nonpoint Source, and Watershed Project Support programs. Monitoring under SWAMP does not include effluent or discharge monitoring, which is covered under the various Waste Discharge Requirements (WDR) issued by the Regional Water Boards. The following

existing surface water monitoring programs have been included as part of SWAMP: State Mussel Watch, Toxic Substance Monitoring Program, Toxicity Testing Program, and Coastal Fish Contamination Program.

Total Maximum Daily Loads and Investigation Orders. Water quality monitoring is conducted as part of all TMDLs to assess receiving water conditions and to verify that targeted load reductions are occurring over time. Table J-2 summarizes existing TMDL efforts for the Region, indicates their stage of development, and lists the primary issues or constituents associated with each. In some instances (e.g., Rainbow Creek) TMDL monitoring can also include groundwater investigations.

Table J-2
TMDLs in the Region

TMDL	Primary Issues / Constituents
Implementation Phase	
Rainbow Creek	Nitrogen and Phosphorus
Chollas Creek	Diazinon
Chollas Creek	Metals
Shelter Island Yacht Basin	Dissolved Copper
Development Phase	
Bacteria I TMDL for Beaches and Creeks	Bacteria
Bacteria I TMDL for San Diego Bay	
Naval Station Submarine Base	Benthic community degradation and sediment toxicity (specific constituents TBD)
San Diego Bay Sediments (Downtown Anchorage, B St / Broadway Piers, Switzer Creek)	
Mouth of Chollas Creek	
Coastal Lagoons and Beaches[1]	Sediment, Bacteria, Nutrients

1 Includes the following water bodies addressed in Regional Board Investigative Order No. R9-2006-076: Santa Margarita River Lagoon (eutrophic), Loma Alta Slough (eutrophic, bacteria), Loma Alta Creek beach (bacteria), Buena Vista Lagoon (sediments, nutrients, bacteria), Buena Vista Creek beach (bacteria), Agua Hedionda Lagoon (sediment, bacteria), Agua Hedionda Creek (TDS), San Elijo Lagoon (eutrophic, sediment, bacteria), Escondido Creek beach (bacteria), Los Peñasquitos Lagoon (sediment), and Famosa Slough and channel (eutrophic).

Pursuant to California Water Code Section 13267, the Regional Board may also direct dischargers to conduct additional monitoring or special investigations, often as part of the TMDL development process. For example, Regional Board Order No. R9-2006-076 was issued in 2006 to municipal stormwater Copermittees, Caltrans, Camp Pendleton, and other

dischargers to support the development of a TMDL for several coastal lagoons and beaches (see Table J-2). This Order requires that extensive monitoring of lagoons and tributaries be conducted for sediment, bacteria, and nutrients.

Point-Source Discharge Permit Compliance Monitoring. The Regional Board regulates point source discharge of wastewater to land and surface waters of the Region so that the highest quality and beneficial uses of these waters are protected and enhanced. Regulation is by issuance of either WDRs or NPDES permits. NPDES permits are updated every five years, while WDRs are updated at the discretion of the Regional Board. Both WDRs and NPDES permits contain monitoring requirements to verify compliance with applicable conditions. These requirements vary according to those specific conditions.

Local Agency Programs

Regional Municipal Stormwater Program. Under the Regional Municipal Stormwater Permit (Order No. R9-2007-0001), the County, the Port of San Diego, the San Diego County Regional Airport Authority, and the eighteen incorporated cities within the region must implement broad-based urban runoff management programs that include extensive monitoring.

Under this program, monitoring has been conducted since the 1993-94 wet season, but the specific requirements and overall scope of the program have evolved considerably since that time. The current monitoring program includes several components designed to collectively address monitoring goals and core management questions. Table J-3 (page J-7) summarizes these goals and questions. Table J-4 (page J-7) describes individual elements of the monitoring program.

Ocean Outfall/Recreational Water Monitoring (AB411). The DEH Ocean and Bay Recreational Water Program monitors beach water quality at 60 locations for recreational use as part of the AB411 requirements between April and September of each year. The City of San Diego, other individual cities, and wastewater agencies also conduct routine monitoring in conjunction with DEH. Monitoring includes water samples collected from more than 110 shoreline locations on a weekly basis between April and September of each year. Storm drain sampling is also conducted weekly by the City of San Diego. Shoreline samples are analyzed for bacterial indicators (Total Coliform, Fecal Coliform and Enterococcus Bacteria).

Table J-3
Goals and Core Management Questions Addressed by Regional Stormwater Monitoring Program

Monitoring Goals
1. Assess compliance with Order No. R9-2007-0001.
2. Measure and improve the effectiveness of the Copermittees' urban runoff management programs.
3. Assess the chemical, physical, and biological impacts to receiving waters resulting from urban runoff discharges.
4. Characterize urban runoff discharges.
5. Identify sources of specific pollutants.
6. Prioritize drainage and sub-drainage areas that need management actions.
7. Detect and eliminate illicit discharges and illicit connections to the MS4.
8. Assess the overall health of receiving waters.
Core Management Questions
1. Are conditions in receiving waters protective, or likely to be protective, of beneficial uses?
2. What is the extent and magnitude of the current or potential receiving water problems?
3. What is the relative urban runoff contribution to the receiving water problem(s)?
4. What are the sources of urban runoff that contribute to receiving water problem(s)?
5. Are conditions in receiving waters getting better or worse?

Table J-4
Current Stormwater Monitoring Program Components

Monitoring Element	**Description**	**Frequency**
A. Receiving Waters Monitoring Program		
Mass Loading Station Monitoring	11 stations located in downstream segments of major watersheds, upstream of tidal influence	Samples collected during three storm events per year
Temporary Watershed Assessment Station (TWAS) Monitoring	Same as mass loading stations, but stations are located in upstream reaches	Twice during wet weather and twice during dry weather
Bioassessment Monitoring	Conducted at 20 sites (two reaches within each of the 10 watershed management areas) and 3 reference sites	Samples collected twice per year, annually
Toxicity Identification Evaluations (TIEs)	Conducted to evaluate the extent and causes of pollution in receiving waters and prioritize and implement management actions	When monitoring results indicate degradation
Ambient Bay and Lagoon Monitoring (ABLM)	Sediment testing as well as chemistry, toxicity, and benthic community testing	Annual
Coastal Storm Drain Monitoring	Bacterial sampling conducted in sewer outfalls and receiving waters (coastal and lagoon) during dry- and wet-weather periods	Samples collected twice monthly
Pyrethroids Monitoring	Monitoring program to measure and assess the presence of pyrethroids in receiving waters	TBD
B. Urban Runoff Monitoring		
MS4 Outfall Monitoring	To characterize pollutant discharges from MS4 outfalls in each watershed	Wet and dry weather
Source Identification Monitoring	To identify sources of discharges of pollutants causing the priority water quality problems within each watershed	TBD
Dry Weather Field Screening and Analytical Monitoring	Consists of (1) field observations; (2) field screening monitoring; and (3) analytical monitoring at selected stations	April - October
C. Regional Monitoring		
Southern California Bight '08	Optional participation in the Bight '08 study during the 2008-2009 monitoring year	TBD

Watershed Sanitary Surveys. The quality of stored reservoir water can be negatively impacted by residential and commercial development and human activities in the watersheds. The California Surface Water Treatment Rule (Title 22 of the California Code of Regulations) requires every public water system using surface water to conduct a comprehensive sanitary survey of its watersheds every five years. The purpose of such a survey is to identify actual or potential sources of contamination or any other watershed-related factor which might adversely affect the quality of water used for domestic drinking water. Source water is analyzed for organic and inorganic constituents, microorganisms, and general physical characteristics, and results compared to the MCL and/or SMCL standards for drinking water. Watershed Sanitary Surveys examine potential sources of contaminants in the watersheds draining into reservoirs, and include recommendations for managing these effects. They also serve as a basis for future watershed management and planning efforts. They are completed through a review of various data sets including existing aerial photographs, GIS data, reports, water quality data and other record documents, and supplemented by field surveys. They are updated every five years.

Cooperative Interagency Resource Coalition (CIRC). CIRC is a website sponsored by the Water Authority to provide a forum for sharing information and data among Water Authority member agencies.

Academic and Research Institutions

Several academic and research institutions play a key role in providing data that support IRWM planning and management.

Southern California Coastal Water Research Project (SCCWRP). SCCWRP is a joint powers agency focusing on marine environmental research for the Southern California Bight. SCCWRP's mission is to gather scientific information so that member agencies can effectively and cost-efficiently protect the Southern California marine environment. Although SCCWRP has traditionally focused its efforts on wastewater discharges from Publicly Owned Treatment Works (POTWs), SCCWRP in recent years has developed and refined urban runoff and surface water quality monitoring programs. SCCWRP heads up the Southern California Bight Monitoring Program.

Scripps Institute of Oceanography. Scripps Institution of Oceanography is one of the oldest, largest, and most important centers for marine science research, graduate training, and public service in the world. It founded in 1903 as an independent biological research laboratory,

which became part of the University of California in 1912. Research at Scripps encompasses physical, chemical, biological, geological, and geophysical studies of the oceans. There are more than 300 active research projects at Scripps.

Scripp's Coastal Observing Research and Development Center (CORDC) participated in the La Jolla Shores Coastal Watershed Management Plan as the lead for ASBS information management. This system consisted of automated data transfer and ingestion, data archiving and backup, public display of data and historical data download. The CORDC team first modified the SWAMP templates to fit the suite of variables collected for the SIO NPDES permit. For a given data type, the templates contain full relationships and input fields. Completed templates are emailed and automatically ingested into the backend database. The backend database was also leveraged from the SWAMP system. The Microsoft Access© system was reprogrammed in a LINUX based MySQL database. Ingestion was automated through programmed parsing scripts. The scripts read template files, stripped out values and loaded them into the appropriate tables within the backend. Once new values were entered into the system, they are queried and displayed on the website (http://cordc.ucsd.edu/projects/asbs). The user can select "Shoreline Water Quality" for bacteriological data display. (CORDC, 2007)

The goal of the ASBS information management system is to establish the infrastructure needs and generate a conceptual design required for long term assessment of ASBS performance and related management decisions. The infrastructure needs to meet both the needs of the regulatory data collection as well as incorporate monitoring activities, scientific studies, and observations that are required for enhanced ecosystem assessment and ASBS management, yet may be outside of the present regulatory framework. Upon analysis of needs for compatibility with both the Surface Water Ambient Monitoring Program (SWAMP) and the California Integrated Water Quality System (CIWQS) as well as room for expansion for other state mandated observations, the data management team adopted a system based on the SWAMP backend for regulatory ASBS data. Recommendations for future data system development and management include defining changes within, adoption, and implementation of the SWAMP structure; development and design of a data system for ecosystem management; integration of environmental observational data; needs assessment with ASBS science and management community to define optimal data distribution, presentation, and analysis tools; and prototyping implementation of an end-end system in an ASBS to serve as a model for a statewide system.

Southern California Coastal Ocean Observing System (SCCOOS). SCCOOS is a project of particular importance to IRWM efforts. SCCOOS was established by a consortium of research organizations that included Scripps Institute of Oceanography. SCCOOS aims to integrate a broad suite of observations within the Southern California Bight that, in part, include: surface currents, satellite imagery, wave conditions and forecasts, meteorological conditions and forecasts, water quality, ocean temperature, salinity, chlorophyll, and density. In addition to maintaining data bases, SCCOOS presents and manages data in a number of innovative data interfaces and products, leveraging web-based mapping (Google©) to provide localized and navigable interactive display of data. This effort allows scientists, decision makers, and the public access to products that will provide a scientific basis for research, management, and improved uses of the ocean environment. SCCOOS also presents data and product displays at a regional and local level in near real-time for a host of users. These products include: Southern California meteorological observations, wind and rainfall forecasts, shoreline water quality, surface current maps, wave conditions, bathymetry, and satellite imagery (MODIS, OCM Ocean Color, GOES, Interpolated SST), as well as localized automated shore stations, manual shore stations, and moorings. (SCCOOS, 2007) SCCOOS automated shore stations consist of a suite of sensors that are attached to piers at several locations along the California coast. These automated sensors measure temperature, salinity, chlorophyll, turbidity and water level at frequent intervals in the nearshore coastal ocean. These data can provide local and regional information on mixing and upwelling, land run-off, and algal blooms. SCCOOS data are incorporated into computer models developed to simulate the coastal ocean environment. Models can be used to help forecast ocean transport pathways, such as those responsible for the circulation of coastal pollutants, small marine organisms, and nutrients. Models also aid in assessing climate change and variability and their potential effects on coastal communities.

Other Academic and Research Institutions. The Region hosts several other universities that serve as sources of water quality data through academic research, graduate theses, etc. This includes San Diego State University (e.g., Geography, Geology, Biology, and Public Health programs), the University of San Diego, and the University of California, San Diego.

Citizen Monitoring

Citizen-based volunteer monitoring efforts in the Region have recently expanded and become a formidable source of water quality data. Efforts are being led by local colleges and universities, non-governmental organizations (NGOs), and stakeholder groups. These groups use monitoring as a tool to educate individuals and communities, to influence positive

behavioral changes, and to protect local natural resources. Many have standardized their protocols to comply with SWAMP data quality objectives, and can be used as data sources to support the implementation of statewide programs such as TMDL development and implementation and Clean Water Act 303(d) listing of impaired water bodies.

San Diego Stream Team is citizen-monitoring group dedicated to the bioassessment of the County's rivers and streams using techniques approved by the State and Federal governments. Team volunteers conduct bioassessment of the County's rivers and streams using techniques approved by the State and Federal governments. Water samples are also collected for additional analysis, which may include nutrients, dissolved oxygen, and pollutants such as heavy metals (e.g., nickel, cadmium, chromium VI). Quality assurance conducted by professionals renders these samples useful to government agencies for both defining problem areas and seeking solutions.

The San Diego CoastKeeper Water Quality Monitoring program currently tests all San Diego County watersheds on a monthly basis by mobilizing and training members of the community. The goal of the monitoring activities is to develop a comprehensive assessment of surface water quality throughout the county for the purpose of (1) addressing non point source pollution; (2) establishing a baseline to protect unimpaired water bodies; and (3) identifying impaired water bodies and potential sources of impairment through regular monitoring. All monitoring takes place with an approved Quality Assurance Project Plan in place, and data are SWAMP compliant. Because of the stringent training and the Quality Assurance/Quality Control protocols that are followed throughout the training and the sampling/ monitoring events, CoastKeeper’s water monitoring data is accepted and used by the State and Regional Water Boards for 303(d) listings. The data that is generated is made available CoastKeeper’s website.

San Diego CoastKeeper also acts as the facilitator of the San Diego Citizen Watershed Monitoring Consortium, whose mission is to foster environmental stewardship through watershed monitoring. The consortium is a group of non-profit organizations, educational institutions and government agencies that work together to raise awareness about the importance of water resources in our region through collecting data and sharing information about pollution prevention, ecosystem protection and water conservation. The main activities of the consortium are to:

- Conduct community water monitoring activities throughout San Diego County,
- Organize World Water Monitoring day events in San Diego County and Tijuana,
- Share water quality data and educational information, and
- Connect teachers and students around the globe through environmental data sharing.

Other citizen-monitoring efforts are focused within specific watersheds or sub-regions. For instance, the San Diego River Park Foundation, RiverWatch Team, under a grant from the U.S. Bureau of Reclamation (USBR), has conducted monthly river water quality monitoring surveys at 15 different locations along the San Diego River, from Santee to the I-5. The Carlsbad Watershed Network, through its Watershed Stewards Training program, is also coordinating watershed quality monitoring in the Carlsbad Hydrologic unit. The program is designed to demonstrate the interrelationship of watershed health, beauty, recreation, economics and citizen behavior.

Special Studies and Projects

Surface water quality monitoring is also often conducted as part of special projects. Many state and federal grants funded through State Board are administered by the Regional Board (e.g., 319(h), and Propositions 13, 40, and 50). These grants are generally required to provide water quality data that is SWAMP compliant and report in SWAMP format.

Groundwater Monitoring. Groundwater monitoring data are available through a variety of sources in the Region.

USGS National Water Information System (NWIS). As described above, the USGS National Water Information System (NWIS) supports the acquisition, processing, and long-term storage of water data. This system provides real-time data on depth to groundwater at 20 stations in the County.

Waste Discharge Compliance Monitoring. As described above, WDRs and NPDES permits contain monitoring requirements to verify compliance with applicable conditions. WDR and NPDES permit requirements often include groundwater monitoring. For example, the Regional Board has established monitoring programs for recycled water and wastewater operations that discharge to groundwater. Dischargers must periodically collect and analyze groundwater quality samples from wells representative of the receiving groundwater. The Regional Board has established groundwater monitoring requirements for WDRs within many of the Region's watersheds, including Santa Margarita, San Luis Rey, Carlsbad, San Dieguito, San Diego River, and Otay.

Underground Storage Tank Monitoring. The Regional Board and DEH require groundwater monitoring as part of regulating compliance with underground tank regulations. Monitoring associated with underground storage tanks is normally limited to the immediate vicinity of the underground tank (to check for tank leaks). At documented remediation sites where leaks

have been detected, however, extensive groundwater monitoring is required to document site remediation and recovery. The Regional Board and DEH have required monitoring as part of site remediation efforts at more than 600 underground tank sites within the Region (Regional Board, 2007).

Special Studies and Projects. Groundwater quality data are also periodically collected or compiled as part of special studies, including CEQA evaluations, groundwater supply investigations, scientific studies conducted by government or research organizations. The County Water Authority's *1997 Groundwater Report* compiled and summarized data presented in prior DWR reports, USGS reports, and groundwater supply investigations performed by local agencies.

The State Board Groundwater Ambient Monitoring and Assessment (GAMA) program conducted a groundwater quality report for the San Diego Drainages Hydrogeologic Province[1] in 2004 and will be embarking on Voluntary Domestic Well Monitoring Assessment Program in 2007 in coordination with the County.

Habitat and Natural Resources Monitoring. A significant variety of habitat data has been collected within the Region. Data have been collected as part of site-specific or project-specific investigations (e.g. CEQA analyses), educational or scientific investigations (e.g. San Diego State University research programs), volunteer organizations (e.g. Audubon Society), regional and sub-regional habitat conservation programs, and sub-regional MSCP efforts. The most significant ongoing habitat monitoring programs are conducted as part of the sub-regional MSCP efforts.

Multiple Species Conservation Program (MSCP). The MSCP is a comprehensive habitat conservation program that addresses multiple species habitat needs and the preservation of native vegetation communities for a 900-square-mile planning area in the southwestern portion of the County. Completed in 1998, the MSCP Plan targets 171,917 acres of open space for conservation within the planning area, including over half of all remaining natural habitat areas (167,667 acres) and 4,250 acres of other open spaces (such as disturbed and agricultural lands) that contribute to conservation objectives. Local jurisdictions and special districts implement their respective portions of the MSCP Plan through subarea plans, which

[1] California GAMA Program: Ground-Water Quality Data in the San Diego Drainages Hydrogeologic Province, California, 2004

describe specific implementing mechanisms for the MSCP. The conservation measures specified in the MSCP Plan provide for "coverage" of 85 species of plants and animals under state and federal endangered species laws. The MSCP also provides for a preserve management program that actively maintains habitat quality and reduces threats to covered species and a subregional biological monitoring program to gauge the progress of the program towards meeting its biological objectives.

Specific management plans have been created for several of the Region's preserve sites, including the San Vicente Highlands Open Space Preserve and Barnett Ranch Open Space Preserve. Until management plans (Area-Specific Management Directives) are approved for specific preserve sites, stewardship and adaptive management activities are being conducted in conformance with the agency-approved Framework Management Plan(s). This interim management includes baseline surveys and invasive exotic plant removal. Several habitat management plans for preserve areas within the Region have also been approved that are consistent with the Framework Management Plans. Monitoring and data collection elements typically associated with MSCP programs are described in Table J-5.

Table J-5
Typical MSCP Monitoring Elements

Element	Description
General habitat monitoring	Includes site assessments for habitat conditions, invasive species, evidence of trespass or litter, and noting management needs
Species specific monitoring/surveys	Includes surveys and population monitoring of bats, arroyo toads, and western pond turtles; coastal sage scrub bird monitoring; and California gnatcatcher dispersal studies
Other Tools	Includes: Rapid Assessment Protocol surveys for vegetation and rare plants; vernal pool inventories; reptile/amphibian arrays; small mammal trapping; bird counts; wildlife movement studies; roadkill monitoring; photo monitoring of habitat; and, post-fire recovery surveys.

San Diego Audubon Society Christmas Bird Counts. The primary objective of the Christmas Bird Count is to monitor the status and distribution of bird populations across the Western Hemisphere. More than 50,000 observers participate each year in this all-day census of early-winter bird populations. Results are compiled into the longest running database in ornithology, representing over a century of unbroken data on trends of early-winter bird populations across the Americas. The information is vital for conservation. For example, local trends in bird populations can indicate habitat fragmentation or signal an immediate

environmental threat, such as groundwater contamination or poisoning from improper use of pesticides.

A total of 101 birders participated in the San Diego count circle 2006 Christmas Bird Count on December 17th. 200 species observations were confirmed. The most abundant species counts were 9,485 Surf Scoters, 7,494 Western Grebes, 2,654 Sanderlings and 2,570 American Wigeons. Unusual sightings included: White-winged Scoter, Long-tailed Duck, Reddish Egret, Cattle Egret, Yellow-crowned Night-heron, Vermilion Flycatcher, Tropical Kingbird, Warbling Vireo, Hermit Warbler, and Painted Redstart. Complete current year and historical bird counts are available on the National Audubon website located at: (http://audubon2.org/birds/cbc/hr/count_table.html).

San Diego State University (SDSU) Biological Field Stations. The SDSU Field Station Programs is dedicated to supporting a wide array of outdoor research and education activities. Three of the four field stations are located partially or wholly within the Region. The Santa Margarita Ecological Reserve, established in 1962, provides protected sites for research and education of southern California ecosystems. Fortuna Mountain Research Reserve consists of 500 acres located within the boundaries of Mission Trails Regional Park. At the Mission Trails Visitor and Interpretive Center information can be found on the park's history, natural plant and animal communities, and various activities and destinations within the park. The Tijuana River National Estuarine Research Reserve is located near the US and Mexico border in the coastal southern portion of the County. The reserve contains a diverse suite of estuarine, aquatic and terrestrial habitats. Field station activities include a variety of data and information outputs, including Species Lists, GIS maps, and REMOT (Real-time Environmental Monitoring and Observation Technology), a system of hardware and software technologies that collect environmental information and deliver and display the data at real-time on the Field Stations Program website (http://fs.sdsu.edu/kf/).

J.3 Data Gaps

Despite the extensive ongoing water resources monitoring within the Region, opportunities exist for additional data gathering to close existing 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 substantially over the next several years.

Pollutants and Sources. Many data gaps exist within the Region's programs to monitor pollutants and sources.

Characterization of Nonpoint Sources. Nonpoint source (NPS) pollution is considered to be the major contributor of pollution to impacted streams, lakes, wetlands, estuaries, marine waters, and groundwater basins, and the leading cause of water quality impairments, in California. Yet, despite the existence of a myriad of programs focused on various aspects of NPS management (e.g., State Board NPS Program, Municipal Stormwater Permit, TMDLs), ongoing efforts are hampered by a lack of specific knowledge about the individual sources within the Region's watersheds that collectively constitute NPS pollution. For instance, the Regional Municipal Stormwater Permit requires that local jurisdictions implement programs to address impacts from more than 40 commercial and industrial business types, these sources are present by the tens of thousands throughout the Region. In the long-term, effective management will require that data collection be focused on better characterizing the specific sources of priority pollutants in the Region's watersheds. Not only must specific activities and processes occurring on-site be better understood, but our knowledge of how threat-to-water-quality varies within broad categories of regulated sources (e.g., residences, restaurants, etc.) must also be increased.

Characterization of Agricultural Runoff and Sources. Water quality monitoring of agricultural runoff has been identified as an additional data gap. San Diego agriculture is a $1.5 billion industry that ranks 10th in the nation for the value of agricultural products sold. The County's unique topography creates a wide variety of microclimates resulting in nearly 30 different climate types of vegetation communities. This diversity allows for over 200 different agricultural commodities to be produced in the County – from strawberries and tomatoes along the coast, to apples in the mountain areas. Chemicals applied during operations (e.g., pesticides and fertilizers) may be carried into the ground, and to surface or groundwaters. The extent of contamination resulting from agricultural practices is currently unknown, and should be addressed in future data collection efforts.

Characterization of Pathogen Impacts and Loading. Recreational uses are among the most important beneficial uses of many of the Region's receiving waters. However, in recent years, section 303(d) listings for bacterial indicators have become increasingly common. The greater than 40 existing listings for bacterial indicators are problematic because the indicators themselves are not thought to present a threat to humans, i.e., there presence is merely an indicator of the potential presence of disease organisms. Future monitoring would benefit

from the development of measures that provide a better indication of actual risk, as well as a basis for the identification and assessment of specific management measures. Likewise, site-specific epidemiological studies and source investigations (e.g., DNA source tracking) may also be indicated.

Evaluation of Source Load Reductions. While considerable data collection has focused on identifying water quality problems and impairments throughout the Region, comparatively little is know about the effectiveness of specific management measures targeted to remedy these problems. The 2007 Municipal Stormwater Permit requires that source load reductions be determined for a variety of sources regulated under the program. However, the current state-of-the-art for conducting load reduction estimates, especially at a broad programmatic level, is poorly evolved. Considerable effort is currently being invested in the development of new methods, but data are generally not available to support estimation either of non-structural BMP effectiveness or implementation frequency. This data gap must be addressed to improve the effectiveness and cost-efficiency of pollution management programs.

Receiving Water Monitoring. Data gaps exist within the Region's watershed sampling, streamflow monitoring, and groundwater monitoring programs.

Representative Watershed Sampling. Water quality monitoring that does not include the upper portions of many of the Region's watersheds presents a spatial data gap. Stormwater programs have conducted mass loading monitoring at the base of the Region's watersheds since 1993-94. However, while useful for focusing and prioritizing efforts regionally, this approach is limited in its ability to provide a representative characterization of the quality of receiving waters within these watersheds. The addition of Temporary Watershed Assessment Stations in the 2007 Municipal Stormwater Permit will begin to address this data gap, but additional focus on augmenting upstream data sets will be required in the future. Expanding the numbers and locations of monitoring stations would also provide a more representative assessment of water quality for completing updates of the 303(d) list of water quality impairments in the Region, and would better support source identification and management efforts.

Streamflow Monitoring. Ongoing streamflow monitoring provides a basic statistical understanding of surface water flows within major streams and rivers in the Region. A larger number and greater geographical distribution of streamflow gauging stations, however, is required to assess streamflow recharge of groundwater, to provide a better understanding of

streamflow within smaller watersheds and lesser tributaries, and to provide streamflow data needed to develop TMDLs.

Groundwater Monitoring. While groundwater data are collected in many watersheds within the Region, data are insufficient to adequately characterize groundwater quality, groundwater availability, and aquifer characteristics throughout much of the Region. This is particularly evident in areas exclusively dependent on groundwater supplies. Groundwater data are sufficient to characterize groundwater quality and availability only within some of the Region's major aquifers (see Table B-17 on page B-45).

Within groundwater-dependent communities in the inland portions of the County (outside the Region's major alluvial aquifers), water quality data are too scarce to effectively characterize and manage water quality problems. Spatial and temporal understanding of groundwater quality in these areas is therefore lacking. A centralized, coordinated groundwater data collection effort would be required to allow for more complete characterization of groundwater availability and quality within the Region. Data needs include the development of chloride mass balance method to compare to current Thronthwaite methodology of assessing groundwater recharge, more stream gauging of creeks in the groundwater reliant areas to better quantify runoff factor in recharge equations and more monitoring wells in fractured rock aquifers to provide a better understanding of existing quantities.

Monitored Constituents. Because monitoring strategies are often driven by regulatory mandates, the selection of monitored constituents tends to be broad, inclusive (e.g., all EPA Priority Pollutants), and static. In the past several years, watershed and water quality management in the Region has evolved to become increasingly focused on specific issues and problems. Likewise, watershed sources of pollution are in continual flux. For instance, it is estimated that there are currently more than 85,000 chemicals in commerce the U.S., with more than 2,000 new chemicals being added to this mix annually (a rate of seven per day). Although the nature of water and environmental pollution generally remains the same over time, the details clearly do not. Monitoring and data collection must therefore become increasingly focused on newly identified priorities, as well as "emerging chemicals of concern" (e.g., pyrethroid pesticides, brominated flame retardants, nanoparticles, and pharmaceutical wastes).

Habitat and Natural Resource Monitoring. Habitat mapping efforts within the Region are reasonably complete, but significant additional data collection is needed to better address

habitat health and viability and to update habitat maps. Additional habitat health, species composition, and invasive species data are required in all watersheds to provide for a greater understanding of geographic-, temporal-, and water quality-related trends. Although several federal, state and local agencies collect data with respect to the quantity and quality of habitat, currently no single entity can provide a comprehensive assessment of such data. DFG, however, has contracted with San Diego State University to facilitate habitat and natural resources data collection and analysis. The university is coordinating with USGS and USFWS as part of this effort.

Monitoring and Assessment Approaches. In some instances, data gaps could be addressed through modifications to existing monitoring and assessment approaches. For instance, monitoring approaches that better focus on water quality or environmental "risk," rather than static regulatory benchmarks such as chemical concentrations, could better and more 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.

Another key issue with respect to monitoring approaches is that of linkages between media. Although the cycling of many constituents between water supply systems, surface waters, groundwater, and potentially biota, is well understood from a theoretical perspective, little real world data exist to support the development of effect management approaches. For instance, high levels of TDS have been documented in supplied water, surface waters, and groundwater throughout the Region. Future data collection will need to be increasingly focused on characterizing and managing this problem.

Finally, an increased understanding of the dynamics of the systems within which existing monitoring is conducted would be beneficial. For example, although the 2006 update of the Region's 303(d) list generated several new listings for drinking water reservoirs (e.g., for color, pH, manganese, nitrogen, and phosphorous) a better understanding of the limnology of these water bodies would help to interpret the results on which the listings are based. For example, data on the cycling of dissolved oxygen and nutrients would help to provide a framework for interpreting results.

J.4 Data Management and Dissemination

A considerable variety of water and environmental resource data are collected throughout the Region. With limited exception, ownership and responsibility for the management of data resides with the parties that collect them (i.e., permitted dischargers, NGOs, research institutions) and/or that require their collection (i.e., permitting agencies). 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.

For a regionally focused effort, two fundamental approaches to data management include (1) distributed and (2) centralized. Distributed approaches rely on the parties or organizations that collect data to also be responsible for other aspects of their management (storage, quality assurance/quality control (QA/AC), analysis, and dissemination). Centralized approaches are those which emphasize a single entity or location for any or all of these data management functions. Depending on the scale considered, some data management systems can be considered both distributed and centralized elements.

This Plan will utilize a combination of both approaches (see Figure J-1 on page J-21). As shown in Figure J-1, most data management functions will continue to reside with the primary data owners or peripheral data centralization systems.

Rather than duplicate these functions, the Plan will build on them through the augmentation of the San Diego IRWM website (www.sdirwmp.org). An IRWM Plan Data and Information Management System will be publicly accessible through the website. While every effort will be made to ensure open, public access to data used in the Plan performance assessment, confidentiality agreements may be required to obtain a portion of the data used to support Plan assessment. In these cases, data availability will be managed in a manner consistent with the terms of the individual confidentiality agreements. Further development and augmentation of the website will be explored with the stakeholders, agencies, and the general public to determine the scope and extent of desired functionality. However, as described further below, this system is intended to address three primary data and information management goals.

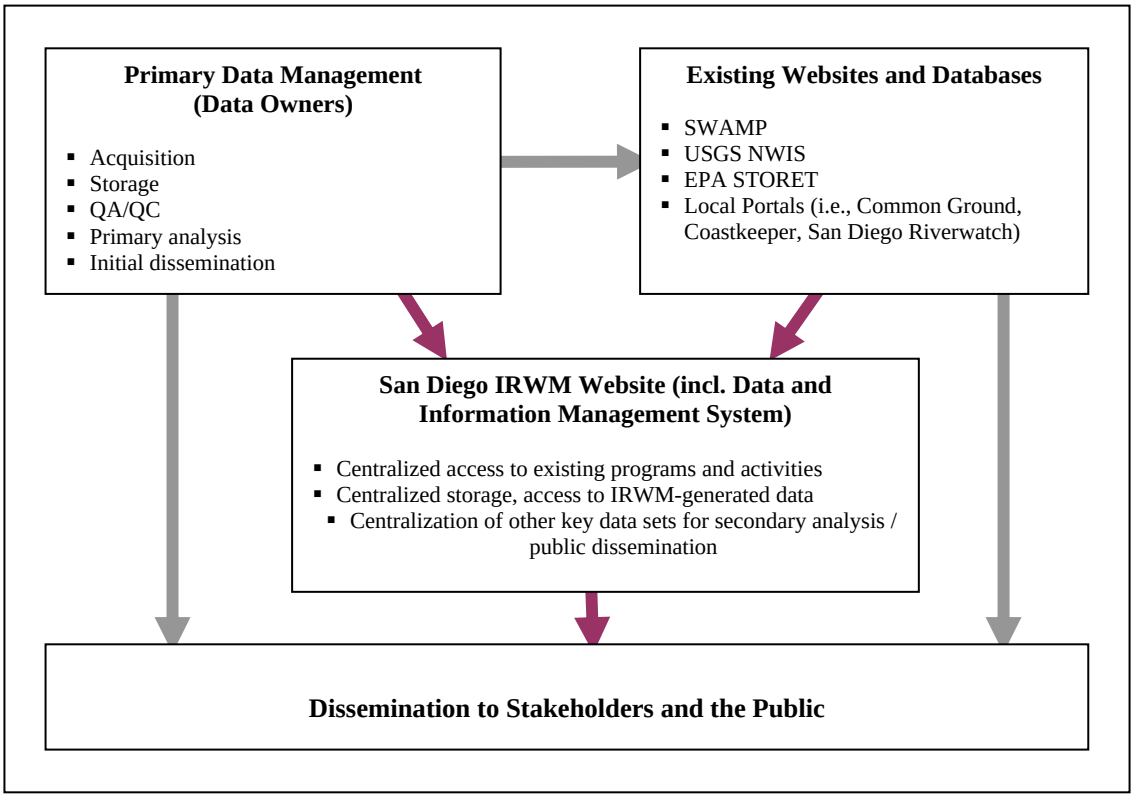

Figure J-1
Overview of Data Management and Dissemination Approach

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

A considerable volume 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 them. A key focus of the updated San Diego IRWM website will be to establish a centralized point for interested parties to find and explore these existing resources, and to more easily obtain the specific data they need. This will include web links and contact information for agencies and organizations collecting or managing water management data.

It is important to recognize that many existing efforts provide a considerable degree of data centralization and access to data sources and databases (see Table J-6 on page J-22). In some cases, there may be opportunities for integration or consolidation of efforts over time. In other cases, the goal will simply be to ensure that monitoring and data management efforts are not duplicated between programs, or that applicable data management standards are met.

Table J-6
Examples of Existing Websites and Databases

Database	Description
SWAMP Access Database	The main functions of SWAMP Data Management 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.
EPA STORET (http://www.epa.gov/storet/)	STORET is a repository hosted by the Environmental Protection Agency (EPA) for water quality, biological, and physical data.
Multiple Species Conservation Program (MSCP) Databases	The County Diego is developing a comprehensive database to track and more efficiently manage monitoring activities (www.dplu-mscp.sdcounty.ca.gov). When complete, it 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. 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.
San Diego Coastkeeper Citizen Monitoring Database (http://www.ca-watersheds.net/thinMaps/sdck/index.html)	San Diego Coastkeeper is currently developing a data portal which contains field screening data collected by volunteers. The data portal contains field screening data collected throughout 2006 by volunteers that were trained in accordance with State Board and EPA field methods.
San Diego Bay Watersheds Common Ground (www.sdbay/sdsu.edu)	The Common Grounds Project is conducted by the City of San Diego, San Diego State University and the 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. It allows for (1) user-based and pre-defined interactive outputs that may be tailored to specific user categories, (2) access to raw data, analyzed data, reports, maps, and other documents, and (3) map building via queries, which can be used in conjunction with more advanced functions (e.g., data analysis tools, modeling, and environmental assessment).
USGS National Water Information System (NWIS; http://waterdata.usgs.gov/nwis)	The NWIS is a comprehensive and distributed application that supports the acquisition, processing, and long-term storage of water data.
San Diego River Watershed Data Center	The San Diego River Watershed Data Center is an online resource for citizen-based monitoring programs. Currently the Data Center has compiled nearly 3 years of data for the San Diego River Park Foundation's RiverWatch program which has been collected at 15 sites on a monthly basis. The Data Center is being expanded to incorporate other citizen based monitoring programs for water chemistry, bioassessment, presence of non-native invasive plants in the riparian corridors, and animal tracking information as well as nuisance problems such as trash dumps. The Data Center will also incorporate mitigation sites as well as information from 401 certifications and other information available to the public.

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, documents and reports will be posted or linked through the website. Examples include Urban Water Management Plans (UWMPs), Metropolitan's Integrated Resources Plan updates and Report Card, Consumer Confidence Reports, Annual MSCP management and monitoring reports, plant and wildlife surveys reports, and area-specific management plans.

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

As described in Section I, performance data will also be tracked to assess the progress of implementation and the success of individual IRWM projects and programs, as well as the Plan as a whole. Through the San Diego IRWM website, stakeholders will be able to directly access data and information on all IRWM initiatives. At a minimum, this will include basic information about the IRWM planning process such as meeting dates, agendas, and notes. It will also provide information on the Plan process and relevant documents, e.g., annual reports that can be downloaded.

Plan stakeholders and the general public will be informed of the IRWM planning process and online data availability through email announcements and physical mailings to the stakeholder database. Local press will also be informed as future work is completed and data become available online. In addition, it is anticipated that future work will include extensive public outreach aimed at encouraging stakeholder participation. This process will be used as a forum for generating public awareness and disseminating the information contained in the data library. For additional information on anticipated stakeholder involvement during Plan implementation, please refer to Section N: Stakeholder Involvement.

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

Finally, selected data sets will be incorporated into a centralized GIS database of key parameters that can be queried by the user. As shown, this increased functionality is intended to increase the overall access and utility of water management data for the Region. Building on the example of the San Diego Common Ground project (see Table J-6 on page J-22), the following types of functionality are anticipated: (1) user-based and pre-defined interactive outputs that may be tailored to specific user categories, (2) access to raw data, analyzed data, reports, maps, and other documents, and (3) map building via queries, which can be used in conjunction with more advanced functions.

J.5 Support for Statewide Data Needs

Water resource data collection and management in the Region will support statewide data needs in several ways.

1. Support for Statewide Data Management Programs and Standards

Data collected to support the 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, including the following:

- **Surface Water Ambient Monitoring Program (SWAMP)**. SWAMP is a statewide monitoring effort designed to assess the conditions of surface waters throughout the State of California.

- **Groundwater Ambient Monitoring and Assessment (GAMA) Program**. GAMA was created by the State Board to improve statewide ambient groundwater quality monitoring and assessment and to increase the availability of information about groundwater quality to the public. Stewardship of the state's groundwater resources is the shared responsibility of all levels of the government and community. Participation in the GAMA Program is voluntary.

- **California Environmental Resources Evaluation System.** California Environmental Resources Evaluation System (CERES) is an information system developed by the California Resources Agency to facilitate access to natural resource data. The goal of CERES is to improve environmental analysis and planning by integrating natural and cultural resource information from multiple contributors and by making it available and useful to a wide variety of users. CERES collects and integrates data and information and distributes it via the World Wide Web, tapping into important information sources and contributing to advances in the science of data management and metadata cataloging by encouraging cooperation among governmental, educational, and private groups. CERES focuses on three related components: technology, data, and community. The first, technology, includes the development of new software and network structures to accommodate the search and retrieval, organization, and accessibility demands associated with huge volumes of data in a wide range of forms. The second, data, encompasses the conversion of vast quantities of information into digital form as well as the evaluation of existing digital data sets and the development of metadata catalogs required searching and data-quality and appropriate use assessment. The third, community, contains CERES'

efforts to promote the use of the network for planning and policy and to foster the growth of new users and contributors in a far-reaching web of affiliations.

- **California Environmental Data Exchange Network.** The California Environmental Data Exchange Network (CEDEN) is one of the CERES' identified websites for coordinated data sharing. CEDEN is growing statewide cooperative data exchange program of various groups involved in the water and environmental resources of the State of California. Most of CEDEN's data exchange services are custom developed using a robust tool set which has been used to connect scores of programs into the network. Multiple projects are underway to extend CEDEN data exchange to additional standards and those services should be available in the coming year.

- **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 data are internet-accessible, but GIS-formatted data are not standardized among data layers. Data contributors are responsible for data accuracy.

- **California Natural Diversity Data Base (CNDDB).** CNDDB is a data base of rare species and communities BIOS data that is maintained and continuously updated by DFG. CNDDB is part of a nationwide network of GIS endangered species data. CNDDB data are quality controlled and placed in a standardized format that allows comparison of data from different data sources. CNDDB data may be accessed directly or through BIOS.

In addition to serving as a repository for regional compilation of water resources data and information, the Plan will support statewide data activities 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 SWAMP and GAMA programs. Upon completion of the Plan performance assessment, the project-specific data collected, along with its associated quality assurance/quality control information, would be provided to the state in a format that can be easily integrated into statewide data collection and tracking programs. The Plan organization will also encourage project proponents and other stakeholders to contribute data to the CERES and CEDEN databases.

2. Increased Data Availability

A primary objective of the Plan is to support existing statewide priorities and preferences. Projects and programs that are funded, implemented, or coordinated through the Plan, will increasingly provide data and information that is both consistent with and in support of these priorities. As such, useful water management data and information will generally be more available to the state and the public as a result of these efforts.

3. Support for Statewide Water Supply Assessment and Management

Data will also assist in updating the California Water Plan.

4. Evaluation of Regulatory Compliance

Data will also assist regulators in evaluating compliance with such programs as NPDES permits, drinking water supply, TMDL implementation, and underground storage tank oversight.

5. Support for NPS and Watershed Management Initiatives

Data will support the statewide NPS Management Plan goal of providing a single unified, coordinated statewide approach to dealing with NPS pollution structured around 61 identified management measures. Closely related is the Watershed Management Initiative (WMI), which uses an integrated planning approach to create and implement unique solutions for each watershed. Each Regional Board and the State Board revises its WMI Chapter annually to reflect changing priorities and conditions in the State's watersheds. The Regional Board's Watershed Management Chapter implements key elements of the NPS Management Plan and identifies priority water resource management issues. The priorities for implementation of the Watershed Management Chapter include an increased emphasis on geographic focus, comprehensive perspective, improved decision-making, and improved efficiency. The Region's IRWM data directly support each of these priorities.

6. Support for Regional and Watershed Assessments

Data will also provide direct support for statewide programs to assess regional and watershed water quality, including the SWAMP and 303(d) listing process. In addition, data will be used to assist in the development of updated priorities for each of their Watershed Urban Runoff Management Plans (WURMPs) under the Municipal Stormwater Permit, as well as the development of other local watershed management plans.

A limited number of programs compile water resources data for the Region and present it as a regional assessment. As future work is completed, the IRWM Plan institutional organization will develop a data and information system for relevant water resources information and data throughout the Region. As such, this process represents an important first step toward developing a regional perspective for water resources management information. The data and conclusions developed through the IRWM Plan assessment process may be used by state agencies for developing regional fact sheets and determining regional funding priorities. Periodic information updates could be coordinated with the State Water Plan update. Another opportunity for data coordination may be found with the Regional Board. California's Regional Boards are currently reviewing new data standardization and data provision requirements to accompany Section 401 certification permits. If this program becomes formalized, additional opportunities for regional data integration may arise. Such requirements and standards would provide data at the project-scale that could then be aggregated for a regional interpretation. Coordination with the Regional Board will continue with the implementation of the Plan.

7. Support for Groundwater Assessment and Management

Groundwater data collected through this IRWM effort will comply with and support the objectives of the GAMA Program GAMA, including improvement of statewide ambient groundwater quality monitoring and assessment, and increasing the availability of information about groundwater quality to the public. As described, groundwater projects funded through the Region's IRWM effort will be required to produce data that are comparable with applicable GAMA standards.

8. Support for Natural Resource Assessment and Management

Habitat and natural resource data will comply with and support the applicable objectives and standards of statewide natural resource conservation and management programs including the Multiple Species Conservation Program. As described, project proponents and other stakeholders will also be encouraged to contribute data to the CERES, CEDEN, BIOS, and/or CNDDB data bases.

9. Regional Planning Focus / Increased Coordination of Efforts

A primary reason for the development of integrated, regional water management is that a functional disconnect exists between many water supply, water quality, and natural resource management approaches. While much of the reason for that disconnect is that regulatory programs tend to be designed to address clearly- but narrowly defined problems, the solution

to this problem by and large rests in increasing coordination of those efforts over time. By bringing together all of the parties necessary to achieve integrated, regional water management approaches, the Region's IRWM effort will provide an unprecedented level of focus on, and analysis of, existing and new data and information. This, in turn, will lead to increased insight and increased stakeholder and public participation. Moreover, through the IRWM planning process, opportunities to directly coordinate efforts with representatives of state programs and initiatives will increase. As a whole, increased coordination should improve the quality and usefulness of data collection efforts within the Region.

Section J References

California Environmental Resources Evaluation System (CERES). Website located at: www.ceres.ca.gov/.

San Diego Bay Watersheds Common Ground. Website located at: www.sdbay/sdsu.edu.

Coastal Observing Research and Development Center (CORDC)). ASBS Information Management. Located at http://www.cordc.ucsd.edu/projects/asbs. 2007.

County of San Diego. MSCP website, located at: www.dplu-mscp.sdcounty.ca.gov.

National Audubon Society. Website at: http://audubon2.org/birds/cbc/hr/count_table.html.

Regional Water Quality Control Board, San Diego Region (Regional Board). Watershed Report for San Diego Region 9. Located on Geotracker website at: www.geotracker.waterboards.ca.gov/reports/public/watershed_report.asp. 2007.

San Diego Coastkeeper Citizen Monitoring Database. Website located at: http://www.ca-watersheds.net/thinMaps/sdck/index.html.

San Diego Coastkeeper, City of San Diego, and County of San Diego. San Diego Bay Watersheds Common Grounds website located at: www.sdbay/sdsu.edu.

San Diego County Water Authority. *Groundwater Report*. 1997.

San Diego IRWM Plan website. Website located at: www.sdirwmp.org .

State Water Resources Control Board (State Board). Surface Waters Ambient Monitoring Program (SWAMP) website, located at: www.swrcb.ca.gov/swamp/index.html.

Southern California Coastal Ocean Observing System (SCCOOS). Located at: www.sccoos.org. 2007.

U.S. Environmental Protection Agency (EPA). STORET website, located at http://www.epa.gov/storet/.

U.S. Geological Survey (USGS). National Water Information System (NWIS) website, located at: http://waterdata.usgs.gov/nwis.

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