

Preliminary Inventory of Monitoring Programs

An initial inventory of existing water quality and aquatic resource monitoring programs in California was used to provide a starting point for the Monitoring Council's consideration of constraints and opportunities affecting efforts to meet the goals of the Statute.

Background

SB 1070 finds that SWRCB funding for ambient surface water monitoring is inadequate to ensure the assessment of all waters, and that monitoring efforts underway could be enhanced significantly with increased coordination of the many separate monitoring activities that are conducted at the local, state, and federal levels. The ultimate intent of SB 1070 is to improve the state's existing mechanisms for tracking and reporting on ecosystem health and water quality. One of the first tasks is to identify what kinds of data various state departments are collecting that could be used for assessing ecosystem health and water quality and communicating program performance. We used a few key questions, which the California Water Quality Monitoring Council (the Council), may want to expand, to guide us in the initial inventory of data collection activities:

1. What are the monitoring program objectives?
2. What are the management and assessment questions the data are intended to answer?
3. How are data collection activities (or monitoring programs) funded?
4. Are data available via the web?
5. Are monitoring designs, data collection approaches, quality assurance plans, data management procedures, and data interpretation frameworks documented and easily accessible?

Although SB 1070 does not define "ambient monitoring," it would be helpful to clarify that term at the outset as: "the *periodic* and *systematic* collection and recording of physical, chemical, and/or biological data using documented methods to evaluate the status or condition of a given water body in order to observe and measure trends of environmental characteristics as they relate to human health, ecological conditions, and designated water uses." The legislation requires that "...the Monitoring Council shall focus initially on the water quality monitoring efforts of state agencies, including but not limited to..." the following Boards, Departments, and Commissions:

- 1) State Water Resources Control Board and Regional Water Quality Control Boards
- 2) Department of Fish and Game
- 3) Coastal Commission
- 4) State Lands Commission
- 5) Department of Parks and Recreation
- 6) Department of Forestry and Fire Protection
- 7) Department of Pesticide Regulation
- 8) Department of Health Services
- 9) "The Department" (assuming this means the Department of Water Resources)

Other departments that make significant direct and indirect investments in clean water and ecosystem health are: All Conservancies (with the Coastal Conservancy being the largest of the nine); Department of Conservation, and Department of Toxic Substances Control. It should be noted, however, that not all of the state agencies that invest in ecosystem health and clean water conduct or cause others to conduct ambient monitoring to evaluate the outcome of their investments. Most of them track their *activities* only (e.g., land acquisitions, restoration efforts), without assessing the *outcomes* of their activities that can be linked to improvements in environmental conditions. Activity tracking is mostly conducted in non-standardized fashion.

Summary of departmental missions and monitoring/assessment activities

Below are general descriptions of departmental missions and activities that match the definition of “ambient monitoring” AND associated assessments, development of monitoring guidance and methodology, or one-time landscape characterizations that are required to place ambient monitoring information in the appropriate context. The state departments specifically mentioned in SB 1070 are highlighted in *italics*.

Boards and Departments within Cal/EPA

- 1) *State Water Resources Control Board and Regional Water Quality Control Boards*
The Water Boards' mission is to preserve, enhance and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.

Monitoring and Assessment Activities:

- a) SWAMP (current focus on bioaccumulation in fish; characterizing “stream health” throughout the state by use of benthic macroinvertebrate community composition and physical habitat assessments in high-gradient streams; misc. special studies). SWAMP is “umbrella” and provides ambient context for additional monitoring efforts.
- b) Ambient monitoring required under NPDES permits (permit-specific)
- c) Ambient monitoring under the Nonpoint Source Program (not systematic)
- d) TMDL implementation monitoring (not systematic)
- e) Effectiveness monitoring of grant-funded implementation projects
- f) Agricultural Waiver Program monitoring
- g) Ambient monitoring under various grant projects
- h) Forthcoming ASBS monitoring
- i) Forthcoming coordinated wetland mitigation monitoring

The Board is also a partner in the Interagency Ecological Program.

- 2) *Department of Pesticide Regulation*
The Department's mission is to protect human health and the environment by regulating pesticide sales and use, and by fostering reduced-risk pest management.

Monitoring and Assessment Activities:

The Department has a number of collections of data and other information related to pesticide registration, licensing, pesticide use, environmental effects, enforcement, and other program elements.

3) *Department of Toxic Substances Control*

The Department's mission is to restore, protect and enhance the environment, to ensure public health, environmental quality and economic vitality, by regulating hazardous waste, conducting and overseeing cleanups, and developing and promoting pollution prevention.

Monitoring and Assessment Activities:

The Department monitors and tracks site clean-ups; it assesses human and ecological risks, and analyzes site samples.

Departments and Commissions within the Resources Agency

4) *Department of Fish and Game*

The Department of Fish and Game maintains native fish, wildlife, plant species and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The department is also responsible for the diversified use of fish and wildlife including recreational, commercial, scientific and educational uses.

Monitoring and Assessment Activities:

The Marine Protection Areas (MPA) program is developing a network of protected ocean regions dedicated to preserving biological diversity, promoting recovery of wildlife populations and improving marine ecosystem health. Management of the MPAs requires monitoring of biological, social and economic impacts.

The Resource Assessment Program's goal is to inventory, monitor, and assess the distribution and abundance of priority species, habitats, and natural communities in California.

The department is also a partner in the Interagency Ecological Program.

The Office of Oil Spill Prevention and Recovery administers the Scientific Study and Evaluation Program that funds to investigate and evaluate new oil spill response and cleanup methods, potential adverse effects of oil spills, and development of natural resource damage assessment tools.

The Department periodically conducts fish species abundance and condition surveys, as well as creel surveys.

5) *California Coastal Commission*

The mission of the Coastal Commission is to protect, conserve, restore, and enhance environmental and human-based resources of the California coast and ocean for environmentally sustainable and prudent use by current and future generations.

Monitoring and Assessment Activities: No large-scale activities – other than facilitation of tool development via the Critical Coastal Areas Program and tracking trends in marine debris during Coastal Cleanup Day.

6) *State Lands Commission*

The Commission serves the people of California by providing stewardship of the lands, waterways, and resources entrusted to its care through economic development, protection, preservation, and restoration.

Monitoring and Assessment Activities: No large-scale water quality or aquatic resource monitoring activities with the exception of the Ballast Water Monitoring Program.

7) *Department of Parks and Recreation*

The Department's mission is to provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation.

Monitoring and Assessment Activities: The Inventory, Monitoring, and Assessment Program (IMAP) provides goals, guidance, and standards for the Department's efforts to systematically evaluate the vegetation, wildlife, and physical natural resources of the State Park System. Pilot areas for inventorying, monitoring, and assessing natural resources are Wilder Ranch in Santa Cruz County and Chino Hills in Riverside County.

8) *Department of Forestry and Fire Protection (CalFire)*

CalFire's mission emphasizes the management and protection of California's natural resources; a goal that is accomplished through ongoing assessment and study of the State's natural resources and an extensive CDF Resource Management Program. CDF oversees enforcement of California's forest practice regulations which guide timber harvesting on private lands.

Monitoring and Assessment Activities:

The Fire and Resource Assessment Program - FRAP (formerly known as Forest and Range Assessment Program) provides periodic overviews of the status, trends, and challenges to California's forests and rangelands. The program provides landscape-level geospatial data on a number of environmental, social, and economic indicators of sustainability.

Contract work, cooperative agreements, or MOUs are used with several entities to conduct cooperative instream monitoring projects in forested watersheds throughout the state. These projects include:

- USFS-PSW—cooperative agreement with CalFire to conduct research-level monitoring in the Caspar Creek watershed (100-year agreement in place-- <http://www.fs.fed.us/psw/topics/water/caspar/100yearMOU.pdf>).
- SPI, CTM-Hawthorne Timber Company—MOUs with CalFire signed to cooperatively conduct THP-scale effectiveness instream monitoring at Judd Creek and SF Wages Creek, respectively.

- Garcia River monitoring, Elk River, Little Creek monitoring, etc.—contracts with the MCRCD, HSU, and Cal Poly SLO, respectively, to conduct instream monitoring studies.

A number of time-limited monitoring programs have been undertaken, among them the Hillslope Monitoring Program (1996-2002), Modified Completion Report monitoring (2001 to 2004), and Forest Practice Rule Implementation Monitoring, which began in 2007 and is anticipated to operate through 2011. These monitoring programs use a random sample of completed Timber Harvest Plans to test the implementation and effectiveness of Forest Practice Rules related to water quality.

9) *Coastal Conservancy*

The Coastal Conservancy acts with others to preserve, protect and restore the resources of the California Coast. The Coastal Conservancy's vision is of a beautiful, restored and accessible coastline. The Conservancy also houses the Ocean Protection Council, which guides and coordinates state agencies on oceans and coastal resource protection issues, as well as recommending legislative policy for protecting these resources.

Monitoring and Assessment Activities:

The Conservancy is a partner in the Coastal Oceans Currents Monitoring Program (COCMP), which is a multi-institution, interagency collaboration with the goal of integrated monitoring of currents in the coastal ocean. Initially, COCMP will emphasize technology to measure and map surface currents.

The Conservancy also oversees tracking of wetland acquisition and restoration in parts of the state, and inventories barriers to fish passage in coastal and SF Bay Area watersheds in collaboration with DWR, DFG, Caltrans, and other agencies.

10) *Department of Water Resources*

DWR operates and maintains the State Water Project, including the California Aqueduct. The department also provides dam safety and flood control services, assists local water districts in water management and conservation activities, promotes recreational opportunities, and plans for future statewide water needs.

Monitoring and Assessment Activities:

The *Division of Operations and Maintenance* maintains a water quality program that collects detailed information on concentrations and distribution of chemical, physical, and biological parameters at more than thirty sites in the California Aqueduct and associated reservoirs.

The *Division of Environmental Services* provides data related to drinking water quality and provides a central focal point for the collection and dissemination of water quality information. The department is a member of the Interagency Ecological Program (IEP) which assesses and monitors the ecological resources of the San Francisco Bay / Sacramento – San Joaquin Estuary. The goal of the IEP is to develop a better understanding of the estuary's ecology and the effects of water projects and other human activities on fish and wildlife resources.

The *Division of Planning and Local Assistance* assesses water bodies for water quality characteristics, risks to beneficial uses, and effects of watershed management. The

Real-time Water Quality Management Program uses telemetered stream stage, salinity data and computer models to simulate and forecast water quality conditions along the lower San Joaquin River. The Fish Passage Improvement Program identifies and maintains a database of man-made barriers to fish migration. The Division provides the Department of Water Resources with the basis for surveillance of agricultural land uses, as well as the nature, location, and rate of change in water use. It covers urban, agricultural, and managed wetlands water use, known collectively as cultural water use. The division also administers numerous grant programs that may generate ambient monitoring data.

The *Division of Flood Management* maintains a real-time decision support system to DWR Flood Management and other flood emergency response organizations, providing operational and historical hydrologic and meteorological data, forecasts, and reports.

11) *Department of Conservation*

The Department of Conservation provides services and information that promote environmental health, economic vitality, informed land-use decisions and sound management of our state's natural resources. The department houses the statewide Watershed Program, which has the goal of coordinating and improving state agency processes in order to improve service to local watershed efforts, to demonstrate improvement in watershed health, and to promote collective investment among state, federal and local resources.

Monitoring and Assessment Activities:

The Farmland Mapping and Monitoring Program (FMMP) produces maps and statistical data used for analyzing impacts on California's agricultural resources. Agricultural land is rated according to soil quality and irrigation status. The maps are updated every two years with the use of aerial photographs, a computer mapping system, public review, and field reconnaissance. The Department also provides guidance and develops manuals for mine reclamation.

The California Geological Services is housed in the Department of Conservation and provides data on seismic, as well as landslide and erosion hazards. It develops and maintains watershed maps of geologic and geomorphic features.

Departments within the Health and Human Services Agency

12) *Department of Public Health*

The department was established to protect and promote the health status of Californians through population-based public health programs and services.

Monitoring and Assessment Activities:

The Marine Biotoxin Monitoring Program surveys, classifies, and monitors commercial shellfish-growing areas.

The Drinking Water Source Assessment and Protection Program provides guidance and information to local communities to delineate the area around a drinking water source through which contaminants might move and reach that drinking water supply; to inventory possible contaminating activities that might lead to the release of microbiological or chemical contaminants within the delineated area; and to determine

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the possible contaminating activities to which the drinking water source is most vulnerable.

The California Beaches Program provides guidance and methods for monitoring recreational beaches (ocean, and fresh water).

Note: Many of these monitoring and assessment programs and projects are supported by resources from the State General Fund or federal programs (primarily via USEPA and the U.S. Fish and Wildlife Service) and are subject to annual fluctuations and budget decisions by the State Legislature and Congress.

Table A2.1. Data Types Collected by Departments

Dept.	Drink	Swim	Fishing	Aquatic Life	Foundation Data	Tool Dev.	Status & Trends	Diagnostic Data	Landscape Assessment
SWRCB & RWQCBs	x	x	x	x	x	x	x	x	x
DFG				x	x	x	x		x
CCC				x	x				x
SLC				x					
Parks				x					
CDF				x	x				
DPR	x		x	x	x		x		
DPH	x	x			x				
DWR	x			x	x	x	x		x
SCC					x				x
DOC	x			x	x				x
DTSC					x	x			

The inventory of “monitoring and assessment programs” will have to rely on some kind of classification system that would enable the Monitoring Council to determine specific actions and funding needs necessary to coordinate and enhance existing data collection, interpretation, and reporting efforts.

A proposed data classification system consists of the following broad categories, which can be hierarchically refined:

- Foundation data (required to place monitoring and research data into context and to develop conceptual models). Examples of foundation data are the National Hydrography Dataset (NHD), the California Wetlands Inventory, maps of storm drains and other man-made runoff conveyance systems, flow data, land cover and land use, habitat types, watershed geology, climate, rainfall, tidal elevation, and others.
- Landscape-level assessment data. These are foundation data with information values added. Examples are landslide hazard maps, condition scores of multi-metric indices (benthic macro-invertebrate IBI, riparian bird, fish indices, watershed disturbance indices, hydromodification indices, etc.).
- Status and trends data in beneficial use condition. These tend to be the “true” monitoring data comprised of successive measurements over time using consistent and comparable methods.
- Diagnostic data, comprised of short-term special studies to explore cause-and-effect relationships or to test hypotheses

- Tool development, such as testing and validating new analytical, sampling, or assessment methods or guidelines; establishing consistent data formatting approaches; quality assurance and control guidance; web-based data query systems, and the like.

Information Sources

State Water Resources Control Board and Regional Water Quality Control Boards

Surface Water Ambient Monitoring Program (SWAMP):

http://www.waterboards.ca.gov/water_issues/programs/swamp/

Areas of Special Biological Significance (ASBS):

http://www.waterboards.ca.gov/water_issues/programs/ocean/asbs.shtml

Bay Protection and Toxic Cleanup Program:

http://www.waterboards.ca.gov/water_issues/programs/bptcp/

National Pollutant Discharge Elimination System (NPDES):

http://www.waterboards.ca.gov/water_issues/programs/npdes/

Total Maximum Daily Load (TMDL) Program:

http://www.waterboards.ca.gov/water_issues/programs/tmdl/tmdl.shtml

Financial Assistance Programs:

http://www.waterboards.ca.gov/water_issues/programs/grants_loans/

Department of Pesticide Regulation

Surface Water Protection Program:

<http://www.cdpr.ca.gov/docs/emon/surfwttr/index.htm>

Pesticide Use Reporting:

<http://www.cdpr.ca.gov/docs/pur/purmain.htm>

Department of Fish and Game

Resource Assessment Program:

<http://www.dfg.ca.gov/RAP/>

Marine Life Protection Act:

<http://www.dfg.ca.gov/mlpa/masterplan.asp>

California Natural Diversity Database:

<http://www.dfg.ca.gov/biogeodata/cnddb/>

Heritage and Wild Trout Program:

<http://www.dfg.ca.gov/fish/Resources/WildTrout/index.asp>

Marine Sport Fish Survey (Refugia Project):

<http://www.dfg.ca.gov/marine/refugia.asp>

Office of Spill Prevention and Response Scientific Study and Evaluation Program:

<http://www.dfg.ca.gov/ospr/about/science/ssep.html>

Coastal Commission

Water Quality Program:

<http://www.coastal.ca.gov/nps/npsndx.html>

State Lands Commission

Land Management Division:

http://www.slc.ca.gov/Division_Pages/LMD/Documents/lmd_brochure.pdf

Environmental Planning & Management:

http://www.slc.ca.gov/Division_Pages/DEPM/DEPM_Home_Page.html

Ballast Water Monitoring Program:

http://www.slrc.ca.gov/Spec_Pub/MFD/Ballast_Water/Ballast_Water_Default.html

Department of Parks and Recreation

Inventory, Monitoring & Assessment Program:

http://www.parks.ca.gov/default.asp?page_id=836

Department of Forestry and Fire Protection

Fire and Resource Assessment Program:

<http://frap.cdf.ca.gov/projects.html>

http://www.fire.ca.gov/CDFBOFDB/board/msg_supportedreports.asp

Department of Water Resources

State Water Project (SWP) Water Quality Monitoring:

<http://www.omwq.water.ca.gov/>

Water Data Library:

<http://wdl.water.ca.gov/>

Watershed Restoration Program:

<http://www.watershedrestoration.water.ca.gov/>

Department of Public Health

Drinking Water Source Assessment and Protection Program:

<http://www.cdph.ca.gov/certlic/drinkingwater/Pages/DWSAP.aspx>

Division of Drinking Water and Environmental Management:

<http://www.cdph.ca.gov/programs/Pages/DDWEM.aspx>

Department of Conservation

Watershed Program:

<http://www.conservation.ca.gov/dlrp/wp/Pages/Index.aspx>

http://cwp.resources.ca.gov/uploads/images/53/MOU_watershed.pdf

Farmland Mapping and Monitoring Program:

<http://www.conservation.ca.gov/dlrp/fmmp/Pages/Index.aspx>

California Geographical Survey:

<http://www.conservation.ca.gov/cgs/Pages/Index.aspx>

Coastal Conservancy

<http://www.scc.ca.gov/Programs/pandp.htm>

Department of Toxic Substances Control

Human and Ecological Risk Assessment:

<http://www.rdtsc.ca.gov/AssessingRisk/index.cfm>

Department of Transportation

Biological Resources Issues:

<http://www.dot.ca.gov/hq/env/bio/index.htm>

Interagency Ecological Program (I.E.P.)

<http://www.iep.water.ca.gov/>

Environmental Monitoring Program:

http://www.baydelta.water.ca.gov/emp/about_the_EMP.html

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Table A2.2: Simplified summary of key monitoring programs (somewhat subjective)

Department	Name of Program	Program Purpose	Funding Source	Approx. 5-Year Average Funding Level	Landscape-Level Assessment	Status & Trends	Guidance, Method Dev., Special Studies	Data in e-form?	Statewide	Regional	Water Body Type	Resource (Beneficial Uses)
State Water Resource Control Board / Regional Water Quality Control Boards	Surface Water Ambient Monitoring Program	Condition of all surface waters	GF, federal, fees	\$5M/yr	x	x	x	yes	x	x	All water body types (O, W, L, S, E, R)	AL, DW, Fishing, Swim
Department of Pesticide Regulation	Pesticide Use Inventory	Track use	AG fund, federal, fees	\$1.6M/yr (based on 05/06 and 06/07)		x		yes	x		W, L, S, R	AL, DW, Fishing
	Surface Water Protection Program	Characterize pesticide residues, identify sources of contamination, determine mechanisms of off-site to surface water, and develop site-specific mitigation strategies.	AG fund, federal, fees	?		x	x	yes	x		W, L, S, R	AL, DW, Fishing

Funding Source: GF = general fund, AG = agricultural fund

Water Body Type: O = ocean, W = wetlands, L = lakes, S = streams, E = estuaries, R = rivers

Resource: AL = aquatic life, DW = drinking water

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Dept. of Fish and Game	Marine Protection Areas Program	Develop a network of protected ocean regions to preserve biological diversity, promote recovery of wildlife populations and improve ecosystem health	GF, ELPF	\$19.58 M in 06/07		x	x	yes	x (coast)	x	O	AL
	Resource Assessment Program	Address resource assessment priorities and existing efforts in the collection, analysis, and use of data on native fish, wildlife, plants, and communities.	GF	? on hiatus	x	x	x	Yes. http://www.cdfg-rap.net/	x	x	E, L, S, R, W	AL
	CA Natural Diversity Database	Inventories of the status and locations of rare plants and animals.	land developers' fees?	?		x		Yes	x; non-random			AL

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Dept. of Water Resources	State Water Project (SWP) Water Quality Monitoring	1) document special and temporal changes in SWP water quality; 2) plan water treatment operational changes; 3) identify and respond to pollution or other water quality episodes; 4) compare SWP water quality to drinking water standards.	revenue from hydro-electric power, bond funds, GF	?		x		Yes	x		reservoirs & aqueducts	AL, DW
	Envir. Monitoring Program (part of Interagency Ecological Program)	Provide necessary information for compliance with flow-related water quality standards specified in the water right permits	federal	?		x		Yes		x; Delta and Upper SF Estuary	R, E	AL, DW

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Dept. of Parks and Recreation	Inventory, Monitoring & Assessment Program	Evaluate the vegetation, wildlife, and physical natural resources of the State Park System	GF	?	x	x	x	Not yet	Not yet	Pilot projects	E, S, R, L	AL
State Lands Commission	Ballast Water Monitoring Program	Evaluate effectiveness of ballast water discharge regulations	fees	\$2.3M/yr		x		No	x		O, E	AL
Dept. of Forestry and Fire Protection	Fire and Resource Assessment Program	Assess the amount & extent of CA's forests and rangelands, analyzes their conditions & identifies alternative mgmt & policy guidelines.	GF	?	x	x		yes	x		S, R	AL
Coastal Commission	Coastal Cleanup Day; Critical Coastal Areas		Bond funds; public-private partnerships	?	x	x	x	yes		Coast-wide; CCA Pilot projects	S, O, E	AL

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Coastal Conservancy	Ocean Protection Council	Guide and coordinate state agencies on oceans & coastal resources protection. Recommend legislative policy for protecting these resources. (No monitoring)	Bond funds	\$28M in 07/08			x	N/A	x (coast)		O, E	AL, Fishing, Swim
Dept. of Public Health	Marine Biotoxin Monitoring Program	Surveys, classifies & monitors commercial shellfish growing areas	mostly Federal, some GF	?				monthly reports avail.	x (coast)		O, E	Fishing
	Beaches and Recreational Waters	Guidance, monitoring	mostly Federal, some GF	allocates over \$1.5M/yr to local gov't to monitor beaches' water			x	some data avail. from US EPA	x		O, E, L	Swim
	Drinking Water Source Assessment & Protection	Assess risks to public drinking water sources	mostly Federal, some GF	?				summ. reports avail.	x		S, L, R	DW