

Appendix I: CA Water DRoP User Needs Survey

Background information

1. How would you categorize your current occupation or interest in California water data?
Please check all that apply.

Table 1. Participants' occupation / interest

<i>Occupations / Interest</i>	<i>Percentage of Participants</i>
Researcher / scientist	43.6%
Engineer	23.7%
Consultant	22.0%
Professor / educator	21.6%
Manager / decision maker	14.5%
Regulator	8.3%
Policy Maker	6.6%
Student	4.6%
Farmer / rancher / vintner	3.7%
Public citizen group	2.9%
Volunteer	2.9%
Lawyer	2.1%
Technologist	2.1%
Librarian / archivist	1.2%
Other	11.2%

Comments for Other: (30 comments) Other occupations / interests include administrator, agronomist, documentary film producer, EMS coordinator, farm advisor, geologist, hydrogeologist, resource economist, QA office manager, tribal government, water district board member / director, water conservation specialist, water resources planner, and writer among others.

2. Which of the following best describes your current employer / organization / affiliation?

Table 2. Participants' employer / organization / affiliation

<i>Current Employer / Organization /Affiliation</i>	<i>Percentage of Participants</i>
University	26.7%
State government	22.5%
Consultant	16.3%
Local government	8.3%
Federal government	7.1%
Municipal water district	3.8%
Non-governmental organization	2.5%
Farm / ranch / vineyard operator	2.1%
Irrigation district	1.7%
Law firm	1.3%
N/A	1.7%
Other	6.3%

Comments for Other: (18 comments) Other employers / organizations / affiliations include food processing, Native American tribe, regional board, resource conservation district, retired, self-employed, watermaster, water purveyor, and water treatment and irrigation efficiency services among others.

Assessing data needs

3. How would you categorize your need for California water data? Please check all that apply.

Table 3. Participants' need for CA water data

<i>Need for CA Water Data</i>	<i>Percentage of Participants</i>
Research / analysis	75.5%
Environmental interests	49.4%
Decision-making, policy	41.5%
Decision-making, engineering	41.1%
Regulation	33.6%
Decision-making, operations	33.2%
Education support	33.2%
Litigation support	15.4%
Other	3.7%

Comments for Other: (15 comments) Other needs include grant writing, personal (e.g. flooding), photographs and documents for documentary films, sales/marketing support, and tribal water rights among others.

4. What percentage of the data that you use is collected by OTHER organizations?

Table 4.1 Participants' need for data collected by other organizations (*number of responses within each percentage range by employer / affiliation*)

<i>Participant's Employer/ Affiliation</i>	<i>Percentage of Data Participant Uses that is Collected by <u>OTHER</u> Organizations</i>					<i>Total Responses</i>	<i>Average Percentage</i>
	<i>75-100%</i>	<i>50-74%</i>	<i>25-49%</i>	<i>0-24%</i>			
University	27	16	2	10	55	66%	
Consultants	20	7	7	4	38	64%	
Federal	7	3	2	4	16	56%	
State	16	15	10	11	52	51%	
Local	8	3	6	3	20	51%	
Water Districts	2	3	1	3	9	49%	
NGOs	2	2	0	2	6	55%	
Farm/Ranch/Vineyard	2	2	0	0	4	71%	
Irrigation District	1	1	2	0	4	48%	
Law Firm	2	0	1	0	3	73%	
Other	4	4	3	3	14	53%	

Table 4.2 Participants' need for data collected by other organizations (*number of responses within each percentage range by occupation / interest*)

Participant's Occupation or Interest	Percentage of Data Participant Uses that is Collected by <u>OTHER</u> Organizations					
	75-100%	50-74%	25-49%	0-24%	Total Responses	Average Percentage
Researcher / Scientist	37	25	16	19	97	56%
Engineer	23	12	8	13	56	54%
Consultant	27	11	7	5	50	67%
Professor / Educator	20	14	3	8	45	64%
Manager / Decision Maker	9	10	8	8	35	48%
Regulator	6	7	0	6	19	53%
Policy Maker	7	4	3	1	15	64%
Student	6	1	1	2	10	66%
Farmer/Rancher/Vintner	2	4	0	2	8	53%
Public Citizen Group	2	4	1	0	7	71%
Volunteer	1	3	1	1	6	57%
Lawyer	2	1	2	0	5	64%
Technologist	3	0	2	0	5	64%
Librarian / Archivist	2	0	1	0	3	70%

5. How would you characterize your frequency of need for data collected by other organizations?

Total Responses: 223

Table 5. Participants' frequency of need for data from each agency type

Collected By:	Frequency of Need (percentage of participants)				
	Daily	Weekly	Monthly	Annually	N/A or blank
State agencies	15%	22.7%	33.6%	20.9%	7.7%
Federal agencies	10.9%	17.7%	33.6%	27.4%	10.5%
Local agencies	4.5%	16.4%	30%	28.6%	20.5%
Municipal water districts	3.18%	11.4%	25.9%	31.8%	27.7%
Universities	2.2%	7.6%	23.8%	32.7%	33.6%
Irrigation districts	2.7%	8.1%	19.3%	28.3%	41.7%
Consultants	2.2%	7.6%	22.4%	21.5%	46.2%
NGOs	2.7%	5.4%	17.9%	25.1%	48.9%

6. How would you characterize the data that you need? Please check all that apply.

Total Responses: 226

Table 6. Participants' characterization of data needed from each agency type

Data From:	Characterization of Needed Data (percentage of participants)			
	Digital	Digital, Older Format	Not Digitized	N/A
State agencies	82.3%	34.1%	20.4%	5.8%
Federal agencies	80.5%	28.3%	19.5%	9.3%
Local agencies	68.6%	27.4%	26.5%	14.2%
Universities	65.9%	23.0%	14.6%	24.3%

NGOs	55.3%	20.4%	14.6%	33.6%
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7. Are there specific agencies whose data you would like greater access to? If so, please specify.

Table 7.1 Specific agencies listed by participants

<i>Agency</i>	<i>Number of Times Listed</i>
CA Department of Water Resources	22
U.S. Geological Survey	22
Regional Water Quality Control Boards	10
U.S. Environmental Protection Agency	9
Irrigation Districts (in general)	8
Water Districts / Agencies (in general)	7
CA Department of Public Health	6
State Water Resources Control Board	6
Metropolitan Water District of Southern California	5
National Oceanic and Atmospheric Administration	5
U.S. Bureau of Reclamation	5
U.S. Army Corps of Engineers	4
Counties / Municipalities (in general)	3
Local Agencies (in general)	3
Federal Agencies (in general)	3
State Agencies (in general)	3
CA Department of Fish and Game	2
CA Department of Pesticide Regulation	2
CA Department of Toxic Substance Control	2
U.S. Fish and Wildlife Service	2
CA Climate Data Archive	1
CA Department of Consumer Affairs	1
CA Department of Finance	1
CA Department of Food and Agriculture	1
CA Department of Forestry	1
El Dorado County	1
Flood Control Agencies	1
Imperial Irrigation District	1
Los Angeles Department of Water and Power	1
National Center for Environmental Health	1
National Marine Fisheries Service	1
National Resources Conservation Service	1
Nevada County	1
Orange County Water District	1
Pacific Northwest National Laboratory	1
Placer County	1
Resource Conservation Districts	1
San Diego County	1
Santa Clara Valley Water District	1
Sierra County	1
State Reclamation Board	1

Tahoe Resource Planning Agency	1
Tulare Basin Irrigation Districts	1
U.S. National Weather Service	1
Universities	1
UC Davis Coop Extension	1

Additional Comments: Some participants specified which data they were most interested in from each agency they listed.

Table 7.2 Specific data listed by participants

<i>Agency</i>	<i>Specific Data</i>
CA Department of Water Resources	<ul style="list-style-type: none"> - water level and water chemistry data for basin analysis - improved digital records of water rights permits - the ability to download large blocks of data from CDEC (e.g. daily records of every snow pillow in a single query)
U.S. Geological Survey	<ul style="list-style-type: none"> - historical 15-min data available online - a greater range of raw data - more available/complete stream gauge/flow data - water level and water chemistry data for basin analysis - data summaries don't always provide needed information and the 30 or 60 day real time data limit is constraining for long term trends - greater access to geophysical files - data that has not been published
Regional Water Quality Control Boards	<ul style="list-style-type: none"> - water level and water chemistry data for basin analysis - POTW discharge compliance reports - data (site info) in electronic format. - current and historic information that is not available in GeoTracker
U.S. Environmental Protection Agency	<ul style="list-style-type: none"> - the community Water System Survey - Drinking Water Infrastructure Needs Survey and Assessment - Clean Water Infrastructure Needs Survey and Assessment - Raftelis engineering report on rates
Irrigation Districts (in general)	<ul style="list-style-type: none"> - their rules and accounting
CA Department of Public Health	<ul style="list-style-type: none"> - well location data - technology reports (e.g. Title 22 disinfection technology)
State Water Resources Control Board	<ul style="list-style-type: none"> - reports submitted to them for compliance by agencies/municipalities and their consultants
National Oceanic and Atmospheric Administration	<ul style="list-style-type: none"> - NCDC - COOPS historic data
U.S. Army Corps of Engineers	<ul style="list-style-type: none"> - data that has not been published - old information
Local Agencies / Counties / Municipalities	<ul style="list-style-type: none"> - city drainage maps - county environmental health - county groundwater quality and levels - older reports available online in pdf format
Federal Agencies	<ul style="list-style-type: none"> - groundwater quality and levels

State Agencies	- groundwater quality and levels
CA Department of Consumer Affairs	- professional licenses
Consultants	- consultants' reports
State Water Contractors	- water level and water chemistry data for basin analysis
Water Well Drillers	- water well logs
<i>not agency specific</i>	- the data and metadata associated with data reports posted online - "aggregated data on water control facilities such as groundwater recharge basins, evaporation ponds, etc." - "real time data regarding state water conservation, reservoir levels, major transfers, precipitation, etc." - "consolidated water usage, extent and nature of conjunctive resources management, coastal urban wastewater recovery / recycling"
Private Property Owners	- groundwater pumping and surface water diversions by private property owners

8. Which of the following categories of California water data do you most frequently search for? Which would you benefit most from improved access to? Please check all that apply.

Total Responses: 230

Table 8. Percentage of participants that most frequently searches for and would benefit from improved access to the various categories of California water data

<i>Category</i>	<i>Benefit From Improved Access To</i>	<i>Most Frequently Search For</i>
Watersheds / groundwater basin	47.8%	53.0%
Water quality (wastewater, agriculture, industrial, stormwater)	43.5%	54.8%
Discharges (wastewater, agricultural, industrial, stormwater)	40.9%	45.7%
Groundwater elevation	35.7%	37.8%
Receiving water quality	34.3%	33.0%
Water system operations	33.5%	40.0%
Streamflow	31.3%	53.5%
Drinking water quality	21.7%	30.9%
Aquatic ecology	20.9%	22.6%
Meteorological	20.0%	31.7%
Oceanographic	10.9%	9.6%
Other	5.7%	9.6%

Comments for Other: (33 comments) The most mentioned were water supply / use, CIMIS / ET, and irrigation. Other comments included city drainage maps, contaminant plume concentrations and extent, geomorphic, land use, legal/legislative, private water diversions, recycled water quantity and quality, restoration projects, rivers sediments, snow courses and pillows, surface water and groundwater water deliveries, water sales to other agencies, , water market conditions, water

quality permit data, well drilling permits, and well logs among others.

9. There are a number of barriers to using data, including the data's format, accessibility, and quality. Please rate your need for improved access to each of the following.

Table 9. Participants' need for improved access (*percentage of participants and total responses*)

<i>Improved Access To:</i>	<i>Extremely Important</i>	<i>Important</i>	<i>Somewhat Important</i>	<i>Not Important</i>	<i>Total Responses</i>
Data that are available online	62.7%	27.3%	6.4%	3.6%	220
Digital data that are not currently available online	42.3%	42.3%	13.0%	2.3%	215
Data that have undergone QA/QC	43.8%	36.5%	15.3%	4.4%	203
Data available in reports	38.1%	42.4%	18.1%	1.4%	210
Data that have not yet been digitized	30.3%	35.1%	28.8%	5.8%	208
Raw data	16.2%	33.0%	32.5%	18.3%	197

Comments: (14 comments) The following were also listed in comments: a better cataloging and search mechanism, metadata, preliminary digital data, and a standardized digital format (for comparisons). Category specific comments include: historical water quality data, storm drain maps, streamflow, and well logs.

10. Please rate your need for improved access to recent versus historical data

Table 10. Participants' need for improved access to recent and historical data (*percentage of participants and total responses*)

<i>Improved Access To:</i>	<i>Extremely Important</i>	<i>Important</i>	<i>Somewhat Important</i>	<i>Not Important</i>	<i>Total Responses</i>
Data collected in the past year	53.7%	36.0%	9.3%	0.9%	214
Data collected in the past 10 years	51.9%	41.7%	6.5%	0%	216
Data collected prior to 2000	36.8%	40.5%	20.0%	2.7%	220

Comments: (17 comments) Participants specifically listed historical groundwater level information (as far back as possible), historical data from water use projects, and the need for a long period of flow history. Participants additionally commented on the importance of historical data for computer groundwater models (need 30-50 years of data), establishing anti-degradation analyses (pre-1968), long term prediction assessment of water quality availability, restoration planning (aerials from the 1940s), weather patterns and stream flow, risk assessment, the analysis of recent data, and in general. The importance of digitized historical data was also mentioned.

11. Please rate the importance of the following characteristics to you when using data.

Table 11. Participants' importance rating for each data characteristic (*percentage of participants and total responses*)

<i>Characteristic</i>	<i>Extremely Important</i>	<i>Important</i>	<i>Somewhat Important</i>	<i>Not Important</i>	<i>Total Responses</i>
are findable and accessible online	75.4%	19.7%	3.9%	0.9%	228
are in usable digital form	66.7%	26.2%	6.2%	0.9%	225

have well documented metadata	45.0%	31.7%	19.7%	3.7%	218
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12. Please specify any other factors that are important to you when using data.

Comments: (59 responses) The two most mentioned factors were the accuracy/reliability (or QA/QC) of the data and the data's output/download format. With regard to the accuracy/reliability of the data, one participant discussed the problem of using preliminary flow data for operations decisions when it can undergo large changes retroactively. In terms of the output/download format, participants want common data formats compatible with standard software packages without requiring major format changes or writing code to get the data into a usable format. Specifically mentioned were Excel (or other spreadsheets), Access (or other databases), GIS compatible, and ascii formats.

The next most mentioned factors were documented site location information, followed by documented research/collection methodologies, well documented metadata, and the continuity/completeness of the data.

Other factors mentioned include applicable units, both narrative and graphical reporting capability, the data collection interval (the shorter the better), links to comparable data, map-based user interface, references and foundational data, searchable by keywords/variables, a simple and intuitive web site interface, and updated contact information.

13. Please share any additional comments you have about your data needs.

Comments: (31 responses) Responses ranged from general to specific.

General responses include a better inventory of data, a repository for data, easy to find and search, availability on the internet, well documented metadata, bibliographic information and references, needing to have a spatial component, downloadable in a standard and parsable format, downloadable maps / graphics without the need for expensive software, and updated data.

One participant mentions frustration with having to contact multiple agencies to obtain information, the lack of knowledge of what exists within some agencies, and the occasional lack of response from some agencies. Another participant states that much of the surface water data is "disjointed and fragmented between organizations." One participant states that most of their data needs have been met by a third party provider scraping environmental data from government web site and providing direct access to Excel and Matlab for data analysis.

Specific responses include a greater availability of water district information; groundwater quantity and quality data; water level and water chemistry data for basin aquifer analyses; areas with contaminated groundwater (with wells no longer in service due to that contamination); geologic data with soil physical properties; cultural data (surface features); the location of gauging stations and groundwater monitoring devices; mapping of watersheds, stream reaches, and land use; large survey files (especially lidar and images); high resolution digital copies of photographs and historical documents; data necessary for predicting the environmental impact of water flows/fluxes; data related to water and climate change; and the broader spectrum of data needed to deal with "interdisciplinary" issues in water management, water conservation, watershed restoration, habitat and aquatic ecology, etc.;" tribal consultation or inclusion; and historic data.

Are the existing methods for finding and accessing California water data sufficient?

14. How easy is it for you to find and access data collected within your own organization? Outside of your organization?

Table 14. Participants' difficulty rating for finding and accessing data within/outside their organization (percentage of participants and total responses)

<i>Find and Access Data</i>	<i>Very Easy</i>	<i>Somewhat Easy</i>	<i>Somewhat Difficult</i>	<i>Very Difficult</i>	<i>N/A</i>	<i>Total Responses</i>
within your own organization	22.4%	39.5%	25.6%	3.6%	9.0%	223
outside of your organization	1.4%	37.7%	47.3%	10.9%	2.7%	220

Comments: (18 comments) Slightly more than one third of comments said that ease of access varies depending on the organization and the type of data sought. (One participant said that knowing the right contact person is necessary.) The issue of accuracy was also raised in a couple of comments – one stating that there are many agencies with inaccurate data and another stating that getting accurate information from farmers can sometimes be difficult. Getting large amounts of data was also reported as being difficult in one comment.

One participant said that data was easier to locate within their own organization prior to their web site redesign. Another participant mentioned being unable to find a CIMIS report covering water use by crop in the state. Another participant (affiliated with the CA Department of Water Resources) said that USGS has the best system for QA/QC and timely online access.

15. On average, how many hours per month do you spend searching for, downloading, reformatting, and documenting water data?

Total Responses: 225

Table 15. Average (and median) number of hours that participants spend performing each activity

<i>Activity</i>	<i>Average (hrs)</i>	<i>Median (hrs)</i>
Searching for	10	5
Downloading	5	2
Reformatting	4	2
Documenting	7	2

16. Which of the following tools or methods do you use when searching for California water data?

Total Responses: 218

Table 16.1 Participants' frequency of use of each search tool / method

<i>Tool / Method</i>	<i>Frequency of Use (percentage of participants)</i>				
	<i>Daily</i>	<i>Weekly</i>	<i>Monthly</i>	<i>Annually</i>	<i>N/A or Blank</i>
Google (or other search engine) searches	34.9%	21.6%	22.9%	9.6%	11%

Specific agency or program web site searches	14.2%	34.4%	29.4%	11.9%	10.1%
Colleague inquiries	4.1%	16.5%	30.3%	15.1%	33.9%
Agency or program inquiries	2.8%	12.4%	30.7%	23.4%	30.7%
Databases of water data	6.9%	12.4%	29.4%	17.4%	33.9%
Indices or catalogs of water data	1.4%	8.3%	30.3%	15.1%	45%
Libraries or archives	1.4%	6.4%	20.2%	26.6%	45.4%

What is your success rate with each tool/method?

Total Responses: 194

Table 16.2 Participants' success rate with each tool / method (percentage of participants and non-N/A responses) *Note: N/A responses and blanks not included in percentages*

<i>Tool / Method Success Rate</i>	<i>Very High</i>	<i>High</i>	<i>Medium</i>	<i>Low</i>	<i>Very Low</i>	<i>Non-N/A Responses</i>
Specific agency or program web site searches	10.8%	33.5%	43.2%	11.4%	1.1%	176
Google (or other search engine) searches	10.8%	28.4%	46.6%	11.9%	2.3%	176
Colleague inquiries	6.2%	31.5%	50.8%	10.8%	0.8%	130
Databases of water data	10.6%	27.3%	40.2%	18.9%	3.0%	132
Agency or program inquiries	4.3%	25.2%	51.8%	16.5%	2.2%	139
Libraries or archives	4.9%	27.5%	40.2%	22.5%	7.8%	102
Indices or catalogs of water data	0.9%	17.0%	56.3%	21.4%	4.5%	112

17. Please specify any additional tools or methods you use when searching for California water data.

Comments: (39 responses) Responses included American Water Works Association, bibliographies, Brown and Caldwell daily news summary, California Urban Water Conservation Council , CaSil GIS Library (mapping data – also USGS, NRCS), CDEC, CEDEN, CIMIS, CIWQS, DWR NRO (for Well Completion Report data, tools to analyze groundwater level statistics, groundwater contouring data, and conducting QA/QC on monitoring data), GeoTracker, GeoTracker GAMA, Google Earth (to validate poor agency waterway maps), hardcopy reports, HEC-DSSVue (to search for CDEC and USGS data), periodicals, personal library and data, seminars, Texas A&M system, third party provider (scrapes governmental data into more useful format with better access), trade and professional journals, trade shows, and WaterML .

18. Are the currently available methods for finding and accessing California water data sufficient to meet your needs?

Total Responses: 222

Table 18. How often the currently available methods for finding and accessing CA water data are sufficient to meet participants' needs

<i>Methods for Finding and Accessing Data Sufficient?</i>	<i>Percentage of Participants</i>
Always	0.9%

Most of the time	45.9%
Sometimes	48.2%
Rarely	3.6%
N/A	1.4%

Comments: (20 comments) Many responses mentioned that a lot of data is not readily available - specifically data from irrigation and water districts, older data (e.g. older data from the California Climate Data Center), municipal drinking water contaminant data submitted to the Department of Public Health, HUC and water quality data, and Department of Water Resources data that isn't digitized (including Bulletins 16, 23, and 130). While CIMIS was described as being "perfect" by one participant, another said that CDEC versus USGS flow data can be confusing for many. Another participant said they rely on the SFEI and Regional Board staffs.

Also mentioned by participants was not being aware of what else is out there or which sites to check and so not being sure of what additional data they might be missing, living without the data they need or setting up trials to collect it themselves, having to make do with what's available but that more data would improve understanding and analyses, and the lack of spatial and temporal completeness of existing data. Another issue that was raised is that weeks of data can be lost when it's not known that a gauge has gone down because the data isn't instantaneous.

19. Based on your experience searching for data, is what you need publicly accessible online?

Table 19. How often data that participants need is publicly accessible online (*percentage of participants and total responses*)

<i>Data Publicly Accessible Online</i>	<i>Always</i>	<i>Often</i>	<i>Sometimes</i>	<i>Rarely</i>	<i>Never</i>	<i>N/A</i>	<i>Total Responses</i>
Collected by other organizations	3.2%	30.0%	58.1%	6.9%	0.9%	0.9%	217
Collected by your organization	10.2%	29.6%	32.4%	12.5%	5.1%	10.2%	216

20. If you have any additional observations you'd like to share regarding the effectiveness of existing tools or methods for finding and accessing California water data, you may do so here.

Comments: (23 responses) Some of the issues raised include the number and lack of comprehensiveness of existing archives or "fragmentation of data archiving within and between organizations," inconsistency in data management and data formats within and between organizations, inadequate or undocumented metadata, lack of QA/QC, limited accessibility – particularly to historic data, difficulty in using data that is posted in non-parsable formats (e.g. pdf files), and that data sharing is not mandated (e.g. too much information locked-up in municipal engineering departments). One participant (affiliated with the CA Department of Water Resources) indicated that CA DWR needs assistance in this area.

Also mentioned was the need for improved access to threshold concentrations for human health, fish, and wildlife; "tighter integration of water supply and water use data on a local, regional and statewide basis;" notification of newly available and edited data; and state laws to change with regard to well logs and well location information.

The issues involved with moving data from the desktop (whether non-digital or digital data) to the

web and making it accessible to the public were also raised, including changes to organizations' business practices and the financial resources needed to implement those changes.

What services would provide the greatest benefit and generate the greatest interest?

21. How interested would you be in each of the following services?

Table 21. Participants' interest in each service (*percentage of participants and total responses*)

<i>Services</i>	<i>Extremely interested</i>	<i>Interested</i>	<i>Somewhat interested</i>	<i>Not interested</i>	<i>Total Responses</i>
Making online data more findable / accessible via index and/or catalog	59.4%	34.6%	5.1%	0.9%	217
Making offline digital data more findable / accessible via index and/or catalog	42.6%	38.8%	16.7%	1.9%	209
Connecting users to hard-to-find data by request	33.0%	44.3%	19.3%	3.3%	212
Archiving / hosting data in danger of being lost (through staff retirement, outdated formats, etc.)	34.5 %	30.1%	25.2%	10.2%	206
Providing agencies with guidance for digitizing and/or posting data	21.4%	38.8%	17.4%	22.4%	201
Archiving / hosting data at the request of a data generator	16.1%	33.7%	34.2%	16.1%	199

22. Please suggest any services of interest not listed above.

Comments: (19 responses) Additional services of interest suggested by participants included a “digital well inventory for subsurface geology (water well logs, environmental logs, municipal logs, oil and gas logs),” a “centralized catalog of storm-drain data,” “developing a network group [for] expert exchange and collaboration,” guidelines for metadata development, standardizing similar data types across agencies, guidelines for data format and entry procedures, creating a data collection methodology primer, “development agreements with industry to share data,” and “comparisons of rates and water use between and among cities and water districts.”

One participant said that while it would be very valuable to digitize data from older reports, few agencies have the budget to do this.

Another participant raised the concern of overlapping objectives with regard to the number of local, regional, state, and federal entities that have discussed developing databases or catalogues of water data.

23. Are there particular data (recent or historical) that you feel are a priority for cataloging and/or archiving to ensure future access and use? *If so, please specify.*

Comments: (55 responses) Particular data listed by several participants as a priority for cataloging and/or archiving were water system operations, groundwater levels and quality, and well logs. Also

listed by a handful of participants were groundwater pumping / use, soil data, and historic data in general.

Below is a selection of the specific responses (provided to give a sense of the range of responses not captured by the summary above):

- Historical water deliveries at the district and water supplier level historic water rights permits
- Water rights maps
- Water agency digital boundaries
- Municipal drinking water data
- Municipal water demand data, agricultural water demand data, agricultural land use data, surface water diversion data
- Groundwater quality linked to well depth and well logs
- Historical groundwater quality data
- Chemical signature data (major ions, trace metals) from groundwater and surface water investigations by SWB (i.e., GAMA), DWR, USGS
- CDPR well data (pesticide contamination)
- Well logs are not being collected, located, or being made available
- Well Completion Reports from DWR
- Groundwater use - not collected by anyone
- groundwater extraction data
- Soil surveys; Geologic maps and USGS and CGS reports; DWR reports; related state and federal site-specific reports and graphics. In essence, many "out-of-print" documents.
- Subsidence. Soil changes due to irrigation practices (e.g. salinity, specific ion, etc.)
- Digitizing, summarizing and cataloging old paper reports that are difficult or impossible to find
- Borehole geophysical data Borehole cuttings stratigraphy Borehole cuttings descriptions.
- Historical land use from DWR
- Surface water quality
- Stream/river flow data.
- Historical flow and salinity data for the Bay-Delta watershed are printed in old reports (1920s) should be archived.
- Sediment data
- Water/watershed resources and climate change data.
- Historic SFO wind data
- Radar rainfall records
- Tree ring data versus rainfall data from 1990 to present
- Regional crop ET
- Quantity and quality of recycled waters used in California and elsewhere
- Storm-drain data
- CDWR has lots of data that is not digitized, but published in the DWR Bulletins 16, 23, & 130 series.
- Native American Water Resource
- Again related to tribal water rights and needs, no real data exists
- A huge volume of environmental documents are submitted to local, state, and federal regulatory agencies that should be available on line via interfaces such as GeoTracker. I have no sense of what percentage of these documents are being stored in GeoTracker.
- GIS
- Historical data on the evolution of policy, legislation, programs and results

24. How interested would you be in each of the following search features (in addition to the ability to search for records by keyword, category, title, author, agency, program, project, and date range)?

Table 24. Participants' interest in each search feature (*percentage of participants and total responses*)

<i>Search Features</i>	<i>Extremely interested</i>	<i>Interested</i>	<i>Somewhat interested</i>	<i>Not interested</i>	<i>Total Responses</i>
Search by geographic location / region	70.5%	23.0%	5.1%	1.4%	217
Map interface to records	59.7%	26.5%	10.9%	2.8%	211
Search by watershed	59.6%	26.8%	7.5%	6.1%	213
Version history (links to records of same data at different levels of QA/QC, older/newer versions, etc.)	21.5%	44.4%	26.3%	7.8%	205
Data use history (list of publications referencing data set)	16.7%	40.5%	33.8%	9.0%	210

25. Please suggest any features of interest not listed above.

Comments: (13 responses) Additional features of interest suggested by participants included the ability to search by public agency or water management boundary, legislative district, and groundwater basin, and the ability to zoom in to the right scale when using the map interface to search for records. One participant found the GeoTracker interface acceptable for searching and retrieving .pdf documents.

With regard to version history, one participant said that the QA/QC should be done before making the data available to the public and that no revisions should be necessary, other than for things like changing an elevation benchmark in response to subsidence. However, another participant said that it is better to have access to the raw data plus the QA/QC documentation because the analyte detection methodologies may be different.

Another participant suggested that the data use history might also include the users who have accessed the data online thus providing a potential "list of customers willing to pay for the data collection, management and dissemination."

Also suggested was "population changes, water use changes, land use and agricultural changes."

26. Currently, existing networks or wiki-based platforms allow for community involvement around the sharing of data. How interested would you be in each of the following possible community features?

Table 26. Participants' interest in each community feature (*percentage of participants and total responses*)

<i>Community Features</i>	<i>Extremely interested</i>	<i>Interested</i>	<i>Somewhat interested</i>	<i>Not interested</i>	<i>Total Responses</i>
Users can submit suggestions for additional data sets to acquire	18.0%	44.9%	25.4%	11.7%	205
Users can comment on data	12.1%	41.3%	30.6%	16.0%	206

Users can post modified versions of data sets	7.3%	28.2%	34.0%	30.6%	206
User moderated discussion forums	7.7%	25.0%	39.3%	28.1%	196
Users determine priority of acquisitions	5.0%	29.4%	40.8%	24.9%	201

27. Please suggest any additional features of interest for community interaction.

Comments: (18 responses) Approximately one third of the responses raised concerns with a community or wiki approach to data acquisition and management citing the need for QA/QC and stating that such approaches seldom have adequate QA/QC. Responses stated that the people who collect the data should be its custodians while users should have read-only permissions, a lack of trust in the data if data users are allowed to make revisions, and examples of wiki-style sites that “flop from non-use, non-updates, and poor quality control” – for example, the Sacramento River Watershed Portal. Only one respondent was in favor of users making modifications to existing data while another suggested that users be allowed to provide links to data sets. One participant specifically requested “no blogs.”

28. What additional suggestions do you have for the CA Water DRoP in this water resources data management effort?

Comments: (26 responses) Responses included the coordination and sharing of information with other data management efforts (other efforts mentioned include CDEC, Geotracker GAMA, and EPA’s Enterprise Data group), the need for greater involvement by local governments and municipalities, centralizing data or data linkages in order to streamline searches, and a reiteration of the importance of QA/QC, access to complete and well documented metadata, the ability to search by location, and digitizing data. One participant (affiliated with a municipal water district) raised the difficulty this would impose on smaller agencies: “Some water districts are so small that this is a monumental task. What can be done to assist them becoming a part of the digital age?”

Agency-specific suggestions included directing some efforts to assist the Central Valley RWQCB with ground and surface water quality data and analysis and requesting that DWR makes its data available to the public.

Cautions included recognizing the extensive time and effort involved in gathering and documenting data and avoiding building a state-wide database.

One criticism of the survey was that water data management needs “include the collection of relevant data and not just how to organize data that may be irrelevant.” The participant further stated that “the biggest problem is not how the data is being presented or how easy it is to download it but that consistent, high quality data is not being collected in the first place.”