

Strategic Plan for Assembly Bill 1755, the Open and Transparent Water Data Act

April 2018



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Abbreviations

AB 1755	Assembly Bill 1755, the Open and Transparent Water Data Act
CNRA	California Natural Resources Agency
DWR	California Department of Water Resources
GovOps	Government Operations Agency
OWIA	Open Water Information Architecture

Strategic Plan for Assembly Bill 1755, the Open and Transparent Water Data Act

Background

Information as an Asset

Over the past decade or so, the perceived value of data has changed dramatically. Today, thanks to the prolific use of smart phones and tablets, people are quite accustomed to having the world at their fingertips. Available on demand are up-to-the-minute weather projections, driving routes that avoid traffic, and stock performance reports — all with little or no delay for the user. The ability of the average citizen to access and visualize data is at an all-time high.

This level of access is not quite the case when it comes to water-related data sets.

For California, water and ecological data is collected, managed, published, and analyzed by any number of sources. Water-resource-related datasets reside in numerous State, local, and federal agencies, academia, and non-governmental organizations, making it challenging to identify, access, and use data to inform water planning, management, and decision-making.

It stands to reason that decisions founded on timely data and science will be reliable and transparent. It also stands to reason that data collected using public funds are the property of the public and should be made publicly accessible.

Making data of documented quality both easily accessible and discoverable is a necessary first step to improving water management in California.

Open and Transparent Water Data Act

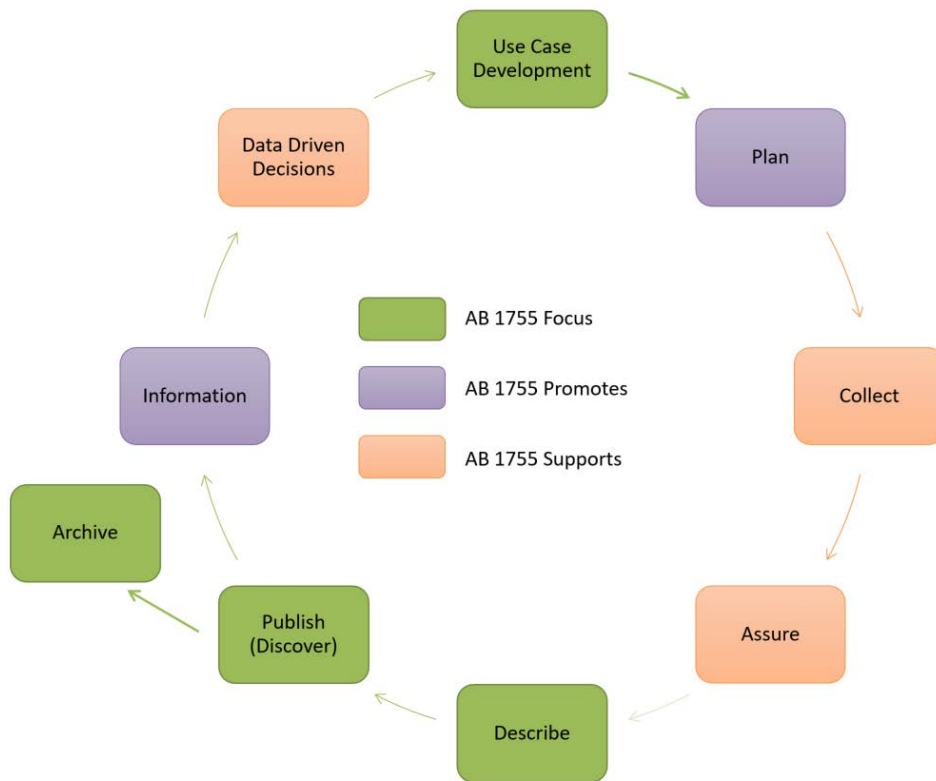
Assembly Bill 1755, The Open and Transparent Water Data Act (AB 1755), signed into law by Governor Edmund G. Brown Jr. on September 23, 2016, requires the California Department of Water Resources (DWR), in consultation with the California Water Quality Monitoring Council, the State Water Resources Control Board, and the California Department of Fish and Wildlife, to create, operate, and maintain a statewide integrated water data platform, and to develop a strategic plan to guide program implementation and protocols for data sharing, documentation, quality control, public access, and promotion of open-source platforms and decision support tools related to water data. (California Water Code Section 12400 et seq.)

The integrated water-data platform must be operational with available water and ecological State agency datasets by September 1, 2019. The platform shall make available by August 1, 2020, certain water and ecological data related to California water supply and management held by identified federal agencies.

AB 1755 is focused primarily on the publication stage of the data-life cycle. A *data-life cycle* is a way of thinking about the flow of data from collection to end uses. Industry experts have characterized the number and names of life cycle stages in different ways, yet agree that data are dynamic with changing

risks and attendant needs at each stage. While statutory requirements of AB 1755 are most closely related to the publication stage, DWR and the Partner Agency Team have embraced the spirit of AB 1755, seeking to ensure a sustainable data future for California’s citizens. Consequently, we contemplate addressing the full data life cycle in implementing the act. Figure 1 identifies how AB 1755 envisions addressing a representative data life cycle.

Figure 1 Typical Data Life Cycle for AB 1755



Note: Adapted from the National Science Foundation’s DataONE Data Life Cycle (<https://www.dataone.org/data-life-cycle>).

Use Case Development: Description of who needs the data, and the form the data is needed, to make specific decisions.

Plan: description of the data that will be compiled, and how the data will be managed and made accessible throughout its lifetime

Collect: observations are made either by hand or with sensors or other instruments and the data are placed into digital form

Assure: the quality of the data are assured through checks and inspections

Describe: data are accurately and thoroughly described using the appropriate metadata standards

Publish: data are made publicly accessible for use by others, along with the relevant information about the data (metadata)

Archive: data are submitted to an appropriate long-term archive (i.e., data center)

Information: data are analyzed

Data Driven Decisions: the practice of making decisions based on analysis of data rather than experience or intuition.

Purpose

This strategic plan is intended to address the stakeholder’s interest in the AB 1755 open water data platform and water resources data; and provide a plan for state agencies charged with implementing the statutory requirements of AB 1755. This Strategic Plan was revised in consideration of feedback received on the initial draft of the *Strategic Plan for Assembly Bill 1755, the Open and Transparent Water Data Act* (DATE?).

Collaborators

This strategic plan was developed by the Department of Water Resources in consultation with the AB 1755 Partner Agency Team. The AB 1755 Partner Agency Team is comprised of four State agencies and organizations explicitly identified in the Open and Transparent Water Data Act —DWR, the SWRCB, CDFW, and the CWQMC. Additional agencies partnering to ensure successful implementation of AB 1755 include, the Governor’s Office of Planning and Research, the California Natural Resources Agency, the Government Operations Agency, and the Delta Stewardship Council.

Vision

Useful data for sound, sustainable water resource management.

Goals, Objectives, and Strategic Actions

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

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

These goals are, in turn, supported by a number of objectives and strategic actions, which are detailed on the following pages.

Guiding Principles

In the implementation of the Open and Transparent Water Data Act, the State of California embraces the following guiding principles:

1. Making data and information accessible, discoverable, and useful will foster new insights, innovation, and entrepreneurship, as well as enhance transparency and trust in decision-making. Data are a valuable resource, and should be made accessible to the widest range of users for the widest range of purposes to the extent permitted by law. At the same time, data are subject to privacy, security, and other valid restrictions.
2. A data-sharing platform should always support the accessibility, discoverability, and usefulness of data. Continuous improvement, based on feedback from end users and data producers, is the cornerstone of a successful platform.
3. Data producers and data users have distinct roles and responsibilities in open data. Data producers are responsible for sharing data of known quality, and documenting essential

metadata; end users are responsible for determining data fitness for use, and documenting their data products.

4. Collaboration is key. The platform will facilitate collaboration and coordination among data providers and users that is necessary to break down existing data “silos,” which have resulted in duplication of efforts, wasted resources, and missed opportunities.

In addition, we embrace the guiding principles set forth by Project Open Data and by the Aspen Institute’s *Internet of Water: Sharing and Integrating Water Data for Sustainability*:

- Principle 1.1: A user-based approach will maximize the value of water data.
- Principle 2.1: All public water data needed to characterize and forecast water budgets should be open by default, discoverable, and digitally accessible.
- Principle 2.2: Water data standards to promote interoperability, efficiency, and user-flexibility will evolve in response to user demand.
- Principle 2.3: Data producers are responsible for sharing data of known quality and documenting essential metadata; end users bear final responsibility for determining whether the data is fit for use.
- Principle 2.4: Data should be shared as openly as possible, consistent with the principle that any security and privacy risks associated with sharing need to be balanced with the potential benefits.
- Principle 3.1: Control and responsibility over data is best maintained by data producers.
- Principle 3.2: A federated system of public water data hubs provides scalability and financial stability to better meet the diverse needs of data users.
- Principle 3.3: A backbone organization should link data hubs and facilitate governance of the system, but not govern the production or use of data.

And finally, we acknowledge that State agencies, departments and Boards involved in this effort may need to evaluate and refine some of their internal data management strategies to succeed in achieving the goals and vision of this plan. To that end, each governmental agency responsible for implementing this plan should consider adopting its own data management principles.

Federation

The Partner Agency Team considers AB 1755 as a unique opportunity to implement a more robust water-data future in which public data are not only sufficient and available, but also useful and used in decision-making and innovation. Many governmental and non-governmental agencies already publish water data, usually through program-specific web pages and web applications. This fragmented organization can make finding the data unduly difficult, often standing in the way of data being useful and used. To capture the innovative spirit of AB 1755, this plan will emphasize federation as a strategy.

No one website or data base could reasonably contain all of California’s water-related data without a substantial increase in data management overhead by the State. But, there is a viable technical solution that links open data platforms under a federated water-data system. To understand federation, it may be helpful to think of open data platforms as libraries, which can be “federated” under an inter-library loan system. Each library has a different set of books and some have special collections. A customer can use the inter-library loan card catalog to find and request a book from any library in the federation. Similarly, in a federated open data system, each open data platform does not need to warehouse every dataset; instead, each open data platform will be accessible through a federated card catalog.

A federated approach will enhance consumer access through voluntary system expansion. Anyone can create an open data platform; and, provided that such a platform conforms to open data principles and defined AB 1755 protocols, it can be added to the federated system, further expanding the card catalog of available datasets.

California's Government Operations Agency (GovOps) hosts a statewide open data portal (data.ca.gov) to improve collaboration, expand transparency, and support innovation. In this context, "open data" is defined as public data collected by the State through its routine business activities and published in a format that is easy to search, download, and combine with other datasets from other sources. The GovOps portal was designed to host open data from more than one agency. Several State agencies host their own open data portals.

The California Natural Resources Agency (CNRA), home of five constituent departments including AB 1755 implementation partners DWR and the California Department of Fish and Wildlife, has launched its own open data platform (data.cnra.ca.gov). This platform, like the GovOps portal, is aimed at increasing the transparency and sharing of data, specifically those collected and managed by the departments of the CNRA.

As a starting point, DWR, in consultation with its partners, aims to federate the GovOps and CNRA portals to allow users access to the range of available existing water and ecological datasets held by State agencies. In time, additional portals will join the federation, bringing users greater access to available water and ecological data.

Goal 1: Data are Sufficient

To improve water management decisions, data must be available at sufficient spatial and temporal resolution while meeting minimum standards of quality. Use cases for water resources management decision-making will be used to determine sufficiency.

Objective 1.1: Utilize Use Cases to Identify the Data Needed for Water Management Decisions

Utilize the concept of use cases to build and maintain a robust inventory of datasets identified by data managers and data consumers. Synthesizing data needs from use cases will highlight important datasets, missing data (data gaps), and more broadly, general system characteristics necessary for an effective open water-data platform. Use cases will continue to be developed as implementation and needs progress.

Action Number	Strategic Action	Description	Time Frame
1	Use Cases	Develop an initial, extensible set of use cases to define and articulate stakeholders' data and information needs in terms that are translatable into platform development requirements. Use cases describe who needs the data, and the form the data is needed, to make specific decisions. For more information, see <i>Data for Water Decision Making: Stakeholder Working Group Synthesis Report</i> .	2018, First Quarter
2	Synthesize Data Needs	Identify and publish a list of water resources-related datasets from use cases.	2018, Third Quarter, Ongoing
3	Write Use Case Protocol	Develop protocol for writing use cases based on lessons learned from use case projects described in actions 1.1.1 and 4.1.1.	2019
4	Use Case Solicitation	Continually collect and publish use cases and data needs from data consumers and water resource managers.	2019 - Ongoing

Objective 1.2: Improve Coordination of Existing Data Collection Efforts

On a periodic basis, publish a catalog of existing data collection efforts at all levels of government, along with data needed for use cases. Prioritize existing datasets to publish. Support cost-efficient data collection efforts.

Action Number	Strategic Action	Description	Time Frame
1	Inventory Existing Datasets	Inventory and publish list of water resources related datasets. Include government agency(ies) that collected and reported (if relevant) the data, along with the reason the information was collected.	2018, Third Quarter
2	Identify Data Gaps	Identify data needed, but not collected, for use cases identified in Objective 1.1.	2019, First Quarter
3	Prioritize Datasets	Prioritize existing datasets to publish on an open data platform.	2018, Fourth Quarter
4	New Programs	Support agency requests to develop new, or expand existing, data collection efforts to address data gaps.	2019, First Quarter
5	Improve Coordination	Improve data coordination efforts among all organizations.	2018, Third Quarter
6	New Data Collection Protocol	Develop protocols for creating or expanding data collection programs.	2019
7	Identify Opportunities to Streamline Data Reporting	Based on data inventory and datasets published on platform produce report identifying opportunities to streamline local agency data reporting requirements.	2020

Goal 2: Data are Accessible

Develop a federated open data platform for data stewards to publish data. Everyone would have access to the data, and the desired data would be easily discoverable. *Federation* refers to a system for data producers to maintain data, while allowing others to have access to the data through a shared catalog and agreed upon standards (Aspen Institute).

Objective 2.1: Develop Protocols

Protocols provide guidelines detailing how to complete certain tasks. Protocols also establish many of the minimum requirements for data to be available in the open data platform. Protocols are essential for ensuring interoperability across open data platforms and datasets. Developing and maintaining a robust set of protocols will be critical for the success of AB 1755.

Action Number	Strategic Action	Description	Time Frame
1	Initial Minimum Protocol Requirements	Develop and publish minimum protocols for data publication. This includes required and optional metadata, data dictionary if applicable, and optional free text description of the data collection, data management, and data qualification methods used by the data steward.	2018, First Quarter
2	Open Water Information Architecture (OWIA)	Leverage OWIA to develop processes data stewards <u>may</u> use to transform and standardize datasets for publication.	2018, Fourth Quarter
3	Develop Governance Structure and Process for Evolution of Protocols	Develop governance structure and process to guide evolution of protocols.	2018, Second Quarter
4	Enhance Protocols	Implement recommendation of the governance group, stakeholder feedback, and third-party efforts for the open data platform and the OWIA.	2019, Third Quarter, Ongoing

Objective 2.2: Develop Federated Open Water-Data Platform

The open water-data platform will be the gateway for access to all AB1755-related datasets. A federated platform with a single access point will significantly enhance user access to the correct data and make more data discoverable. This is not a once-and-done process. It will require constant iteration and user feedback to meet the needs of data consumers.

Action Number	Strategic Action	Description	Time Frame
1	Use Existing Open Data Platforms	Expand use of data.ca.gov, data.cnra.ca.gov, and other existing open data platforms to publish datasets including datasets identified in AB 1755.	2018, First Quarter, Ongoing
2	Develop Platform Functional Requirements	Develop functional and technical requirements for an open water-data platform for the State of California informed by Objective 4.1 use case pilot projects, and data consumer and data provider feedback.	2018, Fourth Quarter
3	Evaluate Existing Platforms	Determine if, and how, existing open data platforms and infrastructure can meet aspirational functional and technical requirements.	2019, First Quarter
4	Implement Platform Enhancements	Implement initial aspirational enhancements based on the functional requirements.	2019, Third Quarter
5	Support Platform	Continually enhance the open data platform based on input from data consumers, data providers, and AB 1755 governance.	2020
6	Publish Federal Datasets	Federate federal datasets identified in legislation on open data platform.	2020, Third Quarter
7	Federate with other Platforms	Federate with other open data platforms.	2020

Goal 3: Data are Useful

Objective 3.1: Improve Interoperability of Datasets

Decision making often involves comparing and integrating multiple datasets. To make datasets useful, all datasets should include documentation based on protocols and community-accepted standards.

Interoperability refers to the formatting that allows computer systems to exchange information using specified data formats and communications protocols that enable data to be readily downloaded, uploaded, and exchanged. Data also need to be interoperable to establish some common information exchange reference — typically accomplished via data standards.

Action Number	Strategic Action	Description	Time Frame
1	Enhance Metadata	Enhance metadata documentation to improve discoverability based on use cases and user feedback.	2019, First Quarter, Ongoing
2	Controlled Vocabulary	Adopt subject-matter-controlled vocabulary to enhance dataset integration based on water community recommendations.	2020 - Ongoing
3	Geo-Referencing	Adopt best practices for geo-referencing data to enhance interoperability based on water community recommendations.	2020 - Ongoing
4	Organization	Develop guidance for organization of a dataset and its resources.	2019, First Quarter
5	Keywords	Maintain a master list of keywords and categories informed by stakeholder feedback and governance group.	2019, Second Quarter
6	Data Format	Collect information from stakeholders on improvements that could be made to the data, or data format, and implement recommendations as feasible.	2019
7	Data Integration	Allow like data to be queried and downloaded through a single access point.	2020

Objective 3.2: Transform Data into Information

Transforming data into useful information is the responsibility of the entire California water community. The open data platform will have limited analytical capability, mostly focused on helping the data consumer find the right data. Combining datasets, developing analytical tools, seeking innovative results, and sharing those results will be done outside of the open data platform, and by everyone interested in improving water management in California.

Action Number	Strategic Action	Description	Time Frame
1	Visualization	Develop simple visualization tools for the open data platform.	2019, Third Quarter
2	Reports	Develop annual report on dataset use from open data platforms.	2019, Third Quarter, Ongoing
3	Download Tools	Develop tools for filtering and querying datasets, and support downloading subsets of data on open data platform.	2019, Third Quarter
4	Collaboration and Innovation	Collaborate with third parties to develop custom web applications and decision support tools. Provide a location to feature third-party tools on a rotational basis.	2019, First Quarter, Ongoing
6	Water Data for California Map Based Web Application	Develop map-based web application enabling users to spatially discover datasets across federated AB 1755 open data platforms.	2020
5	Analytics	Foster and support development of an analytical sandbox for the water community.	2021

Objective 3.3: Archive Datasets

Become the data archive for water-resource data in California.

Action Number	Strategic Action	Description	Time Frame
1	Archive Data	Archive datasets on the open data platform.	2019

Goal 4: Data are Used

The AB 1755 efforts (use case, open data platform, and data stewardship) should be used to inspire improved, sustainable water resource decisions in California, and foster a water community engaged in decision making at all levels of government.

Objective 4.1: Use Case Pilot Project

Pilot projects with programs that developed use cases should be conducted to illuminate the necessary next steps to improve water management decisions, after making the data accessible. These steps would include learning if the AB 1755 efforts were useful, learning how to improve the open data platform and interoperability of the data, documenting the responsibilities of data consumers, and republishing improved datasets employed in the use case.

Initial use cases prepared by UC Water should be used to evaluate the effectiveness of the open data platform.

Action Number	Strategic Action	Description	Time Frame
1	Pilot Projects and Interoperability Test Beds	Select early implementable use cases as pilot projects to test platform and enhance development of protocols and data standards including federation. Create and disseminate a survey to the use case developers, data producers, data consumers and stakeholders for feedback.	2018, Third Quarter
2	Lessons Learned	Publish lesson learned from pilot projects to improve open data platform and protocols.	2019, First Quarter

Objective 4.2: Engage the Water Community

It is important to develop a vibrant water community to support AB 1755 efforts. To make the data meaningful, the efforts must continually evolve to reflect the needs of the water community. Community engagement is necessary for developing new use cases, recommending improvements to the open data platform, improving the usefulness of the data, using all of this to develop new analytical products, and sharing work with their colleagues.

Action Number	Strategic Action	Description	Time Frame
1	Communication and Engagement	Develop and implement a communications and engagement strategy for the water data community.	2018, Second Quarter
2	Data Literacy and Consumer Training	Develop training resources for data consumers to improve data literacy.	2019, Third Quarter
3	Data Stewardship Training	Develop training resources for Partner Agencies wishing to elevate their data to the open data platform.	2019, Third Quarter
4	User Group	Foster and support data steward user group.	2019, First Quarter

Objective 4.3: Sustain the Open Water-Data Platform

The open data platform must be able to respond to changing needs and technology trends. To be sustainable, the system must continually adapt and respond to recommendations for improvement.

Action Number	Strategic Action	Description	Time Frame
1	Sustainable Governance and Funding	Work with the water community to develop a sustainable governance and funding structure for AB 1755 efforts.	2018, Second Quarter
2	Metrics	Platform and dataset usage tracking/statistics, and “success stories/case studies” to measure and highlight how the open data platform is being used to support water management decisions.	2019, First Quarter
3	Improvements	Recommend open data platform, dataset documentation, analytical tool, and reporting improvements.	2019, Second Quarter
4	User Feedback	Solicit feedback from water managers, data consumers, and data stewards on platform and data performance.	2019, First Quarter

Objective 4.4: Use the Data

One measure of success will be when government agencies and the public begin to use data on the platform to create decision-support tools and inform decisions.

Action Number	Strategic Action	Description	Time Frame
1	Analytical Tools	Encourage citizens and government programs to develop decision-support tools and custom web applications using datasets from the open data platform.	2019, Third Quarter
2	Government Publications	Encourage government publications to source and cite data published in the open data platform.	2020, Third Quarter
3	Civic Engagement Projects	Support civic engagement activities and events, like data challenges, application or visualization competitions and hackathons where citizens can meet and engage in collaborative computer programming towards developing innovative solutions for management of California's water resources. This includes challenges for third parties to make use of data on the open data platform to meet the needs of identified use cases with data gaps.	2018, Second Quarter - Ongoing

Responsibility for Implementing Strategic Actions

Partner Agency Team or future AB 1755 governance structure is responsible for pursuing implementation of strategic actions identified in this plan. In many cases, these strategic actions require participation from external partners, data providers and end users. This includes State, Federal and Local government, non-governmental-organizations, academia, tribes, for profit companies, and citizens. It will take a village to develop and sustain a successful open water data platform.

Implementation Plan & Strategic Plan Updates

While the strategic plan sets our sights on a long-term future for management and use of California's water and ecological data, it does not detail all the services and activities required for its implementation. An actionable implementation plan, more time-specific and tactical in nature, is necessary. DWR, in consultation with its partners, is developing an implementation plan that expands upon the strategic actions with delivery timelines and metrics. The implementation plan will identify specific projects, which can then be developed into executable project management plans.

The Partner Agency Team intends to update the AB 1755 Strategic Plan every 5 years in synchronization with the California Water Plan.

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Glossary

AB 1755: The Open and Transparent Water Data Act, legislation passed in 2016, that requires the creation, operation, and maintenance of a statewide integrated water data platform.

Data: Quantitative or qualitative representations or measurements of basic properties of the world.

Data-driven decision making: The practice of making decisions based on analysis of data rather than experience or intuition.

Federation: A group of data providers and users using jointly agreed-upon standards of operation in a collective fashion to ensure the interoperability of the resources they collectively hold and employ. The term may be used, for example, when describing the interoperation of distinct cyber infrastructure networks with different internal structures. The term may also be used when human groups agree to collectively manage cyberinfrastructure development and operation using commonly held, and managed, requirements, standards and conventions, and operating procedures to ensure the interoperability of distinct cyberinfrastructure resources.

Federated data system: A federated data system connects multiple independent data systems through common standards and conventions, while keeping those independent systems as autonomous entities.

Functional requirements: The translation of objectives into engineering terms and technical language describing how the objectives will be met.

Information: Data that have been processed, analyzed, or synthesized so they can be used to answer questions.

Interoperability: The ability of diverse computer systems or software to exchange and make use of common input data.

Metadata: Data that describes and gives information about other data.

Open Water Information Architecture (OWIA): An organizing structure for an open and transparent water data system created in response to the mandate of AB 1755.

Protocols: Methods of implementing a set of objectives and requirements in a systematic way. In computing, protocols mean both specific implementations of methods such as HTTP and FTP and, more generally as described by the Internet Engineering Task Force, protocols are sequences of processing steps that are also referred to as procedures.

Use case: For this report, defined as an example of a water decision making process and the data needs associated with that process. An answer to the set of questions of who needs what data in what form to make what decision.

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