



Governance and Funding for Open and Transparent Water Data

Implementing Assembly Bill 1755

May 10, 2018

REDSTONE

WATER
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Redstone Strategy Group is a leading advisor to private foundations and non-profits worldwide. We help clients identify their highest-return investments, track and learn from results, and continually improve their efforts to solve urgent social problems. Our approach combines substantial experience across all sectors of philanthropy with deep appreciation of our clients' knowledge and expertise. This allows us to collaborate effectively with clients as they improve their ability to achieve social good and learn from their results

The Water Foundation is a nonprofit strategic philanthropy working to fundamentally transform how we manage water in the West. We help funders identify and act on opportunities to better manage water and engage in thoughtful, strategic grantmaking to our nonprofit partners to drive change. We complement these activities with creative coalition building and thoughtful engagement with high-level decision makers.

Project Overview

California is facing water challenges driven by climate change, population growth, and delayed investments in green and gray infrastructure. Many actors across local, state, federal, tribal, private, non-profit, and other sectors will need to work together to meet these challenges. Data is an important tool that can create common understanding, produce consistent monitoring, and support adaptive management. While state, local and tribal governments collect and maintain a great deal of water related data, many of these data sets fall short of their potential to meet California's needs.

The passage of Assembly Bill 1755 (Dodd, 2016) opened the door for the state to transform its water and ecosystem data and information infrastructure, enabling the next generation of water management. Since water data reside in many agencies and entities, with benefits for both public and private stakeholders, implementation of AB 1755 must, by nature, be highly collaborative to fulfill its highest potential.

The Department of Water Resources (DWR) is leading the effort, in collaboration with a variety of state partners ("the Partners").¹ The California Council on Science and Technology (CCST) and UC Water led the development of use-cases describing how integrated data can improve water management. Meanwhile, the Open Water Information Architecture (OWIA) group provided technical support around protocol and standards development. The Partners, informed by the CCST/UC Water and OWIA work, along with this process and stakeholder engagement, [released a progress report in January 2018](#). The progress report, which included an initial draft [Strategic Plan and Preliminary Protocols](#), describes a vision, principles, goals, strategies, and framework to guide implementation of the bill.

While the Partners are developing the strategy, Redstone Strategy Group ran a parallel process to explore governance and funding structures for the nascent Platform. This work built on the vision articulated by the Partners, and aimed to answer the following questions:

1. What are the governance needs associated with implementation of AB 1755?
2. What organizational structure(s) would best meet these governance needs?
3. How can governance promote a sustainable funding model for AB 1755?

To answer these questions, Redstone interviewed over thirty experts and stakeholders in California and across the country. While we had regular opportunities for input and feedback from the Partners, the report that follows is independent. It reflects the findings and judgments of the authors, and has not been endorsed by California state government. It is our aim, however, that these findings will contribute to the ongoing

¹ The State Water Resources Control Board (SWRCB), California Department of Fish and Wildlife (CDFW), California Water Quality Monitoring Council (CWQMC), California Natural Resources Agency, Government Operations Agency (GovOps), Delta Stewardship Council, and the Governor's Office of Planning and Research (OPR).

collaborative process that the state is leading to create the data infrastructure that will allow open and transparent exchange of water data to support decision-making.

The report begins with an overview of our findings, followed by a detailed account of recommendations around platform governance (chapter 2), and sustainable funding (chapter 3).

1. Overview of findings

1.1 Water Data is Essential Infrastructure

Data infrastructure is as essential as roads and bridges

Data is raw material for both economic growth and sustainable management of our environment. But unlike raw materials from the past century – oil, steel, minerals – data, particularly public data, becomes more valuable the more widely it is shared.

To realize this value, California must plan, create, and invest in public water data, just as it does in roads, sewer systems, and water treatment plants. These investments will ensure that the state has adequate water to meet the competing demands of a growing economy, a growing population, and the environment – a challenge made more difficult by extreme weather in a warming climate.

The return on investment for increased access to public data is significant

Physical infrastructure creates great benefits for the economy; so too does data infrastructure. These benefits are diverse and generate positive returns for state government, citizens, and the environment. While estimates vary, a study in 2000 by the Open Data Institute found that the economic return from investment in increased access to public data averaged 39X in the US.²

The economic value of data varies across sectors. Geospatial and environmental data, which include hydrological, environmental quality, and land-use information, tends to generate the highest return,³ and is core to water data infrastructure. Box 1 illustrates some of those potential returns.

AB 1755 affirms the value of water data infrastructure for California's future

In passing AB 1755, the state of California embraced the importance of water data infrastructure to a sustainable water future for the state. Indeed, the legislation and governor highlighted open and transparent water data infrastructure as vital to not only water management, but also to the state's interest in ongoing scientific discovery and innovation.

The economic return on investment in increased access to public data averages 39X in the US

² European Data Portal. *Creating Value through Open Data*. P.48. https://www.europeandataportal.eu/sites/default/files/edp_creating_value_through_open_data_0.pdf

³ Vickery, Graham (2011). "Review of recent studies on PSI re-use and related market developments." European Commission. Available at: <https://ec.europa.eu/digital-single-market/en/news/review-recent-studies-psi-reuse-and-related-market-developments>

Box 1. Illustrative returns on investment for water data infrastructure



Water management: Generate significant cost savings. California could see \$160M – 780M of economic benefit in the water management sector alone. Water management accounts for about 1% of California’s economy, or \$40B – \$60B annually. Conservative estimates place the direct economic value of open access to public sector data at 0.4 – 1.3% through improvements in efficiency, decision-making, and infrastructure investments.⁴



Resilient infrastructure: Safeguard the largest capital investments. California faces an anticipated \$73 billion dollars in water infrastructure investments over the next 20 years.⁵ Improved access to public water data will optimize these investments. Given the size of the projects, even marginal improvements in infrastructure siting and design would generate massive benefits.



Environmental flows: Better protect water-dependent ecosystems. California spends nearly \$700 million each year to manage aquatic ecosystems important for birds, fish, and amphibians and for agriculture and people.⁶ Improved water data will enable better, proactive decision-making around these critical systems.



Water markets: Create flexibility to manage extremes. California still lacks a robust and transparent water market. In large part, this is because the state can’t track in real time how and where water is used and where it is needed. Open data will address this challenge by creating the transparency needed for California to weather the next drought or flood.

⁴ Open Data Institute. *The economic impact of open data: what do we already know?* <https://medium.com/@ODIHQ/the-economic-impact-of-open-data-what-do-we-already-know-1a119c1958a0>

⁵ PPIC, *Paying for Water in California*, Technical Appendix B: Estimates of Water Sector Expenditures, Revenues, and Needs. P.11 and <https://www.epa.gov/cwns/clean-watersheds-needs-survey-cwns-2012-report-and-data>

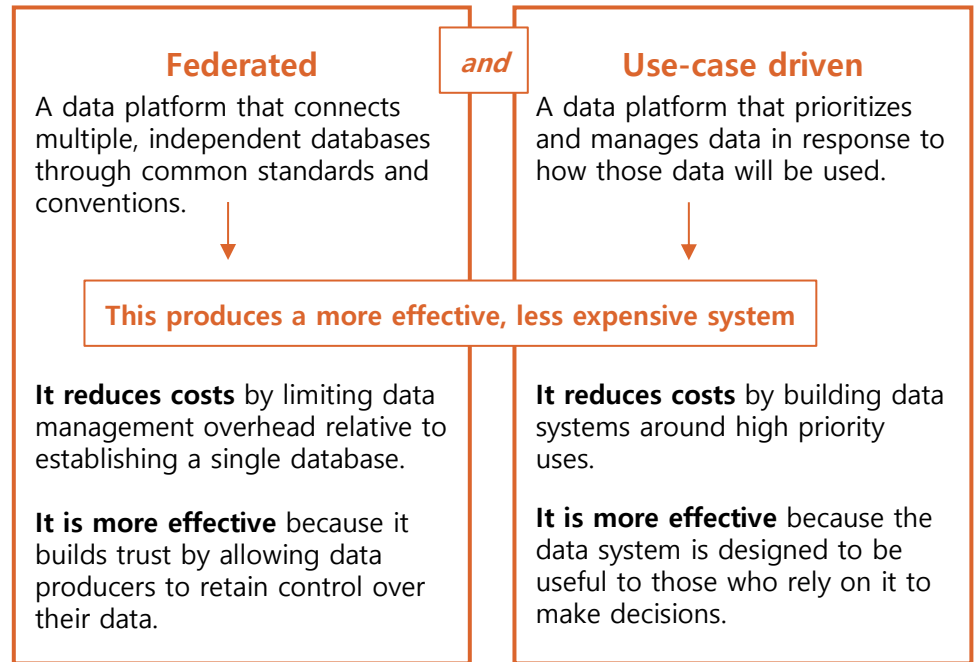
⁶ PPIC, *Paying for Water in California*, Technical Appendix B: Estimates of Water Sector Expenditures, Revenues, and Needs. P.11 and <https://www.epa.gov/cwns/clean-watersheds-needs-survey-cwns-2012-report-and-data>

The vision for AB 1755 is for a *water data platform* – an interlinked set of tools and resources that provide access to data for water decision-making – referred to in this document as “the Platform”

1.2 A Federated, Use-Case Driven Platform Is Needed

The government of California has adopted a powerful vision for the implementation of AB 1755 as a federated, use-case driven platform. This vision is built on two core ideas: (1) a federated system; that is (2) use-case driven (Figure 1).

Figure 1
Benefits of a federated, use-case driven Platform



What does this mean for water data governance?

Governance is the set of systems and processes to coordinate action and decision-making about the structure, content, use, and financing of the water data platform. Adopting a federated, use-case driven system, leads California to a governance structure that realizes the following principles:

1. Governance is neutral, but prioritized

To realize its vision of creating an objective, transparent foundation to understand California’s water system, governance of the platform should be independent from any particular, private or special interest. At the same time, the data platform cannot prioritize all data and uses, so must transparently establish priorities.

Where have you seen this structure before? The Internet.

The Internet Engineering Task Force (IETF) is a large international community whose mission is simply to help the Internet work better. Much like the proposed Water Data Consortium, the IETF is governed by a steering group and includes technical working groups and use-case working groups.

2. Governance engages public and private stakeholders

Given the number of stakeholders involved in federated water data governance – including state agencies, Federal agencies, tribes, NGOs and academics, the private sector, and philanthropy – effective and efficient strategies to engage and respond to various stakeholder groups is vital.

3. Governance fosters accountability

Accountability facilitates collaboration and trust. It aligns interests of stakeholders behind shared goals and objectives. It builds confidence in outside funders and participants, and supports continuous improvement towards better meeting the needs of Platform users.

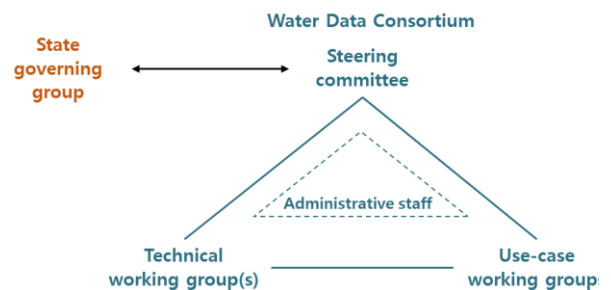
1.3 A Consortium Engages Stakeholders and Builds Trust

We recommend that the California state government consider developing both an internal process to facilitate inter-agency coordination and alignment through a “state governing group,” as well as a Consortium to house and oversee Platform governance. The Consortium would function as an independent, non-profit entity, such as a 501(c)(3), a

public benefit corporation, or a joint powers authority. The independence of a Consortium would enhance fundraising from non-state partners, while also increasing the nimbleness of Platform governance. By ensuring a majority state representation in its leadership (i.e., the Steering Committee), the Consortium would maintain strong links to California state government.

Figure 2

Proposed governance structure for AB 1755



The Consortium would be an independent, not-for profit entity that sits alongside, and coordinates with state government through a “state governing group.” This state governing group would oversee the internal coordination for implementation. The Consortium, however, would manage the major governance functions associated with the Platform, i.e. management of the Steering Committee, the Technical Working Group(s), the Use-case Working Groups, and administrative staff. (For additional details, see Table 1, and section 2.3.)

Just as the costs of roads are shared among local, state, and federal governments and private entities, data infrastructure costs must be shared as well

This structure would maintain the authority and responsibility of the state government over its data, but facilitate active external participation in Platform governance. As a non-state, and non-regulatory entity to govern the Platform, the Consortium will also help foster trust among data providers who could share data while retaining a level of control.

As described in greater detail in section 2.4, we propose that the state government would have a significant representation in the Consortium to ensure tight collaboration, and smooth translation of consortium recommendations into implementation.

Table 1. Overview of governance groups

Entity	Role
State Governing Group	Ensures state standards and Platform standards are aligned, and coordinates: water data publication, IT procurement, use-case implementation, and agency budgets
Steering committee	Provides strategic direction for the Platform, sets priorities, communicates priorities and recommendations to state working group, and manages the administrative staff and external funding
Use-case working groups	Articulates users’ needs and priorities; supports communication of those needs to the technical working group and data providers
Technical working group(s)	Identifies, develops, and recommends the functional and technical requirements (standards and protocols) for the Platform and supports awareness and adoption of standards by data providers
Administrative staff	Facilitates and supports the successful implementation of Consortium meetings and priorities

1.4 Sustainable Platform Funding Is Achievable

AB 1755 assembles, transforms, and organizes an essential element of California’s water infrastructure – its data. While the costs of data infrastructure are but a fraction of physical infrastructure, it does require stable, ongoing funding from the state and others to be successful. We grounded the recommendations around sustainable funding in the following principles:

The following principles guide a funding structure for AB 1755

1. **A portfolio approach promotes long-term sustainability of funding.**
Under a portfolio approach, the state would deliberately structure funding for AB 1755 implementation to draw on multiple sources, and reduce dependency

on any one. Funding sources could include a range of state-based funding mechanisms, as well as local, federal, private, and philanthropic funding.

2. The state remains a majority stakeholder in governance and in funding.

This ensures that the Platform is supportive of state priorities and that Consortium decisions and recommendations can be effectively implemented by the state. For the California state government to retain this role in Platform governance, however, it must commit to providing meaningful, ongoing financial support as well.

3. Clear accountability for outcomes encourages participation of non-state partners. Participation is in the form of engagement in the governance, data production and use, and development of the Platform, as well as funding support for the Platform. Timelines to achieve outcomes (i.e., “early wins”) will be an important part of accountability as it will build the confidence of funders and participants that their investments will result in a stronger connection between data and decision-making.

Sharing the costs of data infrastructure

The physical infrastructure of roads offers a useful analogy for thinking about the structure of funding for data infrastructure. The national highway system provides essential interconnections across the country. State highways connect to that system, and local governments pave the last miles to connect towns and cities to the state and the country. Private entities who own and manage roads do so under regulation to ensure that they mesh with this system and are managed for public good. Just as the costs of roads are shared among local, state, and federal governments and private entities, data infrastructure costs must be shared as well.

To realize the promise of AB 1755, the state government will need to maintain sufficient ongoing funding for data collection, publication, and analytics. The state currently makes a significant investment in collecting, maintaining, and analyzing water data. These investments are made through agency budgets, and through grants to local governments. The success of AB1755 will rely on government maintaining this core funding and potentially make modest ongoing increases in coming years to fund the one-time costs of transformation and accelerate the pace of quality control and publication. Under the proposed governance structure, agencies and programs would retain authority and responsibility for setting and managing their data budgets.

AB 1755 introduces costs above and beyond these standing budgets. These costs could be shared between the state of California and external funding, through the Consortium (see table 2 for an overview of the streams of funding to support AB 1755, and coordination of these funding sources under the proposed governance structure). For example, during the transition there will be a need for investment in:

- Inter-departmental needs assessments to identify what data sets are available, and where there may be duplications in data collection that could be streamlined;

- Development of priority use-cases
- Data transformation and curation costs to prepare existing data for open publication on the new Platform;
- Standards and protocol development to enable interoperability on the Platform;
- Support for increased coordination among state entities and with the external stakeholders, including efforts to develop publication notes, and support wider federation of the platform

Once up and running, the Consortium will help support Platform costs above and beyond data collection and maintenance. These costs would include the administration of the Consortium, meeting coordination for the governance groups, and possibly a technical team that could support the state as well as local data providers as they transition to and implement the new system.

Table 2. Management of funding streams to implement AB 1755

Funding source	Use of funds	State role	Consortium role
Agencies' existing budgets	Ongoing state agency activities including data collection, management, and publication.	State agencies would continue to manage these resources with no change under the proposed consortium structure. State may provide grants to the Consortium.	The state would provide the Consortium transparency into their water data budgets to support alignment with Consortium resources.
Annual allocation for AB 1755-specific funding	Support extraordinary costs associated with the transition to the new data Platform,	State agencies would continue to manage these resources with no change under the proposed consortium structure. State may provide grants to the Consortium.	The state would provide the Consortium transparency into their water data budgets to support alignment with Consortium resources.
State Water Data Administration (WDA) Fund	Granted to the Consortium to support implementation priorities	Grant funds to the Consortium. Collaborate through the Consortium to set implementation priorities.	Receive grants from the state. Manage state grant dollars in alignment with set priorities for AB 1755 implementation.
Consortium Fund	Consortium activities	The state would have visibility into the use of Consortium funds to facilitate alignment with state priorities.	Development budget, oversee use of the Consortium Fund.

Governance here refers to the systems and processes put into place to coordinate action and decision-making about the structure, content, and use of the Platform

The vision for AB 1755 is for a *water data platform* – an interlinked set of tools and resources that provide access to data for water decision-making – referred to in this document as “the Platform”

2. Platform Governance

The success of AB 1755 depends on the cooperation, coordination, and buy-in of stakeholders in the public and private sectors. Successful coordination of these stakeholders will rely on strong governance. Governance here refers to the systems and processes put into place to coordinate action and decision-making about the structure, content, and use of the Platform. These structures may be formal, such as standing working groups, or they may be informal, such as opportunities to share and exchange best practices and approaches. Regardless, governance supports the ongoing functioning and evolution of the Platform for user needs with the ultimate goal of assuring that data is accessible and useful to water management decision-making.

2.1 Applying the federated platform vision to governance

AB 1755 aims to support long-term, open access to data for water decision-making in California, and encourages collaborative governance of data to support that access. The strategic planning process has produced a powerful vision of a federated, use-case oriented Platform to implement the bill. This report builds on that vision in developing governance recommendations.

Federated, use-case oriented structure

By a *federated system*, we mean that data access is secured through an agreed-upon set of exchange standards and protocols among independently managed databases, rather than through data collected into a single database/warehouse. Library systems provide a helpful analogy to understand federated data systems. Individual data providers maintain their own open databases and can be likened to individual libraries within a system. Just as libraries can network to allow for borrowing of books across the system through interlibrary loan, databases in the Platform can be federated to allow access to data in multiple databases. Users of any individual library may pull and request a book through the library system without needing books to be warehoused in a central library. Similarly, users of the federated Platform can request and use data without requiring that data to be housed in a single database/warehouse.⁷

A federated system has the benefit of allowing data providers to retain control of and responsibility for their data sets. In California, a federated system is particularly advantageous given the distributed nature of local, federal, and state institutions and their data for water decision-making, and the need for interoperability across these

⁷ The state develops this helpful analogy in their progress report: <https://www.water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/AB-1755/AB1755ProgressReportinitialdraft13018v42.pdf?la=en&hash=0B9CB4C2BE515DDEBFCCFF1D9D436FD4707ED438&hash=0B9CB4C2BE515DDEBFCCFF1D9D436FD4707ED438>

independent entities. Federation also builds trust in the network among data providers as they can retain control over the quality of and access to their data. At the same time, this distributive nature can be challenging because of the sheer number of organizations and institutions that can become involved in the network.

By a *use-case driven* platform, we mean one in which data are put onto the network and organized in response to the ways in which the data will be used (e.g., for making specific decisions, answering specific research questions, education, innovation, etc.). Under a use-case approach, data publication is informed by the needs of specific users, and success of the system is measured by the system's ability to meet and respond to user needs. Similarly, data quality standards, meta-data documentation requirements, prioritization of data for publication, and levels of interoperability are all indexed to the needs of users. When data are used across multiple use-cases, data standards and protocols ensure interoperability. A use-case orientation also emphasizes the need for iterative feedback among data users, data providers, and system developers to ensure that the Platform is functional and useful.

2.2 Scope of AB 1755 governance

Data management covers a vast array of activities. The state government has adopted a data life cycle approach to guide governance (Figure 1). The life cycle approach helps to distinguish the complementary roles of actors within this overall ecosystem, and to focus AB 1755 governance on those areas where state-led coordination will have the greatest impact on driving a more open and transparent water data system in California.

AB 1755 focuses explicitly on the data publication phase, with implications across the full data life cycle. This focus is emphasized by the enabling legislation, which mandates that information be made “accessible, discoverable, and usable” by the public.⁸ Accessibility, discoverability, and usability are all fundamentally determined through the publication process. As Figure 3 highlights, a focus on publication has significant implications for other phases of the data life cycle, including metadata documentation, data archiving, and what data are prioritized for publication. In addition, it *promotes* planning for data needs, and the extraction of information; and *supports* making data-driven decisions, collecting data, and assuring data quality.

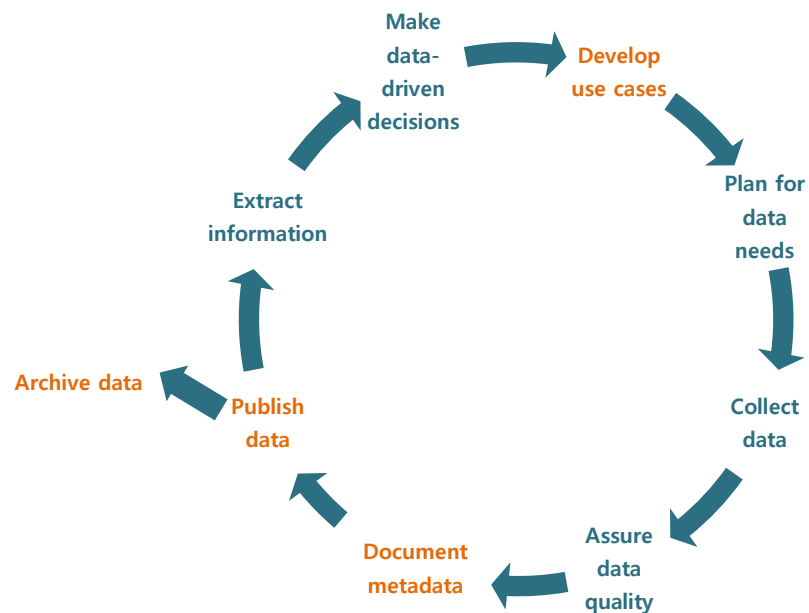
This emphasis on data publication highlights a core set of questions for AB 1755 governance. These questions relate to the priorities, standards, and protocols involved in data publication, including:

- What data should be prioritized for publication?
- How should data be formatted for publication?
- What meta-data documentation is required?

⁸ https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB1755

- What are the data quality expectations?
- What are the high-level protocols and standards around data publication?
- How is participation in the Platform and adoption of the protocols and standards encouraged?
- How does the system build capacity across entities to publish data?

Figure 3
The data life cycle⁹



A focus on publication also identifies questions that are *not* in the initial scope of AB 1755 governance, but would remain in the purview of other participating entities (e.g., individual participating state entities, federal agencies, data providers, data analysis companies). For example, questions associated with data collection – such as which data are collected, with what frequency, and according to what standards – would remain in the remit of the entities collecting the data or setting reporting requirements. Similarly, state entities that are publishing the data would retain responsibility for ensuring quality standards and upholding other privacy and security controls (e.g., removal of personally identifiable information from the data). On the other hand, questions about data analytics may be addressed by a wide range of data users and entities, including state and non-state users, from NGOs to private data and technology companies.

⁹ <https://www.water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/AB-1755/AB1755ProgressReportinitialdraft13018v42.pdf>

2.3 Platform governance involves four functions

AB 1755 establishes a mandate for collaborative governance of the Platform across state entities. The choice of a federated system reflects and further ingrains this collaborative approach. In a federated system, governance structures serve as a coordinating mechanism for distributed parties participating in the Platform. Governance also helps establish a division of responsibility across these entities and endorses an agreed-upon set of processes and procedures for the collaborative to make shared decisions. At the same time, such governance has limited ability to enforce participation on the Platform or adoption of its priorities. Participating state, federal, and non-state entities must be the ones to adopt these standards and recommendations, making governance, ultimately, a party of the willing.

Four functions are recommended for the governance of AB 1755: a steering committee, use-case working groups, technical working group, and a standing administrative staff (see table 3 for an overview). This brief section describes and offers preliminary thoughts about specific responsibilities for each of these functions and who could be involved in each. The description of these entities endorses and builds on the governance functions and schematic described in the [progress report released in January](#).¹⁰

Table 3. Summary of governance functions for the Platform

Entity	Role	Core responsibilities
Steering Committee	Provides strategic direction for the Platform and a forum for shared-decision-making among entities and leverages external funding	<ol style="list-style-type: none"> 1) Coordinate the strategic direction for the Platform 2) Coordinate with state governing group 3) Solicit, coordinate, and manage external resources for Platform activities 4) Set standards, conventions, and protocols 5) Oversee the administrative staff
Use-case working groups	Coordinates use-case implementation on the Platform	<ol style="list-style-type: none"> 1) Consult and engage around user priorities 2) Consult on technical and functional requirements for use-case implementation with technical working group
Technical working group(s)	Identifies, develops, and recommends the functional and technical requirements for the Platform	<ol style="list-style-type: none"> 1) Identify, develop, and recommend functional and technical requirements for the Platform 2) Proactively engage with use-case working groups to support implementation 3) Ensure interoperability and usability across the Platform 4) Train data providers and support awareness and adoption of standards, protocols, and conventions by data provider community
Administrative staff	Facilitates and supports the successful implementation of Consortium meetings and priorities	<ol style="list-style-type: none"> 1) Arrange Consortium meetings 2) Support activities of the Steering Committee, as well as technical and use-case working groups 3) Communicate Steering Committee reports and findings

¹⁰ <https://www.water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/AB-1755/AB1755ProgressReportinitialdraft13018v42.pdf>

Steering Committee *Responsibilities*

This group would serve as the executive committee for the Platform. Responsibilities would include:

- **Coordinate the strategic direction for the Platform**, which may include the management and curation of use-cases and the development of functional capacities on the network. As a federated system of independent entities, the strategic direction involves improving communications for coordination of decision-making, rather than setting a prescriptive direction for the entities. As such, the Steering Committee may choose to coordinate action across distinct subgroups for particular activities, seeking agreement and coordination across the entire Platform whenever possible.
- **Coordinate with the state governing group.** The Steering committee will have the responsibility for coordinating actions and decisions with the state governing group. For the most part, this goal will be accomplished by representation of that group on the Steering Committee and other Consortium committees.
- **Set standards, conventions, and protocols to ensure interoperability.** The Steering Committee would have the authority to adopt standards, conventions, and protocols for the network, and to encourage use of open-source code. In taking these actions, the Steering Committee will be advised by the technical working groups, which will be responsible for the due diligence, consultation, and deliberation required to arrive at expert judgment about best practices for the network. (We address what kinds of decisions could fall within this category below, under the section on “technical working groups.”)
- **Coordinate and manage resources to support Platform activities.** The Steering Committee will provide a forum to coordinate budget priorities and requests across participating entities. In particular, the Committee will create opportunities to share and align budget priorities, identify gaps, and cultivate opportunities to align and coordinate funding. The Committee will also work with funding agencies, both public and private, to secure the necessary resources for the participating entities.

In addition, we anticipate that the Platform will have some level of dedicated funding to carry out governance and supporting activities. The Steering Committee will be responsible for setting a budget for these activities and overseeing expenses in-line with the budget. The third chapter of this report addresses sustainable funding models for the Platform. In that section, we discuss what items may be covered by the Platform budget, as opposed to program and agency budgets.

- **Oversee the administrative staff.** The Steering Committee would oversee the administrative staff, which provides dedicated support to the Platform. The administrative staff is described in greater detail below.

Membership

The Steering Committee could be composed of state and non-state partners, with individual representatives serving on a rotating basis. An illustrative composition of the committee would be balanced across participating groups, including seats for the California state government, seats for Federal, local, and tribal governments, and seats for NGOs, academic institutions, and for-profit companies.

- **State entities**, including the named entities in the AB 1755 legislation, could have standing seats in the Steering Committee. These entities include: Department of Water Resources, State Water Resources Control Board, California Department of Fish and Wildlife, and the California Water Quality Monitoring Council. The state should also invite other entities engaged in the open data effort, such as California Natural Resources Agency, GovOps, Governor’s Office of Planning and Research, California Environmental Protection Agency (CalEPA), legislative leaders, and California Council on Science and Technology (CCST).
- **Federal, local, and tribal government entities.** Federal entities could include experts for example from USGS, U.S Bureau of Reclamation, US EPA, or the National Water Center. Local government entities could include municipal water districts or public utilities. Tribal government entities could include Tribal governments reporting and using both federal and state data for water decision-making.
- **NGOs** contributing data to and using data on the platform.
- **Academic institutions**, both public and private, could participate on the Steering Committee as technical experts (e.g., on data science, hydrology, biology, etc.), and users of the platform.
- **For-profit entities** contributing data to and using data on the platform may participate to represent the expertise as well as the interests of the private sector in innovating with public data. Participation of for-profit entities would need to be limited and balanced with other interests and perspectives to ensure that the Consortium does not get “captured” by any narrow private interest. One way to mitigate this risk is to engage trusted for-profit partners who embrace an open-source, civically-minded approach to their work, such as Splunk, Xyegy, and Civic Actions.

Adopting a rotating membership may help the Steering Committee limit the risk that Platform governance is dominated by any particular, narrow, set of interests, and may promote a high-level of engagement by Committee members while seated. That said, founding Consortium members will ultimately need to define rules of participation that balance these concerns of capture and engagement with the value of retaining institutional knowledge, and high-quality, committed members.

Use-case working group

Use-case working groups are a vital coordination, communication, and engagement mechanism for the Platform. They would help guide Platform development in user priorities by supporting iterative feedback on the Platform on goals as defined through specific use-cases.

As the Platform develops and matures, use-case working groups will likely be identified by the Steering Committee as Platform priorities. Grassroots use-case working groups may also emerge among user groups to address shared interests. Below, we only address the potential role of formal use-case working groups prioritized by the Steering Committee.

Responsibilities

- **Consult on technical and functional requirements for use-case implementation.** The use-case working groups would collaborate with the technical working group(s) to develop recommendations around the functional requirements, standards, protocols, and conventions for a use-case.
- **Coordinate use-case implementation** by engaging user groups and working with them to define user needs and objectives around priority use-cases, and then coordinating publication of the relevant data across the community.
- **Consult and engage around user-priorities:** The use-case working groups would be the primary mechanism for the Platform to listen to and understand how users would like to engage and leverage the Platform, and to identify improvements that will increase its impact over time.

Membership

Membership on the use-case working groups would be voluntary and reflect those agencies and data users most affected by the specific use-case at hand. Unlike the Technical Working group, the influence of the use-case working groups emerges from its reach and relevance to the user community. As a result, participation would be open to all those who are engaged and interested in participating.

Technical working group

Responsibilities

The technical working group(s) would:

- **Identify, develop, and recommend** the functional and technical requirements for the Platform, including but not limited to, guidelines on data standards, data publication approaches, and data vocabulary. Given the number of autonomous entities involved in the federated Platform, these standards would ideally be minimal to ensure interoperability and performance, while not being overly prescriptive of data management at participating agencies and entities.

- **Proactively engage with data providers** to support them in adoption of new standards and protocols.
- **Proactively engage with the use-case working groups** to support development and implementation of the use-cases, and to promote consistent implementation of broader Platform guidelines.
- **Facilitate regional and national coordination around standards setting.** Multiple state, regional, and national entities are developing standards for data used in water decision-making. The technical working group can help coordinate with those entities, building on existing standards when possible, and engaging in the collaborative development of standards where needed.

The technical working group(s) would support two broad categories of data:

- **High-use core data:** In their review of water-data use patterns, the use-case working group found that a limited number of data sets were used across multiple use-cases.¹¹ For these high-use, core data, the technical working group effort would aim to ensure interoperability of the data sets across use-cases.
- **Use-case specific data sets:** Other data are used in focused use-cases. In these instances, the technical working group would advise on the standards, conventions, and protocols that could support the use-case, as well as on the wider utility of the data on the Platform.

Membership

Technical working group(s) could include qualified representatives from each of the participating state agencies, representatives from Federal and Tribal agencies whose data are integrated into the Platform, and external data science experts from academia, NGOs, and the private sector. It would ideally be managed by a Chief Data Officer, who is a full-time staff of the Consortium (see section below on “Administrative Staff”). The influence and authority of the Technical Working Group emerges from their expertise. As a result, the Consortium may want to consider an application process to vet and qualify participants and ensure the highest technical standards across the platform.

Administrative staff

Administrative staff could facilitate and support the implementation of Platform activities. The administrative staff would be a standing team of professional staff. The staffing could include an Executive Officer, as well as focused support for technical and use-case working groups. The Consortium may also consider developing a Chief Data Officer or scientist to help quickly address technical issues that may arise and, just as important, to give confidence that the Consortium is focused on promoting the best science rather than interest-specific viewpoints. Administrative staff would

¹¹ Cite the Kiparski paper, and identify other places where we need to cite this piece

be full-time to ensure commitment and focus to carrying out governance needs for the Platform. The administrative staff would be funded by the Consortium and managed by the Steering Committee.

2.4 Institutionalizing data governance

To implement the Platform, these governance functions must be institutionalized into a structure that can support their ongoing function. This section considers options for that structure, and recommends that the California state government consider developing both an internal process to facilitate inter-agency coordination and alignment, as well as a consortium to house and oversee Platform governance. The Consortium would function as an independent, non-profit entity, such as a 501(c)(3), a public benefit corporation, or a joint powers authority. The independence of the Consortium would enhance fundraising from non-state partners, while also increasing the nimbleness of Platform governance. By ensuring a majority state representation in its leadership (i.e., the Steering Committee), the Consortium would maintain strong links to California state government.

Core principles for institutionalizing data governance

AB 1755 sets an especially high bar for collaboration by requiring coordination among state entities and between the state, local, federal, and tribal government, along with private entities to gather, maintain, and use data *and* to secure start-up and ongoing funding to manage the Platform. The choice of the institutional structure for AB 1755 governance will affect how well California meets this ambitious mandate. Discussions with the Partner Agency Team, guiding principles from the AB 1755 Progress Report, and lessons from past data integration efforts in California collectively suggest that the institutional structure for AB 1755 governance should:

- **Affirm the vital role of California state government in the collection, maintenance, and publication of data for water decision-making and of tools to assist analysis.** The state government has a regulatory role in the oversight of California water, and so in the management of this regulatory data. The California state government also has a vital role in providing a foundation of shared facts and information to guide water planning and management across the state.
- **Align management of data for water decision-making across state entities** to advance the interoperability of California and federal water data, and support the implementation of priority use-cases.
- **Encourage collaboration with non-state data collectors and users.** Non-state participation is important to the success of AB 1755. Non-state actors will contribute vital data and realize value from the data by using it to make decisions and to drive innovation. Governance can encourage this open and active participation by minimizing barriers and providing clear benefits.
- **Promote a sustainable portfolio of funding, including a healthy mix of state and external funding.** AB 1755 will benefit California, local and tribal

governments, private businesses, and non-profit actors. Each of these participants has a role in contributing to sustainable Platform governance and funding. Diversifying the funding sources will also reduce dependence on any one source, and promote long-term sustainability of the Platform.

- **Prevent the dominance of any one interest group.** While AB 1755 offers benefits to all stakeholders, it also creates risk that any one stakeholder group could dominate decision-making to, for instance, prioritize certain types of use-cases over all others. Likewise, tying governance (or associated funding) to any specific state administration’s priorities risks making the Platform vulnerable when the administration changes.
- **Foster trust in data sharing among stakeholders.** Culturally, there is significant distrust in sharing water data. The culture of utilities and water managers to “stay below the radar” as well as negative past experiences in sharing data contribute to this environment. To be successful, Platform governance must build the trust of stakeholders so that they can share data on the Platform without harm and build their appreciation of how they can benefit from sharing their data. Accordingly, it is vital to consider how the governance structure put into place will be perceived by the stakeholders, and whether and how the governance group can establish itself as a neutral broker.

A state process to manage data for water decision-making

AB 1755 requires a significant increase in coordination among state entities involved in data collection, management, and publication. Some kind of process will be needed to support this coordination. The process could be run through existing structures, such as the California Water Quality Monitoring Council; the state could create a new entity (e.g. a Council or Commission); or could utilize an informal coordinating body may to support coordination. The final decision as to the form would need to be made by inter-agency agreement based on internal protocols and relationships. For the purposes of this report, however, we will refer to the entity as “the state governing group.”

The primary objective of the state governing group would be to align water and ecosystem data management activities across state entities. Specifically, the state governing group would align California state government data standards and publication protocols across agencies, ensure those protocols and standards are aligned with Platform standards to the extent possible, coordinate water data and IT procurement processes, and coordinate use-case implementation. To do so, it may develop a data sharing framework to facilitate data exchange.¹² By providing an internal governance structure for California data, it also affirms the independence of the state in the collection, maintenance, and publication of data for water decision-making.

¹² See the CA Data Network; the Great Lakes Commission; the Delaware River Commission for examples of data sharing frameworks

Importantly, private industry, academic, NGO, and Federal, tribal, and local government representatives may each also coordinate with their own constituencies and partners, serving an analogous role to the state governing group within their own institutions and sectors.

A state governing group is insufficient on its own

The state governing group by itself, however, is likely insufficient as a mechanism to engage outside partners, either as participants on the Platform, or as funders of the Platform. As such, the complementary roles of a State Governing Group and a water data consortium are proposed.

- *For participation*, other government entities, most notably the Federal and Tribal governments, as well as other states, could not formally participate in a state governing group, although they may be able to participate on an informal basis. Private interests, meanwhile, may be hesitant to participate in the Platform if its governance and management is perceived as cumbersome or insufficiently responsive to their interests.
- *For fundraising*, our interviews and experience with philanthropic organizations suggest that it is difficult to fundraise private philanthropy or charitable contributions for a state-based entity. Contributions for state-based entities raise questions of accountability for the funding, as well as additionality – is this something that outside dollars are really needed for?

While the Open and Transparent Water Data Act did establish a segregated Water Data Administration Fund that can accept donations as part of AB 1755 implementation, outsiders will likely need greater transparency and accountability around the use of capital contributed to the fund, than can be accommodated within the existing state structure.

Table 4 summarizes how the state governing group would meet the broader objectives of governance for the Platform, and highlights the complementary role of an independent Water Data Consortium, which we will consider in the next section. As illustrated, the state governing group could play a vital role in securing and affirming California state government participation in Platform governance, whereas an independent Consortium would play a complementary role in engaging outside partners, either as participants, or as funders.

Table 4. Alignment between principles and governance components

	Affirm the state's role for official data	Align activities across state entities	Encourage collaboration with non-state actors	Promote a sustainable portfolio of funding	Prevent the dominance of interest groups	Build trust among stakeholders
State group	Higher	Higher	Lower	Lower	Lower	Lower
Consortium	Lower	Lower	Higher	Higher	Higher	Higher

A water data Consortium

Completing Platform governance with a not-for-profit consortium (“The Consortium”) would offer significant benefits to California state government and to the wider water data community. The Consortium would sit alongside California state government, and could be created as a new entity, or could be housed within an existing non-profit (Figure 4). One option to consider is whether the Consortium

could sit within an academic institution or an existing NGO focused on water data, which could both ease integration with state government *and* build trust among non-state partners, since those entities are often accustomed to partnering with academic institutions and other NGOs. The Consortium would help

build the trust of private and non-state entities since it is not a regulatory entity, and would give the users a clear voice and decision-making power in the governance of the Platform.

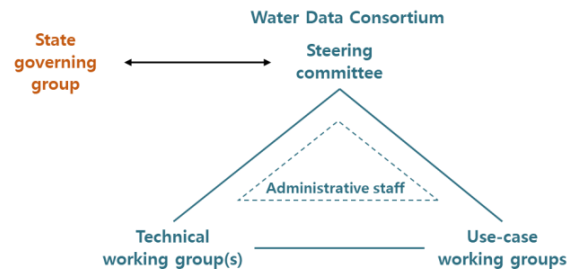
Membership in the Consortium would include representation from the state of California, local, Federal, and tribal governments, as well as non-governmental representation. State representation could include all participating state entities, and possibly legislative leadership as well. Non-government actors could include data providers, managers, and users from academics; private industry actors; and NGOs. California state government has used this model before to facilitate public-private partnerships for data sharing (e.g., the Open Geospatial Consortium, see sidebar on page 33), and should consider this approach for AB 1755 as well.

The Consortium would host all four governance functions outlined above, but would not be responsible for coordination across state entities (table 5). It would house and manage the administrative staff, the Steering Committee, and focus its expertise in the Use-Case Working Groups and Technical Working Group(s). The Consortium could also house a team of on-call data engineers and scientists to provide project-based expert support for use-case implementation by state agencies and other partners (see sidebar on page 23).

As the Consortium and the Platform mature, Consortium members may choose to include data on the Platform that reaches beyond data covered by AB 1755 (e.g. currently non-public data, academic data). The Consortium could encourage such collaboration by, for instance, developing or adapting data sharing frameworks used by similar consortia.

Figure 4

Proposed governance structure for AB 1755



The Consortium would complement work of the state governing group by creating a structure that can more easily engage outside partners. To ensure that the two entities are coordinated, representatives from the state of California, including the state governing group could have a significant proportion of the seats on the Steering Committee, as well as significant participation in the Use-Case and Technical Working Groups.

This model would have important benefits over a state-only structure including:

- **Increased fundraising capacity.** The Consortium would be better positioned to raise money from non-state partners. This could include contributions from private and corporate philanthropy, as well as the development of membership fees going forward.
- **More flexible and nimble engagement with non-state partners,** including local and Federal government, tribal governments, academic partners, NGOs, and business entities.
- **More flexible procurement and staffing processes.**

Table 4 (above) summarizes how the Consortium would meet the broader objectives of governance for the Platform. As illustrated, the Consortium would encourage a more sustainable funding model by facilitating contributions from non-state partners. Table 5 summarizes how the State Governing Group and Consortium would work collectively, and the possible membership and roles for each.

SIDEBAR

Human resources for digital water data products and services

AB 1755 puts a substantial burden on Agencies' data scientists and experts who will be tasked with transforming and managing their data and processes. A centralized team that could work across Agencies would offer great efficiencies and enable current staff to maintain their current foci.

Fortunately, a precedent exists. 18F is an office within the Federal General Services Administration that collaborates with other agencies to fix technical problems, build products, and improve how government serves the public through technology. Likewise, the U.S. Digital Service is a part of the Executive Office of the President that provides consultation services to Federal Agencies on information technology and seeks to improve and simplify Federal digital service. The state could create a similar team for AB 1755 – a Center of Excellence for Water Data, for instance – to play similar roles. It would be managed by the Steering Committee and the administrative staff and be deployed as needed to assist with data management and integration with the state governing group, and on specific projects and analyses with the Consortium.

The state of California already recognizes the need to increase its analytic capacities and is making efforts to do so. A Center of Excellence for Water Data team could assist in this development to enable state and not-for-profit actors, in particular, to make best use of the data, especially when engaging private companies with significant data science expertise and resources.

Table 5: Summary of governance groups

	Participation	Roles	Funding concepts
State Governing Group	<p>Defined by the state partners</p> <ul style="list-style-type: none"> Participation should ensure the following: <ul style="list-style-type: none"> Representatives have necessary authority to implement Coordination with other statewide data efforts Integration with on-going data collection and publication 	<ul style="list-style-type: none"> Align and set state data standards across Agencies Coordinate data publication protocols across Agencies for data covered by AB 1755 Ensure that state protocols and standards are aligned with Platform standards Coordinate data and IT procurement processes for AB 1755 implementation Coordinate use-case implementation Coordinate agency budgets 	<ul style="list-style-type: none"> Funding from participating Agencies Existing agency data management budget Consortium may grant dollars back to state to support implementation priorities
California Water Data Consortium	<p><i>Steering Committee</i></p> <ul style="list-style-type: none"> Chair is a member of state government State entities; term-limited to two-years, and selected by State Governing Group Other stakeholders (e.g. Federal, Tribal and local, academic reps, NGOs, private sector) Funding allocations require simple majority or 2/3 majority 	<ul style="list-style-type: none"> Coordinate the strategic direction for the Platform, including use-case management and curation Coordinate with the state governing group Solicit, coordinate and manage resources for Platform Oversee administrative staff Discuss the uses of different sources of funds for implementation of the Platform across the state and Consortium Allocate funds for implementation from Consortium Fund 	<ul style="list-style-type: none"> State contribution Federal grants Foundation Support Private charitable contributions Membership fees
	<p><i>Use-case working groups</i> Determined by use-cases</p>	<ul style="list-style-type: none"> Consult and engage around user priorities Consult on technical and functional requirements for use-case implementation with technical working group 	
	<p><i>Technical working group</i></p> <ul style="list-style-type: none"> State water managers NGOs Academics Federal and regional water data experts Tribal data experts Data scientists 	<ul style="list-style-type: none"> Identify, develop, and recommend functional and technical requirements Proactively engage with data provider community Proactively engage with use-case working groups to support implementation Ensure interoperability and usability across the Platform 	
	<p><i>Administrative staff</i></p>	<ul style="list-style-type: none"> Arrange Consortium meetings Support activities of the Steering Committee, technical and use-case working groups Communication of reports 	

Are two processes really needed?

The proposed governance structure has a level of complexity to it. It includes the development of two processes: A state governing group, and a non-state NGO in the form of the Consortium. Is this complexity necessary? Our strong sense is that it is, but below we consider the trade-offs involved in simplifying the structure to either one of the options.

The complexity of the structure comes from the recognition that there are two distinct, but equally important layers of coordination necessary to make the proposed Platform function: coordination among state entities, and coordination between the state and non-state entities.

The state of California needs to coordinate data management and publication protocols across the many agencies, departments, and programs involved in management of data covered by AB 1755. This coordination process brings with it an important set of considerations, including regulatory and statutory requirements around the data and compliance, as well as the distinct challenges associated with data management in a state government. These additional considerations are likely too cumbersome to manage within the context of a wider coordination effort, and could discourage engagement by outside partners, particularly around funding for the Platform.

Given this context, a state Council may be sufficient for Platform governance if:

- California state government can commit to fund the Platform at a sustainable level long-term without the addition of external funding from philanthropy, private industry, or membership fees
- Informal coordination with Federal partners is sufficient
- Local partners, academia, and NGOs are motivated enough to engage with a more cumbersome structure to be involved in the Platform

The development of the Consortium is designed to address these challenges by creating a structure that is more flexible, and so more amenable, to collaboration with outside partners. A non-profit structure may also facilitate the accountability and transparency needed to build the confidence of external funders.

Given this context, a Consortium may be a sufficient for Platform governance if:

- The state of California can effectively address its internal data management and governance issues in the context of a larger organization (e.g., as a working group within the Consortium).
- Regulatory and statutory considerations directing and constraining state data management can be addressed within a non-state entity.

3. Sustainable Platform Funding

AB 1755 solidifies an essential element of California’s water infrastructure – its data. While the costs of data infrastructure are only a fraction of those for physical infrastructure, it does require stable, ongoing funding to be successful. Indeed, past efforts at creating a more open and transparent water data system in California have not produced the expected results due, in large part, to inadequate funding. These stalled efforts have also discouraged stakeholders that AB 1755 will be meaningful and create the data infrastructure that the state dearly needs.

Given these setbacks, it is imperative for California state government to build the confidence of both state and non-state partners that this time will be different. A clear and sustainable funding strategy is vital to achieving this goal. Below, we articulate a budget framework for implementation of AB 1755. The framework builds on the governance model described in chapter two of this report.

3.1 Funding principles

1. **A portfolio approach promotes long-term sustainability of funding.**
Under a portfolio approach, the state would deliberately structure funding for AB 1755 implementation to draw on multiple sources to reduce dependency on any one. Funding sources could include a diversity of state-based funding mechanisms, as well as federal, local government funds and private and philanthropic investment.
2. **The state remains a majority stakeholder in governance and in funding.**
This ensures that the Platform is supportive of priorities for the state of California, and that decisions and recommendations reached by the Consortium can be effectively implemented by the state. For California state government to retain this role in Platform governance, however, it will need to provide meaningful, ongoing financial support to it as well.
3. **Clear accountability for outcomes** encourages participation of non-state partners. Outcomes are primarily a matter of delivering useful data to users, or reducing reporting burdens for data producers. By delivering outcomes, the platform becomes useful, and when it is useful, parties are more willing to actively support the system – by contributing data, their time, and their money. Timelines to achieve outcomes (i.e., “early wins”) will be an important part of accountability as it will build the confidence of funders and participants that their investments can result in positive change for California.

3.2 Funding needs for AB 1755 implementation

The state will need to maintain a high level of ongoing funding for data collection, analytics, and maintenance

The state of California funds a significant portion of the collection and maintenance of data used in water decision-making through agency budgets. For AB 1755 to be

successful, it is imperative that the state maintain this core funding, and provide modest increases in coming years to ensure faster, high-quality publication of essential water data. Additional funds will meaningfully accelerate QA/QC processes on data, as well as the transformation of existing databases into publication-ready formats. These two processes are currently the most time-intensive steps in the publication process, and where additional investment would likely have the greatest impact on AB 1755 implementation. As these processes become established and more efficient, agencies may see reduced budget needs in these core data curation activities, freeing up resources for more data analysis and visualization tools.

Under the proposed governance structure, California state agencies and programs would retain authority and responsibility for managing their data management budgets. The state may want to consider adopting an internal process to help state entities coordinate these budgets to ensure that agency budgets are additive, and complementary. This coordination might involve activities to provide transparency into budgets for AB 1755 related expenses. The state governance structure could provide the forum to discuss coordination. We have also recommended that California state entities coordinate their budgets with the Water Data Consortium so that the Consortium could leverage its independent funding to support the shared mission of implementing AB 1755.

Transition to the new Platform

Additional costs associated with implementation of AB 1755 fall into two broad categories: (1) costs to transition to the new system of open data publication; and (2) ongoing costs associated with increased coordination around data publication. Increased coordination is needed not only across California state entities, but also between state entities and the wider stakeholder community of water and ecological data providers, managers, publishers, and users. These costs are above and beyond the current agency and program data management budgets. As noted above, AB 1755 may also entail an increase in the ongoing data management budgets for state agencies, but those needs will not be further addressed in this report.

Costs associated with the transition to a new system

1. Interdepartmental assessment of use-cases and associated data needs

Given the breadth of data affected by AB 1755 use-cases, a needs assessment is required to get a system-wide picture of the state of data across agencies. An interagency assessment could help identify what data are available, and where there may be duplications in data collection that could be streamlined. An initial needs assessment would be tailored to the early use-cases that the Platform takes on (e.g. water budgets, water balance). As the Platform matures and focuses on additional use-cases, the assessment may be needed.

2. Data transformation and curation investments enable the Platform

Agencies maintain data in many formats. In many cases, these data must be transformed to be included in an open platform. This transformation can be time and

resource intensive, and is a major rate-limiting step in publishing data in an open format. In addition, work is needed to get the federated Platform up and running, such as establishing a state publication node infrastructure.

As the Platform matures, these activities will become part of the ongoing data management processes within state agencies and programs and hopefully other data providers. We include it here to draw attention to the need to invest in this process as state entities shift their data management processes to ensure that priority data sets are transformed and made available in a timely fashion through the transition process. It is vital that when the Platform launches, it has sufficient data to support enough use-cases that users, both within and outside of the state, see its value and continue to invest in its ongoing development and evolution.

3. Standards and protocol development enable interoperability

The process for developing standards and protocols to enable the Platform is already underway and will need to continue. The costs associated with their development are modest but cannot be overlooked. They include staff time to engage in the development of the standards and protocols; development and implementation of the testbed network, as well as resources to support meetings and engagement with local, regional, Federal, Tribal, and academic experts.

4. Coordination costs

The increased coordination envisioned by AB 1755 starts during the transition. These coordination costs can be broken down into two categories:

- **State coordination:** In addition to the items identified above, transition to the new Platform includes the development of the state governing group, which will coordinate collection and management of California state data covered by AB 1755. It also includes training for state professionals involved in water data collection, management, and publication according to the new open data standards and protocols.
- **External stakeholder outreach:** External stakeholders are integral to the success of the Platform. California state government has ongoing outreach activities with both public and private sector stakeholders interested in Platform development. Through these interactions, the government is soliciting input about stakeholder concerns and priorities. In addition, there will need to be a set of outreach efforts around the formation of a Consortium. This would include the identification of a leadership group to guide and shape the formation of the entity, as well as communications and engagement with the wider water data community around its design, development, and launch.

The Consortium would support many transition activities

Under the proposed governance structure, the Consortium would ultimately house the four primary governance functions for water data under the new Platform (i.e., Steering Committee, Use-Case Working Group, Technical Working Group, and

administrative staff) and, as such, could support many transition activities. In particular, the Consortium could:

- Support the interagency needs assessment, as well as data transformation and curation
- Lead and coordinate development of standards and protocols
- Facilitate and expand the reach of external stakeholder outreach
- Lead the continued development of the strategic vision for the Platform

California state agencies would continue to lead the interdepartmental needs assessment and state coordination around intra-state governance issues. The state would also provide core funding for data management needed to curate and transform data sets.

Ongoing operations and management

The Consortium would play a major role in the successful, ongoing functioning of the Platform. Once mature, it could support most Platform costs above and beyond data collection and maintenance. Below, we highlight key costs associated with those activities.

1. Administrative staff

The administrative staff would include a standing, dedicated staff to support coordination of governance functions for the Platform. Staff would include at least an Executive Officer, a Chief Data Officer, and administrative support. It would most likely be housed within the Consortium (or its host) and would grow as the Consortium matures.

2. Coordination meetings

The Steering Committee and Working Groups will execute on their mission through a series of meetings throughout the year. While participation will be voluntary, the Consortium will need budget to cover meeting costs, including travel costs for those committee members who require it. While the meeting schedule must be set by Consortium leadership, a starting assumption may be that the Steering Committee and working groups would meet in-person at least three times a year, with one meeting being longer than the other two.

3. Water Data Science Team

The creation of the Platform will transform how California manages water data. To help Agencies and reporting entities make this shift requires meaningful investments in both technical training and development, as well as in culture change. A Water Data Science Team could provide additional expert support to state agencies, as well as external data providers as they implement the needed changes. The team could build on successful models of 18F and the US Digital Service (see sidebar on page 23) but tailor it to the specific expertise required around water data and the development of the Platform.

Recruiting top data science talent has been pivotal to the success of these models in the Federal government, and would represent a significant expense for the Consortium. To manage those costs, the Consortium may want to consider whether its needs are best met through a smaller number of full-time staff who can be deployed to projects, or through maintaining a stable of available experts from a range of relevant fields who could be contracted when needed.

3.3 A sustainable funding model for the Consortium

The Consortium budget would be met through a combination of state and philanthropic funds

The Consortium structure is designed to facilitate a more diversified, sustainable funding portfolio for the Platform. Below, we outline four streams of funding to support AB 1755 implementation. Three of those streams come from state resources. We distinguish them here because they have distinct budgeting processes. AB 1755 implementation will draw on all four of these funding streams over time. While we envision that the Consortium will require initial investments by state and philanthropic funds, we anticipate that over time, these investments can be offset with fees from a membership. This approach would provide an important source of sustained funding for the organization, and create accountability for the Consortium to the water management community it aims to serve.

Four streams of funding for data management

Existing agency and program budgets are the standing budgets allocated to state agencies and programs. This is the primary source of ongoing funding for California data collection and management activities.

The management of these budgets would not change under the Consortium, except that the agencies and programs would provide greater transparency to each other and to the Consortium around how the funds are allocated.

AB 1755-specific funding can be allocated on an annual basis by the legislature. These funds could be used to cover state data collection and management activities not covered by existing agency and program budgets. Because they are allocated on an annual basis, they are not well suited to ongoing data collection and management needs but could cover extraordinary costs associated with the development of and transition to the Platform.

The allocation and management of these resources would remain the responsibility of the state agencies and programs, and would not change under the Consortium structure.

The Water Data Administration Fund was created by AB 1755 to support the implementation of the bill. Appropriated funds are to be “available, upon appropriation, to the Department, the State Board, or the Department of Fish and Wildlife for the collection, management, and improvement of water and ecological data for the purposes of the act.” In addition, the WDA Fund can receive voluntary donations from a wide range of entities.

Under the proposed governance, monies put into the WDA Fund could be granted to the Consortium, and managed by the Consortium to support implementation and ongoing management of AB 1755. This appropriation may be done through a grant or by other mechanisms determined by the state governing group.

A Consortium Fund would be created by the Consortium to receive fundraising dollars. The Consortium Fund would be independent of the state and managed by the Steering Committee in the Consortium. As a fund under the non-profit Consortium, it could receive monies from private or corporate philanthropy; academic institutions; local, state, or the Federal governments; and from business entities or organizations.

Monies in the Consortium Fund would be used to support Consortium activities, and could be granted back to the state when funding resource and priorities allow.

To effectively and efficiently support implementation of AB 1755, these funding streams must be coordinated. Similar to the governance structure, two levels of coordination are important – intra-state coordination, and coordination between California state government and the Consortium. Table 6, below, provides additional detail on how coordination across these four funding streams could work between the state and the Consortium.

Table 6. Management of funding sources to implement AB 1755

Funding source	Use of funds	State role	Consortium role
Agencies' existing budgets	Ongoing state agency activities including data collection, management, and publication.	State agencies would continue to manage these resources with no change under the proposed consortium structure. State may provide grants to the Consortium.	The state would provide the Consortium transparency into their water data budgets to support alignment with Consortium resources.
Annual allocation for AB 1755-specific funding	Support extraordinary costs associated with the transition to the new data Platform,	State agencies would continue to manage these resources with no change under the proposed consortium structure. State may provide grants to the Consortium.	The state would provide the Consortium transparency into their water data budgets to support alignment with Consortium resources.
State Water Data Administration (WDA) Fund	Granted to the Consortium to support implementation priorities	Grant funds to the Consortium. Collaborate through the Consortium to set implementation priorities.	Receive grants from the state. Manage state grant dollars in alignment with set priorities for AB 1755 implementation.
Consortium Fund	Consortium activities	The state would have visibility into the use of Consortium funds to facilitate alignment with state priorities.	Development budget, oversee use of the Consortium Fund.

The Consortium could adopt a membership model as it matures

As the Consortium matures, it may want to consider developing membership fees to support its ongoing activities.

Membership fees would have the advantage of diversifying the funding sources for the Consortium. Just as important, however, membership fees also create an important line of accountability between the Consortium and its participating members. Through their support, the members gain more voice in the direction and priorities of the organization. They also demonstrate to philanthropic and state funders that they value the activities of the Consortium.

Consortium members could include: local, tribal, and Federal governments, utilities, water agencies, water districts, State and Federal water contractors, engineering firms, private industry, NGOs, GSA, or academic institutions.

Given the diversity of potential members, the Consortium could adopt a tiered membership model, similar to the Open Geospatial Consortium (see box to the right). The structure could ensure that entities are not precluded from participation because of an inability to pay, but that participating organizations all contribute to the smooth functioning of the resource.

The Open Geospatial Consortium

The Open Geospatial Consortium (OGC) is an international industry consortium of over 500 companies, government agencies and universities who work together to develop publicly available standards for the interoperability of geospatial information. The state of California was deeply involved in the development and launch of the OGC, through the University of California, Berkeley, which was one of eight charter members for the Consortium.

4. Moving to Platform Implementation

California state government has generated impressive momentum in implementing AB 1755 over the past year. The development of strong governance and sustainable funding should help sustain that momentum, addressing a vital need in the formation of the Platform.

In this final chapter, we would like to sketch some of the key next steps that will be important as the state works to develop and standup governance and funding structures for the Platform.

Take the opportunity to test and refine governance structure as part of the test-bed process. Over the coming months, the state of California will develop a test-bed network to pilot the draft data protocols and standards developed. The test-bed approach provides the state with an opportunity to work through the kinks in the proposed standards and protocols – to understand which of the existing protocols and standards work, which need refinement, and where there are gaps.

The testbed process also provides a valuable opportunity for to test and refine governance organization and processes for the Platform, starting with a pilot of the state governing group, and expanding to integrate the Consortium that it gets up and running. In piloting the state governing group, the state may also want to consider whether it can build on or adapt existing entities, such as the Water Principals or the California Water Quality Monitoring Council.

Work with anchor members and funders to refine and pilot the Consortium. While this report identifies the value and basic structure of a Consortium to support the state of California in implementation of AB 1755, it leaves the details and

mechanics of implementation for further discussion. This choice is deliberate, and responds to the importance of the Consortium being shaped by those who will be its members and funders. The next step in developing a consortium is to identify a core group of founding members and funders who would be interested in investing in and supporting the development of a pilot Consortium. Outreach to anchor members and funders can complement ongoing state outreach by the state government, and provide an important opportunity to test the perceived value of establishing a non-state Consortium to coordinate open water data across California, with those that the Consortium would seek to serve.

Once a core group of members and funders is organized, this group will need to work together to refine the functions and processes of the Consortium, identify and find leadership to direct the organization, and start building the technical and use-case working groups alongside its membership.

Collaboratively identify priority use cases for the Platform. The process to identify and choose use-cases to develop on the platform will be an important, early opportunity for collaborative governance between the state governing group and the emerging Consortium. California state government has initiated a preliminary process to identify initial use-cases to help build the test-bed network. As the Consortium takes shape, it will be important for the state governing group to engage with the Consortium, and develop a process to collaboratively prioritize use-cases. Through this process, they can identify data that are responsive to both the interests and priorities of data providers and users outside of California state government, as well as the priorities of the state.

Plan for an early win. An early win will build confidence that implementation of AB 1755 will result in a successful, impactful Platform, a Platform that can result in direct improvements for water management across California. Early success will help attract funding from non-state partners, and will also help attract the membership that will provide long-term financial sustainability for the Platform. The Safe Drinking Water Data Challenge, already underway, will provide an early example of the potential collaborative power of open data. Further, choices of use case(s) will be critical to realizing additional early wins and will be best accomplished through a broad base of state and non-state collaborators. In planning for early wins, the state government should look to opportunities that expand beyond just the publication of data. For example, planning for an early win may involve identifying opportunities to reduce reporting burdens of local data providers and/or data reports. Alternatively, it could include identifying opportunities and partnership to integrate published data with decision support tools that provide meaningful help to underserved populations.