

# Sites Project Executive Summary

FOR CALIFORNIA'S WATER STORAGE INVESTMENT PROGRAM

Providing high-quality water to enhance the environment,  
the economy and quality of life for Californians



**Sites is an innovative, environmentally sound solution to California's toughest water challenges.**

With broad statewide support, the Sites Project fulfills the clear Proposition 1 mandate from the People of California, who overwhelmingly said the state needs public benefits from new water storage.

# Sites Project Executive Summary

This document summarizes how the Sites Project Authority (Authority) has addressed the California Water Commission's requirements of the Water Storage Investment Program (WSIP), to provide water supply and eligible public benefits.

The Sites Project will make California's water system more efficient, flexible and reliable, which will provide local, statewide and national benefits.

## The project:

- Helps achieve the objectives of the California Water Action Plan
- Reflects the innovative approach mandated by the people of California under Proposition 1
- Provides a substantial supply of high-quality water to support the economy and enhance the environment, particularly in the face of climate change
- Better captures, stores and provides water for the environment, the economy and quality of life for families, farms and businesses
- Is being developed in accordance with the beneficiary-pays-principle



The Sites Project offers the State of California a significant supply of water to improve conditions for salmon and smelt and to comply with the will of California voters.

## The Sites Reservoir

Delivers about **441,000** acre-feet of water per year to California's water system for...



Drinking Water



Irrigation



Climate Change Resiliency



Enhanced Water Quality



New Recreational Opportunities



Flood Management



Ecosystem Improvements



Renewable Energy

**Stabilize Sacramento River**  
fall flows for salmon



**Conserve coldwater pools**  
in existing reservoirs later  
into the summer months to  
improve conditions for salmon  
spawning and rearing



**Provide nutrient rich water**  
to the Yolo Bypass to  
benefit smelt



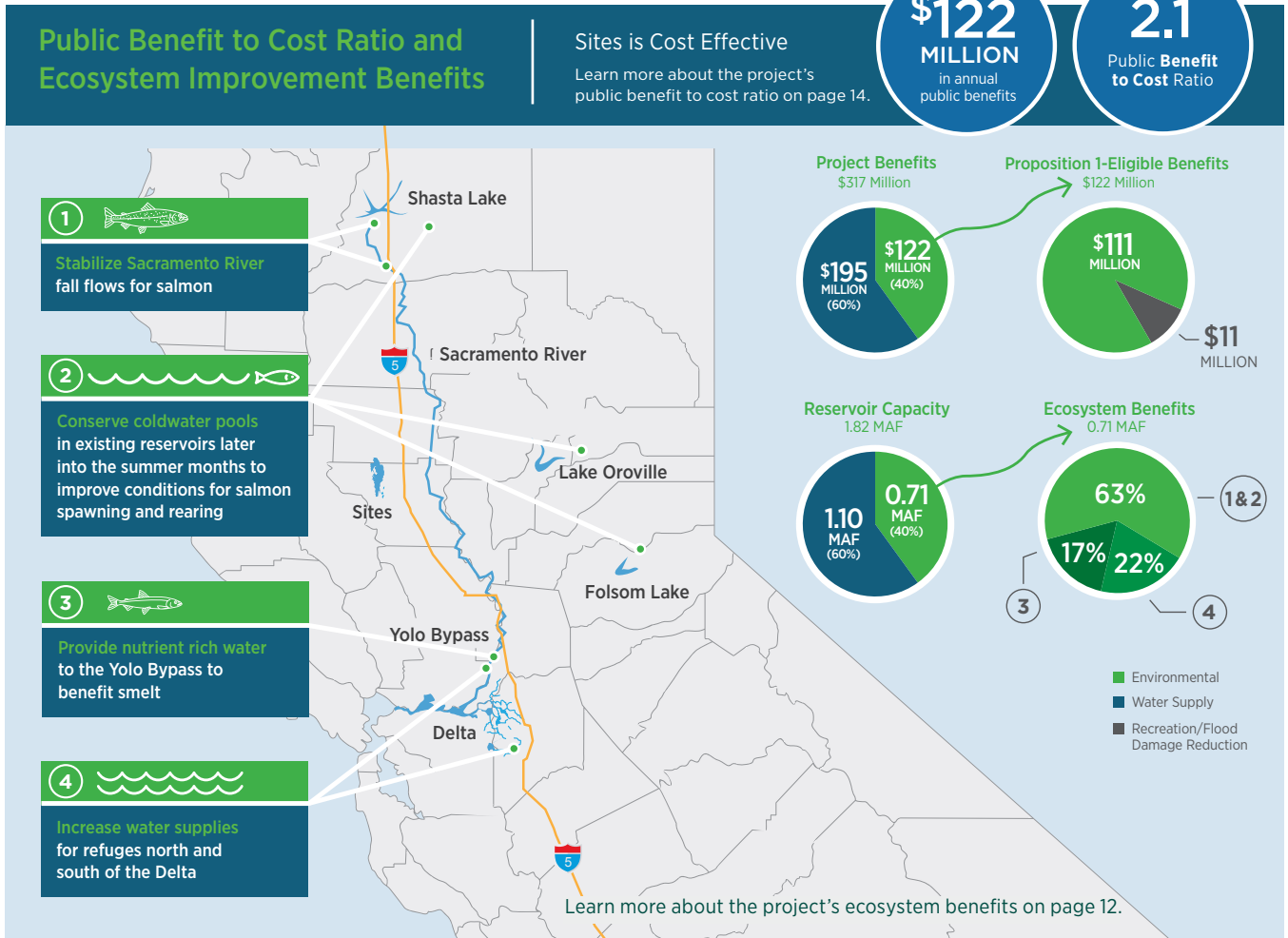
**Increase water supplies** for refuges  
and managed wetlands north and  
south of the Delta



**The time is NOW** to implement bold and strategic water storage options, in order to capture and deliver water for use where and when it's needed most for the environment, families, farms and businesses.

By investing in Sites, the California Water Commission has a unique opportunity to invest in the ecological health of the Sacramento River and Sacramento-San Joaquin Delta (Delta) and fulfill the will of California Voters.

Sites Works for California and Goes Above and Beyond California Water Commission Scoring Criteria in Four Essential Ways



### Relative Environmental Values

Sites provides substantial ecosystem benefits.

The project includes several **critical environmental enhancements**

Learn more about the project's Relative Environmental Values on page 15.

### Resiliency

Sites is resilient.

Sites provides **dedicated water storage** that can be adaptively managed to meet the **changing needs of the Sacramento watershed and Delta**, constituting significant benefits under anticipated future climate conditions

Learn more about the project's resiliency on page 17.

### Implementation Risk

Sites Project is feasible. The real risk lies in not implementing the Sites Project.

The project meets the California Water Commission criteria for **technical, economic, financial, and environmental feasibility**.

The Bureau of Reclamation's Feasibility Report independently validates the feasibility of implementing the Sites Project.

Learn more about the project's implementation risk on page 16.

### Why Sites?

Sites is a critical surface storage project that combines the public benefits of water storage with the ecosystem benefits of increased environmental flows in the Sacramento River.



# Overview

California has grappled with serious water supply reliability and ecosystem challenges for decades. Voters overwhelmingly approved Proposition 1 in anticipation of more frequent drought conditions, a smaller snowpack, heavier rain and flashier storms, aging water infrastructure and declining ecosystem conditions. The Sites Project offers the best opportunity for meeting the will of the voters by providing a reliable source of high-quality water to benefit the ecosystem and provide needed water storage.

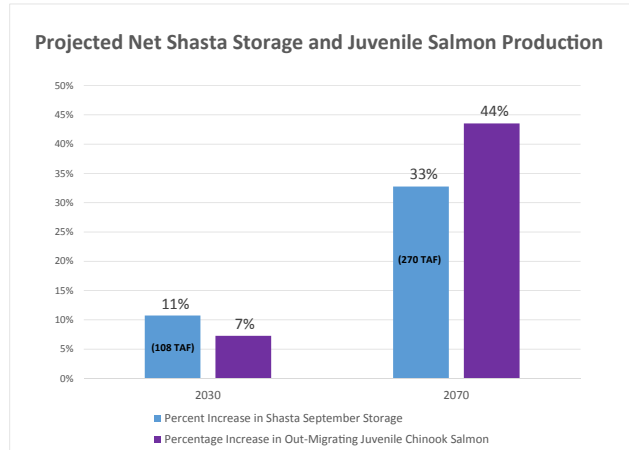
**The Sites Project Authority (Authority) proposes to provide the state with 710,000 acre-feet (40%) of the usable capacity in Sites Reservoir for ecosystem benefits.** When this water is managed according to California Water Commission requirements, the resulting long-term annualized water deliveries would provide:

Proposed 2030-2070 Average Ecosystem Benefits (Acre-Feet)		
Species Benefiting	Drier Years	Average Years
Chinook Salmon	190,000	125,000
Delta Smelt	29,000	39,000
Level 4 Refuge Supplies	19,000	33,000

The proposed operations intentionally provide substantial carry-over storage. This produces larger ecosystem benefits in dry and critical years. Additional benefits for the Water Commission's consideration include:

- **Flexibility:** Should future hydrologic and/or environmental conditions result in a need to provide different benefits than have been assumed in today's Relative Environmental Values (REVs), state's resource managers could reallocate the water to align with new priorities.
- **Partnership:** Through an effective partnership between the Authority and the state resource agencies managing the state's investment, even greater benefits can be achieved.
- **Management:** The Sites Project is being developed in accordance with the beneficiary-pays principle, which enables the state to retain management control over its investment for the life of the Sites Reservoir.
- **Federal Participation:** The Bureau of Reclamation (Reclamation) has been preparing studies to advance the Sites Reservoir. Their congressionally-mandated Draft Feasibility Report demonstrates a strong interest

to invest in the Sites Project, which would strengthen and enhance the state's investment. The federal level of participation will only be determined after the Authority has received a decision on the Water Commission's level of investment.



## Sites Project Authority

Sites is being developed by several Northern California public agencies who are motivated to sustainably build a local water management project that helps the state meet its overall water system needs. The Authority was formed on August 26, 2010 and is governed by a 12-member Board of Directors representing Sacramento Valley leadership in government and water management.

The Authority's Board of Directors is the lead agency working with regional stakeholders and water agencies statewide to advance the construction of the Sites Project. In January 2017, the Authority assumed lead agency responsibilities for ensuring compliance with the California Environmental Quality Act (CEQA) and is working with Reclamation, the federal lead agency, to ensure compliance with the National Environmental Policy Act (NEPA).

Together, the Authority, Reclamation and the California Department of Water Resources (DWR) are working in partnership to improve the operation of the state's interdependent water system.

Should the state or federal government elect to invest in the project's construction, in exchange for acquiring water which they would manage for environmental benefits, the Authority intends that the appropriate state and/or federal resource agency would become a partner. This agency would then have the same or equivalent status as the water agencies who participate and fund their share of the project's costs to improve their water supplies.

## Sites Eligibility for Proposition 1 Funding

The Sites Project complies with all eligibility requirements for WSIP funding and achieves California's co-equal goals of water supply reliability and ecosystem improvement.

WSIP Funding Requirement		Sites Project Compliance
	Eligible Applicant Type (CCR 6006(c)(1)(A)1a)	A Joint Powers Authority will own, govern, manage and operate the Sites Project (CWC 79759)
	Eligible Project Type (CCR 6006(c)(1)(A)1b)	The Sites Project is one of the surface storage projects identified in the 2000 CALFED Record of Decision (CWC 79751(a))
	Not affect a designated Wild and Scenic River (CCR 6006(c)(2)(A))	The Sites Project will not impact designated wild or scenic rivers
	Consistent with Agricultural and Urban Water Management Plans (CCR 6013(a)(1)(C))	Sites has submitted plans for all participating water suppliers that meet the size compliance threshold
	WSIP Program Cost Share < 50% (CCR 6006(c)(1)(A)2)	The proposed WSIP funding share for Sites is 32% of the total project capital cost
	The project's inclusion in an integrated regional water management plan (CWC 6003(a)(1)(A)2)	Sites is identified as a long-term regional priority in the Sacramento Valley Integrated Water Management Plan
	Monetized Ecosystem Benefits > 50% (CCR 6006(c)(1)(A)3)	The value of ecosystem benefits of Sites are > 90% of the total Proposition 1-eligible public benefits
	Provides measurable improvements to the Delta ecosystem or to the tributaries to the Delta (CCR 6006(c)(2)(B))	Sites provides measurable temperature and flow benefits for fish in the Sacramento River (the largest tributary to the Delta), many of which migrate through the Delta
	State Water System Improvement (CCR 6006(c)(2)(C))	In year 2030, the operation of Sites to release water adds an average 83,000 AF of water in Lake Shasta and 59,000 AF of September storage in Oroville
	Cost Effective (benefit cost ratio > 1) (CCR 6006(c)(2)(D))	Depending upon how the state values the public benefits, the Public Benefits Ratio ranges from 2.1 to 4.5 when using WSIP guidelines
	Provides net improvement in ecosystem and water quality conditions (CCR 6006(c)(2)(E))	Sites increases Chinook salmon populations, especially when compared to the no project alternative
	Advances the long-term objectives of restoring ecological health and improving water management for beneficial uses of the Delta (CCR 6006(c)(2)(F))	Sites benefits anadromous fish populations in Delta tributaries, provides pulse flows into the Yolo Bypass to increase food sources to improve Delta smelt growth and condition as they mature into adults and provides Delta outflows from June through September to support beneficial uses

*“Sites Reservoir offers a remarkable opportunity to reoperate California’s longest and largest river, the Sacramento, to provide multiple benefits for fish, farms and cities in an innovative manner. By partnering with the Sites Project Authority in the development of the Reservoir, the state would acquire water storage capacity and have management control over the resulting releases to ensure environmental benefits are achieved.”*

— Senator Dianne Feinstein

*“North and South, rural and urban, Republican and Democrat, California’s leaders agree on one thing: our state needs to invest in Sites Reservoir to meet the water supply challenges of today and the future. Sites provides more water per dollar invested than any other proposed project in the state, enough to supply millions of Californians for an entire year, while also creating environmental benefits and allowing smart recapture and reuse of water released from other reservoirs. Investing in Sites will fulfill the will of the 67% of Californians who supported Proposition 1 funding for water storage infrastructure, and I hope the California Water Commission recognizes the project’s diverse benefits.”*

— Congressman LaMalfa

*“Sites Reservoir is one of the most useful, cost-effective water infrastructure projects California could build. It is an ideal project that can provide water for agriculture, urban uses and the environment. The support for the Sites Project from a majority of the California Congressional delegation speaks to the statewide benefits of the project.”*

— Congressman Garamendi

*“As water and environmental managers have been forced to operate under a constant regulatory threat, Sites Reservoir will provide a critical tool for them to solve California’s toughest water problems collaboratively and productively.”*

— Senator Nielsen

*“Sites is an incredibly important project for the State of California that meets many of the public benefits required by the Water Bond.”*

— Assemblymember Gallagher

*“Building Sites Reservoir is an imperative part of the solution to help California meet our water supply challenges of today and the future. The operational flexibility provided by the unique project offers reliable long-term assistance to California’s complex water system.”*

— Assemblymember Dahle

## Project Location

Ideally located in California’s largest watershed, Sites includes a new 1.8 million acre-foot (MAF) reservoir offstream of the Sacramento River. The Sites Project will be situated on the west side of the Sacramento Valley, approximately 10 miles west of the rural town of Maxwell, in historic Colusa County. The Sacramento Valley is a unique region, known for its farming community, rich agricultural benefits, and natural beauty. The region has been considered ideal for offstream water storage since the 1950’s. Today, with climate change creating a new normal of changing future conditions (less snow-pack and flashier rainfall), **Sites is ideally located to maximize the diversion and storage of excess storm event flows in the Sacramento River.**

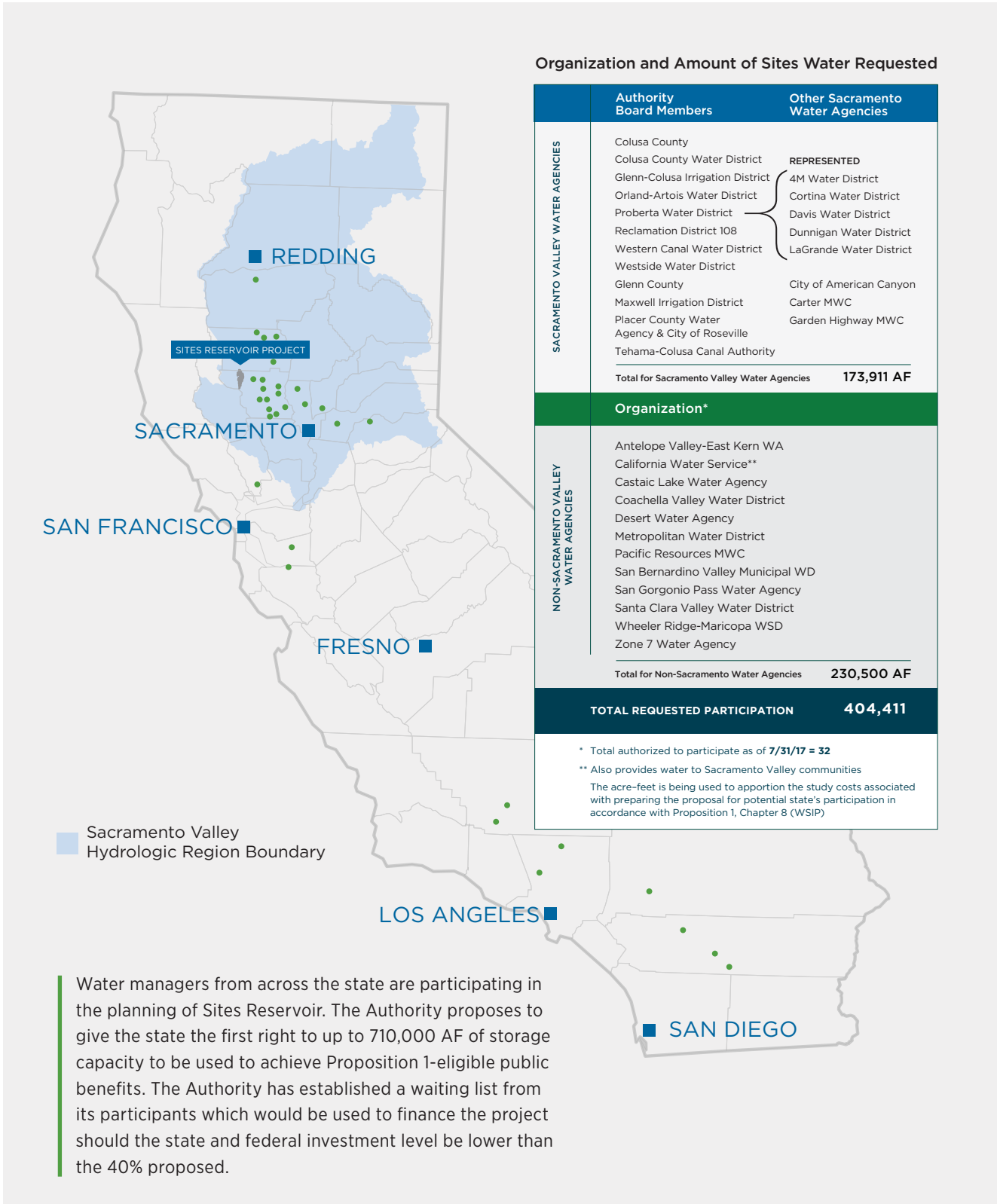


Sites is widely supported by local community leaders, residents, as well as state water managers and agencies from the Bay Area to Southern California. There is bipartisan support for the Sites Project, including the 43 members of California’s Congressional Delegation, 12 State Senators and 18 State Assemblymembers who have signed letters of support.

Participants in the Sites Project represent 39 of California’s 51 congressional districts. A full list of supporters of the Sites Project can be found in Attachment 6E to the Eligibility Tab of the WSIP application.

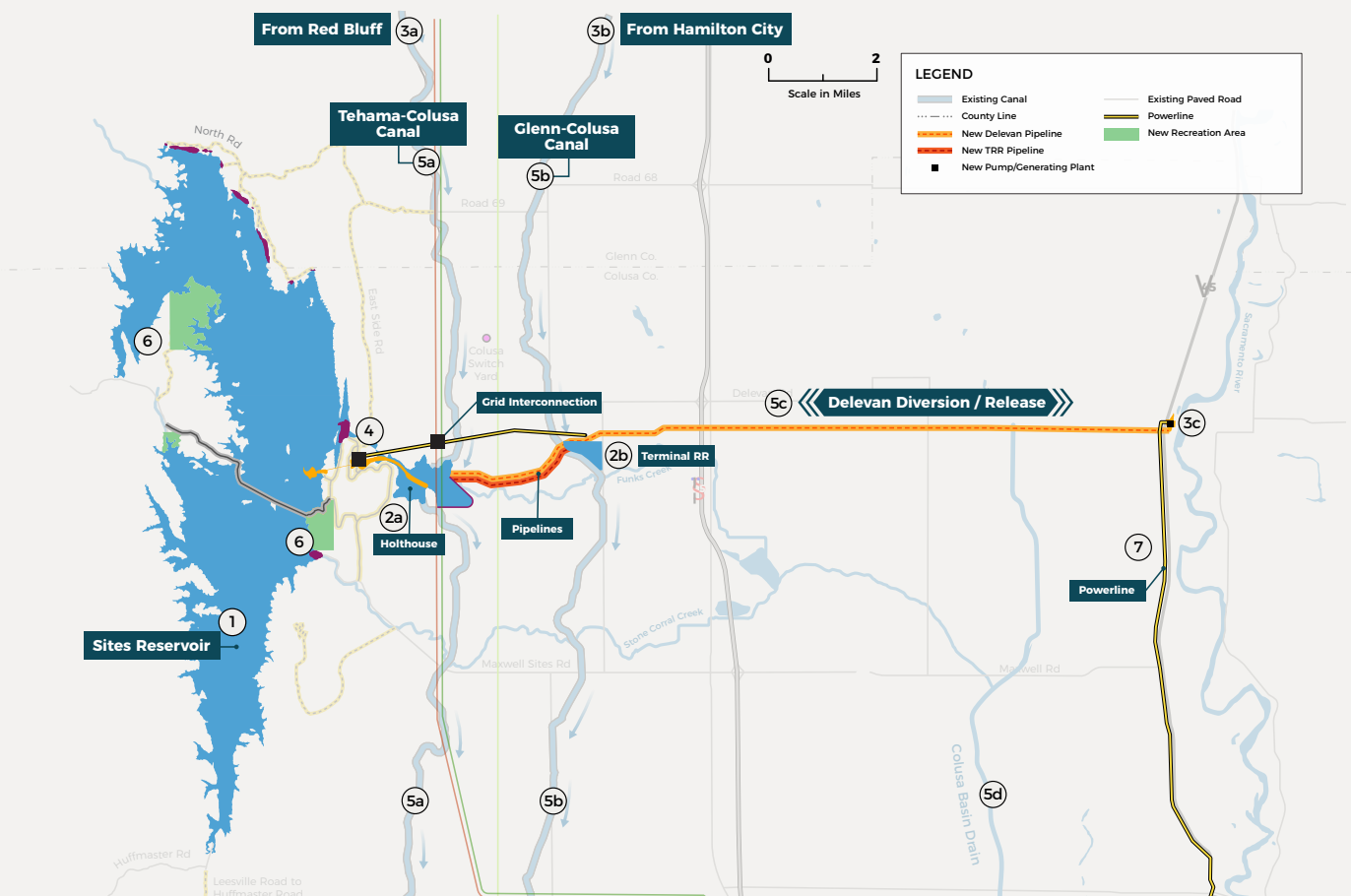
## Sites Statewide Project Participation

Sites is locally-led in partnership with the state and federal government, and is widely supported by water agencies and stakeholders from across the state.



# Sites Project Facilities

Sites is the modern infrastructure upgrade California needs to meet 21st century water challenges



## Sites Creates Jobs and will Enhance Region-Wide Economic Growth and Stability

Annual Employment	Approximate # of Jobs Added
<b>Short Term Employment</b>	
Direct Jobs: Construction	115
Indirect and Induced Jobs: Construction	390
<b>Total Direct, Indirect, and Induced Employment</b>	<b>505</b>
<b>Long-Term Employment: Direct Jobs</b>	
Operations and Maintenance	30
Recreation	15
<b>Total Direct Jobs</b>	<b>45</b>
<b>Long-Term Employment: Indirect and Induced Jobs</b>	
Operations and Maintenance	10
Recreation	2
<b>Total Long-Term Indirect and Induced Jobs</b>	<b>12</b>
<b>Long-Term Total Direct, Indirect and Induced Employment</b>	<b>57</b>

As an offstream reservoir, Sites avoids environmental impacts to aquatic species common with in-stream dam construction. Sites combines the public benefits of water storage with the ecosystem benefits of increased environmental flows in the Sacramento River during droughts, when water for the environment has the highest value. It ensures cold water is available during the late summer months to benefit fish. **With the construction of Sites Reservoir, the combined storage capacity of large reservoirs in the Sacramento Valley increases by about 15%.**



## Sites Project Facilities

Water managers have long acknowledged that by creating a new source of water and adding more flexibility in the system, Sites can help California succeed in implementing 21st century water solutions – to meet human AND environmental needs. To achieve this, the project includes the following facilities:

### 1 Sites Reservoir

The **1.8 MAF** offstream reservoir will require two main dams (Sites and Golden Gate) and nine saddle dams. The resulting reservoir covers **14,200 acres**. This reservoir will also improve local flood protection as witnessed by the February 18, 2017 storm event that flooded part of Maxwell and temporarily closed Interstate 5.

### 2 Regulating Reservoirs

- 2a. Holthouse is an expansion of the existing Funks Reservoir, which provides flow equalization for the Tehama-Colusa Canal. Holthouse Reservoir is sized to allow pump-storage operations to generate renewable energy. Water entering Holthouse Reservoir will be pumped into Sites.
- 2b. The Terminal Regulating Reservoir will be constructed at the Glenn-Colusa Irrigation District Canal for flow equalization with flows pumped into Holthouse.

### 3 Diversions

Water from the Sacramento River will be diverted for conveyance to Sites Reservoir from three locations:

- 3a. The existing Red Bluff Pumping Plant will divert water and convey it through the Tehama-Colusa Canal.
- 3b. The existing Glenn-Colusa Irrigation District Pumping Plant will divert water and convey it through the Glenn-Colusa Canal.
- 3c. A new Delevan Intake Pumping/Generating Plant will divert water into a new pipeline that will convey water into Holthouse Reservoir.

Both the Glenn-Colusa and Tehama-Colusa diversions currently utilize state-of-the-art fish screens and the Delevan Intake will include state-of-the-art fish screens to ensure fish friendly diversions.

### 4 Sites Pumping/Generating Plant

This facility will have a capacity of **5,900 cubic-feet per second** to fill Sites Reservoir. Water released from the reservoir will flow in the reverse direction through the plant and generate seasonal **hydropower** and daily pumped-storage to contribute to the state's renewable energy goals.

### 5 Conveyance

Water from Sites can be delivered throughout much of California. Releases from Sites include the following:

- 5a. The existing Tehama-Colusa Canal conveys water from the Red Bluff Diversion to Holthouse and deliver releases from Sites to local users south of the reservoir.
- 5b. The existing Glenn-Colusa Canal conveys water from the Hamilton City Diversion to the Terminal Regulating Reservoir and deliver releases from Sites to local users south of the reservoir.
- 5c. The new 13.5 mile Delevan Pipeline connects the new Sacramento River intake with Holthouse to convey water in either direction.
- 5d. To the Colusa Basin Drain and either to the Sacramento River or into the Yolo Bypass through Knights Landing Ridge Cut.

Integrating local infrastructure reduces costs and ensures the project complements the Sacramento Valley water system.

### 6 Recreation Areas

The project will include the construction of two new recreation areas on the shore of Sites Reservoir for camping, picnicking, hiking, horseback riding, boating and fishing, among other activities. A separate boat ramp will also be included.

### 7 Powerlines

Overhead powerlines will connect the three pumping/generating plants located at: Holthouse (Sites), the Terminal Regulating Reservoir, and Delevan to the state's electrical grid.

## Sites Project Operations

Sites Reservoir will be filled by diverting excess Sacramento River flows originating from unregulated upstream tributaries. Diversions can potentially occur in any month or water year type, but would be greatest in the winter months with an emphasis on capturing flows from storm events. If Sites existed during 2017's rainy spring, and had been completely empty, 1.8 million acre-feet (AF) of water could have been stored as of May 3, 2017 (DWR).

The Sites Project will operate in cooperation with Central Valley Project (CVP) and State Water Project (SWP) system facilities to produce a wide range of public and ecosystem benefits that can be flexibly managed to adapt to future changes, depending on need and priority. Up to 710,000 AF of capacity supports the storage and then release of critical water supplies dedicated to environmental needs.

Sites Reservoir will provide water benefits through two primary mechanisms: (1) water stored in Sites Reservoir can be released directly to the Colusa Basin Drain and Sacramento River, and (2) water stored in Sites Reservoir could be exchanged for water stored in Shasta Lake, Folsom Lake, or Lake Oroville and Clair Engle Lake (Trinity).

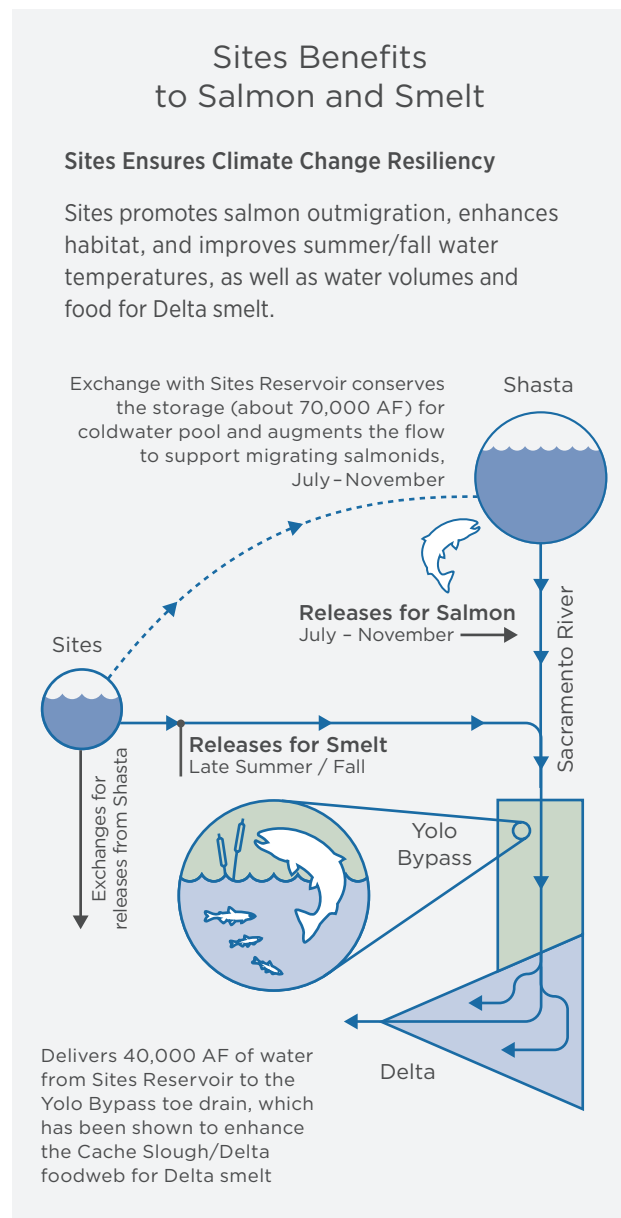
**Had Sites been operational during the 2017 rainy spring season, an additional 1.8 million acre-feet of water could have been stored as of May 3, 2017.**

Sites Reservoir can be used to reduce releases and increase storage in other reservoirs with downstream habitat critical to fish, while still meeting requirements for minimum instream flow objectives, Sacramento River temperature requirements, and Delta salinity control assigned to the SWP and CVP. Through this reduction in releases, storage can be conserved in Trinity Lake, Shasta Lake, Lake Oroville and Folsom Lake to significantly increase regional and system-wide operational flexibility.

**Sites provides significant environmental benefits during dry and critical water year types, and especially during extended drought periods, to benefit coldwater releases for salmon. This benefit also applies to Folsom and Oroville coldwater pools.**

Diversion of excess Sacramento River flows to Sites Reservoir will only take place when flow monitoring indicates that sufficient bypass flows are present in the Sacramento River due to storm event flows.

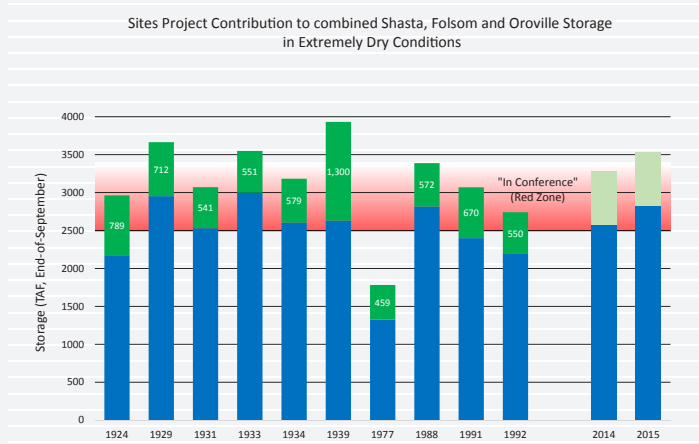
**Sites will capture high, excess runoff in a future with less snowpack and higher temperatures. Approximately 210,000 AF of Sites water will be available annually for environmental use as a long-term average supply.**



Sites will be operated to provide a variety of environmental benefits that will be managed by the state to provide water for ecosystem and water quality purposes. This pool of dedicated water will be managed to improve coldwater conservation storage, augment river flows during critical periods for fish migration, increase flows through certain watercourses and/or facilities (such as the Yolo Bypass), improve water quality and/or enhance habitat restoration. Collectively, the state and the Authority will manage a sizable supply of water to address real-time needs and achieve both intermediate and long-term goals.

Sites Reservoir water will also be used to supplement existing municipal and agricultural supplies for use in the Sacramento Valley and south of the Delta. These operations will be conducted in cooperation with CVP and SWP operations.

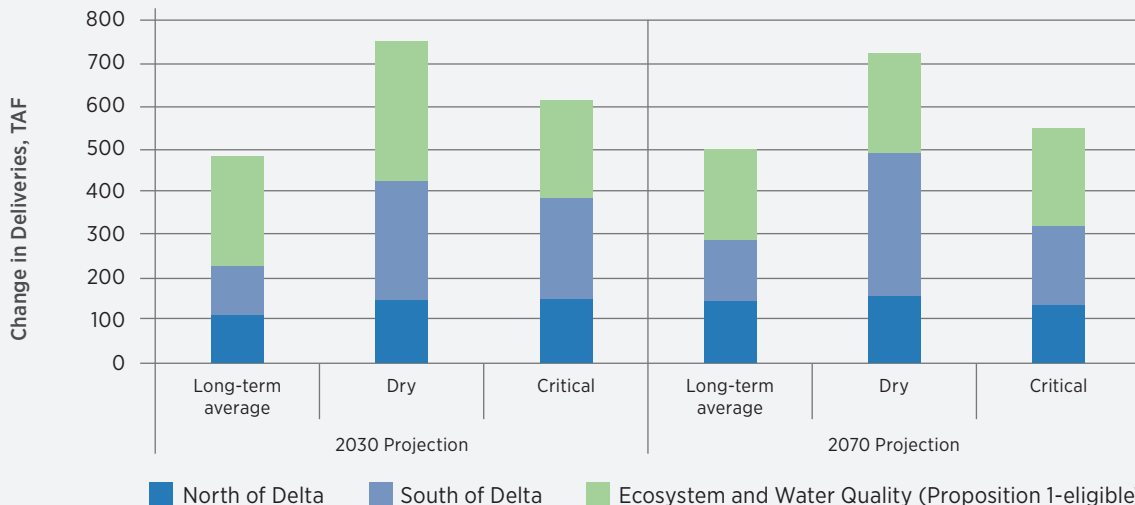
**Sites is particularly beneficial during dry and critical years and extended drought periods, increasing overall water supplies despite climate change impacts.**



During droughts, Sacramento Valley reservoir operations become severely constrained when combined storage levels of Shasta, Folsom and Oroville are reduced to approximately 3 MAF. The addition of Sites Reservoir adds approximately 15% additional storage for the Sacramento Valley. Using the 2030 WSIP hydrology, when drought conditions occur, Sites Reservoir would provide relief during that year for both listed native fish species and for water agencies. Approximately 700,000 acre-feet of the Sites water would carry over into the next year should drought conditions continue.

### Sites Reservoir Provides Water for Public and Non-Proposition 1-Eligible Public Benefits in All Water Year Types

Sites Reservoir Increase in Water Supply



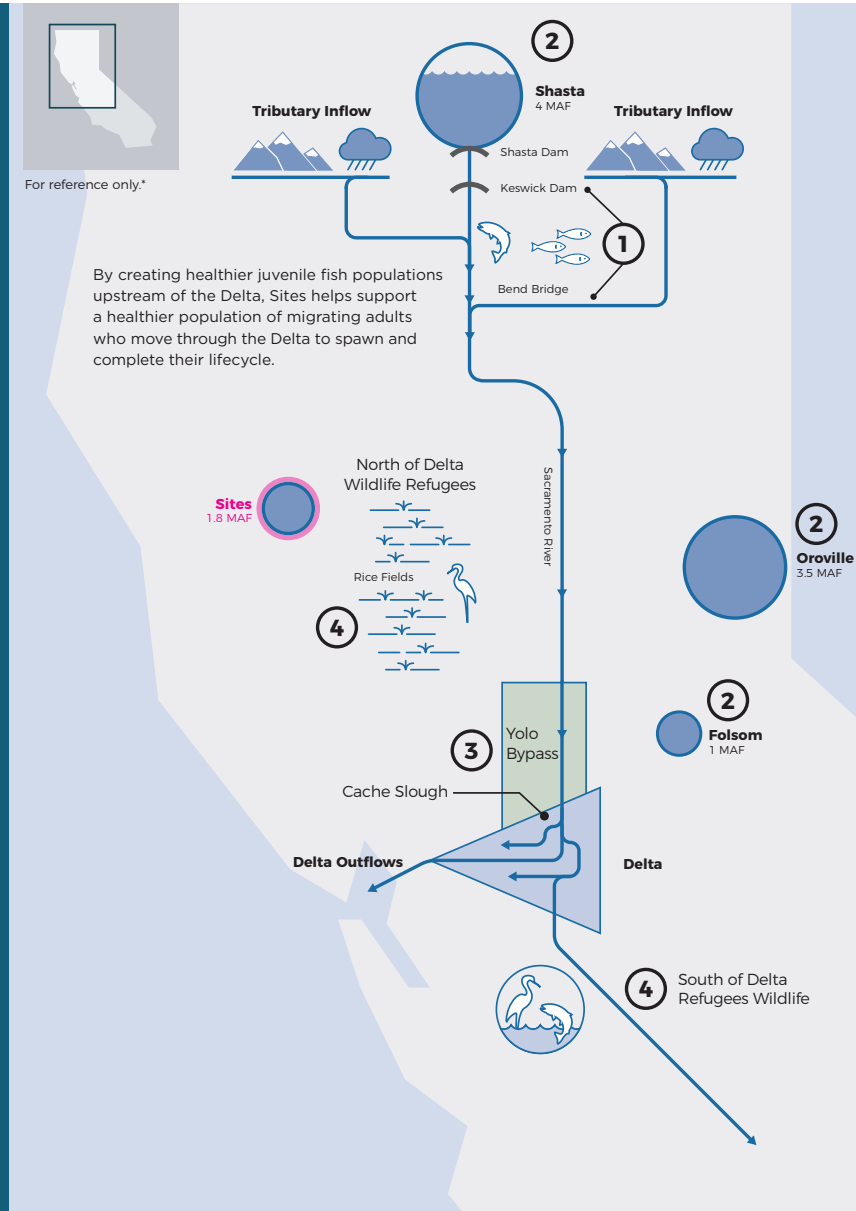
# Proposition 1-Eligible Public Benefits

Proposition 1 allows taxpayer resources to be used for specific public benefits the state can invest in. The state's investment in the Sites Reservoir can be used to achieve the following Proposition 1-eligible benefits.

## Ecosystem Improvements

The Authority will partner with the California Department of Fish and Wildlife (CDFW) and State Water Resources Control Board (SWRCB) to deliver an annual supply of water that would be directed to meet the highest priority water needs in the state.

- 1 The greatest ecosystem benefit will be improved temperatures and flows in the Sacramento River between Keswick Dam and Bend Bridge. This portion of the Sacramento River is critical habitat for Chinook salmon (including the endangered Winter Run) and Steelhead. Water released from Sites Reservoir will meet existing SWP and CVP obligations to enable additional coldwater storage at Shasta and Oroville above critical fish habitat. This storage will provide better temperature control and supplemental flows to support fish migration and reduce egg mortality (i.e. redds).
- 2 Sites will allow for increased coldwater pool storage levels and more reliable coldwater pool storage in existing reservoirs later into the summer months, improving conditions for native fish in several ways:
  - Increased Shasta Lake storage levels provide additional coldwater pool storage in below normal, dry, and critical water-year types.
  - Improved water temperature suitability in Lake Oroville for juvenile steelhead and spring-run Chinook salmon over-summer rearing and fall-run Chinook salmon spawning in the lower Feather River and augmented flows in the lower Feather River to minimize redd dewatering, juvenile stranding and isolation of anadromous salmonids.
  - Additional coldwater pool storage in Folsom Lake benefits juvenile steelhead summer rearing and fall-run Chinook salmon spawning in the lower American River.
- 3 In a distinctly unique ecosystem action, Sites Reservoir will provide two pulse flows of at least 400 cubic feet per second over a two to three week period into the Yolo Bypass. These pulses will be adaptively managed by the state's designated resource agencies to push water high in phytoplankton and zooplankton directly into the Cache Slough area, the only place in the Delta where the endangered Delta smelt population is increasing. The resulting increase in desirable food sources should improve Delta smelt growth and populations as they mature into adults.



- 4 Sites water will enhance ecosystems for bird populations utilizing the Pacific Flyway during annual migration periods. Additionally, up to 50,000 AF of water will be provided to assist in meeting incremental Level 4 wildlife refuge water needs north and south of the Delta. This water will improve habitat conditions for a number of species, including giant garter snake, tricolored blackbird, and migrating waterfowl.



## Additional Ecosystem Improvements (not monetized)

The Sites Project will provide additional benefits that have not been monetized due to lack of sufficient, tangible data and generally-accepted models that could reasonably estimate benefits to specific species. The benefits for Chinook Salmon in the Sacramento River watershed between Keswick Dam and Red Bluff (the area captured in SALMOD models) were monetized, but benefits to salmonids in the Feather River and American River were not monetized. Coldwater and additional flows made possible by Sites will also benefit other species of fish in the Sacramento River watershed, including steelhead and sturgeon. **Therefore, the net environmental benefits Sites can provide are even greater than those provided in the WSIP application criteria.**

## Additional Proposition 1-Eligible Public Benefits

**Water Quality (Not Monetized).** The Sites Project meets SWRCB water quality priorities by providing improved temperature and groundwater conditions. The project will also provide additional water supply to agencies serving disadvantaged communities. These benefits have not been monetized as water quality benefits. However, the temperature improvements benefit anadromous fish and are included in our analysis of coldwater pool benefits. Further, participants in Sites Reservoir are expected to use their water to address the undesirable effects by complying with the Sustainable Groundwater Management Act (SGMA), but the magnitude of these improvements is still being defined.

**Flood.** The local area downstream from the project is prone to floods, including portions of Maxwell, Williams and Colusa. Even though these are seasonal streams, the Funks Creek and Stone Corral Creek watersheds are a key source of flooding during major storms. Construction of the Sites and Golden Gate Dams will reduce the frequency of flooding, reduce river levels to avoid flood events and relieve pressure on local levees. Had Sites been operational during the 2017 spring rainy season, runoff from local creeks and streams could have been captured and stored, reducing high flows, preventing overtopping and avoiding flood waters that caused significant economic damage in

**The Sites Project advances California's objectives of restoring ecological health in the Delta and improving water management for beneficial uses.**

Colusa County and temporarily closed Interstate 5, which is a critical artery for commerce.

**Emergency Response (not monetized).** The Authority is committed to working with state and federal water managers and emergency personnel to provide water to support emergency events such as, but not limited to, firefighting, drought relief and Delta levee failures. Instead of dedicating a volume of water that may not be called upon by the state until at least a one in ten-year event (or longer) occurs, the Authority proposes that should water from Sites Reservoir be used to aid in responding to or recovery from an emergency, that repayment would occur through a mutually-acceptable exchange or transfer of water. As such, this benefit was not monetized and the Authority is not requesting Proposition 1 funding for this purpose.

**Recreation.** Two new recreation areas and a boat ramp will be created on the shore of Sites Reservoir. These areas will provide opportunities for boating, camping, hiking and equestrian use and have been monetized. Sites Reservoir will also improve water levels in existing reservoirs (e.g. Shasta, Oroville and Folsom) to support water-based recreational activities, but these benefits have not been monetized.

## Additional Considerations

**Operational Flexibility (not monetized).** Sites Reservoir can be operated to achieve a wide variety of environmental and water quality objectives by operating to different strategies or priorities. This application proposes an operational strategy that aligns with the Water Commission's regulations by focusing on specific ecologic improvements in the Delta by providing benefits to native anadromous fish and in-Delta fish species. In the future, this operational strategy may be changed to reflect new or higher priorities.

Further, Sites reservoir will increase today's storage capacity in the largest reservoirs in the Sacramento Valley by 15%. Once the reservoir is operable, the state's water managers have the ability to operate differently – for both environmental and human uses – knowing there is additional capacity in the system. The ability to adaptively manage the reservoir releases to achieve different benefits and the benefits associated with the increase in system-wide storage capacity have not been monetized.

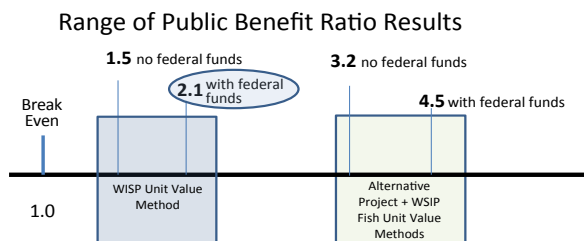
**State’s Operational Control (not monetized).** The Authority proposes that the agencies with delegated authority to manage the state’s investment would also have management control. This would be in the planning and also in the day-to-day releases needed to adapt to current and forecast conditions.

**Net Benefits.** The resulting ecosystem benefits were developed using the CalSim-II model as provided by the Water Commission for use in preparing this application. This model incorporates environmental, water quality, and water rights compliance obligations. Further, the Authority has added a simulated pulse flow criterion to be more protective of migrating juvenile salmonids and a criterion to ensure in-Delta water quality compliance requirements are achieved. The benefits presented in this application represent the difference between the “with project” from the “without project” to reflect the project’s net benefits.

### Sites Economic Benefits

**Benefit-Cost Ratio:** The Sites Project has been evaluated using two different and independent perspectives in conformity with the Water Commission’s WSIP regulations and in accordance with Reclamation’s federal procedures required for congressional authorizations. Their resulting Benefit-Cost Ratios are 1.52 and 1.72, respectively, which are both well above the minimum 1.0 threshold used as the conventional investment decision-making criterion. The difference is attributable to their different future climate change scenarios and use of different unit benefit values reflecting different value propositions.

**Public Benefit Ratio (PBR):** The state’s investment in the Sites Project has been evaluated using two different WSIP regulation approved monetization approaches – the alternative cost method and adjusted WSIP provided unit benefit values. Each approach was applied to only the project’s readily monetizable benefits under both “with” and “without” federal participation scenarios. Their corresponding resulting PBRs results are provided in the following figure:



### Public Benefit Ratio Using Two Different Benefit Monetization Methods

The higher range PBRs reflects the high cost and scarcity of feasible major infrastructure development projects to obtain new water supplies. The alternative cost method also does not fully account for potential economies of scale benefits that large-scale and multi-purpose storage projects such as Sites can achieve. Using more conservative adjusted WSIP unit benefit values (based on the water transfer market) the resulting PBRs are correspondingly lower. Neither of these methods included the non-monetized benefits, some of which are significant.

Proposition 1 Eligible Benefit (in \$M)		Annual Benefits (\$M)
	Ecosystem Improvement	\$111
	Water Quality	N/A
	Recreation	\$7
	Flood Damage Reduction	\$4
	Emergency Response	N/A
Proposition 1 Non-Eligible Benefits (in \$M)		
	Water Supply	\$175
	Hydropower	\$19
<b>Total Monetized Benefit Annually</b>		<b>\$317</b>
<b>PUBLIC BENEFIT RATIO: 2.1 to 4.5</b>		

**Beneficiary-Pays-Principle:** Each participant pays their proportionate cost-share based on their assigned share of the reservoir’s capacity over the project’s life using their storage. Each participant decides how to use their storage – hold it, release it and/or exchange it – within the parameters established by Agreements. To accomplish this:

The benefits of the Sites Project far outweigh the costs. Sites is projected to cost \$4.7 billion (2015 dollars), with an estimated \$317 million in benefits as an annual return on investment.

Continues on page 16 »

## Relative Environmental Values

Benefits delivered by the Sites Project address the Ecosystem and Water Quality Priorities identified by CDFW and the SWRCB. Summary of Priorities:

Ecosystem	#	Priority	Benefit
	1	<b>Cold water for salmonid eggs and fry</b>	<b>Improved temperature downstream of Shasta, Oroville and Folsom</b>
	2	<b>Provide flow for rearing and juvenile migration</b>	<b>Additional water from Shasta and Oroville to be released for migrating juveniles</b>
	3	<b>Avoid dewatering redds and stranding juveniles</b>	<b>Release flows from additional storage in Shasta, Oroville and Folsom to stabilize flows and preserve redds</b>
	4	<b>Improve ecosystem water quality</b>	<b>Provide colder water temperatures in the Sacramento, Feather and American Rivers</b>
	5	<b>Improve dissolved oxygen and colder water</b>	<b>Provides colder water in the Sacramento, Feather and American Rivers</b>
	6	Increase attraction flows during migration	Not included, but operations could be reprioritized for this purpose
	7	Increase Delta outflow	Not monetized. June to October Delta outflow increased by 4% under 2030 conditions.
	8	Maintain or restore groundwater and surface water interconnection	The current groundwater to surface water interconnection will not change with operation of Sites Reservoir
	9	<b>Enhance flow regimes for riparian and floodplain habitat</b>	<b>Release of water to the Yolo Bypass will improve riparian habitat. Augmented flows to preserve redds will lead to seasonal improvement in floodplain habitat.</b>
	10	<b>Improve floodplain Inundation</b>	<b>Benefits additional flow to Yolo Bypass</b>
	11	<b>Enhance diversity of habitat for fish and wildlife</b>	<b>Enhanced habitat in the Sacramento River, Delta, and wildlife refuges</b>
	12	Eliminate barriers to migration	As an offstream reservoir, Sites does not create or remove a barrier to fish migration
	13	Remediate inadequately screened diversions	State-of-the-art fish screens were previously installed on the Sacramento River at the Tehama-Colusa Canal and Glenn-Colusa Canal
	14	<b>Provide water to State and Federal Wildlife Refuges</b>	<b>Up to 50 TAF/yr to refuges and privately managed wetlands</b>
	15	<b>Implement invasive species management</b>	<b>Not monetized. Mitigation areas will manage/control invasive species.</b>
	16	<b>Habitat for commercial, educational, etc. species</b>	<b>Enhanced habitat for waterfowl and gamefish (salmon, steelhead, sturgeon)</b>
<b>Water Quality Priorities</b>			
	1	<b>Temperature</b>	<b>Operation of Sites Reservoir with the CVP/SWP in the Sacramento, Feather, and American Rivers will increase the volume of coldwater that can be released to benefit fish</b>
	2	Dissolved Oxygen	Operation of Sites Reservoir does not improve dissolved oxygen in water bodies deemed to be impaired by the State Water Resources Control Board
	3	Nutrients	Operation of Sites Reservoir does not change the amounts of nitrogen introduced into the waterways
	4	Mercury	Construction and operation of Sites Reservoir does not change the amount of mercury in the Sacramento, Feather or American Rivers
	5	<b>Salinity</b>	<b>Not monetized. If Sites were operable in 2015, benefits could be provided. However, based on the WSIP requirements, any benefits will erode by 2070 due to effects of climate change.</b>
	6	<b>Groundwater</b>	<b>Sites Reservoir will reduce undesirable results in groundwater</b>
	7	<b>Delta Tributary Flows</b>	<b>Operation of Sites Reservoir will not provide flows that resemble natural hydrograph patterns. However, it will provide increased flows, especially in dry and critical water year types, as well as provide pulse flows for benefits in Yolo Bypass.</b>
	8	Improve required water self-reliance	Sites Reservoir incrementally improves regional water self-reliance by helping reduce demand on the Delta watershed by developing local supplies in the west side of the Sacramento Valley.
	9	<b>Basic Human Needs</b>	<b>Water from Sites will be provided to disadvantaged communities</b>

**Bold type** = Public benefits offered by the Sites Project

## Beneficiary-Pays-Principle (con't)

- **Capital costs:** The participating water agencies will finance their proportionate shares of capacity and Proposition 1 funds will cover the state's share of the initial capital.
- **Annual Costs (Operations, Maintenance and Replacement):** The participating water agencies will pay their proportionate share based on releases either at Holthouse or Delevan as appropriate. The state's share of these costs can be provided from revenues generated from at least two sources: (1) after water has been released from a reservoir to provide at least one Proposition 1-eligible benefit, a small portion of this water could be recaptured and then sold under a long-term contract and/or (2) the state's share of water stored in the reservoir could be used to generate electricity for third annual party sales through the pumped-storage operations. Should the state's revenue exceed the applicable annual costs, the surplus could be used to provide additional public benefits within the Sacramento Valley and/or Delta.

## Implementation Risk

The implementation risk of the Sites Project has been characterized in accordance with the WSIP methodology in this application. Further, an independent analysis of the Project's feasibility using federal guidelines is available in the Draft NODOS Feasibility Report. Although the federal methodology differs from the WSIP methodology (e.g., different climate change assumptions), the results of the two studies are generally consistent. This independent analysis of the project by Reclamation found the project to be feasible based on available information.

**Sites offers essential benefits under future conditions.**

**Technical Feasibility:** Reclamation, DWR and the Authority have independently reviewed the engineering for the Sites Project facilities and considered them all feasible for construction. The development of cooperative operations that cause "no harm" to SWP or CVP operations or senior water rights is currently underway in a collaborative process. The operations modeled in this application are restricted to the diversion of excess Sacramento River flows. Additional protection for migrating salmonids that restricts diversions during pulse flow periods are also included in the modeling to ensure that the public benefits result in net ecosystem improvement.

**Economic Feasibility:** The annualized benefits provided by the project significantly exceed the annualized total project costs – even when only those benefits that could be monetized are included and even when conservative estimates of unit values are applied (refer to economics section).

**Financial Feasibility:** There are currently 32 water agencies throughout the state that are participating in the development of the Sites Project. Of this, 28 agencies have requested to participate at a level that would allow them to receive water supply benefits. For planning purposes, the Authority has been using 500,000 acre-feet as the average long-term annualized volume the Sites Reservoir could produce. To date, these participants have requested 404,411 acre-feet (80%). Should the state elect to participate in the 710,000 acre-feet of reservoir capacity (40%), the participant's requests will be reduced proportionately (i.e. currently, there is a waiting list to receive water supply benefits).

Congress has authorized federal participation in up to 50% of a locally-sponsored water storage project in exchange for acquiring water benefits for the environment and water quality. Reclamation's Draft Feasibility Report, determines there is a federal interest in participation for up to 14% of the project's cost. A water storage project, having local, state, and federal participation demonstrates a strong level of financial backing and solid financial feasibility.

**Operational flexibility and adaptive management are key components of the Sites Project, contributing to environmental benefits and ecosystem protection.**

**Environmental Feasibility:** When filled, Sites Reservoir will convert what has predominately been lands used for livestock grazing to create a new aquatic ecosystem. Sites will provide a significant new source of water to support existing and struggling aquatic and riparian ecosystems, **conserve** coldwater pools in upstream reservoirs for salmon and increase plankton for native estuarine fish. The Sites Project will minimally impact existing rivers and channels and where environmental impacts do exist a scientifically-based adaptive management program and mitigation and monitoring strategy will be implemented to protect the ecosystem.



As the CEQA and NEPA lead agencies, respectively, the Authority and Reclamation released a Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) that describes the impacts to environmental and cultural resources that would be reasonably expected to occur with the development of the Sites Project. Impacts that are significant and unavoidable are described within the EIR/EIS. While the project creates substantial ecosystem benefits, some significant and unavoidable impacts will remain after mitigation. These impacts include impacts to the community of Sites, existing golden eagle habitat, historical and cultural resources, disturbance of a dedicated cemetery, and conversion of prime farmland and native rangeland. The Authority is working with landowners, communities, Tribes, and government agencies to develop relocation and mitigation plans to mitigate these impacts.

**Sites creates and protects aquatic and riparian habitat, improves ecosystem conditions, provides additional flows during critical periods for fish, and secures water for consumptive use.**

## Sustainable Groundwater Management

In the DWR SGMA Program’s Water Available for Replenishment Report (2017), it is estimated that 48% of the water that could be used to replenish California’s groundwater will need to come out of the Sacramento River. Both the storage and the conveyance systems associated with Sites Reservoir are well suited to staging and conveying water to areas where groundwater depletion is producing undesirable effects. Providing surface water at a controlled rate and in seasons where the opportunity for in lieu of use and infiltration can be maximized is essential to SGMA compliance. In addition, Sites participants include agencies that are deeply invested in groundwater management in the Sacramento Valley, Bay Area, Central Valley, and Southern California. For example, Colusa County is investing in 10 TAF/year specifically to support SGMA compliance.

## Resiliency

Because of climate change, some public benefits decline slightly and others increase between 2030 and 2070 for the operations modeled under current WSIP application

requirements. One of the most beneficial features of Sites is that it provides dedicated storage of water for environmental purposes that can be repurposed for the highest priority public benefit as future conditions change.

The benefits to anadromous fish from the Sites Project become even more valuable over time. Without Sites, the population of Chinook salmon would decline drastically due to climate change. Modeling results for Sites Reservoir demonstrate the ability of the project to offset some of the decline in population due to rising temperatures, improving the resiliency of salmon populations in the face of climate change.

## Integration with the State’s Water System

The Authority is working with Reclamation and DWR to develop cooperative operations between Sites Reservoir, the SWP and the CVP that will improve water supply reliability throughout the state’s integrated water system.

### The operational scenarios are designed to concurrently:

- maximize water supply reliability
- improve Delta water quality
- provide seasonal flexible hydropower storage and daily pumped-storage
- increase survival of anadromous fish that migrate through the Delta. Provide seasonal nutrient-rich food for Delta smelt.

Sites Reservoir is also an important regional initiative and was identified as a long-term regional priority in the Sacramento Valley Integrated Water Management Plan due to its water supply reliability and flood protection benefits.

Finally, the Sites Project will also increase the value of projects that may be implemented in the future. One example is the River Arc Project on the American River under consideration by Authority members Placer County Water Agency and the City of Roseville, in coordination with the Sacramento County Water Agency and City of Sacramento. The River Arc Project will improve water supply reliability and groundwater quality in the lower American River watershed. Constructing Sites Reservoir can considerably enhance the potential benefits of this project and other future groundwater storage projects that improve groundwater sustainability in the Sacramento Valley.

## Potential for Expansion

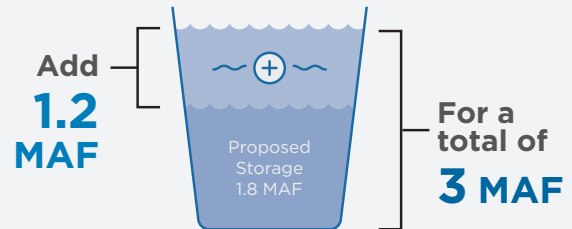
The Sites Project can be expanded to provide additional public and non-Proposition 1 eligible benefits. The most likely near-term expansion includes the ability to divert floodwaters into storage from the Colusa Basin Drain. This will provide water managers with the ability to divert an additional 40 TAF annually of excess river flows.

The Draft NODOS Feasibility Report, which evaluated the development of the “Colusa Basin Complex” could include raising the Sites Reservoir dams and constructing dams with Sites Reservoir to increase storage in existing SWP and CVP reservoirs and also improve the conditions downstream from these reservoirs for fish.

### Engineered for Growth, Flexibility, and Reliability

#### Storage

Potential expansions of the Sites storage and delivery infrastructure will

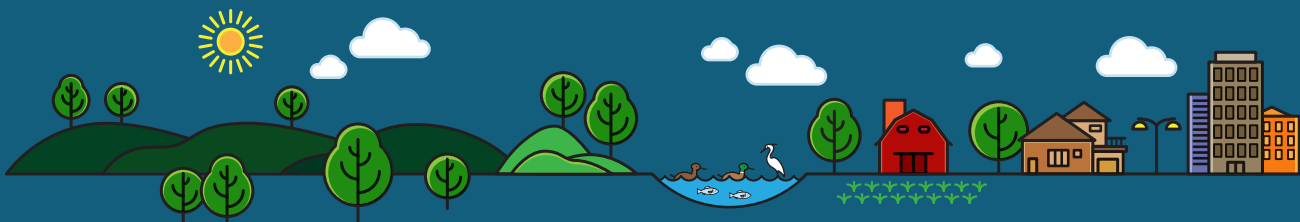


of water for the



environment and human use.

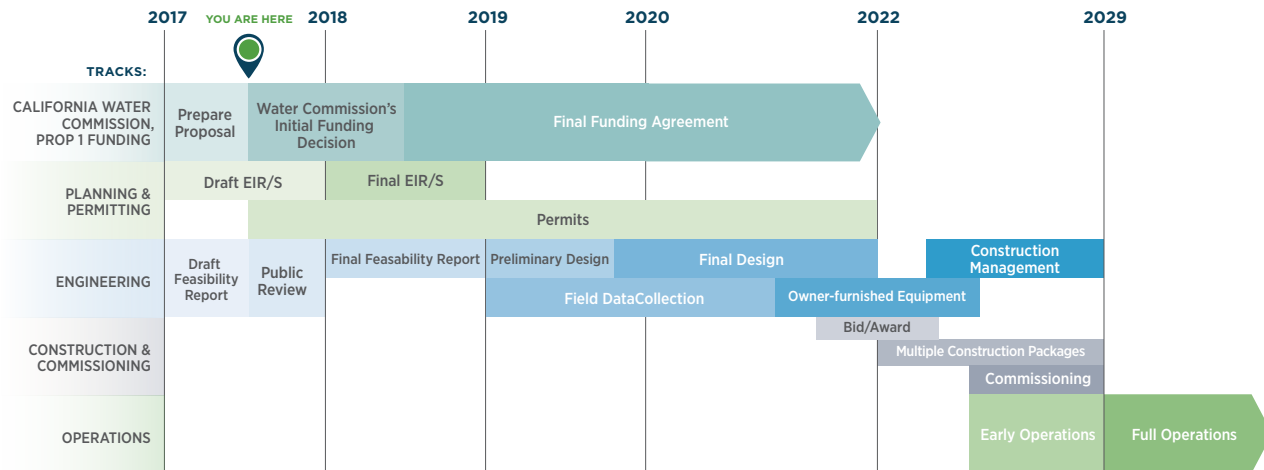
Sites is a smart water storage investment for California’s future. The California Water Commission has an opportunity to improve the Delta ecosystem, enhance the flexible operation of our state’s water system and fulfill the will of California voters.



WATER FOR THE ENVIRONMENT, FAMILIES, FARMS AND BUSINESSES



## Sites Project Schedule



## WSIP Application Reference Guide

Executive Summary Section	You Can Find More Information At
Eligibility for Proposition 1 Funding	Eligibility Tab and Program Requirements Tab
Letters of Support	Eligibility Tab – Attachment A6E Support Letters
Project Facilities	Eligibility Tab – Attachment A3 Project Description and Attachment A4 Drawing Package
Project Operations	Benefit Calculation, Monetization and Resiliency Tab – Attachment A2 Operations Plan
Benefits	Benefit Calculation, Monetization and Resiliency Tab – Attachment A3 Physical and Monetized Benefits and Attachment A5 Documentation
Costs	Benefit Calculation, Monetization and Resiliency Tab – Attachment A8 Basis of Estimate Report
<b>Public Benefit Ratio</b> and Benefit Cost Ratio	Benefit Calculation, Monetization and Resiliency Tab – Attachment A9 Benefit Cost Ratio
Ecosystem Improvements	Physical Public Benefits Tab – Attachment A1 and A2 Ecosystem Priorities Benefit Calculation, Monetization and Resiliency Tab – Attachment A3 Physical and Monetized Benefits
Other Proposition 1 Benefits	Physical Public Benefits Tab
Unmonetized Benefits	Benefit Calculation, Monetization and Resiliency Tab – A7 Non-Monetized Benefits
<b>Relative Environmental Values</b>	Physical Public Benefits Tab – Attachment A1 and A2 Ecosystem Priorities, Attachment A1 and A2 Water Quality
<b>Implementation Risk</b>	Feasibility and Implementation Risk Tab Draft Environmental Impact Report/Environmental Impact Statement: <a href="http://sitesproject.org/information/DraftEIR-EIS">http://sitesproject.org/information/DraftEIR-EIS</a> Feasibility Report: <a href="https://www.sitesproject.org/information/FeasibilityReport">https://www.sitesproject.org/information/FeasibilityReport</a>
Sustainable Groundwater Management	Eligibility Tab – Attachment A6C Groundwater
<b>Resiliency</b>	Benefit Calculation, Monetization and Resiliency Tab – Attachment A12 Uncertainty Analysis
Integration with State Water System	Benefit Calculation, Monetization and Resiliency Tab – Attachment A2 Operations Plan
Schedule	Eligibility Tab – Attachment 3 Schedule

Sites Works for California by providing a solid return on the investment of public dollars for both the state to produce environmental benefits beyond what is achievable today and for public water agencies seeking to improve their water supply reliability.

Sites Reservoir will give California its first major reservoir that dedicates a significant capacity (710,000 acre-feet or 40%) to ensure the Proposition 1-eligible benefits that were approved by the voters are achieved. This innovative new partnership will ensure that water for environmental purposes is directed to the most critical needs and highest priorities – both today and into an uncertain future.

Sites:

- Is a feasible and cost-effective project that will advance the long-term objectives of restoring ecological health and improving water management for beneficial uses of the Delta.
- Is resilient by providing long-term operational flexibility for both environmental and water supply reliability purposes, that will also improve the overall operation of the state's water system.
- Will be operated to provide additional water during droughts by diverting storm-generated runoff in the Sacramento River, when there is minimal impact to the environment, to then provide reservoir releases into the Sacramento, Feather and Lower American Rivers at times that are critical to the survival of native fish species.

## Project Benefits



Enhanced water management flexibility



Improved environmental flows



Increased water supply reliability



Ecosystem improvements



Potential new renewable energy resources



New recreation opportunities



Climate change resiliency



Flood management



Enhanced water quality



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