



**DIVISION OF MULTI-BENEFIT INITIATIVES
DELTA LEVEES SPECIAL FLOOD CONTROL PROJECTS**

**2022
PROJECTS
SOLICITATION PACKAGE
FOR
MULTI-BENEFIT PROJECTS**

September 2022 Draft

The California Department of Water Resources (DWR) invites eligible applicants to submit proposals as described in the Delta Levees Special Flood Control Projects Program's (Special Projects Program) 2014 Guidelines for Providing Funding to Local Public Agencies(Special Projects Guidelines), dated June 18, 2014.

The goal for this Projects Solicitation Package (PSP) is to receive applications for Multi-Benefit projects that promote levee improvement (up to the DWR Bulletin 192-82 template), habitat enhancement, emergency response, seismic resiliency, and/or export water supply reliability. This PSP will directly further the goals outlined in the California Water Action Plan (Water Action Plan) and the California Water Resilience Portfolio 2020 (Portfolio) by helping to protect the economic and ecological vitality of the Sacramento-San Joaquin Delta (Delta), reducing the failure risk to levees in the Delta, providing increased flood protection, improving export water supply reliability, and protecting and restoring important ecosystems.

This solicitation makes up to \$37 million available for selected projects. Interested Applicants must submit a Full Application, as detailed below¹.

Deadlines for this PSP are as follows:

FULL APPLICATION SUBMITTAL

Only one application may be submitted per Local Agency

Submit **one hard copy** of Full Applications and one electronic copy of all documents by 4:00 p.m. on **xxxxxx xx, xxxx**. All copies and attachments must be legible and suitable for copying.

Submit electronic copies to: DeltaLeveesProgram@water.ca.gov

Questions regarding this PSP, please contact:

Andrea Lobato, PE, Manager
Delta Levees Program
Division of Multi-Benefit Initiatives
Department of Water Resources
(916) 902-6667
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Link to Projects Solicitation Package: [XXXXXXXXXX](#)

¹Additionally, section IX of the Special Projects Guidelines explains the application process.

Delta Levees Special Flood Control Projects 2022 Projects Solicitation Package for Multi-Benefit Projects

1. INTENT

The intent of this PSP is to provide funding for public benefit in accordance with Section 12311 of the California Water Code for Multi-Benefit projects. Multi-Benefit projects may include levee improvements, habitat enhancement, helping prevent salinity intrusion, protection of freshwater conveyance, protection of state and local and federal infrastructure, and/or protection of deep-water shipping channels. Additionally, selected projects shall ensure no net loss of habitat and shall support the Delta Levees Program's mandate to provide net long-term habitat improvement² and net benefit to aquatic species in the Delta.

2. BACKGROUND

Legislation

On November 7, 2006, California voters approved Proposition 84, which enacted the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006. California voters approved Proposition 1 on November 4, 2014, which enacted the Water Quality, Supply, and Infrastructure Improvement Act of 2014. These two propositions authorize the use of funds to provide grants to local agencies in the Delta through the Special Projects Program.

Section 12311 of the California Water Code identifies the primary purpose of the Special Projects Program as the protection of discrete and identifiable public benefits, including the protection of public highways and roads, utility lines and conduits, and other public facilities, and the protection of urbanized areas, water quality, recreation, navigation, fish and wildlife habitats, and other public benefits.

Under California Water Code Section 12314, the Special Projects Program must fully mitigate the habitat impacts of each project it funds and ensure that the Program results in net long-term habitat improvements and have a net benefit for aquatic species in the Delta.

California Water Action Plan

The California Water Action Plan, originally released in January 2014 and updated in 2016, was developed as a guide for the State of California to achieve sustainable water management. The California Water Action Plan discusses specific challenges and goals the State faces and identifies ten actions that address the State's most pressing

²CWC 12310(e) "Net long-term habitat improvement" means enhancement of riparian, fisheries, and wildlife habitat.

water issues. For the Delta, these include increasing flood protection and achieving the co-equal goals of a more reliable water supply for California and the protection, restoration, and enhancement of the Delta ecosystem. The 2016 Update of the California Water Action Plan is available at:

http://resources.ca.gov/docs/california_water_action_plan/Final_California_Water_Action_Plan.pdf

California Water Resilience Portfolio 2020

The California Water Resilience Portfolio 2020 (Portfolio), released on July 28, 2020, is the blueprint for equipping California to cope with more extreme droughts and floods and rising temperatures, while addressing long-standing challenges that include declining fish populations, over-reliance on groundwater and lack of safe drinking water in many communities. Proposal 18 of the Portfolio, titled “Help protect the economic and ecological vitality of the Sacramento-San Joaquin Delta”, calls for continued support for local levee operations and maintenance in the Delta.

https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Water-Resilience/Final_California-Water-Resilience-Portfolio-2020_ADA3_v2_ay11-opt.pdf

Guidelines

DWR published the Special Projects Guidelines in May 2014. The Special Projects Guidelines offer details on the purpose, process, and requirements of the project selection and are incorporated as part of this PSP. All definitions of terms and requirements for projects under the Special Projects Guidelines apply to this PSP. The Special Projects Guidelines were amended January 2019 to authorize the use of Proposition 1 funding. The Special Projects Guidelines are available at:

<https://water.ca.gov/-/media/DWR-Website/Web-Pages/Work-With-Us/Grants-And-Loans/Delta-Levees-Special-Flood-Control-Projects/Files/2014-Guidelines.pdf>

Addendum #1 to The Special Projects Guidelines is available at:

<https://water.ca.gov/-/media/DWR-Website/Web-Pages/Work-With-Us/Grants-And-Loans/Delta-Levees-Special-Flood-Control-Projects/Files/Addendum-12014-DLSP-GuidelinesProp1Final20190122.pdf>

This PSP provides a summary of the application process requirements, an application timeline, and the eligibility, ranking, and cost share criteria for this offering. In addition, the applicant is still subject to all requirements as specified in the Special Projects Guidelines.

Delta Stewardship Council

The Delta Stewardship Council (DSC) was created by the Delta Reform Act of 2009. One of the charges of the DSC was the development of a Delta Plan, which was adopted May 16, 2013, and became effective on September 1, 2013. A component of the Delta Plan is the Funding Priority List that was developed through the Delta Levee Investment Strategy. This Funding Priority List is incorporated into the Application Scoring Criteria in Section 5B of this PSP at the request of the DSC. A table and a map showing the funding priorities is provided in Appendix 1. Only those applications that

meet the Eligibility Requirements under Section 3 (below) will be considered for funding. Additional information regarding the Delta Levee Investment Strategy and funding priorities is available on the DSC's website: <http://deltacouncil.ca.gov/>.

The Delta Reform Act of 2009 also established a certification process for State or local agencies to demonstrate consistency with the Delta Plan when undertaking a qualifying (covered) action. Successful applicants for funding under this PSP must complete any necessary consistency determination for a covered action as required by the Delta Plan. The process is further explained on the DSC's website: <http://deltacouncil.ca.gov/>.

Climate Change

State law and executive orders require State agencies to account for climate change in all planning, infrastructure and investments, including grant making. In addition, several Executive Orders (EO) direct state agencies to analyze and plan for the impacts of climate change using best available science and to consider nature-based solutions to challenges posed by climate change. EO B-30-15, signed by Governor Brown on April 29, 2015, directs State agencies to "take climate change into account in their planning and investment decisions and employ full life-cycle cost accounting to evaluate and compare infrastructure investments and alternatives." EO N-82-20, signed by Governor Newsom on October 7, 2020, directs all state agencies to "identify and implement near- and long-term actions to accelerate natural removal of carbon and build climate resilience in our forests, wetlands, urban greenspaces, agricultural soils, and land conservation activities in ways that serve all communities and in particular low-income, disadvantaged and vulnerable communities."

Public Resources Code section 71150 et seq. requires the California Natural Resources Agency (CNRA) to establish the State's climate adaptation strategy, known as "the plan," by July 1, 2017, and update it every three years. According to Public Resources Code section 71154, subdivision (c)(1), State agencies shall work to maximize, where applicable and feasible, "promoting the use of the plan to inform planning decisions and ensure that state investments consider climate change impacts, as well as promote the use of natural systems and natural infrastructure, when developing physical infrastructure to address adaptation." Also, Public Resources Code section 71155 requires State agencies to "take into account the current and future impacts of climate change, including the economic damages and financial liabilities associated with those impacts, when planning, designing, building, operating, maintaining, and investing in state infrastructure."

Regarding planning for sea level rise, the Ocean Protection Council's *2018 State Sea Level Rise Guidance* provides information to state and local agencies and non-governmental entities on how to consider sea level rise in their plans, projects, and investments with a recommendation to analyze low, medium and high sea level rise scenarios in project planning.

Project applicants are requested to complete a Climate Risk in Investments Survey in Appendix 7 to assist DWR in understanding organizational capacity to address climate change. Project applicants can refer to the climate change resources guidance provided in Appendix 8 for support in conducting their climate change analysis for their proposed projects.

3. ELIGIBILITY REQUIREMENTS

All applicants must be in compliance with the requirements set forth in Sections 12300 – 12318 of the California Water Code, as well as all the requirements associated with the Special Projects Program and the Delta Levees Maintenance Subventions Program (Subventions Program), and all requirements set forth in the Special Projects Guidelines. Applicants must also be in good standing on past funding agreements for both the Special Projects and Subventions Programs.

DWR may deny applications that do not adequately meet the requirements of California Water Code Sections 12300 – 12318 or that do not adequately meet the criteria for this PSP. DWR may also check the reasonableness and accuracy of submitted materials and may deny applications that contain discrepancies or significant problems.

Eligible Applicants

An applicant must be a Levee Maintaining Agency (LMA or Local Agency)³ responsible for maintaining a Project or Non-Project levee in the Primary Zone of the Delta or a Non-Project levee in the Secondary Zone of the Delta and be in good standing with all components of the Delta Levees Program, including the Special Projects Program and the Subventions Program. LMAs must also be in good standing with the California Department of Fish and Wildlife (CDFW) for habitat mitigation obligations under the Delta Levees Program.

Eligible LMAs

Only those LMAs that represent islands/tracts with sub-tidal volumes sufficiently large to negatively affect water quality (if flooded) will be eligible under this PSP, based on their Anthropogenic Accommodation Space⁴ (AAS). An LMA with an AAS greater than 10,000 acre-feet is eligible to submit a project under this PSP.

Eligible Projects

Eligible Multi-Benefit projects under this PSP should improve the integrity of an LMA's levee(s) and/or contribute to increased reliability of export water from the Delta for the State and federal water projects and must also provide net long-term habitat improvement including a net benefit for aquatic species in the Delta. Full Applications must be consistent with the applicants' completed Five-Year Plan or contain a justification for any notable differences.

4. AVAILABLE FUNDS

This PSP may provide up to \$37 million in total grant funding depending upon available funding. The fund sources for this PSP are Propositions 1 and 84, with the potential for

³Eligible applicants shall be referred to as either "LMA," "applicant," or "local agency" in this document.

⁴AAS = Acreage x Average Depth (e.g. Flood Volume in acre feet (ac-ft)). This is directly related to the acreage of the District and the depth below mean high tide elevation.

other funds that may become available. DWR is under no obligation to allocate funding if submitted proposals are not responsive to the intent of the PSP, do not provide sufficient detail, or if total funding requests from responsive applications are less than the total grant funding available. DWR may also choose to withhold and/or redirect a portion of this amount based on emergency needs in the Delta, or other considerations within DWR's authority.

Total combined initial grant awards for both Phase 1 and 2 (described henceforth) shall not exceed \$15 million. DWR reserves the right to exceed this amount based on changed circumstances and shall be allowed within DWR's sole discretion.

5. APPLICATION AND SELECTION PROCESS

Unlike the previous two Multi-Benefit PSP solicitations, this application process will only include a Full Application and will not include submittal of a Concept Proposal. An LMA may submit only one application.

5A. FULL APPLICATIONS

Full Applications must include⁵:

- A cover sheet that provides an overview of the project;
- A statement by the LMA identifying the applicant's representatives, including the Engineer, Project Biologist, and anyone authorized to provide information on the LMA's behalf;
- A completed Local Agency Information Sheet (Appendix 3);
- A resolution adopted by the LMA authorizing submission of the application and designating a representative to sign the application (Appendix 4);
- A statement of the LMA's intent to enter into a Project Funding Agreement (PFA) with the Department of Water Resources (DWR), to implement a project under the Special Projects Program, and to provide local cost share for the project after signing a contract with DWR.
- A detailed project description.⁶ The description must clearly explain the proposed work and its location(s) and include maps and drawings that illustrate the plan so major components are clear. The project description must include sufficient information to clearly identify and describe the following components that are applicable to the category of project:

⁵ Applicants with questions about what to provide are encouraged to consult with DWR Delta Levees Program staff.

⁶The level of detail provided in the project description is at the discretion of the applicant, but it is in the applicant's best interest to offer as much detail and documentation as possible as the eligibility and ranking criteria in the Guidelines require a great deal of specific information. Descriptions may be limited to a discussion of elements/objectives.

- the levee improvement portion of the project including a description of improvements to levee integrity;
- the habitat enhancement portion of the project including a description and map of benefits to the Delta ecosystem and flood protection, and how it will provide a net habitat improvement and net benefit to aquatic species of the Delta;
- a description of the types and amount of habitat present on-site, potentially impacted by the project;
- how the project will improve export water supply reliability from the Delta for the State and federal Water Projects;
- A checklist of the materials required and a statement certifying that the project description is accurate, the cost estimate is reasonable, that the levee stability improvements are reasonable, and that the water supply reliability benefits are realistic and a statement explaining the public assets protected shall be completed by a professional civil engineer licensed in California;
- The curriculum vitae from a qualified biologist or restoration ecologist acting on behalf of the District (cited here as Project Biologist) who has endorsed the project. The Project Biologist shall provide a statement discussing how the project intends to meet the requirements of Water Code Section 12314(b), which requires no net long-term loss of habitat;
- A statement prepared by the Project Biologist discussing how the project intends to meet the requirements of Water Code Section 12314(d), which requires net habitat improvement and net benefit to aquatic species of the Delta. This should include a description of benefits of any habitat creation and/or improvements;
- A draft of the CEQA checklist, completed by the Project Biologist, identifying all potential project impacts, typical of "Appendix G" to CEQA Guidelines;
- A detailed discussion of the environmental permits required for the project, and a schedule for permit completion; a description of any environmental or habitat impacts that may occur, an estimate of the corresponding acreage, and a description of how the mitigation cost estimate was calculated;
- A detailed discussion and map of any enhancement proposal to provide clarity on how the enhancement will be achieved, including, but not limited to: a planting plan, clear performance standards, maintenance activities, monitoring and reporting requirements, and long-term management.
- Any landside habitat proposed must be within the LMA's easement or a letter of commitment from the landowner agreeing to establishment of planned habitat on their property must be included with the application.

- A detailed discussion of how the project defines, anticipates, and addresses climate change impacts, including a description of the method and data used to assess the potential impacts of flooding and/or sea level rise on the proposed project. See also Appendix 7 to provide the information requested in the Climate Risk in Investments Survey questions (note that responses to these questions do not affect scoring).
- A project financing plan, including grants, loans, or bonds from other sources that are necessary for completing the proposed work; and
- A completed checklist of the application contents and materials required.

Submission of Full Applications

Potential Applicants are encouraged to contact the Special Projects Program with any questions or to set up meetings regarding their Full Applications.

Applicants shall submit one hard copy and one electronic copy of all documents comprising their Full Applications by the deadline on the first page of this PSP. All copies and attachments must be legible and suitable for copying.

Applications shall be submitted to:

Andrea L. Lobato, P.E., Manager
Delta Levees Program
Division of Multi-Benefit Initiatives
Department of Water Resources
Post Office Box 942836
Sacramento, CA 94236-0001

Full Applications that do not meet the deadline will not be reviewed. Applications received by the deadline will be reviewed for eligibility and completeness. Applications that are not substantially complete as determined by DWR will not be reviewed beyond completeness. DWR may contact and ask for additional information for those Full Applications that are substantially complete but missing some items. If an applicant is contacted by DWR with a request for more information, the applicant will have one week from the date of contact to provide all requested information in full.

Completed Full Applications will be scored and ranked using the Full Application Scoring Criteria in this PSP. Applications will then be selected for participation in the Special Projects Program. Following the selection, DWR will notify all applicants of their standing. Once the selection process is complete, the selected applicants will be requested to enter into a Project Funding Agreement (PFA) with DWR.

Funding for the Projects will be broken up into two phases with separate PFAs. The Phase 1 PFA will provide for planning, design, and permitting, while Phase 2 PFA will provide for construction, construction engineering and inspections, mitigation costs associated with construction, and project close out. DWR will not enter into Phase 2 funding until Phase 1 has been completed; however, successful completion of Phase 1 will not guarantee Phase 2 funding. Phase 2 funds will be available on a

first come first served basis, depending upon available funding. Funds for either Phase 1 or Phase 2 shall be disbursed only after execution of a PFA.

The total allowable cost for a Phase 1 grant shall not exceed 20%² of the construction cost. Phase 1 grants will be based on the District Engineer's initial estimate but may ultimately be revised based on actual bid amounts. If the Phase 1 PFA amount exceeds the maximum allowable percent, the Phase 2 grant will be adjusted accordingly.

5B. APPLICATION SCORING CRITERIA

Complete Applications will be scored by DWR in the following criteria:

- DSC Delta Levee Investment Strategy Funding Priorities – 50 points Maximum
- Financing by cost-sharing partners – 50 points Maximum
- General Considerations – 100 points Maximum
- Export Water Supply Reliability and Public Benefits – 100 points Maximum
- Ecosystem Enhancement – 100 points Maximum
- Levee System Integrity – 100 points Maximum
- Climate Change Vulnerability and Adaptation Assessment: Project Resilience over the Project Lifespan – 50 Points Maximum

Based on the quality of the applications received, the Special Projects Program reserves the right to establish a minimum score that must be achieved to be considered for funding.

The detailed scoring criteria are summarized in Tables 1 through 7.

² It is the sole discretion of the Department to adjust the maximum allowable percentage as deemed appropriate.

Table 1. Scoring Criteria, Consistency with the DSC Delta Levee Investment Strategy Funding Priorities (Maximum 50 Points)

Criterion/Score	Notes
<p>Consistency with the DSC Delta Levee Investment Strategy Funding Priorities</p> <ul style="list-style-type: none"> • 0 to 50 points 	<p><i>Scoring is based on the island/tract's placement on the DSC's Delta Levee Investment Strategy Funding Priority List, shown on the table and map in Appendices 1a and 1b, respectively, within this application. These funding priorities will only be applied as a part of the Application Scoring Criteria, as all applications must meet the Eligibility Requirements under Section 3 of this proposal to be considered eligible for funding. Additional information regarding the funding priorities is available on the DSC's website: http://deltacouncil.ca.gov/.</i></p> <p>To receive maximum points the applicant's district must be considered a Very-High priority for funding, based on the DSC's Delta Levee Investment Strategy Funding Priorities.</p> <p style="text-align: center;">-or-</p> <p>To receive 35 points the applicant's district must be considered a High priority for funding, based on the DSC's Delta Levee Investment Strategy Funding Priorities.</p> <p style="text-align: center;">-or-</p> <p>The applicant will receive no points if its district is not considered a Very-High or High priority for funding.</p> <p>Note: The DSC Delta Plan provides the opportunity for a project located on a lower funding priority district to still be considered for funding, provided there is sufficient justification. To be considered for points under this criterion, an applicant with a lower funding priority must provide written justification.</p>

Table 2. Scoring Criteria, External Financing (Maximum 50 Points)

Criterion/Score	Notes
<p>Partnerships/ Matching Funding</p> <ul style="list-style-type: none"> • 0 to 50 points 	<p><i>Scoring is based on the participation of, and commitment made by outside parties (i.e., this does not include the LMA or DWR), to assist in cost sharing the work. These parties may be other State or federal agencies as well as non-governmental organizations.</i></p> <p>To receive maximum points the applicant must submit with the Full Application a signed commitment letter and/or copy of an executed agreement with the cost share partner documenting a funding <u>commitment</u> of at least 10% or more of the estimated total project cost.</p> <p style="text-align: center;">-or-</p> <p>To receive 30points the applicant must submit a <u>letter of intent</u> by the outside cost share partner to commit funding of at least 10% or more of the estimated total project cost.</p> <p style="text-align: center;">-or-</p> <p>To receive 20 points the applicant must submit a <u>written statement of intent to seek external funding</u> from a named third party for at least 10% or more of the estimated total project cost and evidence of the third party's willingness to support the project that is acceptable to DWR.</p> <p style="text-align: center;">-or-</p> <p>DWR may at its sole discretion award 0-10 points for various levels of third-party funding commitment that fall below the 10% threshold identified above⁸.</p>

⁸For example, submission of a signed agreement with a third party for 5% of the total project cost could earn up to 10 points in this category in recognition of the solid commitment of external funds to the project.

Table 3. Scoring Criteria, General Elements and Quality of Proposal (Maximum 100 Points)

Criterion/Score	Notes
<p>Project Description</p> <ul style="list-style-type: none"> • 0 to 20points 	<p>Project description is clear and complete, and includes the following elements:</p> <p>Project location with stationing and site maps, schedule, permits, potential habitat impacts, design, and other project-related information.</p> <p>Required: A clear statement of the deficiency that exists and how the project addresses the need, including: a strong engineering justification of how the levee integrity improvements address the levee deficiency, and/or a strong biological justification of how the habitat enhancement design of the project supports the Special Projects Program mandates of achieving net habitat improvement.</p>
<p>Cost Estimate</p> <ul style="list-style-type: none"> • 0 to 10points 	<p>Project includes a cost estimate that is complete, detailed, and accurate and considers all aspects of the project from planning and permitting, construction, and potential mitigation associated with the project. The specificity and reasonableness of the estimate will also be taken into consideration.</p>
<p>Emergency Infrastructure</p> <ul style="list-style-type: none"> • 0 to 10 points 	<p>Project increases protection of infrastructure that is essential during an emergency. Scoring is based on how well a project provides protection of local public utilities, roads, services, fuel centers, and food centers, etc. that are considered critical or lifeline infrastructure during an emergency.</p>
<p>Habitat Impacts</p> <ul style="list-style-type: none"> • 0 to 10points 	<p>Proposal includes an accurate and detailed assessment estimating the potential habitat impacts, identifies any potentially impacted sensitive, threatened and endangered species due to the proposed project, and describes how the potential impacts will be avoided, minimized, and/or mitigated.</p>
<p><i>Habitat Benefits</i></p> <ul style="list-style-type: none"> • 0 to 20 points 	<p>Project description includes the following related to Habitat Benefits:</p> <ul style="list-style-type: none"> • An accurate and detailed description of the habitat improvements and benefits, including habitat types and acreages of each that will be restored and/or enhanced, conceptual design, construction methods, and maintenance requirements for project success. • How existing habitat avoidance is incorporated into project design, when applicable. • How climate impacts will be addressed in the strategies employed to maintain habitat benefits over time given impacts of climate (with increased temperature, risk of drought, wildfire, flood, sea level rise). <p>Each proposal must include a budget and timeline for implementing habitat improvements to be awarded points in this category.</p> <p>This section is only for describing habitat created as enhancement; any mitigation that will be planted at the project site should be described under the Habitat Impacts section.</p>

Table 3. Scoring Criteria, General Elements and Quality of Proposal (continued)

Criterion/Score	Notes
Environmental Compliance/Permitting <ul style="list-style-type: none"> • 0 to 10 points 	The application includes a list of anticipated environmental, construction, and other permits with corresponding cost estimate, funding, and schedule for obtaining them.
Public Benefits <ul style="list-style-type: none"> • 0 to 10 points 	The application describes protection of assets of public benefit, including highways, railroads, gas transmission lines, etc.
Construction Start <ul style="list-style-type: none"> • 0 to 10 points 	Project is anticipated to begin construction within two years of grant award.

Table 4. Scoring Criteria, Public Water Supply (100 Points Possible)

Criterion/Score	Notes
Water Supply Corridors <ul style="list-style-type: none"> • 0 to 50 points 	Scoring is based on the project's specific potential to improve the reliability of water supply corridors, including the extent to which the project protects the Old and Middle River water supply corridors or benefits public drinking water supply.
Water Quality Effects/Benefits <ul style="list-style-type: none"> • 0 to 40 points 	Scoring is based on how well a project helps prevent salinity intrusion from the San Francisco Bay into the Delta due to Levee failure.
Barriers and drought relief infrastructure <ul style="list-style-type: none"> • 0 to 10 points 	Scoring is based on the project's specific relevance to improvement of the reliability of the water supply through the implementation of channel barriers or other DWR sponsored emergency drought relief infrastructure in the Delta (if applicable).

Table 5. Scoring Criteria, Ecosystem Enhancement (Maximum 100 Points)⁹

Criterion/Score	Notes
Enhancement Habitat	<p><i>To obtain points, the applicant must commit to a one-year establishment period for enhancement plantings followed by a three-year performance period¹⁰, implementing a monitoring and management plan for successful establishment of planted species. Enhancement must include one of the two waterside features identified below.</i></p> <p><i>Scoring considerations will be made based upon:</i></p> <ul style="list-style-type: none"> • <i>Quality of the project, including those projects that incorporate a higher diversity of habitat types into their habitat enhancement design,</i> • <i>Quantity of the enhancement being proposed,</i> • <i>Avoidance and minimization of habitat impact amounts associated with the project,</i> • <i>Ratio of habitat enhancement to total project area,</i> • <i>Projects that replace invasive plant species with CDFW-approved native plantings, and</i> • <i>Projects that assess, anticipate and address climate impacts to maintain ecosystem enhancement over time.</i>
<p>Waterside Features</p> <ul style="list-style-type: none"> • <i>0 to 80 points for DLWH and associated habitat.</i> <p>-or-</p> <ul style="list-style-type: none"> • <i>0 to 60 points for waterside habitat without DLWH.</i> 	<p><i>Delta Levee Waterside Habitat (DLWH projects), previously Fish Friendly Levee Habitat (FFLH), will be targeted along the main stems of the Sacramento and San Joaquin Rivers, and the North and South forks of the Mokelumne River. DLWH projects will not be encouraged along the Old and Middle Rivers, except near the confluence of the San Joaquin River. However, waterside habitat without DLWH is encouraged throughout the Delta. (See Appendix 5 for more details on DLWH).</i></p> <p>The project includes improvement or creation of DLWH, that must have in-water habitat as well as Shaded Riverine Aquatic Habitat and Riparian Forest and/or Scrub Shrub habitat, incorporating native grasses and forbs, as appropriate. Scoring is based on the quality and complexity of habitat proposed and the extent to which DLWH habitat is incorporated into the design of the overall project including strategies provided for weed management and maintenance of planted vegetation.</p> <p>Shaded Riverine Aquatic (SRA) Habitat, Riparian Forest, and Scrub Shrub, incorporating native grasses and forbs, as appropriate, without in-water habitat development. Scoring is based on the quality and complexity of habitat proposed and the extent to which</p>

⁹The final ecosystem enhancement score will be based on points for 1) one of the two identified levee waterside enhancement features, 2) landside enhancement features and 3) the approach and feasibility.

¹⁰The one-year Establishment period will begin immediately following the end of planting. The three-year Performance period, through a separate PFA at the Project's cost-share assuming available funding, will begin immediately following the Establishment period. See Appendix 2 for more details.

Table 5. Scoring Criteria, Ecosystem Enhancement (continued)

Criterion/Score	Notes
	non-tidal waterside habitat is incorporated into the design of the overall project including strategies provided for weed management and maintenance of planted vegetation. (See Appendix 6 for SRA and other Delta Levees Program habitat types.)
<p>Landside Features</p> <ul style="list-style-type: none"> • <i>0 to 10 points for Riparian Forest, Scrub-shrub, Freshwater Marsh</i> 	A combination of riparian forest, scrub shrub (including hedgerows ¹¹), and/or freshwater marsh, incorporating native grasses and forbs, as appropriate. Scoring is based on the quality and complexity ¹² of the habitat proposed and the extent to which the landside levee, toe berm, and adjacent landside areas incorporate vegetation features into the overall project design, including strategies provided for weed management and maintenance of planted vegetation.
<p>Approach and Feasibility</p> <ul style="list-style-type: none"> • <i>0 to 10 points</i> 	Scoring is based on the technical merits of the design of the proposed habitat enhancement features. Include well-described detailed plans for how the performance period monitoring and management plan will be accomplished.

Table 6. Scoring Criteria, Levee System Integrity (100 Points Possible)

Criterion/Score	Notes
<p>Static and Seismic Stability</p> <ul style="list-style-type: none"> • <i>0 to 65points</i> 	Scoring is based on how well the project improves static and seismic stability of the proposed levee. Discussion should explicitly identify any proposed geologic and geotechnical exploration or studies, as well as include any relevant existing studies, proposed factors of safety, the expected outcome for the overall resiliency of the levee, specific features to address seismic stability, or known site conditions of the levee foundation.
<p>Levee Standard</p> <ul style="list-style-type: none"> • <i>0 to 15points</i> 	Scoring is based on a clear statement of the proposed levee standard chosen for the project, the adequacy of the project's justification for the levee standard chosen, and its consistency with the District's completed Five-Year Plan. This PSP provides for levee improvement to a Delta Levees Program supported standard (up to the DWR Bulletin 192-82 template), described in the Special Projects Guidelines.

¹¹Hedgerows are a band of native shrubs and trees, running linearly along the toe of the levee, along the stability berm, or bordering a field (see Appendix 6 for more detailed description).

¹²Habitat complexity includes a minimum of seven plant species per habitat type, greater number of habitat types, larger enhancement acreage, and higher habitat values with RF, FM, SS and SRA on the high end and native grasses and forbs on the low end, but a combination of all of them on the highest end.

<p>System Flood Risk</p> <ul style="list-style-type: none"> • 0 to 10points 	<p>The project must not increase flood risk to other Delta islands/tracts. Scoring is based on the project’s ability to avoid and/or mitigate negative impacts to flood water conveyance and avoid or mitigate adverse effects (from flooding due to all factors including- anticipated climate change impacts) to adjacent islands/tracts.</p>
<p>Flood Protection for Legacy Communities</p> <ul style="list-style-type: none"> • 0 to 10points 	<p>Scoring is based on how the project will contribute to the protection of a Legacy Community (where applicable), and the applicant’s description of risk reduction planned for the community.</p>

Table 7. Scoring Criteria, Climate Change Vulnerability and Adaptation Assessment: Project Resilience over the Project Lifespan (50 Points Possible)

Criterion/Score	Notes
<p>Climate Change Vulnerabilities</p> <ul style="list-style-type: none"> • 0 to 10 points 	<p>Scoring is based on how well climate change vulnerabilities have been identified in the project proposal (water supply/demand, water quality, sea level rise, flooding, wildfire, ecosystem and habitat.).¹³</p>
<p>Project Vulnerabilities Assessment</p> <ul style="list-style-type: none"> • 0 to 10 points 	<p>Scoring is based on how well the project anticipates climate change vulnerabilities. For example, does the project evaluate more than one climate change vulnerability? Describe how the climate change assessment is qualitative, quantitative deterministic with one climate change projection, or quantitative probabilistic, which depict the uncertainty of climate change with multiple projections.¹³</p>
<p>Project Benefits</p> <ul style="list-style-type: none"> • 0 to 10 points 	<p>Scoring is based on how the project will continue to deliver on the intended purpose and overall project benefits over a reasonable time period based upon the climate change analysis. Describe the benefits and how long will they last.</p>
<p>Project Adaptive Capacity</p> <ul style="list-style-type: none"> • 0 to 10 points 	<p>Scoring is based on the adaptive capacity of the project or how well the project applicant employs adaptative management strategies to adjust to changing conditions over time. For example, does the project rely on a “one design fits all”, or is there potential to adjust the project to more adverse climatic conditions? Will the project make future climate adaptation more difficult? For example, one could envision acquiring a larger easement than the original levee design to raise the levee crown over time if required by increased climate change conditions.</p>
<p>Project Maintenance, monitoring, long-term management and/or operation under Climate Change</p> <ul style="list-style-type: none"> • 0 to 10 points 	<p>Scoring is based on the ability to maintain the project over time, including monitoring, and long-term management and/or operation under climate change conditions. Is there a contingency plan in place to account for the uncertainty of climate change projections on external factors that could impact the functionality of the project? For example, should the access road to the project become flooded, how would that affect the project functionality?</p>

¹³ See Appendix 8, Section I.7.

6. COST SHARE

The State will determine its final cost share once the evaluation is complete. The State minimum cost share for this PSP will be 75 percent of the total project cost. Projects evaluated under this PSP will be cost shared according to the rules set forth in the Special Projects Guidelines Pages 20 through 23.

Costs in excess of the maximum award will be cost shared at a maximum 50 percent State cost share, subject to availability of funds.

7. AWARD TIMELINE

The deadline to submit a Full Application is listed in the box on Page 1 of this document. Evaluation of Full Applications is anticipated to occur in XXXXX2022, with notification to applicants of funding decisions in XXXXX2022.

8. FUNDING REQUIREMENTS

For all projects awarded funding by DWR, the funding recipient will need to execute a funding agreement with the State. It is HIGHLY recommended that applicants review the grant agreement template prior to submission of their proposal. If applicants are not able to abide by the terms and conditions contained therein, applicants should not submit a proposal. A funding agreement template may be found online at: xxx insert site xxx. The following is a partial list of requirements that will be contained within any funding agreement:

8 A. Conflict of Interest

All participants are subject to State conflict-of-interest laws. Failure to comply with these laws, including business and financial disclosure provisions, will result in the proposal being rejected and any agreement being declared void. Other legal action may also be taken. Applicable statutes include, but are not limited to, Government Code section 1090 and Public Contract Code sections 10410 and 10411.

As part of the conflict-of-interest requirements, individuals working on behalf of a funding recipient (grantee) may be required by the State to file a Statement of Economic Interests (Fair Political Practices Commission Form 700) if it is determined that an individual is a consultant for Political Reform Act purposes.

8 B. Confidentiality

Applicants should be aware that when submitting a proposal to the State, they will waive their rights to the confidentiality of the contents of the proposal. Once a decision on an application has been made by DWR, the proposal is subject to disclosure pursuant to the California Public Records Act (Gov. Code, § 6250 et seq.).

8 C. Labor Code Compliance

As part of the funding agreement, the funding recipient shall agree to be bound by all the provisions of the Labor Code regarding prevailing wages, and shall monitor all contracts subject to reimbursement from the funding agreement to assure that the prevailing wage provisions of the Labor Code are being met. Current Department of Industrial Relations (DIR) requirements may be found at:

<http://www.dir.ca.gov/lcp.asp>. Funding recipients receiving funds from Proposition 84 will be required to certify that it has a Labor Compliance Program (LCP) in place or has contracted with a third party that has been approved by the Director of DIR to operate an LCP. The funding recipient will also affirm that it is aware of the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance.

Before submitting an application, applicants are urged to consult with their legal counsel regarding Labor Code compliance. DWR will not advise applicants on Labor Code compliance. For more information, please refer to DIR's Public Works Manual at: <http://www.dir.ca.gov/dlse/PWManualCombined.pdf>.

8 D. Compliance with the CEQA and Other Environmental Laws

All activities funded pursuant to the Program must comply with the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). Any work that is subject to CEQA and funded under a funding agreement shall not proceed until documents that satisfy the CEQA process are received by DWR, and DWR has completed its CEQA compliance. Alternatively, the grantee shall notify DWR if they believe their activities will not be considered a project under CEQA, or that their activities qualify for a CEQA exemption. DWR must ensure the adequacy of the CEQA documents before it can provide funding; therefore, early coordination between the lead agency and DWR during the preparation of the CEQA documents will help expedite DWR's review and approval process.

8 E. Competitive Bidding and Procurement

A grantee's contracts with other entities for the acquisition of goods, services, and construction of public works with funds provided by the State must be in writing and shall comply with all applicable laws and regulations regarding the securing of competitive bids and undertaking competitive negotiations. If a funding recipient does not have a written policy to award contracts through a competitive bidding or sole source process, Department of General Services' State Contracting Manual rules must be followed and are available at: <https://www.dgs.ca.gov/OLS/Resources/Page-Content/Office-of-Legal-Services-Resources-List-Folder/State-Contracting>. Applicants with questions regarding competitive bidding requirements should be directed to their counsel. DWR will not advise applicants on competitive bidding requirements.

8 F. Signage or Acknowledgement of Credit

To the extent practicable, a project supported by funds from the Small Community Drought Relief Program will include signage and other relevant forms of acknowledgement informing the public that the project received funds from DWR and

the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 and/or the Water Quality, Supply, and Infrastructure Improvement Act of 2014. Specific verbiage will be included in the final grant agreement.

8 G. Indemnify and Hold Harmless

As part of the funding agreement, grantees shall indemnify and hold harmless the State, its officers, agents, and employees from any and all liability from any claims and damages (including inverse condemnation) arising from the planning, design, construction, repair, replacement, rehabilitation, maintenance, and operation of the project, and any breach of the funding agreement.

8 I. Eligible Project Costs

Eligible project costs may include the reasonable costs of studies, engineering, design, project construction, and other work directly related to the scope of work. Reimbursable administrative expenses are the necessary incidental costs that are directly related to the project.

Costs associated with travel are eligible for reimbursement if the travel expenses are reasonable, justifiable, and necessary for the successful completion of the project. Allowable reimbursement rates for mileage, lodging, and per diem are limited to the requirements specified by the California Department of Human Resources (<http://www.calhr.ca.gov/employees/pages/travel-reimbursements.aspx>). No travel outside the State of California shall be reimbursed unless prior written authorization is obtained from the State.

Costs that are not eligible for reimbursement include but are not limited to:

- Costs incurred prior to the execution of the funding agreement.
- Purchase of equipment that is not an integral part of the project.
- Purchase of water supplies that are not an integral part of the project.
- Establishing a reserve fund.
- Replacement of existing funding sources for ongoing programs.
- Support of existing punitive regulatory agency requirements and/or mandates in response to negligent behavior.
- Purchase of land in excess of the minimum required acreage necessary to operate as an integral part of the project, as set forth and detailed by engineering and feasibility studies, or land purchased prior to the execution of the grant agreement.
- Payment of principal or interest of existing indebtedness or any interest payments.
- Operation and maintenance costs.

- Costs incurred as part of any necessary response and cleanup activities required under the Comprehensive Environmental Response, Compensation, and Liability Act; Resource Conservation and Recovery Act; Hazardous Substances Account Act; or other applicable law.
- Any federal or state taxes.
- Expenses incurred in preparation of the proposal or an application for another program
- Any indirect costs. Indirect Costs means those costs that are incurred for a common or joint purpose benefiting more than one cost objective and are not readily assignable to the funded project (i.e., costs that are not directly related to the funded project).

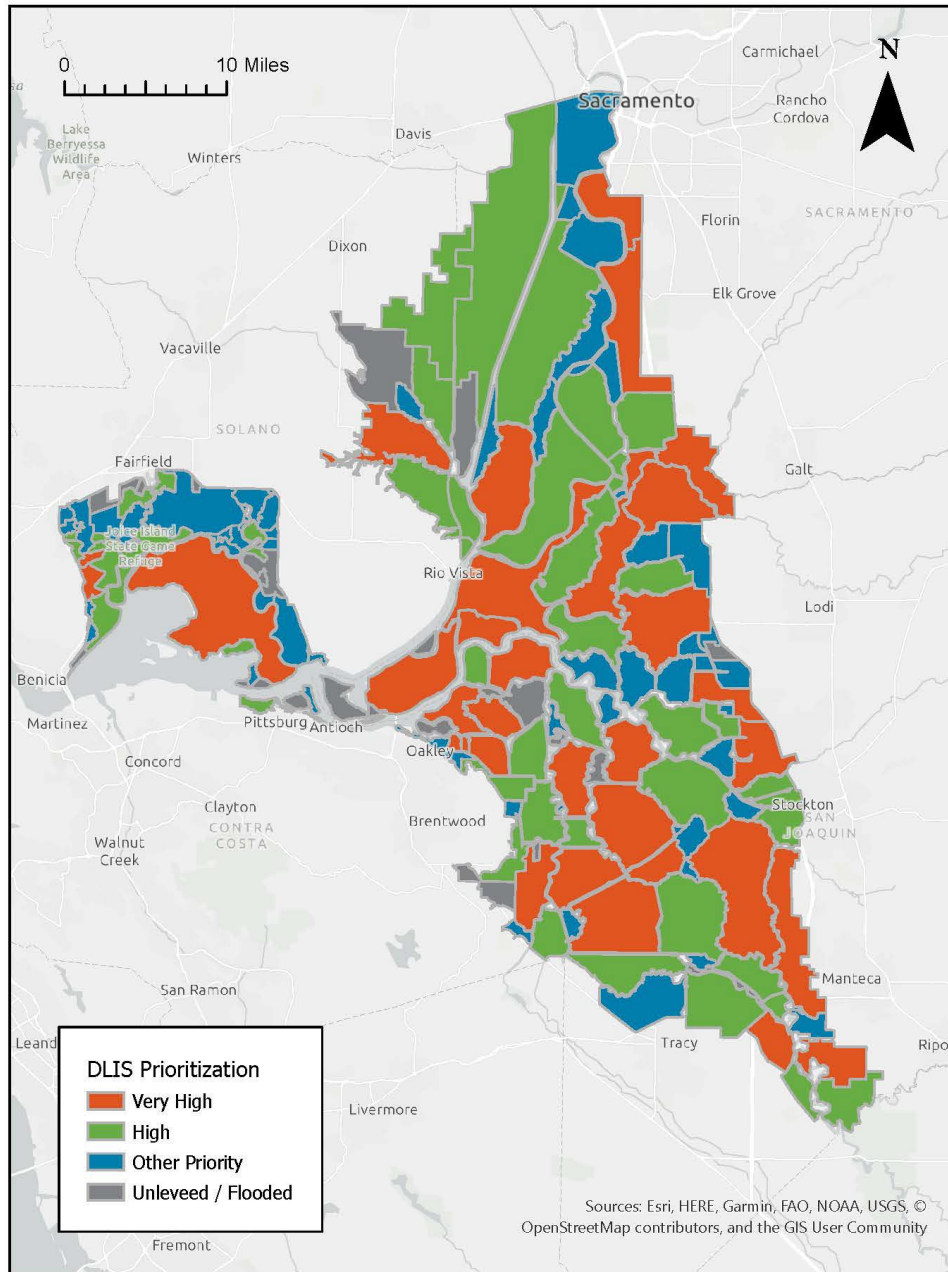
Examples of Indirect Costs include, but are not limited to: central service costs; general administration of the Funding Recipient; non-project-specific accounting and personnel services performed within the Funding Recipient's organization; depreciation or use allowances on buildings and equipment; the costs of operating and maintaining non-project-specific facilities; tuition; conference fees; and, generic overhead or markup. This prohibition applies to the grantee and any subcontract or sub-agreement for work on the funded project that will be reimbursed with grant funds from DWR.

Appendix 1

DSC Delta Levee Investment Strategy

Preliminary Draft Delta Levees Investment Priorities

Delta Levees Investment Priorities



- All applications must meet the Eligibility Requirements under Section 3 of this proposal to be considered eligible for funding. Some of the entities shown on the table above may not meet those requirements.
- For additional and updated information regarding the funding priorities shown in the above table, please refer to the DSC's website: <http://deltacouncil.ca.gov/>.

Appendix 1 (Continued)

Very High Priority	<p><u>Bacon Island, Bethel Island, Bishop/DLIS-14 (North Stockton), Brannan-Andrus, Byron Tract, DLIS-19 (Grizzly Slough Area), DLIS-28, DLIS-33, DLIS-63 (Grizzly Island Area), Drexler Tract, Dutch Slough*, Hasting Tract, Hotchkiss Tract, Jersey Island, Jones Tract (Upper and Lower), Maintenance Area 9 North, Maintenance Area 9 South, McCormack-Williamson Tract*, McDonald Island, McMullin Ranch, Middle and Upper Roberts Island, New Hope Tract, North Stockton, Paradise Junction, Reclamation District 17, Ryer Island, Sherman Island, Staten Island, Terminous Tract, Twitchell Island, Upper Andrus Island, Victoria Island, Webb Tract.</u></p>
High Priority	<p><u>Bouldin Island, Brack Tract, Bradford Island, Cache Haas Area, Central Stockton*, Clifton Court Forebay, DLIS-01 (Pittsburg Area), DLIS-07 (Knightsen Area), DLIS-08 (Discovery Bay Area), DLIS-20 (Yolo Bypass), DLIS-22 (Rio Vista), DLIS-26 (Morrow Island), DLIS-29, DLIS-30, DLIS-31 (Garabaldi Unit), DLIS-32, DLIS-39, DLIS-41 (Joice Island Area), DLIS-44 (Hill Slough Unit), DLIS-55, DLIS-59, Egbert Tract, Fabian Tract, Glanville, Grand Island, Holland Tract, Honker Bay, Kasson District, Libby McNeil, Little Egbert Tract, Lower Roberts Island, Mandeville Island, Mossdale Island, Netherlands, Palm-Orwood, Paradise Cut, Pearson District, Pescadero District*, Rindge Tract, River Junction, Shima Tract, Stewart Tract*, Sunrise Club, Tyler Island, Union Island East, Veale Tract, Walnut Grove, Woodward Island, Yolano.</u></p>
Other Priority	<p><u>Atlas Tract, Bixler Tract, Canal Ranch Tract, Chipps Island, Coney Island, Dead Horse Island, DLIS-06 (Oakley Area), DLIS-10, DLIS-15, DLIS-17, DLIS-18, DLIS-25, DLIS-27, DLIS-34, DLIS-35, DLIS-36, DLIS-37 (Chadbourne Area), DLIS-40, DLIS-43 (Potrero Hills Area), DLIS-46, DLIS-47, DLIS-48, DLIS-49, DLIS-50, DLIS-51, DLIS-52, DLIS-53, DLIS-54, DLIS-56, DLIS-57, DLIS-62, Drexler Pocket, Ehrhardt Club, Empire Tract, Fay Island, Glide District, Holt Station, Honker Lake Tract, King Island, Lisbon District, Medford Island, Mein's Landing, Merritt Island, Peters Pocket, Pico- Naglee, Prospect Island, Quimby Island, Randall Island, Rio Blanco Tract, Rough And Ready Island, Shin Kee Tract, Stark Tract, Sutter Island, Venice Island, Walthall, West Sacramento, Wetherbee Lake, Winter Island, Wright-Elmwood Tract.</u></p>

- All applications must meet the Eligibility Requirements under Section 3 of this proposal to be considered eligible for funding. Some of the entities shown on the table above may not meet those requirements.
- For additional and updated information regarding the funding priorities shown in the above table, please refer to the DSC's website: <http://deltacouncil.ca.gov/>.

Appendix 2

Habitat Enhancement and Multi-Benefit Project Establishment Period and Performance Period Expectations

Establishment Period Expectations

The Establishment Period, which is included in the initial PFA, will begin immediately after all enhancement plantings associated with the project have been successfully installed (including any necessary/required soil preparation and irrigation establishment). If plantings occur in different areas of the project or at different times, the establishment period begins after the last area is planted. Monitoring and maintenance during this one-year time period will include regularly scheduled invasive plant control, calibration of watering needs, and plant replacement as needed. Detailed documentation of tasks accomplished and issues managed (adaptive management) will be required for payment.

Performance Period Expectations and Reporting

The three-year Performance Period, which will be funded through a separate PFA at the same cost share of the preceding PFA, will begin immediately following the end of the Establishment Period and will include regularly scheduled monitoring, maintenance, annual reporting, and adaptive management. Eligible tasks associated with monitoring, reporting, and achieving performance criteria during the Performance Period will qualify for full reimbursement.

In consultation with CDFW, DWR Delta Levees Program and Delta Ecosystem Enhancement staff, performance criteria for each of the habitat types will be included in the SOW Performance criteria, including percent cover, species richness (number of plant species in a given area), and appropriate density for trees and shrubs. Planting density will be based on seeding and planting rate, species mix, and a detailed planting plan, which will be included in the SOW.

In coordination with the District, a CDFW-approved biologist (which could include DWR environmental staff) will visit the site annually to determine performance success according to the criteria developed for the site. Annual survey results will be provided in a monitoring report (due November 1 of each year), submitted to both CDFW and DWR, to evaluate if the targeted success criteria are being met. Any recommendations or remedial actions suggested by CDFW or DWR to improve the site will be reported back to the District.

Habitat monitoring and maintenance actions taken during the Performance Period may include re-planting, re-seeding, invasive plant control, and/or other maintenance activities.

Long-term Habitat Improvement

Habitat enhancement sites are expected to remain in place for at least as long as the Delta Levees Program stays in existence; therefore, all attempts will be made by the

District to avoid removal, minimize disturbance, and maintain higher biological values of the habitat enhancement site as measured through the success criteria of the project. Habitat maintenance will continue to be covered under the Subventions Program. If the site is ultimately damaged or somehow destroyed by future activities, the District will work with CDFW and DWR to develop an equivalent amount of habitat, either back onsite or at an alternate location, subject to the approval of CDFW and DWR.

DRAFT

Appendix 3

Local Agency Information

Title of Project :

Short Description :
:

Applicant Agency

Legal Name:

Mailing Address:

City, State, Zip Code:

Telephone: ()

Fax: ()

E-Mail:

Authorized Representative

Name:

Title:

Telephone: ()

Fax: ()

E-Mail:

Alternate Contact

Name:

Title:

Telephone: ()

Fax: ()

E-Mail:

**Cities/Communities in
the Protected Area:**

County :

Members of Congress

Name, District No.:

Name, District No.:

State Senators

Name, District No.:

Name, District No.:

Members of the State Assembly

Name, District No.:

Name, District No.:

Appendix 4 Authorizing Resolution Template

RESOLUTION NO. [xxxx]

A RESOLUTION OF THE [GOVERNING BODY] OF THE [AGENCY NAME]
AUTHORIZING THE GRANT APPLICATION, ACCEPTANCE, AND EXECUTION
FOR THE [PROJECT TITLE]

WHEREAS, [Agency Name] proposes to implement [Project Title];

WHEREAS, [Agency Name] has the legal authority and is authorized to enter into a funding agreement with the State of California; and

WHEREAS, [Agency Name] intends to apply for grant funding from the California Department of Water Resources for the [Project Title];

THEREFORE, BE IT RESOLVED by the [Governing Body] of the [Agency Name] as follows:

1. That pursuant and subject to all of the terms and provisions of the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Pub. Resources Code, § 75001 et seq.) and the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Wat. Code, § 79700 et seq.), the [Agency Name] [Title of Authorized Representative], or designee is hereby authorized and directed to prepare and file an application for funding with the Department of Water Resources, and take such other actions as necessary or appropriate to obtain grant funding.
2. The [Agency Name] [Title of Authorized Representative], or designee is hereby authorized and directed to execute the funding agreement with the Department of Water Resources and any amendments thereto.
3. The [Agency Name] [Title of Authorized Representative], or designee is hereby authorized and directed to submit any required documents, invoices, and reports required to obtain grant funding and fulfil the requirements of the funding agreement.

CERTIFICATION I hereby certify that the foregoing Resolution was duly and regularly adopted by the [Governing Body Name] of the [agency name] at the meeting held on [date], motion by [member name] and seconded by [member name], motion passed by the following vote:

AYES:
NOES:
ABSTAIN:
ABSENT:

Attest:

[Printed Name]
[Title], [Governing Body]

[Printed Name]
[Secretary/Clerk]

Appendix 5

Delta Levee Waterside Habitat (previously Fish Friendly Levee Habitat) as a type of Channel Margin Habitat

The Delta Levees Program is required to support net long-term habitat improvement (California Water Code Section 12311) within the Delta. The Program is also mandated to promote the co-equal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem (California Water Code Section 85054).

The development of Channel Margin Habitat (CMH) with maximum biological values requires a significantly wider water-to-land transition zone than is typically available in many Delta channels that are bordered by heavily rip-rapped levees. Given this reality, the Program has developed a Delta-specific CMH definition for waterside habitat that is created as an additional non-structural component of an existing levee structure. Delta-specific CMH that is designed to benefit native fish species within the confines of an existing levee system is henceforth being referred to as “Delta Levee Waterside Habitat” (DLWH), previously designated as “Fish Friendly Levee Habitat.” This habitat type is primarily intended to provide Delta-specific rearing and outmigration habitat for juvenile salmonids and other native fish, while decreasing habitat for non-native predators of native fishes.

Delta Levee Waterside Habitat features a complex of aquatic, wetland, and riparian habitats at the edge of watercourses. DLWH provides sandy or muddy substrate at a range of elevations that include tidally submerged or shallow benches to riparian habitat (aka Shaded Riverine Aquatic). DLWH provides diversity in structure, topography, vegetation, and hydrology, with shallower depths and slower velocities than in the adjacent channel, which combine to dissipate the energy of moving water. The creation of DLWH also provides built-in accommodation for anticipated sea level rise and increased intensity of freshwater flows due to climate change.

The intention of creating Delta Levee Waterside Habitat is to include a mosaic of ecologically valuable water-to-upland habitats along fish migration corridors within the Delta that provide the food and shelter necessary for the successful rearing of native fish species.

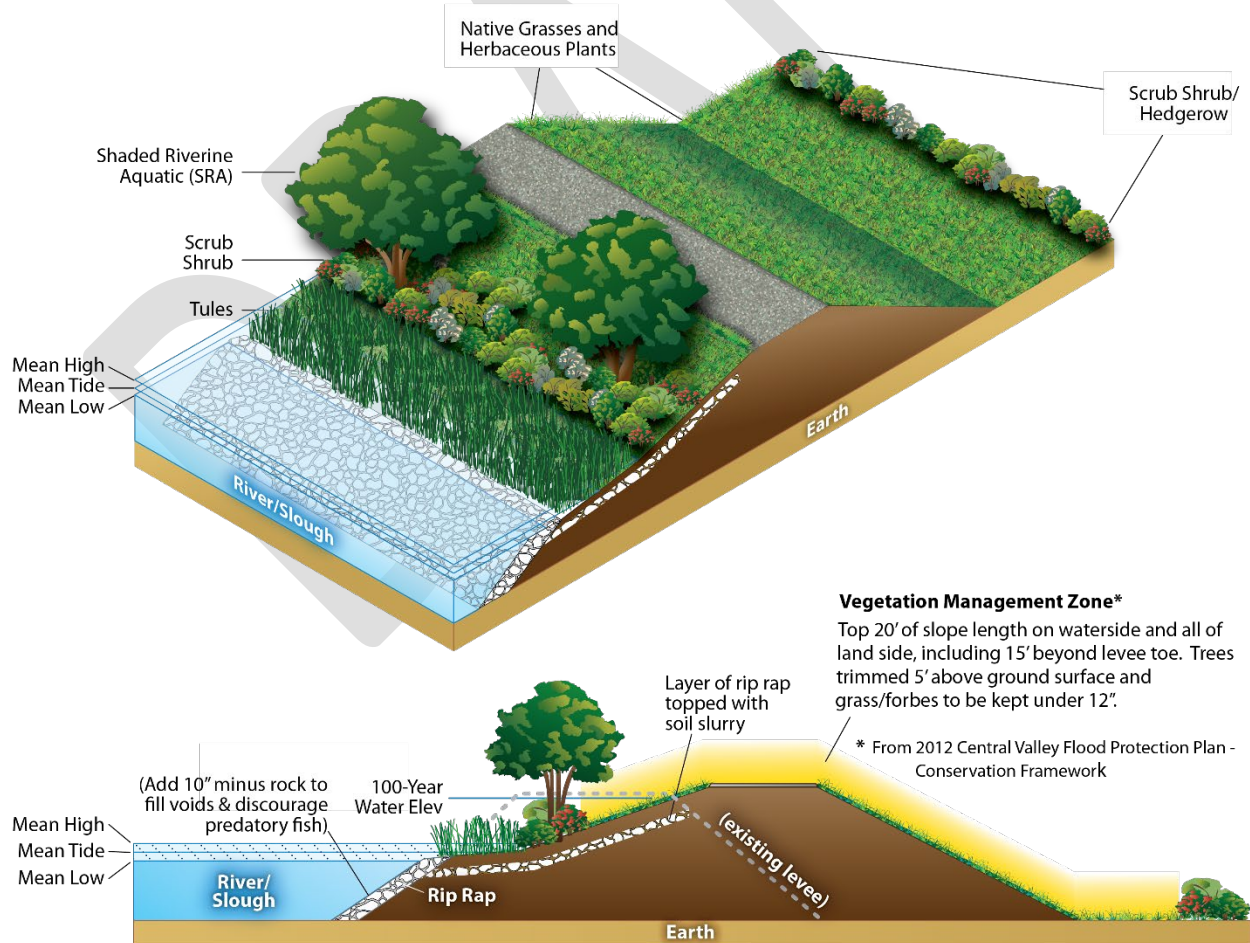
The principal ecological functions of Delta Levee Waterside Habitat include the following:

- Increase the amount of edge along water and levee slope through development of sloped benches, varying habitat slopes, or scalloping the water’s edge.
- Provide food production and foraging opportunities for native fish species and especially for salmonids during their outmigration by increasing aquatic emergent vegetation, scrub shrub and riparian vegetation on the higher slope.
- Provided foraging opportunities for salmonids and other native fish species by providing flow refuge through aquatic emergent vegetation and in-water finely branched woody material.

- Provide refuge from predation for salmonids during their outmigration through in-water finely branched woody material and overhead cover through overhanging riparian vegetation.
- Reduce predacious fish habitat through the reduction of submerged riprap or filling of voids within submerged riprap with smaller rock material.
- Provide habitat diversity through the creation of seasonally and tidally influenced levee slopes and benches into higher elevation riparian forest and scrub shrub habitat.

Delta Levee Waterside Habitat and Associated Landside Habitat

This example demonstrates a full array of habitat enhancement features, including a tidally submerged sloped bench that lends itself to tulle plantings; the use of 10" minus rock to fill rip rap voids, thereby discouraging predatory non-native fish; a waterside tidal slope planted to scrub shrub aquatic habitat to provide foraging and flow refuge, non-tidal slope planted to shaded riverine aquatic habitat; and landside features that include native grasses and forbs, and scrub shrub/riparian forest plantings.



Disclaimer: Drawings are idealized for how habitat should be incorporated into multi-benefit levee projects in order to benefit native delta species and are not meant to be used for levee design. Each levee repair site will be taken on a case-by-case basis and may not include all features shown. Drawings are not to scale.

Appendix 6

Definition of Habitat Types

Freshwater Marsh (FM) Habitat – is a relatively shallow aquatic area, usually less than about 4.5 feet deep, where emergent plants are growing. In the Delta, freshwater marsh occurs in non-tidal or tidal regimes. The most common plants are tules, bulrushes, and cattails. Plant biomass and productivity is frequently high in freshwater marshes. Many resident and freshwater fish (e.g., various minnows including Sacramento Splittail and juvenile salmonids) use tidally-influenced FM for cover from predators and feeding areas.

Scrub-shrub (SS) Habitat – is a stand of woody vegetation less than 20 feet in height. The various tree species that make up SS are generally the same as for RF, although in most instances alders and or willows are the dominant plants. SS also include such species as California blackberry, California wild rose, and coyote brush. Habitat value for fish and wildlife tends to increase with density and diversity of vegetative structure. Scrub shrub habitat can typically be found at mean-high water or higher elevations.

Shaded Riverine Aquatic (SRA) Habitat – is characterized by woody shoreline vegetation which overhangs the water's edge. Within the Delta, the woody vegetation component of SRA is most often provided by willows, alders, box elders, and cottonwoods. Shade provides cover and allochthonous* material for fish and wildlife and moderates high temperatures.

Riparian Forest (RF) Habitat – is characterized by woody vegetation (trees greater than 20 feet in height) that may or may not overhang the water's edge. The most common trees in the Delta include cottonwood, sycamore, alder, Oregon ash, willows, box elder, black walnut, and various oaks. RF habitat provides food, cover, nesting, and roosting places for many birds, including hawks, owls, herons, egrets, wood ducks, woodpeckers, flickers, and numerous passerine species and can provide an important movement corridor for wildlife. It also provides allochthonous^{14*} material for fish and smaller invertebrates to feed upon. Riparian forest habitat can typically be found at mean high-water or higher elevations.

Hedgerow Habitat – is characterized by a linear barrier (hedge) of trees and shrubs that typically borders a field or road and consists of riparian forest and/or scrub-shrub habitat type plants.

*Denotes organic matter that originated at a distance from its present position.

Appendix 7

Climate Risk in Investments Survey Questions

Appendix 7 is requested for all applicants and will be required prior to agreement execution. DWR uses the responses to these questions to assess the climate preparedness of our applicants as part of considering climate change in State investments (AB 2800). The responses will inform development of additional climate change guidance. Applicants should answer the following questions regarding their organization and include copies of the requested information. Answers to these questions and the documents submitted as part of this appendix will not affect project scoring.

1. Does the organization have a primary point of contact for climate change? (Yes/no; if yes, who is it and to what position in the organization does that person report?)
2. Does the organization have a strategic business plan that considers climate change? (Yes/no; if yes, please submit a copy)
3. Has the organization adopted any policies or made any formal public statements about climate change? (Yes/no; if yes, please attach a copy)
4. Has the organization conducted a climate change vulnerability assessment? (Yes/no; if yes, please submit a copy)
5. How would you describe your organization's capacity to adapt to the impacts of climate change? (Open ended; one-three paragraphs)

Appendix 8

Resources for Climate Change Considerations

Resources for Climate Change Considerations in Proposals

I.1 Scope and Purpose

The purpose of this Appendix is to provide guidance, information and resources to assist project applicants in understanding, identifying, assessing, and addressing climate change for project proposals. This information is derived from the California Department of Water Resources' (DWR's) experiences, state recommendations and requirements for considering best available science on climate, and information available from other local, state, and national governments, non-governmental organizations, and research scientists.

The resources and information contained here should be considered a guide in that it does not recommend a specific approach or process to be followed. The guidance also recognizes that project applicants will have varying needs and capacities to conduct climate change analysis for their project proposal. Project applicants are encouraged to use best available science and information that is available that pertains to their project type and proposed project location.

I.2 Legislative Authority on Considering Climate Change

The State of California recognizes the threat of climate change impacts to our communities, infrastructure, and economy. Under Assembly Bill 2800, the state is mandated to account for climate change in all planning, infrastructure, and investments, including grant making. Investments made need to be effective under future climate conditions.

Further, funding sources for this program, Proposition 84 and Proposition 1, acknowledge that climate change poses significant challenges for the State. These challenges must be addressed through careful planning and through improvements in land use and water management that both reduce contributions to global warming and improve the adaptability of our water and flood control systems.

I.3 Climate Change Background

Climate change is here and impacting California now. Climate models and observations have shown that the climate is no longer static and that planning based on the hydrology of the past is no longer adequate.

Projections of climate change in California indicate a further intensification of wet and dry extremes and shifting temperatures that can lead to more frequent flooding and droughts and impacts to both water demand and supply. Extreme and higher temperatures can lead to increases in water use and evapotranspiration. A declining snowpack and earlier runoff patterns could result in changes to stream flow patterns and reservoir operations. Projections of more frequent, severe, and prolonged droughts could lead to less surface water available and exacerbate ongoing stressors in groundwater basins across the state. Without implementing preparedness and resilience strategies to adapt to or mitigate these impacts, the changing climate can threaten water supply reliability and ecosystem health and increase flood risk exacerbated by sea level rise in specific state locations.

For the Sacramento-San Joaquin Delta region, several climate analyses studies conclude:

- Projections of increased warming are consistent for the entire Central Valley¹⁵.
- Extreme precipitation — the driver for most flood events — likely will intensify (especially in the north and south Delta), even with projections of overall drier conditions¹⁵.
- Changes in flood magnitudes and frequencies are projected to vary from north to south in the Central Valley. The high-elevation San Joaquin watersheds show the largest percentage increases in flood volumes caused by a reduction in precipitation falling as snow and more rapid snowpack melting¹⁵.
- Overall changes in the timing, duration, and magnitude of flows can change river geomorphic functions, floodplain activation, sediment mobilization, and the distribution of riverine habitats and adversely affect specific target species that depend on those processes¹⁵.
- Future floods are expected to have increased peak water surface elevations and cause more damage in tidally-influenced areas of the lower San Joaquin and Sacramento River watersheds because of sea level rise¹⁵.
- Frequency and magnitude of emergency response actions are expected to increase as a result of sea level rise, even in dry conditions¹⁵.
- Climate change will not impact Delta residents equally. Approximately 65 percent of the population who could be exposed to the 100-year flood by 2050 resides in areas with high concentrations of socially vulnerable residents.¹⁶

I.4 Considering Climate Change Impacts in Proposed Projects

The following approach for considering climate change in project planning and implementation builds on DWR's internal guidance, [Climate Action Plan: Phase 2](#) (DWR 2018), and the [Climate Change Handbook for Regional Water Management](#) (DWR 2011).

Three-step approach for Conducting a Climate Change Analysis

DWR recommends three steps for assessing climate change in proposed projects. First, project applicants should conduct a screening process to determine what elements and other aspects of the project may be

¹⁵ https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Flood-Management/Flood-Planning-and-Studies/Central-Valley-Flood-Protection-Plan/Files/CVFPP-Updates/2022/2022updateCVFPP22_layout_v9_plus_Append_BC.pdf

¹⁶ <https://deltacouncil.ca.gov/delta-plan/climate-change>

exposed and sensitive to climate change. The second step involves selecting and conducting an analysis on the proposed project and nearby habitats/structural/levee elements at risk to climate change.

The third step involves demonstrating how the proposed project is responsive to the identified climate impacts. This includes describing the strategies and actions that are or can be employed to respond to the impacts of climate change on the proposed levee improvement project and surrounding environment.

Step 1: Climate Change Risk and Vulnerability Screening

The first step in conducting a climate change analysis is to assess exposure and sensitivity to changing climatic conditions. In the absence of quantifiable likelihoods and impacts (an absence of which is common in assessing a range of future conditions), *risk* is evaluated by combining how exposed a region is to climate change, and the sensitivity of the project to those exposures. *Exposure* refers to the degree to which the project may be influenced by changes in climate. *Sensitivity* to exposure commonly involves an assessment of the project, considering tolerance changes to factors such as temperature, precipitation, and other key processes. It may also be relevant to consider the sensitivity to exposure of the surrounding ecosystems and habitats, where these habitat, species and ecosystems are integral to the project objectives and outcomes.

Not all areas of the Delta will experience climate impacts the same way. Even if risk to changing climate conditions is low, understanding the risks to the project can contribute to better planning and reliability outcomes.

The Central Valley Flood Protection Plan Updates (DWR Public Draft 2022, DWR 2017), Delta Adapts Vulnerability Assessment (DSC 2021), DWR Climate Action Plan: Phase III Vulnerability Assessment (DWR 2019), and Delta Levee Investment Strategy findings are relevant to determining climate change risks to the proposed project. However, because these assessments are not at the proposed project scale, a project applicant may choose to conduct a stand-alone in-depth climate risk assessment. In-depth assessments with scientific rigor can have multiple benefits, such as understanding the cascading effect of climate change on a project.

A suggested screening exercise is included at the end of this Appendix and provides a suite of questions in several climate impact categories to assist project applicants in identifying climate considerations for their projects. The screening exercise is not required to be submitted with project applicants – it is provided as a tool to support completing step 1 of a climate change analysis. Finally, not all climate impact categories will apply to this specific project solicitation. The basis of this screening exercise is generic by nature so that it can apply to any DWR project solicitations.

Step 2: Selecting the Climate Change Analysis Approach

The next step involves conducting a more thorough analysis of project elements identified in Step 1 as being at higher risk to climate change. The following information is provided as a guide to selecting a climate change analysis approach. The information provided here is not intended to be prescriptive or establish requirements for the analysis but to frame how project applicants might consider the most effective way to identify and consider climate change impacts for their projects.

Existing Climate Change Analysis

Modelling how climate change is projected to impact a region can be a resource intensive exercise. For planners who are unable to pursue such an analysis, it is prudent to explore if an existing climate change

analysis of their region may have already been conducted by other entities. Using climate change analyses conducted by another entity, such as a governmental agency, research institution, or consulting firm could save time and resources and can help ensure planning with a consistent set of climate change projections. Project applicants should determine whether such studies are conducted with scientific rigor and are consistent with accepted peer-reviewed approaches.

For the Delta region, there are several existing resources that describe risks and vulnerabilities to climate change that may provide useful information. These resources are discussed further below.

Conducting a New Climate Change Analysis

In some cases, project applicants may wish to conduct their own climate change analysis for their project proposals. There are multiple approaches for analyzing the impact of climate change, such as a “bottom-up” approach (starting with system characteristics and capabilities), “top-down” approach (starting with characterizations of future climate), a sensitivity analysis, and stress tests. Whatever approach is selected, it should adhere to the best available scientific guidance for climate change analysis.

The “IPCC Expert Meeting on Assessing and Combining Multi Model Climate Projections Meeting Report”¹⁷ provides one of the most comprehensive, consolidated synopses of this expansive research field. A few of the most pertinent principles from that report are summarized below. These scientific principles are included here to provide the basis for building out a climate change analysis. These principles introduce the theoretical underpinnings of the following section, which outlines specific considerations relevant to project manager’s choice of climate change analysis methods and data.

- **Data Sources:** The following factors are considered in assessing future climate change in a region: historical changes, changes projected by global climate models (GCMs) and their downscaled products, and climatic process-based changes such as intensification of atmospheric rivers or increases in the climatic water deficit. This means that the climate change analysis should incorporate information from historical observations, GCMs, downscaled GCM projections, and other relevant information about historical and projected changes.
- **Purpose and Uncertainty:** Climate change impact assessments are made for multiple reasons and employ different methodological approaches. Depending on the purpose, some impact studies explore the variations in models and in what is referred to as the “uncertainty space,” more thoroughly than others. Some studies may legitimately reach a specific conclusion by using a single global climate model or downscaled product. For policy-relevant impact studies, it is desirable to sample the uncertainty space by evaluating global and regional climate model ensembles and downscaling techniques.
- **Other Forcings:** It should be recognized that additional forcings and feedbacks, which may not be fully represented in global models, may be important for

¹⁷ https://www.wcrp-climate.org/wgcm/references/IPCC_EM_MME_GoodPracticeGuidancePaper.pdf

regional climate change (e.g., land use change, heat island effect, or the influence of atmospheric pollutants). Climate forcings refer to those physical factors outside the climate itself that affect the Earth's climate. These include human-induced changes in greenhouse gas emissions, surface reflectivity, and atmospheric aerosols.

- **Qualitative Information:** When quantitative information is limited or missing, assessments may provide narratives of climate projections (storylines, quantitative or qualitative descriptions of possible realizations of climate change) in addition to, or as an alternative to, maps, averages, ranges, scatter plots, or formal statistical frameworks for the representation of uncertainty.
- **Communicate Uncertainties:** Limits to the information content of climate model outputs for regional projections need to be communicated clearly. The relative importance of uncertainties typically increases for small scales and affects relevant quantities due to limitations in model resolution, local feedbacks and forcings, low signal-to-noise ratio of observed trends, and possibly other confounding factors relevant for local effects.
- **Model Selection:** For regional applications, some climate models may not be considered because of their poor performance for some regional metric or relevant process. That said, there are no simple rules or criteria to define this distinction. Whether a set of models should be considered is a different research-specific question in every case. Selection criteria for model assessment should be based, among other factors, on availability of specific parameters and the spatial and temporal resolution within the model.
- **Downscaling:** The usefulness and applicability of downscaling methods strongly depend on the purpose of the assessment (e.g., for the analysis of extreme events or assessments in complex terrain). If only a subsample of the uncertainty space of the available global climate model is used for the downscaling, this should be noted explicitly.
- **Time Horizon and Emissions Scenarios:** Many impact studies are affected by the relative similarity between different greenhouse gas emission scenarios in the near term. The length of the time period considered in the assessment studies can significantly affect results.

Building upon these scientific principles, there are several other factors that should be considered in choosing an approach for developing a new climate change analysis. The following six analytical considerations should be used to determine the most appropriate approach:

1. Climate sensitive parameters.
2. Spatial scale.
3. Infrastructure/systems and operational activities.

4. Legal and institutional issues.
5. Continuity with previous work/studies.

1. Climate-sensitive Parameters

Assessing the climate sensitivity of infrastructure can assist in determining the type and scope of climate change analysis to use. Analytical considerations may include climate-sensitive parameters, climate-driven parameters, and how definite the assessment of these parameters can be. Analytical considerations include:

- What are the climate-sensitive parameters that affect project performance (e.g., average precipitation, sea level rise, summer high daily temperatures, extended heat waves, atmospheric river driven precipitation)?
- What are the climate-driven parameters that affect vulnerability of the project (e.g., average annual streamflow; September streamflow; 3-, 5-, 7-day streamflow; stream temperatures; minimum flows; wildfire; sea level rise)?
- Does adequate data exist to explore how climate change could affect the project or surrounding area?
- Do extreme events (floods, droughts, heat waves, wildfires) significantly impact the performance of the project or infrastructure?
- How skillfully do downscaled global climate models simulate historically observed climate parameters of interest? How will the observed historical record of climate parameters of interest be used? How will (downscaled) global climate model data for climate parameters of interest be used? Is low-frequency variability in the climate parameters of interest an important consideration?
- What is the optimal temporal scale to adequately analyze the climate conditions (e.g., hourly, 6-hourly, daily, weekly, monthly, annually, multi-year averages)?

Many climate-sensitive parameters are commonly used by state and local entities analysis. For example, flood-protection analyses focus on flooding that could possibly disrupt the water supply, most likely through damage to infrastructure. When analyzing potential flood impacts daily and, in some cases, hourly temperature and precipitation will be the key climate-sensitive parameters of interest, while 1-, 3-, 5-, and 7-day peak streamflow and antecedent watershed conditions (such as snowpack and soil moisture) will be key climate-driven parameters of interest. GCMs are not designed to provide climate information at these temporal scales and do not have the spatial resolution to adequately simulate orographic precipitation patterns and other acute spatial characteristics. Downscaling approaches have been used in the past to address these issues, but concerns remain about the ability of downscaling methods to adequately translate important large-scale phenomena to smaller scale impacts. Again, project applicants should evaluate past efforts and the unique characteristics of the region before deciding on an approach.

2. Spatial Scale

In selecting the climate change analysis approach, project applicants will want to assess analytical considerations relevant to the spatial scale of the proposed project. These issues may include the following:

- Is the analysis, consistent with other previously used datasets and analyses (e.g., CVFPP, Delta Adapts)?
- Is the analysis consistent with other plans or analyses conducted over the same, similar, or overlapping areas?

Some analyses can be done at localized scales and are not influenced by conditions outside of the watershed in question; but, in many cases, conditions outside of the watershed will have important ramifications for the analysis.

3. Infrastructure, Systems and Operational Activities

Infrastructure, systems, and operational considerations include the following:

- Does the analysis consider multiple infrastructure or system changes? Or is the existing system (without changes) being analyzed under modified climate conditions?
- Is there an existing operations model (e.g., flood protection or water supply) that can be run with different climate conditions to simulate performance under differing climate conditions?
- What are the climate-sensitive inputs to the existing system model? What is the time step of the existing system model? Do these system model characteristics align with available climate datasets?
- Does the system model allow all important conditions to vary over time (land use, population, sea level, water demand, etc.)?

Often the models used to evaluate climate impacts, such as a water system operations model, are configured so that certain conditions remain fixed throughout the simulation. This constraint may have important ramifications for how the simulation is configured and the type of climate dataset and tools used.

4. Legal and Institutional Issues

Analytical considerations relevant to identifying the legal and institutional issues and constraints include the following:

- Is there a statute, regulation, or policy that requires a specific approach or the use of specific tools or datasets?
- Are there partnership agreements that require or constrain the selection of approaches,

tools, or data for climate change analysis?

- Who will be performing the analysis?

Developing new tools and datasets or deploying existing tools and datasets to be used for planning often involves additional considerations because of the range of technical capacities and data availability at local levels. For example, in 2017, DWR developed tools and data for climate change analysis to be used for the Central Valley Flood Protection Plan Update, which were updated for the Central Valley Flood Protection Plan 2022 Public Draft. An important consideration in the CVFPP 2017 was that the datasets and tools had to be compatible to current standard of practice used by many federal agencies to develop flood frequency analysis using USGS Bulletin 17C. Because of these considerations, a novel approach had to be developed specifically for the CVFPP to adjust the flood frequency for climate change projection using climate change ratio or factors. Some water supply sources may be similar in the sense that they have not yet been analyzed for impacts from climate change, and they are complicated by their source, topography, legal obligations, infrastructure, or stakeholder goals and objectives, as well as other challenges.

5. Continuity with Previous Work/Studies

The following considerations are useful to ensure continuity with previous analyses to the greatest ability possible:

- Does the analysis/plan need to be consistent with previously performed work? Does this analysis fit within an existing framework or larger/programmatic plan that was already analyzed using a specific approach and dataset?
- Does the analysis build upon or update previously completed analysis or planning work?
- Has a similar analysis been completed previously?

When a new analysis connected to previous work is being performed, additional considerations are useful to maintain alignment with the previous work. In these situations, it is important to maintain coherence and alignment between previous work and new work while also addressing the need to evolve and incorporate scientific, analytical, and management improvements. This stresses the importance of beginning this process with a thorough examination of existing climate change analysis at the local/regional level up to the watershed and statewide levels.

Step 3: Developing Adaptation Strategies, Planning, and Implementation

Analyzing how a changing climate can impact the project helps reveal what needs to be mitigated, planned for, or otherwise implemented to decrease risks. Often the vulnerabilities to climate change are also vulnerabilities to existing extreme conditions. Climate change can exacerbate existing challenges, thus the need to address those challenges may become a higher priority as part of a proposed project.

The actions, infrastructure, and social processes of developing ways to mitigate climate change impacts is referred to as “climate adaptation.” Adaptation strategies range widely depending on the needs of the region, capacity of the actors, and land use opportunities or constraints. They may involve engineered infrastructure, legal or policy actions or more nature-based approaches. In the Delta, flood risk adaptation strategies may be combined with ecosystem improvement strategies. For example, setback levees can achieve additional levee height for flooding and sea level rise resilience while promoting habitat enhancements such as increased inundation of floodplain habitat to benefit native fish. In addition, tidal wetland restoration in the Delta can support subsidence reversal, improve habitat for native species, and increase carbon sequestration. More information on developing climate change adaptation strategies can be found at <https://resilientca.org/apg>.

Furthermore, adaptation strategies should be flexible enough to scale up to more adverse conditions. Future conditions derived from climate change projections have significant uncertainties due to multiple factors (e.g., greenhouse gas emissions trajectories). These projections are also revised approximately every 10-years by the Intergovernmental Panel on Climate Change (IPCC) and might result in different trends than the latest IPCC Work Group II Sixth Assessment Report¹⁸. Therefore, taking a median projection from the latest climate change projection might result in a 50 percent chance of success or a 50 percent chance of failure or maladaptation during the project lifespan. One option could be to build robust adaptation strategies which account for more extreme climate change projections with the risk of high-cost projects for low effectiveness in the long term. Another option is to proactively consider building flexibility in the project design to reduce a so-called lock-in situation. For example, one could envision acquiring a larger easement than the original levee design to raise the levee crown over time if required by increased climate change conditions. This flexibility in the project design will require a monitoring program to provide adaptive feedback and/or corrective action(s) relative to more recent climate change projections.

Finally, project proposals should consider evaluating the cascading effect of climate change on the project and its potential implication relative to its operation and maintenance. For example, is the project’s accessibility at risk from climate change? If the response is yes, a contingency plan should be discussed in the eventuality that the project cannot be maintained, monitored, or operated over time.

I.5 Resources

The list below includes a catalogue of existing DWR-produced and -partnered climate change datasets and resources. This information is not meant to recommend any tool or dataset over another. The description of each resource clarifies its purpose, contents, and recommended uses for climate change analysis so that the project proponent can determine its application to the proposed project.

Cal-Adapt.org

Cal-Adapt provides a view of how climate change might affect California, including changes in temperature, precipitation, snowpack, sea level rise, and wildfire. It contains tools, data, and resources to conduct research, develop adaptation plans, and build applications. Data products currently available on Cal-Adapt include:

¹⁸ <https://www.ipcc.ch/report/ar6/wg2/>

- LOCA downscaled projections.
- Historical observed daily temperature and precipitation gridded data.
- Sea level rise scenarios.
- Snowpack forced by LOCA and gridded observed data.
- Wildfire scenarios.
- Long drought scenarios (LOCA).
- Streamflow (routed and bias corrected by LOCA).
- Additional climate variables generated through use of the VIC model forced by LOCA, downscaled projections, and gridded observed data.

CVFPP Scenario

Developed in 2017, this climate change scenario was established specifically for the Central Valley Flood Protection Plan (CVFPP) 2017 Update. This scenario covers the Central Valley and develops changes in flood volumes at various return periods to modify Central Valley Hydrology Study (CVHS) unregulated volume-frequency curves to incorporate future climate change for the flood risk analysis.

One climate change scenario over a 96-year period, is included.

- Combined Warming and Precipitation Change Scenario based on CMIP5 Climate Model Simulations:
 - Late Century: Projected precipitation and temperature changes.
- Uses downscaled climate model data based on bias-correction spatial disaggregation downscaling method.
- Quantile mapping methodology used to perturb historical observed record of temperature and precipitation with climate trends.
- Hydrology model: VIC at 1/16-degree spatial resolution (6 km x 6 km grid spacing).
- Flood Frequency Analysis: Bulletin 17B method in the United States Geological Survey's PeakFQ software.
- Uses end-of-century climate change scenario considering combined changes in precipitation and temperature for CVFPP complete risk analysis.

For sea level rise, the 2017 CVFPP Update used a medium projection value, for year 2062 from National Research Council Report, 2012¹⁹ estimated at 1.26ft at the Golden Gate Bridge. Additional details on the approach used can be found in Maendly, 2018²⁰.

Reference:

- [2017 CVFPP Update — Climate Change Analysis Technical Memorandum.](#)
- 2022 CVFPP Update — Technical Analyses Summary Report Public Draft (Technical Report and Appendices can be requested)

Data Availability: Data products can be requested via [email](#).

Status as of 2022: The [Public Review Draft 2022 CVFPP Update](#) relies upon three climate change scenarios following the procedure established in the 2017 CVFPP Update. These new scenarios used climate model simulation data from the CMIP5, which was the basis of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5). The three scenarios represent three future conditions centered at 2072. 1) A drier – less warming condition, 2) A median condition similar to the scenario developed under the 2017 CVFPP Update, and 3) a wetter – more warming condition. Projected changes to historical unregulated flow volumes are derived through hydrologic modeling of the Central Valley watersheds. Unregulated flow volumes were estimated by applying climate scenarios (i.e., temperature and precipitation projections derived from CMIP5) to the historical variability in climate and simulating the hydrologic responses of the Central Valley watersheds using the VIC model.

Two enhancements were made to the 2017 CVFPP Update approach for the 2022 CVFPP Update specific to sea level rise in the Delta. First, the stage-discharge relationships in the Delta were improved by doubling the number of events simulated with the RMA model and development of the flow-stage relationship. Second, the sea level rise projection was changed based on the Ocean Protection Council 2018 guideline (OPC, 2018) and correspond to 3.68 feet at the Golden Gate Bridge by 2072. Further analyses were done using a range of sea level rise from 0 to 6ft.

Recommended Uses: These scenarios have applicability for flood planning studies in the Central Valley. The CVFPP 2017 and 2022 public draft climate change scenarios were used to develop changes in flood volumes at various return periods for more than 150 locations throughout the Central Valley and the Delta. The changes in flood volumes and sea level rise developed to support the CVFPP 2017 and 2022 Updates can be useful for other planning studies but require extra caution to use them for designing a flood project.

Delta Adapts: Sacramento - San Joaquin Delta Vulnerability Assessment

The Delta Adapts: Creating a Climate Resilient Future study is a regional

¹⁹ National Research Council. 2012. Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future. Washington, DC: The National Academy Press.

²⁰ https://www.energy.ca.gov/sites/default/files/2019-12/Water_CCCA4-EXT-2018-011_ada.pdf

climate change vulnerability analysis for the Sacramento-San Joaquin Delta. The Delta Stewardship Council (Council) initiated Delta Adapts in 2018 to improve the Council's understanding of regionally specific climate change vulnerabilities and risks and address how Delta communities, infrastructure, and ecosystems can adapt to future conditions. This assessment includes a planning horizon of 2100 while recognizing the 2050 planning horizon used for the Delta Plan and proposed amendments. The Flood Hazard Analysis Technical Memorandum that accompanies this study provides additional data and information regarding flood risk from inland flows and sea level rise based of 0, 1, 2, 3, 4, 5, 6, 7, and 10 ft. The technical information contained in the Flood Hazard Analysis is accessible, transparent, and replicable – characteristics that support the scientific process in the Bay-Delta research and planning community, where best available science and policymaking is constantly changing. The initiative uses open source software to the extent possible to support enhancements and derivative works (Morin et al. 2012). The methods and assumptions are clearly documented in this technical memorandum so that the results of this work are transparent and replicable.

Recommended Uses:

Understanding the climate change impacts to the Delta's people, places, agricultural production, infrastructure, recreational facilities and opportunities, ecosystems, and water supply on or adjacent to proposed Delta special levees projects. Tools developed through the Flood Hazard Analysis can be used to quantifiably understand flood risk exposure to people, land, and assets in the Delta by county as well as visualize flood exposure risk by islands and sub-regions within the Delta under nine deterministic and probabilistic flood scenarios.

References:

- Delta Adapts: Creating a Climate Resilient Future and Technical Memorandum Flood Hazard Assessment June 2021
- [Climate Change Flood Scenarios in the Delta \(shinyapps.io\)](https://shinyapps.io)

Decision Scaling Platform

Decision scaling is a platform for climate change analysis rather than a specific set of scenarios to be used for analysis. Decision scaling integrates vulnerability-based analysis with traditional risk-based assessment methods, allowing for the assessment of climate vulnerability across a wide range of potential future climate conditions and estimation of the probability of specific outcomes. This bottom-up approach enables planning for future changes that is informed by the best available science on climate change while not dependent on precise prediction of future values (i.e., does not rely on specific climate scenarios). Since 2016, DWR has collaborated with the University of Massachusetts Hydrosystems Research Group on the development of the decision scaling platform for the Central Valley watershed.

- Analysis platform evaluates system impacts and potential adaptation strategies across precipitation changes of +/- 30 percent and temperature changes of 0–4 degrees Celsius.
- Fifty-four hydrological sequences explore variations in inter-annual hydrologic variability observed in the 1,100-year reconstructed paleo record of streamflows in the Sacramento-San Joaquin watershed.

- Provides ability to explore hydrologic or system performance metrics across a range of climate changes.
- Hydrology model: Sacramento Soil Moisture Accounting hydrologic model (SAC-SMADS).
- Operations Model: CalLite 3.0.

Reference: [Decision Scaling Evaluation of Climate Change Driven Hydrologic Risk to the State Water Project Final Report](#)

Data Availability: Guidance on incorporating the decision scaling platform and related data products can be requested via [email](#) from the DWR Climate Change Program.

Status as of 2022: The decision scaling platform draws on cutting edge climate analysis research and techniques that have evolved out of a field known as “decision-making under deep uncertainty.” This platform allows DWR to analyze the Central Valley water system and potential changes to it across a wide range of climate changes and to assign conditional probability estimates to each outcome so that decision-makers have probabilistic information about expected outcomes as well as less likely outcomes.

Recommended Uses: This platform is recommended for higher-level strategic planning applications and has not yet been used for specific project-level evaluations. Additional future work will focus on integrating decision scaling and detailed project level analysis.

I.6 Other Resources and References

Several additional reports, studies, and other resources provide more guidance and information on conducting climate change analyses in California and beyond and may be helpful for planning and implementing Delta levee special projects.

Sea-Level-Rise Guidance for California Local Planning

Befus KM, Hoover DJ, Barnard PL, Erikson LH, 2020. Projected responses of the coastal water table for California using present-day and future sea- level-rise scenarios: U.S. Geological Survey data release. Available at: <https://doi.org/10.5066/P9H5PBXP>.

California Ocean Protection Council (OPC): Updated Sea Level Rise Guidance, March 2018. Available at: http://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-A OPC_SLR_Guidance-rd3.pdf.

This guidance builds on previous sea-level-rise guidance from OPC and includes probabilistic sea-level-rise projections for 2030, 2050, 2070, and 2100 that should be used by state and local agencies and non-governmental entities implementing projects or programs funded by the state or on state property.

California Governor's Office of Emergency Services. 2020. California Adaptation Planning Guide 2020 Update. State of California. Available at: <https://www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/hazard-mitigation-planning/california-climate-adaptation>

Social Vulnerability of Populations

Delta Adapts looked at [Social Vulnerability to Climate Change in the Delta \(shinyapps.io\)](https://shinyapps.io)

CalEnviroScreen, a tool that ranks census tracts based on a combination of social, economic, and environmental factors, to identify Disadvantaged Communities (DACs). [CalEnviroScreen | OEHHA](#)

The [Disadvantaged Communities \(DAC\) Mapping Tool](#) is a web-based application to assist local agencies and other interested parties in evaluating DAC status throughout the State, using the definition provided by Proposition 84 IRWM Guidelines (2015).

Ecosystems and Habitats

Climate Change Vulnerability Assessment: Climate Action Plan, Phase 3. Sacramento, California: DWR, 2019.

Available at: <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Climate-Change-Program/Climate-Action-Plan/Files/CAP-III-Vulnerability-Assessment.pdf>

DWR's Phase III Climate Change Vulnerability Assessment (VA) provides the first comprehensive evaluation of DWR's vulnerabilities to expected increases in wildfire, extreme heat, and sea-level rise, as well as to changes in ecosystems and long and short-term hydrology due to climate change. While this VA is specific to DWR's assets and resources, there is information about the vulnerability of habitats and ecosystems by ecoregions that may be informative for project applicants of Delta Levee Special Project proposals.

Selection of California USBR Basin Studies

Sacramento and San Joaquin Rivers Basin Study

California Department of Water Resources

This study, collaboratively developed by Reclamation, the State of California Department of Water Resources, El Dorado County Water Agency, Stockton East Water District, California Partnership for the San Joaquin Valley and Madera County Resource Management Agency, examines climate change impacts and adaptation actions for the Sacramento River Basin, San Joaquin River Basin and the Tulare Lake Basin.

- [Sacramento and San Joaquin Rivers Basin Study Report and Executive Summary](#)
- [Sacramento and San Joaquin Rivers Basin Study Technical Report](#)
- [Sacramento and San Joaquin Rivers Basin Study Appendices](#)

Cal-Adapt and the Climate Change Technical Advisory Group (CCTAG) – California Climate Change Projections

This document was developed in 2015 by a formal committee of outside experts working with DWR staff. The projections are drawn from the Coupled Model Intercomparison Project Phase 5 (CMIP5) archive and use a three-step culling procedure with a variety of metrics pertinent to water management in California to select the 10 global climate models that have the greatest ability in simulating California climate conditions. This information is now stored on the Cal-Adapt platform.

- Total of 20 transient projections running from 1950–2099.
- Ten global climate models and two representative concentration pathways (4.5 and 8.5).
- Uses localized constructed analogs (LOCA) downscaling (6 kilometer [km] x 6 km grid spacing).
- Provides daily maximum and minimum temperature and precipitation.
- Hydrology model: Variable infiltration capacity (VIC).
- Water management model: WEAP.
- Operations model: CalSim-II.

Reference: [Perspectives and Guidance for Climate Change Analysis](#).

Data Availability: LOCA downscaled projections data are available for exploration and download from the [CalAdapt website](#) and API.

Status as of 2022: These scenarios provide a suite of future climate projections that generally cover the range of uncertainty expected in potential future climate conditions. The California Fourth Climate Change Assessment and CalAdapt have recommended and used this suite of scenarios for all studies done for the upcoming assessment report. The Fourth Assessment team has also provided additional guidance on which of the 20 scenarios to use when using the full 20-model ensemble is infeasible.

Recommended Uses: These scenarios have wide applicability for many types of studies. The WSIP scenarios provide an example of how those additional preprocessing steps have been performed by DWR for the Water Storage Investment Program.

Other References

Brugger J, Crimmins M. 2015. Designing institutions to support local-level climate change adaptation: Insights from a case study of the U.S. Cooperative Extension System. *Weather, Climate, and Society*. 7(1): 18-38. Available at: <https://journals.ametsoc.org/wcas/article/7/1/18/924>

Houlton, Benjamin, Jay Lund. (University of California, Davis). 2018. Sacramento Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-002. https://www.energy.ca.gov/sites/default/files/2019-11/Reg_Report-SUM-CCCA4-2018-002_SacramentoValley_ADA.pdf

Ray P, Brown C. 2015. *Confronting Climate Uncertainty in Water Resources Planning and Project Design: The Design Tree Framework*.

International Bank for Reconstruction and Development/The World Bank. Available at: <https://openknowledge.worldbank.org/bitstream/handle/10986/22544/9781464804779.pdf?sequence=1&isAllowed=y>

U.S. Global Climate Research Program (USGCRP). 2018. *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel,

K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018. Available at: <http://climateassessment.ca.gov/>

I.7 Sample Climate Change Vulnerability Screening Exercise

This screening exercise is intended to guide project applicants in identifying all potential climate change vulnerabilities for their projects. The information gathered here can help guide the focus of a more detailed climate change analysis for a project. The screening exercise is not required to be submitted with project applicants. It is provided as a tool to support completing step 1 of a the recommended three-step climate change analysis approach. Please note that not all climate impact categories will apply to this specific project solicitation. The basis of this screening exercise is generic by nature so that it can apply to all DWR project solicitations.

I. Water Demand

- Are there major industries that require cooling/process water in your planning region?
 - As average temperatures increase, cooling water needs may also increase.
 - Identify major industrial water users in your region and assess their current and projected needs for cooling and process water.

- Does water use vary by more than 50% seasonally in parts of your region?
 - Seasonal water use, which is primarily outdoor water use, is expected to increase as average temperatures increase and droughts become more frequent.
 - Where water use records are available, look at total monthly water uses averaged over the last five years. If maximum and minimum monthly water uses vary by more than 25%, then the answer to this question is "yes".
 - Where no water use records exist, is crop irrigation responsible for a significant (say >50%) percentage of water demand in parts of your region?

- Are crops grown in your region climate-sensitive? Would shifts in daily heat patterns, such as how long heat lingers before night-time cooling, be prohibitive for some crops?
 - Fruit and nut crops are climate-sensitive and may require additional water as the climate warms.

- Do groundwater supplies in your region lack resiliency after drought events?
 - Droughts are expected to become more frequent and more severe in the future. Areas with a more hardened demand may be particularly vulnerable to droughts and may become more dependent on groundwater pumping.

- Are water use curtailment measures effective in your region?
 - Droughts are expected to become more frequent and more severe in the future. Areas with a more hardened demand may be particularly vulnerable to droughts.

- Are some instream flow requirements in your region either currently insufficient to support aquatic life, or occasionally unmet?
 - Changes in snowmelt patterns in the future may make it difficult to balance water demands. Vulnerabilities for ecosystems and municipal/agricultural water needs may be exacerbated by instream flow requirements that are:
 1. Not quantified,

2. Not accurate for ecosystem needs under multiple environmental conditions including droughts, and
3. Not met by regional water managers.

II. Water Supply

- Does a portion of the water supply in your region come from snowmelt?
 - Snowmelt is expected to decrease as the climate warms. Water systems supplied by snowmelt are therefore potentially vulnerable to climate change.
 - Where watershed planning documents are available, refer to these in identifying parts of your region that rely on surface water for supplies; if your region contains surface water supplies originating in watersheds where snowpack accumulates, the answer to this question is "Yes."
 - Where planning documents are not available, identify major rivers in your region with large users.
 - Identify whether the river's headwaters are fed by snowpack.
- Does part of your region rely on water diverted from the Delta, imported from the Colorado River, or imported from other climate-sensitive systems outside your region?
 - Some imported or transferred water supplies are sources from climate-sensitive watersheds, such as water imported from the Delta and the Colorado River.
- Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?
 - Coastal aquifers are susceptible to salt intrusion as sea levels rise, and many have already observed salt intrusion due to over-extraction, such as the West Coast Basin in southern California.
- Would your region have difficulty in storing carryover supply surpluses from year to year?
 - Droughts are expected to become more severe in the future. Systems that can store more water may be more resilient to droughts.
- Has your region faced a drought in the past during which it failed to meet local water demands?
 - Droughts are expected to become more severe in the future. Systems that have already come close to their supply thresholds may be especially vulnerable to droughts in the future.

III. Water Quality

- Are increased wildfires a threat in your region? If so, does your region include reservoirs with fire-susceptible vegetation nearby which could pose a water quality concern from increased erosion?
 - Some areas are expected to become more vulnerable to wildfires over time.
- Does part of your region rely on surface water bodies with current or recurrent water quality issues related to eutrophication, such as low dissolved oxygen or algal blooms? Are there other water quality constituents

- potentially exacerbated by climate change?
- Warming temperatures will result in lower dissolved oxygen levels in water bodies, which are exacerbated by algal blooms and in turn enhance eutrophication. Changes in streamflows may alter pollutant concentrations in water bodies.
- Are seasonal low flows decreasing for some waterbodies in your region? If so, are the reduced low flows limiting the waterbodies' assimilative capacity?
- In the future, low flow conditions are expected to be more extreme and last longer. This may result in higher pollutant concentrations where loadings increase or remain constant.
- Are there beneficial uses designated for some water bodies in your region that cannot always be met due to water quality issues?
- In the future, low flows are expected decrease, and to last longer. This may result in higher pollutant concentrations where loadings increase or remain constant.
- Does part of your region currently observe water quality shifts during rain events that impact treatment facility operation?
- While it is unclear how average precipitation will change with temperature, it is generally agreed that storm severity will probably increase. More intense, severe storms may lead to increased erosion, which will increase turbidity in surface waters. Areas that already observe water quality responses to rainstorm intensity may be especially vulnerable.

IV. Sea Level Rise

- Has coastal erosion already been observed in your region?
- Coastal erosion is expected to occur over the next century as sea levels rise.
- Are there coastal structures, such as levees or breakwaters, in your region?
- Coastal structures designed for a specific mean sea level may be impacted by sea level rise.
- Is there significant coastal infrastructure, such as residences, recreation, water and wastewater treatment, tourism, and transportation, at less than six feet above mean sea level in your region?
- Coastal flooding will become more common, and will impact a greater extent of property, as sea levels rise. Critical infrastructure in the coastal floodplain may be at risk.
 - Digital elevation maps should be compared with locations of coastal infrastructure.
- Are there climate-sensitive low-lying coastal habitats in your region?
- Low-lying coastal habitats that are particularly vulnerable to climate change include estuaries and coastal wetlands that rely on a delicate balance of freshwater and salt water.
- Are there areas in your region that currently flood during extreme high tides or storm surges?
- Areas that are already experiencing flooding during storm surges and very high tides, are more likely to experience increased flooding as sea levels rise.
- Is there land subsidence in the coastal areas of your region?
- Land subsidence may compound the impacts of sea level rise.

- Do tidal gauges along the coastal parts of your region show an increase over the past several decades?
 - Local sea level rise may be higher or lower than state, national, or continental projections.

V. Flooding

- Does critical infrastructure in your region lie within the 200-year floodplain?
 - While it is unclear how average precipitation will change with temperature, it is generally agreed that storm severity will probably increase. More intense, severe storms may lead to higher peak flows and more severe floods.
 - Refer to FEMA floodplain maps and any recent FEMA, US Army Corps of Engineers, or DWR studies that might help identify specific local vulnerabilities for your region. Other follow-up questions that might help answer this question:
 1. What public safety issues could be affected by increased flooding events or intensity? For example, evacuation routes, emergency personnel access, hospitals, water treatment and wastewater treatment plants, power generation plants and fire stations should be considered.
 2. Could key regional or economic functions be impacted from more frequent and/or intense flooding?
- Does part of your region lie within the Sacramento-San Joaquin Drainage District?
 - The SSJDD contains lands that are susceptible to overflows from the Sacramento and San Joaquin Rivers and are a key focus of the Central Valley Flood Protection Plan.
<https://water.ca.gov/Programs/Flood-Management/Flood-Planning-and-Studies/Central-Valley-Flood-Protection-Plan>
- Does aging critical flood protection infrastructure exist in your region?
 - Levees and other flood protection facilities across the state of California are aging and in need of repair. Due to their overall lowered resiliency, these facilities may be particularly vulnerable to climate change impacts.
- Have flood control facilities (such as impoundment structures) been insufficient in the past?
 - Reservoirs and other facilities with impoundment capacity may be insufficient for severe storms in the future. Facilities that have been insufficient in the past may be particularly vulnerable.
- Are wildfires a concern in parts of your region?
 - Wildfires alter the landscape and soil conditions, increasing the risk of flooding within the burn and downstream areas. Some areas are expected to become more vulnerable to wildfires over time.

VI. Ecosystem and Habitat Vulnerability

- Does your region include inland or coastal aquatic habitats vulnerable to erosion and sedimentation issues?
 - Erosion is expected to increase with climate change, and sedimentation is expected to shift. Habitats sensitive to these events may be particularly vulnerable to climate change.
- Does your region include estuarine habitats which rely on seasonal freshwater flow patterns?

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- Seasonal high and low flows, especially those originating from snowmelt, are already shifting in many locations.

- Do climate-sensitive fauna or flora populations live in your region?
 - Some specific species are more sensitive to climate variations than others.

- Do endangered or threatened species exist in your region? Are changes in species distribution already being observed in parts of your region?
 - Species that are already threatened or endangered may have a lowered capacity to adapt to climate change.

- Does the region rely on aquatic or water-dependent habitats for recreation or other economic activities?
 - Economic values associated with natural habitat can influence prioritization.

- Are there rivers in your region with quantified environmental flow requirements or known water quality/quantity stressors to aquatic life?
 - Constrained water quality and quantity requirements may be difficult to meet in the future.

- Do estuaries, coastal dunes, wetlands, marshes, or exposed beaches exist in your region? If so, are coastal storms possible/frequent in your region?
 - Storm surges are expected to result in greater damage in the future due to sea level rise. This makes fragile coastal ecosystems vulnerable.

- Are there areas of fragmented estuarine, aquatic, or wetland wildlife habitat within your region? Are there movement corridors for species to naturally migrate? Are there infrastructure projects planned that might preclude species movement?
 - These ecosystems are particularly vulnerable to climate change.
- Does your region have invasive species management issues at your facilities, along conveyance structures, or in habitat areas?
 - As invasive species are expected to become more prevalent with climate change, existing invasive species issues may indicate an ecological vulnerability to climate change.

VII. Hydropower

- Is hydropower a source of electricity in your region?
 - As seasonal river flows shift, hydropower is expected to become less reliable in the future.

- Are energy needs in your region expected to increase in the future? If so, are there future plans for hydropower generation facilities or conditions for hydropower generation in your region?
 - Energy needs are expected to increase in many locations as the climate warms. This increase in electricity demand may compound decreases in hydropower production, increasing its priority for a region.