Water Storage Investment Program:
Technical Reference Staff Report

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Introduction

Proposition 1, the Water Quality, Supply, and Infrastructure Improvement Act of 2014, provided $2.7 billion to the Water Commission (Commission) for public benefits associated with water storage projects. The public benefits as defined in the statute include ecosystem improvements, water quality improvements, flood control, emergency response, and recreation. These are benefits associated with water storage projects that may be enjoyed by all Californians, i.e., the public are the beneficiaries of these types of benefits.

Project proponents must describe their public and nonpublic project benefits in applications for WSIP funding. In their applications, project proponents must quantify the benefits provided by the proposed project to support their request for bond funding. The quantification of public benefits will be used to determine a project's return on investment (i.e., a benefit cost ratio), so the Water Commission can ensure the state is maximizing the amount of public benefits achieved for the amount of state funding spent.

The quantification of public benefits is crucial to the Commission's determination that a project is eligible for funding and maximizes the return on state investment. Many different types and sizes of water projects are eligible for WSIP funding. The appropriate methodology for quantifying the public benefits of each project will depend on the project type, location, and other project-specific factors. Quantifying public benefits can be difficult for applicants to do – it can involve complex water operations modeling, species models, contaminant transport models, etc. Further, the quantification of public benefits must include physical metrics (e.g., volume of water, flow, concentration, population) and economic metrics (dollar value of the benefit), so the process includes economic methods of varying degrees of complexity.

This Technical Reference supports applicants' project analysis and quantification of public benefits and assists applicants in producing competitive, technically sound applications. This Technical Reference provides specific information to applicants about what a sound analysis of without-project and with-project conditions, benefits, and impacts includes and describes some models and methods that could be employed to meet regulatory requirements of the WSIP.

The WSIP regulations include quantification principles and performance standards that an applicant is required to follow for their project to compete for public funding. Specifically, Section 6004 of the regulations describes the requirements for the without-project conditions, with-project conditions, and how benefits must be quantified in physical and monetary values. The regulations include the following framework for quantifying benefits:

1. Define the without-project future conditions
2. Define the with-project future conditions
3. Calculate physical changes

4. Monetize the value of project benefits
5. Estimate the project costs
6. Compare benefits to costs
7. Allocate costs to beneficiaries

Intended Use and Audience of Document

This Technical Reference is intended to support the physical and economic analysis of the public benefits of eligible water storage projects. The audience and users of this document are intended to be technical staff (i.e. engineers, environmental scientists, modelers, economists, and water facility operators) that will be responsible for running models and conducting the technical and economic analyses on proposed projects for the WSIP funding application.

This document has been developed to be incorporated by reference in the Commission's WSIP Regulations (CCR Title 23. Division 7. Chapter 1) which contain all of the requirements of the WSIP. Applicants are required to consult and, to the extent possible, follow the requirements and recommendations contained in the document.

Document Content

The chapters of the Technical Reference follow this framework and provide the following information and considerations for applicants' use:

- **Section 1 Introduction –** Provides background information and limitations of the document. The limitations of the Technical Reference are also described below in the Document Limitations section of this Executive Summary.

- **Section 2 Defining the Without-Project Future Conditions –** Describes how an applicant determines the appropriate geographic and temporal scope of their analysis and the set of physical, regulatory, and socioeconomic conditions and assumptions to be used to define the without project future conditions for the project analysis in the application. Defining the future water-related conditions is critical for establishing the baseline against which benefits or impacts are measured. The regulations contain the requirements for defining the without project future conditions and these requirements are reflected in the Technical Reference document. The Technical Reference provides the applicant guidance and project-specific considerations to help them meet the requirements in the regulation.

- **Section 3 Defining the With-Project Future Conditions –** Explains how an applicant should describe the with-project condition. This description includes additions and modifications to the without-project condition that are based on an applicant's proposed water storage project description and operations plan, or other changes that can be directly related to the proposed water storage project.

- **Section 4 Calculating Physical Changes –** Describes concepts and methods to quantify the physical changes (benefits or impacts) resulting from water storage projects. The physical changes are represented by differences between the with- and without-project conditions. The process of quantifying benefits for a water storage project involves a sequence of modeling or other analysis that links the project and its operation to the resulting changes in physical resources. This section provides the technical information to applicants to support selection of appropriate methods for quantifying potential project benefits and is organized by analysis or benefit type. This section helps applicants determine the most appropriate methods for evaluating changes resulting from a water storage project. In order to select the most appropriate method, applicants must consider the project type, location, size, features, and expected benefits or impacts (including appropriate analysis of the temporal and geographic extent of the benefits and impacts).

- **Section 5 Monetizing the Value of Project Benefits –** Describes how the Commission recommends physical benefits be monetized. This section provides economic assumptions, describes methods for monetizing benefits, and describes tools and methods by public benefits type, with emphasis on the appropriate level of analysis. This section is supported by detailed appendices located at the end of the Technical Reference.

- **Section 6 Estimate Project Costs –** Describes important considerations for estimating potential project costs. Cost estimates are an important factor in determining the economic feasibility of a proposed project and are required for allocating costs to beneficiaries. The regulations include requirements for what must be included in a project cost estimate, such as the capital costs of the project and other potential costs over the project's planning horizon, including operations and maintenance, repair, and replacement. The Technical Reference supports the applicants' determination of the type of costs included in a cost estimate and what level of detail is appropriate based on the level of design a project has at the time of application.

- **Section 7 Comparing Benefits to Costs –** Assists applicants with analyzing and documenting the expected return for public investment consistent with the requirements identified in the regulations. All project benefits, including all public benefits, must be compared to project costs to establish appropriate cost shares, and to consider and establish the financial feasibility of the project. For the monetized public benefits, the applicant must, as defined in the regulations, calculate the expected return for public investment as the ratio of the present value of the net public benefits to the total requested capital cost share.

- **Section 8 Allocating Costs to Beneficiaries** – Provides direction on how applicants should allocate project costs to project beneficiaries. Costs must be allocated appropriately to beneficiaries to support the WSIP funds requested. The cost allocated to any public benefit must not exceed the economic value of that public benefit. Further, the cost allocation must document that at least 50 percent of the WSIP funding request is based on the ecosystem improvement benefits of the water storage project. The cost allocation must also document that the Program funding request is at or below the 50 percent total cost share maximum.

- **Section 9 Determining Cost Effectiveness –** Describes how an applicant can determine if their project is cost effective. The applicant must calculate, display, and justify the cost of the least-cost alternative means for providing the same amount, or more, of the total physical benefits as provided by the proposed project, if there is at least one feasible alternative means of providing the same amount or more of the total physical benefits.

- **Section 10 Evaluating Sources of Uncertainty –** Provides guidance for applicants to assess the importance of some key assumptions. Quantification of benefits and impacts requires a number of assumptions and estimates about future conditions with and without the proposed project. All of these assumptions have uncertainty regarding their magnitude, timing, and scope. Applicants must evaluate how changes in these assumptions would affect quantification of benefits and the water storage project's overall return on investment.

This document provides a range of analytical methods for quantifying benefits. The set of methods presented allows an applicant to use their judgment when selecting methods most appropriate for the location, size, and parameters of their project. However, applicants must also consider and understand the program requirements to support their identification of the most appropriate project analysis tools. The Technical Reference helps applicants identify the different tools and methods that could be considered to support their project analysis and allow them to provide the required information.

Document Limitations

The methods described in this technical reference serve the purpose of providing direction for quantifying the benefits and impacts of eligible water storage projects for Proposition 1 funding. This technical reference is not a comprehensive guide to quantifying benefits or impacts of any water-related project in the state. Further, the most appropriate methods for evaluating changes resulting from a water storage project depend on a number of factors such as the project's location, size, features, and expected benefits or impacts, which are unique to each project.

This Technical Reference provides general concepts of analysis, plus some information on the features, advantages, and drawbacks of a set of methods.

The following are important limitations of this document:

- It is not a user's manual for how to implement any particular method.
- It does not list or describe all possible methods.

An applicant may select a method not included in this Technical Reference if the method is conceptually sound and adequately described and documented in their WSIP funding application and required components are met. Selection and application of methods contained in the Technical Reference to a specific project is left to the applicant; applications will be assessed for technical quality of analysis by subject-matter experts during the application review period on a case-by-case basis.

This technical reference describes methods as *required, recommended,* or *suitable*. For any method used, the applicant must describe how they implemented the method, including data, assumptions, calculations, and sources of information, in sufficient detail to allow technical reviewers to assess the overall quality of analysis. Required methods (models, data sets, parameter values, or assumptions) are designated with the phrase "must use" or "shall use."