

Water Committee Report

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Sacramento, CA 95814

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File ID: 2019-00372

March 26, 2019

Discussion Item 03

Title: Water Rights and Water Supply Regulatory Processes [Oral Report]

Location: Citywide

Recommendation: Receive and file a presentation on water rights and water supply processes.

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Presenter: Jim Peifer, Principal Engineer, (916) 808-1416, Department of Utilities

Attachments:

1-Description/Analysis

2-Project Description

Description/Analysis

Issue Detail: Numerous regulatory processes that may affect the City's water entitlements and access to water are occurring. These include the California WaterFix Water Rights Change Petition, the Water-Fix California Environmental Quality Act (CEQA) process, the Bay Delta Water Quality Control Plan Update along with its associated voluntary settlement process, and the proposed Sites Reservoir. These efforts attempt to improve environmental conditions in the Sacramento-San Joaquin Delta and increase the reliability of the water supply in other regions of the State. They could, however, affect flows in the American River and storage levels in Folsom Reservoir, thus possibly adversely impacting the City's water supply.

Policy Considerations: This item is relevant to General Plan policy U 2.1.1, titled "Exercise and Protect Water Rights," which states that "The City shall exercise and protect its water rights and entitlements in perpetuity."

Economic Impacts: Not applicable.

Environmental Considerations: Not Applicable.

Sustainability: Not Applicable.

Commission/Committee Action: Not applicable.

Rationale for Recommendation: Not Applicable.

Financial Considerations: Not Applicable.

Local Business Enterprise (LBE): Not applicable.

Background: The State Water Resources Control Board (SWB) is responsible for adopting and updating the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan), which establishes water quality control measures and flow requirements needed to provide reasonable protection of beneficial uses in the watershed. A concern for the SWB is how to address prolonged and precipitous declines of native aquatic species in the Bay-Delta and the ecosystem they depend upon.

The Bay-Delta Plan is being updated through two separate processes (Plan amendments). First, on December 12, 2018, through State Water Board Resolution No. 2018-0059, the State Water Board adopted the Plan amendments and Final Substitute Environmental Document

(SED) establishing the Lower San Joaquin River flow objectives and revised southern Delta salinity objectives. On February 25, 2019, the Office of Administrative Law approved the Plan amendments, which are now in effect.

Second, the State Water Board is also considering Plan amendments focused on the Sacramento River and its tributaries, Delta eastside tributaries (including the Calaveras, Cosumnes, and Mokelumne rivers), Delta outflows, and interior Delta flows.

The proposed regulatory action within the Plan amendments and the SED calls for an unimpaired inflow of 45 percent to 65 percent, which potentially reduces the amount of water that reservoir operators, such as the U. S. Bureau of Reclamation could store. This could potentially affect the City's water supply and the management of the lower American River. The SWB has encouraged the submission of a voluntary agreements by water users to provide similar benefits of the regulatory action. Voluntary agreements allow for other measures to be included that address the fisheries such as the creation of habitat.

On December 12, 2018, the directors of the California Department of Fish and Wildlife and Department of Water Resources presented the elements of a Voluntary Agreement to the State Water Resources Control Board. Attached is the project description for the analysis of the voluntary agreement.

1.0 Introduction/Overview

1.1 Context of Water Quality Control Plan Update

On December 12, 2018, the State Water Resources Control Board (State Water Board or Board) adopted Resolution 2018-0059, approving an update to the Bay-Delta Water Quality Control Plan (Bay-Delta Plan). Ordering paragraph 7 states:

The State Water Board directs staff to provide appropriate technical and regulatory information to assist the California Natural Resources Agency in completing a Delta watershed-wide agreement, including potential flow and non-flow measures for the Tuolumne River, and associated analyses no later than March 1, 2019. State Water Board staff shall incorporate the Delta watershed-wide agreement, including potential amendments to implement agreements related to the Tuolumne River, as an alternative for a future, comprehensive Bay-Delta Plan update that addresses the reasonable protection of beneficial uses across the Delta watershed, with the goal that comprehensive amendments to the Bay-Delta Plan across the Delta watershed may be presented to the State Water Board for consideration as early as possible after December 1, 2019.

The parties to the Planning Agreement now submit this Proposed Project consistent with that direction. As stated in the Planning Agreement, the parties will develop a Voluntary Agreements (VA) by December 1, 2019. This proposal is for the purposes of environmental review and the VA will specify detailed terms for implementation.

1.2 Purposes

The purpose of this Proposed Project (proposal) is to establish water quality conditions that support 1) the viability of native fishes in the Bay-Delta watershed and, 2) achievement of related objectives in the Bay-Delta Plan, as amended. Such conditions are intended to help reverse the declines described in the “July 2018 Framework for the Sacramento/Delta Update to the Bay Delta Plan” and prior planning documents. The proposal provides these conditions through the significant assets of flow measures, non-flow measures, accelerated implementation of actions, incorporation of a structured science-based decision-making process, flexibility, and financial resources. The comprehensive nature of the proposal is also intended to provide water supply reliability, consistent with the legal requirement of providing reasonable protection for all beneficial uses.

1.3 Definitions

“Asset” means the resources provided by the proposal that include water, funding, habitat, accelerated implementation timing due to schedule, and flexibility as to when the assets are deployed.

“Bay-Delta Plan” means the plan prepared and updated by the State Water Resources Control Board which establishes water quality control measures and flow requirements needed to provide reasonable protection of beneficial uses in the watershed.

“Biological and Environmental Targets” means specific, measurable values of biological parameters such as “egg to fry survival”.

“Conceptual Model” means the narrative hypothesized relationship between actions, targets, and objectives.

“Central Valley Project” or **“CVP”** means the Central Valley Project as defined in 3404(d) of Title XXXIV of Public Law 102-575.

“Delta” or **“Sacramento-San Joaquin Delta”** means the Sacramento-San Joaquin Delta (including Suisun Marsh) as defined in Water Code Sec. 85058.

“Department of Water Resources” or **“DWR”** means the California Department of Water Resources, a department of the California Natural Resources Agency.

“Department of Fish and Wildlife” or **“DFW”** means the California Department of Fish and Wildlife, a department of the California Natural Resources Agency.

“Environmental Targets” means specific, measurable values of environmental parameters such as “acres of suitable rearing habitat.” Environmental targets are the larger compilation of multiple specific performance targets (i.e. it may take numerous actions to achieve an environmental target).

“Flow Measures” means actions taken to achieve instream and Delta flows for beneficial uses.

“Funding” means money provided from sources such as party contributions to water or science, available public funding, or both.

“Governance Structures” refers to all institutional arrangements identified for the effective implementation and governance of the VA.

“Hypothesis” means a quantifiable relationship between an action and a target that can be tested through monitoring and potentially refuted through performance metrics.

“Non-flow Measures” means in-stream, off-stream, and in-Delta habitat restoration, fish passage, predator control, or other actions that provide targeted habitat benefits.

“Outcome(s)” means the intended results of the actions presented in the proposal.

“Performance Metrics” means the measurable criteria that indicate whether an action does or does not result in the hypothesized effects.

“Performance Targets” means specific, measurable values describing implementation of the specific components of the VA.

“Proposed Project” or “Proposal” means the package of proposed flow and non-flow measures, contemplated for inclusion in the VA and to be analyzed as an alternative by the State Water Resources Control Board.

“Public Water Agencies” means anticipated parties to the VA that are regional water suppliers and distributors for agricultural, municipal, and industrial use.

“Science Program” means a comprehensive program to inform the implementation of both flow and non-flow measures.

“State Water Board” or “Board” means the State Water Resources Control Board.

“State Water Project” or “SWP” means the State Water Project as authorized by Water Code sections 12930 et seq. and Water Code sections 11100 et seq. and operated by DWR.

“Structured Decision Making (SDM)” means a collection of proven practices rooted in decision theory that breaks down complex decisions into different components consisting of explicit quantifiable objectives, decision alternatives (i.e., management actions), and models that are used to predict changes in the objectives due to each management action or set of actions in consideration of uncertainty.

“Systemwide Asset” is an asset such as water, funds, staff, equipment, or other capacity that would be deployed on a scale greater than one tributary/delta area.

“Reclamation” or “Bureau of Reclamation” means the Bureau of Reclamation, an agency of the Department of Interior.

“Voluntary Agreement” or “VA” means the package of agreements among entities which comprises both flow and non-flow measures intended to achieve reasonable protection of beneficial uses.

“VA Flows” are flows occurring as a result of the VA, including release of stored water or foregoing diversions.

“VA Goals and Targets” are the intended biological outcomes from implementing the VA.

“VA Tributaries” includes the Sacramento River mainstem, Feather, Yuba, American, Mokelumne, Tuolumne, and contributors from Friant and the Delta.

1.4 Proposal Elements

1.4.1 Outcomes

The proposal is intended to achieve environmental and biological outcomes in furtherance of the purpose described above. By June 30, 2019, the proposal will be updated to refine elements of the project description. These outcomes will be specific, measurable, achievable, relevant, and time-bound, to assure accountability and effectiveness.

1.4.2 Integration of Flow and Non-Flow measures

To date, the Bay-Delta Plan has only imposed flow requirements, but has not required measures to directly address other factors including invasive species, ocean and tidal conditions, physical modifications of channels and wetlands, and activation of floodplains. The proposal is a comprehensive approach to management of aquatic conditions.

The proposal includes governance and science components intended to manage habitat conditions using assets made available in this proposal in an integrated manner. These governance and science components are meant to allow assets to be managed adaptively to achieve outcomes, integrating information gained through the proposed science program and other information available to the governance team.

1.4.3. Constructed Habitat and other Non-Flow Measures

The proposal includes measures to address multiple factors affecting fish and wildlife beneficial uses, including spawning and rearing habitat availability and quality, predation by non-native species, passage barriers, and hatchery operations. The Parties to the VA will be responsible to ensure timely completion of all measures specified in the Agreements. The Parties will maintain and continue to manage successful restoration measures which they have already funded, constructed, or currently operate; and to undertake measures required by other regulatory processes.

1.4.4 Flow Measures

The proposal builds upon existing implementation responsibilities for the State Water Board's 2006 Bay-Delta Plan by committing Parties to additional flow measures as described in the VA. The proposal will provide instream flows above existing conditions and in a manner that: (a) does not conflict with the requirements of the Sustainable Groundwater Management Act; (b) maintains reliability of water supply for other beneficial uses, including designated wildlife refuges. The proposal includes adjustment of flow amounts in successive dry years and immediately subsequent years for the purpose of ensuring reliable reservoir storage to protect cold water pool fishery benefits as well as water supply beneficial uses.

Under CEQA the appropriate baseline is current existing conditions, which includes outflow resulting from all existing regulatory actions. And for purposes of performing the comparative analysis, it would be appropriate to compare anticipated outcomes under the proposed VA to anticipated outcomes under the Water Board's expected order, which is likely to include Delta outflow that currently results from other existing regulatory programs.

1.4.5 Science Program

The VA will include a comprehensive science program that informs implementation of the flow and non-flow measures. The program will include the following elements.

- **Biological and Environmental Targets.** The science program will identify a manageable set of SMART (specific, measurable, achievable, relevant, and time-bound) objectives that describe desired

environmental and biological outcomes to support achieving Water Quality Control Plan (WQCP) Objectives.

- **Develop and test hypotheses.** The program will identify and test key hypotheses and assumptions, especially/even if conflicting, about how the ecosystem functions and what measures will be most effective at achieving desired outcomes.
- **Implement specific experiments.** The science program will foster a “safe to fail” experimental approach to maximize learning using a formal structured decision-making framework.
- **Learn from the experiments.** Ensure that each measure is implemented in a manner that maximizes learning.
- **Facilitate a collaborative process.** All Parties will be engaged in the development and implementation of the science program.
- **Facilitate a transparent process,** through collaboration, reporting, and open data.

1.4.6 Governance

The proposal includes a governance program that will involve a structured decision-making process to inform implementation of flow and non-flow measures to achieve outcomes. The process will be collaborative and informed by the science program. Independent science review will also be conducted to facilitate the transparency and learning to guide further implementation efforts.

1.4.7 Funding

The proposal is to use dedicated funds consisting of (a) contributions based on deliveries to or diversions by the public water agency Parties, (b) alignment of existing programs, and (c) other sources. See Tables 3 and 4. The contributions from public water agency Parties will be collected annually during the term of the Agreements. Through the contributions, the public water agency Parties expect to secure funds totaling \$425 million for the additional flows and over \$262 million for habitat restoration and the science program over the term of the Agreements. Funds generated from the Central Valley Project may require federal authorization.

1.5 How VA relates to Bay Delta Plan Update

The State Water Board established and revises the Bay-Delta Plan to carry out obligations under the Clean Water Act and Porter-Cologne Water Quality Control Act to reasonably protect beneficial uses, including fish and wildlife, in the Bay-Delta watershed. Historically, the State Water Board has relied on its water right authority and water right proceedings as the predominant mechanism to implement objectives in the Bay-Delta Plan.

This regulatory approach generates significant tension among water interests, is lengthy, and spawns litigation leading to further conflict and uncertainty. The proposal provides an alternate, integrated and voluntary approach to achieving the statutory objective of reasonable protection of beneficial uses

without the negatives of the traditional regulatory approach. Further, the proposal provides a mechanism for complementing water flow elements with non-flow measures, along with a science program and dedicated funding sources, that are important to the long-term viability of fish and wildlife populations. If the evaluation of the proposal demonstrates reasonable protection of beneficial uses, proposal could become an integral part of the Bay-Delta Plan update. The Parties anticipate that at the end the proposed 15-year term of the VA, the VA would be renewed, modified, or renegotiated, and/or the State Board would be completing a Plan Update.

1.5.1 State Water Board Statements on VA

The State Water Board has consistently signaled that it recognizes the benefits of negotiated solutions with supporting scientific rigor that demonstrates the agreement will reasonably protect beneficial uses. Former Chair Marcus and Executive Director Howard documented the Board's support for VA in the Bay-Delta Watershed in letters in October 2015, November 2015, and February 2016. Further, the Board itself embraced a path forward for a comprehensive Delta watershed-wide agreement in Resolution 2018-0059.

1.5.1.1 Lower San Joaquin Tributaries

On December 12, 2018, the State Water Board adopted an update to the Bay-Delta Plan to amend the water quality objectives for the protection of fish and wildlife beneficial uses in the Lower San Joaquin River (LSJR) and its three eastside tributaries, the Stanislaus, Tuolumne, and Merced Rivers, and agricultural beneficial uses in the southern Delta. While the Board completed its Bay-Delta Plan update for the LSJR and tributaries, the adoption resolution (Resolution 2018-0059) indicated that the analysis for a future Bay-Delta Plan update could include an alternative that relies upon a comprehensive Delta watershed-wide VA, including potential amendments related to the LSJR. Consistent with that adoption resolution, a VA that satisfies legal and scientific requirements could lead to further Bay-Delta Plan amendments that would adjust requirements related to the LSJR.

1.5.1.2 Sacramento/Delta Update

The State Water Board staff released the July 2018 Framework for Sacramento/Delta Update to the Bay-Delta Plan (Framework) for updating water quality objectives for the protection of fish and wildlife beneficial uses outside of the LSJR. The Framework outlines potential changes that would be analyzed as part of a forthcoming environmental analysis to support a further Bay-Delta Plan update. As a result of Resolution 2018-0059, the State Water Board staff will analyze the effects of implementing the proposal. This proposal has been developed in consideration of the State Board's Framework. Ultimately, a VA that satisfies legal and scientific requirements could be incorporated into the upcoming Bay-Delta Plan Update.

1.6 Appendices

The Parties propose this Project Description, specifically sections 1-3, for the State Water Board's use in its Comprehensive Substitute Environmental Document to update the Bay-Delta Plan. Under the California Environmental Quality Act, the parties expect, pursuant to Resolution 2018-0059, that the State Water Board will undertake a programmatic analysis of any action alternatives, including the

proposal reflected in this Project Description. The Parties will ensure appropriate project-level environmental analyses are conducted at a suitable time, with an expectation that they may tier off the State Water Board's analysis where applicable. See Planning Agreement section 3(b).

Some public water agency Parties have prepared Appendices A1 – A9 as preliminary proposals for such project-level analyses. Certain details are not resolved among all the Parties as of March 1, 2019. All parties will continue discussions to further develop and revise these proposals in mutually agreeable form for the purpose of completing both project-level analyses and the VA themselves. These public water agency Parties acknowledge more collaboration between all the Parties will result in finalized details for analysis. The Planning Agreement Section 3 specifies the next milestone for the complete collaborative analysis to be submitted to the State Water Board.

The proposals submitted by the public water agency Parties include the following:

- Appendix A1: Sacramento River
- Appendix A2: Feather River
- Appendix A3: Yuba River
- Appendix A4: American River
- Appendix A5: Mokelumne River
- Appendix A6: Tuolumne River
- Appendix A7: San Joaquin River Settlement Downstream of the Merced River (Friant Division)
- Appendix A8: Sacramento-San Joaquin Delta
- Appendix A9: Putah Creek

Appendix A10 is intended to show expanded lists of projects that are illustrative of the level of the non-flow projects being proposed as part of the Project Description. These lists are not intended to be comprehensive but are intended to show the scope and magnitude of the projects that may be implemented by effort of the Parties to the anticipated VA.

2.0 Assets and Expected Outcomes

For each of the tributaries included in this proposal, including the Delta, this section describes the various assets proposed in terms of flow and non-flow measures, funding available to implement these measures, timing of implementation, and expected outcomes of these measures. Overall, the combination of the flow and non-flow measures will be used to create substantial benefits to ecosystem functions and to create conditions necessary to improve native fish populations. The augmented instream and Delta outflow will be applied based on a governance program as described below and will be integrated with landscape and other changes to achieve the outcomes. An important component of this proposal is the application of testable hypotheses to determine how to adjust these flow and non-flow measures overtime to achieve biological and other targets and the implementation of the science program. This approach accommodates uncertainty, climate change, and refined knowledge over time, and the State Board's obligation for periodic review of the Bay-Delta Plan. More information is provided in Section 3.

The flow components of the proposal provide real water focused primarily on above normal, below normal, and dry water year types (which cumulatively total about 55% of all years). These are years when flow resources can be made available (in non-critical years) and can provide significant ecosystem

benefits (in years that are not wet). This real water is generated through land fallowing, reservoir reoperation, and/or demand reduction, and limited use of groundwater substitution. Additionally, the flow components of this proposal take into account a wide range of beneficial uses including terrestrial habitat for waterfowl and other species that use areas proposed for fallowing, cold water pool management for Chinook salmon and steelhead, the ability for economies to absorb changes in water supply, water quality requirements, and funds available to purchase water for environmental uses. Tables 1 and 2 shows contributions of water in each water year type from each source.

Tables 1 and 2. Contribution of Flow from Each Water User Party to the Voluntary Agreement

Table 1. New Water Through VA ¹									
WQCP Phase	Tributary	Season	Source	Application²	C	D	BN	AN	W
1	Tuolumne ^{3,4}			Flow	45	70	89	99	99
	Friant	February - May	Reduction in recapture under SJR Settlement	Flow		50 ⁵	50 ⁵	50 ⁵	50 ⁵
2	Sacramento	Spring or Summer ⁶	Land fallowing	Block		100	100	100	
	Feather	Spring or Summer ⁶	Land fallowing	Block		50	50	50	
	Yuba	Assume Spring likely ⁶	Reservoir storage	Block		50	50	50	
	American	Spring	Groundwater substitution	Hybrid	10	10			
			Reservoir storage				10	10	
			Reservoir storage and/or groundwater substitution			10			
		Reservoir storage and/or groundwater substitution		20	20				
Mokelumne ⁴	March - October	Reservoir storage	Flow				45	45	
						10			
							20		
Years 1-7					New Water by Year Type (TAF)⁷				
					75	370	369	404	194
	Years 8+ of VSA implementation⁸	TBD	TBD	TBD		300	300	300	
Total New Water by Year Type (TAF)					75	670	669	704	194

¹ Above existing conditions. See Section 1.3.5

² "Flow" represents an instream target, "Blocks" can be scheduled within constraints, and "Hybrid" represents a combination

³ Subject to successive D/C year relief (BN year does not reset D/C year sequence, but would require floodplain pulse)

⁴ Subject to further review of dynamic local modeling to validate totals

⁵ Subject to the schedule and availability of releases for the San Joaquin River Settlement and specific terms of the Friant VA proposal.

⁶ Subject to coordination with DFW (Yuba) or fisheries agencies (Sacramento, Feather)

⁷ These quantities do not yet account for the Putah Creek proposal, explained in Appendix A9.

⁸ Year Types TBD. This 300TAF of water would be made available consistent with the description in Addendum H to the December 12, 2018 Framework. Water made available through Proposition 1 storage projects will become available as projects become operational, without further demonstration of a science-based need under the VA.

WQCP Phase	Tributary	Season	Source	Application	C	D	BN	AN	W
2	Sacramento	Pursuant to flood control and SOD requirements	Flood	Flow					Case-by-case basis
		March	Reservoir storage	Flow	30				
	Feather	April 1 - September 8 ⁹	Power Bypass	Flow	700 cfs pulse in low flow channel (LFC)				
		September 9 - March 31 ⁷	Power Bypass	Flow	800 cfs pulse in LFC				
		January 1 - April 15	Power Bypass	Hybrid		43	43	43	
	South-of-Delta	After April 1	Export curtailment	Hybrid		300 ¹⁰	300	300	
Total Reoperated Water by Year Type (TAF)					30+	343+	343+	343+	Case-by-case basis

Non-flow components of this proposal are intended to address a variety of limiting factors in participating tributaries and in the Delta. Addressing these limiting factors will produce benefits for species such as salmon, steelhead, smelt, sturgeon, and other aquatic life. The outcomes associated with these benefits are intended to provide a contribution to conditions that support multiple life stages of fish and will provide long-lasting positive landscape-based outcomes. Even though the specific metrics for all projects are not yet fully defined, they will provide substantially more acreages of suitable in-channel, side channel and floodplain, cubic yards of spawning gravel supplementation, miles of access related to fish passage projects, or other key habitat improvements yet to be identified. Currently, the VA would allow for more than 290,359 cubic yards of gravel supplementation to help support spawning and incubation; more than 6,427 acres of tributary in-channel, side channel, and floodplain habitat; and more than 5,455 acres of in-Delta tidal wetland, floodplain, channel bank, and upland habitat. Table 3 summarizes each tributary’s contribution to non-flow measures, the supported life stage associated with the action, and the anticipated outcome from undertaking the actions.

⁹ Subject to modifications that would be made pursuant to a new FERC license and possible interim phasing. Pulses may vary in duration and volumetric quantities.

¹⁰ A portion of this water would be new as compared to existing conditions in dry years.

Table 3. Summary of Illustrative Non-flow Measures Included in the VA^{11,12}

Tributary	Summary of Key Activities	Targeted Quantity	Fish Life Stage(s) Supported
Sacramento River	Gravel supplementation	40,000+ cubic yards	Spawning and incubation
	Creation of in-channel, side channel, and floodplain habitat	3,225 acres	Spawning, rearing, migration
	Fish screens, fish passage, predator control, new science	N/A	Multiple life stages
<u>Outcomes:</u> Increase suitable spawning area, improve river morphology, increase channel complexity, increase floodplain habitat, provide riparian cover and shading, improve fish passage, screen diversions			
Feather River	Gravel supplementation	99,859 cubic yards	Spawning and incubation
	Creation of floodplain and side channel habitat	2,877+ acres	Spawning, rearing
	Fish passage, predator control, new science	N/A	Multiple life stages
<u>Outcomes:</u> Increase suitable spawning area, improve fish passage, improve river morphology, increase channel complexity, increase floodplain habitat, provide cover and shading, improve hatchery genetic management, reduce predation			
Yuba River	Side channel, off-channel habitat creation and preservation	100 acres	Rearing
<u>Outcomes:</u> Increase rearing habitat availability, increase channel complexity and habitat diversity, provide hydraulic roughness, provide cover, enhance productivity, protect spawning and rearing habitat, reduce predation			
American River	Gravel supplementation	80,000 cubic yards	Spawning and incubation
	Creation of instream, side channel, or floodplain creation	150 acres	Rearing
<u>Outcomes:</u> Increase existing suitable spawning area, improve river morphology, increase floodplain habitat, improve riparian habitat, provide instream cover and habitat complexity, reduce predation			
Mokelumne River	Gravel supplementation and maintenance	1,500+ cubic yards	Spawning and incubation
	Creation of floodplain habitat	60 acres	Rearing
	Fish screens, predator control, hatchery genetics management, new science	N/A	Multiple life stages
<u>Outcomes:</u> Improve growth and survival, improve hatchery genetics management, improve spawning opportunities, increase incubation survival, reduce redd superimposition, improve through-Delta survival, reduce predation			
Tuolumne River	Gravel supplementation and maintenance	54,000 cubic yards	Spawning, incubation, rearing
	Creation/modification of floodplain habitat, Improve instream habitat morphology/complexity	115 acres	Rearing, migration
	Seasonal fish weir, predator control, new downstream point of diversion, spill management	N/A	Multiple life stages
<u>Outcomes:</u> Maintain existing suitable spawning habitat, increase floodplain habitat and in-channel habitat, reduce predation, reduce redd superimposition, improve outmigration success, improve egg to emergence survival, increase channel complexity and habitat diversity			
Sacramento-San Joaquin Delta	Restore tidal wetland, floodplain, riverine, channel bank, and upland habitat	5,455+ acres	Multiple species, multiple life stages
	Aquatic weed control	500 acres	Multiple species, multiple life stages
	Channel margin restoration, predator control, new science, food production, law enforcement	N/A	Multiple species, multiple life stages
<u>Outcomes:</u> Increase Delta Smelt, Longfin Smelt, sturgeon, and salmonid spawning, holding, and rearing habitat; improve food availability and abundance; reduce predation; improved through-Delta survival for outmigration; reduce entrainment; reduce poaching; improve science			

¹¹ Several tributaries have active FERC re-licensing or other regulatory processes underway that may require habitat actions. See Appendix A10 for more detailed information about those requirements and how they relate to totals depicted above.

¹² This table does not yet include non-flow measures for Putah Creek, as explained in Appendix A9.

The flow measures can be implemented upon adoption of the proposal, subject to compliance and permitting. Further development of the science program can be implemented immediately upon adoption of the proposal and contracting for monitoring services. Non-flow measures would be implemented on an aggressive schedule as described below for each tributary.

Funding would come from a variety of sources, including from public water agencies, the State of California, and the United States. An overview of funding sources and contributions of water from public water agencies is shown in Table 4. This includes an initial outlay of directed and competitive funding opportunities from various sources, including those shown in Table 5.

Table 4. Summary of Estimated Revenues Generated by Water Users Under this Voluntary Agreement (Based on Last 10 Years of Diversions)

Contributing Parties	Average Annual Diversions	Total Contribution to Water Revolving Fund Over Term of the VA	Total Contribution to Science and Structural Habitat Fund
South of Delta	4.9 MAF	\$367.5 M	\$147.0 M
Upstream of Delta	6.75M AF	\$48.6M	\$163.5 M
In Delta	120 TAF	\$9.0M	\$3.6M
Total	11.95 MAF	\$425.1 M	\$262.3 - \$314.1 M¹³

Table 5. Potential State Sources of Public Funds for Voluntary Agreement Implementation

Source	\$ Available
California Natural Resources Agency Voluntary Agreement Funding (Proposition 68)	\$200M
Wildlife Conservation Board (Proposition 1 and 68)	\$80+M
DWR Central Valley Multi-Benefit Flood (Proposition 1)	\$40+M
DWR Delta Multi-benefit Flood (Proposition 1)	\$200M
DWR San Joaquin River Tributary Salmonid Restoration (Proposition 13)	\$50M
Delta Stewardship Council Science Grants (General Fund)	\$5M
Delta Conservancy Delta Restoration (Proposition 1 and 68)	\$27M
CDFW Statewide Restoration (Proposition 1 and 68)	\$200M
CDFW Delta Restoration (Propositions 1)	\$30M
Total	\$832+ M

¹³ Subject to other potential public water agency Parties participating in the VA.

3.0 Science, Adaptive Management and Governance

This section describes the governance structure for implementing the VA, including roles and responsibilities for each component of governance and the use of science in decision-making. Governance of the VA will be collaborative, transparent and grounded in science to most effectively deploy the assets described above to achieve biological and environmental goals and targets and meet WQCP Objectives over time, as illustrated in Figure A.

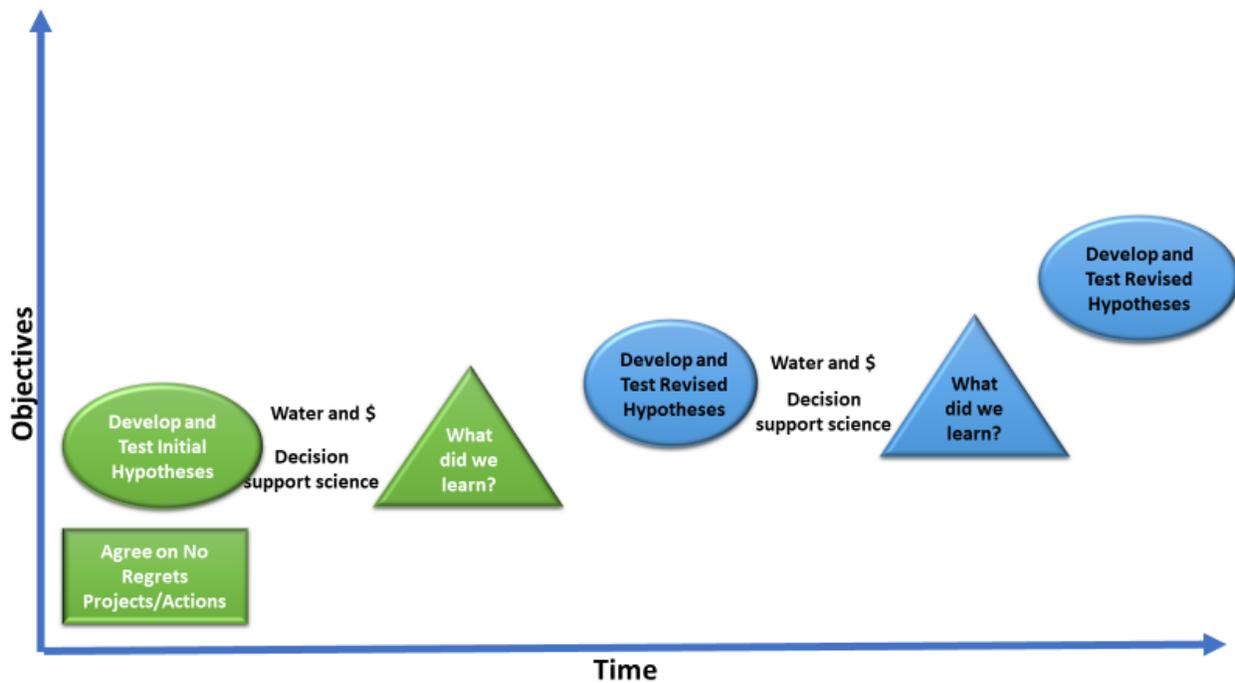


Figure A. Overview of Use of Science and Assets to Meet WQCP Objectives Over Time

3.1 Governance and Decision-Making Structure

3.1.1 Overarching purpose and guiding principles

The primary purpose of the Governance structure is to ensure the effective and efficient implement of all aspects of the VA. The VA will be governed with transparency, accountability and in a spirit of collaboration and common purpose, in a manner consistent with the discretionary regulatory authority of governing agencies.

Governance structures created under the VA will coordinate to the extent possible with existing management structures operating in VA Tributaries to implement flow and habitat actions, science, monitoring, reporting and adaptive management activities.

The Governance structures described in this Project Description are intended to be illustrative of governance provisions that will be included in the final Voluntary Agreements. All Governance structures will be consistent with the terms and conditions of the Voluntary Agreements.

3.1.2 Structure and Functions

This section includes descriptions of the structure and function of key institutional bodies. Additional information on decision making roles is in section 3.2.5.

The **“Systemwide Governance Committee”** (Governance Committee) will be responsible for ensuring overall effective administration and governance of the VA, including reporting on the performance of VA commitments, fiduciary management, the VA Science Program, and ensuring coordination among and between VA Tributaries and systemwide aspects of VA implementation. The Governance Committee will be made up of Signatories to this agreement, the State Water Board, and ex-officio members (TBD). The Governance Committee will be consensus seeking and will make decisions consistent with the schedules of related water system management processes. Dispute resolution procedures for Governance structures are described in Section 3.2.6.

The **“Implementation Team”** would be responsible for the day to day implementation and management of the VA. The Implementation Team would have an Executive Director and additional staff as necessary. The Executive Director would take direction from the Governance Committee within the scope of their contract. The Implementation Team would serve both the systemwide and tributary levels of VA implementation.

The **“VA Tributary Governance Teams”**, and the **“VA Delta Governance Team”** would be responsible for overseeing the implementation of all location-specific activities, including flow and habitat actions, science, reporting etc. To the extent possible, the VA would be implemented through existing entities in VA Tributaries and the Delta, modified as agreed and appropriate. The Tributary and Delta Teams would be made up of VA Tributary and Delta Public Water Agencies, federal and state agencies including the State Water Board, and NGOs who are signatory to the VA. The Tributary Teams will coordinate tributary and Delta actions with the relevant systemwide entities (e.g., Governance Committee, Implementation Office, Flow and Operations Team, Science Program), other Tributary Teams, and water project operators as appropriate. The primary focus of these Governance Teams is planning, implementation, and coordination with the systemwide Governance Committee and Science Program. The multi-year VA plan will serve as a guide for developing and implementing Annual VA Plans for VA Tributaries.

A **“Science Program”** would oversee the development and implementation of a Long-term Science Plan and Annual Science Plans that would foster an experimental approach to maximize learning and improve outcomes. Science Plans would identify systemwide hypotheses, Biological and Environmental Targets, project design, implementation criteria/principles, and monitoring, analysis and reporting methods. The Science Program would coordinate with science efforts/entities on VA Tributary science to ensure effective implementation and maximize the knowledge gained from implementing element of the VA. The Science Program would provide recommendations to the Governance Committee for adaptive management adjustments to VA implementation. (See description of the Science Program for more details).

The “**Independent Scientific Advisory Panel**” will provide services to the Governance Committee and Science Program as requested, e.g., technical advice, effectiveness evaluations, etc. The Delta Science Program could assist with this function. The Advisory Panel will be made up of experts in relevant scientific and technical disciplines and will be free of actual or perceived conflicts of interest. The Science Program could call on other existing independent science panels as needed.

A systemwide “**Flow and Operations Team**,” made up of representatives of the CVP, SWP and PWA facilities will work with the Governance Committee, Implementation Office, Tributary and Delta Teams and the Science Program to ensure all flow and facilities-related planning and implementation activities are feasible, coordinated and comply with all relevant regulatory and other requirements and constraints.

3.1.3 Planning

Each year the Implementation Team will update a **Systemwide Plan** that integrates annual **Workplans** developed by Tributary and Delta Teams and incorporates recommendations and lessons learned produced by the Science Program. The annual planning schedule will be developed as part of the final VA. The systemwide Plan would be submitted to the SWRCB for review and will include at least the following:

- Projected revenues and expenses for coming year across all VA programs;
- Summary of progress across tributary and Delta efforts.
- Updates to Decision Support Tools under Structured Decision Making.
- Recommendations to the Governance Committee for modifications, if any, to Biological and Environmental Goals and Targets.
- Priorities and recommendations for the allocation of system-wide resources towards achieving system-wide performance targets
- Areas where coordination accelerated progress areas where increased coordination could accelerate overall progress

Tributary and Delta Workplans will include the following:

- Progress in previous years toward Tributary and Performance Targets;
- Outcomes on Tributary Biological and Environmental Targets
- Outcomes and updates to tributary and Delta-specific hypotheses under the Science Program.
- Flow, habitat and science related actions planned for coming year, and how the actions are integrated with systemwide actions.
- Flow programs to be considered based on final water year type determinations.

The development of the Systemwide Plan and Workplans for VA Tributaries, Delta and the Science Program, will necessarily be an iterative process to ensure actions are appropriately coordinated and leveraged. Preliminary drafts of the plans will be developed by certain dates TBD as early as possible each year and will be modified as necessary as more reliable runoff forecasts and other information become available. The process for determining and revising Water Year type designations will be described for each VA Tributary, the Delta (and system as whole?). All flow and operations aspects of the Systemwide Plan and Workplans are subject to approval from the Flow and Operations Team (i.e., operators) to ensure proposed operations are feasible and comply with regulatory requirements. The

Implementation Office, Tributary and Delta Teams and Science Program will develop proposed annual plans for review by the SWRCB and other relevant VA Governance Structures. The annual Systemwide Plan will be informed by the information developed by the Science Program and any recommended adaptations to ongoing or planned activities. Tributary and Delta Teams would develop annual Tributary Plans that identify the specific flow and habitat actions to be undertaken in each area.

A general diagram showing the annual governance cycle is below in Figure B.

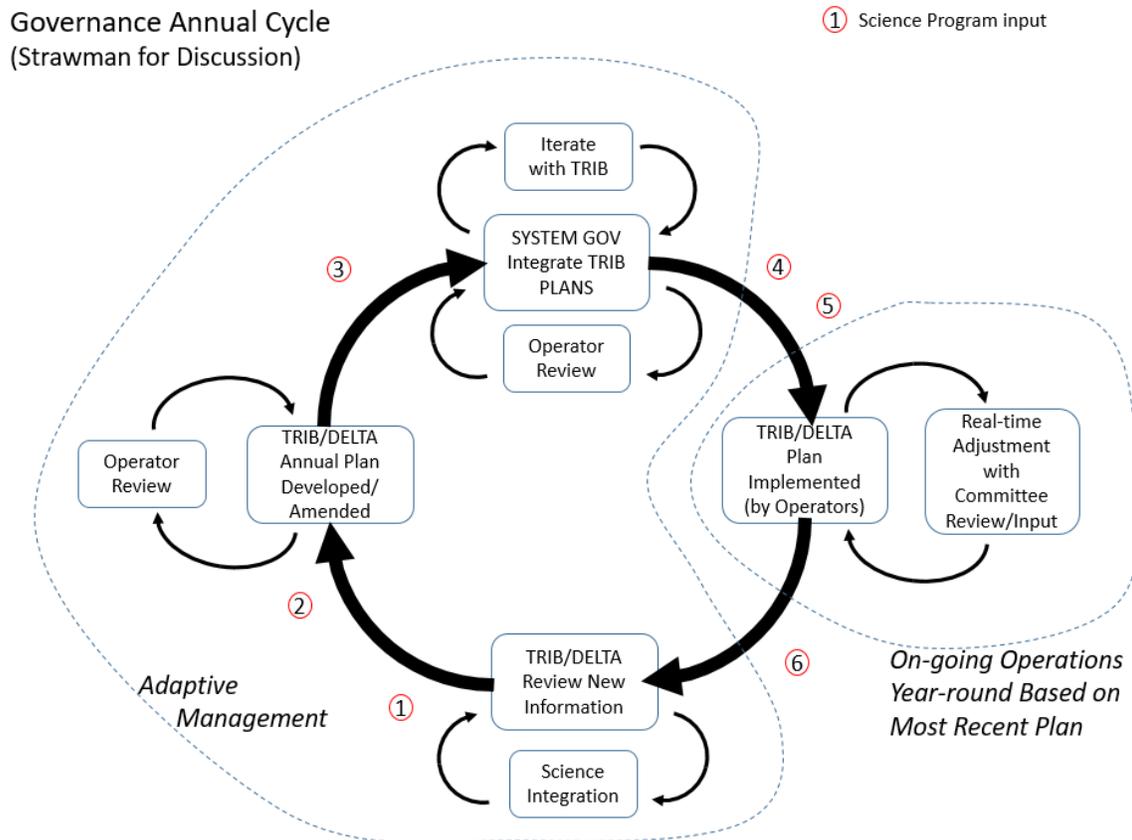


Figure B. Governance Annual Cycle

Typical steps in annual governance cycles:

1. Annual Science Meeting: Communicate new science/current understanding to decision makers. Identify critical uncertainties. Engage Independent Science Advisory Panel in review of science and assessment of completed actions.
2. Tributary/Delta Science Teams: Use system-wide conceptual models of biological and physical relationships and pathways (multiple models may be specified). Develop list of candidate management actions based on conceptual models and results of previous year's actions. Participate in development/refinement of decision support models. Advise respective Tributary and Delta Governance Teams on selecting next generation of actions.
3. Integrated Science Program: Review Tributary/Delta annual plans. Communicate opportunities to modify actions to increase systemwide benefits or learning opportunities.

4. Integrated Science Team and Tributary/Delta Science Teams: Articulate hypotheses, causal mechanisms and/or outcome linkages to be tested by specific actions. Use models to predict responses and develop performance measures. Identify data necessary to test hypotheses/causal mechanisms/outcome linkages and design monitoring and research efforts to accompany each action and systemwide. Identify resource needs.
5. Independent Science Advisory Panel: review annual science plan and/or specific investigation proposals, if requested
6. Implement experiments, collect and share data. Analyze data, synthesize scientific information and interpret results. Assess effectiveness of actions against hypotheses, predictions and performance measures. Learn from experiments, reconsider/revise conceptual models, recalibrate quantitative models. Suggest changes to monitoring schema.

3.1.4 Reporting

The Implementation Office will be responsible for developing and submitting annual and triennial reports, in coordination with the Science Program and Tributary and Delta Teams, to the State Water Resources Control Board. The Governance Committee will approve these reports prior to Board submittal.

- **Annual reports** would include, at a minimum: budget report, the status of implementation of VA actions, progress toward Biological and Environmental Targets and Performance Targets, the flow and habitat actions and other VA activities planned for the coming year. Annual reports will be made available to the SWRCB.
- **Triennial reports** would include annual report items, as well as an evaluation of outcomes and progress toward the biological and environmental targets identified in the VA, progress toward Bay Delta Water Quality Control Plan Objectives, any modifications to VA approach/actions/assumptions about the nature and magnitude of actions necessary to achieve targets and Water Quality Control Plan Objectives. The public would have an opportunity to review and comment on triennial reports. These will be available to the SWRCB in time to support their triennial review process.

3.1.5 Decision-making and Adaptive Management

As described above, developing systemwide and tributary/Delta annual plans will be an iterative process involving Tributary and Delta Teams, the Governance Committee, the Implementation Office, the Science Program and Flow and Operations Team. The decision-making roles and responsibility for each governance component are summarized in Table 6. Nothing in the VA shall be interpreted to require the Federal Parties, the States, or any other Party to implement any action which is not authorized by Applicable Law, where sufficient funds have not been appropriated for that purpose by Congress or the States. The Parties expressly reserve all rights not granted, recognized or relinquished in this agreement, Parties will use Structured Decision Making as described in the Science Program and consistent with the Annual Governance Cycle.

Table 6. Decision-making Roles and Responsibilities

Governance Entity	Decisions and Roles
Systemwide Governance Committee	Overall VA administration, VA goals, objectives and targets, systemwide decision support tools , reporting to SWRCB, implementation of SWRCB recommendations/requirements, management of Implementation Office Executive Director
Implementation Team	Annual Systemwide Plan and Report, budget management, contracting, accounting, coordination with Science Program, Tributary/Delta Teams, Flow and Operations Team
VA Tributary/Delta Governance Teams	Tributary budgets, Tributary annual plans, implementation of flow, habitat and science activities, monitoring, reporting, participation in system-wide decision support tools
Science Program	Developing and implementing Science Plan, coordinating science related activities between and among tributaries/Delta, providing analysis of the effectiveness of various actions on achieving associated biological or environmental goals and targets, and developing adaptive management recommendations as appropriate using structured decision making.
Independent Scientific Advisory Panel	Advice, analysis, program evaluation as requested by Governance Committee
Flow and Operations Team	Project operations and coordination, compliance
State Water Resources Control Board	Participate in system-wide governance, tributary, and Delta teams. Satisfy triennial reviews with respect to fish and wildlife beneficial uses with information developed by the Governance Committee, VA enforcement, and dispute resolution as defined in Section 3.2.6 below.
Signatories/VA Parties	Roles and responsibilities as defined in the VA.

3.1.6 Dispute resolution

A dispute resolution process would be developed for the final VA and will be consistent with trying to resolve disputes within the Governance structure where the dispute arises to the extent feasible. The SWRCB will serve as the arbitrator for disputes regarding issues within the regulatory jurisdiction of the SWRCB that cannot be resolved by the VA parties.

3.1.7 Relationship to and Integration with Existing Tributary Governance Structures

Some VA Tributaries have effective governance structures in place that will be able to easily integrate into the VA governance structure, such as the American River Water Forum.

3.2 VA Science Program

The VA Science Program (Science Program) is intended to inform and support the effective implementation of the VA, including VA habitat and flow actions, evaluation of the effectiveness VA actions, and ongoing adaptive management adjustments to VA actions as needed to accomplish the biological and environmental goals and targets. The Science Program is also intended reduce uncertainties related to the response of target species and ecosystem conditions to management actions. The Science Program will provide the scientific framework to articulate and test hypotheses related to the VA biological and environmental goals and targets. Testable hypothesis will be identified prior to implementation of each action taken under the VA. The parties will continue to refine the Science Program, including progress towards a specific Science Plan that would be implemented immediately once the VA is adopted.

3.2.1 Purpose

The primary purpose of the Science Program is to inform decisions regarding identification of the appropriate biological and environmental goals and targets, implementation of the VA actions, and achievement of VA goals and targets. The secondary purpose is to monitor the effectiveness and evaluate the progress of VA actions and make recommendations to inform adaptive management to maximize progress toward the VA goals.

In order to achieve these purposes, the Science Program will:

- Prepare a Long-Term Science Plan and Annual Science Plans, including review of appropriate goals and targets.
- Periodically assess whether anticipated outcomes of VA program are appropriate.
- Assess the outcomes of the actions as compared to targets.
- Provide input to annual and triennial reporting.

3.2.2 Guiding Principles of the Science Program

The Science Program will be guided by the following principles to ensure its effectiveness and efficiency:

- Incorporate past efforts, avoid duplication of effort, and coordinate existing efforts to the extent possible to meet conservation goals.

- Be transparent and collaborative, including the use of Structured Decision-Making.
- Support experimentation in a “safe to fail” environment.
- Facilitate data collection to evaluate biological and environmental goals, objectives and targets that guide VA implementation.
- Focus design, effectiveness monitoring, and evaluation efforts toward fulfilling VA objectives and fostering understanding.
- Engage separate study teams from study plan developers and integrating the information.

3.2.3 Structure of the Science Program

The Science Program will involve the following components:

- VA Science Program will develop the Long-Term Science Plan, including conceptual models, hypotheses, validation of conceptual models with quantitative models, biological and environmental goals and targets, and monitoring and data analysis methods/protocols focused on the system/program level. This entity will coordinate with Tributary Science Teams (TSTs) to develop the Science Plan, assess program effectiveness and develop reports.
- Tributary science and Delta science teams, as part of the overall Tributary Governance structures, will develop and implement Annual Science Plans including hypotheses to be tested, biological and environmental goals and targets and monitoring plans specific to their geographies. Tributary Science Teams will coordinate with the Science Program to design actions consistent with the Science Program approach (i.e., designed to maximize scientific learning and outcomes).
- Independent Scientific Advisory Panel(s) will provide services to the VA Governance Committee and Science Program as requested, e.g., technical advice, effectiveness evaluations, etc. The VA Governance Committee will report on the implementation of recommendations from the Independent Scientific Advisory Panel in Annual and Triennial Reports. The Independent Scientific Advisory Panel will reply to the Governance Committee response to recommendations.
- The Science Program will strive to ensure science plans will be developed by individuals not involved in the implementation of VA actions.

3.3 Environmental and Biological Goals and Targets

As described above, the voluntary agreements will include a science program specifying proposed biological and environmental outcomes; methods to monitor, evaluate, and report whether implementation is succeeding in achieving those outcomes; and procedures to adjust the science program under specified terms. (Umbrella Agreement/Planning Agreement section 2(c).) Substantial effort is needed to develop specific environmental and biological goals and targets, and parties expect to develop them by June 30, 2019. This further negotiation for environmental and biological goals and targets will be consistent with the organizing principles expressed in the Umbrella Agreement/Planning Agreement and will create goals and targets that are specific, measurable, achievable, relevant, and time-bounded (*i.e.*, “SMART”). This section presents the guiding principles to the development of those goals and targets.

The biological goals for the voluntary agreements are to (a) substantially contribute to the achievement of overall viability of Central Valley salmonids by promoting measures that address specific life-stage stressors for the viability of fish and avian, terrestrial and aquatic species in the Bay-Delta Estuary and the Bay-Delta watershed; and (b) substantially contribute to the doubling of the natural production of Central Valley salmon (under the CVPIA Salmonid Doubling Objective and the Bay-Delta Plans narrative Chinook salmon doubling objective) by providing substantial contributions to the creation of conditions that would support viable populations of native fish in the affected rivers and the Bay-Delta.

The defined and specific goals and targets that will contribute towards achieving the goal identified above should consider but not be limited to aspects such as the following.

- Contributing towards viable populations of native fishes where viability includes abundance, productivity, life history diversity, and spatial structure.
- Contributing towards functional water flow regimes and appropriate frequency, timing, and duration of flow for native fishes.
- Contributing towards ecologically functioning, self-sustaining riverine and estuarine habitats.
- Contributing towards improved survival, productivity, life history, and genetic diversity of native fish.
- Contributing towards improved juvenile salmonid rearing habitat as described in the Flow West metrics.
- Contributing towards improved water quality and other habitat conditions.