WORKING DRAFT TECHNICAL MEMORANDUM ◦ APRIL 2021

Potter Valley Project Feasibility Study: Alternatives Description and Project Plan




PREPARED FOR

Potter Valley Project Planning Agreement Parties

California Trout
Humboldt County
Mendocino County Inland Water and Power Commission
Round Valley Indian Tribes
Sonoma County Water Agency

PREPARED BY

Stillwater Sciences
McMILLEN JACOBS ASSOCIATES
McBain Associates
APPLIED RIVER SCIENCES
M3
pH
Geosyntec

Suggested citation:
Stillwater Sciences et al. 2021. Potter Valley Project Feasibility Study:
Alternatives Description and Project Plan. Prepared by Stillwater Sciences and McBain Associates, Arcata, California; McMillen Jacobs Associates, Boise, Idaho; M.Cubed, Davis, California; Princeton Hydro, South Glastonbury, Connecticut; and Geosyntec Consultants, Oakland, California for the Potter Valley Project Planning Agreement Parties. April.

Cover photos: Clockwise from upper left: Upper Eel River entering Lake Pillsbury during 2014 drought; Cape Horn Dam spilling during high winter flows; Potter Valley Powerhouse Tailrace entering the East Branch Russian River; Eel River immediately downstream of Scott Dam at Soda Creek confluence.

Table of Contents

Tables

Figures

1 INTRODUCTION

A foundation of the Shared Objectives of the Potter Valley Project Planning Agreement Parties (Parties), and correspondingly the Feasibility Study, is to identify feasible "Two-Basin Solutions" and potential Potter Valley Project (Project) descriptions in the following two categories:

- Dam(s) removed + water supply and fish restoration modifications; and
- Dams remain in place + water supply and fish passage modifications.

The Congressman Jared Huffman Ad Hoc Committee was formed in 2018 to search for potential Two-Basin Solutions based on a common understanding of water supply and fish passage information. Membership of the Ad-Hoc Committee included stakeholders and agencies from both the Eel River and Russian River watershed with a direct interest in the Project. Two working groups were formed to address this technical information need: The Water Supply Working Group and Fish Passage Working Group. Within each of these two working groups, there was a Subgroup that was responsible for conducting the water supply and fish passage evaluations and reporting back to the Working Groups and the Ad-Hoc Committee. These two Subgroups were comprised of technical staff from National Marine Fisheries Service (NMFS), Pacific Gas and Electric (PG&E) and their consultants, Sonoma County Water Agency (Sonoma Water), California Department of Fish and Wildlife (CDFW), Round Valley Indian Tribes (RVIT), and U.S. Fish and Wildlife Service (USFWS). In May 2019, and subsequently updated in February 2020, the Water Supply Subgroup completed a summary report of the various water supply scenarios analyzed (Addley et al. 2019). In December 2019, the Fish Passage Subgroup completed a summary report of the various fish passage options for Scott Dam and Cape Horn Dam (Fish Passage Working Group 2019).

These two reports were intended to form the foundation of additional analyses and integration to further evaluate feasible Two-Basin Solutions. However, PG&E's withdrawal from the Federal Energy Regulatory Commission (FERC) relicensing process in 2019 resulted in the formation of the Parties, and the additional analyses and integration process reverted to this Feasibility Study. Accordingly, the water supply and fish passage evaluations conducted by the Ad Hoc Committee Working Groups were the jumping off points for evaluation of the "dam(s) removed" and "dams remain" categories for this Feasibility Study.

1.1 Purpose

The purpose of this technical memorandum is to illustrate the process used to develop Alternatives for analysis in the Feasibility Study that satisfies the requirement of feasible solutions to dam(s) removed and dams remain Water Supply Scenarios, and to summarize the process used to develop a Project Plan from these Alternatives.

1.2 Overall Approach

We first summarize the Water Supply Scenarios and associated infrastructure changes developed by the Ad Hoc Committee Water Supply Working Group (Section 2). Analyses in the Capital Improvements Technical Memorandum (Stillwater Sciences et al. 2021a) and Potential Ecosystem and Fisheries Responses to Potential Alternatives Technical Memorandum (Stillwater Sciences et al. 2021b) focused on differences between:

- Baseline Scenario (current operations; referred to as Baseline hereafter);
- Scenario 4B (modified Reasonable and Prudent Alternatives (RPA)/FIRO and fish flows);

- Scenario 2 (run-of-the-river/Forecast Informed Reservoir Operations [FIRO] and fish flows); and,
- Scenario 3 (decommissioning)

This approach allowed comparison of future conditions to both existing conditions and the condition in which the Project is not relicensed by the Parties. In addition to Water Supply Scenarios, we also developed five combinations of Water Supply Scenarios with potential Project infrastructure modifications as described in Section 3, which were then prioritized and evaluated by the Parties to develop a proposed Project Plan described in Section 4.

2 SUMMARY OF WATER SUPPLY SCENARIOS

There were nine Water Supply Scenarios analyzed by the Ad Hoc Committee Water Supply Working Group, two of which were scenarios that analyzed future climate changes on hydrology and water demand. Several of these Water Supply Scenarios did not meet water supply needs in the Russian River watershed and were thus considered infeasible. Of the remaining Water Supply Scenarios that were feasible, Scenario 2 and Scenario 4B (Table 1-1) were selected to reflect the dams remain and dam(s) removed categories, respectively. However, Scenario 4 developed in a draft version of Addley et al. (2019) assumed current operations in the Russian River watershed, while Scenario 2 assumed modified operations in the Russian River watershed.

The modified operations on the Russian River consisted of (1) the Forecast Informed Reservoir Operations (FIRO) at Lake Mendocino; and (2) implementation of the Fish Habitat Flows and Water Rights Project (Fish Flow Project). FIRO creates a buffer pool of 11,050 acre-feet (ac-ft) in the flood control pool which the U.S. Army Corps of Engineers (Corps) can retain or release at their discretion. The buffer pool is managed using a Decision Support Model developed by Sonoma Water along with the other tools and protocols the Corps uses to manage flood control operations at Lake Mendocino. FIRO has been demonstrated to significantly increase functional storage at Lake Mendocino.

The Fish Flow Project proposes to modify minimum instream flows in the Russian River in accordance with NMFS 2008 Biological Opinion for Water Supply, Flood Control Operations, and Channel Maintenance conducted by the U.S. Army Corps of Engineers, the Sonoma County Water Agency, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District in the Russian River watershed (Russian River B.O.), improving habitat for salmonids in the Russian River and reducing summer water demand from Lake Mendocino storage. When implemented, both of these modified operations in the Russian River Basin resulted in improvements in water supply. Because Scenario 4 in Addley et al. (2019) assumed current conditions rather than the FIRO and Fish Flow Project operations used in Scenario 2, a new water supply scenario (Scenario 4B) was created to enable more consistent comparison with Scenario 2 (Table 2-1). Sonoma Water re-ran the HEC-ResSim model for this new Scenario 4B, and results were incorporated into the final Water Supply Working Group Report (Addley et al. 2019).

Table 2-1. Matrix of Water Supply Scenarios modified from the Ad Hoc Committee Water Supply Working Group (Addley et al. 2019).

Modeling Scenarios			Russian River & Lake Mendocino Alternatives		
			Current Operations	**Lake Mendocino FIRO (Hybrid) with Fish Flow Project Operations[1]**	**Raise Coyote Valley Dam**
Potter Valley Project Alternatives	Dams Remain	Current Operations[2]	Baseline: Existing Climate (n=1)		
			Baseline FC: Future Climate (n=4)		
		Revised Operations[3]	Scenario 4: Existing Climate (n=1)	Scenario 4B: Existing Climate (n=1)	
	Dam(s) Removed	Run-of-the-river[4]		Scenario 2: Existing Climate (n=1)	
				Scenario 2FC: Future Climate (n=4)	
		Decommission[5]	Scenario 1: Existing Climate (n=1)	Scenario 3: Existing Climate (n=1)	Scenario 5: Preliminary analysis, Existing Climate

Note: Red outlined boxes are potential future Water Supply Scenarios primarily analyzed by Feasibility Study.

[1] Lake Mendocino Forecast Informed Reservoir Operations (FIRO) and Sonoma County Water Agency Fish Habitat Flows and Water Rights Project Draft Environmental Impact Report (State Clearinghouse No. 2010092087) (Fish Flow EIR) Assumptions: Maximum allowed reservoir elevation during November-March flood reserve space raised from 68,400 acre-feet (ac-ft) to 80,050 ac-ft. Reduces Lake Mendocino releases in all years except driest year by up to 80 cubic feet per second (cfs). Achieve unmet Potter Valley Irrigation District (PVID) demands (up to 15,320 ac-ft) via PVID pumpback from Lake Mendocino.

[2] Current operations: Scott Dam and Cape Horn Dam stay in place, streamflows and diversions based on 2002 Biological Opinion Reasonable and Prudent Alternative (RPA) flows, maximum diversion=170 cfs based on model calibration mass balance. Russian River flows based on 2008 Biological Opinion RPA and 1986 Decision 1610, existing flood control rule curve (no FIRO).

[3] Project Revised Operations Assumptions: 1) allow discretionary Project diversions when Scott Dam is spilling up to 170 cfs, 2) reduce Eel River minimum instream flow "floor" by up to 50 cfs in winter and spring, and 3) reduce minimum instream flow on the East Fork Russian River year-round by various amounts for different water year types.

[4] Run-of-the-River Assumptions: Remove Scott Dam; continue Van Arsdale diversions with a maximum Project diversion of 300 cfs resulting from capital projects that improve diversion reliability; achieve unmet PVID demands (up to 15,320 ac-ft) via in-valley storage, aquifer storage and recovery, pumpback from Lake Mendocino, or other means.

[5] Decommission Assumptions: Scott Dam, Cape Horn Dam, and Project Diversion would be completely removed, no water diversions from Eel River to Russian River, Eel River streamflows would be unimpaired.

A brief summary of the two Water Supply Scenarios is provided in the following sections; more detailed results can be found in Addley et al. (2019).

2.1 Water Supply Scenario 2

The rules for when diversions cease each year are based on NMFS Reasonable and Prudent Alternative (RPA) flow thresholds for Project operations. The RPA streamflows and associated diversion thresholds will need to be revisited during the FERC licensing process, but are reasonable to use for the Feasibility Study. This scenario will meet the dam(s) removed category and can accommodate either retaining or removing Cape Horn Dam provided that a reliable seasonal diversion is maintained with existing or new infrastructure.

Eel River, same as Baseline, except:

- Zero storage capacity at Lake Pillsbury (Scott Dam is removed); Cape Horn Dam remains in the model.
- No Block Water hydrographs released because Scott Dam is removed.
- Maximum diversion capacity applied is increased from 170 cubic feet per second (cfs) to 300 cfs, which assumes full tunnel capacity can be used via improvements to fish screen and other diversion structures.
- In the model, diversion flows can range from 30 cfs to 300 cfs. Diversions occur when flows at Cape Horn Dam are greater than [minimum RPA flow below Cape Horn Dam] + [5 cfs buffer] + [30 cfs diversion threshold].

Russian River, same as Baseline, except:

- PVID water needs partially met by increased seasonal diversion capacity of up to 300 cfs.
- Rule set applied to PVID diversions: PVID water needs not met by seasonal diversions and local runoff are provided via pumpback from Lake Mendocino up to 15,320 ac-ft, ranging from 0 cfs to 70 cfs between April 15 and October 15 (based on 2016 PVID reported total demand). If Lake Mendocino storage is less than 15,000 ac-ft, the model does not allow pumpback to occur.
- Russian River flows are based on the Fish Flow Project, which includes in general, lower flow schedules as compared to Sonoma Water's current water right permit requirements and State Water Resouces Control Board (State Board) Decision 1610 (D-1610). The difference in D-1610 and Fish Flow Project flow regimes varies by month and water year condition, ranging from a difference of 0 cfs to 80 cfs. The greatest differences occur in the wettest year types during summer months. Both flow regimes have a floor of 25 cfs.
- Maximum conservation storage of Lake Mendocino is assumed to be equal to the flood pool encroachment (FIRO buffer pool) that was approved for the water year 2019 planned major deviation to the Lake Mendocino/Coyote Valley Dam Water Control Manual, which allows for additional winter and fall water supply storage (68,400 - 80,050 ac-ft) (Figure 2-1). Modeling does not simulate forecast-based operations; therefore, storage levels, releases, and downstream flows could differ from the simulation results.

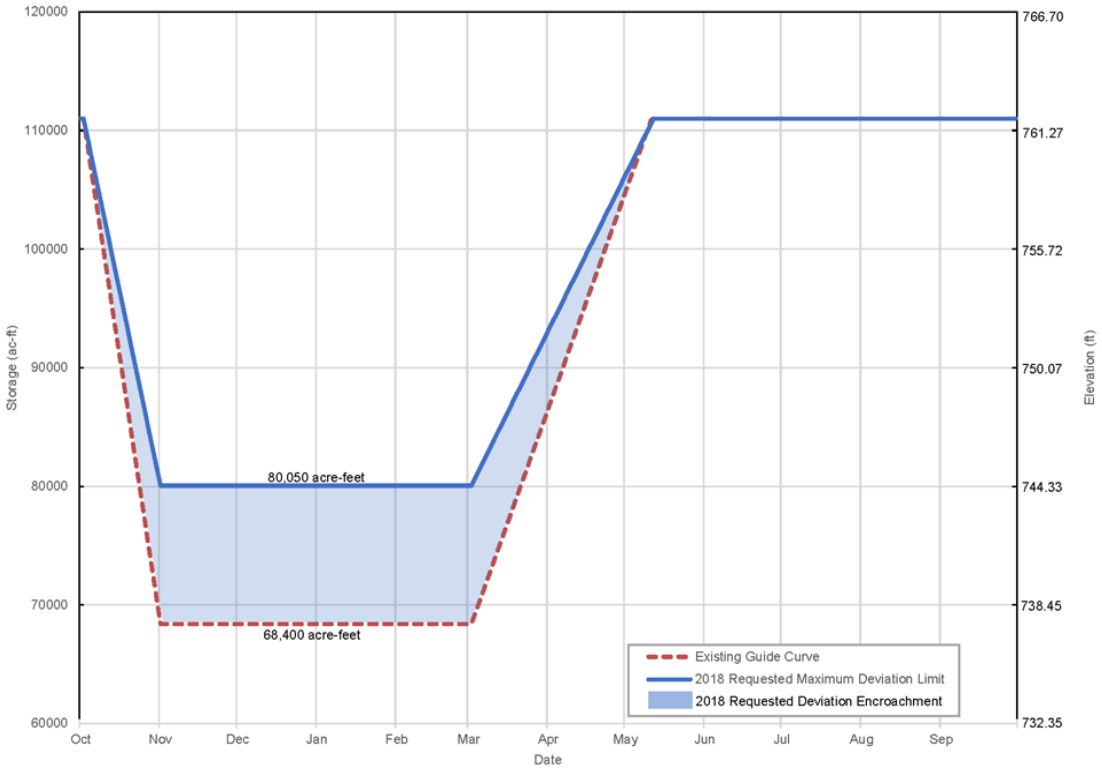

Figure 2-1. Assumed Forcast Informed Reservoir Operations (FIRO) buffer pool storage curve, which allows additional storage by raising the winter (November 1 through March 1) storage maximum from 68,400 ac-ft to 80,050 ac-ft.

2.2 Water Supply Scenario 4B

Like Scenario 2, this scenario relies on RPA flows on the Eel River and will need to be re-evaluated as part of the FERC licensing process, but is reasonable for use for the Feasibility Study. This scenario will meet the dams remain category and can accommodate either retaining or replacing Cape Horn Dam, provided that a diversion is maintained with existing or new infrastructure.

Eel River, same as Baseline, except:

- Additional diversions are allowed to occur when the Lake Pillsbury water level is spilling, even when storage is below the Target Storage Curve. Under the current RPA (baseline operations), discretionary diversions from the Eel River to the Russian River cannot be made when Lake Pillsbury storage is below the Target Storage Curve (TSC) for the given water year type (Figure 2-2a). Only the required minimum flow for the East Branch Russian River and PVID's allotment can be diverted under those circumstances. In Scenario 4B, there would be an exception to this rule when Lake Pillsbury is spilling where discretionary diversions would be allowed during the spill even if the reservoir's storage is under the TSC. This would allow additional diversion in the spring of wetter water years, with limited impact to Eel River flows while delivering cold water to Lake Mendocino (Figure 2-2b).
- The Eel River below Cape Horn Dam minimum instream flow floor is lowered by up to 50 cfs in the spring and winter to better match natural flow patterns during drier years. Under

baseline operations, aside from set summer flows, the required minimum Eel River flows below Van Arsdale (E-11) vary daily between a floor and a cap (Figure 2-3**Error! Reference source not found.**a) and are indexed to the calculated unimpaired flow at Van Arsdale. The winter/spring floor (Dec 1- May 15) on minimum Eel River flows below Van Arsdale (E-11) is 100 cfs in all water year types (Figure 2-3a). In dry years, this can exceed inflows to Lake Pillsbury and deplete storage in the reservoir. Additionally, it does not mimic natural hydrology, setting an artificially high flow rate when unimpaired flows in the Eel River would be lower. In Scenario 4B, the E-11 winter/spring floor would be reduced from 100 cfs to 50 cfs (Figure 2-3b). The E-11 cap on required minimum flows would remain the same. While the E-11 floor spring recession would be modified slightly to account for the lower starting point, the summer flows would remain the same.

Russian River, same as Baseline, except:

- Required releases to East Branch Russian River are lowered to support higher storage in Lake Pillsbury. The additional diversions allowed by the spill exception are expected to make up for some of the inflow reduction, while not impacting storage. The required summer flows are reduced from 75 cfs (Figure 2-4a) to 35 cfs (Figure 2-4b) for the Normal water year type and remain at 25 cfs for the Dry water year type. In both Normal and Dry water year types, the winter/spring required flows are reduced from 35 cfs (Figure 2-4a) to 20 cfs (Figure 2-4b). The rarely triggered Critical water year type remains 5 cfs.
- Russian River flows are based on the Fish Flow Project, which includes in general, lower flow schedules as compared to Sonoma Water's current water right permit requirements and D-1610. The difference in D-1610 and Fish Flow Project flow regimes varies by month and water year condition, ranging from a difference of 0 cfs to 80 cfs. The greatest differences occur in the wettest year types during summer months. Both flow regimes have a floor of 25 cfs.
- Estimated FIRO operations that allow for additional winter and fall water supply storage (68,400 -80,050 ac-ft) (Figure 1-1).

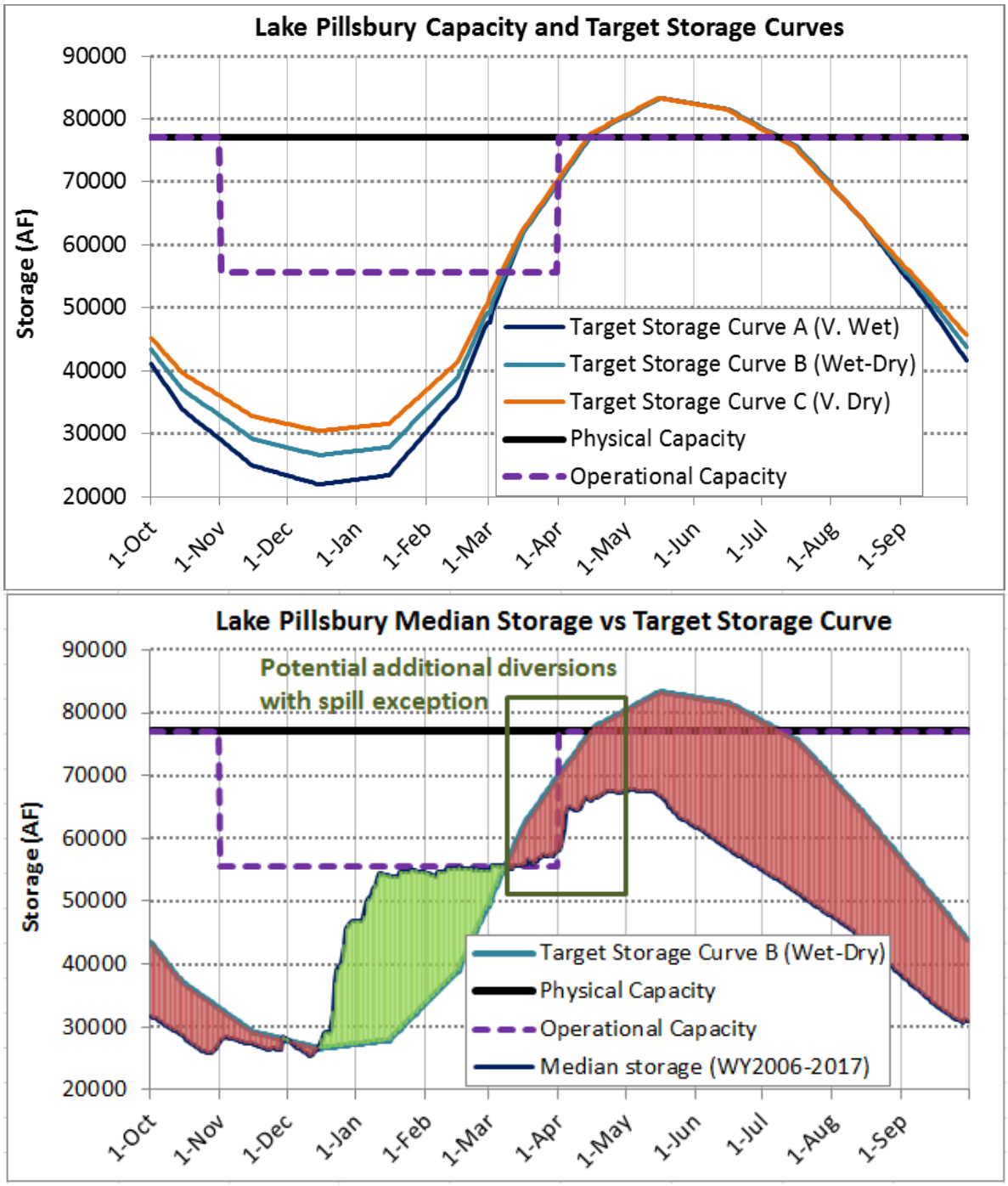

Figure 2-2. Lake Pillsbury existing Target Storage Curves, showing (a) Comparison of RPA-designated Target Storage Curves to reservoir physical and operational capacities, and (b) Comparison of recent median daily storage to most common classification of the Target Storage Curves (green and red bars indicate when median storage is above or below TSC B, allowing or prohibiting discretionary diversions). The green box highlights the period of potential additional diversions the spill exception would allow.

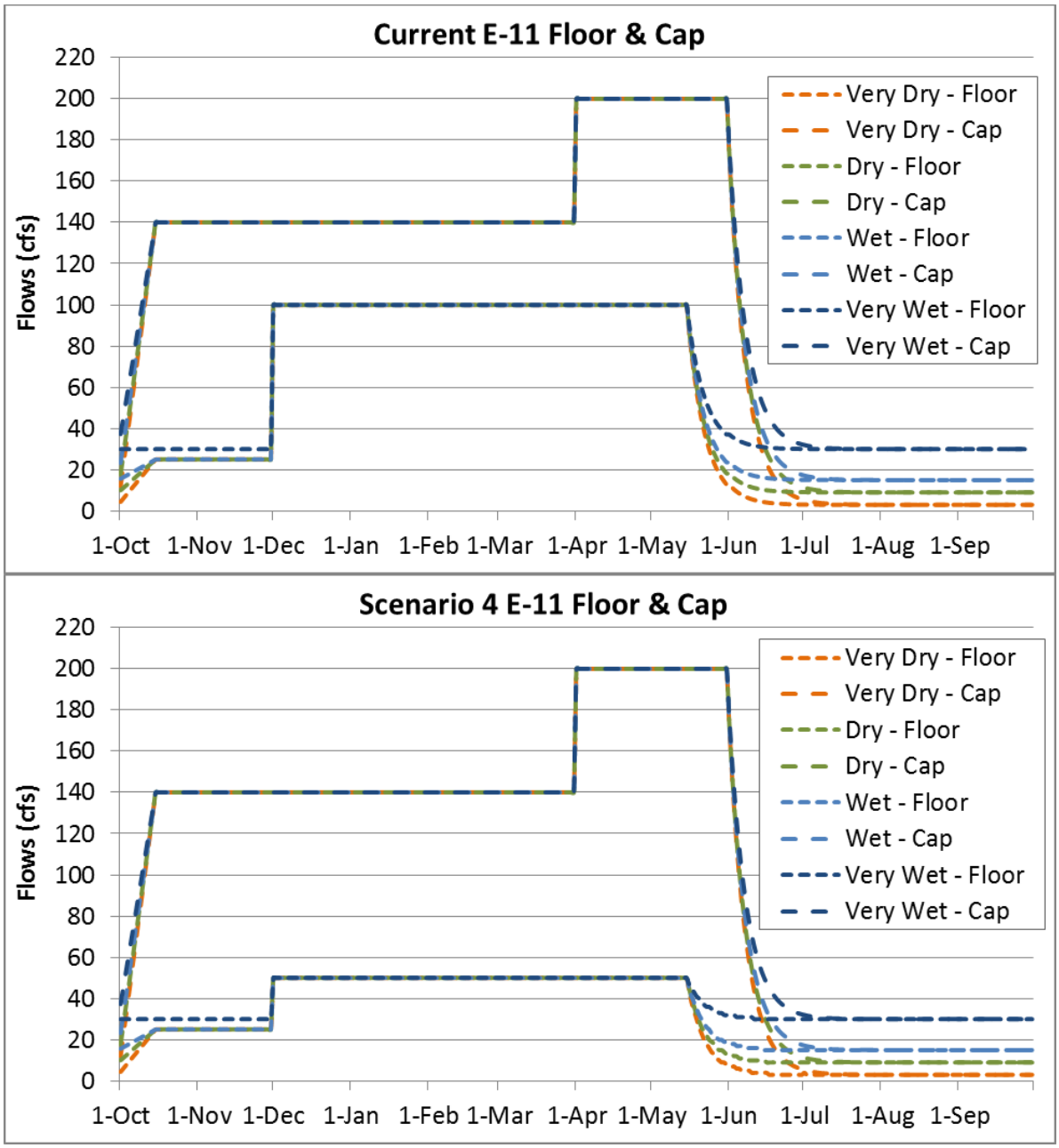

Figure 2-3. Existing and Scenario 4B RPA Eel River floor and cap instream flow releases, showing (a) Current E-11 floor and cap on required minimum flow by water year type, and (b) Scenario 4B lowered E-11 floor (cap remains the same). For simplification, the serial cases (years that follow Very Wet years) are not shown. When the Very Wet classification is triggered, the following summer has an increased flow requirement as follows: Very Dry – 3 cfs increases to 5 cfs, Dry – 9 cfs increases to 20 cfs, Wet – 15 cfs increases to 25 cfs, and Very Wet – 30 cfs increases to 35 cfs.

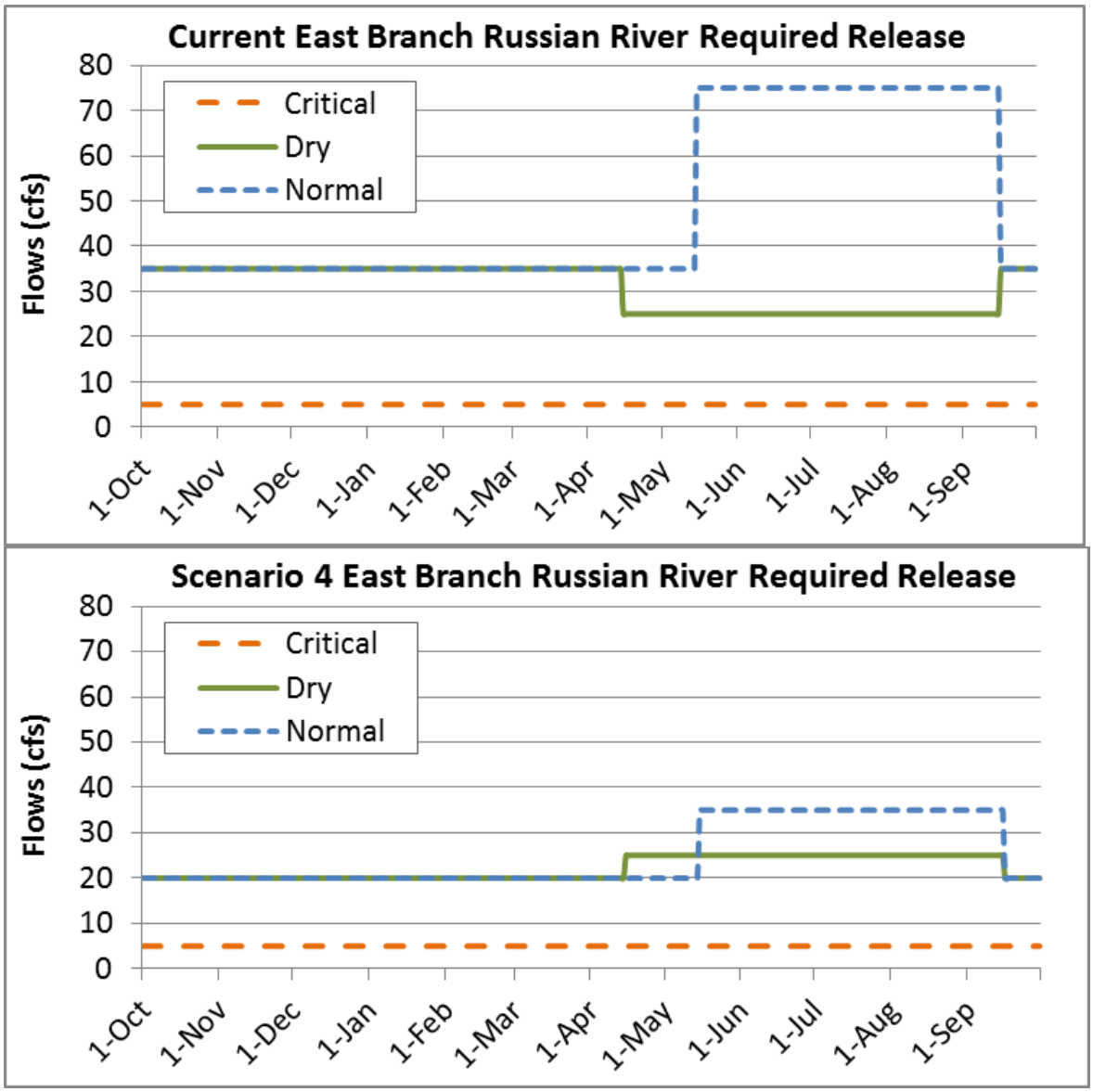

Figure 2-4. Existing and Scenario 4B RPA East Branch Russian River required instream flow releases, showing (a) Current East Branch Russian River required release by water year type, and (b) Scenario 4B lowered required releases (with no change to the rarely triggered Critical water year type). To simplify, Normal water year type with Dry Spring Exception not shown. In that special case, the summer flow requirement for the East Branch Russian River drops to 40 cfs under the baseline operations. In Scenario 4B, there is no Dry Spring Exception, as the required summer flow for Normal WY type has been reduced to 35 cfs.

3 ALTERNATIVE DEVELOPMENT APPROACH

To develop Feasibility Study Alternatives, these two water supply options would be logically paired with different "Options" of infrastructure modification, fish passage, sediment management, and other actions (Figure 3-1).

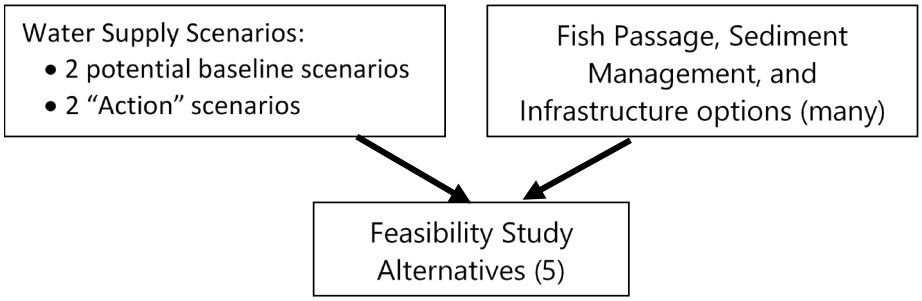

Figure 3-1. Conceptual approach of integrating Water Supply Scenarios with other options to create Feasibility Study Alternatives.

The Options have been developed to reflect what was analyzed in the Capital Improvements Technical Memorandum (Stillwater Sciences et. al. 2021a) and summarized in Table 3-1 through Table 3-3. Lastly, based on the high cost of FERC licensing and the modest power generation return for the Project, the option of ceasing power generation and avoiding FERC licensing was also considered.

Table 3-1. Table of fish passage, sediment management, and infrastructure options analyzed in the Feasibility Study for Scott Dam.

Scott Dam Categories	Options
Dam Retention or Decommissioning	Retain Scott Dam and retrofit
	Single Year Removal
	Phased Removal (4 years)
Lake Pillsbury Sediment Management (if Scott Dam removed)	Remove mobile sediment (~12 million cubic yards)
	Remove minimal sediment (~1.5 million cubic yards)
	Remove no sediment and allow to route downstream (~12 million cubic yards)
Lake Pillsbury Revegetation (if Scott Dam removed)	Natural revegetation (no planting)
	Revegetate and mulch entire inundation area
	Revegetate valley floor and spoils area
Adult Fish Passage	Natural Fishway
	Conventional Fishway
	Modified Conventional Fishway
	Trap and Haul
	Hopper System
	Whoosh (include fish counting capability)
Juvenile Fish Passage	Floating Surface Collector at the dam
	Fixed Surface Collector
	Variable intake surface collector
	Through Spillway
	Collection at Head-of-Reservoir or in tributaries

Table 3-2. Table of fish passage, sediment management, and infrastructure options analyzed in the Feasibility Study for Cape Horn Dam and Potter Valley Powerhouse.

Cape Horn Dam and Potter Valley Powerhouse Categories	Options
Dam Decommissioning	Retain Cape Horn Dam and retrofit
	Single Year Removal
Van Arsdale Reservoir Sediment Management (if Cape Horn Dam removed)	Remove no sediment and allow to route downstream (~1.2 million cubic yards)
Van Arsdale Reservoir Revegetation (if Cape Horn Dam removed)	Natural revegetation (no planting)
Adult Fish Passage	Retrofit upstream fish ladder
	Retrofit fish hotel
Juvenile Fish Passage	Downstream fishway
Van Arsdale Diversion Modification	Retain and modify existing diversion
	Modified diversion at Cape Horn Dam
	Radial Collector well field
	Infiltration gallery
	Vertical intake screen diversion
	Cone screen diversion
Potter Valley Powerhouse Modification	Retain and continue power generation
	Remove generators and install energy dissipation structure (no FERC licensing)

The dam(s) removed alternatives uses Water Supply Scenario 2, which (based on the water balance modeling) satisfies Lake Mendocino and mainstem Russian River water supply needs (Addley et al. 2019), but does not meet PVID water supply needs in most years (seasonal diversions in winter and early spring, no diversions in summer). Therefore, in addition to the Eel River Options, there are PVID water supply Options included to remedy seasonal shortcomings in PVID water supply (Table 3-3) and are discussed in greater detail in Appendix 2 of the Capital Improvements Technical Memorandum (Stillwater Sciences et. al. 2021a).

When developing the alternatives, the various Options are combined with the Water Supply Scenarios in a logical way. For example, for a dam(s) removed alternative, no fish passage Options are included. Conversely, for a dams remain alternative, a fish passage Option is selected that has the best ecological performance and lowest cost.

Table 3-3. Table of water supply infrastructure options analyzed in the Feasibility Study for PVID water supply supplementation for dam(s) removed alternatives (Water Supply Scenario 2).

PVID Water Supply Categories	Options
Tributary Storage via Dam	Drainage near PVP Powerhouse
	Busch Creek
	Boyes Creek
Improved Water Delivery and Use Efficiency	Piped Canals
Pumpback Water from Lake Mendocino	Pumpback Alone via Pipeline
	Pumpback with Tributary Storage
	Pumpback with Piped Canals
	Pumpback with Piped Canals and Water Dropoff

4 SUMMARY OF ALTERNATIVES AND PROJECT PLAN SELECTION

Based on (1) the cost comparisons and qualitative evaluation of the different Options, (2) initial professional judgement on performance with respect to the Shared Objectives, and (3) the logical process described in Section 1, the Stillwater Sciences team presented the Parties with five different alternative project plans for the licensing of the Project (Table 4-1 and Table 4-2):

- Alternative 1: Current facilities and hydropower generation
- Alternative 2: Removal of Scott Dam and hydropower generation
- Alternative 3: Removal of both Scott and Cape Horn dams and hydropower generation
- Alternative 4: Removal of Scott Dam and no hydropower generation
- Alternative 5: Removal of both Scott and Cape Horn dams and no hydropower generation

Alternative 1 reflects a dams remain alternative (combined with Water Supply Scenario 4B), and Alternatives 2 through 5 reflect dam(s) removed alternatives (combined with Water Supply Scenario 2).

Table 4-1. Summary of Alternatives developed for initial consideration in the Potter Valley Project Feasibility Study - Scott Dam.

Alternative:	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Water Supply Scenario:	**Scenario 4B**	**Scenario 2**	**Scenario 2**	**Scenario 2**	**Scenario 2**
Disposition of Dams & Power Generation[1]:	Scott Dam Remains Cape Horn Remains Generation Remains	**Scott Dam Removed** Cape Horn Remains Generation Remains	**Scott Dam Removed** **Cape Horn Removed** Generation Remains	**Scott Dam Removed** **Cape Horn Removed** **Generation Removed**	**Scott Dam Removed** Cape Horn Remains **Generation Removed**
Scott Dam	Remains	Removed	Removed	Removed	Removed
Demolition Phasing	N/A	Phased Removal (4 years)	Single year Removal	Single year Removal	Phased Removal (4 years)
Lake Pillsbury Sediment Management	Remains	Remove mobile sediment (~12 million cu yds)	Remove no sediment and allow to route downstream (~12 million cu yds)	Remove no sediment and allow to route downstream (~12 million cu yds)	Extensive sediment removal (~12 million cu yds)
Lake Pillsbury Revegetation	N/A	Partially Revegetate valley floor and spoils area	Revegetate entire inundation area	Revegetate entire inundation area	Revegetate entire inundation area
Scott Dam Upstream Fish Passage	Natural Fishway	No dam, fully volitional passage after 4 years	No dam, fully volitional passage	No dam, fully volitional passage	No dam, fully volitional passage after 4 years
Scott Dam Downstream Fish Passage	Collection in tributaries and truck haul downstream	No dam, fully volitional passage after 4 years	No dam, fully volitional passage	No dam, fully volitional passage	No dam, fully volitional passage after 4 years

[1] **Bold** text indicates differences from Alternative 1

Table 4-2. Summary of Alternatives developed for initial consideration in the Potter Valley Project Feasibility Study – Cape Horn Dam.

Alternative:	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Water Supply Scenario:	**Scenario 4B**	**Scenario 2**	**Scenario 2**	**Scenario 2**	**Scenario 2**
Disposition of Dams & Power Generation[1]:	Scott Dam Remains Cape Horn Remains Generation Remains	**Scott Dam Removed** Cape Horn Remains Generation Remains	**Scott Dam Removed** **Cape Horn Removed** Generation Remains	**Scott Dam Removed** **Cape Horn Removed** **Generation Removed**	**Scott Dam Removed** Cape Horn Remains **Generation Removed**
Cape Horn Dam	Remains	Remains	Removed	Removed	Remains
Demolition Phasing	N/A	N/A	Single year Removal	Single year Removal	N/A
Van Arsdale Sediment Management	N/A	N/A	Remove no sediment and allow to route downstream (~1.2 million cu yds)	Remove no sediment and allow to route downstream (~1.2 million cu yds)	N/A
Cape Horn Dam Upstream Fish Passage	Retrofit fish ladder and fish hotel	Retrofit fish ladder and fish hotel	No dam, fully volitional passage	No dam, fully volitional passage	Retrofit fish ladder and fish hotel
Cape Horn Dam Downstream Fish Passage	No change	No change	No dam, fully volitional passage	No dam, fully volitional passage	No change
Van Arsdale Diversion	Retain and modify fish screen and fish bypass pipe to enable 300 cfs	Retain and modify fish screen and fish bypass pipe to enable 300 cfs	Construct surface diversion upstream, gravity feed to existing diversion	Construct surface diversion upstream, gravity feed to existing diversion	Retain and modify fish screen and fish bypass pipe to enable 300 cfs
Potter Valley Powerhouse	Retain and continue power generation	Retain and continue power generation	Retain and continue power generation	Remove generators and install energy dissipation structure	Remove generators and install energy dissipation structure
PVID Water Supply	Remains as-is	Lake Mendocino pumpback with water dropoff through Potter Valley	Lake Mendocino pumpback with water dropoff through Potter Valley	Lake Mendocino pumpback with water dropoff through Potter Valley	Lake Mendocino pumpback with water dropoff through Potter Valley

Alternative:	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
Water Supply Scenario:	**Scenario 4B**	**Scenario 2**	**Scenario 2**	**Scenario 2**	**Scenario 2**
Disposition of Dams & Power Generation[1]:	Scott Dam Remains Cape Horn Remains Generation Remains	**Scott Dam Removed** Cape Horn Remains Generation Remains	**Scott Dam Removed** **Cape Horn Removed** Generation Remains	**Scott Dam Removed** **Cape Horn Removed** **Generation Removed**	**Scott Dam Removed** Cape Horn Remains **Generation Removed**
Studies and FERC Licensing	Complete existing studies and FERC licensing	Complete new and existing studies and FERC licensing	Complete new and existing studies and FERC licensing	Conduct necessary studies and EIR	Conduct necessary studies and EIR

[1] **Bold** text indicates differences from Alternative 1

The Parties then compared these alternatives to the Shared Objectives described in the Planning Agreement, which are:

1. Minimize or avoid adverse impacts to water supply reliability, fisheries, water quality and recreation in the Russian River and Eel River watersheds;
2. Improve fish passage and habitat on the Eel River sufficient to support recovery of naturally reproducing, self-sustaining and harvestable native anadromous fish populations including migratory access upstream and downstream at current project dam locations;
3. Reliance on best available science and engineering analyses as the basis for evaluating options for restoration, water delivery, and hydroelectric generation pursuant to a new license;
4. Collaboration on funding;
5. Active participation of tribes and other stakeholders who are willing to support the other Shared Objectives;
6. Economic welfare of both watersheds;
7. Continued hydroelectric generation; and
8. Protecting tribal cultural, economic, and other interests in both the Eel and Russian River watersheds.

The Parties determined that, because: (1) hydropower generation is one of the Shared Objectives included in the Planning Agreement, and (2) proceeding through the FERC process would provide the most control for the Parties to determine the disposition of the Project, Alternatives 4 and 5 should be excluded from further consideration.

The Parties then turned their consideration to the remaining three alternatives and evaluated those alternatives based on the extent to which the three alternatives could meet the Shared Objectives of providing enhanced fish passage and water supply reliability.

In terms of fish passage, Alternative 3 would provide the best fish passage because it would remove both Scott and Cape Horn dams. Alternative 2 would provide good fish passage because, even though Cape Horn Dam is an impediment to upstream migration, the fish ladder at Cape Horn Dam can be repaired/refurbished to provide adequate passage. Alternative 1 provides the least effective fish passage because, even though a fish ladder could provide upstream passage at Scott Dam, downstream passage would need to be provided through "trap and haul," juvenile fish collectors, or other methods.

In terms of water supply reliability, Alternative 1 would provide the best water supply reliability because it would retain current water storage facilities. Alternative 2 was considered to be feasible, although there are concerns as to whether a "run of the river" water diversion approach can provide water supply reliability equal to current conditions, especially in drought years. Evaluating water supply reliability will be the focus of several of the studies to be undertaken at a later date. Alternative 3, which would remove Cape Horn Dam and thus be required to rely on a new water diversion system, would not likely be able to provide sufficient water supply reliability based on experience with similar facilities in the Russian River system and based on the uncertainty of potential changes to the hydraulic regime of the Eel River (including but not limited to changes in sediment load) associated with the removal of Scott Dam.

Faced with these considerations, the Parties concluded that Alternative 2 is the best alternative to include as the proposed Project Plan at the present time. Alternative 2 would provide much improved fish passage (especially if coupled with improvements to the adult fish ladder and downstream

juvenile migration at Cape Horn Dam). Moreover, if the questions relating to water supply reliability could be resolved in a manner satisfactory to Mendocino County Inland Water & Power Commission and Sonoma Water, Alternative 2 would also meet the water supply reliability criterion. In this way, Alternative 2 best satisfies the Shared Objectives and so was chosen as the Proposed Project for inclusion in the Feasibility Study Report.

The Parties recognize that the current information available to fully compare the pros and cons of the alternatives is incomplete, and additional studies and analysis will be required to confirm the decisions taken in selecting a preferred alternative for the future FERC environmental review. Accordingly, the Parties have identified several studies to be completed as part of the next phase of the licensing process that will further corroborate or refine the assumptions that were utilized in the Project Plan selection process, and anticipate that details or elements of the Project Plan will likely be adjusted or modified as a result of study findings or stakeholder input, and eventually incorporated into a preferred alternative for the FERC environmental review.

4.1 Disclaimers

The Parties submitted the Feasibility Study Report to FERC based on the best information available as of May 13, 2020. With the addition of new information described above, the proposed Project Plan or elements of the Project Plan may change.

The technical memoranda prepared by the Stillwater Sciences team and delivered to the Parties in March 2020 played an important role in providing background for the Parties' deliberations, but were not the sole criteria used in the Parties' selection of Alternative 2 as the proposed Project Plan. The technical memoranda represent the scientific and engineering views of the Stillwater Sciences team and its subconsultants as of March 2020; those technical memoranda cannot and should not be attributed to the views of the Parties. The technical memoranda were completed under intense time pressure and with limited budget; for that reason, they should be considered only as preliminary and tentative evaluations of available existing data. No Party has endorsed those technical memoranda, and due to the limitations of time and budget, no Party is bound by the statements in the technical memoranda.

5 REFERENCES

Addley, C., C. Delaney, J. Emery, M. Lent, S. McBain, J. Mendoza, P. Pyle, D. Seymour, and A. Ticlavilca. 2019. Results of initial water supply modeling for Potter Valley Project and Russian River alternatives, Prepared by the Water Supply Modeling Subgroup for the Potter Valley Project Huffman Ad-Hoc Committee Water Supply Working Group, Prepared on May 22, 2019, Updated on February 20, 2020. http://pottervalleyproject.org/wp-content/uploads/2020/02/Water-Supply-Modeling-Grp-Combined-Deliverables_Final.pdf

Fish Passage Working Group. 2019. Fish Passage Profiles Evaluation Report, Potter Valley Project Ad Hoc Committee. December. http://pottervalleyproject.org/wp-content/uploads/2019/12/Fish-Passage-Evaluation-Report_FINAL.pdf

Stillwater Sciences, et al. 2021a. Potter Valley Project Feasibility Study: Alternatives Description and Project Plan. Prepared by Stillwater Sciences and McBain Associates, Arcata, California; McMillen Jacobs Associates, Boise, Idaho; M.Cubed, Davis, California; Princeton Hydro, South Glastonbury, Connecticut; and Geosyntec Consultants, Oakland, California for the Potter Valley Project Planning Agreement Parties. April.

Stillwater Sciences, et al. 2021b. Potter Valley Project Feasibility Study: Potential Ecosystem and Fisheries Responses to Project Alternatives. Prepared by Stillwater Sciences and McBain Associates, Arcata, California; McMillen Jacobs Associates, Boise, Idaho; M.Cubed, Davis, California; Princeton Hydro, South Glastonbury, Connecticut; and Geosyntec Consultants, Oakland, California for the Potter Valley Project Planning Agreement Parties. April.