POTTER VALLEY
PROJECT

Ad Hoc Briefing

10.17.18 Meeting

Document developed by the Consensus Building Institute
in cooperation with Ad Hoc Committee and Working Group Members

Contents

OVERVIEW

In spring 2017, Congressman Jared Huffman convened the Potter Valley Project Ad Hoc Committee for the purpose of identifying possible areas of agreement among a diverse group of stakeholders concerning the Potter Valley Hydroelectric Project in advance of the April 2017 start for the project's Federal Energy Regulatory Commission (FERC) relicensing process. Ad Hoc participants include representatives from the project-owner Pacific Gas & Electric Company; local, state, and federal agencies; local water districts; tribes; and non-governmental organizations.

The Ad Hoc Committee's goal for 2018 is to agree on potentially viable scenarios for the future of the project that build on technical working group recommendations and the associated opportunities and impacts of the scenarios. These scenarios would be advanced for consideration to the relicensing stakeholders, particularly the state and federal agencies with conditioning authority under the FERC relicensing process.

The Ad Hoc Committee offers an open forum for diverse perspectives to discuss regional water planning alongside consideration of salmonid population recovery that complements the formal relicensing process and can also extend beyond the scope of the relicensing process. The Committee has no formal authority, yet it also has no constraints – thereby offering a unique opportunity to support constructive dialogue among stakeholders and consideration of a broad range of scenarios.

The Congressman introduced goals and principles for a "Two-Basin Solution", which focuses on crafting a future for the Potter Valley Project that encompasses interests of both the Eel River and Russian River basins.

The Committee identified two key topics that are fundamental to the Potter Valley Project: (1) fish passage above Scott Dam and (2) water supply. The Committee formed two technical working groups to examine these issues in a rapid, focused manner using existing information. Working groups report findings to the full Ad Hoc Committee to inform its discussions. The two working groups share members to promote integrated thinking across both spheres, and Ad Hoc Committee members or staff are active in both. In addition, the impartial facilitator supporting the Ad Hoc and its working groups also convened a design team to help guide the Ad Hoc Committee process.

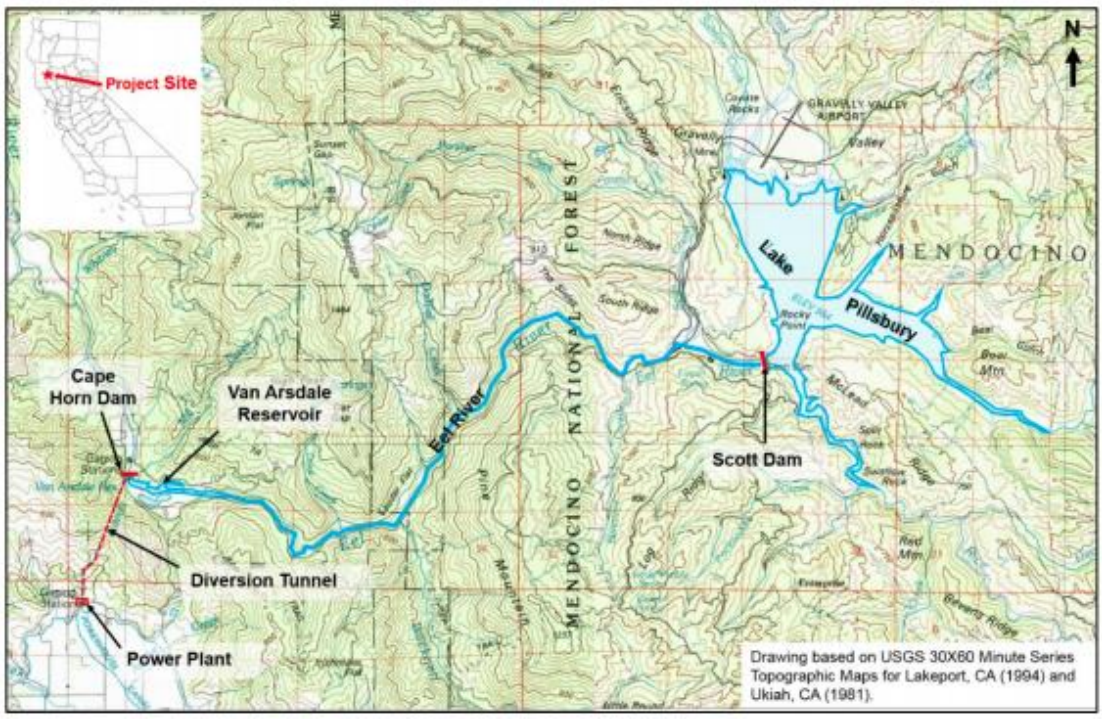
The Water Supply Working Group established objectives, which the Ad Hoc Committee approved in May 2018, and has successfully developed and reached consensus on a water and operations computer model to use for comparing consequences of different project operating scenarios. The working group still needs to affirm that the model is suitable for use in the relicensing process, but this is likely. As of October 2018, the Water Supply Working Group is in the process of running the model to evaluate several key scenarios, which would also sync up with the fish passage options under consideration.

The Fish Passage Working Group established objectives, which the Ad Hoc approved in May 2018, and has identified and begun evaluating the pros and cons of a range of possible approaches to provide upstream and downstream fish passage for the targeted species of steelhead, Chinook salmon, and lamprey. These evaluations are based on limited information and analysis given the short time frame

and resources available. However, participants in the working group include biological and fish-passage-technology experts. The working group has framed its scenarios as fish passage (via ladder, natural channel, etc.); trap and haul; partial dam removal; and removing Scott Dam and modifying Cape Horn Dam. The working group has developed a high-level qualitative filtering tool to assist evaluation of different approaches.

The full Ad Hoc Committee and its working groups have not reached consensus on a single approach for fish passage or water supply. They will continue to evaluate a range of approaches and identify considerations to inform the relicensing process.

This report summarizes the process and findings of the Potter Valley Project Ad Hoc Committee for the purpose of informing the relicensing proceeding conducted through October 2018. The working groups will perform further analyses and provide additional information for future Ad Hoc Committee consideration.



GUIDING PRINCIPLES FOR A TWO-BASIN SOLUTION

Congressman Huffman introduced goals and principles for a Two-Basin Solution to craft a future for the Potter Valley Project that encompasses interests of both the Eel River and Russian River basins.

Congressman Jared Huffman
Potter Valley Project Ad Hoc Committee

08.01.2018

We as interested parties in the Potter Valley Project Ad Hoc Committee are committed to joint problem solving and working toward an outcome of the Potter Valley Project relicensing process that reflects the following goals and principles:

Co-Equal Goals

- 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 dam locations; and
- Minimize or avoid adverse impacts to water supply reliability, fisheries, water quality, and recreation in the Russian River and Eel River basins.

Other Goals and Guiding Principles

- Respect tribal rights and their traditional connections to aquatic life, water and cultural resources in both basins
- Minimize and mitigate adverse impacts to Lake County, including Lake Pillsbury businesses and residents
- Ensure accountable governance and financially viable operations, including addressing potential liabilities
- Jointly pursue public funding based on environmental and water supply benefits
- Ensure that implementation of fish passage improvements in the Eel River basin happens in parallel and ideally simultaneously with water supply solutions in the Russian River basin

OBJECTIVES

Water Supply

The charge of the Water Supply Working Group is to identify water supply issues on the Eel and Russian Rivers, identify viable near- and longer-term solutions, and assess potential futures for the Potter Valley Project. The working group's objectives are to:

- Address water supply needs and demands across both basins
- Consider future hydrographs
- Articulate existing constraints (costs)
- Maximize benefits of coordinating operations, timing, and flow regimes along with biological considerations for timing, quality, and temperature
- Evaluate a small number potential scenarios that consider fish passage to inform Ad Hoc decision making

(View Water Supply Working Group Charter and Objectives.)

Fish Passage

The Ad Hoc Committee charged the Fish Passage Working Group with identifying a list of conceptual-level passage options that would meet three objectives for targeted anadromous fish species beyond Cape Horn Dam and Scott Dam. Achieving these objectives will promote the recovery and long-term viability of currently depressed fish populations in the Eel River. The working group strives to identify fish passage options that meet the following objectives for each targeted fish species:

- Population viability of upper Eel River anadromous fishes
- Access to abundant high quality habitat
- Functional fish passage

(See Appendix for detailed objectives. View Fish Passage Charter and Objectives.)

OPTIONS UNDER EVALUATION

Both working groups are meeting to examine potential options that address fish passage and water supply under a two-basin solution. As of October 2018, a number of options have been considered, outlined here, and the working groups are beginning to narrow the options that will receive further examination.

Water Supply Modeling Scenarios

Modeling Scenarios (Updated 10.3.2018)		Russian River / Lake Mendocino Alternatives					
		Baseline / Current Ops	Lake Mendocino FIRO (Hybrid) with fish flow EIR Ops	Raise Coyote Valley Dam	Raise Coyote Valley Dam with FIRO	Reduce Russian River Water Demands	PVID Storage
Potter Valley Project Alternatives	Baseline / Current Ops	1 - **Done**					
	PVP Decommission	2- **Done**	5 - NEXT				
	PVP Revised Ops (RPA E-5, Reduce EBRR flows, etc.)		4 - **NEXT**				
	Lowered Scott Dam						
	Run-of-the-River+		3 - Done 6 - NEXT: CLIMATE				

+Run-of-the-River Assumptions: Remove Scott Dam, Van Arsdale diversions with excess flows, and meet Potter Valley Irrigation District (PVID) demands from Lake Mendocino

Fish Passage Scenarios

1 Fish Passage at existing Scott Dam	2 Trap & Haul	3 Partial Scott Dam Removal	4 Remove Scott Dam and Modify Cape Horn Dam
Fish Ladder **Natural Channel** **Fish Surface Collector** (downstream) **Fish Elevator**	**Short Term** (10-15 years) **Long Term** Needs evaluation	**Lower Scott Dam** 1) Meet PVID demand and environmental flows 2) Retain accumulated sediment	**Remove Scott Dam and Modify Cape Horn Dam** **Remove both Scott Dam and Cape Horn Dam** 1) With Diversion (provides another baseline for flows and fish) 2) No Diversion

PRELIMINARY UNDERSTANDING OF OPTIONS

Water Supply Model and Scenarios

The Water Supply Working Group has been working over several meetings to develop modeling tools to conduct analyses to carry out its objectives. The working group formed a small subcommittee of modelers to validate the model and conduct the detailed work necessary to run and present modeling scenarios and results. The Water Supply Working Group is able to present the preliminary results of three scenarios at the October 2018 Ad Hoc Committee and is in the process of advancing additional scenarios through the analytical process. The upcoming scenarios are aimed to inform the Ad Hoc Committee's deliberations on a two-basin solution.

The model can help the Ad Hoc Committee to understand the following:

- Compare between different options
- Understand Eel River flows
- Consider diversions, storage in Lake Pillsbury, and impacts on Lake Mendocino and the Upper Russian River

Validated Model

The Water Supply Working Group has consensus that the model will simulate future project scenarios with sufficient accuracy so model outputs can be used for water supply and ecological evaluations for both the Eel River and Russian River basins. The working group has based this consensus on the model validation results. Validation of the PVP HEC-ResSim model indicates that it is reasonably representing Lake Pillsbury storage, flows below Cape Horn Dam (E11) and tunnel diversions (E16). Documentation of model validation is available on the Potter Valley Project Ad Hoc website.

Scenario 1: Baseline / Current Operations

The current operations scenario represents existing conditions and is used for comparisons with future operations scenarios. The following assumptions were used for the current operations model simulation.

Eel River Assumptions

- FERC license
- Discretionary transfers for power generation are capped at 170 cubic feet per second (cfs) to match observed monthly water balance
- Unimpaired hydrology developed by Cardno in 2018 was used as input to the model

Russian River Assumptions

- Compliance with State Water Resources Control Board Decision 1610
- Compliance with the Russian River Biological Opinion
- Unimpaired hydrology developed by the USGS

Insights

Validation of the current model scenario indicates that it is reasonably representing observed conditions.

Scenario 2: Decommission – Scott Dam and Cape Horn Dam

The following assumptions were used for the Potter Valley Project decommission model simulation.

Eel River Assumptions / Inputs

- Both Scott Dam and Cape Horn Dam are removed resulting in no water supply storage
- Transfers from the Eel River to the East Fork Russian River are discontinued
- Unimpaired hydrology developed by Cardno in 2018

Russian River Assumptions / Inputs

Same as Current Operations Scenario

- Compliance with State Water Resources Control Board Decision 1610
- Compliance with the Russian River Biological Opinion
- Unimpaired hydrology developed by the USGS

Insights

Eel River

- Flows in the Eel River below Scott Dam and Cape Horn Dam are significantly lower in the summer through mid-fall compared to the current operations scenario.
- No block water[1] is available to release for flow enhancement.
- Flows in the Eel River below Cape Horn Dam most of the time are similar to the current operations scenario. Flows are slightly lower than the current operations scenario in the low flow portion of October and November, and slightly higher than the current operations scenario during the high flow events in late fall and late spring.

Russian River

- East Fork Russian River flows are greatly reduced. Water is not available for irrigation in Potter Valley.
- There are significant impacts to the water supply reliability of Lake Mendocino and the Upper Russian River (from the confluence of the East Fork and the West Fork to the confluence of Dry Creek and the Russian River). With no Eel River diversion and under current operations of the Russian River, Lake Mendocino goes dry for some period of time 68 out of the 110 years of historical hydrology modeled. This is compared to one out 110 years for Current Operations scenario.
- Flows in the Upper Russian River are significantly lower in the summer through mid-fall compared to the Current Operations scenario.

[1] Block Water references an annual volume (2500 acre-feet) of water reserved for discretionary release by NMFS to enhance flows for fisheries. NMFS and CDFW work in consultation with PG&E.

Scenario 3: Run-of-the-River

For the run-of the-river scenario the following assumptions were used for the model simulation.

Eel River Assumptions

- Scott Dam is removed resulting in no water supply storage.
- Transfers from the Eel River to the East Branch Russian River are only authorized when flows below Cape Horn Dam are 35 cfs above the minimum flow calculated in accordance with the Reasonable and Prudent Alternative described in the Potter Valley Project Biological Opinion and PG&E's current FERC license.
- Capital improvement projects are implemented at Cape Horn Dam, Van Arsdale fish screens (modified to allow 300 cfs diversion), and the tunnel, conveyance piping, penstocks, and powerhouse to optimize the reliability and efficiency of the facilities.
- Unimpaired hydrology developed by Cardno in 2018 was used as input to the model.

Russian River Assumptions / Inputs

- The State Water Resources Control Board issues an order approving Sonoma Water's pending water rights petitions that would change the current hydrologic index and instream flow requirements as proposed by the Fish Flow Project.
- The Coyote Valley Dam – Lake Mendocino Water Control Manual is revised to include Forecast Informed Reservoir Operations (FIRO) as a tool to manage flood control operations.
- A significant capital project is constructed to provide water supply from Lake Mendocino to the Potter Valley Irrigation District. This would require a pump station built at Lake Mendocino and booster pumps along a 13-14 mile pipeline that would be constructed to pump water upstream to Potter Valley during the irrigation season. (Note: Cost estimates for this capital improvement project have not been calculated.)

Insights

Eel River

- Stored water is not available to release for transfer to Potter Valley Irrigation District and the East Fork Russian River.
- Flows in the Eel River below Scott Dam and Cape Horn Dam are significantly lower in the summer through mid-fall compared to the Current Operations scenario.
- There is no block water available to release for flow enhancement.
- Flows in the Eel River below Cape Horn Dam, most of the time, are similar to or lower than the Current Operations scenario (e.g., flows are lower than the Current Operations scenario in late fall).

Russian River

- Flow does not exist in the East Fork Russian River during the summer/fall except from return flows that occur as a result of water pumped back to Potter Valley Irrigation District for irrigation.
- There are general improvements (compared to the current operations scenario) to the water supply reliability of Lake Mendocino and the Upper Russian River, particularly in dry years.

- Flows are lower from early summer to early fall resulting from the lower minimum instream flows identified by the Fish Flow Project.

Upcoming Work

- Revised Potter Valley Project operations scenario: This scenario would improve cold water pool availability in Lake Pillsbury and Lake Mendocino (i.e., improved downstream cold water fish habitat), reduce minimum flows on the East Fork Russian River, and improve Eel River flows below Cape Horn Dam during the late fall and late spring shoulder seasons.
- Potter Valley Project decommission with revised Lake Mendocino operations (FIRO hybrid) with fish flow EIR operations scenario: This would make the decommissioning run compatible with the other runs that include revised Lake Mendocino operations.
- Run-of-the-River with climate change scenario: This would test the run-of-the-river option with future climate variability.
- A potential future scenario is Potter Valley Project decommissioning with a raised Coyote Valley Dam component.

Fish Passage Technologies and Scenarios

The Fish Passage Working Group identified four "scenarios" for evaluation: fish passage, trap and haul, lowering Scott Dam, and removing Scott Dam and modifying Cape Horn Dam. Initially, each scenario had several fish passage technologies identified for potential evaluation. Some scenarios require more than one technology to provide both upstream and downstream passage.

Fish Ladder

The working group considered a conventional fish ladder passage system at the existing Scott Dam.

Method and Facility / Equipment Options

- Concrete Fish Ladder
- Exit Gallery and Control Gates to manage for varying Reservoir Levels
- Guide Nets to Direct Fish within Reservoir

Pros - Fish Ladder	Cons / Risks - Fish Ladder
- Conventional fish passage alternative designed for adult Chinook salmon and steelhead. - Provides volitional passage - Supports volitional upstream passage for Chinook salmon and steelhead.	- Long ladder needed due to large height of dam. - High construction and operations and maintenance costs. - Fish attraction challenges (out-migrants to ladder; adults to ladder entrance). - Predation concerns at ladder. - Ladder construction requires extended drawdown within reservoir, risking flooding. - Challenging to accommodate large fluctuation in reservoir water surface
Uncertainties / Major Considerations	

- Downstream passage difficult, but could be possible with more design work (e.g., evaluate guide net effectiveness).
- Dam/bank and downstream channel stability uncertainties.
- Uncertain impacts on potential water supply disruptions.
- Unknown consequences on water quality and water temperature downstream.
- May be unable to accommodate adult summer-run steelhead.

Natural Channel

The working group evaluated a natural channel option. This provides for fish passage via a constructed channel or stream that essentially goes around the dam with some type of structure to direct the fish into the channel.

Method and Facility / Equipment Options

- Bank location (north or south banks on either side of Scott Dam)
- Channel slope
- Channel length / footprint

Pros - Natural Channel	Cons / Risks - Natural Channel
- Likely lower construction cost than ladder. - Flexible liner is more resilient to earth flows. - Likely cheaper to maintain/repair. - Provides volitional passage	- Many of same cons as listed for the fish ladder option. - Challenging to accommodate large fluctuation in reservoir water surface. - Still need concrete control structures upstream and downstream. - Larger footprint increases risk of failure due to geologic instability.

Uncertainties / Major Considerations
- More geotechnical studies needed to understand geological risks. - Gentler slopes help facilitate fish passage. - Unknown whether examples of long, natural channels exist.

Trap & Haul

The working group evaluated a trap & haul scenario that would involve: 1) collection of adult salmon and steelhead at either Cape Horn Dam or Scott Dam and their transport upstream to either Lake Pillsbury or the mouths of tributary streams to the reservoir and 2) collection of juveniles in Lake Pillsbury or tributary streams and their transport downstream to the Eel River below Scott Dam/Cape Horn Dam.

Method and Facility / Equipment Options

- Trap adults at Cape Horn Dam (CHD) vs. below Scott Dam (volitional passage at CHD).
- Transport juveniles vs. juveniles out-migrating on their own.

Pros - Trap & Haul	Cons / Risks - Trap & Haul
- Quicker implementation time, short-term option. - Some resource benefits could be achieved more rapidly than with other alternatives. - Can be phased: expand operations based on successful methods. - Extensive prior experience and lessons learned. - Avoids challenges of reservoir water surface fluctuations.	- Not volitional. - Attracting / guiding fish (particularly downstream migrants) to collection devices can be challenging or have high operation and maintenance (O&M) costs.

Uncertainties / Major Considerations
- Scientific community split on actual benefits and success rates of trap and haul as a short-term or long-term solution. - How much "fish handling / management" is desired? - Access to facilities, land acquisition needed? - Uncertain whether this can become a long-term solution. - Uncertain if trap & haul will work for lamprey migration. - Costs and fish passage survival rates unknown relative to fish ladder and natural channel options.

Partial Scott Dam Removal

The working group evaluated two different options for partial removal of Scott Dam: 1) reduction in the height of Scott Dam to the extent possible while meeting Potter Valley Irrigation District (PVID) water demand and environmental flows in the Eel River; and 2) reduction in the height of Scott Dam to the extent possible while retaining accumulated sediments in Lake Pillsbury.

Method and Facility / Equipment Options

1) 80-foot high dam -- Meet PVID water demand and environmental flows at gage E-11 below Cape Horn Dam
2) 49-foot high dam -- Retain accumulated sediment behind Scott Dam (avoid potentially re-suspending potentially mercury-laden sediment and/or burying the diversion facility at Van Arsdale).

Option 1

The working group indicated that for Option 1, Scott Dam could not be lowered enough to both satisfy PVID demand and offer substantial fish passage benefits with sufficient guarantee of success (e.g., daunting 80' dam height). The group had mixed views on whether Option 1 could still prove viable if, for example, PVID demand from Lake Pillsbury/Scott Dam were lower (e.g., met with other water supply sources). Others concluded that because so much of the water supply resides in the upper elevation of the pool that even modest quantities of stored water for PVID diversion necessitate a high dam.

Option 2
The following table summarizes the pros and cons of the Option 2 scenario.

Pros - Partial Dam Removal: Option 2-Retain Accumulated Sediment	Cons / Risks - Partial Dam Removal: Option 2-Retain Accumulated Sediment
- More fish-friendly dam height (49' vs. 130'). - Reduces potentially mercury-laden sediment resuspension concerns. - Relatively low O&M costs. - Provides volitional passage.	- Less storage capacity, resulting in reduced water supply for Russian River. - Still have fish passage limitations during fall/spring/dry years. - Less optimal rearing habitat downstream due to reduction in available cold water pool. - May require fish trapping to avoid reintroducing invasive species. - Challenging to accommodate fluctuation in reservoir water surface.
Uncertainties / Major Considerations	
- Lowering the dam height does not necessarily convert 1:1 with fish ladder height reduction. - Any dam height reduction risks increased turbidity and changes in water temperature and dissolved oxygen, potentially degrading downstream habitat. - Unknown risk and impacts of algal blooms.	

Remove Scott Dam and Modify Cape Horn Dam

The working group evaluated two different full dam removal options: 1) full removal of both Scott Dam and Cape Horn Dam; and 2) full removal of Scott Dam while leaving a modified Cape Horn Dam in place to allow for continued diversions.

Working group members indicated removal of both dams with no diversions may not satisfy the two-basin solution objective. However, the group indicated the option still merits consideration (e.g., to explore diversion alternatives or to know more precisely why this option does not satisfy the two-basin solution objective). The working group has referenced the Lake Mendocino Water Supply Reliability Study and UC Davis Study – Raising Coyote Valley Dam for general analyses of removing both dams.

The following table summarizes the pros and cons of the Remove Scott Dam and Modify Cape Horn Dam scenario.

Pros Remove Scott Dam & Modify CHD	Cons / Risks Remove Scott Dam & Modify CHD
- Provides volitional passage. - Substantial benefit for fish passage, habitat, and population benefit at lower long-term cost. - Reduces invasive fish species habitat.	- Water storage loss and associated impacts (e.g., reduced water supply for Russian River). - Loss of storage used to provide summer diversions does not meet the PVID water needs for summer irrigation.

- Reduce/eliminate mercury methylation and bio-accumulation. - Avoid damages from potential Scott Dam failure. - Provides diversion facility for continued water export to Russian River. - Help meet federal government trust obligations to tribes.	- Future unimpaired hydrology needs to be evaluated to understand impact on diversions. - Reduced ability to manage flows in the Eel River resulting in reduced summer flows and higher summer water temperatures.
Uncertainties / Major Considerations	
- Would need to explore winter-only diversion; provide another baseline for flows and fish. - Should explore alternative diversion mechanisms. - Unknown costs of maintaining alternative diversion structure compared to full decommission. - Unknown consequences on water quality permitting. - Costs for rehabilitating the lakebed. (See McMillen Jacobs Study)	

Qualitative Assessment Tool

The Fish Passage Working Group developed a high-level qualitative filtering tool to assist evaluation of different scenario options. The working group will use the filtering tool to qualitatively evaluate a select number of specific scenarios. (Refer to Appendix for the qualitative assessment tool.)

The tool considers the following across target species and life stages:

- Biological feasibility for upstream and downstream passage, including reservoir navigability, passage efficiency, and predation
- Habitat and water quality, including within the reservoir and downstream
- Hydrologic effects
- Other risk factors

The tool also includes

- Engineering and geotechnical feasibility
- Water delivery or storage potential
- Fish monitoring and exclusion capacity
- Passage operations
- Cost of construction
- Cost of operations and maintenance
- Timeframe to achieve resource benefits
- Risks and uncertainties

Upcoming Work for Fish Passage

The Fish Passage Working Group is currently in the process of identifying specific technical aspects necessary to evaluate the scenarios. Then, a subgroup will be running each scenario through the filtering tool to evaluate the viability of each fish passage option. The working group will meet to review these products in early December.

Fish Passage Supporting Information

Approaches	Options under Consideration	Information (studies, presentations, memos, etc.)
General	**Multiple Options** Preliminary Analysis of Potential Alternatives	Sonoma Water Cover Letter McMillen Jacobs Associates Modifications Feasibility Report Sediment Stabilization Measures
1 Fish Passage above existing Scott Dam	**Fish Ladder**	Mead & Hunt Study Geotechnical Opinion 8/16/18 Natural Channel Presentation
	Natural Channel	
	Fish Surface Collector (downstream)	
	Fish Elevator	
2 Trap & Haul	**Short Term (10-15 years)** Trap adults at Cape Horn Dam vs. below Scott Dam Transport juveniles vs. juveniles out-migrate on their own	PG&E and Cardno Informational Document Minto Fish Trap Facility Virtual Tour NMFS Collection-and-Transport over High Dams 8/16/18 presentation slides
	Long Term Needs evaluation	
3 Partial Scott Dam Removal	**Lower Scott Dam** 1) Meet PVID demand and environmental flows 2) Retain accumulated sediment	8/16/18 Scenarios Handout
4 Remove Scott Dam and Modify Cape Horn Dam	**Remove Scott Dam and modify Cape Horn Dam**	Pros & Cons Table (Updated 9/2018) McMillen Jacobs on lakebed restoration No Diversion: Lake Mendocino Water Supply Reliability Study UC Davis Study – Raising Coyote Valley Dam
	Remove Scott Dam and Cape Horn Dam 1) With Diversion 2) No Diversion	

APPENDIX: AD HOC COMMITTEE ROSTER

Convener: Congressman Jared Huffman

California Department of Fish and Wildlife – Allan Renger, Matt Myers

California Trout – Curtis Knight, Reggie Collins, Darren Mierau

City of Ukiah – Sean White

Coyote Valley Band of Pomo Indians – Chairman Michael Hunter, Ghazal Mahdavian, Emily Luscombe

Friends of the Eel River – Scott Greacen, David Keller

Humboldt County – Supervisor Estelle Fennell, Hank Seemann

Pacific Gas and Electric Co. – David Moller, Paul Kubicek, Brian Bottari, Melissa Lavinson, Matthew Miller, Susan Kester

Round Valley Indian Tribes – President Jim Russ, Paula Britton, Douglas Hutt, Jr.

Wiyot Tribe – Chairman Ted Hernandez, Tribal Administrator Michelle Vassel, Eddie Koch, Tim Nelson

Lake County – Supervisor Jim Steele

Mendocino County – Supervisor Carre Brown, Supervisor John McCowan

National Marine Fisheries Service – Steve Edmonson, Bob Coey, Joshua Fuller, Alicia Van Atta

Pacific Coast Federation of Fishermen's Association – Noah Oppenheim

Potter Valley Irrigation District – Janet Pauli, Guinness McFadden

Russian Riverkeeper – Don McEnhill

Sonoma Water – Grant Davis, David Manning, Pamela Jeane, Don Seymour, Jay Jasperse, Mike Thompson

Sonoma County – Supervisor James Gore

State Water Resources Control Board – Parker Thaler, Meiling Roddam

Trout Unlimited – Brian Johnson

U.S. Forest Service – Dawn Alvarez, Ann Carlson, Dennis Smith

U.S. Fish and Wildlife Service – Damon Goodman, Nick Hetrick

Congressman Jared Huffman's Office – John Driscoll, Jenny Callaway, Iliana Madrigal, Lindsay Righter, Ben Miller

APPENDIX: FISH PASSAGE OBJECTIVES

Approved by Ad Hoc Committee on May 7, 2018

The Fish Passage Working Group (FPWG) is developing information and recommendations on fish passage for the Potter Valley Project Ad Hoc Committee. The FPWG is composed of Potter Valley Project stakeholders charged with identifying a prioritized list of conceptual-level passage options that would meet three fish passage objectives for targeted anadromous fish species beyond Cape Horn and Scott dams, located within the upper mainstem Eel River, California. If these fish passage objectives are achieved, recommended fish passage options will promote the recovery and long-term viability of currently depressed fish populations in the Eel River. The FPWG strives to identify fish passage options that meet the following objectives for each targeted fish species:

Objective #1: Population Viability of Upper Eel River Anadromous Fishes

Evaluating passage and reintroduction of anadromous Chinook salmon, Pacific Lamprey and steelhead trout to historically occupied habitats above Scott Dam is one of the primary goals of the Potter Valley Project Two-Basin Solution Committee. To achieve the goal of successful reintroduction, the Fish Passage Working Group (FPWG) recommends that fish passage objectives promote the viable fish population (VFP) concept (an expansion of the viable salmonid population (VSP) concept used in NMFS' salmonid recovery planning documents to be inclusive of non-salmonid fishes). These population viability concepts (VFP/VSP) are based on four parameters fundamental to evaluating population viability status: abundance, productivity, spatial structure, and diversity. Abundance can be enhanced by increasing the carrying capacity of existing populations. Increased population productivity (number of downstream migrating juvenile fish per spawner) can result from improved survival rates in newly accessible high quality habitat. Enhancing spatial structure, or the ability of individuals to disperse across a landscape, can be a direct benefit of improved fish passage. Enhanced spatial structure promotes life history diversity as fish populations adapt to new environments. These four parameters could constitute independent objectives; however, the timeframe required for each of these objectives varies and not all may need to be improved to achieve overall population viability for the targeted species. The FPWG suggests using the VFP concept as a guiding principal to investigate fish passage alternatives for Scott and Cape Horn dams.

Objective #2 Access to Abundant High Quality Habitat

Allow anadromous fish access to historically occupied streams with sufficient habitat quantity and quality to complete essential life stages and promote long-term population viability. Accessible streams should provide habitat and water quality conditions that allow for timely seasonal spawning and juvenile rearing opportunities. Where possible, provide opportunities for fish to reside and access stream networks with seasonally interconnected high quality habitat. Avoid exposing fish to low quality habitat that harbor introduced predatory fish species.

Objective #3 Functional Fish Passage

Provide safe, timely, reliable, and effective upstream and downstream passage at Scott and Cape Horn dams for all targeted adult and juvenile anadromous fish life-stages.. Employ fish passage options and technologies that minimize stress, injury, and mortality, while maximizing passage efficiency, and minimizing migratory delay. Consider each targeted species life stage requirements, needs for timely seasonal movements, and habitat quality and quantity in affected lake and stream environments.

APPENDIX: QUALITATIVE FISH PASSAGE ASSESSMENT TOOL

10/12/18

Scoring Section I	Scott Dam Passage Scoring Scheme 1-10 (1-10 poor to very good) or NA. Include individual scores per participant within each cell (e.g., 7,5,8, etc.).									
	Juvenile Steelhead	Smolt Steelhead	Adult Winter-Run Steelhead	Adult Summer (Spring)-Run Steelhead	Juvenile Chinook	Adult Fall-run Chinook	Pacific Lamprey	Sacramento Sucker/other native fish species	Notes	Definitions
Biological Feasibility for Upstream Passage										**Ability for targeted species and associated lifestages to successfully find the fishway and migrate to spawning/rearing tributaries above Scott Dam (upper Eel River, Rice Fork, and Salmon Creek, etc.). Allows for the potential benefit to the species by re-establishing occupancy of habitats, thereby promoting ecological and evolutionary processes responsible for local adaptation and diverse life histories.**
Reservoir navigability										Ability of fish to find tributaries above Scott Dam (upper Eel River, Rice Fork, Salmon Creek, etc.) from the top of the fishway (reservoir-side) through the reservoir. Potential risk of migration delay into tributaries due to changing reservoir dynamics, elevations, and confluence/delta/sedimentation dynamics, etc. Are tributary delta areas assumed to be impeding passage under the prescribed passage alternative?
Passage efficiency (fishway, etc.)										Specific to each volitional or non-volitional passage alternative required to ascend Scott Dam. Likelihood of achieving desired attraction flows while neutralizing risks of migration delay, fallback potential, confusion or lost migratory cues, etc. Consider all infrastructure, hydraulic, and hydrologic constraints.
Predation										Potential risk of being consumed by bass, pikeminnow, otters, eagles or other predators associated with ascending the fishway and through the reservoir.
Biological Feasibility for Downstream Passage										**Ability for targeted species and associated lifestages to successfully find the fishway and migrate to spawning/rearing tributaries above Scott Dam (upper Eel River, Rice Fork, and Salmon Creek, etc.). Allows for the potential benefit to the species by re-establishing occupancy of habitats, thereby promoting ecological and evolutionary processes responsible for local adaptation and diverse life histories.**
Reservoir navigability										Ability of fish to find top of fishway (reservoir-side) as they descend from tributaries above Scott Dam/Lake Pillsbury (upper Eel River, Rice Fork, Salmon Creek, etc.) through the reservoir. Potential risk of migration delay descending from tributaries due to changing reservoir dynamics, elevations, and confluence/delta/sedimentation dynamics. Are tributary delta areas assumed to be impeding passage under the prescribed passage alternative?
Passage efficiency (fishway, etc.)										Specific to each volitional or non-volitional passage alternative required to descend Scott Dam. Likelihood of achieving desired attraction flows while neutralizing risks of migration delay, fallback potential, confusion or lost migratory cues, etc. Consider all infrastructure, hydraulic, and hydrologic constraints.
Predation										Potential risk of being consumed by bass, pikeminnow, otters, eagles or other predators associated with descending the fishway and through the reservoir.
Habitat and Water Quality										**Quality and quantity of fish habitat and associated water quality conditions**
Habitat upstream of Scott Dam										Potential habitat capacity above Scott Dam (not including water quality, see below). Consider inundated habitat (spawning and rearing) due to reservoir (roughly 6% in due to Pillsbury and 0.7% in due to Cape Horn); migratory habitat (staging/holding).
Water quality within reservoir										Anticipated water quality conditions (temperature, D.O., etc.) during the expected presence of the scored lifestage. Consider impacts/benefits of reservoir storage conditions and associated flow release schedule on downstream water quality in the Eel River (e.g., cold water pool management, algal dynamics, etc.).
Habitat downstream of Scott Dam										Potential habitat capacity due to passage facility footprint and associated operations. Consider degradation of spawning and rearing habitat due to interruption of sediment and large wood transport.
Water quality below reservoir										Anticipated water quality conditions (temperature, D.O., etc.) during the expected presence of the scored lifestage. Consider impacts/benefits of reservoir storage conditions and associated flow release schedule on downstream water quality in the Eel River (e.g., cold water pool management, algal dynamics, etc.).
Hydrologic Implications										**Hydrograph implications as it relates to the targeted species and associated lifestage. Consider functionality over a range of flows, environmental cues, migration windows (passage opportunity), water quality considerations, etc.**
Other Risk Factors/Notes/Assumptions per Lifestage (important)										**Add notes or other pertinent information that influenced scoring outcomes per individual and/or group score. These notes are important for the basis of future discussions.**

Scoring Section II	Scott Dam Passage Scoring Scheme 1-10 (1-10 poor to very good) or NA. Include individual scores per participant within each cell (e.g., 7,5,8, etc.).		
	Score	Notes	Definitions
Engineering and Geotechnical Feasibility			**Likelihood that a passage alternative can be incorporated/modified into existing infrastructure; structural integrity; bank sloughing; dam safety, etc. Long-term stability.**
Water Delivery or Storage Potential			**Ability of the passage alternative to allow for diversions to the EBRR and/or storage.**
Fish Monitoring and Exclusion Capacity			**Ability of the passage alternative to monitor fish; sort and tag fish; exclude exotics, etc.**
Passage Operations			**Likelihood of successful operations as it relates to the level of complexity for the passage alternative to function properly under a range of reservoir operations and the degree of human intervention needed. Consider flow/wood/sediment conditions, water operations, maintenance, management, and reliability, etc.**
Cost: Construction			**Relative cost of similar type passage projects. See Mead & Hunt (2018) and McMillen Jacobs Associates (2018).**
Cost: Operations & Maintenance			**Annual operational and maintenance costs, potential failure modes, intensity of operations and maintenance. See Mead & Hunt (2018) and McMillen Jacobs Associates (2018).**
Timeframe to Achieve Resource Benefits (Fisheries)			**Implementation feasibility, short vs. long term, timeframe for construction. Score 1-3 (>30yrs); Score 4-7 (10-30yrs); Score 7-10 (<10yrs).**
Risks & Uncertainties			**Ability to fit into an adaptive management scheme (modify/improve).**