

# NOTES: Fish Passage Working Group #4

Meeting Held: 08.16.18

Notes prepared by Consensus Building Institute

**Next Meeting:** Wednesday, Sept 26, 1:00-4:00 @ Ukiah Valley Conference Center

## Meeting in Brief

The working group explored the pros/cons of a range of fish passage scenarios. The group wanted to continue a broad perspective on the scenario options, but also recommended developing criteria to identify which scenarios to focus and advance the group’s discussions to meet the Ad Hoc timeline.

The group agreed to provide feedback on the [simplified assessment tool](#), which can offer a general starting point to compare scenarios. At its September meeting, the group will use a revised filtering assessment tool and attempt to narrow the scenarios for further analysis and modeling.

## Scenarios Overview

1 Fish Passage	2 Trap & Haul	3 Partial Dam Removal	4 Remove Scott and Modify Cape Horn Dam (CHD)
OPTIONS <b>Fish Ladder</b> ( <a href="#">Mead &amp; Hunt</a> )  <b>Natural Channel</b>  <b>Fish Surface Collector</b> (downstream)  <b>Fish Elevator</b>	<b>Short Term (10-15 years)</b> Pilot for learning Bridge measure  <b>Long Term</b> Needs evaluation	<b>Lower Scott Dam</b> 1) Meet PVID demand and envt flows  2) Retain accumulated sediment	<b>Remove Scott and Modify CHD</b>  <b>Remove Scott and CHD</b> With Diversion: Provides another baseline for flows and fish No Diversion (see <a href="#">Lake Mendocino Supply Reliability study</a> and <a href="#">UC Davis Study</a> )

## Action Items (organized by person)

Assignee	Timing	Task
All	Mid-Sept	Review fish passage technology <a href="#">Simplified Assessment Tool</a> ; send feedback to Josh and CBI.
Darren	Aug 29	Send CBI the revised Scenario: Remove Scott Dam and CHD Pros/Cons table per Aug 16 discussion. ( <a href="#">View</a> )
Damon	Aug 29	Confirm correct lamprey study posted to website: ( <a href="#">View</a> )

Jon	Aug 29	Send CBI the Trap and Haul presentation slides for website posting ( <a href="#">view</a> )
CBI	Aug 16	Post SCWA Alternatives Analysis documents ( <a href="#">view</a> )
Steve E	Aug 16	Send CBI the NMFS fish passage over high dams paper ( <a href="#">view</a> )

## Fish Passage Scenarios Discussion

Work group members further explored the pros/cons and uncertainties for different fish passage scenarios. Below summarizes major insights that emerged from discussions for each scenario. Refer to the links below to presentation slides and handouts for additional information per scenario.

Scenarios	Options under Consideration	Information (studies, presentations, memos, etc.)
<b>General</b>	<b>Multiple Options</b> Preliminary Analysis of Potential Alternatives	<a href="#">Sonoma Water Cover Letter</a> <ul style="list-style-type: none"> <li><a href="#">Modifications Feasibility Report</a></li> <li><a href="#">Sediment Stabilization Measures</a></li> </ul>
<b>1 Fish Passage</b>	<b>Fish Ladder</b>	<ul style="list-style-type: none"> <li><a href="#">Mead &amp; Hunt</a></li> <li><a href="#">Geotechnical Opinion</a></li> <li><a href="#">8/16/18 Natural Channel presentation slides</a></li> </ul>
	<b>Natural Channel</b>	
	<b>Fish Surface Collector</b> (downstream)	
	<b>Fish Elevator</b>	
<b>2 Trap &amp; Haul</b>	<b>Short Term (10-15 years)</b> Pilot for learning Bridge measure	<ul style="list-style-type: none"> <li><a href="#">8/16/18 presentation slides</a></li> <li><a href="#">Minto Fish Trap Facility Virtual Tour</a></li> <li><a href="#">NMFS Collection-and-Transport over High Dams</a></li> </ul>
	<b>Long Term</b> Needs evaluation	
<b>3 Partial Dam Removal</b>	<b>Lower Scott Dam</b> 1) Meet PVID demand and envt flows 2) Retain accumulated sediment	<ul style="list-style-type: none"> <li><a href="#">8/16/18 Scenarios Handout</a></li> </ul>
<b>4 Remove Scott and Modify Cape Horn Dam</b>	<b>Remove Scott and modify CHD</b>	<ul style="list-style-type: none"> <li><a href="#">8/16/18 Pros / Cons Table</a></li> <li><a href="#">Updated Table (9/18)</a></li> </ul>
	<b>Remove Scott and CHD</b> With Diversion: Provides another baseline for flows and fish No Diversion	

		<ul style="list-style-type: none"> <li>• <a href="#">UC Davis Study - Raising Coyote Valley Dam</a></li> </ul>
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## Scenario #1: Fish Ladder - Natural Channel

Three options analyzed: North Bank “Long,” South Bank “Long,” and South Bank “Wraparound.” - [View presentation slides](#)

### Major Considerations

- Geologic stability
- Channel slope supporting successful fish passage

### Natural Channel vs. Concrete Fish Ladder

- Pros for Natural Channel: likely lower construction cost, flexible liner more resilient to earth flows, and cheaper to maintain/repair.
- Cons for Natural Channel: still need concrete control structures upstream and downstream, and larger footprint increases risk of failure due to geologic instability, concrete construction better for “Wraparound” option due to steep slope.

### Location of Natural Channel

- North Bank “Long” Pros: easier access, gentler slope, and no tributaries to cross.
- South Bank “Long” Pros: possibly more stable than north side, accommodates existing dam entrance structure, and gentler slope than “Wraparound.”
- South Bank “Wraparound” Pros: lower risk of mass wasting damage/failure.

### Uncertainties / Other Considerations

- More geotechnical studies needed to understand geological risks.
- Small drainage on north side near Soda Creek confluence may be another option - possibly more stable ground, but requires costly tunnel construction.
- Group did not know of examples of long natural channels, just short channels.

## Scenario #2: Trap & Haul

[View presentation slides](#)

### Major Considerations

- How much “fish handling / management” is desired? Is it important to know exactly what fishes are being collected, where they are collected/transported, and when?
- Access to facilities, land acquisition needed?

### Method and Facility / Equipment Options

- Trap adults at CHD vs. below Scott Dam (volitional passage at CHD).
- Transport juveniles vs. juveniles outmigrate on their own.
- All options still require some sort of fish ladder and holding facility.

### Pros of Trap & Haul

- Can be phased. Expand operations based on successful methods. Shares many of the same components as fish passage (e.g., ladder and holding pools).

### Cons of Trap & Haul

- WHOOSHH works only for adult fish and is still fairly experimental.
- Facilities may be similarly costly to fish ladders.
- Survivorship may vary among species / life stages.
- Attracting / guiding fish to collection devices can be challenging or have high O&M costs.

### Uncertainties / Other Considerations

- Unsure of specific cost estimates ([McMillen Jacobs report](#) may have very general estimates).
- Unsure if WHOOSHH system can transport fish over large distances.
- Uncertain if Trap & Haul will work for lamprey migration.
- Request for greater guarantee for downstream migration success without transport.
- Is this a viable long-term solution?
- Costs and fish passage survival rates unknown relative to fish ladder option.

## Scenario #3: Partial Removal of Scott Dam

Two options explored: 1) meet PVID water demand and environmental flows below E-11; 2) retain accumulated sediment behind Scott Dam - [View Pros / Cons handout](#).

### Major Considerations

- Water supply benefits from storage.
- Make passage easier than the Mead & Hunt fish ladder.
- Avoid remobilizing the potentially mercury-laden sediment accumulated behind Scott Dam.

### Option 1) Meet PVID Demand and Environment Flows

- Pros: Meeting PVID demand while possibly improving fish passage.
- Cons: Potentially no improvement to fish passage, spill is still at daunting 80' height, reduced cold water pool, pikeminnow and bass remain a concern.

### Option 2) Retain Accumulated Sediment

- Pros: More fish-friendly dam height (49'), reduces mercury-laden sediment resuspension concerns, relatively low O&M costs, and provides opportunity to eradicate invasive species' populations.
- Cons: Less storage capacity, still have fish passage limitations during fall/spring/dry years, less optimal rearing habitat, may require fish trapping to avoid invasives reintroduction.

### Uncertainties / Other Considerations

- Lowering the dam height does not necessarily convert 1:1 with fish ladder reduction.
- Any dam reduction risks turbidity and changes in dissolved oxygen, potentially causing fish kills and other issues downstream.
- Explore the potential risk and impacts of algal blooms.

## Scenario #4: Remove Scott Dam & Remove / Modify CHD

[View Pros / Cons Table](#)

### Removing Both Scott Dam and CHD with No Diversions

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). Refer to [Lake Mendocino Water Supply Reliability Study](#) and [UC Davis Study - Raising Coyote Valley Dam](#) for general analyses of full dam removal.

### Pros for Removing Scott Dam & Removing / Modifying CHD

- Help meet federal government trust obligations to Tribes.
- Improved Eel River ecosystem conditions (fish passage, sediment transport regime, etc.)

### Cons / Costs for Removing Scott Dam & Modifying CHD

- Water storage loss and associated impacts (property, recreation, etc.)
- Rehabilitating the lakebed (US Forest Service).
- Need more detail regarding implication of annual water storage loss.
- Liability cost and possibility of dam failure.
- Counting fish.
- Water rights for discontinuing operations (purchasing rights and litigation).
- Reducing / eradication of pike minnow.

### Cons / Costs for Modifying CHD

- Maintaining CHD for winter debris and sediment loads.
- Fish passage impairment still exists, especially for certain steelhead.

### Uncertainties and Other Considerations

- Consider diversion alternatives.
- Water quality permitting and compliance.
- Uncertain whether decommission or retrofitting / repairing is more costly.

## Lamprey Migration

[View Lamprey Migration Memo](#)

- Flexible PVC tubing dramatically improved lamprey upstream migration to overcome sharp angles and high-flow velocities.
- Migration occurs over several months (ascending: April-September; descending: November-May).
- Downstream migration closely associated with peak flow events.
- Class sizes vary dramatically year to year.
- Perched meadows and lower gradient reaches offer stable nest habitat.
- Some move up to perched meadows; others take up residence in the stream.
- Spring spawners, but not much information is available.

### Referenced studies

- Goodman DH, Reid SB. 2017. [Climbing above the competition: Innovative approaches and recommendations for improving Pacific Lamprey passage at fishways](#)
- Goodman DH, et al. 2015. [Punctuated seaward migration of Pacific lamprey](#)

- Reid SB & Goodman DH. 2016. [Free-swimming speeds and behavior in adult Pacific Lamprey](#)

## Additional Fish Passage Considerations

- [Congressman Huffman's Two-Basin Solution Principles](#)
- [Fish Passage Working Group Objectives](#)
- Monitoring can be designed around any of the scenarios / options. The group should not consider monitoring design as a major limiting factor.
- Consider the impact on domestic wells (groundwater-surface water interaction).
- The group acknowledged there are different opinions on whether to prioritize volitional passage options.
- [Sonoma Water](#) released [preliminary analysis](#) by McMillen Jacobs Associates of potential alternatives based on experiences in the northwest, which considers several of the options the working group discussed and presents high-level economic analyses. Sonoma Water also provided a supplemental report by EnviroAnalytics Group that examined [sediment stabilization measures](#) (assumes river channel restoration and slope stabilization).

## Simplified Filtering Assessment Tool

The group briefly discussed the Filtering Assessment tool that was simplified per the group's feedback at the previous meeting. Several expressed hesitation to remove scenarios/options from consideration; however, they suggested using the filtering tool and develop a criteria to identify which scenarios / options warrant closer exploration. The group agreed to review the simplified assessment tool and provide Josh Fuller / CBI feedback to further refine the tool. [View Simplified Assessment Tool](#)

### Assessment Variables / Criteria Considerations

- Upstream and downstream biological feasibility
- Predation and other risk factors
- Engineering and geotechnical feasibility
- Hydro-impairment (deviation from Eel River natural flow)
- Water delivery and storage potential
- Operations
- Costs (Construction and O&M)
- Risk and Uncertainty
- Habitat / Water Quality / Sediment

## Next Steps

Working group members will revise the scenarios pros / cons documents per the August 16 discussion.

At the September 26<sup>th</sup> meeting, the working group will use the revised filtering assessment tool and attempt to identify the top scenarios for further analysis and modeling.