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## MEMORANDUM

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**TO:** Bob Turner, Salmon Management Division, National Marine Fisheries Service, Northwest Region

**FROM:** Patty Dornbusch, Protected Resources Division, National Marine Fisheries Service, Northwest Region

**SUBJECT:** 2010 Pacific Coast Salmon Plan Biological Opinion, Contingency Task D

**DATE:** February 2, 2011

**CC:** Lower Columbia Recovery Planning Steering Committee

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**Background:**

In its annual guidance letter to the Pacific Fishery Management Council , the National Marine Fisheries Service (NMFS) described the applicable exploitation limits for Lower Columbia River (LCR) tule Chinook for 2010 and 2011 (Thom and McInnis 2010). NMFS' guidance was that Council fisheries be managed in 2010 subject to a total exploitation rate limit of 0.38 and, in 2011, subject to a total exploitation rate limit of 0.36. The guidance indicated that the limit would be increased to 0.37 in 2011 if certain tasks were completed that reduced uncertainties surrounding the recovery strategy for LCR tule Chinook. NMFS designed these tasks to accelerate the recovery process by identifying and promoting actions that will benefit LCR tule populations and to provide greater certainty that these actions will occur quickly. The tasks were to be completed by NMFS, the states, recovery planners, or other interested parties.

Task D was as follows:

*NMFS will receive a report that describes a recovery plan implementation schedule that identifies specific actions for a 3 to 5 year period, potential implementing entities, costs, location and duration of action, funding source, VSP and limiting factors affected, and linkages to milestones for improved habitat conditions.*

A work group consisting of the following staff met to discuss this task:

Bernadette Graham Hudson (Lower Columbia Fish Recovery Board)  
Jeff Breckel (Lower Columbia Fish Recovery Board)  
Catherine Corbett (Lower Columbia River Estuary Partnership)  
Elizabeth Gaar (NOAA Fisheries)  
Patty Dornbusch (NOAA Fisheries)  
Dan Guy (NOAA Fisheries)  
Kevin Goodson (Oregon Department of Fish and Wildlife)

This memo describes their conclusions regarding the task.

### Background on ESA Recovery Plan for Lower Columbia River Chinook Salmon

ESA Section 4(f)(1)(B) directs NMFS to develop recovery plans for listed species under its jurisdiction. These plans must contain (1) site-specific management actions necessary to achieve the plan's goals; (2) objective, measurable criteria which, when met, would result in a determination that the species be removed from ESA listing; and (3) estimates of the time and cost required to carry out the actions needed to achieve the plan's goal.

The ESA recovery plan for the Lower Columbia River Chinook ESU will be part of a multi-species plan for the Lower Columbia that will address Lower Columbia River coho and steelhead and Columbia River chum in addition to Lower Columbia River Chinook. The plan will consist of an ESU-level summary document and the following three management unit<sup>1</sup> plans:

- (1) the *Lower Columbia Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead*, completed in August 2010 (ODFW 2010),
- (2) the *Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan*, completed in May 2010 (LCFRB 2010a), and
- (3) the *ESA Recovery Plan for the White Salmon River Subbasin*, a draft of which was completed in April 2010 (NMFS 2010).

NMFS will also incorporate by reference into the ESU-level plan two recovery plan "modules": the *Columbia River Estuary ESA Recovery Plan for Salmon and Steelhead* (NMFS 2011) and the *Recovery Plan Module: Mainstem Columbia River Hydropower Projects* (NMFS 2008).

NMFS expects to make the ESU-level plan, along with the three management unit plans as appendices, and the two modules incorporated by reference, available for public review and comment as a proposed ESA recovery plan in 2011.

In the opinion of the Task D workgroup, the management unit plans contain adequate detail to guide near-term implementation of recovery plan actions and for preliminary compliance with this contingency action. In the case of the LCFRB plan, additional assessment and planning work completed to date as part of LCFRB plan implementation provides additional near-term guidance for implementation. In addition, since completing their local plans, the Lower Columbia Fish Recovery Board, Oregon Department of Fish and Wildlife, and NMFS, in conjunction with local stakeholders in the White Salmon Basin, have begun work on more detailed implementation schedules. The estuary module also contains priority geographic locations (by mainstem river reach) for implementation of estuary habitat actions. Completion of the module also will be followed by development of a more detailed implementation schedule for module actions.

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<sup>1</sup> A management unit is an area that requires different management, perhaps because of different threats in different geographic areas, or that might be managed by different entities, or that might encompass different populations (NMFS Interim Endangered and Threatened Species Recovery Planning Guidance, Version 1.3, June 2010).

The information in the management unit plans and its sufficiency to guide initial implementation, as well as the content of and timeline for completing more detailed implementation schedules, are described below.

#### Content of Management Unit Plans and Estuary Module

All three of the management unit plans and the estuary module contain site-specific actions, identify potential implementers and funders, provide cost estimates and timeframes for implementation, and identify VSP and/or limiting factors affected. The degree of geographic specificity and additional detail varies by plan, but in general, the plans contain sufficient detail to guide implementation, pending completion of more detailed implementation schedules (see below). The way in which each management unit plan and the estuary module address these information components is described below.

*Lower Columbia Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead* (ODFW 2010): Chapter 7 of this recovery plan identifies strategies and actions to address all limiting factors and threats identified in the plan (encompassing tributary and estuary habitat, hydropower, harvest, hatcheries, predation, and future threats from population growth and climate change). Actions are keyed to specific limiting factors and threats for each population (see e.g., the actions for the Clatskanie fall Chinook population, ODFW 2010, pp. 254-255). In addition to these population-specific actions, the plan contains sets of actions that apply to all ESUs (see ODFW 2010, pp. 228-238) and to all fall Chinook populations (see ODFW 2010, pp. 251-252). Chapter 9 of the plan contains additional detail on actions--locations, schedule, costs, and potential implementers. This information is organized by actions that apply to all populations (see ODFW 2010, pp. 340-360) and by actions within a subbasin (see, e.g., the actions for the Clatskanie subbasin, ODFW 2010, pp. 363-365). The plan also contains guidelines for prioritizing actions (see ODFW 2010, p. 386); plan implementers will apply these guidelines when developing implementation schedules and, in the interim, will apply them to immediate implementation decisions.<sup>2</sup>

*Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan* (LCFRB 2010a): Chapter 5 of this plan contains “regional strategies and measures” for recovery in the categories of tributary habitat, estuarine habitat, dams, fisheries, hatcheries, ecological interactions, and climate and ocean effects. For habitat, the actions as articulated in this chapter are general and not specific to species, populations, or subbasin. For harvest and hatcheries, this chapter does contain specific measures for fall Chinook (see LCFRB 2010a, pp. 5-38--5-41 and pp. 5-54--5-56), although the actions as articulated still clearly require additional detail to provide a specific sense of how, when, and by whom they will be implemented. Chapter 6 of the plan provides information on timing of implementation by establishing benchmarks for percentage of actions to be implemented in 12-year increments as well as for action effectiveness and population status improvement (see LCFRB 2010a, pp. 6-26). In addition,

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<sup>2</sup> The *Lower Columbia Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead* (ODFW 2010) is available electronically at [http://www.dfw.state.or.us/fish/CRP/lower\\_columbia\\_plan.asp](http://www.dfw.state.or.us/fish/CRP/lower_columbia_plan.asp).

section 10.9 of the plan contains a table showing potential implementers and estimated schedule for each action.<sup>3</sup>

For habitat actions, the subbasin chapters of Volume II contain extensive additional site-specific detail. In these chapters, the LCFRB prioritizes each stream reach in each subbasin as Tier I through IV, with Tier I reaches representing areas where recovery measures would yield the greatest benefits. Reaches are assigned to tiers on a multispecies basis that incorporates each population's importance relative to recovery objectives as well as the relative importance of reaches within population boundaries. Reach tiers are most useful in identifying habitat recovery measures in channels, floodplains, and riparian areas. Each chapter of Volume II also prioritizes a set of habitat measures at the subbasin scale and assigns reach priorities to each measure. Each chapter also contains a table of more specific habitat actions, with potential implementers, spatial extent of target area, expected biophysical response, and certainty of outcome identified.<sup>4</sup>

*Draft ESA Recovery Plan for the White Salmon River Subbasin* (NMFS 2010): The draft White Salmon recovery plan includes recovery strategies and actions related to reestablishing production in areas blocked by Condit Dam once the dam is removed, restoring and protecting freshwater habitat, and addressing impacts of hatcheries, harvest, and hydropower. Habitat actions are keyed to the population and VSP parameters affected (see NMFS 2010, Table 6-3). The plan also identifies high priority reaches for habitat protection/restoration and priority actions for those reaches (see NMFS 2010, pp. 6-15--6-19). Chapter 7 of the plan provides cost estimates for each action, potential implementing entities, and estimates of the duration of each action (see NMFS 2010, Table 7-1). Table 7-2 of the plan contains additional detail on habitat actions by showing reach specific actions, unit costs, and number of units needed for implementation.

*Columbia River Estuary ESA Recovery Plan for Salmon and Steelhead* (NMFS 2011): The Estuary Module identifies actions related to habitat, flow, predation, and species interactions and assigns each action to priority geographic reaches of the lower mainstem Columbia River. The Module also notes that in many cases, additional assessment is needed to refine geographic priorities for implementation. Table 5-6 of the module shows the estimated level of effort, cost, schedule, and potential implementing entities for each action.<sup>5</sup>

Overall, these documents all contain sufficient detail to direct near-term implementation to high priority actions and locations. In many cases, plan implementers will need to conduct additional assessments to develop greater geographic specificity for habitat actions. Additional planning and assessment may also be required to develop implementation details for other actions, including those related to harvest and

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<sup>3</sup> The *Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan* (LCFRB 2010) is available electronically at <http://www.lcfrb.gen.wa.us/default1.htm>.

<sup>4</sup> The *Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan* (LCFRB 2010) is available electronically at <http://www.lcfrb.gen.wa.us/default1.htm>.

<sup>5</sup> The *Columbia River Estuary ESA Recovery Plan for Salmon and Steelhead* (NMFS 2011) is available electronically at <http://www.nwr.noaa.gov/Salmon-Recovery-Planning/ESA-Recovery-Plans/Estuary-Module.cfm>.

hatcheries. Successful near-term, and long-term, implementation of actions will depend on adequate funding, staffing, and, in the case of actions on private lands, participation from landowners.

#### Additional LCFRB Products that Guide Implementation

The Lower Columbia Fish Recovery Board completed its original recovery plan in 2004, so with several years of implementation underway, the Board has completed additional products to help guide implementation. The *Lower Columbia Salmon Recovery 6-Year Habitat Work Schedule & Lead Entity Habitat Strategy* (Habitat Strategy)(LCFRB 2010b), which is updated annually, builds on information in the recovery plan by providing additional data on reach-level limiting factors by species and on priority reach-level habitat protection and restoration actions within each of the 17 subbasins that the plan addresses. Information in the Habitat Strategy is based on Ecosystem Diagnosis and Treatment (EDT) analysis; while reach-level limiting factors are identified for each species and life-history stage, reach-level protection and restoration priorities incorporate multiple species benefits.<sup>6</sup>

Habitat restoration strategies developed for select subbasins supplement the habitat strategy described above. These habitat restoration strategies identify site-specific restoration opportunities considering actual on-the-ground conditions, prioritize those opportunities based on recovery plan objectives, and develop conceptual designs for high priority projects. Habitat restoration strategies are complete for the Grays, Mill-Abernathy-Germany, Lower Cowlitz, Lower Kalama, Lower East Fork Lewis, and Woodard Creek basins and are in development for the Skamokawa and Ceweeman basins. These strategies assist project sponsors in identifying projects and securing funding. The LCFRB continues to pursue funding to complete restoration strategies in additional subbasins. As restoration strategies are completed, the information is incorporated into the Habitat Strategy described above.<sup>7</sup>

In addition, the Washington Department of Fish and Wildlife (WDFW) has been developing the Conservation and Sustainable Fisheries Plan, which will provide greater specificity for how and when harvest and hatchery actions will be implemented, including actions specific to fall Chinook. WDFW has completed a draft of the plan and is in the process of implementing it. The agency expects to finalize the plan once NMFS has finalized the Mitchell Act Environmental Impact Statement (EIS) to ensure consistency between the two documents. Actions identified in the plan will be incorporated into LCFRB's implementation tracking program, SalmonPORT (described below).

#### Implementation Schedules

Recovery planners for the three management unit plans and the estuary module will develop detailed implementation schedules for the actions in their plans. The NMFS Northwest Region has worked with the NMFS Office of Protected Resources to develop a regional template for implementation schedules that is consistent with NMFS interim recovery planning guidance (NMFS 2010). NMFS will work with local planners in the Lower Columbia to modify the template as needed to accommodate management

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<sup>6</sup> The *Lower Columbia Salmon Recovery 6-Year Habitat Work Schedule & Lead Entity Habitat Strategy* (LCFRB 2010) is available electronically at <http://www.lcfrb.gen.wa.us/2010%20HWS.htm>.

<sup>7</sup> The habitat restoration strategies are available electronically at [http://www.lcfrb.gen.wa.us/document\\_library\\_studies.htm](http://www.lcfrb.gen.wa.us/document_library_studies.htm).

unit plan needs while still accomplishing the objectives and information needs of the template. Implementation schedules will be complete within one year of completing the LCR ESU-level plan.

The preliminary draft implementation schedule for the *ESA Recovery Plan for the White Salmon River Subbasin*, which is based on this template, is attached as an example (attachment A).

Implementation schedules will contain information for the immediate 3 to 5 year period on specific actions, geographic location, potential funding sources, funds needed, potential implementing entities, estimated start date, end date, and other notes regarding implementation.

#### *Timelines for Completing Implementation Schedules*

*Lower Columbia Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead* (ODFW): ODFW expects to complete a preliminary draft implementation schedule by July 2011 and a final schedule by the end of 2011.

*Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan LCFRB* (LCFRB): The LCFRB has developed a web-based tracking system for programmatic recovery plan actions. The system, known as SalmonPORT, incorporates most of the information requirements of an implementation schedule (see <http://www.lowercolumbiasalmonrecovery.org/>). The LCFRB is currently working with implementation partners to populate this system with detailed information on how, when, and by whom each plan action will be implemented. NMFS will work with the LCFRB to identify any needed modification to SalmonPORT to fulfill information requirements for an implementation schedule. To complement SalmonPORT's tracking of programmatic actions, LCFRB is developing an online habitat strategy and project tracking system that will track restoration and protection projects and relate them to priorities identified in the Habitat Strategy. Projects implemented by recovery plan partners and projects that result from implementation of the programmatic actions captured in SalmonPORT will be linked to their respective partner and program through the online system. THE LCFRB expects to complete these tracking systems by mid-2011.

*ESA Recovery Plan for the White Salmon River Subbasin* (NMFS): NMFS has been working with local entities in the White Salmon basin on the implementation schedule for the White Salmon recovery plan (the draft implementation schedule is attached as attachment B). NMFS expects to complete this implementation schedule by March 2011.

*Columbia River Estuary ESA Recovery Plan for Salmon and Steelhead* (NMFS and LCREP): As noted above, Table 5-6 in the Module includes a rudimentary schedule for implementing each of the 23 management actions, but this schedule will need to be refined and additional detail will need to be added. The first step in coordinated implementation of the module will be a conversation among all relevant entities and stakeholders to discuss near-term implementation priorities, with a goal of developing a 5-year implementation schedule that provides specificity and certainty regarding near-term actions and that identifies lead entities for implementation of specific actions or projects. The Lower Columbia River Estuary Partnership, a National Estuary Program established to bring about collaboration, would be an appropriate convener of this discussion.

Task D Relationship to Tasks A and C:

Harvest Biological Opinion Task A was that

*NMFS will produce or receive a report that describes the primary funding sources for habitat improvement projects, and existing data bases and/or summaries of all past and present projects that benefit LCR tule populations. The report should include an assessment of the feasibility and utility of developing a more coordinated and centralized reporting system. The report will also comment on how to best improve coordination and reporting of all future projects.*

As noted in the Memorandum Regarding Harvest Biological Opinion Contingency Task A (Graham Hudson et al. to Turner 2011), the NMFS Northwest Regional Office, in collaboration with the Southwest Regional Office, is undertaking a Pilot Salmonid Recovery Action Tracking system for tracking actions and projects called for in ESA recovery plans for salmon and steelhead. The pilots are for the Middle Columbia and Upper Columbia recovery domains, with the intent that all domains will ultimately participate. The system will be a spatially-explicit tracking system that is a public system enabled with interactive tools for custom displays, queries, exports and reports. The approach is to incorporate (not duplicate or consolidate) and ensure compatibility with existing tracking systems. NMFS will base this system on the existing infrastructure of the PCSRF data system and the Northwest Fisheries Science Center will maintain it. Tasks completed and underway include: (1) developing a standard template for recovery actions, including definitions of fields, standard drop-down lists, data dictionaries and business rules; (2) adding Middle Columbia and Upper Columbia recovery actions to the template; (3) building a public web interface and tools; and (4) building “web services” to display project information associated with recovery actions. NMFS hopes to complete these pilot tasks for presentation and discussion and possible expansion to other domains in 2011. Essentially, this tracking system will record and track the progress of actions identified in the implementation schedules described above.

Harvest Biological Opinion Task C was that

*NMFS will receive one or more reports that identify milestones or expected trends in improved habitat conditions in high priority tributary and intertidal areas for tule Chinook populations.*

Implementation schedules will need to lay out the actions required to meet these milestones. Benchmarks may relate to trends in habitat condition as well as to information needs.

## REFERENCES CITED

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- Oregon Department of Fish and Wildlife (ODFW). 2010. *Lower Columbia Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead*.

Thom, Barry A., and Rodney R. McGinnis. 2010. Letter to David Ortmann, Chairman, Pacific Fishery Management Council from Barry A. Thom, Acting Regional Administrator, NMFS Northwest Region, and Rodney R. McGinnis, Regional Administrator, Southwest Region. March 2.

**White Salmon Implementation Schedule**  
12/3/2010

Recovery Strategies as Prioritized in Recovery Plan	Applicable Species		Spawning Area (MaSA/MISA) (steelhead only)	VSP Parameter(s) Addressed	Limiting and Potentially Limiting Factor(s) Addressed	Action Type	Priority	Location in Recovery Plan	Specific Geographical Location(s)	Potential Funding Source	Cost Estimate (\$)										Total Estimated Cost (\$)	Total Cost Secured	Funds Needed	Potential Implementing Entity(s)	STATUS N=not started, not funded F=Funded, not started T=Terminated C=Cancelled D=Done	Estimated Start Date	Estimated End Date	Estimated Years from Start to Finish	Actual Start Date	Actual End Date	Comments							
											Year 1		Year 2		Year 3		Year 4		Year 5																			
	Chinook	Steelhead	Coho	Chum																																		
RM&E	x	x	x	x	Below Big Brother Falls	All	Potentially all	Baseline Data Collection Prior to Dam Removal: Existing Population Information	Complete gathering information on existing salmonid stocks.	Table 6-1, Section 6.1.6	Downstream of Condit Dam	PacifiCorp										\$0		\$0	PacifiCorp, White Salmon Working Group	Completed for pre-dam removal in 2009						White Salmon Working Group: USFWS, YN, WDFW, PacifiCorp, NOAA, FS, USGS,						
									Determine fish species composition, distribution in Buck & Spring Creeks, & the White Salmon River upstream of Northwestern Lake.	Table 7-1	Buck & Spring Creeks, & the White Salmon River upstream of Northwestern Lake	USFWS, YN, USGS, WDFW									\$25,000		\$25,000	USGS, YN														
									Assess fish life history attributes within Buck, Spring, & Rattlesnake Creeks, & the White Salmon River.	Table 7-1	Buck, Spring, & Rattlesnake Creeks, and the White Salmon River	USFWS, YN, USGS, WDFW									\$19,500		\$19,500	USGS														
									Obtain & archive tissue samples in a non-lethal manner.	Table 7-1	Below Condit	USFWS, YN, USGS, WDFW									\$10,000		\$10,000	USGS														
									Baseline Data Collection Prior to Dam Removal: Existing Habitat Information	Table 6-2, Section 6.2	Throughout known and expected future distribution of anadromous salmonids	USFWS, YN, USGS, WDFW									\$80,000		\$80,000	PacifiCorp, White Salmon Working Group, Klickitat Co., landowners														
									Assess riparian condition & riparian restoration needs with willing landowners.	Table 7-1	Throughout White Salmon Basin - stratified approach	SRFB, CSF, other	\$40,000			\$40,000					\$40,000		\$120,000	\$40,000	\$80,000	UCD, Forest Service, PacifiCorp, WDNR, Klickitat Co., landowners												
									Conduct habitat surveys with emphasis on restoration needs in Buck & Spring Creek, & the Mainstem White Salmon River upstream of Northwest Lake.	Table 7-1	Buck & Spring Creeks, & the Mainstem White Salmon River upstream of Northwest Lake	USFWS, YN, USGS, WDFW									\$21,000		\$21,000	USGS, YN, PacifiCorp, Klickitat Co., landowners														
									Baseline Data Collection: Hatchery Status Monitoring	Table 7-1	Throughout known and expected future distribution of anadromous salmonids	USFWS, YN, USGS, WDFW									\$40,000		\$40,000	USFWS														
									Determine genetic similarities of unmarked carcasses & natural origin smolts in the White Salmon River to hatchery baseline populations.	Table 7-1	Throughout known and expected future distribution of anadromous salmonids	USFWS, YN, USGS, WDFW				\$40,000		\$40,000			\$160,000		\$160,000	USFWS						Action would continue to 2016								
Dam Removal and Species Reintroductions	x	x	x		Below Big Brother Falls	All	Passage	Restore Passage	Remove passage at Condit Dam or remove dam (ensure FERC approval)	Section 6.2	Condit Dam	PacifiCorp			\$10,000,000-12,000,000						\$10,000,000 to 12,000,000		\$10,000,000 to 12,000,000	PacifiCorp														
					Below Big Brother Falls	Diversity	Catastrophic habitat disruption	Implement reintroduction plan for White Salmon salmonids	Prior to dam removal, capture White Salmon fall Chinook and transport them upstream of the reservoir	Section 6.1.1	Downstream of Condit Dam to upstream of Northwest Lake	PacifiCorp			\$20,000							\$20,000		\$20,000	PacifiCorp, White Salmon Working Group													
					Below Big Brother Falls	All	All	Restore channel stability banks, replant banks, and restore habitat in inundated area currently occupied by the reservoir and habitats downstream of Condit dam impacted by dam removal	Implement Pacificorp's Decommissioning Management Plan	Section 6.2	Northwestern Lake downstream to mouth	PacifiCorp									\$895,000 to 1,100,000+		\$895,000 to 1,100,000+	PacifiCorp														
								Restore channel mainstream above Condit Dam.	Table 7-1	Northwestern Lake	PacifiCorp									\$400,000-600,000		\$400,000-600,000	YN, WDFW, UCD															
								Restore riparian condition.	Table 7-1	Northwestern Lake downstream to mouth	PacifiCorp			\$20,000		\$80,000		\$80,000		\$80,000		\$260,000		\$260,000	UCD						May entail stinger planting, which raises cost substantially							
								Dredge mouth of River if needed	Table 7-1	White Salmon mouth	PacifiCorp									\$650,000		\$650,000	ACOE															
	x	x	x	x	Below Big Brother Falls	All	Absence of viable fish populations	Restore populations	Implement reintroduction plan for White Salmon salmonids	Section 6.1 and Section 10	Throughout known and expected future distribution of anadromous salmonids	YN, WDFW, USFWS			\$10,000										White Salmon Working Group						Details of reintroduction plans are provided in Recovery Plan and are subject to change as a result of monitoring of success							
RM&E	x	x	x	x	Below Big Brother Falls	All	Potentially all	Baseline Habitat Data Collection Population Monitoring: - Monitor population abundance and productivity - Monitor proportion and origin of hatchery salmon and steelhead on the spawning grounds proportion and origin of hatchery salmon and steelhead on the spawning grounds - Assess the resident trout contribution to smolts below Condit Dam; assess change in resident population after steelhead re-colonization/re-introduction	Gather information needed to identify and prioritize habitat actions that will provide the greatest opportunity to contribute to recovery	Section 6.2, Table 6-3	Northwestern Lake downstream to mouth	PacifiCorp												\$131,000			PacifiCorp, White Salmon Working Group						Completed in 2009					
							Install & maintain large multiplexed PIT-tag detectors in the lower White Salmon mainstem, & in Buck & lower Rattlesnake Creeks. Report findings.	Table 7-1	Lower White Salmon mainstem, & in Buck & lower Rattlesnake Creeks	USFWS, YN, USGS, WDFW										\$176,000		\$176,000	White Salmon Working Group															
							Implement population monitoring in the White Salmon River & Rattlesnake Creek.	Table 7-1	White Salmon River & Rattlesnake Creek	USFWS, YN, USGS, WDFW										\$300,000		\$300,000	White Salmon Working Group															
							Install two small stationary PIT-tag detectors in the lower mainstem portion of Spring Creek.	Table 7-1	Lower-most portion of Spring Creek	USFWS, YN, USGS, WDFW										\$20,000		\$20,000	USGS															
							Pit Tag 3,000 juvenile salmonid each year above & below Condit Dam to track individual movement & seasonal growth rates.	Table 7-1	White Salmon & tributaries below Big Brother Falls	USFWS, YN, USGS, WDFW										\$10,000		\$10,000	USGS															
							Conduct adult spawning ground surveys and monitor.	Table 7-1	Throughout known and expected future distribution of anadromous salmonids	USFWS, YN, USGS, WDFW										\$351,000		\$351,000	WDFW															
							Create and maintain fish counts & biological database.	Table 7-1	Throughout known and expected future distribution of anadromous salmonids	USFWS, YN, USGS, WDFW										\$9,000		\$9,000	WDFW															
							Mark adults for mark-recapture population estimates.	Table 7-1	Throughout known and expected future distribution of anadromous salmonids	USFWS, YN, USGS, WDFW										\$72,000		\$72,000	WDFW															
							Derive estimates of salmonid population abundance & complete reporting.	Table 7-1	Throughout known and expected future distribution of anadromous salmonids	USFWS, YN, USGS, WDFW										\$400,000		\$400,000	USGS & WDFW															

**White Salmon Implementation Schedule**  
12/3/2010

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											Year 1		Year 2		Year 3		Year 4		Year 5																			
	Chinook	Steelhead	Coho	Chum																																		
Habitat	x	x	x	x	Below Big Brother Falls	All	Potentially all	Protect and conserve existing natural ecological processes	Population Monitoring: Genetic analyses	Compare adult & smolt genetic analyses to ongoing adult salmon escapement estimates of WDFW & smolt outmigration estimates of USGS in the White Salmon River.	Table 7-1	Below Condit	USFWS, YN, USGS, WDFW										\$70,000	\$70,000	USFWS													
	x	x	x	x	Below Big Brother Falls	All	Water temperature	Restore vegetation along stream sections that exceed state standards for temperature	Identify stream segments that are excessively warm; within those areas, work with willing landowners to implement actions to increase density of riparian vegetation where sparse; implement programs to protect existing riparian vegetation, reduce sediment inputs to streams.	Section 6.2, Tables 6-2 and 6-3	Throughout known and expected future distribution of anadromous salmonids	Federal, State, County, and local governments														Federal, State, County, and local governments					Ongoing	Ongoing	Costs associated with other regulatory obligations					
	x	x	x	x	Below Big Brother Falls	All	Passage	Restore passage and connectivity to habitats blocked or impeded by artificial barriers	In cooperation with irrigation district and others remove or replace culverts and upstream passage including dikes, culverts and irrigation structures, provide upgrade screening of irrigation diversions.	Section 6.2, Table 6-3	Buck Creek	YN, USFWS, WDNR, WDOT, Private landowners, USFS, SRFB, PCSRF, UCD, or others																										
	x	x	x	x	Below Big Brother Falls	Absundance and productivity	Potentially dissolved oxygen	Reduce nutrient inputs	Reduce runoff of nutrients from septic tanks, dairies, agricultural lands, and other sources.	Section 6.2, Table 6-3, Table 7-1	Entire basin	NRCS, WDOE, WA Dept. of Ag, landowners																						Includes education as well as project implementation				
	x	x	x	x	Below Big Brother Falls	Absundance and productivity, spatial structure	Potentially, pool abundance and quality, cover	Improve LWD abundance and recruitment	In cooperation with landowners plan, design and install stable wood and other large debris in streambeds and develop approaches to ensuring long-term LWD recruitment.	Section 6.2, Table 6-3, Table 7-1	Rattlesnake Creek, Indian Creek, Buck Creek, Spring Creek, White Salmon River (Buck Creek to Husum)	YN, SRFB, PCSRF, NRCS, USFS, or others																										
	x	x	x	x	Below Big Brother Falls	Abruptness and productivity	Potentially dissolved oxygen	Reduce nutrient inputs	Reduce runoff of nutrients from septic tanks, dairies, agricultural lands, and other sources.	Section 6.2, Table 6-3, Table 7-1	Entire basin	NRCS, WDOE, WA Dept. of Ag, landowners																										
	x	x	x	x	Below Big Brother Falls	Abruptness and productivity, spatial structure	Potentially, pool abundance and quality, cover	Improve LWD abundance and recruitment	In cooperation with landowners plan, design and install stable wood and other large debris in streambeds and develop approaches to ensuring long-term LWD recruitment.	Section 6.2, Table 6-3, Table 7-1	Rattlesnake Creek, Indian Creek, Buck Creek, Spring Creek, White Salmon River (Buck Creek to Husum)	YN, SRFB, PCSRF, NRCS, USFS, or others																										
	x	x	x	x	Below Big Brother Falls	Abruptness and productivity	Potentially dissolved oxygen	Reduce nutrient inputs	Reduce runoff of nutrients from septic tanks, dairies, agricultural lands, and other sources.	Section 6.2, Table 6-3, Table 7-1	Rattlesnake Creek, Indian Creek, Buck Creek, Spring Creek, White Salmon River (Buck Creek to Husum)	YN, SRFB, PCSRF, NRCS, USFS, or others																										
	x	x	x	x	Below Big Brother Falls	Abruptness and productivity	Potentially dissolved oxygen	Reduce nutrient inputs	Reduce runoff of nutrients from septic tanks, dairies, agricultural lands, and other sources.	Section 6.2, Table 6-3, Table 7-1	Rattlesnake Creek, Indian Creek, Buck Creek, Spring Creek, White Salmon River (Buck Creek to Husum)	YN, SRFB, PCSRF, NRCS, USFS, or others																										
	x	x	x	x	Below Big Brother Falls	Abruptness and productivity	Potentially dissolved oxygen	Reduce nutrient inputs	Reduce runoff of nutrients from septic tanks, dairies, agricultural lands, and other sources.	Section 6.2, Table 6-3, Table 7-1	Rattlesnake Creek, Indian Creek, Buck Creek, Spring Creek, White Salmon River (Buck Creek to Husum)	YN, SRFB, PCSRF, NRCS, USFS, or others																										
	x	x	x	x	Below Big Brother Falls	All	All	Public Awareness	Public Awareness regarding restoration projects and importance of wood in streams and riparian areas	Section 7.2, Table 7-1	Entire basin	YN, SRFB, PCSRF, NRCS, USFS, USFWs, WDNR, or others																										
	x	x	x	x	Below Big Brother Falls	Abundance and Productivity	Direct Mortality	Harvest Management	Manage harvest for low impact fisheries and rapid population growth	Section 6.4, Table 6-4	All salmon fisheries and all non-salmon fisheries with salmon by-catch	Co-managers																										
Harvest	x	x	x	x	Below Big Brother Falls	Abundance and Productivity	Direct Mortality	Harvest Management	Manage harvest for low impact fisheries and rapid population growth	Section 6.4, Table 6-4	All salmon fisheries and all non-salmon fisheries with salmon by-catch	Co-managers																						Funding provided by Co-managers				

**White Salmon Implementation Schedule**  
12/3/2010

Recovery Strategies as Prioritized in Recovery Plan	Applicable Species		Spawning Area (MaSA/MISA) (steelhead only)	VSP Parameter(s) Addressed	Limiting and Potentially Limiting Factor(s) Addressed	Action Type	Specific Action(s)	Priority	Location in Recovery Plan	Specific Geographical Location(s)	Potential Funding Source	Cost Estimate (\$)										Total Estimated Cost (\$)	Total Cost Secured	Funds Needed	Potential Implementing Entity(s)	STATUS N=not started, not funded F=Funded, not started O=On-going T=Terminated C=Canceled D=Done	Estimated Start Date	Estimated End Date	Estimated Years from Start to Finish	Actual Start Date	Actual End Date	Comments																
												Year 1		Year 2		Year 3		Year 4		Year 5																												
	Cost Secured	Cost Needed										Cost Secured	Cost Needed	Cost Secured	Cost Needed	Cost Secured	Cost Needed	Cost Secured	Cost Needed	Cost Secured	Cost Needed																											
Harvest	x	x	x	x	Below Big Brother Falls	Abundance and Productivity	Direct Mortality	Harvest Management	Adjust tributary harvest regulations in areas where harvest significantly impacts salmon and steelhead population growth	Section 6.4, Table 6-4	White Salmon basin Harvest monitoring (Tribal and State)	WDFW, YN/BIA, Co-managers	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$50,000	\$50,000		WDFW, YN, Co-managers						See row 10																
Hatcheries	x	x	x	x	Below Big Brother Falls	Abundance and Productivity	See Population Reintroduction Plans			Section 6.3, Table 6-4, Table 6-2, Table 6-1	Throughout known and expected future distribution of anadromous salmonids	Funding source to be determined based on RM&E input											TBD			Co-managers						Hatchery programs for White Salmon dependent of RM&E results																
						Adult abundance	Reintroduction - hatchery production	Rehabilitate White Salmon Ponds and update intake screen	Section 6.3, Table 6-4, Table 6-2, Table 6-1	Lower White Salmon	Mitchell Act, ACOE											\$450,000			USFWS																							
Hydrosystem and Mainstem Predation	x	x	x	x	Below Big Brother Falls	All	Stream Flow	Maintain or improve hydropower operations and facilities at Bonneville Dam to enhance salmon and steelhead survival	Decrease water travel time during smolt outmigration	Section 6.5, Table 6-4	Columbia River	Action Agencies											Costs addressed in Middle-Columbia River roll-up plan			BPA, ACOE																						
Hydrosystem and Mainstem Predation	x	x	x	x	Below Big Brother Falls	All	Passage	Maintain or improve hydropower operations and facilities at Bonneville Dam to enhance salmon and steelhead survival	Improve operation of adult passage, maintain high standards of adult fish passage at Bonneville Dam	Section 6.5, Table 6-4	Bonneville Dam	Action Agencies											Costs addressed in Middle-Columbia River roll-up plan			BPA, ACOE																						
Hydrosystem and Mainstem Predation	x	x	x	x	Below Big Brother Falls	Abundance and Productivity	Predation	Reduce predation on salmonids	Reduce predation by pimelods, piscivores, cormorants, and Caspian terns	Section 6.5, Table 6-4	Mainstem Columbia	Action Agencies											Costs addressed in Middle-Columbia River roll-up plan			BPA, ACOE																						
<b>Jewett Creek</b>																																																
RM&E	x	x			Jewett Cr.	spatial structure		Baseline data collection	Determine spatial distribution of salmonids in Jewett Creek.			SRFB, SRFB, other		\$1,000									\$1,000			MCFEG, YN, WDFW																						
RM&E	x	x			Jewett Cr.	abundance, productivity, genetic diversity		Baseline data collection	Complete gathering information on existing salmonid stocks; determine the status, life histories and genetic composition of fish in Jewett Creek			SRFB, SRFB, other		\$2,000									\$2,000			MCFEG, YN, WDFW																						
RM&E	x	x			Jewett Cr.	obstructions, habitat limiting factors	Baseline data collection	Assess fish passage and habitat conditions in lower Jewett Creek	Lower Jewett Creek	SRFB, SRFB, other	\$0	\$5,000	\$0		\$0		\$0	\$0	\$0	\$0	\$5,000			MCFEG, YN, WDFW, landowners,																								
Habitat	x	x			Jewett Cr.	All	habitat limiting factors	Restore riparian areas based on habitat assessment	Throughout known and presumed distribution of anadromous salmonids	SRFB, SRFB, other	\$0		\$0	\$50,000	\$0		\$0		\$0		\$75,000			MCFEG, YN, WDFW, landowners,						Includes potential daylighting and restoring meanders on Jewett and Dry Cks.																		