APPENDIX D

COST DEVELOPMENT PROTOCOL

North Central California Coast Recovery Domain
CCC Coho ESU Recovery Plan

Cost Assumption Tables

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COSTS ASSUMPTION TABLES

In order to develop recovery costs, a standardized method was developed to assign costs to recovery actions. The assumptions are based on DFG's "Cost and Socioeconomic Impacts of Implementing the California Coho Recovery Strategy" (2004) and NMFS "Habitat Restoration Cost References for Salmon Recovery Planning" (2008), assessed addition information such as aggregate costs, wage rates, and socioeconomic impacts and created assumption tables for specific categories of actions and action types. The following assumption tables were used to assign costs to specific action steps for the population specific implementation tables.

Table 1. Recovery Implementation Cost

Action	Cost	Unit
Stream Complexity	25,000	Mile
	101,120	ELJ
Riparian Vegetative Cover	20,057	Acre
Vegetative Ground Cover	1,422	Acre
	39,574[1]	Acre
Floodplain Connectivity	36,046	Mile
Estuarine Ecology	272,120	Acre

[1] Source: CDFG 2004 (p. 1-16)
[2] Source: NMFS 2008, p. 43-44

[1] Cost for treating non-native species in freshwater and riparian environments.

Table 2. Fish Passage Improvement ($/Project)				
Stream Crossing	**Land Use**			
	Forest	**Agriculture**	**Suburban**	**Urban**
Tributary: Total Barrier	63,636	159,090	318,181	556,818
Tributary: Partial/Temporal Barrier	31,818	79,545	159,090	278,409
Stream : Total Barrier	159,090	381,818	556,818	795,454
Stream: Partial/Temporal Barrier	79,545	190,909	278,409	397,727

[1]Source: CDFG 2004, p. 1-16

Table 3. Dam Removal	
Size of Dam	**$; $/ft**
one cost estimate for <15ft dam	568,181
>15 ft high -cost/ft	17,045
one estimate - unknown height; complete barrier	1,022,727
one estimate - unknown height; partial/temporal or unknown barrier	511,363

[1] Source: CDFG 2004, p.11

Table 4. New Fish Ladder[1]	
Waterway Size	**Cost ($)**
Large	1,022,727
Small	568,181

[1]

Source: NMFS 2008, p. 9

Table 5. Culvert Replacement ($/Culvert)[1]				
Size of Waterway	**Road Type**			
	Forest Road	**Minor 2 Lane**	**Major 2 Lane**	**Hwy 4+ Lane**
Small (0-10')	31,976	87,209	174,419	319,767
Medium (10-20')	87,209	220,930	319,767	436,047
Large (20-30')	133,721	267,442	406,977	813,953

[1]Source: NMFS 2008, p. 10

Table 6. Replacing a Culvert w/ a New Type of Structure[1]	
New Type of Crossing	**Avg. Cost ($)**
Bridge <40ft	51,546
Bridge >40ft	103,093
Bottomless/Open Bottom Arch	193,961
Natural Bottom Pipe Arch	215,776
Box Culvert	248,352

[1]Source: NMFS 2008, p. 10

Table 7. Floodplain and Tributary Reconnection ($/acre)[1]			
Materials	**Extent of Earth Moving**		
	Minimal	**Moderate**	**Substantial**
Minimal	8,721	17,442	40,698
Moderate	17,442	29,070	58,140
Substantial	40,698	58,140	81,395

[1]

Source: NMFS 2008, p.26

Table 8. Riparian Planting ($/acre)[1]			
Materials/Site Accessibility	**Level of Site Preparation***		
	Flat/Light Clearing	**Avg. Slope/Avg. Clearing**	**Steep/Heavy Clearing**
Low Cost	17,442	40,698	93,023
Medium Cost	26,163	63,954	110,465
High Cost	46,512	78,488	1,366,279

[1] Source: NMFS 2008, p. 32

Table 9. Upslope Riparian Thinning[1]	
Type	**$/acre***
Mechanical	876
Hand 15-30% slope 40-60% cover	928
Hand 30-50% slope 60-90% cover	1,237
Chemical	155
Average	799

[1]Source: NMFS 2008, p. 64

Table 10. Road Inventories[1]	
Location	**$/mi**
Humboldt County	829
Eel River	538
Mattole River	635
Russian River	936
Salmon Creek	1068
Gualala River	837
Avg. all Inventories	807

[1]Source: NMFS 2008, p. 61

Table 11. Erosion Assessments[1]	
Location	**$/acre***
Humboldt County	9.5
Del Norte County	11.9
Average all assessments in CA**	10.7

[1]Source: NMFS 2008, pg. 61

Table 12. Removal of Invasive Plant Species[1]		
Species	**$/acre***	**Source**
Arundo	29,762	Neil 2002
Himalayan Blackberry	990	Bennet 2007 (avg)
Purple Loosestrife and Water Chestnut	361	USFWS 2001
Pepperweed and Giant Reed	1,000	Northern California Conservation Center 2010
Average (excluding outlier of Arundo)	784	

Establishing a Multiplier

The recovery costs established by DFG in 2004 are for CCC coho salmon ESU and portions of the SONC coho ESU, which include Del Norte to Santa Cruz counties. Recovery costs were not standardized across the CCC coho salmon ESU due to the variability between each of the three regions, such as extent of urbanization, labor wages, access, and material costs. To attempt to encapsulate the anticipated increased cost of implementing recovery actions, we applied a multiplier of 0.20 to the standard costs for the San Francisco Region, and a multiplier of 0.14 in the Central Coast Region to reflect the variability in wages between the regions. It is uncertain if this will apply in all circumstances, watersheds, or recovery actions.

Table 13. Multiplier of Recovery Cost to Regions: North Central Coast Office

Region	Multiplier
North Coast	none
San Francisco Bay	0.20
Central Coast	0.14