Appendix A

Proposed Klickitat River Habitat Actions

Table A-1: Proposed Klickitat River Habitat Actions

Action category	Actions	Affected Sites	Time Needed to Implement	Time Needed to Realize Benefits	Implementing Entities	2012 Estimated Cost	Implement -ability (L-M-H)	Comment
Fish passage	Replace culverts	Culverts on several tributary streams	< 3 Years	< 3 Years	Yakama Nation	$100,000 – 530,000	High	Spring Chinook and steelhead are expected to begin re-colonizing spawning and rearing habitat above Castile Falls now that passage has been significantly improved. At least one partial barrier culvert near the mouth of Piscoe Creek, 3 more possible barriers upstream, and a partial barrier near the mouth of McCreedy Creek may be replaced by following BIA timber sale improvement plan. Percent of MSA degraded assumes full passage at Castile Falls.
Research, monitoring, & evaluation	Monitor effectiveness of passage improvements at Castile Falls	Castile Falls	ongoing	5 - 10 Years	Yakama Nation	$100,000 – 530,000	High	
Protection	Protect existing habitat from future degradation	Klickitat River from RM 70.5 to RM 87.05, Piscoe Creek, Diamond Fork, Butte Meadows Creek, Chaparral Creek	< 3 Years	3 - 5 Years	Yakama Nation, State land management agency (i.e. WADNR), Private landowner	$2,600,000 – 5,300,000	High	Improved side-channel habitat, pool quality, and quantity will improve rearing habitat and juvenile growth and survival. Numerous private sections in the upper portion of the Diamond Fork watershed were purchased by a developer. WaDNR parcels that are currently in State Lands could be reclassified as Natural Areas.
Channel and floodplain modification	Re-vegetate riparian areas	Chaparral Creek, Coyote Creek, McCreedy Creek, Butte Meadows Creek, Klickitat R. from Castle Falls (RM 65.75) to RM 87.05, upper Diamond Fork	3 - 5 Years	5 - 10 Years	Yakama Nation	$100,000 – 530,000	High	Actions will lead to improved floodplain connectivity, pool quality, gravel sorting and stability, thus increasing available refugia, improving rearing habitat, and juvenile and egg-to-fry survival.

Action category	Actions	Affected Sites	Time Needed to Implement	Time Needed to Realize Benefits	Implementing Entities	2012 Estimated Cost	Implement-ability (L-M-H)	Comment
	Place LWD or other structures to stop headcutting	Chaparral Creek, Coyote Creek, McCreedy Creek, Butte Meadows Creek, Klickitat R. from Castle Falls (RM 65.75) to RM 87.05, upper Diamond Fork	3 - 5 Years	3 - 5 Years	Yakama Nation	$530,000 – 1,100,000	Moderate	
	Reduce fine sediment introduced from streambank mass wasting	Chaparral Creek, McCreedy Creek, Piscoe, Diamond Fork, Coyote, Butte Meadows, Klickitat R. from Castile Falls (RM 65.75) to RM 87.05	< 3 Years	5 - 10 Years	Yakama Nation	$100,000 – 530,000	Moderate	Point source delivery of fine sediment from roads; stream bank mass wasting. Actions will decrease run-off/peak flows and sediment introduction, decrease interception and incision of shallow groundwater flows, and restore valley-bottom morphology and potential for channel migration. Spawning and rearing habitat will be improved; egg-to-fry survival will increase.
	Improve channel complexity and connectivity	Klickitat River from RM 70.5 to RM 87.05, Chaparral Creek, Diamond Fork, Piscoe Creek	3 - 5 Years	3 - 5 Years	Yakama Nation	$100,000 – 530,000	Moderate	Greater impact of reduction in food web on fry colonization in mainstem than in tributaries. Reducing sediment inputs will increase aquatic insect production for food. Carcass analogs may provide a temporary food source for juveniles. Actions will improve primary and secondary productivity by improving substrate conditions.
	Restore floodplain connectivity	Klickitat River from RM 70.5 to RM 87.05, Piscoe Creek,	3 - 5 Years	3 - 5 Years	Yakama Nation	$100,000 – 530,000	Moderate	Hydroconfinement; floodplain roads; historic overgrazing. Potential

Action category	Actions	Affected Sites	Time Needed to Implement	Time Needed to Realize Benefits	Implementing Entities	2012 Estimated Cost	Implement -ability (L-M-H)	Comment
		Diamond Fork, Butte Meadows Creek, Chaparral Creek						habitat fragmentation.
	Place LWD	Klickitat River from RM 70.5 to RM 87.05, Piscoe Creek, Diamond Fork, Butte Meadows Creek, Chaparral Creek	3 - 5 Years	< 3 Years	Yakama Nation	$100,000 – 530,000	High	
	Restore stream length	Klickitat River from RM 70.5 to RM 87.05, Piscoe Creek, Diamond Fork, Butte Meadows Creek, Chaparral Creek	3 - 5 Years	< 3 Years	Yakama Nation	$530,000 – 1,070,000	High	
	Short-term introduction of spawning gravel	Klickitat River from RM 70.5 to RM 87.05, Piscoe Creek, Diamond Fork, Butte Meadows Creek, Chaparral Creek	< 3 Years	< 3 Years	Yakama Nation	$100,000 – 530,000	High	Improved side-channel habitat, pool quality and quantity will improve rearing habitat and juvenile growth and survival. Numerous private sections in the upper portion of the Diamond Fork watershed were purchased by a developer. WaDNR parcels that are currently in State Lands could be reclassified as Natural Areas.
	Restore side-channel connectivity	Klickitat River from RM 70.5 to RM 87.05, Piscoe Creek, Diamond Fork, Butte Meadows Creek, Chaparral Creek	3 - 5 Years	3 - 5 Years	Yakama Nation	$100,000 – 530,000	Moderate	
	Restore stream length and place LWD	Klickitat River from RM 70.5 to RM 87.05, Piscoe Creek, Diamond Fork, Butte Meadows	3 - 5 Years	< 3 Years	Yakama Nation	$500,000 – 1,070,000	Moderate	

Action category	Actions	Affected Sites	Time Needed to Implement	Time Needed to Realize Benefits	Implementing Entities	2012 Estimated Cost	Implement-ability (L-M-H)	Comment
		Creek, Chaparral Creek						
	Restore channel morphology	Piscoe Creek, Chaparral Creek, Diamond Fork, Coyote Creek	3 - 5 Years	3 - 5 Years	Yakama Nation	$530,000 – 1,070,000	Moderate	Lack of riparian canopy and pool habitat; sediment load. High temperatures during summer low flows and formation of anchor ice in winter caused by lack of cover and pools limit productivity. Rearing habitat, juvenile survival will be improved.
	Riparian re-vegetation	Piscoe Creek, Chaparral Creek, Diamond Fork, Coyote Creek	5 - 10 Years	5 - 10 Years	Yakama Nation	$100,000 – 530,000	High	
Land-use	Disconnect roads from streams	Piscoe Creek, Chaparral Creek, Diamond Fork, Coyote Creek	3 - 5 Years	5 - 10 Years	Yakama Nation	$100,000 – 530,000	Moderate	
	Relocate/ soften floodplain infrastructure; Perforate roads to allow peak flows to move onto floodplain; Close/relocate ORV trails	Chaparral Creek, Coyote Creek, McCreedy Creek, Butte Meadows Creek, Klickitat R. from Castle Falls (RM 65.75) to RM 87.05, upper Diamond Fork	3 - 5 Years	5 -10 Years	Yakama Nation, State land management agency (i.e. WADNR)	$530,000 – 1,070,000	Moderate	Actions will lead to improved floodplain connectivity, pool quality, gravel sorting and stability, thus increasing available refugia, improving rearing habitat, and juvenile and egg-to-fry survival.
	Riparian forest management and planning: plan to leave buffer strips in riparian forest zones	Chaparral Creek, McCreedy Creek, Piscoe, Diamond Fork, Coyote, Butte Meadows, Klickitat R. from Castile Falls (RM 65.75) to RM 87.05	5 - 10 Years	5 -10 Years	Yakama Nation, State land management agency (i.e. WADNR)	$0 - 100,000	Moderate	Point source delivery of fine sediment from roads; stream bank mass wasting. Actions will decrease run-off/peak flows and sediment introduction, decrease interception and incision of shallow groundwater flows, and restore valley-bottom morphology and potential for channel migration. Spawning and rearing habitat will be improved; egg-to-fry survival will
	Disconnect roads from stream network; relocate/	Chaparral Creek, McCreedy Creek, Piscoe, Diamond Fork,	5 - 10 Years	5 -10 Years	Yakama Nation, State land management agency (i.e.	$530,000 – 1,070,000	High	

Action category	Actions	Affected Sites	Time Needed to Implement	Time Needed to Realize Benefits	Implementing Entities	2012 Estimated Cost	Implement -ability (L-M-H)	Comment
	abandon mid-slope roads where possible; relocate/aband on valley-bottom roads where possible. Improve surface and drainage characteristics of roads in tributary watersheds	Coyote, Butte Meadows, Klickitat R. from Castile Falls (RM 65.75) to RM 87.05			WADNR)			increase.
	Limit riparian livestock grazing	Chaparral Creek, McCreedy Creek, Piscoe, Diamond Fork, Coyote, Butte Meadows, Klickitat R. from Castile Falls (RM 65.75) to RM 87.05	< 3 Years	< 3 Years	Yakama Nation, State land management agency (i.e. WADNR), Private landowner	$0 - 100,000	High	
	Decrease fine sediment production and delivery from roads and other land uses	Klickitat River from RM 70.5 to RM 87.05, Chaparral Creek, Diamond Fk., Piscoe Creek	3 - 5 Years	5 -10 Years	Yakama Nation	$100,000 – 530,000	High	Negative impact of reduction in food web greater on fry colonization in mainstem than in tributaries. Reducing sediment inputs will increase aquatic insect production for food.
Water quality	Short-term fertilization of stream with carcasses or carcass analogs	Klickitat River from RM 70.5 to RM 87.05, Chaparral Creek, Diamond Fk., Piscoe Creek	< 3 Years	< 3 Years	Yakama Nation	$100,000 – 530,000	High	Carcass analogs may provide a temporary food source for juveniles. Actions will improve primary and secondary productivity by improving substrate conditions.
Population management	Eliminate illegal harvest by enforcing tribal and sport regulations	upper Klickitat mainstem	< 3 Years	< 3 Years	Yakama Nation	$0 - 100,000	Moderate	Infrequent/episodic occurrence, but moderate to high impact when it does occur

Table A-2: Major Spawning Area (MaSA) Actions and Costs

MSA	Type/Subtype[a]	Unit[a]	# Units	2012 Cost / Unit	2012 Cost
Upper Klickitat MaSA	Fish Passage - Culvert Replacement	# of installations	7	$107,000	$749,000
	Instream - Streambank Stabilization	length treated in miles	2	$107,000	$214,000
	Instream - Channel Connectivity	length treated in miles	12	$65,000	$780,000
	Instream - Channel reconfiguration (includes channel roughening)	length treated in miles	4	$506,000	$2,024,000
	Instream - Deflectors/ barbs	length treated in miles	1	$35,000	$35,000
	Instream - Off channel habitat	length treated in miles	1	$105,600	$105,600
	Instream - Spawning Gravel Placement	length treated in miles	1	$95,000	$90,000
	Instream - Log (control) weirs	# of structures	10	$2,500	$25,000
	Instream - Rock (control) weirs	# of structures	14	$2,500	$35,000
	Instream - Large Woody Debris	# of structures	20	$1,000	$20,000
	Instream - Structure/ Log Jam	# of structures	125	$16,000	$2,000,000
	Instream - Beaver Introduction	# of beavers introduced	20	$350	$7,000
	Riparian - Livestock Water Development	# of installations	3	$6,400	$19,200
	Riparian - Water Gap Development	# of installations	0	$1,200	$0
	Riparian - Fencing	miles	25	$10,700	$267,550
	Riparian - Planting	species; area treated (acres)	200	$2,100	$420,000
	Riparian - Weed Control	species; area treated (acres)	200	$1,000	$200,000
	Sediment Reduction - Road Reconstruction	miles			
	Sediment Reduction - Road Relocation	miles	8	$128,000	$1,024,000
	Sediment Reduction - Road Stream Crossing Improvements (Rocked Ford)	miles	4	$1,900	$7,600
	Sediment Reduction - Road Drainage System Improvements	miles	60	$6,400	$384,000
	Sediment Reduction - Road Obliteration	miles	1	$7,500	$7,000
	Sediment Reduction - Erosion Control Structures	# of erosion structures	15	$1,500	$22,500
	Sediment Reduction - Sediment Traps and Upland Erosion Control (sediment control basins, windbreaks, planting, conservation land management)	# of erosion structures	60	$600	$36,000
	Upland- Agriculture - Fencing	miles	2	$9,400	$18,800
	Upland- Agriculture - Water Development	# of installations	3	$2,500	$7,500
	Upland- Vegetation - Planting	area treated (acres)	35	$2,100	$73,500

MSA	Type/Subtype[a]	Unit[a]	# Units	2012 Cost / Unit	2012 Cost
	Upland- Vegetation - Invasive Plant Control	area treated (acres)	20	$250	$5,000
	Upland- Vegetation - Slope Stabilization	area treated (acres)	80	$180	$14,400
	Land Protected, Acquired, or Leased - Streambank Protected	miles	4	$362,000	$1,448,000
	Nutrient Enrichment - Carcass Analog	area treated (acres)	10	$4,200	$42,000
	Nutrient Enrichment - Carcass Placement	area treated (acres)			
	Project maintenance - Site Maintenance	miles	12	$4,200	$50,400
					$10,081,650
White Creek MaSA	Fish Passage - Culvert Replacement	# of installations	9	$107,000	$963,000
	Instream - Channel reconfiguration (includes channel roughening)	length treated in miles	14	$506,000	$7,084,000
	Instream - Spawning Gravel Placement	length treated in miles	5	$95,000	$475,000
	Instream - Large Woody Debris	# of structures	150	$1,000	$150,000
	Instream - Structure/ Log Jam	# of structures	150	$16,000	$2,400,000
	Instream - Beaver Introduction	# of beavers introduced	10	$350	$3,500
	Riparian - Water Gap Development	# of installations	3	$1,300	$3,900
	Riparian - Fencing	miles	6.5	$10,700	$69,550
	Riparian - Planting	species; area treated (acres)	400	$2,800	$1,120,000
	Riparian - Weed Control	species; area treated (acres)	2	$1,000	$2,000
	Sediment Reduction - Road Reconstruction	miles	4	$8,600	$34,400
	Sediment Reduction - Road Relocation	miles	12	$64,000	$768,000
	Sediment Reduction - Road Stream Crossing Improvements (=Rocked Ford)	miles	0.1	$1,012,000	$101,200
	Sediment Reduction - Road Drainage System Improvements	miles	50	$6,400	$320,000
	Sediment Reduction - Road Obliteration	miles	5	$7,500	$37,500
	Sediment Reduction - Erosion Control Structures	# of erosion structures	50	$1,500	$75,000
	Sediment Reduction - Sediment Traps and Upland Erosion Control (sediment control basins, windbreaks, planting, conservation land management)	# of erosion structures	40	$600	$24,000
	Upland- Vegetation - Invasive Plant Control	area treated (acres)	40	$250	$10,000
	Land Protected, Acquired, or Leased - Streambank Protected	miles	2	$171,000	$342,000
	Nutrient Enrichment - Carcass Analog	area treated (acres)	15	$4,300	$64,500
	Project maintenance - Site Maintenance	miles	14	$4,300	$60,200

MSA	Type/Subtype[a]	Unit[a]	# Units	2012 Cost / Unit	2012 Cost
					$14,107,750
Middle Klickitat MaSA	Fish Passage - Culvert Replacement	# of installations	1	$266,000	$266,000
	Instream - Channel Connectivity	length treated in miles	4.5	$506,200	$2,277,900
	Instream - Off channel habitat	length treated in miles	2.5	$450,400	$1,126,000
	Instream - Spawning Gravel Placement	length treated in miles	1	$96,000	$96,000
	Instream - Large Woody Debris	# of structures	25	$1,000	$25,000
	Instream - Structure/ Log Jam	# of structures	45	$37,000	$1,665,000
	Riparian - Fencing	miles	2	$10,700	$21,400
	Riparian - Planting	species; area treated (acres)	110	$5,300	$583,000
	Riparian - Weed Control	species; area treated (acres)	30	$1,700	$510,000
	Sediment Reduction - Road Stream Crossing Improvements (=Rocked Ford)	miles	0.05	$1,012,000	$50,600
	Sediment Reduction - Road Drainage System Improvements	miles	15	$6,300	$94,500
	Sediment Reduction - Road Obliteration	miles	13	$85,000	$1,105,000
	Sediment Reduction - Erosion Control Structures	# of erosion structures	60	$1,600	$96,000
	Sediment Reduction - Sediment Traps and Upland Erosion Control (sediment control basins, windbreaks, planting, conservation land management)	# of erosion structures	35	$600	$21,000
	Upland- Vegetation - Planting	area treated (acres)	1280	$450	$576,000
	Upland- Vegetation - Invasive Plant Control	area treated (acres)	20	$1,800	$36,000
	Upland- Vegetation - Slope Stabilization	area treated (acres)	10	$1,900	$19,000
	Land Protected, Acquired, or Leased - Streambank Protected	miles	2	$682,000	$1,364,000
	Project maintenance - Site Maintenance	miles	15	$8,700	$130,500
					$10,062,900
Lower Klickitat MaSA	Fish Passage - Culvert Replacement	# of installations	1	$373,000	$373,000
	Instream - Channel Connectivity	length treated in miles	0.9	$900,000	$810,000
	Instream - Channel reconfiguration (includes channel roughening)	length treated in miles	2	$1,238,000	$2,476,000
	Instream - Deflectors/ barbs	length treated in miles	35	$37,000	$1,295,000
	Instream - Off channel habitat	length treated in miles	0.4	$1,238,000	$495,200
	Instream - Spawning Gravel Placement	length treated in miles	2.5	$96,000	$240,000
	Instream - Log (control) weirs	# of structures	10	$2,700	$27,000
	Instream - Rock (control) weir	# of structures	8	$2,700	$21,600

MSA	Type/Subtype[a]	Unit[a]	# Units	2012 Cost / Unit	2012 Cost
	Instream - Structure/ Log Jam	# of structures	25	$48,000	$1,200,000
	Riparian - Water Gap Development	# of installations	4	$1,400	$5,600
	Riparian - Planting	species; area treated (acres)	320	$4,900	$1,568,000
	Riparian - Weed Control	species; area treated (acres)	80	$1,900	$152,000
	Sediment Reduction - Road Drainage System Improvements	miles	15	$4,900	$73,500
	Sediment Reduction - Road Obliteration	miles	3.5	$64,000	$224,000
	Sediment Reduction - Erosion Control Structures	# of erosion structures	15	$1,800	$27,000
	Sediment Reduction - Sediment Traps and Upland Erosion Control (sediment control basins, windbreaks, planting, conservation land management)	# of erosion structures	35	$600	$21,000
	Upland- Vegetation - Invasive Plant Control	area treated (acres)	120	$1,900	$228,000
	Land Protected, Acquired, or Leased - Streambank Protected	miles	4	$853,000	$3,412,000
	Project maintenance - Site Maintenance	miles			
					$12,648,900
Swale Creek MiSA	Instream- Wetland - Wetland Restoration	area treated (acres)	3200	$5,900	$18,880,000
	Instream - Channel Connectivity	length treated in miles	1.2	$506,200	$607,440
	Instream - Channel reconfiguration (includes channel roughening)	length treated in miles	17	$1,012,000	$17,204,000
	Instream - Spawning Gravel Placement	length treated in miles	8.5	$96,000	$816,000
	Instream - Structure/ Log Jam	# of structures	55	$16,000	$880,000
	Instream - Beaver Introduction	# of beavers introduced	10	$350	$3,500
	Riparian - Planting	species; area treated (acres)	250	$2,400	$600,000
	Riparian - Weed Control	species; area treated (acres)	250	$1,900	$475,000
	Sediment Reduction - Road Drainage System Improvements	miles	4	$2,900	$11,600
	Sediment Reduction - Road Obliteration	miles	4	$64,000	$256,000
	Sediment Reduction - Erosion Control Structures	# of erosion structures	25	$1,600	$40,000
	Sediment Reduction - Sediment Traps and Upland Erosion Control (sediment control basins, windbreaks, planting, conservation land management)	# of erosion structures	40	$600	$24,000
	Upland- Vegetation - Planting	area treated (acres)	800	$450	$360,000
	Upland- Vegetation - Invasive Plant Control	area treated (acres)	800	$1,800	$1,440,000
	Land Protected, Acquired, or Leased - Streambank Protected	miles	17	$341,000	$5,797,000

MSA	Type/Subtype[a]	Unit[a]	# Units	2012 Cost / Unit	2012 Cost
	Nutrient Enrichment - Carcass Analog	area treated (acres)	50	$4,300	$215,000
	Project maintenance - Site Maintenance	miles	17	$4,300	$73,100
					$47,682,640
Klickitat Canyon MiSA	Sediment Reduction - Road Stream Crossing Improvements (Rocked Ford)	miles	0.1	$336,000	$33,600
	Sediment Reduction - Road Drainage System Improvements	miles	55	$5,100	$280,500
	Sediment Reduction - Road Obliteration	miles	2	$16,000	$32,000
	Sediment Reduction - Erosion Control Structures	# of erosion structures	50	$1,600	$80,000
	Sediment Reduction - Sediment Traps and Upland Erosion Control (sediment control basins, windbreaks, planting, conservation land management)	# of erosion structures	35	$600	$21,000
	Project maintenance - Site Maintenance	miles	55	$4,900	$269,500
					$716,600
Lower Little Klickitat MiSA	Instream - Channel reconfiguration (includes channel roughening)	length treated in miles	6	$900,800	$5,404,800
	Instream - Spawning Gravel Placement	length treated in miles	3	$96,000	$288,000
	Instream - Large Woody Debris	# of structures	20	$1,000	$20,000
	Instream - Structure/ Log Jam	# of structures	18	$16,000	$288,000
	Instream - Beaver Introduction	# of beavers introduced	10	$350	$3,500
	Riparian - Planting	species; area treated (acres)	160	$2,400	$384,000
	Riparian - Weed Control	species; area treated (acres)	20	$1,800	$36,000
	Sediment Reduction - Road Stream Crossing Improvements (=Rocked Ford)	miles	0.1	$1,012,000	$101,200
	Sediment Reduction - Road Drainage System Improvements	miles	10	$4,800	$48,000
	Sediment Reduction - Erosion Control Structures	# of erosion structures	35	$1,500	$52,500
	Sediment Reduction - Sediment Traps and Upland Erosion Control (sediment control basins, windbreaks, planting, conservation land management)	# of erosion structures	20	$600	$12,000
	Upland- Vegetation - Planting	area treated (acres)	800	$450	$360,000
	Upland- Vegetation - Invasive Plant Control	area treated (acres)	200	$1,700	$340,000
	Land Protected, Acquired, or Leased - Streambank Protected	miles	12	$85,300	$1,023,600
	Nutrient Enrichment - Carcass Analog	area treated (acres)	50	$4,300	$215,000
	Project maintenance - Site Maintenance	miles	6	$4,300	$25,800
					$8,602,400

MSA	Type/Subtype[a]	Unit[a]	# Units	2012 Cost / Unit	2012 Cost
Upper Little Klickitat MaSA	Fish Passage - Culvert Replacement	# of installations	1	$133,000	$133,000
	Instream - Channel Connectivity	length treated in miles	0.5	$506,200	$253,100
	Instream - Channel reconfiguration (includes channel roughening)	length treated in miles	22	$506,200	$11,136,400
	Instream - Spawning Gravel Placement	length treated in miles	11	$96,000	$1,056,000
	Instream - Large Woody Debris	# of structures	55	$1,200	$66,000
	Instream - Structure/ Log Jam	# of structures	35	$9,900	$346,500
	Instream - Beaver Introduction	# of beavers introduced	15	$350	$5,250
	Riparian - Livestock Water Development	# of installations	40	$3,600	$144,000
	Riparian - Water Gap Development	# of installations	40	$1,400	$56,000
	Riparian - Fencing	miles	36	$10,700	$360,000
	Riparian - Planting	species; area treated (acres)	800	$2,100	$1,680,000
	Riparian - Weed Control	species; area treated (acres)	400	$1,700	$680,000
	Sediment Reduction - Road Reconstruction	miles	0.5	$3,200,000	$1,600,000
	Sediment Reduction - Road Stream Crossing Improvements (Rocked Ford)	miles	10	$2,200	$22,000
	Sediment Reduction - Road Drainage System Improvements	miles	30	$11,700	$351,000
	Sediment Reduction - Erosion Control Structures	# of erosion structures	20	$1,500	$30,000
	Sediment Reduction - Sediment Traps and Upland Erosion Control (sediment control basins, windbreaks, planting, conservation land management)	# of erosion structures	40	$1,800	$72,000
	Upland- Vegetation - Planting	area treated (acres)	12800	$450	$5,760,000
	Upland- Vegetation - Invasive Plant Control	area treated (acres)	300	$800	$240,000
	Land Protected, Acquired, or Leased - Streambank Protected	miles	22	$80,000	$1,760,000
	Nutrient Enrichment - Carcass Analog	area treated (acres)	5	$4,000	$20,000
	Project maintenance - Site Maintenance	miles	38	$4,000	$152,000
					$25,923,250
Upper Middle Klickitat MiSA	Instream - Structure/ Log Jam	# of structures	30	$30,000	$900,000
	Riparian - Planting	species; area treated (acres)	40	$5,400	$216,000
	Sediment Reduction - Road Reconstruction	miles	2	$27,700	$55,400
	Sediment Reduction - Road Stream Crossing Improvements (Rocked Ford)	miles	6	$1,900	$11,400
	Sediment Reduction - Road Drainage System Improvements	miles	16	$3,800	$60,800
	Upland- Vegetation - Invasive Plant Control	area treated (acres)	115	$1,800	$207,000

MSA	Type/Subtype[a]	Unit[a]	# Units	2012 Cost / Unit	2012 Cost
	Project maintenance - Site Maintenance	miles	18	$1,700	$30,600
				$1,461,700	Assumes river route remains in place with only drainage improvements; estimates do not include roads falling under Forest and Fish jurisdiction
Trout Creek MiSA	Fish Passage - Culvert Replacement	# of installations	3	$266,000	$798,000
	Instream - Channel reconfiguration (includes channel roughening)	length treated in miles	10	$506,200	$5,062,000
	Instream - Spawning Gravel Placement	length treated in miles	10	$95,000	$950,000
	Instream - Large Woody Debris	# of structures	15	$1,600	$24,000
	Instream - Structure/ Log Jam	# of structures	30	$9,000	$270,000
	Instream - Beaver Introduction	# of beavers introduced	10	$350	$3,500
	Riparian - Planting	species; area treated (acres)	60	$4,200	$252,000
	Sediment Reduction - Road Reconstruction	miles	18	$27,700	$498,600
	Sediment Reduction - Road Stream Crossing Improvements (Rocked Ford)	miles	5	$1,900	$9,500
	Sediment Reduction - Road Drainage System Improvements	miles	25	$4,100	$95,000
	Sediment Reduction - Erosion Control Structures	# of erosion structures	25	$1,600	$40,000
	Sediment Reduction - Sediment Traps and Upland Erosion Control (sediment control basins, windbreaks, planting, conservation land management)	# of erosion structures	15	$600	$9,000
	Upland- Vegetation - Invasive Plant Control	area treated (acres)	40	$1,800	$72,000
	Project maintenance - Site Maintenance	miles	10	$4,500	$45,000
					$9,609,800
West Fork Klickitat MaSA	Sediment Reduction - Road Reconstruction	miles	0.5	$1,280,000	$640,000
	Sediment Reduction - Road Drainage System Improvements	miles	15	$5,900	$88,500
	Project maintenance - Site Maintenance	miles	0.5	$12,900	$6,450
					$734,950
[a] from Table 1 in Plummer guidance document					