COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

DRAFINAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE ROCKY REACH HYDROELECTRIC PROJECT
Docket No. P-2145-060

Section 4
Developmental Analysis
Pages 211 through 232
FEIS

4.0 DEVELOPMENTAL ANALYSIS

In this section, we analyze the project's use of the water resources of the Columbia River to generate power, estimate the economic benefits of the project, and estimate the cost of various environmental measures and the effects of these measures on project operations. Chelan PUD does not propose any modifications to the project generation facilities, but it does propose several environmental and recreational enhancements that would affect project costs.

4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT

Consistent with the Commission's approach to economic analysis, we base the value of the project power benefits on current cost of replacement power using alternative resources. Our analysis is based on current costs, with no assumptions concerning future escalation or inflation of the various cost components included in the cost of project power or alternative power.[33] For the Rocky Reach Project, we assume the value of generation is similar to the cost of purchasing the equivalent generation from BPA at its new resource rate for firm power.[34] Using the average of the monthly high and low load hourly energy rates for BPA customers buying power for all 5 years of the 5-year rate period, we calculate an average energy value of 34.4 mills/kWh. We use BPA's new resource capacity demand rate schedule to value the project's 1,225,000 kW of dependable capacity at $24 per kW per year (kW-yr). Using the average energy value of 34.4 mills/kWh and capacity demand of $24/kW-yr, the result is a power value of 39.27 mills/kWh.

The current cost economic analysis is not entirely a first-year analysis in that certain costs, such as major capital investments, would not be expended in a single year. The maximum period we use to annualize such costs is 30 years. Also, some future expenses, such as taxes and depreciation, are known and measurable and are, therefore, incorporated in our cost analysis.

For our economic analysis of the alternatives, we used the assumptions, values, and parameters shown in table 17.

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[33] Mead Corporation, Publishing Paper Division, 72 FERC ¶61,027 (July 13, 1995).

[34] Bonneville Power Administration, 2002 Wholesale Power Rate Schedules (Revised December 2001).

Table 17. Summary of key parameters for economic analysis of the Rocky Reach Project. (Source: Chelan PUD, 2004a, as modified by staff).

Assumption	Value	Source
Power value[a]	39.27 mills/kWh	Chelan PUD/staff
Overall cost of money	7 percent	Chelan PUD
Discount rate	7 percent	Staff
Insurance rate	0.25 percent of new net investment	Staff
Term of financing[b]	20 years	Staff
Period of analysis[c]	30 years	Staff
Escalation rate after 2006[d]	0 percent	Staff
Net investment (2006$)[e]	$532,715,460	Chelan PUD/staff
O&M costs (2006$)[f]	$35,632,400	Chelan PUD/staff
No-action average annual generation (MWh)[g]	6,030,900	Chelan PUD/staff
No-action dependable capacity (kW)	1,225,000	Staff

[a] Based on Chelan PUD (2004a) energy value of 34.4 mills/kWh and dependable capacity value of $24/kW-yr.

[b] Staff uses 20 years as the standard term of financing.

[c] Chelan PUD submitted a 50-year analysis in its license application (Chelan PUD, 2004a). However, staff uses 30 years as the standard period of analysis. Costs that would be incurred by Chelan PUD beyond 2035, including major costs for acoustic studies in 2036 and 2046 and juvenile bypass system R&M in 2047, are not included in this analysis.

[d] Chelan PUD assumed a 3.5 percent escalation rate in its license application (Chelan PUD, 2004a). Our analysis assumes no escalation.

[e] Net plant investment from Chelan PUD (2004a, table 18), adjusted through straight line depreciation to 2006. Additional costs added by staff include installation of the Commission-approved micro-turbine ($2,202,010) (Chelan PUD, letter dated December 27, 2004) and relicensing costs ($16,200,000) and existing costs ($119,672,600) (Chelan PUD, 2004a, table 20), all expressed in 2006$.

[f] O&M from Chelan PUD (2004a, tables 19 and 20), including existing annual O&M ($28,373,000); local, state, and federal taxes ($1,147,000), existing O&M

($2,932,659), and costs associated with the Bull Trout Management Plan that would be incurred prior to issuance of a new license ($432,800). Additional costs added by staff include micro-turbine O&M ($6,099) beginning in 2010. All costs were escalated to 2006$.

[g] Average annual generation (5,806,000 MWh) from Chelan PUD (2004a) plus increased efficiency gains due to turbine rehabilitation (231,700 MWh) and installation of approved micro-turbine (6,100 MWh), less effects of environmental measures incurred prior to relicensing (–12,900 MWh) (Chelan PUD, letter dated December 27, 2004).

4.2 COMPARISON OF ALTERNATIVES

Table 18 provides a summary of the annual cost, power benefits, and annual net benefits for the three alternatives: Chelan PUD's proposal, Chelan PUD's proposal with staff-recommended measures (staff alternative), and the no-action alternative.

Table 18. Summary of the annual cost, power benefits, and annual net benefits for three alternatives.

	No Action	Chelan PUD's Proposal	Staff Alternative
Installed capacity (MW)[a]	865.76	865.76	865.76
Annual generation (MWh)[b]	6,030,900	6,030,900	6,030,900
Annual power value ($/MWh and mills/kWh)	$236,862,960 39.27	$236,862,960 39.27	$236,862,960 39.27
Annual cost ($/MWh and mills/kWh)	$79,893,810 13.25	$97,328,570 16.14	$97,187,920 16.11
Annual net benefit ($/MWh and mills/kWh)	$156,969,150 26.02	$139,534,390 23.14	$139,675,040 23.16

[a] Includes approved micro-turbine scheduled to be on line in 2010. Turbine is not associated with relicensing, and is therefore considered part of "No Action."

[b] Includes increased efficiency due to rehabilitation of turbines and installation of approved micro-turbine.

4.2.1 No-Action Alternative

Under the no-action alternative, the project would continue to operate as it was operating when the Commission issued its REA notice on January 12, 2005. The planned turbine rehabilitation and micro-turbine installation approved by the Commission would occur, but Chelan PUD would not proceed further with HCP implementation and would not make other changes or enhancements to the environmental conditions of the project.

Following the noted turbine changes, installed capacity would be 865.76 MW and generation would equal 6,030,900 MWh of electricity annually. Based on our estimate of the current cost of replacing this amount of power with no consideration of inflation over the 30-year period of our analysis, the average annual power value of the project under the no-action alternative would be $236.86 million (about $39.27/MWh) and the average annual cost would be $79.89 million (about $13.25/MWh), resulting in an average annual net benefit of $156.97 million (about $26.02/MWh).

4.2.2 Chelan PUD's Proposal

Under Chelan PUD's proposal, the PUD would implement the environmental measures identified on table 19 as being recommended by Chelan PUD. Chelan PUD's proposal includes a number of substantial investments including continued implementation of the HCP, restoration and maintenance of the fish bypass, hatchery improvements, and recreational facility improvements. The measures included in this alternative would not change the project's installed or dependable capacity or its average annual generation. With the same average annual power value as the no-action alternative and with an average annual cost of $97.333 million (about $16.14/MWh), the average annual net benefit of Chelan PUD's proposal would be $139.533 million (about $23.14/MWh).

4.2.3 Chelan PUD's Proposal with Staff-Recommended Measures

Under Chelan PUD's proposal with staff-recommended modifications, the project would have the same power benefit as for Chelan PUD's proposal and the no-action alternative. With an average annual cost of $97.19 million (about $16.11/MWh), the average annual net benefit of the staff alternative would be $139.68 million (about $23.16/MWh). The staff alternative includes most, but not all, the measures proposed by Chelan PUD as well as several additional measures. We discuss the reasons for the staff modifications in section 5.1, *Comprehensive Development and Recommended Alternative.*

4.3 COST OF ENVIRONMENTAL MEASURES

Certain measures proposed by Chelan PUD and other parties would affect project economics because they can increase the production cost by requiring new capital expenditures or additional annual costs for O&M. None of the measures would affect the project's power production capability or average annual generation. Table 19 summarizes the costs of environmental measures considered in this final EIS.

Table 19. Costs of proposed and recommended environmental measures for the Rocky Reach Hydroelectric Project. (Source: Chelan PUD, 2006a, modified by staff)

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
Rocky Reach Environmental Forums					
1	Establish RR Policy Committee and Fish, Wildlife, Recreation, and Cultural Forums	Settlement Parties, Staff	$0	$5,000	$5,000
Shoreline Erosion Plan and Measures[c]					
2	Erosion control demonstration projects	Settlement Parties, Staff	$204,800	$0	$17,020
3	Distribution of erosion control information	Settlement Parties, Staff	$0	$510	$510
4	Shoreline erosion control inventory and monitoring	Settlement Parties, Staff	$0	$3,690	$3,690
Water Quality Plan and Measures					
5	TDG measures	Settlement Parties, Staff	$10,240	$62,550	$63,400
6	Water temperature measures	Settlement Parties, Staff	$0	$37,860	$37,860
7	Continued operation under the Hourly Coordination Agreement and the Hanford Reach Agreement[d]	Settlement Parties, CRITFC, Umatilla, Staff	$0	$0	$0

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
8	Water quality sampling in macrophyte beds	Settlement Parties, Staff	$0	$9,000	$9,000
10	Continued implementation of spill prevention and response plans[d]	Settlement Parties, Staff	$0	$0	$0
11	Continued spill management to minimize TDG while meeting fish survival goals and continued monitoring of water temperatures in the project[d,e]	Umatilla Tribes, Staff	$0	$0	$0
12	Management to meet Washington state water quality standards[f]	WDOE, Interior, Umatilla Tribes, American Rivers, Staff	$0	$0	$0
13	Water Quality Committee[g]	Umatilla Tribes	$0	$5,120	$5,120
Anadromous Fish Measures under the HCP					
14	Annual and comprehensive progress reports[d]	Settlement Parties, Staff	$0	$0	$0
15	License amendment application as needed[d]	Settlement Parties, Staff	$0	$0	$0
16	Design drawing filings as needed[d]	Settlement Parties, Staff	$0	$0	$0
17	Energy loss (spill)[d]	Settlement Parties, Staff	$0	$0	$0

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
18	Studies, including 2003 FPE, 2004 acoustic and PIT studies, and 2005 acoustic and PIT studies[d]	Settlement Parties, Staff	$0	$0	$0
19	2006 acoustic study	Settlement Parties, Staff	$1,761,280	$0	$146,340
20	2006 PIT study	Settlement Parties, Staff	$1,718,580	$0	$142,790
21	2016 and 2026 acoustic studies[h]	Settlement Parties, Staff	$3,522,560	$0	$292,680
22	Research and development under the HCP (years 1–10)	Settlement Parties, Staff	$0	$579,590	$579,590
23	Pumping energy[d]	Settlement Parties, Staff	$0	$0	$0
24	Continue the existing predator control program[d]	Settlement Parties, Staff	$0	$0	$0
25	Increase the predator control program	Settlement Parties, Staff	$0	$102,400	$102,400
26	Continue existing fish ladder O&M[d]	Settlement Parties, Staff	$0	$0	$0

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
27	Continue existing fish counting[d]	Settlement Parties, Staff	$0	$0	$0
28	Juvenile bypass system construction[d]	Settlement Parties, Staff	$0	$0	$0
29	Bypass system flow[d]	Settlement Parties, Staff	$0	$0	$0
30	Bypass construction R&M (year 2017)[i]	Settlement Parties, Staff	$66,560,000	$0	$5,530,230
31	Bypass construction R&M (year 2032)[i]	Settlement Parties, Staff	$66,560,000	$0	$5,530,230
32	Incremental bypass system O&M (years 1–5)	Settlement Parties, Staff	$0	$240,400	$240,400
33	Incremental bypass system O&M (years 6–30)	Settlement Parties, Staff	$0	$490,940	$490,940
34	Ongoing bypass system O&M (years 1–30)	Settlement Parties, Staff	0	$501,240	$501,240
35	Hatchery capital improvements	Settlement Parties, Staff	$4,096,000	$0	$340,320

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
36	Continue existing hatchery O&M[d]	Settlement Parties, Staff	$0	$0	$0
37	Hatchery O&M (incremental)	Settlement Parties, Staff	$0	$571,700	$571,700
38	Hatchery management committees (years 1–10)	Settlement Parties, Staff	$0	$144,900	$144,900
39	Hatchery management consultants (years 1–10)	Settlement Parties, Staff	$0	$57,960	$57,960
40	Hatchery management committees (years 11–30)	Settlement Parties, Staff	$0	$87,420	$87,420
41	Tributary Conservation Fund (habitat mitigation)	Settlement Parties, Staff	$0	$254,980	$254,980
Alternatives or Additions to the HCP					
42	Established juvenile salmonid mortality and FPE goal achievement (2013 and 2020)	Umatilla Tribes	Unknown	Unknown	Unknown
43	Adult upstream salmonid passage goal achievement	Umatilla Tribes	Unknown	Unknown	Unknown

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
44	Funding for regional evaluation of salmon stock	Umatilla Tribes	Unknown	Unknown	Unknown
White Sturgeon Plan and Measures					
45	Brood stock planning, collection, stocking, and monitoring[j]	Settlement Parties, Staff	$0	$61,440	$61,440
46	White sturgeon population supplementation program through hatchery construction	Umatilla Tribes	$786,430	$102,400	$167,740
47	Monitoring and evaluation program including construction of hatchery facility	Umatilla Tribes	$0	$43,030	$43,030
48	Determining the carrying capacity of available habitat and adjusting the supplemental program[g]	Settlement Parties	$0	$26,160	$26,160
49	Annual report to the RR Fish Forum and FERC[g]	Settlement Parties, Staff	$0	$10,240	$10,240
50	Four-tier sturgeon studies	Umatilla Tribes	Unknown	Unknown	Unknown
Bull Trout Plan and Measures[k]					
51	Operation of upstream and downstream fish passage, including fishway counts	Settlement Parties, Staff	$0	$5,120	$5,120

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
52	Adult bull trout upstream and downstream passage evaluation	Settlement Parties, Staff	$147,460	$0	$12,250
53	Sub-adult bull trout monitoring	Settlement Parties, Staff	$0	$5,120	$5,120
54	Fishway and bypass modifications, if needed	Settlement Parties, Staff	Unknown	Unknown	Unknown
55	Participate in the FWS bull trout recovery plan development meeting	Settlement Parties	$0	$1,690	$1,690
56	Bull trout radio-tagging and PIT tagging, 2005–2008[l]	Settlement Parties, Forest Service, Staff	$0	$12,340	$12,340
57	Sub-adult PIT tagging (2006–2009)[l]	Settlement Parties, Forest Service, Staff	$0	$2,240	$2,240
58	Stranding and entrapment study (2005–2007)[l]	Settlement Parties, Forest Service, Staff	$60,000	$0	$4,990
59	Impact minimization measures[l]	Settlement Parties, Staff	$0	$0	$0
60	Radio telemetry study, correlation analysis, facility or operations modifications if required[m,n]	Settlement Parties, Forest Service, Staff	$442,370	$0	$36,750

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
61	Sub-adult bull trout PIT tagging (starting 2018 and every 10 years thereafter)[m]	Settlement Parties, Forest Service, Staff	$0	$260	$260
62	Collection and funding of tissue samples for genetic analysis (starting 2018 and every 10 years thereafter)[m]	Settlement Parties, Forest Service, Staff	$0	$190	$190
63	Information exchange and regional monitoring efforts[m]	Settlement Parties, Forest Service	Unknown	Unknown	Unknown
Pacific Lamprey Plan and Measures					
64	Continued operation of upstream fishway and downstream fish bypass facilities[d]	Settlement Parties, Staff	$0	$0	$0
65	Upstream passage counts	Settlement Parties, Staff	$0	$10,240	$10,240
66	Literature review of upstream passage measures	Settlement Parties	$20,480	$0	$1,700
67	Measures and monitoring to address project-related effects on adult lamprey passage[o]	Settlement Parties, Staff	Unknown	Unknown	Unknown
68	Periodic passage monitoring (every 10 years)	Settlement Parties, Staff	$0	$14,190	$14,190

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
69	Measurement of effects on juvenile downstream passage	Settlement Parties, Staff	$716,800	$0	$59,560
70	Measures to identify and address juvenile lamprey presence, abundance, and habitat use[g,p]	Settlement Parties	$51,200	$0	$4,250
71	Identify and implement measures to address unavoidable effects to achieve No Net Impact	Settlement Parties	Unknown	Unknown	Unknown
72	Investigation of fishway modifications for improving passage of Pacific lamprey, implementation of feasible measures and operational changes, and continued monitoring of fishway effectiveness[g,p]	Umatilla Tribes	$102,400	$0	$8,510
73	Upstream lamprey passage activities (annual passage counts, fishway modifications, and radio telemetry program at unspecified intervals)	Umatilla Tribes	Unknown	Unknown	Unknown
74	Downstream lamprey passage measures	Umatilla Tribes	Unknown	Unknown	Unknown
75	Juvenile lamprey habitat assessments (measure abundance, evaluate impacts)	Umatilla Tribes	Unknown	Unknown	Unknown
76	Pacific lamprey regional research and information sharing[g]	Umatilla Tribes	$0	$81,920	$81,920

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
77	Meeting specified lamprey passage goals	Umatilla Tribes	Unknown	Unknown	Unknown
78	Lamprey monitoring beyond project boundaries	Umatilla Tribes	Unknown	Unknown	Unknown
Resident Fish Plan and Measures					
79	Fish rearing and stocking	Settlement Parties	$0	$100,000	$100,000
80	Resident fish/fishing enhancement measures	Settlement Parties	$0	$3,820	$3,820
81	Recreational fishing evaluation	Settlement Parties	$61,440	$0	$5,100
82	Evaluation of predatory resident fish on HCP plan species	Settlement Parties, Staff	$0	$6,140	$6,140
83	Monitor resident fish species composition and abundance	Settlement Parties	$0	Included in No. 82	Included in No. 82
Other Fisheries and Wildlife Measures					
84	Detailed fishery operations plan	Umatilla Tribes	Unknown	Unknown	Unknown
85	Hatchery and habitat management plans	Umatilla Tribes	Unknown	Unknown	Unknown
86	Aquatic invasive species monitoring and control plan development and implementation[g]	Settlement Parties, Staff	$7,680	$0	$640

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
Wildlife Plan and Measures					
87	Provide funds to WDFW each year to restore, maintain, or improve WDFW lands within the Chelan Wildlife Area	Settlement Parties, Forest Service, Staff (except as noted in items 91 and 92)	$0	$75,780	$75,780
88	Provide funds to WDFW for restoration of cultivated lands on Chelan WMA	Settlement Parties, Forest Service, Staff (except as noted in items 91 and 92)	$0	$59,230	$59,230
89	Funding for BLM land management on lands in the Rocky Reach Wildlife Area[q]	Settlement Parties, Forest Service, Staff (except as noted in items 91 and 92)	$0	$40,960	$40,960
90	Funding for Forest Service land management on lands in the Rocky Reach Wildlife Area[q]	Settlement Parties, Forest Service, Staff (except as noted in items 91 and 92)	$0	$10,240	$10,240
91	File a revised Wildlife Plan[r]	Staff	$0	$0	$0
92	File a report every 5 years on proposed Wildlife Plan activities[r]	Staff	$0	$0	$0

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
93	Revise project boundary to include lands where operation and maintenance is required under the Wildlife Plan[r]	Staff	$0	$0	$0
94	Establishment of a conservation easement on Chelan PUD Sun Cove property for protection of riparian shoreline	Settlement Parties, Forest Service, Staff	$100	$0	$10
95	Implementation of integrated noxious weed management program on lands affected by reservoir fluctuation	Settlement Parties, Forest Service, Staff	$0	$10,240	$10,240
96	Funding for threatened and endangered wildlife surveys and/or improvement projects for any species[s]	Settlement Parties, Forest Service, Staff	$0	$3,070	$3,070
97	Implementation of noxious weed control for *Spiranthes diluvialis* protection in the Rocky Reach Wildlife Area	Settlement Parties, Forest Service, Staff	$0	$5,120	$5,120
98	Implementation of a *Spiranthes diluvialis* monitoring program to evaluate the ongoing status of the populations	Settlement Parties Forest Service, Staff	$0	$3,070	$3,070
99	Funding for conservation easements on private lands where *Spiranthes diluvialis* occurs	Settlement Parties, Forest Service, Staff	$0	$3,280	$3,280

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
Cultural Plan and Measures					
100	RR Cultural Forum and twice-yearly meetings	Settlement Parties, Staff	$0	$2,050	$2,050
101	Appointment of Cultural Resource Coordinator[t]	Settlement Parties, Staff	$0	$1,020	$1,020
102	Development and implementation of treatment plans for eligible resources	Settlement Parties, Staff	$0	$3,070	$3,070
103	Monitoring plan implementation	Settlement Parties, Staff	$0	$3,070	$3,070
104	Development of separate TCP Plan	Settlement Parties, Staff	$0	$1,720	$1,720
105	Curation Plan development	Settlement Parties, Staff	$0	$190	$190
106	Integrated cultural resources information system development and implementation	Settlement Parties, Staff	$0	$1,720	$1,720
107	Development and implementation of interpretive/educational plan/program	Settlement Parties, Staff	$0	$5,150	$5,150
108	Site treatment measures[u]	Settlement Parties, Staff	$204,800	$0	$17,020

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
Recreation Plan and Measures					
109	Continued ownership, operation and maintenance of Rocky Reach reservoir park system[d]	Settlement Parties, Staff	$0	$0	$0
110	Renovations and enhancements at Lincoln Rock State Park and Daroga State Park	Settlement Parties, Staff	$6,144,000	$0	$510,480
111	Construction of a paved 1-mile trail from Lincoln Rock State Park to a fish bypass viewing station downstream of Rocky Reach dam	Settlement Parties, Staff	$512,000	$0	$42,540
112	Design and implementation of an irrigation system at Orondo Park	Settlement Parties, Staff	$25,600	$0	$2,130
113	Design and implementation of Entiat Park upgrades	Settlement Parties, Staff	$6,144,000	$0	$510,480
114	Wastewater treatment plant upgrade to accommodate usage of Entiat Park facilities	Settlement Parties, Staff	$1,331,200	$0	$110,600
115	Lease to the City of Entiat, with an option to purchase, 9.32 acres Entiat shoreline currently owned by Chelan PUD[v]	Settlement Parties, Staff	$0	$0	$0

	Environmental Measures	Recommending Entities[a]	Capital and One-time Costs (2006$)[b]	Annual Costs Including O&M (2006$)[b]	Total Annualized Cost
116	Annual operation and maintenance of improvements made at Entiat Park	Settlement Parties, Staff	$0	$335,870	$335,870
117	Design and construction of Entiatqua Trail	Settlement Parties, Staff	$1,228,800	$0	$102,100
118	Annual community meeting	Settlement Parties	$0	$1,000	$1,000
119	Recreation use study beginning in year 20	Settlement Parties, Staff	$102,400	$0	$8,510
120	Recreation resources monitoring and evaluation program	Settlement Parties, Staff	$0	$27,960	$27,960
121	Completion of construction by year 10	Settlement Parties, Staff	$0	$0	$0
123	Recreation monitoring on BLM land[g]	Staff	$0	$3,070	$3,070
124	Interpretive trails and signs at project recreational sites[g]	Settlement Parties, Staff	$0	$2,050	$2,050
125	Recreation enhancement fund	Forest Service	$1,000,000	$211,739	$294,830
126	Information and education program for project recreational sites	Forest Service	$0	$2,000	$2,000
127	File a revised Recreation Plan[r]	Staff	$0	$0	$0

Notes: CRITFC – Columbia River Inter-Tribal Fish Commission
FERC – Federal Energy Regulatory Commission
FPE – fish passage efficiency
FWS – U.S. Fish and Wildlife Service
HCP – Anadromous Fish Agreement and Habitat Conservation Plan for the Rocky Reach Project
O&M – operation and maintenance
PIT tag – passive integrated transponder tag
R&M – restoration and maintenance
REA – ready for environmental analysis
RR – Rocky Reach
TCP – traditional cultural property
TDG – total dissolved gas
WDFW – Washington Department of Fish and Wildlife

[a] Settlement Parties = proposed by Settlement Parties in Settlement Agreement; Staff = recommended in staff alternative; Forest Service = recommended by the party in its letter(s) to the Commission in response to the Commission's REA notice.

[b] Costs based on Chelan PUD estimates in the Settlement Agreement, except as noted.

[c] Costs and measures to implement shoreline erosion at BLM cultural sites are contained in Measure No. 108.

[d] Cost included in no-action alternative; no incremental cost associated with Chelan PUD's proposal.

[e] Included as component of TDG measures in Water Quality Plan.

[f] Staff assumes that the cost of achieving state water quality standards is reflected in the measures recommended for inclusion in the water quality plan.

[g] Staff cost estimate.

[h] Does not include acoustic studies in 2036 and 2046, which occur beyond the 30-year economic analysis period.

[i] Does not include bypass R&M in 2047, which occurs beyond the 30-year economic analysis period.

[j] Staff does not recommend hatchery construction at this time, but recommends that other elements of the proposed supplementation program be implemented on license issuance, and that the hatchery be constructed if monitoring and evaluation of initial measures indicates that it is needed to achieve White Sturgeon Plan goals.

[k] Measures included in FERC-approved Bull Trout Plan.

[l] Staff assumes that costs to be incurred in 2005 and 2006 to implement the FERC-approved Bull Trout Plan are part of the no-action alternative; costs to be incurred in 2007 and beyond are treated as incremental costs associated with Chelan PUD's proposal.

[m] Post-licensing costs associated with implementation of the FERC-approved Bull Trout Plan are assumed to be incremental costs of Chelan PUD's proposal.

[n] Does not include the cost of facility modifications or operational changes if they are identified.

[o] Most of this measure is reasonable and would benefit lamprey; however, we do not recommend including a requirement to meet passage rates similar to best rates at other projects in the Columbia and Snake rivers in any license issued for the project.

[p] Does not include the cost of implementing feasible measures or operational changes if they are identified.

[q] Costs include matching funds.

[r] Cost for staff's recommended measures are assumed to be included in cost of respective plan.

[s] Chelan PUD currently funds wildlife surveys at $7,500 per year. The proposal would fund studies at $10,500 per year, equaling an incremental cost of $3,000 annually.

[t] Assumes duties undertaken by existing staff rather than new hire.

[u] Cost for stabilizing site 45CH254 (on BLM land) is included in this measure.

[v] Chelan PUD estimated a zero cost for this trade-lease/purchase agreement. Staff assumes the lands to be traded are of equal value.

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