



ECONOMIC ANALYSIS OF CRITICAL  
HABITAT DESIGNATION FOR THE BULL  
TROUT

Final | September 10, 2010

prepared for:

U.S. Fish and Wildlife Service

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## EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential for economic costs to be associated with the proposed critical habitat designation for the bull trout (*Salvelinus confluentus*). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).
2. The Service originally listed the Klamath River and Columbia River bull trout distinct population segments (DPSs) as threatened on June 10, 1998. Since then, three additional bull trout DPSs were listed as threatened (Coastal Puget Sound, Jarbidge River, and Saint Mary-Belly River). Critical habitat for the bull trout was designated for all five DPSs on September 26, 2005.<sup>1</sup> On January 5, 2006, a complaint was filed alleging that the Service failed to designate adequate critical habitat, among other allegations. On March 23, 2009, the Service provided notice to the court that it would seek remand of the final critical habitat rule for the bull trout. On July 1, 2009, the court granted the request for a voluntary remand of the 2005 final rule, and directed that a new proposed rule be completed by December 31, 2009, with a final rule completed by September 30, 2010.
3. The 2010 draft proposed rule proposes designation of approximately 22,676 river miles and 533,426 acres of lake habitat.<sup>2</sup> This proposed designation is comprised of 32 units. These units include rivers, tributaries, and lakes distributed throughout 86 counties in Washington, Oregon, Idaho, Montana, and one county in Nevada. Fifteen out of the 32 proposed critical habitat units include stream reaches that are unoccupied by bull trout. Exhibit ES-1 presents an overview map of the proposed critical habitat.
4. This analysis employs a “without critical habitat” and “with critical habitat” framework. The “without critical habitat” scenario represents the baseline for the analysis, considering protections already accorded the bull trout; for example, protections provided under the Federal listing and other Federal, State, and local regulations. The “with critical habitat” scenario describes the incremental costs that would not occur but for this designation of critical habitat for the species. In addition, this analysis discusses the potential benefits that could result from bull trout conservation efforts.

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<sup>1</sup> Note that while the previous economic analyses were conducted for two separate proposed critical habitat designations based on distinct population segments (DPSs) of bull trout, the bull trout is currently listed as one coterminous U.S. DPS which is what is covered by the current critical habitat designation and associated economic analysis.

<sup>2</sup> 75 FR 2269. This analysis is based on GIS Data provided by the Service on October 1, 2009 as amended via written communication on November 3, 2009, for which total proposed river miles were 22,647. The published proposed rule included 22,676 river miles. The final rule considers an additional 270 river miles, of which approximately 75 are unoccupied by bull trout or salmon species and occur in the Clark Fork Basin and Malheur River CHUs. These additional unoccupied river miles represent an increase of approximately 0.3 percent of the total study area for this analysis, and thus are not expected to significantly change the results presented.

### KEY FINDINGS

**Estimated Incremental Costs:** Incremental costs are those costs expected to be incurred as a result of critical habitat designation for the bull trout. Annualized incremental costs associated with the designation of critical habitat for the bull trout are estimated to be \$5.09 million to \$7.66 million. The range of costs represents uncertainty in the types and costs of project modifications.

**Detailed Estimated Incremental Costs:** Dam operations are expected to incur the greatest incremental economic impacts, followed by forest management and administrative costs.

- **Dams:** Estimated incremental costs associated with dam project modifications range from \$2.12 million to \$2.52 million, annually. These costs are primarily related to conservation efforts in the Upper Willamette River Basin, including providing fish passage (fish ladder and trap & haul), temperature control projects, and seasonal changes to flow.
- **Forest Management:** Estimated incremental costs associated with forest management projects range from \$0.41 million to \$1.65 million, annually. These costs are associated with efforts to reduce sedimentation, timing restrictions, elimination of fish barriers (e.g., culverts), and changes to harvest methods.
- **Administrative Costs:** Estimated incremental costs associated with additional section 7 administrative efforts are expected to be \$2.11 million annually.

**Estimated Baseline Costs:** Baseline costs are those costs associated with actions to conserve the bull trout or its habitat, which would be incurred regardless of critical habitat designation. Baseline costs associated with conservation efforts for the bull trout and its habitat are estimated to be \$97.2 million to \$105.0 million, annually. These costs are adapted from previous analyses of bull trout critical habitat. The range of costs represents uncertainty in the types and costs of project modifications.

**Detailed Estimated Baseline Costs:** Under the baseline scenario, nearly half of all estimated costs are due to conservation efforts imposed on forest management activities. Costs imposed on development activities and dam operations make up most of the remaining estimated costs.

- **Forest Management:** Costs associated with project modifications to forest management activities account for 44 percent of estimated baseline impacts. These costs are expected to be associated with conservation measures imposed on timber harvest activities, including efforts to reduce sedimentation, timing restrictions, elimination of fish barriers (e.g., culverts), and changes to harvest methods.
- **Development:** Under the high cost scenario, costs associated with project modifications imposed on development activities account for 25 percent of projected baseline impacts. These costs result from implementation of stormwater control requirements.
- **Dams:** Costs associated with project modifications imposed on dam operations account for 18 percent of estimated baseline impacts under the high cost scenario. These costs result from projected conservation efforts including providing fish passage (fish ladder or trap and haul), temperature control projects, habitat acquisition, and seasonal changes to flow.

5. Of currently proposed critical habitat areas, nearly 19,800 river miles (87 percent) were previously proposed as bull trout critical habitat. Two detailed economic analyses of those past proposals were conducted in 2004 and 2005.<sup>3</sup> Both of these analyses were made available for, and received, public comment. Due to extensive overlap between the current proposed critical habitat and these past proposals, this analysis draws heavily on these two existing economic analyses. Costs associated with bull trout conservation efforts estimated in the earlier economic analyses have been updated to current dollars, adjusted to reflect the currently proposed unit boundaries, and reported in this analysis to provide context for the reported incremental costs.<sup>4</sup>
6. To provide information on the sensitivity of these results to the assumed real discount rate, Appendix B provides the annualized value of incremental impacts for each critical habitat unit, applying a three percent real discount rate. Appendix B also presents undiscounted costs by year for all projected incremental costs.

#### POTENTIAL INCREMENTAL COSTS

7. This analysis focuses on quantification of the incremental costs of this rulemaking. Annualized incremental costs are forecast at \$5.09 million to \$7.66 million (assuming a seven percent discount rate). The majority of forecast incremental costs are associated with unoccupied critical habitat, as analyzed in the two previous economic analyses. In particular, based on the fact that 23 percent of this proposed unit is considered by the Service to be unoccupied habitat, the Upper Willamette River Basin unit has greatest forecast incremental costs. These costs represent a portion of the costs associated with conservation efforts undertaken at flood control facilities on the Upper Willamette River system. Conservation efforts associated with dam operations have the highest expected incremental costs. A summary of potential incremental costs by unit is presented in Exhibits ES-2 and ES-3. The distribution of projected incremental costs across activities is provided in Exhibits ES-4.
8. A key analytic assumption is that conservation efforts that would be protective of bull trout and its habitat that are expected to occur in areas that the Service considers unoccupied by the bull trout are considered to be incremental. Incremental costs are estimated as follows for unoccupied critical habitat areas.

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<sup>3</sup> Bioeconomics, Inc. 2004. Final Economic Analysis of Critical Habitat Designation for the Bull Trout (Columbia/Klamath Populations), hereafter "the 2004 economic analysis of the Columbia and Klamath DPSS." Northwest Economic Associates (NEA). 2005. Economic Analysis of Critical Habitat for Three Populations of Bull Trout - Coastal Puget Sound, Jarbidge River, Saint Mary-Belly River, hereafter "the 2005 economic analysis of the Coastal Puget Sound, Jarbidge, and Saint Mary-Belly DPSS."

<sup>4</sup> This analysis focuses on economic impacts anticipated to occur after publication of the final rule. Annualized costs identified in the two previous bull trout critical habitat economic analyses are assigned to the new critical habitat units and inflated to 2009 dollars. Because organization of the proposed critical habitat units in this rule differs somewhat from the previous rules (i.e., 32 total units versus the 29 units proposed in previous rulemakings), estimated costs are allocated by river mile to the new critical habitat units. The resultant cost estimates are presented at the critical habitat unit level in annualized terms, applying a seven percent discount rate throughout the report.

- ***Previously Proposed Unoccupied Areas.*** For unoccupied areas overlapping with previous bull trout critical habitat proposals, cost estimates are drawn from the previous economic analyses and assigned to the critical habitat units proposed in this rule.
- ***Newly Proposed Unoccupied Areas.*** For newly proposed unoccupied areas, the analysis focuses on identifying additional conservation efforts that may be expected as a result of critical habitat designation for the bull trout. The 72 river miles of newly proposed unoccupied habitat that are also designated as critical habitat for listed salmon species (0.3 percent of proposed critical habitat) were not included in the incremental analysis. In estimating the incremental costs of conservation efforts, this analysis assumes that conservation efforts and associated costs would be similar to those for occupied areas within the same critical habitat unit.

#### CURRENT ECONOMIC CONDITIONS

The Service recognizes that the current economic situation in the U.S. is creating conditions in which the local economies are less able to absorb additional regulatory burden. The economies of certain communities within the study area are likely more at risk economically than when the 2004 and 2005 analyses were conducted. For example, because of higher overall unemployment, any jobs impacts associated with this rule will be more acutely felt. Note that the analysis forecasts potential economic activities and the impacts of critical habitat over a 20-year time period, and economic conditions will likely change over this period. The incremental impacts forecast in this analysis (\$5.09 million to \$7.66 million, annually) are not large when distributed across the 87-county study area, though some uneven distribution of these impacts may result in disproportionate impacts in some communities.

#### POTENTIAL BASELINE COSTS

9. Estimated annualized baseline costs are forecast to be \$97.2 million to \$105.0 million. Projected baseline costs are presented by unit in Exhibit ES-5. The distribution of projected baseline costs across activities is provided Exhibit ES-6. The relatively large magnitude of baseline costs reflects the numerous existing regulatory protections and associated conservation activities for the bull trout and for salmon and steelhead listed species that share the same habitat). Nearly half of baseline costs result from conservation efforts associated with forest management activities, including timber sales, much of which is addressed under existing habitat conservation plans.<sup>5</sup> Another quarter of the estimated baseline costs are related to mitigating the impacts of development projects in the Puget Sound and Olympic Peninsula critical habitat units. Key analytic issues include the following:

<sup>5</sup> Existing and ongoing habitat conservation plans covering forest management activities near Puget Sound and on the Olympic Peninsula are detailed in Table 9 of the 2005 economic analysis of the Coastal Puget Sound, Jarbidge, and Saint Mary-Belly DPSs (p. 63-64).

- **Occupancy.** Conservation efforts occurring in areas that the Service considers occupied by the bull trout are included in the baseline for this analysis. This is because the Service has indicated that “in occupied habitat, it is unlikely that an analysis would identify a difference between measures needed to avoid the destruction or adverse modification of critical habitat from measures needed to avoid jeopardizing the species” (see Appendix E).<sup>6</sup>
  - ***Previously Proposed Occupied Areas.*** For proposed areas that were previously analyzed, the types of baseline conservation efforts expected and estimates of associated costs are adapted from previous economic analyses cited above.
  - ***Newly Proposed Occupied Areas.*** Because it relies on previous analyses of critical habitat designation to arrive at baseline cost estimates, this analysis does not quantify the baseline costs associated with newly proposed occupied habitat (approximately 11 percent of proposed river miles). While this may result in under-reporting of baseline costs, some of these costs were likely captured in the previous analyses due to the proximity of new areas to previously analyzed areas.
- **Conservation Efforts for Riparian Areas.** Riparian area conservation efforts in proposed critical habitat areas impact a wide range of activities, including development, dam operations, forest management, mining, transportation, irrigation diversion, grazing, utilities, habitat restoration and other activities. For example, development activities in the Puget Sound and Olympic Peninsula critical habitat units must adhere to a specific set of stormwater management regulations; these regulations also benefit the bull trout and its habitat. Because these development projects would be required to implement stormwater management requirements regardless of the designation of critical habitat, these costs are considered to be part of the baseline.
- **Conservation Efforts for Other Listed Species.** In addition to the listing of bull trout under the Endangered Species Act, there are numerous other Federal and State regulations providing protection for the proposed critical habitat. In particular, numerous conservation efforts are underway on behalf of salmon and steelhead species in the proposed critical habitat area that also benefit the bull trout and its habitat. Costs of conservation efforts undertaken for these other species, but which benefit the bull trout, are considered in this analysis to be baseline costs.

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<sup>6</sup> U.S. Fish and Wildlife Service, “Incremental Effects Memo for Proposed Bull Trout Critical Habitat” emailed to IEc on September 24, 2009.

**ADMINISTRATIVE COSTS**

10. Total annualized incremental impacts associated with unoccupied areas are estimated at \$2.1 million. The greatest incremental impacts are anticipated to be associated with section 7 consultations conducted for forest management, transportation, as well as other activities. Annualized baseline administrative costs are estimated at \$4.6 million. Key analytic issues include the following:
- **Costs to Consider Adverse Modification in section 7 consultation.** Critical habitat designation may increase section 7 consultation efforts where a project or activity may also adversely modify critical habitat. Administrative efforts associated with future bull trout consultations may therefore result in both baseline and incremental impacts.
  - **Level of Incremental Administrative Effort.** Three different scenarios may trigger incremental administrative consultation costs: (1) additional effort to address adverse modification in a new consultation, (2) re-initiation of consultations to address adverse modification, and (3) incremental consultation resulting entirely from critical habitat designation. Incremental administrative costs are forecast based on the level of historical consultation (to forecast those future consultations where additional efforts may be needed) as well as research into potential new consultation efforts in the future.

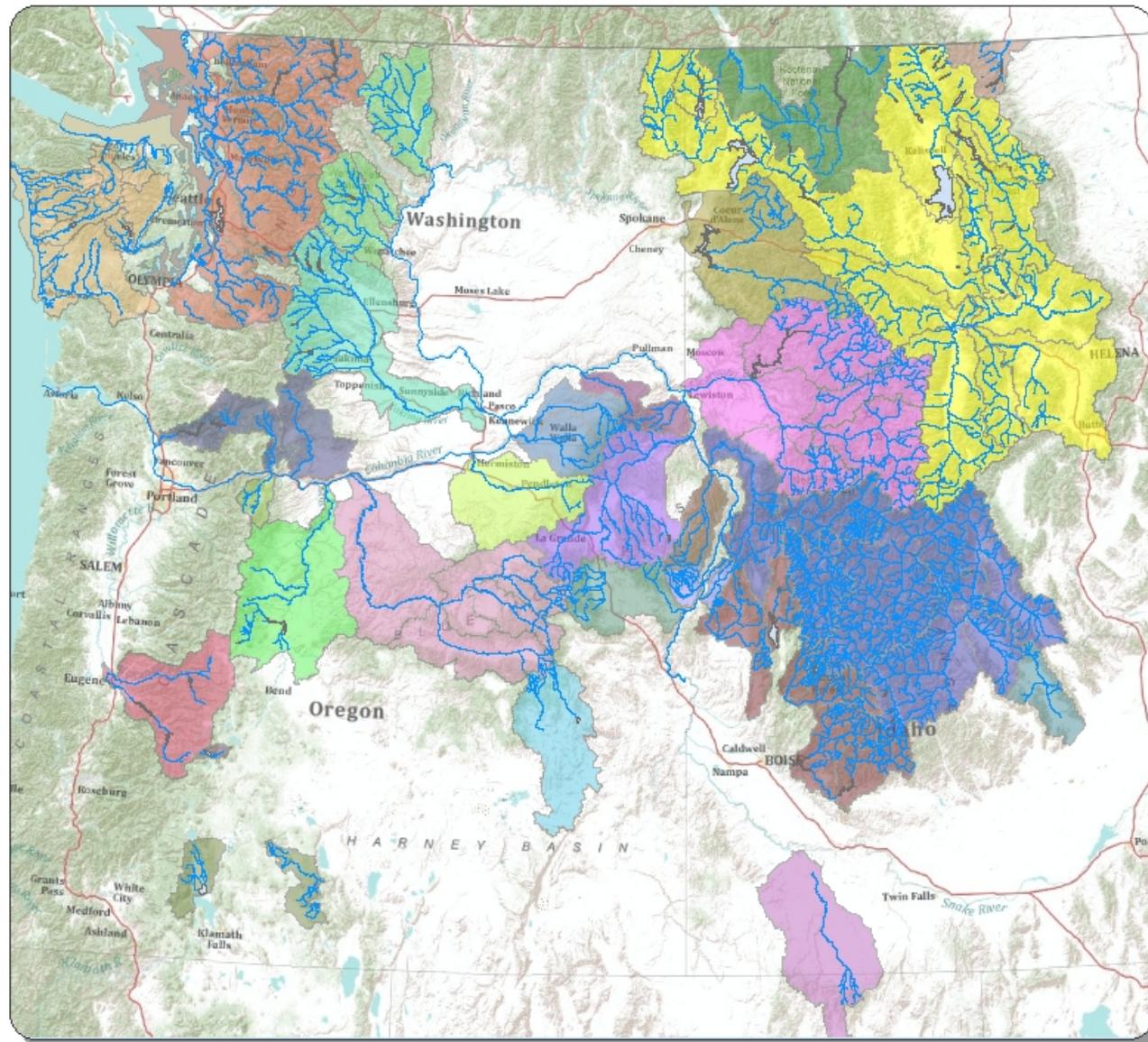
**POTENTIAL BENEFITS OF BULL TROUT CONSERVATION**

11. Conservation efforts for bull trout critical habitat have the potential to result in increased bull trout populations, which in turn could result in increases in recreational fishing opportunities over the long term. In addition, increased bull trout population size could result in enhanced non-use value by the public (i.e., existence value). In addition, improved water quality, flood protection and aesthetic improvements to the landscape could also occur. However, these benefits are not quantified in this analysis. The primary information gap involves a lack of detailed understanding of the likely future bull trout populations or the impacts of critical habitat on those populations. A detailed explanation for each benefit category is as follows:
- **Recreational Fishing Values (Direct Use Values).** Chapter 6 discusses the current status of the bull trout fishery and the information that would be required to estimate potential benefits associated with greater recreational fishing opportunities due to critical habitat designation for bull trout. Additional information would be required in order to quantify these benefits, including: 1) detailed forecasts of the timing and extent of expected bull trout population increases resulting from critical habitat designation; 2) any associated expected changes in fishing regulations, and 3) the responsiveness of anglers to a new target species. At this time, the Service is not able to forecast how critical habitat designation may affect the future population of bull trout in critical habitat areas. Further, specific changes, including timing, to fishing regulations are uncertain. As such, this analysis does not quantify the potential

benefits associated with increased recreational fishing opportunities due to bull trout critical habitat designation.

- **Existence Value.** There is no existing study that can be easily transferred to the current policy question in order to quantify the value the public would place on actions taken to enhance probability of recovery of bull trout due to critical habitat designation. However, existing studies do support the conclusion that preservation of fish species in general is likely to generate substantial benefits to the public.
- **Indirect Benefits.** The analysis recognizes that, to the extent that bull trout conservation efforts for critical habitat lead to improved water quality, increased open space, or aesthetic benefits, indirect use benefits may result (such as increased hiking or wildlife-viewing activities). However, absent information on the long term biological and physical changes expected to occur in critical habitat areas as a result of critical habitat designation, the analysis does not attempt to quantify these types of potential benefits.

EXHIBIT ES-1. PROPOSED CRITICAL HABITAT



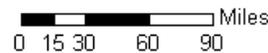
Overview of Proposed Critical Habitat

1:4,679,161

Legend

- Proposed critical habitat
- Critical Habitat Units**
- <all other values>
- CHU**
- Clark Fork River Basin
- Clearwater River Basin
- Coeur d'Alene Lake Basin
- Grande Ronde River
- Hells Canyon Complex
- Hood River
- Imnaha River
- Jarbidge River Basin
- John Day River Basin
- Klamath River Basin
- Kootenai River Basin
- Little Lost River Basin
- Lower Columbia River Basin
- Lower Deschutes River
- Malheur River
- Odell Lake
- Olympic Peninsula
- Powder River
- Puget Sound
- Saint Mary River Basin
- Salmon River Basin
- Sheep / Granite Creeks
- Snake River Basin
- Southwest Idaho River Basins
- Umatilla River
- Upper Columbia Basin
- Upper Willamette River
- Walla Walla River Basins
- Yakima River

Source:  
 1. US Fish and Wildlife Service, Field Office  
 2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA



## EXHIBIT ES-2. FORECAST INCREMENTAL COSTS BY UNIT, 2010-2029 (DISCOUNTED AT 7 PERCENT)

UNIT #	CRITICAL HABITAT UNIT	ESTIMATED TOTAL INCREMENTAL COSTS (PRESENT VALUE 7% DISCOUNT RATE)		ESTIMATED ANNUALIZED COSTS (7% DISCOUNT RATE)	
		LOW END	HIGH END	LOW END	HIGH END
1	Olympic Peninsula	\$1,730,000	\$1,730,000	\$153,000	\$153,000
2	Puget Sound	\$3,160,000	\$3,160,000	\$279,000	\$279,000
3	Lower Columbia River Basins	\$5,510,000	\$5,800,000	\$486,000	\$512,000
4	Upper Willamette River	\$18,100,000	\$18,500,000	\$1,600,000	\$1,630,000
5	Hood River	\$327,000	\$864,000	\$28,800	\$76,200
6	Lower Deschutes River	\$1,140,000	\$2,140,000	\$101,000	\$188,000
7	Odell Lake	\$12,400	\$12,400	\$1,100	\$1,100
8	Mainstem Lower Columbia River	\$128,000	\$128,000	\$11,300	\$11,300
9	Klamath River Basin	\$1,360,000	\$3,860,000	\$120,000	\$341,000
10	Upper Columbia River Basins	\$2,190,000	\$2,600,000	\$193,000	\$229,000
11	Yakima River	\$2,350,000	\$2,580,000	\$208,000	\$228,000
12	John Day River	\$708,000	\$1,210,000	\$62,400	\$106,000
13	Umatilla River	\$90,600	\$222,000	\$7,990	\$19,600
14	Walla Walla River Basin	\$190,000	\$353,000	\$16,800	\$31,100
15	Lower Snake River Basins	\$154,000	\$378,000	\$13,600	\$33,400
16	Grande Ronde River	\$374,000	\$503,000	\$33,000	\$44,300
17	Imnaha River	\$73,500	\$73,500	\$6,480	\$6,480
18	Sheep and Granite Creeks	\$11,800	\$11,800	\$1,040	\$1,040
19	Hells Canyon Complex	\$1,300,000	\$2,490,000	\$115,000	\$220,000
20	Powder River Basin	\$2,010,000	\$3,750,000	\$177,000	\$331,000
21	Clearwater River	\$1,330,000	\$2,840,000	\$117,000	\$250,000
22	Mainstem Upper Columbia River	\$489,000	\$489,000	\$43,200	\$43,200
23	Mainstem Snake River	\$270,000	\$271,000	\$23,800	\$23,900
24	Malheur River Basin	\$672,000	\$1,050,000	\$59,300	\$92,700
25	Jarbidge River	\$95,500	\$95,500	\$8,420	\$8,420
26	Southwest Idaho River Basins	\$2,640,000	\$6,070,000	\$233,000	\$535,000
27	Salmon River Basin	\$2,550,000	\$3,840,000	\$225,000	\$339,000
28	Little Lost River	\$65,200	\$101,000	\$5,750	\$8,890
29	Coeur d'Alene River Basin	\$4,340,000	\$14,200,000	\$383,000	\$1,250,000
30	Kootenai River Basin	\$159,000	\$159,000	\$14,100	\$14,100
31	Clark Fork River Basin	\$4,110,000	\$7,300,000	\$362,000	\$644,000
32	Saint Mary River Basin	\$38,600	\$38,600	\$3,400	\$3,400
Total		\$57,700,000	\$86,800,000	\$5,090,000	\$7,660,000

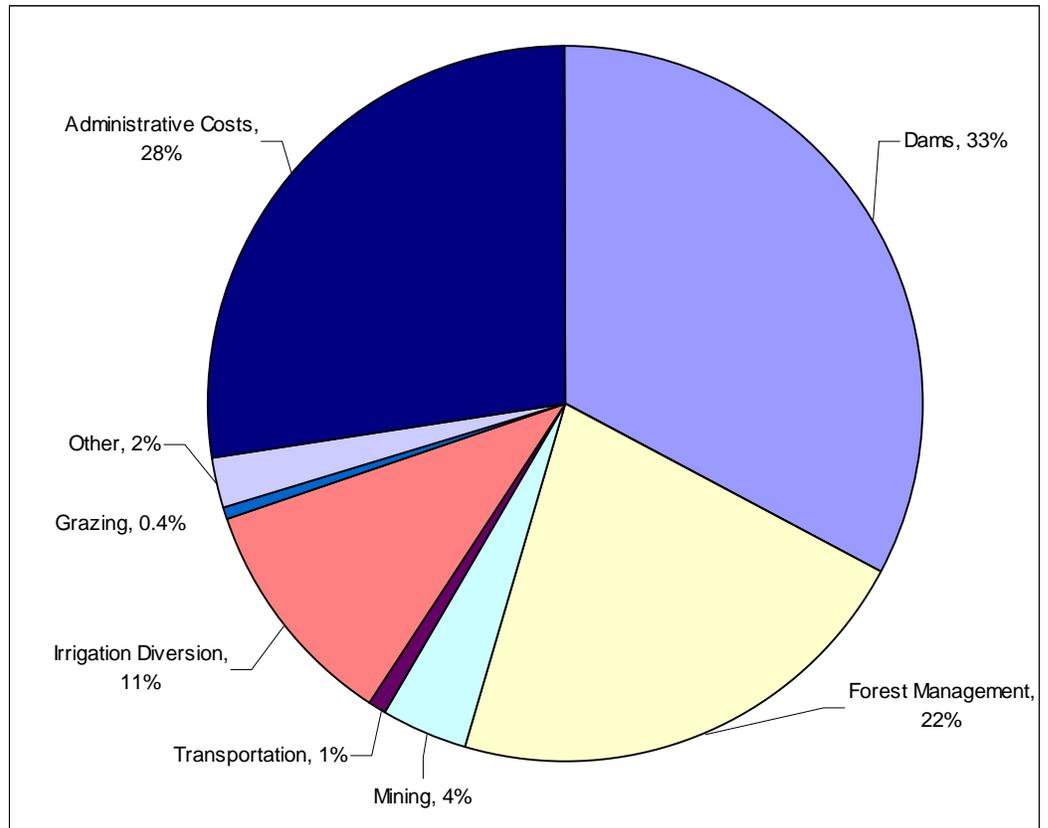
Note: Totals may not sum due to rounding.

## EXHIBIT ES-3. FORECAST INCREMENTAL COSTS BY UNIT, 2010-2029 (DISCOUNTED AT 3 PERCENT)

UNIT #	CRITICAL HABITAT UNIT	ESTIMATED TOTAL INCREMENTAL COSTS (PRESENT VALUE 3% DISCOUNT RATE)		ESTIMATED ANNUALIZED COSTS (3% DISCOUNT RATE)	
		LOW END	HIGH END	LOW END	HIGH END
1	Olympic Peninsula	\$2,430,000	\$2,430,000	\$158,000	\$158,000
2	Puget Sound	\$4,440,000	\$4,440,000	\$290,000	\$290,000
3	Lower Columbia River Basins	\$7,710,000	\$8,120,000	\$503,000	\$530,000
4	Upper Willamette River	\$25,400,000	\$26,000,000	\$1,660,000	\$1,700,000
5	Hood River	\$459,000	\$1,210,000	\$29,900	\$79,200
6	Lower Deschutes River	\$1,600,000	\$3,000,000	\$105,000	\$196,000
7	Odell Lake	\$17,500	\$17,500	\$1,140	\$1,140
8	Mainstem Lower Columbia River	\$180,000	\$180,000	\$11,700	\$11,700
9	Klamath River Basin	\$1,900,000	\$5,430,000	\$124,000	\$354,000
10	Upper Columbia River Basins	\$3,080,000	\$3,650,000	\$201,000	\$238,000
11	Yakima River	\$3,310,000	\$3,620,000	\$216,000	\$236,000
12	John Day River	\$994,000	\$1,690,000	\$64,900	\$111,000
13	Umatilla River	\$127,000	\$311,000	\$8,300	\$20,300
14	Walla Walla River Basin	\$267,000	\$496,000	\$17,400	\$32,300
15	Lower Snake River Basins	\$217,000	\$531,000	\$14,100	\$34,700
16	Grande Ronde River	\$525,000	\$706,000	\$34,300	\$46,100
17	Imnaha River	\$103,000	\$103,000	\$6,740	\$6,740
18	Sheep and Granite Creeks	\$16,600	\$16,600	\$1,080	\$1,080
19	Hells Canyon Complex	\$1,830,000	\$3,500,000	\$120,000	\$228,000
20	Powder River Basin	\$2,820,000	\$5,270,000	\$184,000	\$344,000
21	Clearwater River	\$1,860,000	\$3,990,000	\$122,000	\$260,000
22	Mainstem Upper Columbia River	\$687,000	\$687,000	\$44,900	\$44,900
23	Mainstem Snake River	\$379,000	\$381,000	\$24,700	\$24,900
24	Malheur River Basin	\$944,000	\$1,480,000	\$61,600	\$96,300
25	Jarbidge River	\$134,000	\$134,000	\$8,750	\$8,750
26	Southwest Idaho River Basins	\$3,700,000	\$8,520,000	\$242,000	\$556,000
27	Salmon River Basin	\$3,580,000	\$5,390,000	\$234,000	\$352,000
28	Little Lost River	\$91,500	\$142,000	\$5,970	\$9,240
29	Coeur d'Alene River Basin	\$6,090,000	\$19,900,000	\$398,000	\$1,300,000
30	Kootenai River Basin	\$224,000	\$224,000	\$14,600	\$14,600
31	Clark Fork River Basin	\$5,770,000	\$10,200,000	\$376,000	\$669,000
32	Saint Mary River Basin	\$54,200	\$54,200	\$3,530	\$3,530
	<b>Total</b>	<b>\$80,900,000</b>	<b>\$122,000,000</b>	<b>\$5,280,000</b>	<b>\$7,960,000</b>

Note: Totals may not sum due to rounding.

EXHIBIT ES-4. DISTRIBUTION OF FORECAST ANNUALIZED HIGH-END INCREMENTAL COSTS, BY ACTIVITY (7% DISCOUNT RATE)



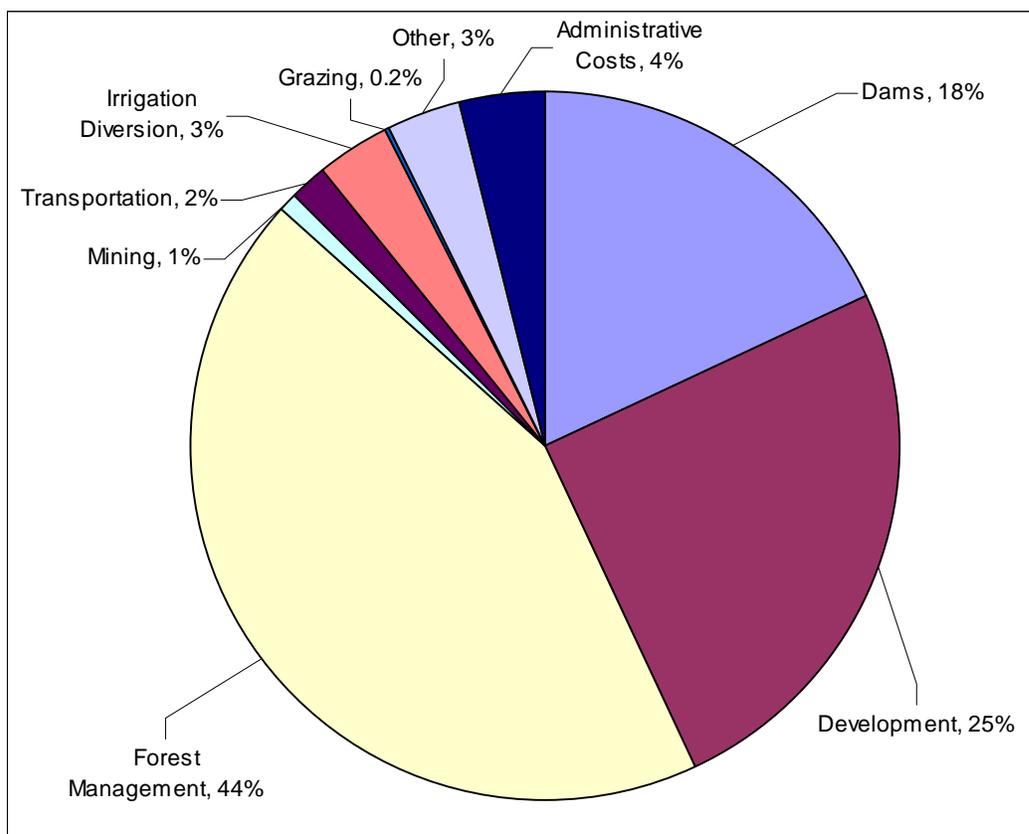
## EXHIBIT ES-5. FORECAST BASELINE COSTS BY UNIT, 2010-2029 (ANNUALIZED)

UNIT #	CRITICAL HABITAT UNIT	ANNUALIZED COSTS (3% DISCOUNT RATE)		ANNUALIZED COSTS (7% DISCOUNT RATE)	
		LOW END	HIGH END	LOW END	HIGH END
1	Olympic Peninsula	\$19,100,000	\$19,100,000	\$18,400,000	\$18,400,000
2	Puget Sound	\$68,000,000	\$68,000,000	\$65,500,000	\$65,500,000
3	Lower Columbia River Basins	\$161,000	\$267,000	\$155,000	\$257,000
4	Upper Willamette River	\$5,530,000	\$5,660,000	\$5,320,000	\$5,450,000
5	Hood River	\$37,500	\$103,000	\$36,100	\$98,900
6	Lower Deschutes River	\$187,000	\$342,000	\$180,000	\$330,000
7	Odell Lake	\$4,150	\$11,400	\$4,000	\$11,000
8	Mainstem Lower Columbia River	\$160,000	\$333,000	\$154,000	\$320,000
9	Klamath River Basin	\$61,200	\$151,000	\$58,900	\$145,000
10	Upper Columbia River Basins	\$655,000	\$1,030,000	\$631,000	\$995,000
11	Yakima River	\$832,000	\$971,000	\$801,000	\$935,000
12	John Day River	\$240,000	\$435,000	\$231,000	\$418,000
13	Umatilla River	\$31,100	\$89,800	\$30,000	\$86,400
14	Walla Walla River Basin	\$56,900	\$130,000	\$54,800	\$125,000
15	Lower Snake River Basins	\$45,000	\$114,000	\$43,300	\$110,000
16	Grande Ronde River	\$127,000	\$284,000	\$122,000	\$273,000
17	Imnaha River	\$35,800	\$96,400	\$34,400	\$92,800
18	Sheep and Granite Creeks	\$4,350	\$8,660	\$4,190	\$8,340
19	Hells Canyon Complex	\$147,000	\$265,000	\$141,000	\$255,000
20	Powder River Basin	\$205,000	\$378,000	\$197,000	\$364,000
21	Clearwater River	\$595,000	\$1,520,000	\$573,000	\$1,460,000
22	Mainstem Upper Columbia River	\$229,000	\$358,000	\$220,000	\$345,000
23	Mainstem Snake River	\$48,000	\$48,600	\$46,200	\$46,800
24	Malheur River Basin	\$170,000	\$274,000	\$164,000	\$264,000
25	Jarbridge River	\$195,000	\$195,000	\$188,000	\$188,000
26	Southwest Idaho River Basins	\$755,000	\$1,750,000	\$726,000	\$1,680,000
27	Salmon River Basin	\$1,330,000	\$3,190,000	\$1,280,000	\$3,070,000

UNIT #	CRITICAL HABITAT UNIT	ANNUALIZED COSTS (3% DISCOUNT RATE)		ANNUALIZED COSTS (7% DISCOUNT RATE)	
		LOW END	HIGH END	LOW END	HIGH END
28	Little Lost River	\$28,900	\$66,500	\$27,900	\$64,000
29	Coeur d'Alene River Basin	\$143,000	\$366,000	\$138,000	\$352,000
30	Kootenai River Basin	\$86,500	\$202,000	\$83,300	\$194,000
31	Clark Fork River Basin	\$1,280,000	\$2,830,000	\$1,230,000	\$2,730,000
32	Saint Mary River Basin	\$550,000	\$550,000	\$529,000	\$529,000
Total		\$101,000,000	\$109,000,000	\$97,200,000	\$105,000,000

Note: Totals may not sum due to rounding.

EXHIBIT ES-6. FORECAST ANNUALIZED HIGH END BASELINE COSTS, BY ACTIVITY (7% DISCOUNT RATE)



## CHAPTER 1 | INTRODUCTION

### 1.1 INTRODUCTION

1. The purpose of this report is to estimate the economic costs of proposed critical habitat for five distinct population segments (DPS) of the federally listed bull trout (*Salvelinus confluentus*, “bull trout”): the Klamath River, Columbia River, Coastal Puget Sound, Jarbidge River, and Saint Mary-Belly River DPS. The report was prepared by Industrial Economics, Incorporated (IEc) for the U.S. Fish and Wildlife Service (Service).
2. This analysis identifies the incremental economic effects of the proposed rule by estimating the costs of actions taken to protect the bull trout and its habitat under two scenarios, one “without critical habitat” and the other “with critical habitat.” The difference between the two represents the incremental costs of the proposed rule. This information is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation, unless such exclusion would result in the extinction of the species.<sup>1</sup> In addition, this information allows the Service to address the requirements of Executive Orders (E.O.) 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).<sup>2</sup> Detailed discussion of the framework for this analysis is provided in Chapter 2.
3. This chapter provides a brief introduction to the 2009 proposed critical habitat for the bull trout. It includes a summary of past legal actions that relate to the current proposal, a map of the proposed units, and a summary of threats to the proposed critical habitat, as determined by the Service.<sup>3</sup>

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<sup>1</sup> 16 U.S.C. §1533(b)(2).

<sup>2</sup> Executive Order 12866, Regulatory Planning and Review, September 30, 1993 (as amended by Executive Order 13258 (2002) and Executive Order 13422 (2007)); Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001; 5. U.S.C. § 601 et seq; and Pub Law No. 104-121.

<sup>3</sup> All official definitions and boundaries should be taken from the Proposed Rule.

**1.2 PREVIOUS FEDERAL ACTIONS**

4. The Service originally listed the Klamath River and Columbia River bull trout DPSs as threatened on June 10, 1998. Since then, three additional bull trout DPSs were listed as threatened (Coastal Puget Sound, Jarbidge River, and Saint Mary-Belly River). Two economic analyses were conducted to assess the impacts of these past rulemakings. Critical habitat for the bull trout was designated for all five DPSs on September 26, 2005.
5. On January 5, 2006, a complaint was filed alleging that the Service failed to designate adequate critical habitat for the bull trout, and failed to properly assess the economic benefits and costs of critical habitat, among other allegations. On March 23, 2009, the Service provided notice to the court that it would seek remand of the final critical habitat rule for bull trout. On July 1, 2009, the court granted the request for a voluntary remand of the 2005 final rule, and directed that a new proposed rule be completed by December 31, 2009, with a final rule completed by September 30, 2010.

**1.3 PROPOSED CRITICAL HABITAT DESIGNATION**

6. The 2010 draft proposed rule proposes designation of approximately 22,676 river miles and 533,426 acres of lake habitat.<sup>4</sup> Exhibit ES-1 provides a map of the proposed designation, while Exhibits 1-1 and 1-2 provide information concerning the size of each critical habitat unit.

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<sup>4</sup> 75 FR 2269. This analysis is based on GIS Data provided by the Service on October 1, 2009 as amended via written communication on November 3, 2009, for which total proposed river miles were 22,647. The published proposed rule included 22,676 river miles. The final rule considers an additional 270 river miles, of which approximately 75 are unoccupied by bull trout or salmon species and occur in the Clark Fork Basin and Malheur River CHUs. These additional unoccupied river miles represent an increase of approximately 0.3 percent of the total study area for this analysis, and thus are not expected to significantly change the results presented.

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## EXHIBIT 1-1. SUMMARY OF PROPOSED CRITICAL HABITAT RIVER MILES BY UNIT

UNIT	NAME	PROPOSED CRITICAL HABITAT (RIVER MILES)		
		OCCUPIED	UNOCCUPIED	TOTAL
1	Olympic Peninsula	1,222.1		1,222.1
2	Puget Sound	2,236.6		2,236.6
3	Lower Columbia River Basins	146.1	78.1	224.2
4	Upper Willamette River	147.8	41.7	189.5
5	Hood River	36.5	33.8	70.3
6	Lower Deschutes River	268.2	19.6	287.8
7	Odell Lake	13.8	3.3	17.1
8	Mainstem Lower Columbia River	308.8		308.8
9	Klamath River Basin	54.1	219.4	273.5
10	Upper Columbia River Basins	699.6		699.6
11	Yakima River	740.3		740.3
12	John Day River	710.4	20.6	731.0
13	Umatilla River	131.6		131.6
14	Walla Walla River Basin	232.3	49.0	281.3
15	Lower Snake River Basins	176.6		176.6
16	Grande Ronde River	619.7	37.5	657.2
17	Imnaha River	177.5		177.5
18	Sheep and Granite Creeks	29.8		29.8
19	Hells Canyon Complex	248.2		248.2
20	Powder River Basin	175.1	76.1	251.2
21	Clearwater River	1,679.0		1,679.0
22	Mainstem Upper Columbia River	228.6		228.6
23	Mainstem Snake River	280.7	62.4	343.1
24	Malheur River Basin	123.4	32.3	155.7
25	Jarbidge River	165.9		165.9
26	Southwest Idaho River Basins	1,688.0		1,688.0
27	Salmon River Basin	5,045.2		5,045.2
28	Little Lost River	128.3		128.3
29	Coeur d'Alene River Basin	353.8	155.4	509.2
30	Kootenai River Basin	364.8		364.8
31	Clark Fork River Basin	3,216.7	96.6	3,313.3
32	Saint Mary River Basin	69.7	2.9	72.6
<b>Total</b>		<b>21,718.8</b>	<b>928.7</b>	<b>22,647.5</b>

Note: Totals may not sum due to rounding. This analysis is based on GIS Data provided by the Service on October 1, 2009 as amended via written communication on November 3, 2009. The published proposed rule included 22,676 river miles. The final rule considers an additional 270 river miles, of which approximately 75 are unoccupied by bull trout or salmon species and occur in the Clark Fork Basin and Malheur River CHUs. These additional unoccupied river miles represent an increase of approximately 0.3 percent of the total study area for this analysis, and thus are not expected to significantly change the results presented.

## EXHIBIT 1-2. SUMMARY OF PROPOSED CRITICAL HABITAT LAKE ACRES BY UNIT

UNIT	NAME	PROPOSED CRITICAL HABITAT (ACRES)		
		OCCUPIED	UNOCCUPIED	TOTAL
1	Olympic Peninsula	8,318.1	0	8,318.1
2	Puget Sound	44,208.3	0	44,208.3
3	Lower Columbia River Basins	11,999.7	0	11,999.7
4	Upper Willamette River	4,058.4	4,841.2	8,899.6
5	Hood River	91.1	0	91.1
6	Lower Deschutes River	3,812.9	314.3	4,127.3
7	Odell Lake	3,427.6	0	3,427.6
9	Klamath River Basin	0.0	9,329.5	9,329.5
10	Upper Columbia River Basins	2,553.1	0	2,553.1
11	Yakima River	15,531.0	0	15,531.0
16	Grande Ronde River	1,495.5	0	1,495.5
21	Clearwater River	16,610.2	0	16,610.2
24	Malheur River Basin	1,768.9	0	1,768.9
26	Southwest Idaho River Basins	38,400.6	0	38,400.6
27	Salmon River Basin	4,100.6	0	4,100.6
29	Coeur d'Alene River Basin	31,152.2	0	31,152.2
30	Kootenai River Basin	29,873.1	0	29,873.1
31	Clark Fork River Basin	295,225.5	0	295,225.5
32	Saint Mary River Basin	6,314.5	0	6,314.5
<b>Total</b>		<b>518,941.3</b>	<b>14,485.0</b>	<b>533,426.4</b>
<b>Note:</b> Totals may not sum due to rounding.				

**1.4 THREATS TO CRITICAL HABITAT AREAS**

7. This report describes and quantifies the potential economic costs associated with proposed critical habitat designation for the bull trout in relation to the threats identified by the Service. The proposed rule describes specific categories of threats to proposed critical habitat, including:

- Dams;
- Residential and commercial development;
- Forest management practices;
- Livestock grazing;
- Agriculture and agricultural diversions;
- Roads;
- Mining;

## OVERVIEW OF IRRIGATED AGRICULTURE IN CRITICAL HABITAT AREAS

Irrigated agriculture is an important industry in bull trout critical habitat areas, employing thousands of people and providing a vital fiscal foundation for rural areas. The 87 counties adjacent to proposed critical habitat for the bull trout comprise an abundant agricultural region, producing a large assortment of crops and products, including grains, fruits, vegetables, forage crops, as well as dairy and forest products. The four states that contain critical habitat for bull trout produced agricultural products with a value of \$19.67 billion in 2007, and net cash farm income of operations of \$4.9 billion (or approximately \$38,000 per farm). As shown, approximately 47,000 farms use irrigation across 8.7 million acres of farmland, for an average of 184 irrigated acres per farm in the four states with bull trout critical habitat. Collectively, these farms used 15.9 million acre-feet of water in 2008, or an average of 338 acre-feet per farm. As shown, the majority of farms with irrigation (61 percent) are small, with acreages less than 49 acres.

A number of agricultural interests commented on the Draft Economic Analysis during the public comment period. Commenters included Farmers Canal Water Users, Watson Agriculture Inc., Idaho Water Users and Idaho Farm Bureau, Oregon Farm Bureau, Klamath Water Users, and a number of small agricultural operations. These commenters were generally concerned about the potential for the designation to affect their operations. Anticipated impacts to agriculture are discussed in the body of this report. The exhibit below provides summary statistics for agricultural activities occurring in critical habitat areas, and is intended to provide some context for the impacts discussed later in the analysis.

	Idaho	Montana	Oregon	Washington	Total
<b>All Farms</b>					
Value of crops	41%	45%	68%	70%	58%
Value of livestock, poultry, & their products	59%	55%	32%	30%	42%
Total net cash farm income of operation (billions)	\$1.36	\$0.83	\$0.90	\$1.79	\$4.88
Average net cash farm income of operations (per farm)	\$53,720	\$28,016	\$23,441	\$45,454	\$37,658
<b>Farms with Irrigation</b>					
Total farms with irrigation	13,834	8,507	12,156	12,712	47,209
Total irrigated acres	3,319,827	1,947,159	1,758,602	1,675,898	8,701,486
Total annual irrigated acre-feet applied	6,228,403	2,660,677	3,276,679	3,781,371	15,947,130
Average Irrigated Acres/farm	240	229	145	132	184
Average annual acre-feet per farm	450	313	270	297	338
Total value of agricultural products sold (billions)	\$5.69	\$2.80	\$4.39	\$6.79	\$19.67
<b>Percent of Farms with Irrigation by Size</b>					
1-49 acres	57%	45%	66%	69%	61%
50-99 acres	9%	12%	11%	11%	11%
100-199 acres	10%	12%	7%	8%	9%
200-499 acres	11%	18%	9%	6%	11%
500-999 acres	7%	9%	4%	4%	6%
1,000 to 1,999	3%	3%	2%	2%	2%
2,000 +	2%	1%	1%	1%	1%

Source: National Agricultural Statistics Service, 2008 Farm and Ranch Irrigation Survey, Tables 2, 3, and 12; National Agricultural Statistics Service, Census of Agriculture, 2007, State Profiles. Exhibit presents statewide statistics.

- Non-native species; and
  - Other activities (utilities, restoration, recreation, and other instream activities).
8. Chapters 3 and 4 discuss these activities in greater detail and provide examples of several past conservation measures intended to avoid, mitigate, or compensate for these threats. These conservation measures are the basis of the economic costs presented in this analysis.

#### 1.5 STRUCTURE OF THE REPORT

9. Following this chapter, Chapter 2 discusses the framework employed in this analysis. Chapters 3 through 6 cover the assessment of potential economic impacts, organized by type of impact:
- Chapter 3 – Baseline Impacts;
  - Chapter 4 – Incremental Impacts;
  - Chapter 5 – Administrative Costs; and
  - Chapter 6 – Economic Benefits.
10. In addition, the report includes seven appendices:
- Appendix A, which considers potential impacts on small entities and the energy industry;
  - Appendix B, which provides information on the sensitivity of the economic impact estimates to alternative discount rates;
  - Appendix C, which contains maps of newly proposed unoccupied critical habitat areas which were the focus of the incremental impacts analysis;
  - Appendix D, which provides supplemental information on the distribution of administrative costs by unit and activity;
  - Appendix E, which provides information provided by the Service regarding the potential incremental effects of the proposed designation;
  - Appendix F, which contains information comparing the primary constituent elements for bull trout and salmon; and,
  - Appendix G, which contains information regarding how costs from previous economic analyses were distributed among the current proposed critical habitat units.

## CHAPTER 2 | FRAMEWORK

11. The purpose of this report is to estimate the economic impact of actions taken to protect the federally-listed bull trout and its habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the areas considered for critical habitat designation. This analysis employs "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections already accorded the bull trout; for example, under the Federal listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the bull trout. The analysis forecasts both baseline and incremental impacts likely to occur after the proposed critical habitat is finalized. Due to extensive overlap between the current proposed critical habitat and these past proposals, this analysis draws heavily on past existing analyses of bull trout critical habitat effects.
12. This information is intended to assist the Secretary of DOI in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.<sup>5</sup> In addition, this information allows the Service to address the requirements of E.O. 12866 and 13211, and the RFA, as amended by SBREFA.<sup>6</sup>
13. This section describes the framework for the analysis. First, it describes the case law that led to the selection of the framework applied in this report. It then describes in economic terms the general categories of economic effects that are the focus of regulatory impact analysis, including a discussion of both efficiency and distributional effects. Next, this section defines the analytic framework used to measure these impacts in the context of critical habitat regulation, including the link between existing and critical habitat-related protection efforts and potential impacts, and the consideration of benefits. It concludes with a presentation of the information sources relied upon in the analysis.

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<sup>5</sup> 16 U.S.C. §1533(b)(2).

<sup>6</sup> E.O. 12866, Regulatory Planning and Review, September 30, 1993 (as amended by E.O. 13258 (2002) and E.O. 13422 (2007)); E.O. 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001; 5. U.S.C. §§601 *et seq.*; and Pub Law No. 104-121.

## 2.1 BACKGROUND

14. The U.S. Office of Management and Budget's (OMB) guidelines for conducting economic analysis of regulations direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way the world would look absent the proposed action."<sup>7</sup> In other words, the baseline includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e., occurring over and above existing constraints) are attributable to the proposed regulation. Significant debate has occurred regarding whether assessing the impacts of the Service's proposed regulations using this baseline approach is appropriate in the context of critical habitat designations.
15. In 2001, the U.S. Tenth Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat, regardless of whether those impacts are attributable co-extensively to other causes.<sup>8</sup> Specifically, the court stated,
- “The statutory language is plain in requiring some kind of consideration of economic impact in the CHD [critical habitat designation] phase. Although 50 C.F.R. 402.02 is not at issue here, the regulation's definition of the jeopardy standard as fully encompassing the adverse modification standard renders any purported economic analysis done utilizing the baseline approach virtually meaningless. We are compelled by the canons of statutory interpretation to give some effect to the congressional directive that economic impacts be considered at the time of critical habitat designation.... Because economic analysis done using the FWS's [Fish and Wildlife Service's] baseline model is rendered essentially without meaning by 50 C.F.R. § 402.02, we conclude Congress intended that the FWS conduct a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes. Thus, we hold the baseline approach to economic analysis is not in accord with the language or intent of the ESA [Endangered Species Act].”<sup>9</sup>
16. Since that decision, however, courts in other cases have held that an incremental analysis of impacts stemming solely from the critical habitat rulemaking is proper.<sup>10</sup> For example, in the March 2006 ruling that the August 2004 critical habitat rule for the Peirson's milk-

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<sup>7</sup> OMB, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

<sup>8</sup> *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

<sup>9</sup> *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

<sup>10</sup> *Cape Hatteras Access Preservation Alliance v. Department of Interior*, 344 F. Supp. 2d 108 (D.D.C.); *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

vetch was arbitrary and capricious, the United States District Court for the Northern District of California stated,

“The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep’t of the Interior*, 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the Service’s baseline approach and the court held that the baseline approach was both consistent with the language and purpose of the ESA and that it was a reasonable method for assessing the actual costs of a particular critical habitat designation *Id* at 130. ‘To find the true cost of a designation, the world with the designation must be compared to the world without it.’”<sup>11</sup>

17. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis reports both:
- a. The baseline impacts of bull trout conservation from protections afforded the species absent critical habitat designation; and
  - b. The estimated incremental impacts precipitated specifically by the designation of critical habitat for the species.

Summed, these two types of impacts comprise the fully co-extensive impacts of bull trout conservation in areas considered for critical habitat designation.

18. Incremental effects of critical habitat designation are determined using the Service's December 9, 2004 interim guidance on “Application of the ‘Destruction or Adverse Modification’ Standard Under Section 7(a)(2) of the Endangered Species Act” and information from the Service regarding what potential consultations and project modifications may be imposed as a result of critical habitat designation over and above those associated with the listing.<sup>12</sup> Specifically, in *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, the Ninth Circuit invalidated the Service’s regulation defining destruction or adverse modification of critical habitat, and the Service no longer relies on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat.<sup>13</sup> Under the statutory provisions of the Act, the Service determines destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional to serve its intended conservation role for the species. A detailed description

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<sup>11</sup> *Center for Biological Diversity et al, Plaintiffs, v. United States Bureau of Land Management et. al, Defendants and American Sand Association, et al, Defendant Intervenors*, Order re: Cross Motions for Summary Judgment, Case 3:03-cv-02509 Document 174 Filed 03/14/2006, pages 44-45.

<sup>12</sup> Director, U.S. Fish and Wildlife Service, Memorandum to Regional Directors and Manager of the California-Nevada Operations Office, Subject: Application of the “Destruction or Adverse Modification” Standard under Section 7(a)(2) of the Endangered Species Act, dated December 9, 2004.

<sup>13</sup> *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, No. 03-35279 (9th Circuit 2004).

of the methodology used to define baseline and incremental impacts is provided later in this section.

## 2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

19. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the bull trout and its habitat (hereinafter referred to collectively as “bull trout conservation efforts”). Economic efficiency effects generally reflect “opportunity costs” associated with the commitment of resources required to accomplish species and habitat conservation. For example, if the set of activities that may take place on a parcel of land is limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of bull trout conservation efforts.
20. This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation efforts on small entities and the energy industry. This information may be used by decision-makers to assess whether the effects of species conservation efforts unduly burden a particular group or economic sector. For example, while conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience relatively greater impacts. The differences between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

### 2.2.1 EFFICIENCY EFFECTS

21. At the guidance of OMB and in compliance with E.O. 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of regulations that protect bull trout habitat, these efficiency effects represent the opportunity cost of resources used or benefits foregone by society as a result of the regulations. Economists generally characterize opportunity costs in terms of changes in producer and consumer surpluses in affected markets.<sup>14</sup>
22. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land manager, such as the U.S. Army Corps of Engineers (USACE), may enter into a consultation with the Service to ensure that a particular activity will not adversely modify

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<sup>14</sup> For additional information on the definition of "surplus" and an explanation of consumer and producer surplus in the context of regulatory analysis, see: Gramlich, Edward M., A Guide to Benefit-Cost Analysis (2nd Ed.), Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. Environmental Protection Agency, Guidelines for Preparing Economic Analyses, EPA 240-R-00-003, September 2000, available at <http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html>.

critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

23. Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, protection measures that reduce or preclude the development of large areas of land may shift the price and quantity of housing supplied in a region. In this case, changes in economic efficiency (i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the market.
24. This analysis begins by measuring impacts associated with efforts undertaken to protect bull trout and its habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. In bull trout habitat, residential development projects experience the greatest impacts. However, the quantity and price of housing is not anticipated to be significantly affected. Instead, developers may experience compliance and delay costs. As a result, measurable changes in consumer and producer surplus are not anticipated.

#### 2.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

25. Measurements of changes in economic efficiency focus on the net impact of conservation efforts, without consideration of how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations. OMB encourages Federal agencies to consider distributional effects separately from efficiency effects.<sup>15</sup> This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

#### Impacts on Small Entities and Energy Supply, Distribution, and Use

26. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the RFA, might be affected by future species conservation efforts.<sup>16</sup> In addition, in response to E.O. 13211 "Actions Concerning Regulations That

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<sup>15</sup> U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

<sup>16</sup> 5 U.S.C. §§601 *et seq.*

Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the future impacts of conservation efforts on the energy industry and its customers.<sup>17</sup>

#### Regional Economic Effects

27. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreators) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreators). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.
28. The use of regional input/output models in an analysis of the impacts of species and habitat conservation efforts can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by affected businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.
29. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.
30. While regional economic impacts are possible as a result of incremental impacts of bull trout critical habitat designation, this analysis does not currently model such impacts, as they are anticipated to be modest. There is potential for certain baseline conservation costs associated with this rule to result in regional economic impacts. Baseline regional economic impacts were not calculated in previous analyses of bull trout critical habitat with the exception of economic effects on agriculture from a reduced water supply in the St. Mary-Belly River unit, and timber industry impacts in the Puget Sound and Olympic Peninsula.

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<sup>17</sup> E.O. 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

#### CALCULATING PRESENT VALUE AND ANNUALIZED IMPACTS

This analysis compares economic impacts incurred in different time periods in present value terms. The present value represents the value of a payment or stream of payments in common dollar terms. That is, it is the sum of a series of past or future cash flows expressed in today's dollars. Translation of economic impacts of past or future costs to present value terms requires the following: a) past or projected future costs of critical habitat designation; and b) the specific years in which these impacts have been or are expected to be incurred. With these data, the present value of the past or future stream of impacts ( $PV_c$ ) from year  $t$  to  $T$  is measured in 2009 dollars according to the following standard formula:<sup>a</sup>

$$PV_c = \sum_t^T \frac{C_t}{(1+r)^{t-2009}}$$

$C_t$  = cost of bull trout critical habitat conservation efforts in year  $t$

$r$  = discount rate<sup>b</sup>

Impacts for each activity in each unit are also expressed as annualized values. Annualized values are calculated to provide comparison of impacts across activities with varying forecast periods ( $T$ ). For this analysis, most activities employ a forecast period of 20 years, 2010 through 2029. Annualized future impacts ( $APV_c$ ) are calculated by the following standard formula:

$$APV_c = PV_c \left[ \frac{r}{1 - (1+r)^{-N}} \right]$$

$N$  = number of years in the forecast period (in this analysis, 20 years)

<sup>a</sup> To derive the present value of future impacts,  $t$  is 2010 and  $T$  is 2029.

<sup>b</sup> To discount and annualize costs, guidance provided by the OMB specifies the use of a real rate of seven percent. In addition, OMB recommends sensitivity analysis using other discount rates such as three percent, which some economists believe better reflects the social rate of time preference. (U.S. Office of Management and Budget, Circular A-4, September 17, 2003 and U.S. Office of Management and Budget, "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 *Federal Register* 5492, February 3, 2003.)

### 2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

31. This analysis identifies those economic activities most likely to threaten the listed species and its habitat and, where possible, quantifies the economic impact to avoid or minimize such threats within the boundaries of the study area (the geographic boundaries of the study area are described later in this chapter). This section provides a description of the methodology used to separately identify baseline impacts and incremental impacts stemming from the proposed designation of critical habitat for the bull trout. This evaluation of impacts in a "with critical habitat designation" versus a "without critical habitat designation" framework effectively measures the net change in economic activity associated with the proposed rulemaking.

#### CHANGES IN ANALYTICAL APPROACH FROM PREVIOUS BULL TROUT ECONOMIC ANALYSES

- The Service now distinguishes the *incremental* costs of designation from baseline costs. The previous economic analyses evaluated co-extensive costs (i.e., those resulting from both species listing (jeopardy) and critical habitat designation (adverse modification)). This analysis characterizes all projected costs as either baseline costs (i.e., those impacts expected to occur absent the designation of critical habitat) or incremental costs (i.e., those impacts expected to occur as a result of critical habitat designation);
- The Service provides guidance on distinguishing the incremental costs of the designation, as described in Appendix E of this report; and,
- This analysis considers and estimates the impacts of the rule as currently proposed and as if the existing 2005 critical habitat designation did not exist. In other words, this analysis considers and estimates the impacts associated with designating areas as critical habitat versus not designating these areas. This analysis is intended to assist the Secretary of the DOI in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation. These particular areas also include those already designated as critical habitat under the 2005 designation and which are subject to re-examination by the Secretary.

#### 2.3.1 IDENTIFYING BASELINE IMPACTS

32. The baseline for this analysis is the existing state of regulation, prior to the designation of critical habitat, that provides protection to the species under the Act, as well as under other Federal, State and local laws and guidelines. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other

government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.

33. Baseline impacts include sections 7, 9, and 10 of the Endangered Species Act (Act), and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species.
- Section 7 of the Act, absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. The portion of the administrative costs of consultations under the jeopardy standard, along with the impacts of project modifications resulting from consideration of this standard, are considered baseline impacts. Baseline administrative costs of section 7 consultation are summarized later in Exhibit 2-2.
  - Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the "take" of endangered wildlife, where "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."<sup>18</sup> The economic impacts associated with this section manifest themselves in sections 7 and 10.
  - Under section 10(a)(1)(B) of the Act, an entity (e.g., a landowner or local government) may develop an HCP for a listed animal species in order to meet the conditions for issuance of an incidental take permit in connection with the development and management of a property.<sup>19</sup> The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately avoided or minimized. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

Enforcement actions taken in response to violations of the Act are not included in this analysis.

34. In the case of the bull trout, critical habitat was previously designated in 2004 and 2005.<sup>20</sup> In July 2009, the US District Court for the District of Oregon granted the Service's request for a voluntary remand of the previous designation. Due to extensive overlap between the current proposed critical habitat and past bull trout critical habitat proposals and due to the existence of two detailed economic analyses of those past critical habitat

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<sup>18</sup> 16 U.S.C. 1532.

<sup>19</sup> U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

<sup>20</sup> 69 FR 59995; 70 FR 56211.

proposals, this analysis focuses primarily on incremental impacts likely to occur after the proposed critical habitat is finalized.

35. The protection of listed species and habitat is not limited to the Act. Other Federal agencies, as well as State and local governments, may also seek to protect the natural resources under their jurisdiction. If compliance with the Clean Water Act or State environmental quality laws, for example, protects habitat for the species, such protective efforts are considered to be baseline protections and costs associated with these efforts are categorized accordingly. Of note, however, is that such efforts may not be considered baseline in the case that they would not have been triggered absent the designation of critical habitat. In these cases, they are considered incremental impacts and are discussed below.

#### 2.3.2 IDENTIFYING INCREMENTAL IMPACTS

36. This analysis separately quantifies the incremental impacts of this rulemaking. The focus of the incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts due to existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines.
37. When critical habitat is designated, section 7 requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat (in addition to considering whether the actions are likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in section 7 consultations, and the additional impacts of implementing project modifications resulting from the protection of critical habitat are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental impacts of the rulemaking.
38. Exhibit 2-1 depicts the decision analysis regarding whether an impact should be considered incremental. The following sections describe this decision tree in detail.
39. Incremental impacts may be the direct compliance costs associated with additional effort to forecast consultations, reinitiated consultations, new consultations occurring specifically because of the designation, and additional project modifications that would not have been required under the jeopardy standard. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., developing HCPs in an effort to avoid designation of critical habitat), triggering of additional requirements under State or local laws intended to protect sensitive habitat, and uncertainty and perceptual effects on markets.
40. Specifically, the Service states in a memorandum regarding bull trout critical habitat impacts that “in occupied habitat, it is unlikely that an analysis would identify a difference between measures needed to avoid the destruction or adverse modification of critical habitat from measures needed to avoid jeopardizing the species” (see Appendix

E).<sup>21</sup> Because the Service states that critical habitat is unlikely to result in additional conservation efforts for bull trout over and above the baseline in occupied areas, conservation efforts for bull trout in occupied areas are assigned to the baseline. The Service memorandum also states that “bull trout benefit from existing regulations that impose conservation requirements for other species.” The analysis assumes that actions taken to protect salmon and other listed anadromous fish species would have occurred absent this rule, and hence are baseline. In areas that are considered to be unoccupied by bull trout, salmon, and steelhead species, this analysis generally assumes that similar conservation efforts will be undertaken as would be expected in areas occupied by bull trout. Unlike in occupied areas, anticipated conservation efforts for bull trout in unoccupied areas are assumed to be related to the promulgation of the current critical habitat rule, and are therefore considered incremental. While other conservation actions are also occurring under the baseline even where bull trout is not currently found, these efforts are not removed from incremental cost estimates.

41. Approximately 87 percent of the current proposed rule overlaps with area previously proposed as bull trout critical habitat. Potential conservation efforts related to bull trout critical habitat were extensively described and analyzed in economic analyses of the previously proposed critical habitat designations. The 2004 final economic analysis of the Columbia and Klamath DPSs was reviewed by three independent technical advisors: Dr. Joel Hamilton, Emeritus Professor of Agricultural Economics and Statistics, University of Idaho; Dr. Lon Peters, president of Northwest Economic Research, Inc., a Portland-based firm that provides economic consulting services to electric utilities; and Dr. Roger Sedjo, senior fellow and the director of Resources for the Future’s forest economics and policy program. Similarly, the 2005 economic analysis of the Coastal Puget Sound, Jarbidge and Saint Mary Belly DPSs was peer reviewed by Dr. Peters and Dr. Hamilton, as well as by Dr. Bruce Lippke, Professor Emeritus School of Forest Resources, University of Washington. Feedback from these reviewers was incorporated into the 2004 and 2005 final economic analyses as appropriate.
42. The current analysis makes use of this previous work. However, there are several important reasons why the results of the previous economic analyses are not directly transferable to the current analysis. In particular, in addition to updating information of economic activities occurring in critical habitat areas, we had to account for three major differences between the current and previous reports to utilize previous estimates. First, the geographic distribution of the proposed designation and unit definitions are different. Second, the framework underlying the economic analysis has changed. Previous reports included co-extensive costs, whereas the current analysis distinguishes between baseline and incremental costs. Third, the timeframe covered by the current analysis has been expanded to 20 years. Thus, after first assessing whether the conservation costs forecast in the earlier 2004 and 2005 economic analyses were applicable, relevant estimates were

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<sup>21</sup> U.S. Fish and Wildlife Service, “Incremental Effects Memo for Proposed Bull Trout Critical Habitat” emailed to IEc on September 24, 2009.

inflated to current dollars and adjusted to correspond to revised critical habitat unit boundaries. The occupancy status of the proposed areas was then used to separate baseline from incremental impacts where appropriate. These assumptions are detailed in Section 3.3.1 and Appendix G of this analysis.

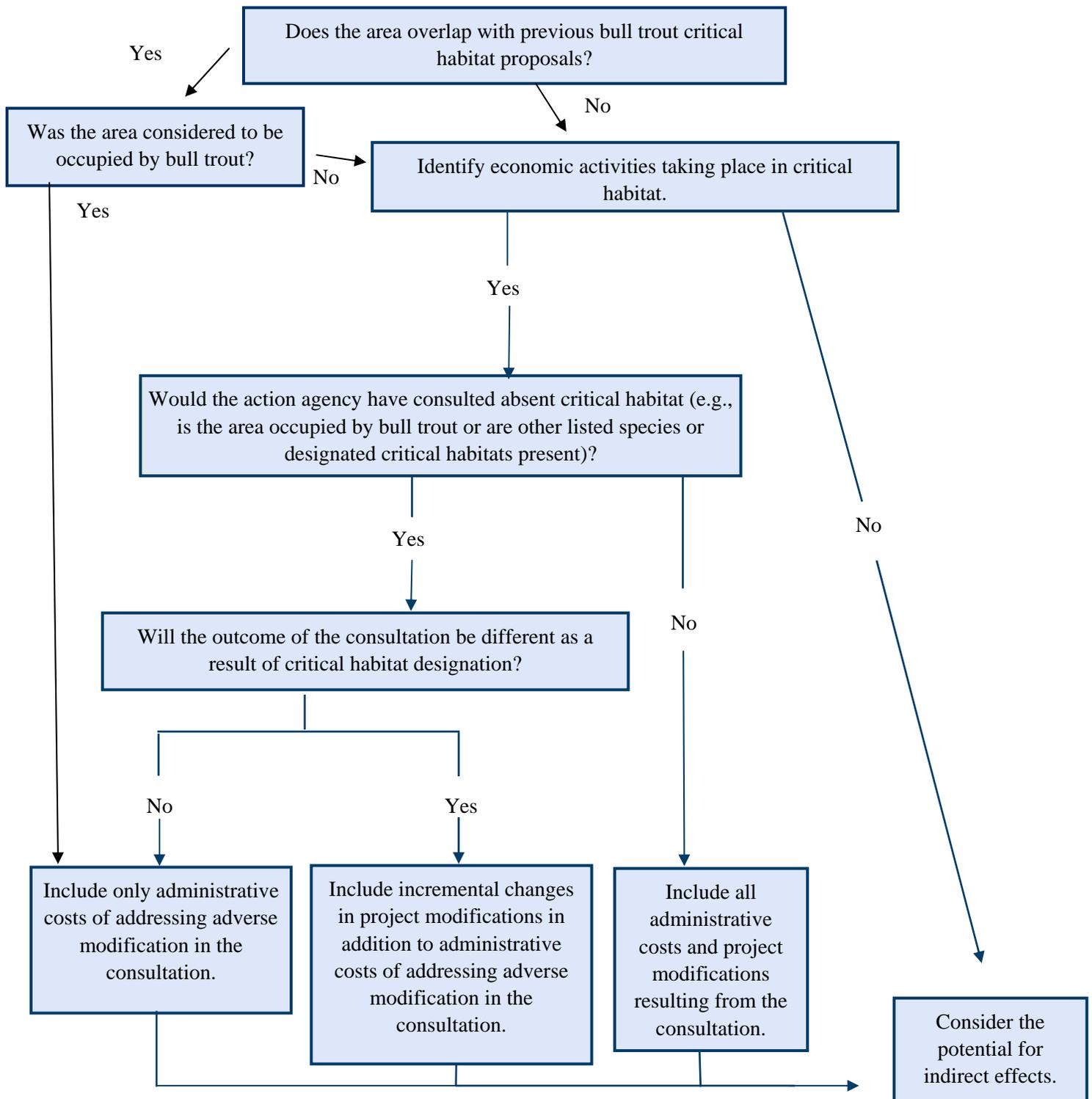
43. The incremental impacts of this rule are considered to be of primary importance for decision-making purposes.<sup>22</sup> Where more recent relevant information was available for conservation efforts or activity locations, this was incorporated, as appropriate, into the incremental cost estimates. These assumptions are described in Exhibit 2-1.

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<sup>22</sup> Discussion of actions taken to protect species and habitat under the baseline scenario is intended to address the concerns of the U.S. 10<sup>th</sup> Circuit Court of Appeals, which instructed the Service to conduct a full analysis of all the economic impacts of critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes (*New Mexico Cattle Growers Ass'n v. U.S. Fish and Wildlife Service*, 248 F.3d 1277 (10<sup>th</sup> Cir. 2001)).

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EXHIBIT 2-1. IDENTIFYING INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION



#### Direct Impacts

44. The direct, incremental impacts of critical habitat designation stem from the consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. The two categories of direct, incremental impacts of critical habitat designation are: 1) the administrative costs of conducting section 7 consultation; and 2) implementation of any project modifications requested by the Service through section 7 consultation to avoid or minimize potential destruction or adverse modification of critical habitat.

#### Administrative Section 7 Consultation Costs

45. Parties involved in section 7 consultations include the Service, a Federal "action agency," and in some cases, a private entity involved in the project or land use activity. The action agency (i.e., the Federal nexus necessitating the consultation) serves as the liaison with the Service. While consultations are required for activities that involve a Federal nexus and may jeopardize the continued existence of the species regardless of whether critical habitat is designated, the designation may increase the effort for consultations in the case that the project or activity in question may adversely modify critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.
46. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:
1. **Additional effort to address adverse modification in a new consultation** - New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.
  2. **Re-initiation of consultation to address adverse modification -** Consultations that have already been completed on a project or activity may require re-initiation to address critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs are considered incremental impacts of the designation.
  3. **Incremental consultation resulting entirely from critical habitat designation** - Critical habitat designation may trigger additional consultations that may not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not, or consultations resulting from the new information about the potential presence of the species provided by the designation). Such consultations may, for example, be triggered in critical habitat areas that are not occupied

by the species. All associated administrative and project modification costs of incremental consultations are considered incremental impacts of the designation.

47. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation, as it may not be possible to predict the precise outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with Service field offices resulted in a range of estimated administrative costs of consultation. For simplicity, the average of the range of costs in each category is applied in this analysis.
48. Exhibit 2-2 provides estimated administrative consultation costs representing effort required for all types of consultation, including those that considered both adverse modification and jeopardy. To estimate the fractions of the total administrative consultation costs that are baseline and incremental, the following assumptions were applied.
  - The greatest effort will be associated with consultations that consider both jeopardy and adverse modification. Depending on whether the consultation is precipitated by the listing or the critical habitat designation, part or all of the costs, respectively, will be attributed to the proposed rule.
  - Efficiencies exist when considering both jeopardy and adverse modification at the same time (e.g., in staff time saved for project review and report writing), and therefore incremental administrative costs of considering adverse modification in consultations precipitated by the listing result in the least incremental effort, roughly one-quarter of the cost of the entire consultation. The remaining three-quarters of the costs are attributed to consideration of the jeopardy standard in the baseline scenario. This latter amount also represents the cost of a consultation that only considers adverse modification (e.g., an incremental consultation for activities in unoccupied critical habitat) and is attributed wholly to critical habitat.
  - Incremental costs of the re-initiation of a previously completed consultation because of the critical habitat designation are assumed to be approximately half the cost of a consultation considering both jeopardy and adverse modification. This assumes that re-initiations are less time-consuming as the groundwork for the project has already been considered in terms of its effect on the species. However, because the previously completed effort must be re-opened, they are more costly than simply adding consideration of critical habitat to a consultation already underway.

## EXHIBIT 2-2. RANGE OF ADMINISTRATIVE CONSULTATION COSTS (2009 DOLLARS)

BASELINE ADMINISTRATIVE COSTS OF CONSULTATION (\$2009)					
CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
CONSULTATION CONSIDERING JEOPARDY (DOES NOT INCLUDE CONSIDERATION OF ADVERSE MODIFICATION)					
Technical Assistance	\$420	n/a	\$788	n/a	\$1,130
Informal	\$1,840	\$2,330	\$1,540	\$1,500	\$7,130
Formal	\$4,090	\$4,610	\$2,630	\$3,600	\$15,000
Programmatic	\$12,300	\$10,200	n/a	\$4,200	\$26,700
INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION (\$2009)					
CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
NEW CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION (TOTAL COST OF A CONSULTATION CONSIDERING BOTH JEOPARDY AND ADVERSE MODIFICATION)					
Technical Assistance	\$560	n/a	\$1,050	n/a	\$1,500
Informal	\$2,450	\$3,100	\$2,050	\$2,000	\$9,500
Formal	\$5,450	\$6,150	\$3,500	\$4,800	\$20,000
Programmatic	\$16,400	\$13,700	n/a	\$5,600	\$35,700
NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION					
Technical Assistance	\$420	n/a	\$788	n/a	\$1,130
Informal	\$1,840	\$2,330	\$1,540	\$1,500	\$7,130
Formal	\$4,090	\$4,610	\$2,630	\$3,600	\$15,000
Programmatic	\$12,300	\$10,200	n/a	\$4,200	\$26,700
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Technical Assistance	\$280	n/a	\$525	n/a	\$750
Informal	\$1,230	\$1,550	\$1,030	\$1,000	\$4,750
Formal	\$2,730	\$3,080	\$1,750	\$2,400	\$10,000
Programmatic	\$8,200	\$6,830	n/a	\$2,800	\$17,800
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION   (ADDITIVE WITH BASELINE COSTS ABOVE OF CONSIDERING JEOPARDY)					
Technical Assistance	\$140	n/a	\$263	n/a	\$375
Informal	\$613	\$775	\$513	\$500	\$2,380
Formal	\$1,360	\$1,540	\$875	\$1,200	\$5,000
Programmatic	\$4,100	\$3,410	n/a	\$1,400	\$8,910
Source: IEc analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2009, and a review of consultation records from several Service field offices across the country conducted in 2002.					
Notes:					
1. Totals may not sum due to rounding.					
2. Estimates reflect average hourly time required by staff.					

### Section 7 Project Modification Impacts

49. Section 7 consultation considering critical habitat may also result in additional project modification recommendations specifically addressing potential destruction or adverse modification of critical habitat. For forecast consultations considering jeopardy and adverse modification, and for re-initiations of past consultations to consider critical habitat, the economic impacts of project modifications undertaken to avoid or minimize adverse modification are considered incremental impacts of critical habitat designation. For consultations that are forecast to occur specifically because of the designation (incremental consultations), impacts of all associated project modifications are assumed to be incremental impacts of the designation. This is summarized below.
1. **Additional effort to address adverse modification in a new consultation** - Only project modifications above and beyond what would be requested to avoid or minimize jeopardy are considered incremental.
  2. **Re-initiation of consultation to address adverse modification** - Only project modifications above and beyond what was requested to avoid or minimize jeopardy are considered incremental.
  3. **Incremental consultation resulting entirely from critical habitat designation** - Impacts of all project modifications are considered incremental.

### Indirect Impacts

50. The designation of critical habitat may, under certain circumstances, affect actions that do not have a Federal nexus and thus are not subject to the provisions of section 7 under the Act. Indirect impacts are those unintended changes in economic behavior that may occur outside of the Act, through other Federal, State, or local actions, and that are caused by the designation of critical habitat. This section identifies common types of indirect impacts that may be associated with the designation of critical habitat. Importantly, these types of impacts are not always considered incremental. In the case that these types of conservation efforts and economic effects are expected to occur regardless of critical habitat designation, they are appropriately considered baseline impacts in this analysis.

### Habitat Conservation Plans

51. Under section 10 of the Act, landowners seeking an incidental take permit must develop an HCP to counterbalance the potential harmful effects that an otherwise lawful activity may have on a species. As such, the purpose of the habitat conservation planning process is to ensure that the effects of incidental take are adequately avoided or minimized. Thus, HCPs are developed to ensure compliance with section 9 of the Act and to meet the requirements of section 10 of the Act.
52. Application for an incidental take permit and completion of an HCP are not required or necessarily recommended by a critical habitat designation. However, in certain situations the new information provided by the proposed critical habitat rule may prompt a

landowner to apply for an incidental take permit. For example, a landowner may have been previously unaware of the potential presence of the species on his or her property, and expeditious completion of an HCP may offer the landowner regulatory relief in the form of exclusion from the final critical habitat designation. In this case, the effort involved in creating the HCP and undertaking associated conservation actions are considered an incremental effect of designation. No specific plans to prepare new HCPs in response to this proposed designation were identified.

#### Other State and Local Laws

53. Under certain circumstances, critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws. This is most likely to occur in areas where the critical habitat designation provides clearer information on the importance of particular areas as habitat for a listed species. For example, when critical habitat areas are designated in a region, state or local regulations may require developers to take additional on-site action to reduce sedimentation, protect forest cover, and manage stormwater; and/or development may be allowed in the designated areas, but appropriate mitigation activities must be taken. The mitigation activities can be on-site or off-site. In cases where these impacts would not have been triggered absent critical habitat designation, they are considered indirect, incremental impacts of the designation.

#### Additional Indirect Impacts

54. In addition to the indirect effects of compliance with other laws or triggered by the designation, project proponents, land managers and landowners may face additional indirect impacts, including the following:
- **Time Delays** - Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
  - **Regulatory Uncertainty** - The Service conducts each section 7 consultation on a case-by-case basis and issues a biological opinion on formal consultations based on species-specific and site-specific information. As a result, government agencies and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these modifications will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation. In this specific analysis, information is not available to quantify this effect.

- **Stigma** - In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not within the boundaries of critical habitat due to perceived limitations or restrictions. As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease. This analysis considers the implications of public perceptions related to critical habitat on private property values within the proposed designation. In this case, given the history of regulation and baseline protections already in place, stigma impacts resulting from this critical habitat designation are not considered reasonably foreseeable.

### 2.3.3 BENEFITS

55. Under E.O. 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.<sup>23</sup> OMB's Circular A-4 distinguishes two types of economic benefits: *direct benefits and ancillary benefits*. Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.<sup>24</sup>
56. In the context of critical habitat, the primary purpose of the rulemaking (i.e., the direct benefit) is the potential to enhance conservation of the species. The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance for implementing E.O. 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.<sup>25</sup> *Rather than rely on economic measures, the Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*
57. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements (PCEs) on which the species depends. To this end, critical habitat designation can result in maintenance of particular environmental conditions that may generate other social benefits aside from the preservation of the species. That is, management actions

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<sup>23</sup> E.O. 12866, Regulatory Planning and Review, September 30, 1993.

<sup>24</sup> U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

<sup>25</sup> Ibid.

undertaken to conserve a species or habitat may have coincident, positive social welfare implications, such as increased recreational opportunities in a region. While they are not the primary purpose of critical habitat, these ancillary benefits may result in gains in employment, output, or income that may offset the direct, negative impacts to a region's economy resulting from actions to conserve a species or its habitat.

58. It is often difficult to evaluate the ancillary benefits of critical habitat designation. To the extent that the ancillary benefits of the rulemaking may be captured by the market through an identifiable shift in resource allocation, they are factored into the overall economic impact assessment in this report. For example, if habitat preserves are created to protect a species, the value of existing residential property adjacent to those preserves may increase, resulting in a measurable positive impact. Where data are available, this analysis attempts to capture the *net* economic impact (i.e., the increased regulatory burden less any discernable offsetting market gains), of species conservation efforts imposed on regulated entities and the regional economy.

#### 2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

59. The geographic scope of the analysis includes all land proposed as critical habitat. Note the economic impacts may be sited outside of the boundaries of the study area (e.g., pesticide use buffers); these impacts are considered relevant to this analysis. The study area does not include lands previously designated as critical habitat that are not included in this proposed revision. Results are presented by proposed critical habitat unit.

#### 2.3.5 ANALYTIC TIME FRAME

60. The analysis estimates impacts based on activities that are "reasonably foreseeable," including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. The analysis estimates economic impacts to activities from 2010 to 2029, 20 years from the expected year of final critical habitat designation.

#### 2.4 INFORMATION SOURCES

61. The primary sources of information for this report are two detailed economic analyses of those past proposals were conducted in 2004 and 2005.<sup>26</sup> In addition, the analysis utilizes communications with, and data provided by, personnel from the Service, Federal, State, and local governments and other stakeholders. This analysis also relies upon the Service's section 7 consultation records and draft management plans prepared by various government agencies.

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<sup>26</sup> Bioeconomics, Inc. 2004. Final Economic Analysis of Critical Habitat Designation for the Bull Trout (Columbia/Klamath Populations), hereafter "the 2004 economic analysis of the Columbia and Klamath DPSS." Northwest Economic Associates (NEA). 2005. Economic Analysis of Critical Habitat for Three Populations of Bull Trout - Coastal Puget Sound, Jarbidge River, Saint Mary-Belly River, hereafter "the 2005 economic analysis of the Coastal Puget Sound, Jarbidge, and Saint Mary-Belly DPSS."

**CHAPTER 3 | BASELINE CONSERVATION EFFORTS**

62. This chapter reports the estimated costs of conservation efforts benefiting the bull trout that are expected to occur under baseline conditions – that is, costs that are expected to be incurred regardless of critical habitat designation. “Baseline” for this analysis represents the existing protections to the bull trout and its habitat under the Act, as well as those protections afforded under other Federal, State and local laws and guidelines. In addition, numerous conservation efforts are underway on behalf of salmon and steelhead species in the proposed critical habitat area that also benefit the bull trout and its habitat. Costs of conservation efforts undertaken for these other species, but which benefit the bull trout, are considered in this analysis to be baseline costs. Projected costs associated with the current rulemaking over and above the baseline are addressed in Section 4.
63. This chapter is organized as follows. First, costs associated with bull trout conservation resulting from baseline regulatory efforts are summarized. Next, it provides a discussion of the baseline regulatory environment. Lastly, the methodology and assumptions underlying the analysis are detailed.
64. As noted elsewhere in this report, two earlier analyses of the economic impact of critical habitat designation were developed by the Service as part of two previous critical habitat proposals.<sup>27</sup> These reports received extensive public comment. This analysis draws heavily on these two reports in estimating the future baseline costs associated with the current proposed designation. These previous estimates have been updated and revised to fit the current proposed rulemaking, as described below.

**3.1 SUMMARY**

65. Exhibit 3-1 summarizes the quantified baseline conservation costs by unit. The proposed unit with the highest projected baseline conservation costs is Puget Sound (Unit 2), followed by the Olympic Peninsula (Unit 1). These two units comprise approximately 82 to 90 percent of the projected baseline costs of this proposed designation, depending on the scenario. For these units, costs associated with forest management and development activities are the highest categories of costs. Both units contain substantial amounts of timberlands, including lands covered by habitat conservation plans (HCPs). Costs associated with timber activities include the costs of implementing conservation measures

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<sup>27</sup> The 2005 Economic Analysis of Critical Habitat for Coastal Puget Sound, Jarbidge River, Saint Mary-Belly DPSs, and the 2004 Economic Analysis of the Columbia and Klamath River DPSs. Both of these analyses were conducted for the Service.

specified in these HCPs. The Puget Sound unit also encompasses the urbanized coastal area along the Puget Sound, and has high costs associated with development.

EXHIBIT 3-1. SUMMARY OF POTENTIAL BASELINE COSTS, BY UNIT (ANNUALIZED)

UNIT #	CRITICAL HABITAT UNIT	ANNUALIZED COSTS	
		LOW END	HIGH END
1	Olympic Peninsula	\$17,900,000	\$17,900,000
2	Puget Sound	\$64,600,000	\$64,600,000
3	Lower Columbia River Basins	\$70,900	\$173,000
4	Upper Willamette River	\$5,300,000	\$5,430,000
5	Hood River	\$28,300	\$91,200
6	Lower Deschutes River	\$149,000	\$298,000
7	Odell Lake	\$2,130	\$9,140
8	Mainstem Lower Columbia River	\$120,000	\$286,000
9	Klamath River Basin	\$31,600	\$118,000
10	Upper Columbia River Basins	\$73,100	\$437,000
11	Yakima River	\$323,000	\$457,000
12	John Day River	\$149,000	\$336,000
13	Umatilla River	\$15,600	\$72,000
14	Walla Walla River Basin	\$19,400	\$89,500
15	Lower Snake River Basins	\$24,000	\$90,200
16	Grande Ronde River	\$50,200	\$201,000
17	Imnaha River	\$15,000	\$73,300
18	Sheep and Granite Creeks	\$1,070	\$5,210
19	Hells Canyon Complex	\$115,000	\$229,000
20	Powder River Basin	\$170,000	\$337,000
21	Clearwater River	\$402,000	\$1,290,000
22	Mainstem Upper Columbia River	\$90,500	\$216,000
23	Mainstem Snake River	\$8,610	\$9,240
24	Malheur River Basin	\$147,000	\$247,000
25	Jarbidge River	\$162,000	\$162,000
26	Southwest Idaho River Basins	\$549,000	\$1,510,000
27	Salmon River Basin	\$753,000	\$2,540,000
28	Little Lost River	\$14,400	\$50,500
29	Coeur d'Alene River Basin	\$83,400	\$298,000

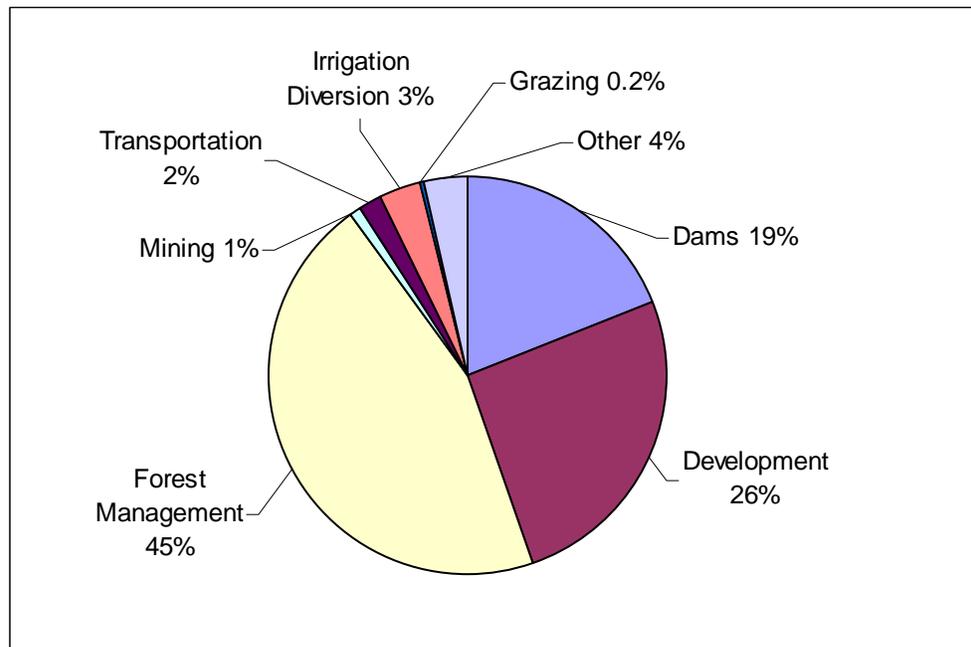
UNIT #	CRITICAL HABITAT UNIT	ANNUALIZED COSTS	
		LOW END	HIGH END
30	Kootenai River Basin	\$41,100	\$152,000
31	Clark Fork River Basin	\$704,000	\$2,200,000
32	Saint Mary River Basin	\$520,000	\$520,000
	Total	\$92,700,000	\$100,000,000

66. The range of estimated costs is primarily due to the uncertainty underlying the analysis of activities on U.S. Forest Service (USFS) lands and project modifications related to the Federal Columbia River Power System in the Columbia River and Klamath River Distinct Population Segments (DPSs). For example, the low end scenario assumes that USFS would not recommend any changes to irrigation withdrawals, while the high end scenario assumes there could be conservation costs associated with ten irrigation diversion projects over the 20-year timeframe of the analysis. The forecast high end activity is based on the consultation history.<sup>28</sup>
67. Exhibit 3-2 provides information on the breakdown of baseline conservation costs by activity. As discussed above, the majority of projected baseline costs are expected to be associated with project modifications to forest management projects, primarily timber-harvest related projects, in the Puget Sound and Olympic Peninsula units. Numerous existing regulations require conservation measures associated with timber management, including the Northwest Forest Plan, State forest management acts, as well as the INFISH and PACFISH management guidelines. This baseline analysis captures the costs of conservation measures implemented to protect bull trout and other species under these existing regulations.

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<sup>28</sup> For additional detail on the forecast of agricultural irrigation diversions project modification costs, please refer to the 2004 Economic Analysis of the Columbia and Klamath River DPSs Section 4.2.7 (specifically pages 4-72 to 4-75).

EXHIBIT 3-2. BREAKDOWN OF POTENTIAL BASELINE CONSERVATION EFFORT COSTS - BY ACTIVITY (HIGH END, ANNUALIZED AT 7%)



### 3.2 BASELINE REGULATORY ENVIRONMENT

68. Existing regulations and the presence of other listed species provide protection for the bull trout and its habitat under baseline conditions. These baseline regulations and the overlap with other listed species are detailed in the two previous economic analyses of bull trout critical habitat, and are briefly summarized in this section. Exhibit 3-3 provides an overview of listed species whose habitat overlaps with bull trout. While the habitat area affected by this proposed bull trout rule supports numerous listed species, salmon and steelhead are most closely related to the bull trout in terms of identified threats and habitat management requirements. Because of the importance of salmon and steelhead in regional habitat conservation, numerous protections have already been undertaken on behalf of these species. For example, a 2005 critical habitat analysis for salmon and steelhead examined nearly 1,100 consultation actions over three years, or approximately 370 actions annually. Each of these consultations generated one or more conservation measures.<sup>29</sup>

<sup>29</sup> National Marine Fisheries Service, Final Economic Analysis of Critical Habitat Designation for Seven West Coast Salmon and Steelhead ESUs, Long Beach, CA, August 2005.

## EXHIBIT 3-3. BASELINE REGULATORY ENVIRONMENT - OVERLAPPING SPECIES

EXAMPLES OF LISTED SPECIES WITH HABITAT OVERLAPING PROPOSED BULL TROUT CRITICAL HABITAT	
<b>Aquatic Species:</b> Puget Sound Chinook Salmon Hood Canal Summer-run Coho Salmon Puget Sound/Strait of Georgia Coho Salmon Oregon chub Lost River sucker Shortnose sucker Kootenai River white sturgeon Lahontan cutthroat trout	
Coastal cutthroat trout Warner sucker Snake River snails Bruneau hot springsnail Bliss Rapids snail Utah valvata Snake River physa Banbury Springs lanx	
<b>Terrestrial Species:</b> Canada lynx Grizzly bear Woodland caribou	<b>Plant Species:</b> Ute ladies'-tresses Wenatchee Mountains checkermallow Bradshaw's lomatium Kincaid's lupine Water howellia MacFarlane's four o'clock
<b>Bird Species:</b> Northern Spotted Owl Whooping crane	

69. Exhibit 3-4 provides a list of regulations that provide regulatory protection to bull trout or its habitat. For more detail on the baseline regulatory environment, please refer to the earlier economic analyses.<sup>30</sup>

<sup>30</sup> In particular, refer to the 2005 Economic Analysis of Critical Habitat for Coastal Puget Sound, Jarbidge River, Saint Mary-Belly DPSs Section 3.2 (beginning on page 57) and the 2004 Economic Analysis of the Columbia and Klamath River DPSs Section 2.2 (beginning on page 2-21).

## EXHIBIT 3-4. BASELINE REGULATORY ENVIRONMENT - KEY REGULATIONS &amp; STATUTES

KEY BASELINE REGULATORY ELEMENTS PROVIDING PROTECTION FOR THE BULL TROUT AND ITS HABITAT
<p><b>Federal Regulations:</b></p> <ul style="list-style-type: none"> <li>Endangered Species Act</li> <li>Federal Power Act</li> <li>Clean Water Act</li> <li>Fish and Wildlife Coordination Act</li> <li>Federal Land Policy and Management Act</li> <li>National Forest Management Act</li> <li>Wilderness Act</li> <li>National Wild and Scenic Rivers Act</li> <li>Fish Restoration and Irrigation Mitigation Act</li> </ul>
<p><b>State/Local Statutes and Regulations:</b></p> <ul style="list-style-type: none"> <li>Northwest Forest Plan</li> <li>Pacific Northwest Electric Power Planning and Conservation Act</li> <li>Idaho, Washington and Oregon Forest Practices Acts</li> <li>Idaho Water Quality Standards</li> <li>Montana Streamside Management Zone Law</li> <li>Montana Stream Protection Act</li> <li>Washington Growth Management Act</li> <li>Washington Department of Fish and Wildlife Hydraulic Project Approval Program</li> <li>Stormwater Management Programs</li> <li>Washington Shoreline Management Act</li> <li>Washington Salmon Recovery Act</li> </ul>
<p><b>Other Regulations/Guidance:</b></p> <ul style="list-style-type: none"> <li>PACFISH/INFISH Biological Opinion and fisheries management</li> <li>Northwest Forest Plan</li> <li>Habitat Conservation Plans</li> <li>Tribal area restoration plans</li> <li>Federal Columbia River Power System (FCRPS) Biological Opinion and other already-completed programmatic biological opinions (e.g., with Army Corps of Engineers, Federal and State highway departments)</li> <li>Natural Resources Conservation Service (NRCS) watershed and soil conservation guidance</li> </ul>

**3.3 IDENTIFICATION OF BASELINE CONSERVATION COSTS**

70. To provide context for understanding the incremental costs presented in Chapter 4, this chapter presents estimates of baseline costs associated with conservation efforts that avoid or minimize threats to bull trout critical habitat. This baseline cost information is developed from the two earlier analyses of critical habitat for the bull trout. These previous estimates have been updated and revised to fit the current proposed rulemaking, as described below.
71. The proposed rule describes threats to proposed critical habitat, including:
- Dams (hydropower and others);
  - Residential and commercial development (urbanization);

- Forest management practices (e.g., timber sales, fuel reduction, salvage logging);
- Livestock grazing;
- Agriculture and agricultural diversions;
- Roads;
- Mining;
- Non-native species; and,
- Other activities (utilities, restoration, non-native species management, recreation, and other instream activities).

72. These are the same threats identified in previous bull trout critical habitat proposals. As described in Chapter 5 of this analysis, a large number of section 7 consultations involving the bull trout have occurred following its listing. On average, 11 formal consultations occurred annually between 2003 and 2009. As part of these formal consultations, the Service has recommended a wide variety of conservation measures. Exhibit 3-5 provides examples of recommendations that have resulted from past consultations. Where these actions were recommended to avoid take of the bull trout or other listed species, they would be considered baseline in nature (i.e., they would occur regardless of the designation).

EXHIBIT 3-5. THREATS AND POTENTIAL BULL TROUT CONSERVATION MEASURES

THREAT	EXAMPLES OF SPECIAL MANAGEMENT TO AVOID, MITIGATE, OR COMPENSATE FOR THREAT
Dams	Provide fish passage (fish ladder or trap and haul), water temperature control projects, habitat acquisition, operation of dam to ensure adequate instream flows.
Forest Management	Reduce sedimentation (improve routine road maintenance projects, remove or abandon problem roads, minimize stream crossings), impose timing restrictions, eliminate fish barriers (e.g., culverts), expand riparian buffers.
Road Maintenance and Transportation	Reduce sedimentation, water quality monitoring, spill prevention, ensure road surface drainage and road stream crossing do not impede fish migration, timing restrictions.
Livestock Grazing	Reduce animal unit months (AUMs), off-stream watering, riparian fencing requirements, timing restrictions.
Agriculture/ Diversions	Reduce flow for irrigation - reallocate for instream flows.
Mining	Reduce sedimentation, perform watershed assessment, monitoring and reporting, timing restrictions.
Development	Implement stormwater management control requirements.
Non-native species	Avoid future introductions, eradicate or control currently introduced species, manage habitat to favor bull trout over other species.

73. For more detail on these baseline conservation efforts, please refer to these earlier economic analyses.<sup>31</sup>

### 3.3.1 UPDATING PRIOR ESTIMATES

74. As discussed in Chapter 2, because baseline costs are not solely attributable to the proposed designation, they are considered in the FEA primarily for purposes of providing context, while the incremental impacts are considered to be of primary importance for decision-making purposes. As also discussed in Chapter 2, approximately 87 percent of the current proposed rule overlaps with area previously proposed as bull trout critical habitat. Potential conservation efforts related to bull trout critical habitat were extensively described and analyzed in economic analyses of the previously proposed critical habitat designations. To described estimated costs of baseline conservation measures expected to occur absent critical habitat for bull trout, this analysis relies on earlier analyses, updated to reflect differences in the proposed designations. The cost of baseline conservation efforts are calculated as follows:

- **Step 1:** Information regarding baseline costs was collected from previous economic analyses.<sup>32</sup> Specifically, costs associated with conservation efforts for bull trout in occupied areas are assigned to the baseline because the Service has indicated that “in occupied habitat, it is unlikely that an analysis would identify a difference between measures needed to avoid the destruction or adverse modification of critical habitat from measures needed to avoid jeopardizing the species because the section 7(a) analysis is focused not only on bull trout populations but also on the habitat that supports them” (see Appendix D).<sup>33</sup>
- **Step 2:** Baseline costs are inflated to 2009 dollars using the Gross Domestic Product deflator.<sup>34</sup>
- **Step 3:** Where the current proposed designation does not overlap exactly with the previous designations, costs are allocated from the old proposed critical habitat units to the newly proposed critical habitat units based on river miles. Since some of the units in the current proposal are smaller (in terms of proposed river

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<sup>31</sup> The 2004 Economic Analysis of the Columbia and Klamath DPSs summarizes project modifications by activity (Section 3.3, beginning on page 3-16) as well as the costs of conservation measures (Section 3.3 beginning on page 3-16); and details the forecasted costs by action agency and activity (Section 4.2, beginning on page 4-6). Appendix D of that report provides a detailed listing of bull trout conservation measures by activity. The 2005 Economic Analysis of the Coastal Puget Sound, Jarbidge River, Saint Mary-Belly DPSs details conservation efforts and associated costs by activity (Sections 3.3 through 3.15, beginning on page 77).

<sup>32</sup> The 2004 Economic Analysis of the Columbia and Klamath DPSs covered a 10-year period, while the 2005 Economic Analysis of Critical Habitat for Coastal Puget Sound, Jarbidge River, Saint Mary-Belly DPSs covered a 20-year timeframe. In order to combine the information presented in these reports, this analysis utilizes annualized costs from each report.

<sup>33</sup> U.S. Fish and Wildlife Service, “Incremental Effects Memo for Proposed Bull Trout Critical Habitat” emailed to IEc on September 24, 2009.

<sup>34</sup> Inflation factors based on the GDP deflator. Accessed on November 1, 2009 at <http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=13&Freq=Qtr&FirstYear=2007&LastYear=2009>

miles), baseline costs from the previous analyses are reduced to reflect these changes in the proposed designation. Additional information on the allocation of costs from the previous analyses to the current critical habitat units is included in Appendix G.

Because it relies on previous analyses of critical habitat designation to arrive at baseline cost estimates, this analysis does not quantify the baseline costs associated with newly proposed occupied habitat (approximately 11 percent of proposed river miles). While this may result in under-reporting of baseline costs, some of these costs were likely captured in the previous analyses due to the proximity of new areas to previously analyzed areas.

- Approximately 462 occupied stream miles included in the previous critical habitat proposal are not included in the current proposal based on better occupancy data and refined information on the importance of certain habitats. Overall, approximately three percent more critical habitat is being proposed in streams (measured on a linear basis) than were proposed in the combined 2002 and 2004 proposed rules. These stream miles represent about two percent of the previous proposed designation. Costs associated with these river miles are excluded from estimates.
- Newly proposed occupied habitat plus unoccupied habitat that overlaps with salmon and steelhead critical habitat make up approximately 12 percent of the proposed critical habitat area, as illustrated in Exhibit 3-6. Baseline costs associated with these areas are not included in current estimates.<sup>35</sup>

75. In certain cases, previous analyses excluded certain costs associated with actions benefiting bull trout, where these actions were primarily to protect other species. This may lead the baseline costs presented here to be slightly understated. For example, costs associated with dam re-licensing were allocated between salmon and bull trout in some cases.<sup>36</sup>
76. It is also important to note that there is potential for certain baseline conservation costs to result in regional economic impacts. However, regional economic impacts were not calculated in previous analyses with the exception of economic effects on agriculture from a reduced water supply in the St. Mary-Belly River unit, and timber industry impacts in the Puget Sound and Olympic Peninsula.

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<sup>35</sup> Some public comments identified additional costs that were not included in the previous 2004 and 2005 analyses. For example, Avista Corporation stated that it has committed to provide more than \$170 million in bull trout conservation and enhancement measures over 45 year under the Clark Fork Settlement Agreement. Moreover, Avista has agreed with the Service to design and construct fish passage at both Clark Fork dams. In addition, the Idaho Department of Lands has incurred "significant expenses providing protection to bull trout." Because these costs were incurred under the baseline, they are not quantified here in keeping with the methodology used to develop the rest of the baseline costs. Public comments of Avista Corporation, March 29, 2010. Public comments of Idaho Department of Public Lands, March 12, 2010.

<sup>36</sup> See the 2004 Economic Analysis of the Columbia and Klamath River DPSs page 2-24 for details.

**EXHIBIT 3-6. NEWLY PROPOSED CRITICAL HABITAT ASSOCIATED WITH BASELINE CONSERVATION EFFORTS**

UNIT	NAME	TOTAL PROPOSED CRITICAL HABITAT (RIVER MILES)	NEWLY PROPOSED - OCCUPIED (% OF TOTAL)	NEWLY PROPOSED - UNOCCUPIED BUT OVERLAPPING WITH SALMON/STEELHEAD (% OF TOTAL)
1	Olympic Peninsula	1,222.0	4.9%	
2	Puget Sound	2,236.6	8.4%	
3	Lower Columbia River Basins	224.3	6.6%	
4	Upper Willamette River	189.5	2.8%	
5	Hood River	70.3	3.3%	0.8%
6	Lower Deschutes River	287.8	13.1%	
7	Odell Lake	17.1	19.2%	
8	Mainstem Lower Columbia River	308.8	5.2%	
9	Klamath River Basin	273.4		
10	Upper Columbia River Basins	699.6	17.3%	
11	Yakima River	740.3	30.1%	
12	John Day River	731.0	25.4%	2.8%
13	Umatilla River	131.6		
14	Walla Walla River Basin	281.3	17.8%	17.4%
15	Lower Snake River Basins	176.6	9.1%	
16	Grande Ronde River	657.2	3.2%	0.4%
17	Imnaha River	177.5	1.4%	
18	Sheep and Granite Creeks	29.7	57.2%	
19	Hells Canyon Complex	248.1	2.4%	
20	Powder River Basin	251.2		
21	Clearwater River	1,679.0	3.9%	
22	Mainstem Upper Columbia River	228.6		
23	Mainstem Snake River	343.1	0.2%	
24	Malheur River Basin	155.8		
25	Jarbidge River	165.9	34.2%	
26	Southwest Idaho River Basins	1,688.1	8.5%	
27	Salmon River Basin	5,045.1	15.7%	
28	Little Lost River	128.4	12.0%	
29	Coeur d'Alene River Basin	509.3	7.2%	
30	Kootenai River Basin	364.7	10.2%	
31	Clark Fork River Basin	3,313.2	13.6%	
32	Saint Mary River Basin	72.6	9.0%	
<b>Total</b>		<b>22,647.5</b>	<b>11.4%</b>	<b>0.3%</b>

This analysis is based on GIS Data provided by the Service on October 1, 2009 as amended via written communication on November 3, 2009, for which total proposed river miles were 22,647. The published proposed rule included 22,676 river miles. The final rule considers an additional 270 river miles, of which approximately 75 are unoccupied by bull trout or salmon species and occur in the Clark Fork Basin and Malheur River CHUs. These additional unoccupied river miles represent an increase of approximately 0.3 percent of the total study area for this analysis, and thus are not expected to significantly change the results presented.

## CHAPTER 4 | INCREMENTAL CONSERVATION EFFORTS

77. This section describes projected incremental conservation efforts and associated costs expected to occur solely due to the designation of critical habitat for the bull trout. As discussed earlier, the focus of the incremental analysis is to determine the cost impacts on activities from the designation of critical habitat that are above and beyond baseline costs (i.e., due to existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines).

**4.1 SUMMARY**

78. To estimate incremental costs of conservation efforts, the analysis focuses on activities occurring in areas considered by the Service to be unoccupied by bull trout. In particular, the analysis focuses on unoccupied critical habitat areas that do not overlap with salmon habitat (“incremental habitat”). These are the areas where incremental impacts are most likely to result from designation of critical habitat because special management needs and considerations to address primary constituent elements (PCEs) developed for salmon are similar to those identified for bull trout (See Appendix E).

79. Exhibit 4-1 provides a summary of the incremental costs of conservation efforts associated with proposed bull trout critical habitat by unit. As shown, activities in the Upper Willamette River unit and the Coeur d’Alene River Basin unit are expected to experience the highest incremental costs associated with designation of critical habitat for the bull trout, with each unit comprising approximately one-quarter of total incremental costs under the high-end scenario. The costs associated with the Upper Willamette River unit will primarily be related to project modifications associated with the Willamette River Basin Flood Control Project, including fish passage (trap and haul operations and construction of a fish ladder), temperature control projects, and bull trout studies.<sup>37</sup> The action agencies propose to conduct Willamette System Review studies that would investigate alternatives for providing upstream and downstream fish passage at priority Willamette Project dams, including USACE dams in the McKenzie and Middle Fork Willamette rivers. If feasible, these facilities would provide re-connectivity for bull trout population segments located above and below USACE dams. In the Coeur d’Alene River Basin unit, conservation measures associated with forest management projects in the Idaho Panhandle National Forest comprise the bulk of the estimated incremental costs. See Appendix B for undiscounted cost estimates and estimates using a discount rate of three percent.

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<sup>37</sup> For more detail on these estimated costs, please refer to the 2004 economic analysis of the Columbia and Klamath DPSs Section 4.2.1 (beginning on page 4-7).

80. Exhibit 4-2 provides a summary of the incremental costs of conservation efforts associated with proposed bull trout critical habitat by activity. As illustrated in the exhibit, conservation efforts associated with dam activities have the highest expected incremental costs. These costs will primarily be related to project modifications associated with the Willamette River Basin Flood Control Project, including fish passage (trap and haul operations and construction of a fish ladder), temperature control projects, and bull trout studies. A portion of the total costs of conservation measures associated with this project are considered incremental based on the portion of this unit considered unoccupied by bull trout.

#### POTENTIAL IMPACTS TO IRRIGATION DIVERSIONS

The Idaho Water Users Association and Idaho Farm Bureau Federation submitted comments on the draft economic analysis questioning whether alternative water supplies would be available to replace irrigation water that could be reallocated as a result of bull trout critical habitat designation. Their comments suggested that it would be better to apply a value for lost farm income, rather than the cost of replacement water, assuming that replacement water would not be available.<sup>38</sup>

As discussed in the 2004 final economic analysis of the Columbia and Klamath River DPSs, the high end scenario forecasts potential average annual losses in irrigation withdrawals of 2,656 acre-feet per year per consultation based on three Biological Opinions completed by NOAA Fisheries where instream flows in Washington were specified primarily to protect anadromous species. The analysis applies an upper-end estimate of water lease values from the Washington State Department of Ecology of \$127 per acre-foot. Because of uncertainty about timing and location, the high end scenario assumes that the consultations would all occur in the first year of the analysis and the costs are spread over all USFS lands within the proposed critical habitat. The portion of costs that are incremental is then calculated based on the portion of those critical habitat units that are considered unoccupied.

The \$127 per acre foot value is based on actual observed sales of water rights. While these values are based in part on purchases, they are reflective of the opportunity cost of foregone water use (e.g., the value of crop losses) and are consistent with other approaches to valuing water, such as a production function or farm budget approach. Accordingly, use of this value is consistent with the case where the irrigator loses the use of the usual source of water and is unable to purchase water elsewhere (the irrigation-related increment to production is lost).

Further, in areas within the proposed critical habitat, water transactions to benefit listed species have occurred. A report titled "Economics of Water Acquisition Projects" indicates that Oregon and Washington water trusts have recently brokered a number of annual water leases for the purpose of augmenting instream flows.<sup>39</sup> This report also confirms that Oregon, Idaho and Washington all allow water rights to be changed from irrigation to instream flow use.

<sup>38</sup> Public comments of the Idaho Water Users Association and the Idaho Farm Bureau Federation, April 5, 2010.

<sup>39</sup> Independent Economic Analysis Board. 2000. Economics of Water Acquisition Projects. IAEB 2001-01. Developed for the Northwest Power Planning Council. December 21, 2000.

81. The range of estimated incremental costs is due to various uncertainties underlying the expected types and costs of conservation measures. In particular, activities on U.S. Forest Service (USFS) lands and dam operations (Army Corps of Engineers (ACOE) permitted and Federal Energy Regulatory Commission (FERC) licensed dam operations) in the Columbia River and Klamath River Distinct Population Segments (DPSs) are assigned a range of estimated incremental costs.<sup>40</sup> For example, the low end scenario assumes that USFS would not recommend any changes to irrigation withdrawals, while the high end scenario assumes there could be conservation costs associated with ten irrigation diversion projects over the 20-year timeframe of the analysis based on the consultation history.<sup>41</sup> For additional detail on estimated costs for previously proposed unoccupied areas, please refer to these earlier economic analyses.<sup>42</sup> For timber activities expected to be impacted in newly proposed areas, because the costs of conservation efforts are expected to vary depending on the type of harvest (e.g., fire salvage, fuels reduction, or green timber sale), a range of potential costs per project are applied to estimate incremental costs.
82. Note that potential incremental costs allocated from the previous analyses are adjusted to reflect the removal of previously analyzed stream miles that are no longer included in the current proposal. In addition, the previous economic analysis of the Columbia and Klamath River distinct population segments (DPSs) focused on section 7 costs. Thus, if any incremental conservation efforts in addition to section 7 costs occur, costs in this analysis may be understated.

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<sup>40</sup> In addition, the range represents different scenarios for forecasting costs associated with various dam projects occurring over extended time periods. The range of low and high estimates is derived from the use of three percent and seven percent discount rates, respectively. For details, see the 2004 economic analysis of the Columbia and Klamath River DPSs, Exhibit 4-3 on page-4-9 and Exhibit 4.3 on page 4-21.

<sup>41</sup> For additional detail on the forecast of agricultural irrigation diversions project modification costs, please refer to the 2004 Economic Analysis of the Columbia and Klamath River DPSs Section 4.2.7 (specifically pages 4-72 to 4-75).

<sup>42</sup> The 2004 economic analysis of the Columbia and Klamath DPSs summarizes project modifications by activity (Section 3.3, beginning on page 3-16) as well as the costs of conservation measures (Section 3.3 beginning on page 3-16); and details the forecasted costs by action agency and activity (Section 4.2, beginning on page 4-6). Appendix D of that report provides a detailed listing of bull trout conservation measures by activity. The 2005 economic analysis of the Coastal Puget Sound, Jarbidge River, Saint Mary-Belly DPSs details conservation efforts and associated costs by activity (Sections 3.3 through 3.15, beginning on page 77).

EXHIBIT 4-1. POTENTIAL INCREMENTAL CONSERVATION EFFORT COSTS, BY UNIT (2009 DOLLARS, ANNUALIZED, 7% DISCOUNT RATE)

UNIT #	CRITICAL HABITAT UNIT	PREVIOUSLY PROPOSED AREAS		NEWLY PROPOSED INCREMENTAL CRITICAL HABITAT		TOTAL INCREMENTAL CONSERVATION EFFORT COSTS	
		LOW END	HIGH END	LOW END	HIGH END	LOW END	HIGH END
1	Olympic Peninsula	\$0	\$0	\$0	\$0	\$0	\$0
2	Puget Sound	\$0	\$0	\$0	\$0	\$0	\$0
3	Lower Columbia River Basins	\$17,700	\$43,300	\$9,510	\$9,510	\$27,200	\$52,800
4	Upper Willamette River	\$1,580,000	\$1,620,000	\$0	\$0	\$1,580,000	\$1,620,000
5	Hood River	\$21,400	\$68,800	\$0	\$0	\$21,400	\$68,800
6	Lower Deschutes River	\$87,300	\$175,000	\$0	\$0	\$87,300	\$175,000
7	Odell Lake	\$0	\$0	\$0	\$0	\$0	\$0
8	Mainstem Lower Columbia River	\$0	\$0	\$0	\$0	\$0	\$0
9	Klamath River Basin	\$81,400	\$303,000	\$0	\$0	\$81,400	\$303,000
10	Upper Columbia River Basins	\$7,230	\$43,300	\$0	\$0	\$7,230	\$43,300
11	Yakima River	\$48,300	\$68,300	\$0	\$0	\$48,300	\$68,300
12	John Day River	\$34,900	\$78,900	\$0	\$0	\$34,900	\$78,900
13	Umatilla River	\$3,190	\$14,700	\$0	\$0	\$3,190	\$14,700
14	Walla Walla River Basin	\$3,970	\$18,300	\$0	\$0	\$3,970	\$18,300
15	Lower Snake River Basins	\$7,160	\$26,900	\$0	\$0	\$7,160	\$26,900
16	Grande Ronde River	\$3,780	\$15,100	\$0	\$0	\$3,780	\$15,100
17	Imnaha River	\$0	\$0	\$0	\$0	\$0	\$0
18	Sheep and Granite Creeks	\$0	\$0	\$0	\$0	\$0	\$0
19	Hells Canyon Complex	\$106,000	\$211,000	\$0	\$0	\$106,000	\$211,000
20	Powder River Basin	\$157,000	\$311,000	\$0	\$0	\$157,000	\$311,000
21	Clearwater River	\$60,000	\$193,000	\$0	\$0	\$60,000	\$193,000

UNIT #	CRITICAL HABITAT UNIT	PREVIOUSLY PROPOSED AREAS		NEWLY PROPOSED INCREMENTAL CRITICAL HABITAT		TOTAL INCREMENTAL CONSERVATION EFFORT COSTS	
		LOW END	HIGH END	LOW END	HIGH END	LOW END	HIGH END
22	Mainstem Upper Columbia River	\$0	\$0	\$0	\$0	\$0	\$0
23	Mainstem Snake River	\$2,150	\$2,310	\$0	\$0	\$2,150	\$2,310
24	Malheur River Basin	\$48,900	\$82,300	\$0	\$0	\$48,900	\$82,300
25	Jarbidge River	\$0	\$0	\$0	\$0	\$0	\$0
26	Southwest Idaho River Basins	\$173,000	\$476,000	\$0	\$0	\$173,000	\$476,000
27	Salmon River Basin	\$48,000	\$162,000	\$0	\$0	\$48,000	\$162,000
28	Little Lost River	\$1,250	\$4,390	\$0	\$0	\$1,250	\$4,390
29	Coeur d'Alene River Basin	\$71,000	\$254,000	\$228,000	\$916,000	\$299,000	\$1,170,000
30	Kootenai River Basin	\$0	\$0	\$0	\$0	\$0	\$0
31	Clark Fork River Basin	\$171,000	\$452,000	\$0	\$0	\$171,000	\$452,000
32	Saint Mary River Basin	\$0	\$0	\$0	\$0	\$0	\$0
	<b>Total</b>	<b>\$2,740,000</b>	<b>\$4,620,000</b>	<b>\$238,000</b>	<b>\$925,000</b>	<b>\$2,970,000</b>	<b>\$5,550,000</b>

Note: Totals may not sum due to rounding.

EXHIBIT 4-2. POTENTIAL INCREMENTAL CONSERVATION EFFORT COSTS, BY ACTIVITY (2009 DOLLARS, ANNUALIZED, 7% DISCOUNT RATE)

ACTIVITY	PREVIOUSLY PROPOSED AREA		NEWLY PROPOSED INCREMENTAL CRITICAL HABITAT		TOTAL INCREMENTAL CONSERVATION EFFORT COSTS	
	LOW END	HIGH END	LOW END	HIGH END	LOW END	HIGH END
Dams	\$2,120,000	\$2,520,000	\$0	\$0	\$2,120,000	\$2,520,000
Development	\$0	\$0	\$0	\$0	\$0	\$0
Forest Management	\$399,000	\$1,060,000	\$9,350	\$589,000	\$408,000	\$1,650,000
Mining	\$77,900	\$77,500	\$219,000	\$219,000	\$297,000	\$296,000
Road Maintenance & Transportation	\$67,100	\$66,800	\$0	\$0	\$67,100	\$66,800
Agriculture/Irrigation Diversion	\$0	\$817,000	\$0	\$0	\$0	\$817,000
Grazing	\$32,300	\$32,200	\$0	\$0	\$32,300	\$32,200
Other (Utility, Dredging, Culverts, Instream activities, Recreation and Restoration)	\$42,900	\$50,800	\$9,510	\$118,000	\$52,400	\$169,000
<b>Total</b>	<b>\$2,740,000</b>	<b>\$4,620,000</b>	<b>\$238,000</b>	<b>\$925,000</b>	<b>\$2,970,000</b>	<b>\$5,550,000</b>
<p>Note: Totals may not sum due to rounding. Incremental costs associated with previously proposed areas are allocated to activities based on the percentage of total impacts forecast for each activity. As such, for some activities (Mining, Road Maintenance &amp; Transportation, and Grazing) the low end costs are slightly greater than the high end costs.</p>						

**POTENTIAL IMPACTS TO ECONOMIC ACTIVITIES ON TRIBAL LANDS**

Approximately 424 miles of streams and shoreline areas in or adjacent to Tribal lands were proposed as critical habitat for the bull trout. Tribes in the United States govern their reservations and are responsible for the provision of public services to reservation residents in the same manner that county and city governments serve their constituents. Tribal governments, however, generally have far fewer resources to draw from and often serve especially disadvantaged populations. As a result, impacts due to critical habitat designation may have a disproportionately negative effect on Tribes, particularly when a designation would affect future development on Tribal trust or allotted trust lands.

Two Tribes submitted comments related to the economic analysis. In particular, the Quinault Indian Nation believes the designation of critical habitat “would impose substantial additional burdens and costs on the Quinault Indian Nation, impairing its ability to benefit from trust resources and exercise treaty protected rights.” The Nation also cites the potential for delays to restoration activities being undertaken by the Nation.<sup>43</sup> The Blackfeet Nation expressed concerns about the Nation’s ability to use its water, “including potential future uses and the effective reallocation of water rights priorities that may be caused by the designation. Further, the Nation is concerned that the designation may impact its continuing utilization of trust resources.”<sup>44</sup>

The Service plans is working with these and other Tribes during the section 4(b)(2) process to address these concerns.

**4.2 IDENTIFYING INCREMENTAL CONSERVATION EFFORTS**

83. In order to identify incremental cost impacts associated with this designation, this analysis focuses on areas considered by the Service to be unoccupied by bull trout. In the current proposed designation, 15 out of 32 total critical habitat units include stream reaches considered by the Service to be unoccupied by bull trout. While it is possible that incremental costs could occur in occupied habitat, the Service has indicated that this is unlikely. Specifically, the Service states that “in occupied habitat, it is unlikely that an analysis would identify a difference between measures needed to avoid the destruction or adverse modification of critical habitat from measures needed to avoid jeopardizing the species” (see Appendix E).<sup>45</sup>
84. Where possible, incremental costs of designation are quantified in this chapter. The Service has stated that “In consultations involving unoccupied critical habitat, there may be incremental project modification costs that would be attributable to the designation of critical habitat.”<sup>46</sup> For unoccupied areas overlapping with previous bull trout critical habitat proposals, cost estimates contained in earlier analyses are used to establish projected costs. For newly proposed unoccupied areas, the analysis focuses on those areas that do not overlap with other listed anadromous fish species (e.g., salmon or

<sup>43</sup> Public comments of the Quinault Indian Nation, April 5, 2010.

<sup>44</sup> Public comments of the Blackfeet Tribe of the Blackfeet Indian Reservation, March 15, 2010.

<sup>45</sup> U.S. Fish and Wildlife Service, “Incremental Effects Memo for Proposed Bull Trout Critical Habitat” emailed to IEc on September 24, 2009. See Appendix E.

<sup>46</sup> Ibid.

steelhead species) because special management needs and considerations to address primary constituent elements (PCEs) developed for salmon are similar to those identified for bull trout (see Appendix F). The areas included in the incremental analysis are detailed by unit in Exhibit 4-3.

**EXHIBIT 4-3. PROPOSED CRITICAL HABITAT ASSOCIATED WITH INCREMENTAL CONSERVATION EFFORTS (RIVER MILES)**

UNIT #	CRITICAL HABITAT UNIT	PREVIOUSLY PROPOSED UNOCCUPIED HABITAT	NEWLY PROPOSED UNOCCUPIED AREAS NOT OVERLAPPING WITH SALMON HABITAT
3	Lower Columbia River Basin	11.2	67.0
4	Upper Willamette River	41.7	
5	Hood River	32.4	0.9
6	Lower Deschutes River	19.6	
7	Odell Lake	3.3	
9	Klamath River Basin	218.3	1.0
16	Grande Ronde River	31.4	3.7
20	Powder River	76.1	
23	Mainstem Snake River	62.4	
24	Malheur River	32.3	
29	Coeur d'Alene River Basin	62.1	93.3
31	Clark Fork River Basin	81.8	14.8
32	Saint Mary River Basin	1.2	1.7
Total		673.8	182.4

Source: IEc GIS analysis.

Note: These totals do not include 72 miles of newly proposed unoccupied habitat that overlap with salmon habitat. No unoccupied newly proposed lake acres are included in the proposed critical habitat.

**4.2.1 PREVIOUSLY PROPOSED UNOCCUPIED AREAS**

85. Significant portions of the currently proposed critical habitat were included in previous bull trout critical habitat proposals. As such, the economic impacts related to previously proposed unoccupied critical habitat areas have been addressed in previous economic reports.<sup>47</sup> Specifically, costs associated with unoccupied areas included in previous

<sup>47</sup> 2004 economic analysis of the Columbia and Klamath DPSs. Note that the only proposed critical habitat considered by the Service to be unoccupied is included in the Columbia and Klamath Distinct Population Segments (DPSs).

analyses totaled \$2.6 million to \$4.4 million annually. Costs assigned to unoccupied areas are considered to be incremental in nature.<sup>48</sup>

86. The following steps were taken to update and incorporate the costs from the previous analyses into this report:
- **Step 1:** Costs associated with areas considered by the Service to be unoccupied critical habitat were identified from previous reports.<sup>49</sup> Specifically, the 2004 economic analysis of the Columbia and Klamath distinct population segments (DPSs) estimated project modification costs for unoccupied areas. That analysis assigned costs to unoccupied river miles based on the estimated average per mile costs of the occupied portion of each critical habitat unit. This method assumes that the costs of conservation measures for unoccupied areas are similar to those for occupied areas within the same critical habitat unit.
  - **Step 2:** Costs associated with unoccupied areas were inflated to 2009 dollars using the Gross Domestic Product deflator.<sup>50</sup>
  - **Step 3:** Costs were allocated from old critical habitat units to the new critical habitat units based on river miles. Where the current proposed designation does not overlap exactly with the previous designations, costs are allocated from the old proposed critical habitat units to the newly proposed critical habitat units based on river miles. Since some of the units in the current proposal are smaller (in terms of proposed river miles), incremental costs from the previous analyses are reduced to reflect these changes in the proposed designation. Additional information on the allocation of costs from the previous analyses to the current critical habitat units is included in Appendix G.
87. Incremental costs associated with previously proposed unoccupied critical habitat are expected in 22 of the proposed critical habitat units.<sup>51</sup> These costs result from project modifications to a variety of activities. The types of conservation efforts and action agencies affected are detailed in Exhibit 4-4. More detail about these forecast costs is available in the 2004 economic analysis of the Columbia and Klamath DPSs.
88. In order to estimate incremental costs associated with previously proposed unoccupied critical habitat the analysis relies on the following key assumptions:

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<sup>48</sup> Approximately 12 percent of previously proposed habitat was finalized, and has been designated as critical habitat since 2005. However, only a fraction of this designated critical habitat is considered to be unoccupied. Therefore, some portion of the impacts considered "incremental" to this rulemaking are already likely to have been undertaken under the 2005 critical habitat rule.

<sup>49</sup> 2004 economic analysis of the Columbia and Klamath DPSs. See Appendix F for estimated project modification costs by activity and by unit for occupied areas. The percentage of unoccupied habitat by unit is shown in this report in Exhibit F.11.

<sup>50</sup> Inflation factors based on the GDP deflator. Accessed on November 1, 2009 at <http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=13&Freq=Qtr&FirstYear=2007&LastYear=2009>

<sup>51</sup> While only 15 units of the current designation contain habitat considered unoccupied by the Service, previously estimated costs of unoccupied areas are assigned as incremental conservation costs in this analysis.

- Incremental costs result primarily from section 7 consultation efforts. To the extent that there are any incremental conservation efforts in addition to those related to section 7, results may be understated.
  - Annual costs associated with previously proposed unoccupied areas estimated for the previous report are applicable over the next 20 years. The previous analysis estimated costs of conservation efforts over a 10-year timeframe. To the extent that bull trout conservation efforts expected during the 10-year period of the previous analysis may be more or less expensive than those likely to occur over the next 20 years, the report may over or understate results.
89. Incremental costs associated with previously proposed critical habitat are summarized by critical habitat unit in Exhibit 4-5. As illustrated in the exhibit, the Upper Willamette River unit has by far the highest incremental conservation costs associated with previously proposed bull trout critical habitat.

## EXHIBIT 4-4. ACTIVITIES POTENTIALLY AFFECTED BY BULL TROUT CRITICAL HABITAT

ACTIVITY	EXPECTED CONSERVATION MEASURES	AFFECTED ACTION AGENCIES	AFFECTED THIRD PARTIES
Dams	Provide fish passage (fish ladder or trap & haul), temperature control projects, habitat acquisition, seasonal changes to flow.	Army Corps of Engineers, Bureau of Reclamation, Federal Energy Regulatory Commission, Bonneville Power Administration - Federal Columbia River Power System	Public utility districts
Forest Management	Reduce sedimentation (improve routine road maintenance projects, remove or abandon problem roads, minimize stream crossings), timing restrictions, eliminate fish barriers (e.g., culverts), expand riparian buffers.	Bureau of Land Management, U.S. Forest Service	Private timber companies
Road Maintenance & Transportation	Reduce sedimentation, water quality monitoring, spill prevention, ensure road surface drainage and road stream crossing do not impede fish migration, timing restrictions.	Federal Highway Commission, Local & state transportation agencies	Private highway/bridge building and maintenance contractors
Grazing	Reduce animal unit months (AUMs), off-stream watering, riparian fencing requirements, timing restrictions.	Bureau of Land Management, U.S. Forest Service	Private cattle ranchers
Agriculture/ Diversions	Reduce flow for irrigation - reallocate for instream flows.	U.S. Forest Service	Crop farmers
Mining	Reduce sedimentation, perform watershed assessment, monitoring & reporting, timing restrictions.	Bureau of Land Management, U.S. Forest Service	Private mining companies
Other (Utility; Dredging; Culvert removals; Other Instream activities; Restoration; and Superfund cleanups)	Reduce sedimentation, timing restrictions, eliminate fish barriers (e.g., culverts), fisheries and aquatic habitat restoration.	U.S. Forest Service, Bureau of Indian Affairs, US Department of Agriculture, and National Oceanic and Atmospheric Administration, and the Service, Federal Columbia River Power System (Bonneville Power Administration, Army Corps of Engineers, Bureau of Reclamation), U.S. Environmental Protection Agency	Superfund site potentially responsible parties

EXHIBIT 4-5. POTENTIAL INCREMENTAL COSTS FOR PREVIOUSLY PROPOSED AREAS, BY UNIT  
(2009 DOLLARS)

UNIT #	CRITICAL HABITAT UNIT	ANNUALIZED COSTS (7% DISCOUNT RATE)	
		LOW END	HIGH END
1	Olympic Peninsula	\$0	\$0
2	Puget Sound	\$0	\$0
3	Lower Columbia River Basins	\$17,700	\$43,300
4	Upper Willamette River	\$1,580,000	\$1,620,000
5	Hood River	\$21,400	\$68,800
6	Lower Deschutes River	\$87,300	\$175,000
7	Odell Lake	\$0	\$0
8	Mainstem Lower Columbia River	\$0	\$0
9	Klamath River Basin	\$81,400	\$303,000
10	Upper Columbia River Basins	\$7,230	\$43,300
11	Yakima River	\$48,300	\$68,300
12	John Day River	\$34,900	\$78,900
13	Umatilla River	\$3,190	\$14,700
14	Walla Walla River Basin	\$3,970	\$18,300
15	Lower Snake River Basins	\$7,160	\$26,900
16	Grande Ronde River	\$3,780	\$15,100
17	Imnaha River	\$0	\$0
18	Sheep and Granite Creeks	\$0	\$0
19	Hells Canyon Complex	\$106,000	\$211,000
20	Powder River Basin	\$157,000	\$311,000
21	Clearwater River	\$60,000	\$193,000
22	Mainstem Upper Columbia River	\$0	\$0
23	Mainstem Snake River	\$2,150	\$2,310
24	Malheur River Basin	\$48,900	\$82,300
25	Jarbidge River	\$0	\$0
26	Southwest Idaho River Basins	\$173,000	\$476,000
27	Salmon River Basin	\$48,000	\$162,000
28	Little Lost River	\$1,250	\$4,390
29	Coeur d'Alene River Basin	\$71,000	\$254,000
30	Kootenai River Basin	\$0	\$0
31	Clark Fork River Basin	\$171,000	\$452,000
32	Saint Mary River Basin	\$0	\$0
	<b>Total</b>	<b>\$2,740,000</b>	<b>\$4,620,000</b>

90. These costs are primarily related to project modifications associated with the Willamette River Basin Flood Control Project, including fish passage (trap and haul operations and construction of a fish ladder), temperature control projects, and bull trout studies. NMFS and the Service both issued biological opinions for these activities in July 2008.<sup>52</sup> Three action agencies were included in the recent consultations. The U.S. Army Corps of Engineers (ACOE) operates and maintains the dams and revetments, the Bonneville Power Administration (BPA) markets the hydropower generated at the dams, and the U.S. Bureau of Reclamation (BOR) sells a portion of the water stored in Project reservoirs for irrigation.

#### IMPACTS TO AREAS OUTSIDE OF CRITICAL HABITAT

Several public comments highlighted the potential for critical habitat to affect areas located upstream or downstream of designated areas. For example, upstream activities that require a certain level of water flow may be affected in the event that minimum flow requirements are implemented in critical habitat areas. In particular, one commenter was concerned about potential impacts to mining activities.<sup>53</sup>

Hecla Mining Company provided comments stating that the prospect of critical habitat in the mainstem Coeur d'Alene basin could curtail productions and employment, citing the potential for critical habitat to shut down operations altogether. Hecla is headquartered in Coeur d'Alene and owns several mines in Idaho, including the Lucky Friday mine in Shoshone County and the Grouse Creek mine in Custer County. The company employs 348 people at its Idaho operations, paying these employees \$31.3 million in wages and salaries. The company also purchases goods and services from Idaho suppliers, generating additional income for these businesses. Should the designation of critical habitat result in the curtailment of production at these facilities, Hecla believes that this economic contribution to the local economy may be at stake.<sup>54</sup>

Critical to an understanding of the potential for impacts on water diversions or conveyance is an understanding of the probability and magnitude of any such changes. We are currently unaware of any data that indicates whether the designation of critical habitat for the bull trout will result in changes to existing or future diversions of water for mining activities. Bull trout critical habitat has been designated downstream of Hecla's operations for the last 5 years, and Hecla provided no data documenting a significant impact on their operations. In addition, hydrologic models are unavailable to assess the role of any specific mining facility's groundwater pumping or surface water diversions in determining stream flow or other hydrologic conditions within critical habitat. As such, this analysis does not quantify the probability or extent to which water use for mining purposes would need to be curtailed or modified to remedy impacts on the bull trout. However, it does provide information from the public comments regarding the scale and importance of particular mining operations.

<sup>52</sup> NMFS. 2008. Consultation on "Willamette River Basin Flood Control Project" July 11, 2008. Also see, U.S. Fish and Wildlife Service. 2008. Biological Opinion on the Continued Operation and Maintenance of the Willamette River Basin Project and Effects to Oregon Chub, Bull Trout, and Bull Trout Critical Habitat Designated Under the Endangered Species Act. July 11, 2008. Both biological opinions available at: <http://www.nwp.usace.army.mil/pm/programs/biop/biopdocuments.asp>

<sup>53</sup> Public comments of Hecla Mining Company, April 5, 2010. Public comments of County of Shoshone, March 12, 2010.

<sup>54</sup> Ibid.

91. In 2008, the Bonneville Power Administration (BPA) noted that “it is difficult to accurately estimate the total cost to implement these measures given that specifics are still to be determined. Our best estimates at this time are that, in addition to the cost for replacement revenue related to spill for temperature management or temporary operation changes, the BPA ratepayer share of the cost to construct fish measures will be in the range of \$80 to \$120 million.<sup>55</sup> The previous analysis forecast a total capital cost of \$215 million over 15 years for this project, of which one-third was attributed to bull trout.<sup>56</sup> As 23 percent of the Upper Willamette River critical habitat unit is considered unoccupied, incremental costs associated with the Willamette project are approximately \$1.67 million annually.<sup>57</sup>
92. Exhibit 4-6 provides a summary of incremental costs for previously proposed unoccupied areas, by activity. As discussed above, the highest costs are related to modifications to dam activities in the Upper Willamette River Basin unit.

**EXHIBIT 4-6. POTENTIAL INCREMENTAL COSTS FOR PREVIOUSLY PROPOSED AREAS, BY ACTIVITY (2009 DOLLARS)**

ACTIVITY	ANNUALIZED COSTS (7% DISCOUNT RATE)	
	LOW END	HIGH END
Dams	\$2,120,000	\$2,520,000
Development	\$0	\$0
Forest Management	\$399,000	\$1,060,000
Mining	\$77,900	\$77,500
Road Maintenance & Transportation	\$67,100	\$66,800
Agriculture/Irrigation Diversion	\$0	\$817,000
Grazing	\$32,300	\$32,200
Other (Utility, Dredging, Culvert Removals, Instream Activities, Recreation and Restoration)	\$42,900	\$50,700
<b>Total</b>	<b>\$2,740,000</b>	<b>\$4,620,000</b>

Note: Totals may not sum due to rounding. Incremental costs associated with previously proposed areas are allocated to activities based on the percentage of total impacts previously forecast for each activity. As such, for some activities (Mining, Road Maintenance & Transportation, and Grazing) the low end costs are slightly greater than the high end costs.

<sup>55</sup> “Estimated Costs of the Willamette BiOp,” Bonneville Power Administration Fact Sheet, July 2008. Available at: [http://www.salmonrecovery.gov/Files/BiologicalOpinions/Estimated\\_costs\\_of\\_the\\_Willamette\\_BiOp.pdf](http://www.salmonrecovery.gov/Files/BiologicalOpinions/Estimated_costs_of_the_Willamette_BiOp.pdf).

<sup>56</sup> Annual costs are estimated to be \$5.58 million (2009 dollars) for this project for occupied areas. For more detail on these estimated costs, please refer to the 2004 economic analysis of the Columbia and Klamath DPSS Section 4.2.1 (beginning on page 4-7).

<sup>57</sup> Ibid. The estimated \$1.67 million is calculated based the percentage of the critical habitat unit considered unoccupied by the Service (23%) and the estimated annual costs for occupied areas (\$5.58 million, 2009 dollars). Specifically, \$1.67 million =  $1/(1-.23) * \$5.58$  million.

#### 4.2.2 NEWLY PROPOSED UNOCCUPIED AREAS

93. As discussed earlier, incremental cost impacts are most likely associated with newly proposed critical habitat areas that are unoccupied by bull trout, where there is no overlap with other listed anadromous fish (e.g., salmon and steelhead species). The newly proposed critical habitat associated with incremental conservation efforts is detailed earlier in Exhibit 4-3. Maps of the newly proposed unoccupied critical habitat areas that do not overlap with salmon habitat (“newly proposed incremental habitat”) are included in Appendix C. Incremental cost impacts are likely associated with these habitat areas where conservation efforts may result solely due to the designation of critical habitat for the bull trout.

#### Unit 3: Lower Columbia River Basin

94. Some additional conservation efforts are expected as a result of the bull trout critical habitat in the Lower Columbia River Basin, however, the Service has indicated that the level of activity is expected to be minimal. The newly proposed incremental habitat in this unit consists of various unoccupied tributaries to the White Salmon River and portions of the mainstem White Salmon River upstream of Condit Dam (and Northwestern Lake).
95. Condit Dam is operated by PacifiCorps under a FERC license, and is currently scheduled for removal commencing in October 2010. The Service initially consulted on the dam removal in 2002, and based on a reinitiation of this consultation, issued a biological opinion on bull trout and bull trout critical habitat in November 2005.<sup>58</sup> The Service did not require any reasonable and prudent measures in the 2005 reinitiation. The reinitiation notes that in its project description, PacifiCorp included the following conservation measures:
- Construct pockets in the drain tunnel to provide resting areas for fish to facilitate upstream migration.
  - Remove the cofferdams placed during the original dam construction and now buried in sediments by may of the year after dam removal so that anadromous fish and char can gain access to upstream habitat with minimal delay.
  - Remove the lowest portions of the dam from July through November, the time of seasonal low flows, to ensure that all concrete will be removed from the river bottom and will complete all in-water work by the following August to lessen adverse effects on multiple year classes of anadromous fish and char.
96. Federal agencies planning new projects in these areas will likely need to consider effects to bull trout and listed salmon species after the Condit Dam is removed. Therefore, incremental effects in these areas are likely only related to projects expected to be consulted on prior to October 2010.

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<sup>58</sup> U.S. Fish and Wildlife Service. Reinitiation of Consultation on Bull trout (*Salvelinus confluentus*) and Consultation on Bull trout Critical Habitat for Condit Dam Removal and Dam Operation. FWS Reference 1-3-05-0059. November 2005.

97. Activities occurring in the Lower Columbia newly proposed incremental critical habitat are likely related to forestry, agriculture, recreation and road maintenance. In addition, there is a proposed gas pipeline construction project in the area. Limited information is available regarding planned projects and project modifications in this area, but they are expected to be minimal with the exception of potential modifications to the pipeline project.<sup>59</sup>
98. Williams Northwest Pipeline and Puget Sound Energy are developing the Blue Bridge Pipeline project to transport natural gas. The project is in the planning stage, and will require a FERC permit. Construction is proposed to begin in the spring of 2012, with operations beginning in 2012.<sup>60</sup> The proposed pipeline is expected to follow the route of an existing pipeline. It is expected to cross several streams in the proposed critical habitat, including Buck Creek and mainstem White Salmon River.<sup>61</sup> Potential project modification costs of \$126,000 are assigned to the first year of the project (2012). This is based on average costs of common conservation activities for pipeline projects including erosion control, bank stabilization, and excavation and backfill requirements.<sup>62</sup>

#### Unit 5: Hood River

99. The newly proposed incremental critical habitat in the Hood River unit includes a portion of Bear Creek that is upstream from salmon habitat. The area falls completely within the Mount Hood National Forest. Based on communication with the Service, any activities that might affect this small area (less than one river mile) would already be consulted on by the USFS, and no additional project modifications would be expected to result from critical habitat designation.

#### Unit 9: Klamath River

100. There is approximately one river mile of irrigation ditch on private land that was not previously proposed and is considered unoccupied on Crane Creek. The primary activity in the area is grazing. Based on conversations with the Service, any bull trout conservation efforts in this area would likely relate to restoration activities. Potential project modification costs could result in cases where federal funding from the Service or the National Resource Conservation Service was used for restoration activities such as fish screens or other recovery activities. However, the Service has indicated that because this area is included in proposed critical habitat for the Lost River sucker and Shortnose sucker, the Service have been conferencing on federally funded activities in this area for the past 15 years, and would not expect any changes other than increased administrative costs to address bull trout critical habitat.

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<sup>59</sup> Email communication from Biologist, FWS Lacey WA Field Office, October 16, 2009.

<sup>60</sup> Additional information available at: <http://www.bluebridgepipeline.com/>.

<sup>61</sup> Email communication from Biologist, FWS Lacey Washington Field Office, October 27, 2009.

<sup>62</sup> 2005 economic analysis of the Coastal Puget Sound, Jarbidge, and Saint Mary-Belly DPSs, pages 163 - 165.

Unit 16: Grande Ronde River

101. There is a four mile reach of the North Fork Indian Creek that appears to be newly proposed incremental habitat in the Grande Ronde River critical habitat unit, as it is considered unoccupied by the Service and does not overlap current salmon or steelhead critical habitat. This area falls partly in Wallowa Whitman National Forest and partly in private land. However, because adjacent reaches of the stream are designated critical habitat for steelhead, and the Service reports that steelhead exist in the four-mile reach, no incremental impacts are forecast for this area.

Unit 29: Coeur d'Alene River Basin

102. This area falls within the Coeur d'Alene and St. Joe Ranger Districts of the Idaho Panhandle National Forest. Because this area has not been subject to consultation for bull trout or bull trout critical habitat in the past (the last known observation was in the 1980s), incremental impacts are likely to occur due to an increased need for section 7 consultation with the Service. Forecast incremental costs are based on discussions with the U.S. Forest Service (USFS) and a review of expected activity in the Coeur d'Alene Ranger District as detailed in the schedule of proposed actions for 2009 – 2010. Based on available information, the analysis forecasts that annually at least two and up to five additional informal section 7 consultations could result from designation of bull trout critical habitat in this unit.
103. At the low end, the analysis forecasts costs of conservation efforts associated with one timber and one mining project. At the high end, the analysis estimates costs associated with two timber projects, one mining project, and two restoration projects annually.<sup>63</sup>
104. Average project modification costs associated with these types of projects are based on information included in the previous economic analyses, inflated to current (2009) dollars. Specifically, average per consultation project modification costs applied in this analysis are:
- Timber: \$5,000 - \$313,000 per project<sup>64</sup>
  - Mining: \$116,000 per project<sup>65</sup>
  - Restoration: \$0 - \$58,000 per project<sup>66</sup>

Unit 31: Clark Fork River Basin

105. There are two stream reaches upstream from occupied bull trout habitat included in this newly proposed incremental habitat: Mill Creek (7 river miles) and Middle Fork LeClerc

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<sup>63</sup> Personal communication with Matt Davis, Biologist, Coeur d'Alene Ranger District, Idaho Panhandle, National Forest, U.S. Forest Service, November 9, 2009. Also, U.S. Forest Service. 2009. Idaho Panhandle National Forest Schedule of Proposed Actions. See file titled "ID Panhandle NF\_sopa-110104-2009-10.pdf", available at <http://www.fs.fed.us/sopa/forest-level.php?110104>.

<sup>64</sup> See 2004 economic analysis of the Columbia and Klamath River DPSs, Exhibit 4.31, page 4-69.

<sup>65</sup> Ibid, page 4-75 to 4-76.

<sup>66</sup> Ibid, pages 4-78 to 4-79 costs of General Forest Management consultations inflated to 2009 dollars.

Creek (7.7 river miles). The Mill Creek area falls partly on National Forest lands, partly on Washington State lands managed by the Department of Natural Resources, and partly on private land. Discussions with National Forest Service personnel indicate that no additional consultations or project modification would be expected for activities on Mill Creek. Because there are no obstructions to fish passage on this stream reach, the National Forest would consult on any activities in this area regardless of the critical habitat designation.<sup>67</sup> Information is not available to determine the impacts of critical habitat designation on the private and state sections of this incremental habitat with certainty. However, as with the National Forest lands, the analysis assumes that additional conservation efforts resulting from critical habitat in this area are unlikely because of the lack of barriers to fish passage.

106. On the Middle Fork LeClerc Creek, the USFS is currently consulting on an aquatic habitat restoration project being planned in cooperation with Stimson Lumber, including road obliteration and relocation, culvert removal, and restoration of riparian area contouring and native vegetation. No modifications to this work would be expected to result from the designation of bull trout critical habitat.<sup>68</sup> Once this project and other planned culvert removals occur, the Middle Fork LeClerc Creek will be open to fish passage.

*Unit 32: Saint Mary River Basin*

107. There is an approximately two mile reach of Red Eagle Creek of newly proposed incremental habitat that falls completely within Glacier National Park. The Service has indicated that this area is in the unroaded backcountry of the park and is unlikely to experience any consultation.<sup>69</sup>

*Summary of Costs of Conservation Efforts for Incremental Areas*

108. Exhibit 4-7 presents a summary of the expected costs associated with conservation efforts in newly proposed incremental critical habitat areas, by critical habitat unit.
109. Exhibit 4-8 presents a summary of the expected costs associated with conservation efforts in new proposed incremental bull trout critical habitat areas, by activity.

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<sup>67</sup> Personal communication with Tom Schuda, Colville National Forest, October 30, 2009.

<sup>68</sup> Ibid.

<sup>69</sup> Email communication from FWS Biologist, MT field office, October 20, 2009.

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EXHIBIT 4-7. POTENTIAL INCREMENTAL CONSERVATION COSTS FOR NEWLY PROPOSED AREAS, BY UNIT (2009 DOLLARS)

CRITICAL HABITAT UNIT	ANNUALIZED COSTS (7% DISCOUNT RATE)	
	LOW END	HIGH END
Unit 3: Lower Columbia River Basin	\$9,000	\$9,000
Unit 29: Coeur d'Alene River Basin	\$228,000	\$916,000
<b>Total</b>	<b>\$238,000</b>	<b>\$925,000</b>
Notes: Totals may not sum due to rounding. This exhibit does not include administrative costs, which are discussed in Chapter 5.		

EXHIBIT 4-8. POTENTIAL INCREMENTAL CONSERVATION COSTS FOR NEWLY PROPOSED AREAS, BY ACTIVITY (2009 DOLLARS)

ACTIVITY	ANNUALIZED COSTS (7% DISCOUNT RATE)	
	LOW END	HIGH END
Dams	\$0	\$0
Urbanization (Development)	\$0	\$0
Forest Management	\$9,350	\$589,000
Mining	\$219,000	\$219,000
Road Maintenance & Transportation	\$0	\$0
Agriculture/Irrigation Diversion	\$0	\$0
Grazing	\$0	\$0
Other (Utility, Dredging, Culverts, Instream activities, Recreation and Restoration)	\$9,510	\$118,000
<b>Total</b>	<b>\$238,000</b>	<b>\$925,000</b>
Notes: Totals may not sum due to rounding. This exhibit does not include administrative costs, which are discussed in Chapter 5.		

## CHAPTER 5 | ADMINISTRATIVE COSTS OF SECTION 7 CONSULTATION

110. Section 7(a)(1) of the Act requires that all Federal agencies utilize their authorities to further the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species. This chapter describes projected future administrative costs of engaging in section 7 consultation activities that consider the bull trout and its critical habitat. Similar to the previous chapters of this report, administrative costs are broken into two categories: baseline costs and incremental costs, as detailed below. Forecast consultations are also categorized by the type of consultation (e.g., informal versus formal) and assigned to the various economic activities described in Chapters 3 and 4 that may that may threaten the bull trout and its critical habitat.

### 5.1 SUMMARY OF ADMINISTRATIVE IMPACTS

111. In total, annualized baseline administrative costs are estimated at \$4.75 million (see Exhibit 5-1), with the greatest costs associated with forest management, transportation, and other activities (e.g., instream construction, restoration, and recreation). Total annualized incremental impacts associated with unoccupied areas are estimated at \$2.1 million. Similar to baseline impacts, the greatest incremental impacts are anticipated to be associated with section 7 consultations conducted for forest management, transportation, as well as other activities. The analytic steps followed to generate these estimates are described below.

EXHIBIT 5-1. SUMMARY OF PROJECTED BASELINE AND INCREMENTAL ADMINISTRATIVE COSTS, BY UNIT (2010-2029)

UNIT	NAME	ANNUALIZED COSTS	
		BASELINE COSTS (7% DISCOUNT RATE)	INCREMENTAL COSTS (7% DISCOUNT RATE)
1	Olympic Peninsula	\$457,000	\$153,000
2	Puget Sound	\$837,000	\$279,000
3	Lower Columbia River Basins	\$83,900	\$459,000
4	Upper Willamette River	\$20,700	\$13,000
5	Hood River	\$7,760	\$7,440
6	Lower Deschutes River	\$31,500	\$13,400

UNIT	NAME	ANNUALIZED COSTS	
		BASELINE COSTS (7% DISCOUNT RATE)	INCREMENTAL COSTS (7% DISCOUNT RATE)
7	Odell Lake	\$1,870	\$1,100
8	Mainstem Lower Columbia River	\$33,800	\$11,300
9	Klamath River Basin	\$27,200	\$38,200
10	Upper Columbia River Basins	\$558,000	\$186,000
11	Yakima River	\$478,000	\$159,000
12	John Day River	\$82,200	\$27,500
13	Umatilla River	\$14,400	\$4,810
14	Walla Walla River Basin	\$35,400	\$12,800
15	Lower Snake River Basins	\$19,300	\$6,450
16	Grande Ronde River	\$72,200	\$29,200
17	Imnaha River	\$19,400	\$6,480
18	Sheep and Granite Creeks	\$3,130	\$1,040
19	Hells Canyon Complex	\$26,100	\$8,700
20	Powder River Basin	\$27,500	\$20,300
21	Clearwater River	\$171,000	\$57,000
22	Mainstem Upper Columbia River	\$130,000	\$43,200
23	Mainstem Snake River	\$37,600	\$21,600
24	Malheur River Basin	\$17,100	\$10,400
25	Jarbidge River	\$25,200	\$8,420
26	Southwest Idaho River Basins	\$177,000	\$59,200
27	Salmon River Basin	\$530,000	\$177,000
28	Little Lost River	\$13,500	\$4,500
29	Coeur d'Alene River Basin	\$54,300	\$83,600
30	Kootenai River Basin	\$42,200	\$14,100
31	Clark Fork River Basin	\$530,000	\$192,000
32	Saint Mary River Basin	\$8,810	\$3,400
Total		\$4,750,000	\$2,110,000

## 5.2 BACKGROUND

112. This section presents background information about the section 7 consultation process, and information on the development of estimates of administrative cost efforts.

### 5.2.1 THE CONSULTATION PROCESS

113. Section 7(a)(2) of the Act requires Federal agencies (Action agencies) to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. In some cases, consultations will involve the Service and another Federal agency only, such as the U.S. Army Corps of Engineers. Often, they will also include a third party, such as the recipient of a Clean Water Act section 404 permit.
114. During a consultation, the Service, the Action agency, and the entity applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the proposed critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species, the activity of concern, and the potential effects to the species and designated critical habitat associated with the proposed activity, the Federal agency, and whether there is a private applicant involved.
115. Section 7 consultations with the Service may be either informal or formal. *Informal consultations* consist of discussions between the Service, the Action agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, and are designed to identify and resolve concerns at an early stage in the planning process. By contrast, a *formal consultation* is required if the Action agency determines that its proposed action may or will adversely affect the listed species or designated critical habitat in ways that cannot be resolved through informal consultation. The formal consultation process results in determination by the Service as to whether the action is likely to jeopardize a species or adversely modify critical habitat, and includes recommendations to minimize expected impacts. Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants depending on the complexity of the particular Federal action and the potential affects to listed species and/or critical habitat.

### 5.2.2 ADMINISTRATIVE SECTION 7 CONSULTATION COSTS

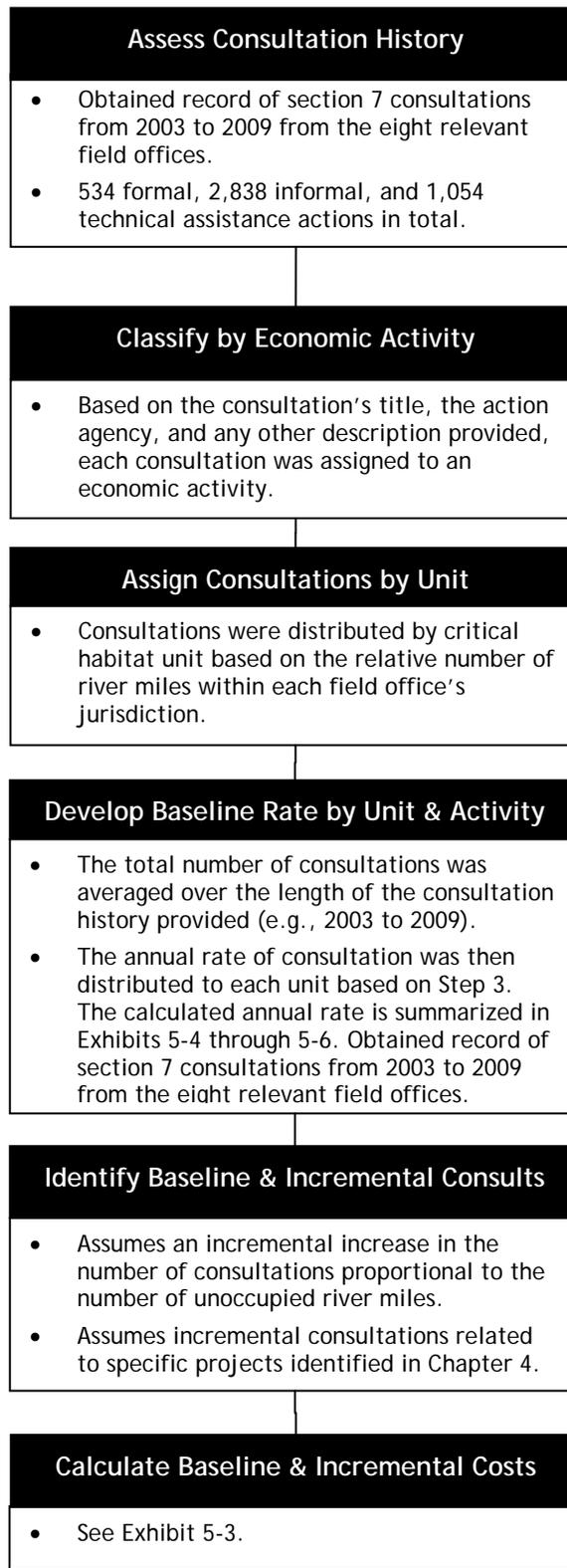
116. While consultations are required for activities that involve a Federal nexus and which may adversely affect the species regardless of whether critical habitat is designated, critical habitat designation may increase the level of consultation effort in cases where a project or activity may also adversely modify critical habitat. Bull trout consultations may therefore have both baseline and incremental impacts.
117. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:

1. **Additional effort to address adverse modification in a new consultation:**  
New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the requirements of listing. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.
  2. **Re-initiation of consultation to address adverse modification:**  
Consultations that have been completed on a project or activity may require re-initiation to address the requirements of critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs are considered incremental impacts of the designation.
  3. **Incremental consultation resulting entirely from critical habitat designation:** Critical habitat designation may trigger additional consultations that would not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not, or consultations resulting from the new information about the potential presence of the species provided by the designation). Such consultations may, for example, be triggered in critical habitat areas that are not occupied by the species. All associated administrative and project modification costs of incremental consultations are considered incremental impacts of the designation. For bull trout, all consultations resulting entirely from critical habitat designation are assumed to occur in unoccupied areas.
118. The administrative cost estimates presented in this chapter take into consideration the level of effort of the Service, the Action agency, and the applicant (where relevant), as well as the varying complexity of the consultation (see Exhibit 2-2).

### 5.3 METHODOLOGY

119. This section presents the methodology used to: (1) estimate the number of future consultations; (2) classify these consultations by economic activity; (3) assign each consultation to a critical habitat unit; (4) develop an estimated baseline rate of consultation; (5) identify baseline and incremental consultations; and (6) calculate anticipated baseline and incremental impacts. This methodology is outlined below and in Exhibit 5-2.

## EXHIBIT 5-2. METHODOLOGY FOR ESTIMATING ADMINISTRATIVE COSTS



- **Step 1: Assess Consultation History.** Eight field offices provided a list of section 7 consultations conducted between 2003 and 2009. These offices included: (1) Boise, (2) Central Washington, (3) Eastern Washington, (4) Montana, (5) Klamath, (6) Nevada, (7) Oregon, and (8) Western Washington. These consultation records were summarized by year and by type (e.g., formal consultations, informal consultations, and technical assistance efforts). The total number of records gathered was 534 formal, 2,838 informal, and 1,054 technical assistance actions (over this time period). The Western Washington and Boise field offices had the most records, with approximately 1,353 and 1,048 total consultations, respectively.
- **Step 2: Classify Consultations by Economic Activity.** Each consultation was assigned to one of the economic activities discussed in Chapters 3 and 4. Activities were determined based on the consultation's title, the relevant action agency, and any other description provided by the field office.<sup>70</sup> Using this system, the most common consultation type was for transportation related activities, followed by dam management and water diversions.
- **Step 3: Assign Consultations by Critical Habitat Unit.** Due to the large volume of consultations and the lack of specific location information for each consultation, this analysis estimates the distribution of consultations by critical habitat unit based on the relative number of river miles within each field office's jurisdiction. Specifically, GIS data provided by the Service identified the number of river miles associated with each field office. The portion of these river miles falling within each critical habitat unit were used to determine the share of each field office's consultations that should be attributed to the unit (see Appendix D).<sup>71</sup>
- **Step 4. Develop Estimated Baseline Rate of Consultation by Unit and Activity.** The total number of consultations expected to occur absent proposed critical habitat was calculated in Step 2. To develop an annual rate of consultation, this total number of consultations was averaged over the length of the consultation history provided (e.g., 2003 to 2009 for most field offices). The annual rate of consultation for each field office was then distributed to each unit using the percentages calculated in Step 3.

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<sup>70</sup> For the Boise field office, approximately 251 (of 934 total) informal and technical assistance efforts could not be assigned to an activity based on their title. These "unknown" consultations were assigned to activities using the same distribution as the formal consultations. For example, if consultations on dams represented 20 percent of all formal consultations, informal dam consultations also were assumed to represent 20 percent of the total. For the Montana field office, no records of informal or technical assistance efforts were provided. This analysis estimated the level of informal consultation and technical assistance based on the ratio to total formal consultations observed in other field offices.

<sup>71</sup> Available GIS data did not assign river miles to either the Klamath or Central Washington offices. For purposes of this analysis, all consultations conducted by the Klamath field office were assigned to the Klamath River basin unit, while consultations conducted by the Central Washington office were split between the Upper Columbia River Basins and Yakima River units based on the counties administered by the office.

- **Step 5. Identify Baseline and Incremental Consultations.** As stated above, the annual rate of consultation calculated in Step 4 is assumed to represent the number of consultations occurring under the baseline scenario (i.e., consultations that would occur even absent the proposed rule). To estimate the number of incremental consultations, this analysis assumes that designation of critical habitat will result in consultations on activities occurring in unoccupied areas where no consultation would have been required absent designation.<sup>72</sup> While critical habitat for bull trout was designated in 2005, only a small fraction of that habitat was considered unoccupied. This analysis assumes that the 2005 critical habitat designation does not provide baseline protection to the species (i.e., this analysis considers the incremental costs of protection, with and without critical habitat designation, not the incremental costs from previous designations).

Therefore, in unoccupied areas, the increase in the number of consultations is assumed to be proportional to the number of unoccupied river miles.<sup>73</sup> That is, this analysis assumes an increase in the consultation rate equivalent to the percentage of unoccupied habitat in each critical habitat unit. For example, in the Lower Columbia River Basins, where unoccupied habitat represents approximately 34.8 percent of the river miles in the unit, this analysis forecasts a 34.8 percent incremental increase in consultations over the rate predicted by the consultation history. In unoccupied areas that were not previously proposed for designation, this analysis also forecasts additional section 7 consultations based on discussions with the relevant stakeholders (see Chapter 4).

Consultations that occur in unoccupied areas that overlap with critical habitat for salmon and steelhead species are considered to be part of the baseline. This analysis assumes that section 7 consultations in these areas for salmon or steelhead already consider possible effects on the bull trout and its habitat; therefore, critical habitat designation would not increase the consultation rate in these areas.

- **Step 6. Calculate Anticipated Baseline and Incremental Administrative Costs.** All baseline consultations occurring in occupied habitat areas are assumed to incur costs of considering jeopardy for the bull trout. In addition, because these consultations occur for projects in critical habitat, they are also

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<sup>72</sup> For example, Boise National Forest indicates that if proposed critical habitat is designated on unoccupied areas, it "will be required to complete ESA consultations with the FWS on projects within that habitat." Public comments of Boise National Forest, March 3, 2010.

<sup>73</sup> This analysis is based on GIS Data provided by the Service on October 1, 2009 as amended via written communication on November 3, 2009, for which total proposed river miles were 22,647. The published proposed rule included 22,676 river miles. The final rule considers an additional 270 river miles, of which approximately 75 are unoccupied by bull trout or salmon species and occur in the Clark Fork Basin and Malheur River CHUs. These additional unoccupied river miles represent an increase of approximately 0.3 percent of the total study area for this analysis, and thus are not expected to significantly change the results presented.

expected to bear incremental costs associated with considering the potential implications of adverse modification. In unoccupied areas, the entire consultation action is incremental, as no consultation on bull trout would have been anticipated absent critical habitat (as discussed above). As such, in these cases the full costs of the section 7 consultation are assigned to bull trout critical habitat (i.e., considered to be incremental costs). The process of distributing of costs between baseline and incremental is also shown in Exhibit 5-3.

Based on public comments, some forecast consultations are assumed to have higher third-party (or applicant) costs than shown in Exhibit 2-2. These costs may be related to the preparation of section 7 documents, retention of legal counsel, hiring of biological consultants for surveying and monitoring, etc.<sup>74</sup>

120. As calculated using the steps outlined above, total estimated baseline and incremental impacts in Exhibits 5-4 and 5-5. The distribution of costs by activity is presented in Exhibits 5-6 and 5-7.

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<sup>74</sup> Public comments of Avista Corporation dated March 29, 2010; Public comments of Hecla Mining Company dated April 5, 2010; Public comments of Public Utility District No. 1 of Chelan County dated March 15, 2010.

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EXHIBIT 5-3. METHODOLOGY FOR DISTRIBUTING ADMINISTRATIVE COSTS BETWEEN BASELINE AND INCREMENTAL

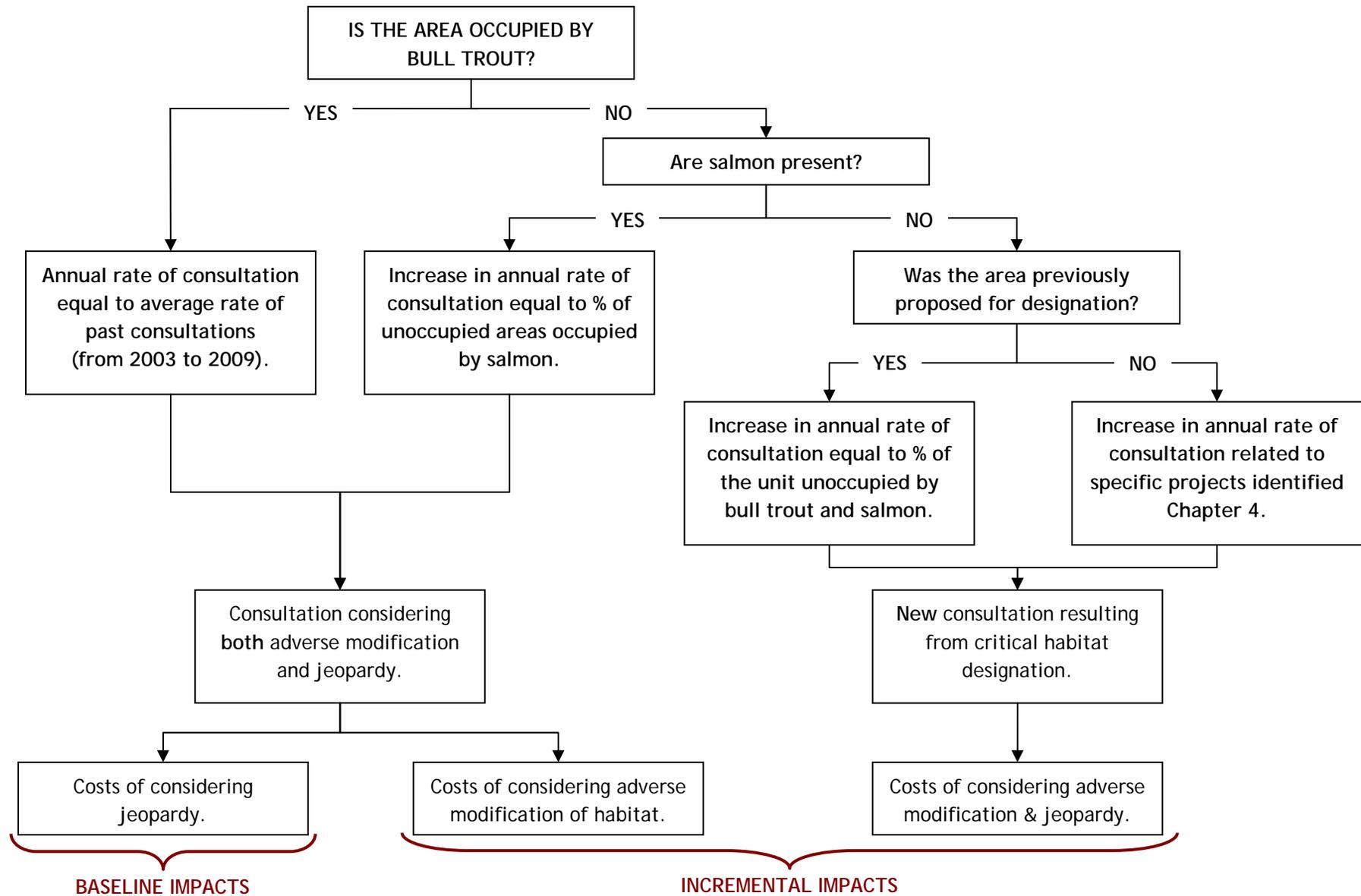


EXHIBIT 5-4. ANNUAL NUMBER OF BASELINE CONSULTATIONS FORECAST BY UNIT AND TOTAL ANNUALIZED COSTS (20 YEARS, DISCOUNTED AT 7 PERCENT)

UNIT	NAME	FORMAL	INFORMAL	TECHNICAL ASSISTANCE	TOTAL COSTS
1	Olympic Peninsula	5.74	56.17	2.23	\$457,000
2	Puget Sound	10.50	102.81	4.08	\$837,000
3	Lower Columbia River Basins	1.05	10.31	0.41	\$83,900
4	Upper Willamette River	0.68	1.60	0.49	\$20,700
5	Hood River	0.25	0.60	0.18	\$7,760
6	Lower Deschutes River	1.03	2.44	0.74	\$31,500
7	Odell Lake	0.06	0.14	0.04	\$1,870
8	Mainstem Lower Columbia River	1.11	2.62	0.79	\$33,800
9	Klamath River Basin	0.86	2.29	0	\$27,200
10	Upper Columbia River Basins	8.96	45.21	23.18	\$558,000
11	Yakima River	9.48	47.84	24.53	\$478,000
12	John Day River	2.63	6.19	1.88	\$82,200
13	Umatilla River	0.47	1.11	0.34	\$14,400
14	Walla Walla River Basin	1.01	2.38	0.72	\$35,400
15	Lower Snake River Basins	0.63	1.50	0.45	\$19,300
16	Grande Ronde River	2.36	5.57	1.69	\$72,200
17	Imnaha River	0.64	1.50	0.46	\$19,400
18	Sheep and Granite Creeks	0.07	0.28	0.27	\$3,130
19	Hells Canyon Complex	0.57	2.36	2.27	\$26,100
20	Powder River Basin	0.90	2.13	0.65	\$27,500
21	Clearwater River	2.18	20.21	5.33	\$171,000
22	Mainstem Upper Columbia River	0.30	2.75	0.73	\$130,000
23	Mainstem Snake River	1.23	2.91	0.88	\$37,600
24	Malheur River Basin	0.56	1.32	0.40	\$17,100
25	Jarbridge River	0.71	2.29	0	\$25,200
26	Southwest Idaho River Basins	3.85	16.08	15.47	\$177,000
27	Salmon River Basin	11.51	48.05	46.24	\$530,000
28	Little Lost River	0.29	1.22	1.18	\$13,500
29	Coeur d'Alene River Basin	0.71	6.13	1.62	\$54,300
30	Kootenai River Basin	0.86	4.19	2.01	\$42,200
31	Clark Fork River Basin	10.00	38.28	19.65	\$530,000
32	Saint Mary River Basin	0.20	0.82	0.47	\$8,810
	<b>Total</b>	<b>81.40</b>	<b>433.30</b>	<b>159.36</b>	<b>\$4,750,000</b>

EXHIBIT 5-5. ANNUAL NUMBER OF INCREMENTAL CONSULTATIONS FORECAST BY UNIT AND TOTAL ANNUALIZED COSTS (20 YEARS, DISCOUNTED AT 7 PERCENT)

UNIT	NAME	FORMAL	INFORMAL	TECHNICAL ASSISTANCE	TOTAL COSTS
1	Olympic Peninsula	0	0	0	\$153,000
2	Puget Sound	0	0	0	\$279,000
3	Lower Columbia River Basins	1.37	45.46	1.27	\$459,000
4	Upper Willamette River	0.15	0.35	0.11	\$13,000
5	Hood River	0.12	0.28	0.09	\$7,440
6	Lower Deschutes River	0.07	0.17	0.05	\$13,400
7	Odell Lake	0.01	0.03	0.01	\$1,100
8	Mainstem Lower Columbia River	0	0	0	\$11,300
9	Klamath River Basin	0.69	1.83	0	\$38,200
10	Upper Columbia River Basins	0	0	0	\$186,000
11	Yakima River	0	0	0	\$159,000
12	John Day River	0	0.01	0	\$27,500
13	Umatilla River	0	0	0	\$4,810
14	Walla Walla River Basin	0.02	0.06	0.02	\$12,800
15	Lower Snake River Basins	0	0	0	\$6,450
16	Grande Ronde River	0.13	0.30	0.09	\$29,200
17	Imnaha River	0	0	0	\$6,480
18	Sheep and Granite Creeks	0	0	0	\$1,040
19	Hells Canyon Complex	0	0	0	\$8,700
20	Powder River Basin	0.27	0.64	0.20	\$20,300
21	Clearwater River	0	0	0	\$57,000
22	Mainstem Upper Columbia River	0	0	0	\$43,200
23	Mainstem Snake River	0.22	0.53	0.16	\$21,600
24	Malheur River Basin	0.12	0.27	0.08	\$10,400
25	Jarbidge River	0	0	0	\$8,420
26	Southwest Idaho River Basins	0	0	0	\$59,200
27	Salmon River Basin	0	0	0	\$177,000
28	Little Lost River	0	0	0	\$4,500
29	Coeur d'Alene River Basin	0.20	6.87	0.49	\$83,600
30	Kootenai River Basin	0	0	0	\$14,100
31	Clark Fork River Basin	0.25	1.10	0.57	\$192,000
32	Saint Mary River Basin	0.01	0.03	0.02	\$3,400
<b>Total</b>		<b>3.63</b>	<b>57.94</b>	<b>3.16</b>	<b>\$2,110,000</b>
* Note: Some units do not have any incremental consultations (i.e., consultations occurring solely as a result of critical habitat). However, these units do incur incremental administrative costs associated with considering adverse modification in a baseline consultation. See Exhibit 5-3.					

EXHIBIT 5-6. DISTRIBUTION OF ANNUALIZED BASELINE COSTS BY ACTIVITY <sup>75</sup>

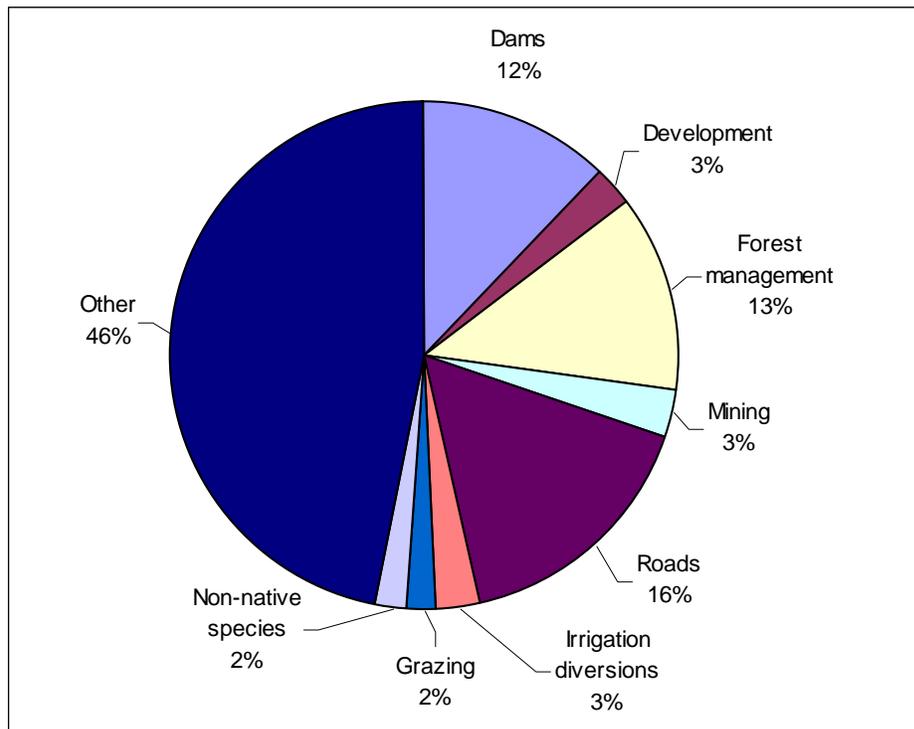
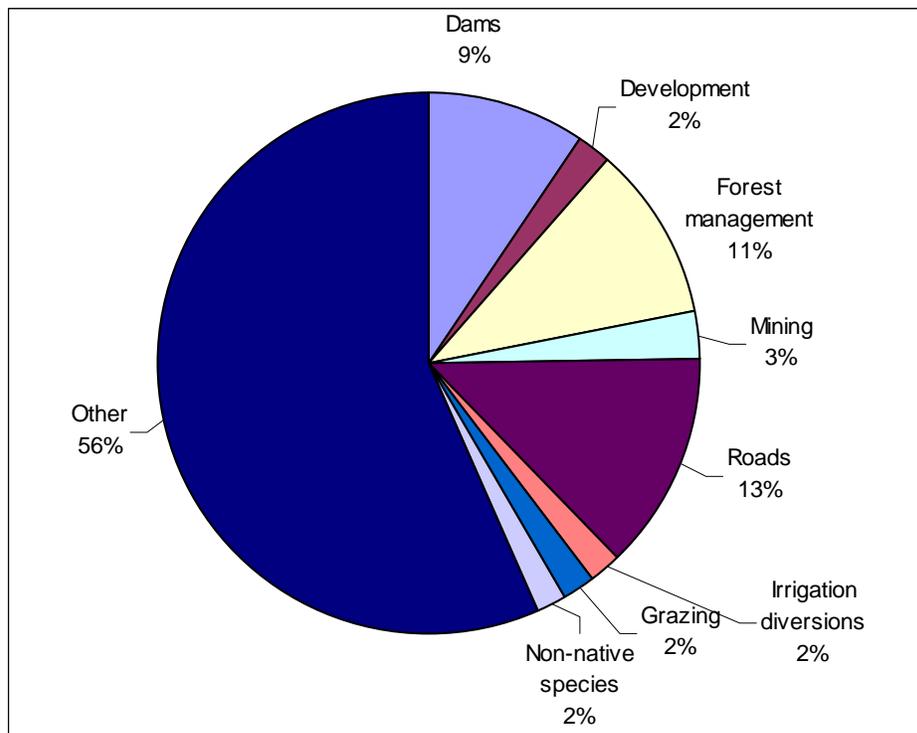


EXHIBIT 5-7. DISTRIBUTION OF ANNUALIZED INCREMENTAL COSTS BY ACTIVITY <sup>75</sup>



<sup>75</sup> Other activities consist of in-stream construction, restoration, and recreation activities.

**5.4 CAVEATS**

121. **Number of Affected Activities.** The number of consultations and technical assistance efforts to be undertaken in the future for activities within a given critical habitat unit is highly uncertain. The frequency of such efforts will be related to the level of economic activity (i.e., whether new activities take place), and whether the activities that do take place may affect the bull trout or its critical habitat. This analysis assumes that future baseline consultations will occur at the same rate as in the past, and that there will be an increase in the rate of consultation after designation proportional to the unoccupied area proposed for designation. To the extent that consultations occur less frequently than predicted in unoccupied areas, this analysis may overestimate incremental administrative costs.
122. **Distribution Across Units.** Absent specific information on location of future actions likely to result in consultation, forecast section 7 consultations are distributed to the critical habitat units based on the number of river miles. To the extent that consultations are not distributed evenly by river mile and are instead concentrated in specific areas, administrative costs may be over or underestimated in certain areas.
123. **Costs of Consultation.** The costs per consultation described in Exhibit 2-2 assume an average level of effort based on a review of past consultations. To the extent that future consultations are not reflective of this average level of effort, this analysis may under or overestimate administrative impacts of section 7 consultation.

## CHAPTER 6 | ECONOMIC BENEFITS

124. This characterization of the potential economic benefits of critical habitat designation for the bull trout is provided to give context to the cost analyses presented in the preceding sections.<sup>76</sup> This section first describes the categories of economic benefit that may derive from the conservation of affected aquatic species and habitats, and discusses the research methods that economists employ to quantify these benefits. Next, this section summarizes the conservation efforts described in Chapters 3 and 4 of this report and links them with potential categories of economic benefit that may derive from their implementation.

#### 6.1 SUMMARY OF BENEFITS RELATING TO BULL TROUT CRITICAL HABITAT DESIGNATION

125. Conservation efforts for bull trout critical habitat have the potential to result in increased bull trout populations, which in turn could result in increases in recreational fishing opportunities over the long term. In addition, increased bull trout population size could result in enhanced non-use value by the public (i.e., existence value). In addition, improved water quality, flood protection and aesthetic improvements to the landscape could also occur. However, these benefits are not quantified in this analysis. The primary information gap involves a lack of detailed understanding of the likely future bull trout populations or the impacts of critical habitat on those populations. A detailed explanation for each benefit category is as follows:

- **Recreational Fishing Values (Direct Use Values).** This chapter discusses the current status of the bull trout fishery and the information that would be required to estimate potential benefits associated with greater recreational fishing opportunities due to critical habitat designation for bull trout. As discussed below, additional information would be required in order to quantify these benefits, including: 1) detailed forecasts of the timing and extent of expected bull trout population increases resulting from critical habitat designation; 2) any associated expected changes in fishing regulations, and 3) the responsiveness of anglers to a new target species. At this time, the Service is not able to forecast how critical habitat designation may affect the future population of bull trout in critical habitat areas. Further, specific changes, including timing, to fishing regulations are uncertain. As such, this analysis

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<sup>76</sup> The Service's policy has been to compare the financial and economic costs of critical habitat designation to the biological benefits to the species, which are generally not monetized. In addition, the Service's policy is that these economic analyses should report net costs; that is, costs of actions to protect the bull trout and its habitat net of any benefits received by the landowner, resource manager, resource users or the regional economy from these actions.

does not quantify the potential benefits associated with increased recreational fishing opportunities due to bull trout critical habitat designation.

- **Existence Value.** There is no existing study that can be easily transferred to the current policy question in order to quantify the value the public would place on actions taken to enhance probability of recovery of bull trout due to critical habitat designation. However, existing studies do support the conclusion that preservation of fish species in general is likely to generate substantial benefits to the public.
- **Indirect Benefits.** The analysis recognizes that, to the extent that bull trout conservation efforts for critical habitat lead to improved water quality, increased open space, or aesthetic benefits, indirect use benefits may result (such as increased hiking or wildlife-viewing activities). However, absent information on the long term biological and physical changes expected to occur in critical habitat areas as a result of critical habitat designation, the analysis does not attempt to quantify these types of potential benefits.

## 6.2 CATEGORIES OF BENEFITS RELATING TO SPECIES AND HABITAT CONSERVATION

126. The primary goal of listing a species is to preserve the species from extinction. However, various other economic benefits, measured in terms of social welfare or regional economic performance, may also result from species and habitat conservation. The benefits of species and habitat conservation can be placed into two broad categories: (1) those associated with the primary goal of species conservation, and (2) those that derive from the habitat conservation efforts to achieve this primary goal.
127. Because a purpose of the Act is to provide for the conservation of endangered and threatened species, the benefits of actions taken under the Act can be measured in terms of the value placed by the public on species preservation (e.g., avoidance of extinction, and/or increase in a species' population). Such social welfare values for conservation of a species may reflect both use and non-use values for the species. Use values derive from a direct use for a species, such as sport-fishing or recreational wildlife-viewing opportunities. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist (e.g., existence or bequest values).
128. As a result of actions taken to preserve endangered and threatened species, such as habitat protection, various other benefits may accrue to the public. For example, conservation efforts for species and habitat may result in improved water quality, which in turn may have collateral human health or recreational use benefits. Recent literature has emphasized the importance of including the value of natural capital and ecosystem services in benefits calculations.<sup>77</sup> In addition, conservation efforts undertaken for the

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<sup>77</sup> For example, Daily, Gretchen C., Stephen Polasky, Joshua Goldstein, Peter M. Kareiva, Harold A. Mooney, Liba Pejchar, Taylor H. Ricketts, James Salzman, and Robert Shallenberger. 2009. Ecosystem Services in Decision Making: Time to Deliver. *Frontiers in Ecology and the Environment*, 7(1): 21-28. Also, TNC (2008): The Nature Conservancy, Natural Capital

benefit of a threatened or endangered species may enhance shared habitat for other species. Such benefits may be a direct result of modifications to projects, or may be collateral to such actions. For example, a section 7 consultation may result in the conservation of buffer strips along streams, in order to reduce sedimentation due to construction activities. A reduction in sediment load may directly benefit water quality, while the presence of buffer strips may also provide the collateral benefits of preserving habitat for terrestrial species and enhancing nearby residential property values (e.g., preservation of open space).<sup>78</sup>

129. Economists apply a variety of methodological approaches in estimating economic values for species and for habitat improvements, including stated preference and revealed preference methods. Stated preference techniques include contingent valuation and conjoint (or attribute-based) analysis. In simplest terms, these methods employ survey research techniques, asking respondents to state what they would be willing to pay for a resource or for programs designed to protect that resource. A substantial literature has developed that describes the application of these techniques to the valuation of natural resources, including endangered species and their habitats.
130. More specifically with respect to use values for species or habitats, revealed preference techniques examine individuals' behavior in response to changes in environmental or other amenities (i.e., people "reveal" their value through their choices). For example, travel cost models are frequently applied to value access to recreational opportunities, as well as to value changes in the quality and characteristics of these opportunities. Basic travel cost models are rooted in the idea that the value of a recreation resource can be estimated using data on travel and time costs incurred by individuals visiting the site. Another revealed preference technique is hedonic analysis, which is often employed to determine the effect of specific environmental characteristics on residential property values.

### 6.3 POTENTIAL BENEFITS OF BULL TROUT CONSERVATION

131. This section describes the types of benefits resulting from bull trout conservation within the study area. Exhibit 6-1 summarizes potential benefits associated with the specific bull trout conservation efforts quantified in Sections 3 and 4 of this report. The first column summarizes bull trout conservation efforts by activity. The second column identifies potential categories of benefits that may derive from implementation of these conservation efforts. A description of the types of potential benefits is provided below. Note that, based on the assessment of incremental costs related to the proposed rule, incremental benefits related to the rule are expected to be limited (i.e., with few incremental project modifications resulting from the designation, the scale of economic benefit is expected to be modest).

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Project. 2008. Ecosystem Services: Can Ecosystem Services Work for Your Conservation Project? Accessed May 19, 2009 from [http://www.naturalcapitalproject.org/ConEX/ConEx\\_A\\_CanESWork\\_for\\_you\\_FINAL.pdf](http://www.naturalcapitalproject.org/ConEX/ConEx_A_CanESWork_for_you_FINAL.pdf)

<sup>78</sup> The Trust for Public Land (2009). Geis, Erica. Conservation: An Investment that Pays, The Economic Benefits of Parks and Open Space, Accessed November 15, 2009 from [http://www.tpl.org/content\\_documents/EconBenefitsReport\\_7\\_2009.pdf](http://www.tpl.org/content_documents/EconBenefitsReport_7_2009.pdf)

132. The categories of economic benefits that may derive from the bull trout conservation efforts described in this report include:
- **Increased recreational fishing opportunities:** To the extent that conservation efforts for the bull trout increase its population size, more recreational fishing opportunities could potentially become available (in the form of catch-and-release fishing, given the status of the species). It is possible that current management approaches could be altered at some point to allow some anglers in some areas to harvest bull trout. Recreational fishing will also benefit from improved water quality. Recreational fishing improvements could be measured by increased fishing efforts within the region.
  - **Improved water quality:** Managing economic activities that occur adjacent to riparian and aquatic habitats (e.g., agriculture, construction, road and bridge maintenance and timber harvests) may improve water quality by reducing chemical runoff, erosion, and sedimentation. Water quality improvements may in turn have human health and human use (e.g., recreational fishing) benefits, facility maintenance cost benefits, as well as benefits to other species in the watersheds.<sup>79</sup>
  - **Increased habitat for other fish and wildlife species:** To the extent that habitat or conservation easements are acquired, or restorations projects occur and avoidance of activities in the riparian zone occur, these increases in riparian habitat can provide canopy and shade, shelter, and food sources for numerous riparian species. Benefits to the populations of other species may result.
  - **Aesthetic benefits:** Social welfare gains may be associated with the enhanced aesthetic quality of improved habitat. Preferences for aesthetic improvements may be measured through increased willingness-to-pay to visit a habitat region for recreation or increased visitation to the region, or improvements in nearby residential property values.
  - **Flood protection:** Maintaining riparian buffers around streams can enhance the flood control services provided by an ecosystem. For example, reducing grazing may allow increased vegetative cover, which tends to reduce flood water velocity and erosive power, and block debris from entering crops and other lands. This may avoid costs of flood-related damages, and increase overall property values.

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<sup>79</sup> Moore, Walter B. and Bruce A. McCarl. 1987. Off-Site Costs of Soil Erosion: A Case Study in the Willamette Valley. *Western Journal of Agricultural Economics*. 12(1): 42-29.

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133. In addition to these potential benefits, all of the conservation efforts described in Exhibit 6-1 are related to the broader conservation and recovery of the species. For example, monitoring and surveying for the species is undertaken to better understand the effects of projects on species, and therefore inform the avoidance or minimization of those effects. All conservation efforts therefore relate to the maintenance or enhancement of the use (e.g., wildlife-viewing) and non-use value (e.g., existence value) that the public may hold specifically for the bull trout. Further, many of the conservation efforts undertaken for the bull trout may also result in improvements to ecosystem health that are shared by other, coexisting species. The maintenance or enhancement of use and non-use values for these other species, or for biodiversity in general, may also result from these bull trout conservation efforts.
134. Additionally, to the extent that conservation efforts lead to increased open space, aesthetic benefits, or improved water quality, which in turn prompt an increase in visitation to the region (e.g., for recreation such as hiking or wildlife-viewing), the economy and employment may benefit from increased regional spending.

## EXHIBIT 6-1. BULL TROUT CONSERVATION EFFORTS AND POTENTIAL ASSOCIATED BENEFITS

ACTIVITY	CONSERVATION EFFORT	POTENTIAL ASSOCIATED BENEFITS <sup>1</sup>
Dam Operations	<ul style="list-style-type: none"> <li>• Provide fish passage (fish ladder or trap &amp; haul).</li> <li>• Temperature control projects.</li> <li>• Habitat acquisition.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased fish population, potentially leading to increased recreational fishing opportunities.</li> <li>• Increased river flows.</li> <li>• Improved water quality.</li> <li>• Increased riparian habitat for flood control.</li> <li>• Increased open space.</li> <li>• Additional shade, cover and shelter for other species.</li> </ul>
Forest Management	<ul style="list-style-type: none"> <li>• Reduce sedimentation (improve routine road maintenance projects, remove or abandon problem roads, minimize stream crossings).</li> <li>• Timing restrictions.</li> <li>• Eliminate fish barriers (e.g., culverts).</li> <li>• Conduct ecological thinning and selective timber harvest.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased fish population, leading to increased recreational fishing opportunities.</li> <li>• Improved water quality.</li> <li>• Increased riparian habitat for flood control.</li> <li>• Aesthetic benefits.</li> </ul>
Road Maintenance & Transportation	<ul style="list-style-type: none"> <li>• Reduce sedimentation.</li> <li>• Water quality monitoring.</li> <li>• Pollutant spill prevention.</li> <li>• Ensure road surface drainage and road stream crossing do not impede fish migration.</li> <li>• Timing restrictions.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased fish population, leading to increased recreational fishing opportunities.</li> <li>• Improved water quality.</li> </ul>
Livestock Grazing	<ul style="list-style-type: none"> <li>• Reduce animal unit months (AUMs) (i.e., improve range habitat).</li> <li>• Provide off-stream watering.</li> <li>• Riparian fencing requirements.</li> <li>• Timing restrictions.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased fish population, leading to increased recreational fishing opportunities.</li> <li>• Improved water quality.</li> <li>• Increased riparian habitat for flood control.</li> <li>• Increased open space.</li> <li>• Additional shade, cover and shelter for other species.</li> </ul>
Diversions	<ul style="list-style-type: none"> <li>• Reduce flow for irrigation - reallocate for instream flows.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased fish population, leading to increased recreational fishing opportunities.</li> <li>• Improved water quality.</li> <li>• Increased river flows.</li> </ul>

ACTIVITY	CONSERVATION EFFORT	POTENTIAL ASSOCIATED BENEFITS <sup>1</sup>
Mining	<ul style="list-style-type: none"> <li>• Reduce sedimentation.</li> <li>• Perform watershed assessment.</li> <li>• Monitoring and reporting.</li> <li>• Timing restrictions.</li> </ul>	<ul style="list-style-type: none"> <li>• Improved water quality.</li> <li>• Aesthetic benefits.</li> <li>• Additional shade, cover and shelter for other species.</li> </ul>
Development	<ul style="list-style-type: none"> <li>• Stormwater control requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased fish populations, leading to increased recreational fishing opportunities.</li> <li>• Improved water quality.</li> </ul>
Non-native species	<ul style="list-style-type: none"> <li>• Avoid future introductions.</li> <li>• Eradicate or control currently introduced species.</li> <li>• Manage habitat to favor bull trout over other species.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased fish population, leading to increased recreational fishing opportunities.</li> <li>• Improved water quality.</li> </ul>
<p><sup>1</sup> Incremental benefits due to critical habitat would be expected to occur primarily in areas that the Service does not currently consider to be occupied by bull trout. Because this analysis assumes that critical habitat would result in the same types of conservation measures being undertaken in unoccupied critical habitat areas as other areas occupied by bull trout, the benefits are assumed to be the same as well.</p>		

### 6.3.1 INCREASED RECREATIONAL FISHING OPPORTUNITIES

135. A potential benefit that could result from bull trout conservation efforts within the study area is increased recreational fishing opportunities. Recreational fishing for bull trout is generally not allowed under state regulations with several exceptions.
- In Idaho, while harvest of bull trout is prohibited, recreational catch-and-release angling for bull trout is allowed in some areas under current regulations.<sup>80</sup>
  - In 2004, Montana Fish, Wildlife and Parks (MFWP) applied to the Service for authorization to allow a limited sport fishing season for bull trout under Section 10(a)(1)(A) of the Endangered Species Act. The Service authorized limited sport fishing for bull trout at Hungry Horse Reservoir, South Fork Flathead River and Lake Koocanusa, as requested by MFWP, after those fisheries were deemed to have reached recovery goals. The Service allowed fishing for bull trout per the regulations proposed by MFWP, which allow angler harvest of up to 300 fish from Hungry Horse Reservoir and catch and release but no possession from South Fork Flathead River. The permit also requires a bull trout permit and catch card system, angler survey and development of educational information pertaining to these new fisheries.<sup>81</sup>
  - In Oregon, bull trout fishing is allowed in various areas including portions of Lake Billy Chinook, the Metolius River, Lake Simtustus, Inmaha River, Wallowa Lake, and the Wenaha River.<sup>82</sup>
  - In Washington, under state regulations, harvest of bull trout is allowed on portions of various rivers at certain times including Baker River, Cascade River, Lost River, Skykomish River, Snohomish River, Suiattle River, Sultan River, Wallace River and Whitechuck River.<sup>83</sup>
136. Based on the limited information available from these bull trout fisheries, it appears that demand would exist for a recovered bull trout fishery. For example, a study of licensed anglers in Oregon indicates that the bull trout was once one of the three most-preferred

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<sup>80</sup> Idaho Fish and Game website; Salmon area regulations. See <http://fishandgame.idaho.gov/fish/rules/sal.pdf>.

<sup>81</sup> Montana Department of Fish, Wildlife and Parks website. See <http://fwp.mt.gov/fishing/license/bulltrout.html> for links to angler surveys including: Hensler, Mike and Neil Benson. Angler Survey Of Experimental Recreational Bull Trout Fishery For Lake Koocanusa, Montana 2007-2008. Montana Department of Fish, Wildlife, and Parks. July 1, 2007 - June 30, 2008. Available at: <http://fwp.mt.gov/wildthings/wildlifelib/Report.aspx?sc=87952&r1=1>. Also, Hensler, Mike and Neil Benson. Angler Survey Of Experimental Recreational Bull Trout Fishery At Hungry Horse Reservoir And South Fork Flathead River, Montana For The 2006 Season; Montana Department of Fish, Wildlife, and Parks. September 2007. Available at: <http://fwp.mt.gov/wildthings/wildlifelib/Report.aspx?sc=87567&r1=1>.

<sup>82</sup> See Oregon Department of Fish and Wildlife website for links to the 2009 fishing regulations. <http://www.dfw.state.or.us/resources/fishing/>

<sup>83</sup> Washington Department of Fish and Wildlife. Fishing in Washington. Sport Fishing Rules 2009/2010 Pamphlet Edition. Available for download at: <https://fortress.wa.gov/dfw/erules/efishrules/>

species of trout.<sup>84</sup> In addition, trout fishing made up 72 percent of fishing days in Montana in 2006.<sup>85</sup> In addition, there is likely value associated with subsistence fishing for bull trout by tribal members in the critical habitat area. Expanded or new opportunities for bull trout recreational fishing could result in economic benefits such as increased angler welfare and regional economic benefits. However, in order to quantify these benefits, additional information would be required, including: 1) detailed forecasts of the timing and extent of expected bull trout population increases resulting from critical habitat designation; 2) any associated expected changes in fishing regulations, and 3) the responsiveness of anglers to a new target species. At this time, the Service is not able to forecast how critical habitat designation may affect the future population of bull trout in critical habitat areas.<sup>86</sup> Further, specific changes, including timing, to fishing regulations are uncertain.<sup>87</sup> As such, this analysis does not quantify the potential benefits associated with increased recreational fishing opportunities due to bull trout critical habitat designation.

#### 6.4 AVAILABLE LITERATURE VALUING BULL TROUT POPULATIONS

137. An ideal study for use in valuing the use and non-use values that may derive from critical habitat designation for the bull trout would be need to be specific to this species, the policy question at hand (economic benefits of critical habitat designation), and the affected population (e.g., citizens of the Northwestern U.S.).
138. Absent primary research specific to the policy question, resource management decisions can often be informed by applying the results of existing valuation research to a new policy question – a process known as “benefit transfer.” Benefit transfer involves the application of unit value estimates, functions, data, and/or models from existing studies to estimate the benefits associated with the resource under consideration. The Office of Management and Budget (OMB) has written guidelines for conducting credible benefit transfers.<sup>88</sup> The important steps in the OMB guidance are: (1) specify the value to be estimated for the rulemaking; and (2) identify appropriate studies to conduct benefits transfer based on the following criteria:

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<sup>84</sup> Oregon Department of Fish and Wildlife. 2007. Oregon Licensed Angler Survey 2006. See <http://www.dfw.state.or.us/fish/programs.asp#Research>

<sup>85</sup> U.S. Fish and Wildlife Service, 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation - Montana.

<sup>86</sup> Service, Portland Office, *Bull Trout (Salvelinus confluentus) 5-Year Review: Summary and Evaluation*, April 25, 2008, p. 14. Accessed at: [http://ecos.fws.gov/docs/five\\_year\\_review/doc1907.pdf](http://ecos.fws.gov/docs/five_year_review/doc1907.pdf); Also, see for example: Service, *Draft Recovery Plan for Three of the Five Distinct Population Segments of Bull Trout (Salvelinus confluentus)*, Chapter 2, Klamath River Recovery Unit, November 29, 2002, p. vi and viii. Accessed at: [http://ecos.fws.gov/docs/recovery\\_plan/021129\\_2.pdf](http://ecos.fws.gov/docs/recovery_plan/021129_2.pdf); Personal communication with Service Region 1 and Field Offices on October 13, 2009.

<sup>87</sup> Ibid.

<sup>88</sup> U.S. Office of Management and Budget, “Circular A-4,” September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

- The selected studies should be based on adequate data, sound and defensible empirical methods and techniques.
- The selected studies should document parameter estimates of the valuation function.
- The study and policy contexts should have similar populations (e.g., demographic characteristics). The market size (e.g., target population) between the study site and the policy site should be similar.
- The good, and the magnitude of change in that good, should be similar in the study and policy contexts.
- The relevant characteristics of the study and policy contexts should be similar.
- The distribution of property rights should be similar so that the analysis uses the same welfare measure (i.e., if the property rights in the study context support the use of willingness-to-accept measures while the rights in the rulemaking context support the use of willingness-to-pay measures, benefits transfer is not appropriate).
- The availability of substitutes across study and policy contexts should be similar.

#### 6.4.1 RECREATIONAL FISHING VALUES (DIRECT USE VALUES)

139. A benefit transfer based analysis using existing studies of sportfishing values associated with a potentially recovered bull trout population has not been conducted for purposes of this report. While there exists a significant recreational fishing valuation literature from which to draw comparable values, there is insufficient biophysical information to support the analysis.<sup>89</sup> First, appropriate allocation of benefits would require modeling changes in bull trout populations over time in response to the designation at the critical habitat unit level. The timing and extent to which the bull trout population would be expected to recover are unknown, either in total or at a unit level. In addition, the specific relationship of recovery of the species to designation of critical habitat is unknown. Without a forecast of the timing and extent of the expected recovery of the bull trout, and information on the associated expected changes to recreational fishing regulations, conducting a credible benefit transfer analysis that quantifies sportfishing benefits associated with bull trout critical habitat is not possible. Further, since future bull trout population dynamics are not currently understood, aggregate benefits figures cannot be readily disaggregated and integrated into an analysis of the costs and benefits of designating particular units as critical habitat.

#### 6.4.2 EXISTENCE VALUE

140. Existence value reflects the utility the public derives from knowledge that a species continues to exist. A number of published studies have demonstrated that the public holds values for endangered and threatened species separate and distinct from any expected direct use of these species (i.e. willingness to pay to simply ensure that a species will

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<sup>89</sup> For example, IEC developed a database for over 100 recreational fishing valuation studies for the Service:

<http://www.indecon.com/fish/>

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continue to exist). These studies include Boyle and Bishop (1987), Elkstrand and Loomis (1998), Kotchen and Reiling (2000), and Loomis and White (1996).<sup>90</sup> There is little doubt that the bull trout provides intrinsic values, and that these values will be enhanced by its survival and recovery.

141. Estimated willingness-to-pay values for fish species conservation have varied widely across studies, from as little as four dollars per person (Boyle and Bishop, 1987) to as much as \$366 per year per household (Hanemann, 1991).<sup>91</sup> These variations depend on: (1) the good being valued (e.g., dam removal and fish habitat restoration, reduction of future fish injuries resulting from toxic contamination, maintenance of sufficient instream water levels); (2) how the question was asked (e.g., yes/no referendum or a payment card approach); (3) the population surveyed (e.g., Montana recreational fishing license holders, all English speaking California households), and (4) the mechanism through which the respondent would actually pay the bid amount (i.e., increase in annual taxes, a one-time fee, an increase in monthly electric bill), as well as other factors. Importantly, in some cases the reported values reflect actions to preserve a number of fish species. Given these differences, it is not possible to predict the willingness to pay individuals would have for the protections afforded to the bull trout due to critical habitat designation under the Act. However, while it is not possible to quantify the value the public would place on actions taken to enhance probability of recovery of bull trout due to critical habitat designation, existing studies do support the conclusion that preservation of fish species in general is likely to generate substantial benefits to the public.

#### 6.4.3 INDIRECT BENEFITS

142. Conservation efforts for the bull trout and its critical habitat may also result in benefits other than those directly associated with the recovery of the bull trout. For example, conservation efforts for bull trout and its habitat may lead to a variety of indirect benefits, including:
- **Improved water quality**, could provide indirect benefits related to recovery of other listed species and habitat, and could potentially lead to lower costs of water treatment in some areas;
  - **Increased instream flows**, may result in indirect benefits associated with increased recreation opportunities such as kayaking, rafting, and shoreline recreation including hiking and camping as well as potential benefits related to mitigation for climate change; and,

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<sup>90</sup> Boyle, K. and R. Bishop. 1987. Valuing Wildlife in Benefit-Cost Analysis: A Case Study Involving Endangered Species. *Water Resource Research*. Vol. 23, pp. 943-950; Loomis, John B. and Douglas S. White. 1996. Economic Benefits of Rare and Endangered Species: Summary and Meta-Analysis. *Ecological Economics*. Vol. 18: 197-206; Kotchen, Matthew J. and Stephen D. Reiling. 2000. Environmental Attitudes, Motivations, and Contingent Valuation of Nonuse Values: A Case Study Involving Endangered Species. *Ecological Economics*. Vol. 32: 93-107.

<sup>91</sup> Hanemann, Michael, John Loomis and Barbara Kanninen. 1991. Statistical Efficiency of Double Bounded Dichotomous Choice Contingent Valuation. *American Journal of Agricultural Economics*, Volume 73(4): 1255-1263; Boyle, K. and R. Bishop. 1987. Valuing Wildlife in Benefit-Cost Analysis: A Case Study Involving Endangered Species. *Water Resource Research*. Vol. 23, pp. 943-950.

- **Increased focus on the quality of habitat** designated as critical habitat could result in potential increases in funding for restoration activities in certain areas, and associated increases in jobs from implementation of restoration activities.

To the extent that bull trout conservation efforts for critical habitat lead to improved water quality, increased open space, or aesthetic benefits, indirect use benefits may result, (such as increased hiking or wildlife-viewing activities). However, absent information on the long term biological and physical changes expected to occur in critical habitat areas as a result of critical habitat designation, the analysis does not attempt to quantify these types of potential benefits.<sup>92</sup>

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<sup>92</sup> This conclusion is similar to that found by Cascade Economics LLC, in their investigation of potential benefits of restoring the Deschutes River Estuary.

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## APPENDIX A | FINAL REGULATORY FLEXIBILITY ANALYSIS AND ENERGY IMPACTS ANALYSIS

1. This appendix considers the extent to which incremental impacts from critical habitat designation may be borne by small entities and the energy industry. The analysis presented in Section A.1 is conducted pursuant to the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996. The energy analysis in Section A.2 is conducted pursuant to Executive Order No. 13211.
2. The analyses of impacts to small entities and the energy industry rely on the estimated incremental impacts resulting from the proposed critical habitat designation. The incremental impacts of the rulemaking are most relevant for the small business and energy impacts analyses because they reflect costs that may be avoided or reduced based on decisions regarding the composition of the final rule. The future baseline impacts associated with the listing of the bull trout and other Federal, State, and local regulations and policies, as quantified in Chapters 3 and 5 of this report, are expected to occur regardless of the outcome of this rulemaking. Incremental impacts are detailed in Chapters 4 and 5 of this analysis.

### A.1 FINAL REGULATORY FLEXIBILITY ANALYSIS

3. This FRFA uses the best available information to identify the potential impacts of critical habitat on small entities. However, a number of uncertainties make specific identification of these impacts difficult, including: 1) the future regulatory burden of critical habitat, in terms on conservation efforts and administrative costs is uncertain, as discussed in the main body of this report; 2) the manner in which the future regulatory burden will be allocated between large and small entities is unknown; 3) the specific locations of small entities is only available at the county level. To account for uncertainty, this analysis utilizes the high end of the estimated range of potential annualized incremental impacts, as reported in the main body of this report. It then uses two scenarios to describe potential impacts to small entities.

#### A.1.1. SUMMARY OF FINDINGS

4. Estimated impacts to small entities, by industry, are summarized in Exhibit A-1. Of potentially affected entities, 97 percent are classified as likely to be “small.” Total annualized impacts to small entities are estimated to be \$3.6 million, or approximately 51 percent of total incremental impacts anticipated as a result of this rule (under the “high-end” cost scenario detailed in earlier chapters of this report). This estimate excludes project modification costs associated with BOR, USACE, and BPA activities at federally

regulated dams, as these are not small entities. In addition, the portion of the projected administrative costs, which are expected to be borne by the Service and various Action agencies, are excluded from this estimate.

5. Exhibit A-1 also presents the number of potentially affected small entities, under two scenarios. These scenarios are intended to provide a measure of uncertainty regarding the number of small entities that may be affected by the designation. Under Scenario 1, this analysis estimates the number of small entities located within areas affected by the proposed designation (approximately 23,800), and assumes that incremental impacts are distributed evenly across all entities in each affected industry. Under this scenario, a small entity may bear costs up to \$1,260, representing between <0.01 and 0.04 percent of average revenues (depending on the industry). Under Scenario 2, this analysis assumes costs of each anticipated future consultation are borne by a distinct small business (approximately 728 entities).<sup>1</sup> Under this scenario, each small entity may bear costs of between \$455 and \$21,500, representing between 0.01 and 0.57 percent of average annual revenues, depending on the industry.

#### A.1.2. FRFA REQUIREMENTS

6. First enacted in 1980, the RFA was designed to ensure that Federal agencies consider the potential for their regulations to unduly inhibit the ability of small entities to compete. The goals of the RFA include increasing the government's awareness of the impact of regulations on small entities and to encourage agencies to exercise flexibility in their rulemakings to provide regulatory relief to small entities.
7. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions).<sup>2</sup> For this rulemaking, this analysis takes the form of a final regulatory flexibility analysis (FRFA). Under 5 U.S.C., Section 603(b) of the RFA, a FRFA is required to contain:
  - i. A succinct statement of the need for, and objectives of, the rule;
  - ii. A summary of the significant issues raised by the public comments in response to the initial regulatory flexibility analysis, a summary of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments;
  - iii. A description of and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available;

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<sup>1</sup> The number of expected annual consultations is detailed in Chapter 5. Consultations on agricultural diversions typically involve an irrigation district rather than an individual farm. As such, the number of anticipated consultations on agriculture is multiplied by the average number of farms per irrigation district to estimate the number of potentially affected small entities engaged in agriculture and irrigation activities (see Exhibit A-1).

<sup>2</sup> 5 U.S.C. 601 et seq.

- iv. A description of the projected reporting, recordkeeping and other compliance requirements of the rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record; and
- v. A description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant alternatives to the rule considered by the agency which affect the impact on small entities was rejected.

## EXHIBIT A-1. SUMMARY OF ESTIMATED IMPACTS TO SMALL ENTITIES BY ACTIVITY TYPE

	UNIT NAME	DAMS	AGRICULTURE AND AGRICULTURE DIVERSIONS <sup>3</sup>	GRAZING	DEVELOPMENT	FOREST MANAGEMENT	ROADS	MINING	OTHER
[A]	Total Annualized Impacts to Small Entities <sup>1</sup>	\$781,000	\$798,000	\$40,700	\$10,200	\$1,660,000	\$125,000	\$276,000	\$400,000
[B]	Estimated Average Annual Revenues for Small Entities <sup>2</sup>	\$3,460,000	\$499,000	\$483,000	\$2,820,000	\$3,860,000	\$10,100,000	\$3,570,000	\$4,130,000
<b>Scenario 1: Assumes All Small Entities within Proposed Critical Habitat Share Incremental Costs Equally</b>									
[C]	Estimated Number of Small Entities within Proposed CH	619	6,411	850	11,798	2,363	736	260	761
[D]	Estimated Impact per Small Entity ([A]/[C])	\$1,260	\$125	\$48	\$0.87	\$703	\$170	\$1,060	\$525
[E]	Impact per Small Entity as Percentage of Revenues ([D]/[B])	0.04%	0.02%	0.01%	0.00%	0.02%	0.00%	0.03%	0.01%
<b>Scenario 2: Assumes All Consultations Involve One Small Entity</b>									
[F]	Estimated Number of Small Entities Expected to Undergo Consultation	39.5	411.1 <sup>3</sup>	17.5 <sup>4</sup>	22.5	77.4	131.6	28.4	390.1
[G]	Estimated Impact per Small Entity ([A]/[F])	\$19,800	\$1,940	\$2,320	\$455	\$21,500	\$949	\$9,750	\$1,020
[H]	Impact per Small Entity as Percentage of Revenues ([G]/[B])	0.57%	0.39%	0.48%	0.02%	0.56%	0.01%	0.27%	0.02%

1. Impacts presented here are based on high end cost estimates, as presented in earlier chapters, discounted at seven percent. Annualized incremental costs exclude costs associated with Federal dam projects, including the Willamette River Basin Project, Federal Columbia River Power System, and Bureau of Reclamation projects because these costs will not be borne by small entities. In addition, the portion of the administrative costs expected to be borne by the Service and Action agencies are excluded from these estimates. Remaining costs are assumed to be borne by small entities. However, some of these remaining costs may also be borne by Federal agencies. For example, forest management costs are assumed to be borne by small entities, when much of the costs may be borne by the U.S. Forest Service.

2. Annual revenues are estimated using Risk Management Association (RMA), *Annual Statement Studies: Financial Ratio Benchmarks 2009 to 2010*, 2009. The following method was used to develop these estimates:

(a) Matched affected economic activities to available NAICS codes in RMA data. The following codes are used for affected industries: Dams (221122), Agriculture (111988), Grazing (11211), Development (236115, 236116, 236117, 237210), Forest Management (113310, 113310), Roads (237310), Mining (212321), and Other (237120, 237130, 237990, 713930, 237110). Where possible, these correspond to the NAICS codes noted in Exhibit A-2.

	UNIT NAME	DAMS	AGRICULTURE AND AGRICULTURE DIVERSIONS <sup>3</sup>	GRAZING	DEVELOPMENT	FOREST MANAGEMENT	ROADS	MINING	OTHER
	<p>(b) For each NAICS code, RMA provides the net sales and the number of entities falling within several sales categories: \$0 to \$1 million, \$1 to 3 million, \$3 to \$5 million, \$5 to \$10 million, \$10 to \$25 million, and greater than \$25 million. Based on the number of entities and total net sales falling within each sales category, developed an estimate of average net sales (revenues) per small entity. Specifically, the analysis averages data for the sales categories at or below the small business threshold for each industry. For example, if the small business threshold is \$7 million, this analysis uses the following sales categories: \$0 to \$1 million, \$1 to 3 million, \$3 to \$5 million, and \$5 to \$10 million. For road construction related activities ("roads") (threshold of \$33.5 million), this analysis used sales categories up to \$10 to \$25 million. This represents a conservative approach to the analysis, as revenues per entity will appear lower, and therefore impacts higher, than if higher revenue categories were included.</p> <p>3. A total of 21 consultations are forecast per year for agriculture and agricultural diversions. This analysis assumes that these consultations are likely undertaken by irrigation districts, which represent multiple farms and thus multiple small entities. To better estimate the actual number of entities that may bear these costs, this analysis develops an estimated number of farms per irrigation district (19.6). This estimate is based on the number of acres per irrigated farm and the estimated number of acres per irrigation district. Developed from USDA, National Agricultural Statistics Service, 2007 <i>Census of Agriculture-State Data, Table 10. Irrigation: 2007 and 2002</i>, 2007 and Idaho Department of Water Resources, GIS Data for "Irrigation Companies," 2008, accessed at <a href="http://www.idwr.idaho.gov/gisdata/gis_data.htm">http://www.idwr.idaho.gov/gisdata/gis_data.htm</a> on December 17, 2009.</p> <p>4. Section 7 consultations for grazing activities may sometimes involve more than one small entity. For example, an allotment may have multiple permittees, while a single permittee may graze on multiple allotments. Similarly, section 7 consultations for grazing may take place at varying levels, covering multiple of single allotments. As a result of this variation, this analysis conservatively assumes one small entity per grazing consultation. To the extent that multiple small entities are involved, impacts per small entity would decrease.</p>								

**POTENTIAL IMPACTS TO ECONOMIC ACTIVITIES ON TRIBAL LANDS**

Approximately 424 miles of streams and shoreline areas in or adjacent to Tribal lands were proposed as critical habitat for the bull trout. The EPA has stated that, "for the purposes of the RFA, States and Tribal governments are not considered small governments but rather as independent sovereigns."<sup>3</sup> Tribal enterprises, like other enterprises, can be considered small entities under RFA/SBREFA.<sup>4</sup> For the purposes of this analysis, activities on Tribal lands are considered likely to be burdened with conservation efforts consistent with other non-Tribally owned lands. This analysis notes that, because Tribal governments generally have far fewer resources to draw from and often serve especially disadvantaged populations, impacts due to critical habitat designation may have a disproportionately negative effect on Tribes.

Two Tribes submitted comments related to the economic analysis. In particular, the Quinault Indian Nation believes the designation of critical habitat "would impose substantial additional burdens and costs on the Quinault Indian Nation, impairing its ability to benefit from trust resources and exercise treaty protected rights." The Nation also cites the potential for delays to restoration activities being undertaken by the Nation.<sup>5</sup> The Blackfeet Nation expressed concerns about the Nation's ability to use its water, "including potential future uses and the effective reallocation of water rights priorities that may be caused by the designation. Further, the Nation is concerned that the designation may impact its continuing utilization of trust resources."<sup>6</sup>

The Service is working with these and other Tribes during the section 4(b)(2) process to address these concerns.

**A.1.3. NEEDS AND OBJECTIVES OF THE RULE**

8. Section 4(a)(3) of the Endangered Species Act (Act) requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable.<sup>7</sup> Given that the bull trout is Federally-listed as threatened under the Act, the Service finds that the designation of critical habitat is required. Critical habitat was originally designated for the species on September 26, 2005. On March 23, 2009, the Service provided notice to the court that it would seek remand of the final critical habitat rule for bull trout. On July 1, 2009, the court granted the request for a voluntary remand of the 2005 final rule, and directed that a new proposed rule be completed by December 31, 2009, with a final rule completed by September 30, 2010.
9. The benefits of critical habitat designation derive from section 7 of the Act, which requires that Federal agencies, in consultation with the Service, ensure that actions they carry out, permit or fund are not likely to destroy or adversely modify critical habitat. As

<sup>3</sup> EPA. "Regulatory Flexibility Act/Small Business Regulatory Enforcement Fairness Act (RFA/SBREFA). What is a "small government?" Accessed at <http://www.epa.gov/sbreffa/government.htm> on August 10, 2005.

<sup>4</sup> The Small Business Size Regulations state that "Business concerns owned and controlled by Indian Tribes, Alaska Native Corporations (ANCs) organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601 *et seq.*), Native Hawaiian Organizations (NHOs), Community Development Corporations (CDCs) authorized by 42 U.S.C. 9805, or wholly-owned entities of Indian Tribes, ANCs, NHOs, or CDCs are not considered affiliates of such entities. Small Business Size Regulations, Title 13: Business Credit and Assistance, Chapter I: Small Business Administration, Part 121: Small Business Size Regulations.

<sup>5</sup> Public comments of the Quinault Indian Nation, April 5, 2010.

<sup>6</sup> Public comments of the Blackfeet Tribe of the Blackfeet Indian Reservation, March 15, 2010.

<sup>7</sup> 16 U.S.C. Sections 1531-1544.

noted above, the Act requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable.

10. The purpose of the proposed rule is to designate critical habitat for the bull trout pursuant to the Endangered Species Act (Act). Section 4(b)(2) of the Act requires that the Service designate critical habitat "on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts, of specifying any particular area as critical habitat." This section grants the Secretary [of the Interior] discretion to exclude any area from critical habitat if (s)he determines "the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat". The Secretary's discretion is limited, as (s)he may not exclude areas if it "will result in the extinction of the species."

#### A.1.4. SUMMARY OF THE SIGNIFICANT ISSUES RAISED BY THE PUBLIC COMMENTS

11. A number of small entities and organizations representing small entities commented on the Draft Economic Analysis and Initial Regulatory Flexibility Analysis (IRFA) during the public comment period. Commenters included Farmers Canal Water Users, Watson Agriculture Inc., Idaho Water Users and Idaho Farm Bureau, Oregon Farm Bureau, Klamath Water Users, and a number of small agricultural operations, among others. As discussed above, Tribal governments are not considered small entities for the purposes of the RFA. Many of these commenters were generally concerned about the potential for the designation to affect water rights. Other comments addressed the methodology used to estimate impacts to small entities in the IRFA. These comments are summarized and addressed below.
12. **Issue 1:** One commenter expressed concerns about certain assumptions underlying the Initial Regulatory Flexibility Analysis (IRFA). In particular, the commenter noted that some consultations may involve more than one small entity (e.g., for consultations on grazing activities); that administrative costs are often not passed on to small entities by Federal and State agencies and may otherwise be subsidized; that the Small Business Administration (SBA) thresholds used are inflated; and that location of small entities participating in activities such as grazing and mining may not correlate with population as assumed in the DEA. Another commenter encouraged outreach with small entities that submitted comments during the public comment period, including addressing these comments in the Final Regulatory Flexibility Analysis (FRFA) prepared for the final rule.
13. **Response 1:** The Initial Regulatory Flexibility Analysis (IRFA) has been revised to a Final Regulatory Flexibility Analysis (FRFA). In addition to the information previously provided in the IRFA, the FRFA provides a summary of comments submitted by small entities in response to the Proposed Rule. The purpose of the FRFA is to assist the Service in determining the extent to which incremental impacts resulting from critical habitat designation may be borne by a substantial number of small entities. As discussed in Section A.1, the FRFA developed two potential estimates of small entities that may be affected depending on the pattern of future consultations and the extent to which impacts are passed on to small entities. Given the breadth of the proposed designation, the number of counties potentially affected, and the more than 70,800 small businesses

falling within these counties, primary data collection efforts on the location of each of these businesses and their individual revenues were not feasible and were considered to be outside the scope of this analysis.

14. Scenario 1 is based on the estimated number of small entities falling within the designation. To derive this estimate, Appendix A of the FEA uses best available data on such factors as the size and annual sales of businesses in the area, as collected by Dun & Bradstreet. These data are available on a county-wide basis. Because counties may include areas that are not part of the critical habitat designation, the number of small entities within the county is scaled by the percentage of the county's population living within the proposed critical habitat boundaries. The commenter correctly points out that some industries may not correspond to population patterns. For example, agricultural, grazing, and mining operations may be located in more rural and less populated areas. Exhibit A-3 provides a summary of all small entities located in the relevant counties, including 416 mining operations, 14,402 agricultural operations, and 1,468 grazing operations. If potential incremental impacts were benchmarked against all of these businesses, the estimated impact per small entity would be less than \$700 per entity, representing less than 0.01 percent of revenues. Scenario 2 is based on the forecast number of consultations, assuming one small entity per consultation except in the case of agricultural operations. As the commenter points out, grazing consultations also may involve more than one small entity. This comment has been addressed in Exhibit A-1.
15. As stated in Section A.1.1 and Exhibit A-1, the portion of administrative costs expected to be borne by Federal and state agencies are excluded from impacts considered in this section as well as any project modification costs likely to be borne by Federal agencies. For example, as noted in Exhibit A-1, impacts associated with Federal dam projects are excluded. In total, annualized incremental impacts to small entities considered in Appendix A are only 51 percent of total incremental impacts estimated in the rest of the report. While one commenter believes that the impacts are overstated, they still represent less than 0.6 percent of annual revenues under both scenarios and for all activities.
16. Finally, the small business size standards noted in Exhibit A-2 are taken directly from the US Small Business Administration.<sup>8</sup> The size standards are used to determine the number of businesses that may qualify as small entities under the RFA (see, for example, the "regulated small entities in county" column in Exhibit A-3). The Service recognizes that many small businesses may have revenues that fall well below this size standard. Therefore, Appendix A uses estimates based on revenue data provided by Risk Management Association to refine its revenue estimates (see Row [B] in Exhibit A-1).
17. **Issue 2:** Various comment letters expressed concern that the designation could result in flow management changes which could impact agricultural operations. For example, several commenters state that the DEA fails to take into account negative impacts that could result from changes in reservoir operations on the Boise, Payette, and Weiser Rivers, which could affect agriculture in this section of Idaho. Another commenter is

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<sup>8</sup> US Small Business Administration, *Table of Small Business Size Standards Matched to North American Industry Classification System Codes*, accessed at: [http://www.sba.gov/idc/groups/public/documents/sba\\_homepage/serv\\_sstd\\_tablepdf.pdf](http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf).

concerned about the economic impacts associated with a loss of irrigation water in Adams County, Idaho. One commenter states that DEA should analyze potential future reallocation of water rights priorities that may be caused by the designation, and any associated costs to the Blackfoot Tribe. On the other hand, a commenter states that reductions in instream flows are unlikely and there is no reason to believe that this will occur on public and private lands.

18. **Response 2:** As discussed in Section 4.1, the FEA forecasts potential incremental impacts resulting from modifications to irrigation diversions across the proposed critical habitat designation. As discussed in the 2004 final economic analysis of the Columbia and Klamath River DPSs, the Service, USFS and BLM have indicated that reductions in irrigation to protect bull trout critical habitat are unlikely. To date, there have not been any section 7 consultations with USFS or BLM where irrigation diversions have been altered to benefit bull trout or its critical habitat. Because of the large degree of uncertainty as to whether consultations regarding irrigation diversions would occur, what volume of water might be reallocated to instream flows, and what the primary use of the diverted water would be (e.g., crops or pasture irrigation), the FEA estimates a range of outcomes. The low end scenario assumes that the Service would not recommend any changes to irrigation withdrawals, while the high end scenario assumes there could be project modification costs associated with ten irrigation diversion projects over the 20-year timeframe of the analysis. This estimated range recognizes that such consultation outcomes are unlikely, but that if a limited number were to occur, the impacts on individual operators could be substantial.

#### A.1.5 DESCRIPTION AND ESTIMATE OF THE NUMBER OF SMALL ENTITIES TO WHICH THE RULE APPLIES

19. Three types of small entities are defined in the RFA:
- **Small Business** - Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently owned and operated and is not dominant in its field of operation. The U.S. Small Business Administration (SBA) has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to North American Industry Classification System (NAICS) industries. The SBA definition of a small business applies to a firm's parent company and all affiliates as a single entity.
  - **Small Governmental Jurisdiction** - Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Special districts may include those servicing irrigation, ports, parks and recreation, sanitation, drainage, soil and water conservation, road assessment, etc. When counties have populations greater than 50,000, those municipalities of fewer than 50,000 can be identified using population reports. Other types of small

government entities are not as easily identified under this standard, as they are not typically classified by population.

- **Small Organization** - Section 601(4) defines a small organization as any not-for-profit enterprise that is independently owned and operated and not dominant in its field. Small organizations may include private hospitals, educational institutions, irrigation districts, public utilities, agricultural co-ops, etc.
20. The courts have held that the RFA/SBREFEA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission (FERC)*, FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities that expected to be regulated were large businesses; however, their customers -- transmitting utilities such as electric cooperatives -- included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers, and FERC could therefore certify that small entities were not directly impacted within the definition of the RFA.<sup>9</sup>
  21. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency (EPA)* addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.<sup>10</sup> The basis of EPA's RFA/SBREFEA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of state plans that incorporated the standards. The court found that, while EPA imposed regulation on states, it did not have authority under this rule to impose regulations directly on small entities and therefore small entities were not directly impacted within the definition of the RFA.
  22. The Small Business Administration (SBA) in its guidance on how to comply with the RFA recognizes that consideration of indirectly affected small entities is not required by the RFA, but encourages agencies to perform a regulatory flexibility analysis even when the impacts of its regulation are indirect.<sup>11</sup> "If an agency can accomplish its statutory mission in a more cost-effective manner, the Office of Advocacy [of the SBA] believes that it is good public policy to do so. The only way an agency can determine this is if it does not certify regulations that it knows will have a significant impact on small entities even if the small entities are regulated by a delegation of authority from the Federal agency to some other governing body."<sup>12</sup>

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<sup>9</sup> 773 F. 2d 327 (D.C. Cir. 1985).

<sup>10</sup> 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

<sup>11</sup> Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act, pg. 20.

<sup>12</sup> *Ibid.*, pg. 21.

23. The regulatory mechanism through which critical habitat protections are enforced is section 7 of the Act, which directly regulates only those activities carried out, funded, or permitted by a Federal agency. By definition, Federal agencies are not considered small entities, although the activities they may fund or permit may be proposed or carried out by small entities. Given the SBA guidance described above, this analysis considers the extent to which this designation could potentially affect small entities, regardless of whether these entities would be directly regulated by the Service through the proposed rule or by a delegation of impact from the directly regulated entity.
24. This FRFA focuses on small entities that may bear the incremental impacts of this rulemaking quantified in Chapters 4 through 5 of this economic analysis. Critical habitat may affect small entities as a result of changes in the project design, operation, or management of activities taking place within the study area as discussed in Chapter 4. Exhibit A-2 describes potentially affected small businesses by NAICS code, highlighting the relevant small business thresholds. Although businesses affected indirectly are considered, this analysis considers only those entities for which impact would not be measurably diluted.
25. Small entities also may participate in section 7 consultation as a third party (the primary consulting parties being the Service and the Federal action agency). It is therefore possible that the small entities may spend additional time considering critical habitat during section 7 consultation for bull trout. These incremental administrative impacts to third parties are discussed in Chapter 5 of this analysis. Additional incremental costs of consultation that would be borne by the Federal action agency and the Service are not relevant to this FRFA as these entities (Federal agencies) are not small.
26. As described above and detailed in Chapters 4 through 5 of this report, incremental impacts associated with this rulemaking are expected to consist of: (1) project modifications occurring within newly proposed, unoccupied areas; and (2) administrative costs associated with section 7 consultations. Chapter 4 discusses forecast project modifications in greater detail, while Chapter 5 quantifies the administrative costs of section 7 consultation. In total, third parties (some of which may be small entities) may bear a total annual impact of up to \$4.2 million in incremental impacts. These potential impacts are described in greater detail below.
  - **Project Modifications.** As discussed in Chapter 4, costs related to incremental conservation efforts may occur in unoccupied areas. In these areas, this analysis forecasts project modifications associated with a variety of activities including dam modifications, bridge replacement, grazing lease modifications, road maintenance, and changes to timber harvest. In total, annual incremental costs associated with project modifications that may affect small entities are forecast at up to \$3.7 million (discounted at seven percent).
  - **Administrative Costs.** Based on the number of past consultations and the extent of unoccupied areas within the designation, this analysis forecasts the number of additional consultations that may take place as a result of critical habitat (see Chapter

- 5). Based on this forecast, annual incremental consultation costs that may be borne by third parties are forecast at \$543,000 in total (discounted at seven percent).<sup>13</sup>
27. Total incremental annualized impacts to third parties are estimated at approximately \$4.2 million. As discussed in greater detail in Section A.1.2, these impacts include project modifications occurring within newly proposed, unoccupied areas, and the costs to third parties of participating in section 7 consultations. These impacts are forecast to be borne by entities involved in a variety of industries, including dam operators (46 percent), forest managers (30 percent), and agriculture operations (8 percent).
28. Ideally, this analysis would directly identify the number of small entities that are located within the critical habitat units proposed in the rule. However, it is not possible to directly determine the number of firms in each industry sector within the critical habitat units because business activity data are maintained at the county level. Therefore, this analysis first identifies small entities in counties that overlap with areas proposed for critical habitat within the action area, then estimates the number of small entities within the study area using the following method:
- In order to estimate the number of businesses located within the study area for the proposed rule, this analysis assumes that business locations are distributed geographically in the same pattern that population is distributed. That is, more densely populated areas will contain proportionally more businesses than less populated areas.
  - The number of people residing within the proposed critical habitat units was estimated by summing up the population of all census blocks that are contained within the critical habitat unit.<sup>14, 15</sup>
  - The ratio of the population within the study area to the total population of the county is used to estimate the proportion of total and small business entities that may be affected by the proposed rule. Thus, this analysis uses population distribution as a proxy for the distribution of small entities in a county.
29. Exhibits A-3 and A-4 present the number of potentially affected small businesses by county and by critical habitat unit. Exhibit A-5 presents the percentage of small businesses estimated to fall within each critical habitat unit.

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<sup>13</sup> Note, this total is not shown in Chapter 5 because it reflects only the administrative costs to third parties, rather than the full cost of the consultation, including Service and Federal agency time. In addition, it excludes annualized impacts associated with non-native species because costs associated with this mitigation are expected to be borne by Federal agencies.

<sup>14</sup> 2000 Census of Population and Housing.

<sup>15</sup> In case of partial containment of a census block, the ratio of the contained and total area of the block was used to estimate the block population residing within the hydrologic unit. The population that resides within each county included in the study area is generated by summing up the population estimates across all critical habitat units with which the county intersects.

**A.1.6 DESCRIPTION OF REPORTING AND RECORDKEEPING EFFORTS**

30. The rule does not directly mandate “reporting” or “record keeping” within the meaning of the Paperwork Reduction Act (PRA).

**A.1.7 IDENTIFICATION OF ALL RELEVANT FEDERAL RULES THAT MAY DUPLICATE, OVERLAP, OR CONFLICT WITH THE PROPOSED RULE**

31. A FRFA must identify any duplicative, overlapping, and conflicting Federal rules. Rules are duplicative or overlapping if they are based on the same or similar reasons for the regulation, the same or similar regulatory goals, and if they regulate the same classes of industry. Rules are conflicting when they impose two conflicting regulatory requirements on the same classes of industry.
32. The protection of listed species and habitat under critical habitat may overlap other sections of the Act. The protections afforded to threatened and endangered species and their habitat are described in section 7, 9, and 10 of the Act. While the proposed critical habitat regulates activities that are Federally funded, authorized by a Federal agency, or carried out by a Federal agency, section 7 also requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. The baseline conservation efforts quantified in this report overlaps with the jeopardy standard invoked by the listing of the species. The incremental impacts forecast in this report and contemplated in this FRFA are expected to result from the critical habitat designation, however, and not other Federal rules.

**A.1.8 A DESCRIPTION OF ALTERNATIVES TO THE PROPOSED RULES WHICH ACCOMPLISH THE OBJECTIVES AND WHICH MINIMIZE IMPACTS ON SMALL ENTITIES**

33. The Service identified 32 units as potential critical habitat for the bull trout. Section 4(b)(2) of the Act allows the Service to exclude areas proposed for designation based on economic impact and other relevant impacts. Therefore, an alternative to the Proposed Rule (designating all 32 proposed units for critical habitat) is the designation of a subset of these units or portions of the various units.

## EXHIBIT A-2. MAJOR RELEVANT ACTIVITIES AND A DESCRIPTION OF THE INDUSTRY SECTORS ENGAGED IN THOSE ACTIVITIES

MAJOR RELEVANT ACTIVITY	DESCRIPTION OF INCLUDED INDUSTRY SECTORS	NAICS CODE	SBA SIZE STANDARD
<u>Dams and Water Diversions</u>	<p><b><u>Electric Power Generation, Transmission and Distribution</u></b></p> <p>This industry group comprises establishments primarily engaged in generating, transmitting, and/or distributing electric power. Establishments in this industry group may perform one or more of the following activities: (1) operate generation facilities that produce electric energy; (2) operate transmission systems that convey the electricity from the generation facility to the distribution system; and (3) operate distribution systems that convey electric power received from the generation facility or the transmission system to the final consumer.</p>	221111 221112 221113 221119 221121 221122	4 million megawatts for the preceding year <sup>1</sup>
	<p><b><u>Water Supply and Irrigation Systems</u></b></p> <p>This industry comprises establishments primarily engaged in operating water treatment plants and/or operating water supply systems. The water supply system may include pumping stations, aqueducts, and/or distribution mains. The water may be used for drinking, irrigation, or other uses.</p>	221310	\$7.0 million average annual receipts
<u>Agriculture</u>	<p><b><u>Crop Production (Oilseed and Grain Farming, Vegetable and Melon Farming, Fruit and Tree Nut Farming)</u></b></p> <p>This industry group comprises establishments primarily engaged in 1) growing oilseed and/or grain crops and/or producing oilseed and grain seeds; 2) growing root and tuber crops (except sugar beets and peanuts) or edible plants and/or producing root and tuber or edible plant seeds; or 3) growing fruit and/or tree nut crops.</p>	1111 1112 1113	\$750,000 average annual receipts
	<p><b><u>Food Manufacturing</u></b></p> <p>Industries in this sector transform livestock and agricultural products into products for intermediate or final consumption. The industry groups are distinguished by the raw materials (generally of animal or vegetable origin) processed into food products.</p>	311	500 employees
<u>Grazing</u>	<p><b><u>Beef Cattle Ranching and Farming</u></b></p> <p>This U.S. industry comprises establishments primarily engaged in raising cattle (including cattle for dairy herd replacements).</p>	112111	\$750,000 average annual receipts
<u>Roads</u>	<p><b><u>Highway, Street and Bridge Construction</u></b></p> <p>This industry comprises establishments primarily engaged in the construction of highways (including elevated), streets, roads, airport runways, public sidewalks, or bridges. The work performed may include new work, reconstruction, rehabilitation, and repairs.</p>	237310	\$33.5 million average annual receipts

MAJOR RELEVANT ACTIVITY	DESCRIPTION OF INCLUDED INDUSTRY SECTORS	NAICS CODE	SBA SIZE STANDARD
<u>Development</u>	<p><b><u>New Single-Family Housing Construction (except Operative Builders)</u></b></p> <p>This U.S. industry comprises general contractor establishments primarily responsible for the entire construction of new single-family housing, such as single-family detached houses and town houses or row houses where each housing unit (1) is separated from its neighbors by a ground-to-roof wall and (2) has no housing units constructed above or below. This industry includes general contractors responsible for the on-site assembly of modular and prefabricated houses. Single-family housing design-build firms and single-family construction management firms acting as general contractors are included in this industry.</p>	236115	\$33.5 million average annual receipts
	<p><b><u>New Multifamily Housing Construction (except Operative Builders)</u></b></p> <p>This U.S. industry comprises general contractor establishments responsible for the construction of new multifamily residential housing units (e.g., high-rise, garden, and town house apartments and condominiums where each unit is not separated from its neighbors by a ground-to-roof wall). Multifamily design-build firms and multifamily housing construction management firms acting as general contractors are included in this industry.</p>	236116	
	<p><b><u>New Housing Operative Builders</u></b></p> <p>This U.S. industry comprises operative builders primarily responsible for the entire construction of new houses and other residential buildings, single-family and multifamily, on their own account for sale. Operative builders are also known as speculative or merchant builders.</p>	236117	
	<p><b><u>Land Subdivision</u></b></p> <p>This industry comprises establishments primarily engaged in servicing land and subdividing real property into lots, for subsequent sale to builders. Servicing of land may include excavation work for the installation of roads and utility lines. The extent of work may vary from project to project. Land subdivision precedes building activity and the subsequent building is often residential, but may also be commercial tracts and industrial parks. These establishments may do all the work themselves or subcontract the work to others. Establishments that perform only the legal subdivision of land are not included in this industry.</p>	237210	\$7.0 million
<u>Forest Management</u>	<p><b><u>Logging</u></b></p> <p>This industry comprises establishments primarily engaged in one or more of the following: (1) cutting timber; (2) cutting and transporting timber; and (3) producing wood chips in the field.</p>	113310	500 employees
	<p><b><u>Timber Tract Operations</u></b></p> <p>This industry comprises establishments primarily engaged in the operation of timber tracts for the purpose of selling standing timber.</p>	113110	\$7.0 million average annual receipts
		115310	

MAJOR RELEVANT ACTIVITY	DESCRIPTION OF INCLUDED INDUSTRY SECTORS	NAICS CODE	SBA SIZE STANDARD
	<p><b><u>Support Activities for Forestry</u></b></p> <p>This industry comprises establishments primarily engaged in performing particular support activities related to timber production, wood technology, forestry economics and marketing, and forest protection. These establishments may provide support activities for forestry, such as estimating timber, forest firefighting, forest pest control, and consulting on wood attributes and reforestation.</p>		
<b><u>Mining</u></b>	<p><b><u>Mining (except Oil and Gas)</u></b></p> <p>Industries in the Mining (except Oil and Gas) subsector primarily engage in mining, mine site development, and beneficiating (i.e., preparing) metallic minerals and nonmetallic minerals, including coal. The term "mining" is used in the broad sense to include ore extraction, quarrying, and beneficiating (e.g., crushing, screening, washing, sizing, concentrating, and flotation), customarily done at the mine site.</p>	212	500 employees
	<p><b><u>Construction Sand and Gravel Mining</u></b></p> <p>This industry comprises establishments primarily engaged in one or more of the following: (1) operating commercial grade (i.e., construction) sand and gravel pits; (2) dredging for commercial grade sand and gravel; and (3) washing, screening, or otherwise preparing commercial grade sand and gravel.</p>	212321	
<b><u>Other Activities</u></b>	<p><b><u>Oil and Gas Pipeline and Related Structures Construction</u></b></p> <p>This industry comprises establishments primarily engaged in the construction of oil and gas lines, mains, refineries, and storage tanks.</p>	237120	\$33.5 million average annual receipts
	<p><b><u>Power and Communication Line and Related Structures Construction</u></b></p> <p>This industry comprises establishments primarily engaged in the construction of power lines and towers, power plants, and radio, television, and telecommunications transmitting/receiving towers.</p>	237130	
	<p><b><u>Other Heavy and Civil Engineering Construction</u></b></p> <p>This industry comprises establishments primarily engaged in heavy and engineering construction projects (excluding highway, street, bridge, and distribution line construction).</p>	237990	
	<p><b><u>Marinas</u></b></p> <p>This industry comprises establishments engaged in operating docking and/or storage facilities for pleasure craft owners, with or without one or more related activities, such as retailing fuel and marine supplies; and repairing, maintaining, or renting pleasure boats.</p>	713930	

MAJOR RELEVANT ACTIVITY	DESCRIPTION OF INCLUDED INDUSTRY SECTORS	NAICS CODE	SBA SIZE STANDARD
	<p><b><u>Water and Sewer Line and Related Structures Construction</u></b>            This industry comprises establishments primarily engaged in the construction of water and sewer lines, mains, pumping stations, treatment plants and storage tanks.</p>	237110	\$33.5 million average annual receipts
	<p><b><u>Sewage Treatment Facilities</u></b>            This industry comprises establishments primarily engaged in operating sewer systems or sewage treatment facilities that collect, treat, and dispose of waste.</p>	221320	\$7.0 million average annual receipts

## EXHIBIT A-3. ESTIMATED NUMBER OF REGULATED ENTITIES BY UNIT AND COUNTY

UNIT	STATE	COUNTY	TOTAL COUNTY POPULATION	POPULATION WITHIN STUDY AREA	% COUNTY POPULATION WITHIN STUDY AREA	ALL REGULATED ENTITIES IN COUNTY	REGULATED SMALL ENTITIES IN COUNTY	ALL REGULATED ENTITIES IN STUDY AREA	REGULATED SMALL ENTITIES IN STUDY AREA
1	Washington	Clallam	64,525	9,940	15%	454	445	74	72
	Washington	Grays Harbor	67,194	66,749	99%	394	382	394	382
	Washington	Jefferson	25,953	2,953	11%	208	208	28	28
	Washington	Mason	49,405	7,945	16%	301	297	52	51
	Washington	Thurston	207,355	18,750	9%	1,005	977	93	91
2	Washington	Island	71,558	8,338	12%	368	368	47	47
	Washington	King	1,737,034	1,489,385	86%	6,166	5,949	5,291	5,105
	Washington	Mason	49,405	7,945	16%	301	297	52	51
	Washington	Pierce	700,820	306,460	44%	2,606	2,541	1,144	1,116
	Washington	Skagit	102,979	101,483	99%	751	707	744	700
	Washington	Snohomish	606,024	520,246	86%	2,600	2,544	2,236	2,188
	Washington	Thurston	207,355	18,750	9%	1,005	977	93	91
3	Washington	Whatcom	166,814	65,222	39%	1,130	1,088	445	429
	Washington	Clark	345,238	5,800	2%	1,603	1,561	32	31
	Washington	Cowlitz	92,948	5,968	6%	413	398	31	29
	Washington	Klickitat	19,161	11,299	59%	246	235	148	141
	Washington	Skamania	9,872	400	4%	62	61	8	8
4	Washington	Yakima	222,581	2	0%	2,130	1,944	8	8
	Oregon	Lane	322,959	153,227	47%	1,994	1,949	952	929
5	Oregon	Linn	103,069	8	0%	1,077	1,036	8	8
	Oregon	Hood River	20,411	16,294	80%	478	448	384	360
6	Oregon	Deschutes	115,367	6,854	6%	1,562	1,536	96	95
	Oregon	Hood River	20,411	16,294	80%	478	448	384	360
	Oregon	Jefferson	19,009	19,005	100%	255	247	255	247
	Oregon	Sherman	1,934	169	9%	124	124	14	14

UNIT	STATE	COUNTY	TOTAL COUNTY POPULATION	POPULATION WITHIN STUDY AREA	% COUNTY POPULATION WITHIN STUDY AREA	ALL REGULATED ENTITIES IN COUNTY	REGULATED SMALL ENTITIES IN COUNTY	ALL REGULATED ENTITIES IN STUDY AREA	REGULATED SMALL ENTITIES IN STUDY AREA
	Oregon	Wasco	23,791	2,807	12%	341	321	45	43
7	Oregon	Klamath	63,775	7	0%	577	553	8	8
8	Oregon	Clatsop	35,630	7,740	22%	309	299	70	68
	Oregon	Columbia	43,560	7,473	17%	325	325	61	61
	Oregon	Gilliam	1,915	334	17%	46	44	10	10
	Oregon	Hood River	20,411	16,294	80%	478	448	384	360
	Oregon	Morrow	10,995	2,367	22%	166	152	40	37
	Oregon	Multnomah	660,486	4,402	1%	2,863	2,765	24	24
	Oregon	Sherman	1,934	169	9%	124	124	14	14
	Oregon	Umatilla	70,548	3,077	4%	677	632	35	33
	Oregon	Wasco	23,791	2,807	12%	341	321	45	43
	Washington	Benton	142,475	205	0%	828	758	7	7
	Washington	Clark	345,238	5,800	2%	1,603	1,561	32	31
	Washington	Cowlitz	92,948	5,968	6%	413	398	31	29
	Washington	Klickitat	19,161	11,299	59%	246	235	148	141
	Washington	Skamania	9,872	400	4%	62	61	8	8
	Washington	Wahkiakum	3,824	560	15%	37	37	9	9
	Washington	Walla Walla	55,180	2	0%	589	556	8	8
9	Oregon	Klamath	63,775	7	0%	577	553	8	8
	Oregon	Lake	7,422	28	0%	134	132	8	8
10	Washington	Chelan	66,616	20,267	30%	1,077	1,018	330	312
	Washington	Okanogan	39,564	5,692	14%	680	650	102	98
11	Washington	Benton	142,475	205	0%	828	758	7	7
	Washington	Kittitas	33,362	33,188	99%	419	402	418	402
	Washington	Yakima	222,581	2	0%	2,130	1,944	8	8
12	Oregon	Gilliam	1,915	334	17%	46	44	10	10
	Oregon	Grant	7,935	7,567	95%	160	160	156	156

UNIT	STATE	COUNTY	TOTAL COUNTY POPULATION	POPULATION WITHIN STUDY AREA	% COUNTY POPULATION WITHIN STUDY AREA	ALL REGULATED ENTITIES IN COUNTY	REGULATED SMALL ENTITIES IN COUNTY	ALL REGULATED ENTITIES IN STUDY AREA	REGULATED SMALL ENTITIES IN STUDY AREA
	Oregon	Jefferson	19,009	19,005	100%	255	247	255	247
	Oregon	Morrow	10,995	2,367	22%	166	152	40	37
	Oregon	Sherman	1,934	169	9%	124	124	14	14
	Oregon	Umatilla	70,548	3,077	4%	677	632	35	33
	Oregon	Wasco	23,791	2,807	12%	341	321	45	43
	Oregon	Wheeler	1,547	1,546	100%	41	40	41	40
13	Oregon	Morrow	10,995	2,367	22%	166	152	40	37
	Oregon	Umatilla	70,548	3,077	4%	677	632	35	33
14	Oregon	Umatilla	70,548	3,077	4%	677	632	35	33
	Washington	Columbia	4,064	3,716	91%	76	74	71	69
	Washington	Walla Walla	55,180	2	0%	589	556	8	8
15	Washington	Asotin	20,551	805	4%	122	120	11	11
	Washington	Columbia	4,064	3,716	91%	76	74	71	69
	Washington	Garfield	2,397	1,973	82%	79	79	67	67
16	Oregon	Umatilla	70,548	3,077	4%	677	632	35	33
	Oregon	Union	24,530	23,735	97%	337	330	329	322
	Oregon	Wallowa	7,226	6,840	95%	181	179	174	172
	Washington	Asotin	20,551	805	4%	122	120	11	11
	Washington	Garfield	2,397	1,973	82%	79	79	67	67
17	Oregon	Wallowa	7,226	6,840	95%	181	179	174	172
18	Idaho	Idaho	15,511	1	0%	268	264	8	8
19	Idaho	Adams	3,476	28	1%	77	77	7	7
	Oregon	Baker	16,741	1,207	7%	249	244	22	22
20	Oregon	Baker	16,741	1,207	7%	249	244	22	22
	Oregon	Union	24,530	23,735	97%	337	330	329	322
21	Idaho	Clearwater	8,930	8,930	100%	118	111	118	111
	Idaho	Idaho	15,511	1	0%	268	264	8	8

UNIT	STATE	COUNTY	TOTAL COUNTY POPULATION	POPULATION WITHIN STUDY AREA	% COUNTY POPULATION WITHIN STUDY AREA	ALL REGULATED ENTITIES IN COUNTY	REGULATED SMALL ENTITIES IN COUNTY	ALL REGULATED ENTITIES IN STUDY AREA	REGULATED SMALL ENTITIES IN STUDY AREA
	Idaho	Lewis	3,747	3,722	99%	107	105	107	105
	Idaho	Nez Perce	37,410	15,033	40%	239	234	100	99
	Washington	Whitman	40,740	4	0%	753	741	7	7
22	Washington	Benton	142,475	205	0%	828	758	7	7
	Washington	Chelan	66,616	20,267	30%	1,077	1,018	330	312
	Washington	Douglas	32,603	19,454	60%	549	521	331	314
	Washington	Franklin	49,347	12,885	26%	689	607	185	162
	Washington	Grant	74,698	1,014	1%	1,130	1,050	22	21
	Washington	Kittitas	33,362	33,188	99%	419	402	418	402
	Washington	Okanogan	39,564	5,692	14%	680	650	102	98
	Washington	Walla Walla	55,180	2	0%	589	556	8	8
23	Idaho	Nez Perce	37,410	15,033	40%	239	234	100	99
	Idaho	Washington	9,977	371	4%	153	150	11	10
	Oregon	Baker	16,741	1,207	7%	249	244	22	22
	Oregon	Malheur	31,615	36	0%	451	428	8	8
	Washington	Asotin	20,551	805	4%	122	120	11	11
	Washington	Benton	142,475	205	0%	828	758	7	7
	Washington	Columbia	4,064	3,716	91%	76	74	71	69
	Washington	Franklin	49,347	12,885	26%	689	607	185	162
	Washington	Garfield	2,397	1,973	82%	79	79	67	67
	Washington	Walla Walla	55,180	2	0%	589	556	8	8
24	Washington	Whitman	40,740	4	0%	753	741	7	7
	Oregon	Grant	7,935	7,567	95%	160	160	156	156
	Oregon	Harney	7,609	198	3%	157	154	9	9
25	Oregon	Malheur	31,615	36	0%	451	428	8	8
	Idaho	Owyhee	10,644	660	6%	130	122	14	14
	Nevada	Elko	45,291	51	0%	161	144	8	8

UNIT	STATE	COUNTY	TOTAL COUNTY POPULATION	POPULATION WITHIN STUDY AREA	% COUNTY POPULATION WITHIN STUDY AREA	ALL REGULATED ENTITIES IN COUNTY	REGULATED SMALL ENTITIES IN COUNTY	ALL REGULATED ENTITIES IN STUDY AREA	REGULATED SMALL ENTITIES IN STUDY AREA
26	Idaho	Adams	3,476	28	1%	77	77	7	7
	Idaho	Boise	6,670	1,971	30%	74	74	26	26
	Idaho	Camas	991	35	4%	35	35	5	5
	Idaho	Elmore	29,130	330	1%	141	130	8	8
	Idaho	Gem	15,181	576	4%	204	202	12	12
	Idaho	Valley	7,651	5,853	76%	179	179	141	141
	Idaho	Washington	9,977	371	4%	153	150	11	10
27	Idaho	Adams	3,476	28	1%	77	77	7	7
	Idaho	Blaine	18,991	23	0%	260	254	8	8
	Idaho	Custer	4,342	3,046	70%	56	55	44	43
	Idaho	Idaho	15,511	1	0%	268	264	8	8
	Idaho	Lemhi	7,806	7,800	100%	104	102	104	102
	Idaho	Lewis	3,747	3,722	99%	107	105	107	105
	Idaho	Valley	7,651	5,853	76%	179	179	141	141
28	Idaho	Butte	2,899	343	12%	53	53	11	11
29	Idaho	Kootenai	108,685	90,059	83%	1,052	1,034	876	862
	Idaho	Shoshone	13,771	13,771	100%	96	92	96	92
30	Idaho	Bonner	36,835	406	1%	446	444	10	10
	Idaho	Boundary	9,871	9,856	100%	125	124	125	124
	Montana	Flathead	74,471	78	0%	916	903	8	8
	Montana	Lincoln	18,837	18,448	98%	266	265	263	262
31	Idaho	Bonner	36,835	406	1%	446	444	10	10
	Idaho	Boundary	9,871	9,856	100%	125	124	125	124
	Idaho	Kootenai	108,685	90,059	83%	1,052	1,034	876	862
	Montana	Deer Lodge	9,417	9,366	99%	37	37	37	37
	Montana	Flathead	74,471	78	0%	916	903	8	8
	Montana	Granite	2,830	2,830	100%	60	60	60	60

UNIT	STATE	COUNTY	TOTAL COUNTY POPULATION	POPULATION WITHIN STUDY AREA	% COUNTY POPULATION WITHIN STUDY AREA	ALL REGULATED ENTITIES IN COUNTY	REGULATED SMALL ENTITIES IN COUNTY	ALL REGULATED ENTITIES IN STUDY AREA	REGULATED SMALL ENTITIES IN STUDY AREA
	Montana	Lake	26,507	26,507	100%	289	285	289	285
	Montana	Lewis and Clark	55,716	1,311	2%	371	368	13	13
	Montana	Lincoln	18,837	18,448	98%	266	265	263	262
	Montana	Mineral	3,884	3,884	100%	63	63	63	63
	Montana	Missoula	95,802	95,802	100%	612	604	612	604
	Montana	Powell	7,180	7,180	100%	86	86	86	86
	Montana	Ravalli	36,070	36,070	100%	457	455	457	455
	Montana	Sanders	10,227	10,227	100%	131	128	131	128
	Washington	Pend Oreille	11,732	6,309	54%	84	83	49	49
	Washington	Stevens	40,066	4	0%	410	403	8	8
32	Montana	Glacier	13,247	541	4%	139	138	10	10
<b>Total</b>			<b>10,211,328</b>	<b>3,762,261</b>		<b>73,755</b>	<b>70,825</b>	<b>24,535</b>	<b>23,798</b>

## EXHIBIT A-4. ESTIMATED NUMBER OF REGULATED ENTITIES THAT ARE SMALL (BY UNIT AND ACTIVITY TYPE)

UNIT	UNIT NAME	DAMS	AGRICULTURE AND AGRICULTURE DIVERSIONS	GRAZING	DEVELOPMENT	FOREST MANAGEMENT	ROADS	MINING	OTHER	TOTAL
1	Olympic Peninsula	15	149	17	268	115	25	12	23	624
2	Puget Sound	204	1,482	62	7,011	254	276	74	364	9,727
3	Lower Columbia River Basins	10	69	13	72	28	13	5	7	217
4	Upper Willamette River	20	223	18	480	146	23	9	18	937
5	Hood River	9	250	2	77	14	4	0	4	360
6	Lower Deschutes River	23	414	19	236	37	17	4	9	759
7	Odell Lake	1	1	1	1	1	1	1	1	8
8	Mainstem Lower Columbia River	35	427	33	258	69	26	15	20	883
9	Klamath River Basin	2	2	2	2	2	2	2	2	16
10	Upper Columbia River Basins	12	263	6	83	31	7	1	7	410
11	Yakima River	16	192	30	127	29	9	4	10	417
12	John Day River	20	235	74	135	82	20	5	9	580
13	Umatilla River	4	41	6	10	4	2	2	1	70
14	Walla Walla River Basin	4	73	4	17	5	2	2	3	110
15	Lower Snake River Basins	2	116	3	17	5	1	1	2	147
16	Grande Ronde River	11	264	78	128	98	12	4	10	605
17	Imnaha River	6	50	34	40	36	5	0	1	172
18	Sheep and Granite Creeks	1	1	1	1	1	1	1	1	8
19	Hells Canyon Complex	2	7	5	5	5	2	1	2	29
20	Powder River Basin	3	140	44	79	61	6	3	8	344
21	Clearwater River	9	134	15	81	68	10	6	7	330
22	Mainstem Upper Columbia River	38	840	43	279	70	22	8	24	1,324
23	Mainstem Snake River	13	287	15	93	25	12	9	16	470

UNIT	UNIT NAME	DAMS	AGRICULTURE AND AGRICULTURE DIVERSIONS	GRAZING	DEVELOPMENT	FOREST MANAGEMENT	ROADS	MINING	OTHER	TOTAL
24	Malheur River Basin	6	21	40	29	60	8	2	7	173
25	Jarbidge River	2	7	2	3	2	2	2	2	22
26	Southwest Idaho River Basins	7	20	9	114	28	12	7	12	209
27	Salmon River Basin	14	87	44	150	76	19	8	16	414
28	Little Lost River	1	5	2	1	0	1	0	1	11
29	Coeur d'Alene River Basin	30	99	10	573	123	47	29	43	954
30	Kootenai River Basin	13	58	12	120	162	19	2	18	404
31	Clark Fork River Basin	85	450	205	1,307	725	129	41	112	3,054
32	Saint Mary River Basin	1	4	1	1	1	1	0	1	10
	Total	619	6,411	850	11,798	2,363	736	260	761	23,798

## EXHIBIT A-5. PROPORTION OF REGULATED ENTITIES THAT ARE CLASSIFIED AS SMALL (BY UNIT AND ACTIVITY TYPE)

UNIT	UNIT NAME	DAMS	AGRICULTURE AND AGRICULTURE DIVERSIONS	GRAZING	DEVELOPMENT	FOREST MANAGEMENT	ROADS	MINING	OTHER	TOTAL
1	Olympic Peninsula	100%	96%	100%	99%	97%	96%	86%	92%	97%
2	Puget Sound	96%	90%	98%	99%	97%	95%	86%	90%	97%
3	Lower Columbia River Basins	100%	92%	100%	99%	93%	100%	100%	88%	96%
4	Upper Willamette River	100%	95%	100%	99%	98%	88%	100%	90%	98%
5	Hood River	100%	92%	100%	100%	100%	80%	0%	100%	94%
6	Lower Deschutes River	96%	93%	100%	99%	100%	94%	100%	100%	96%
7	Odell Lake	100%	100%	100%	100%	100%	100%	100%	100%	100%
8	Mainstem Lower Columbia River	100%	92%	100%	100%	97%	96%	100%	95%	95%
9	Klamath River Basin	100%	100%	100%	100%	100%	100%	100%	100%	100%
10	Upper Columbia River Basins	100%	93%	100%	100%	100%	88%	100%	88%	95%
11	Yakima River	100%	95%	94%	100%	94%	100%	100%	91%	96%
12	John Day River	95%	95%	100%	99%	100%	100%	100%	100%	97%
13	Umatilla River	100%	89%	100%	100%	100%	100%	100%	100%	93%
14	Walla Walla River Basin	100%	95%	100%	100%	100%	100%	100%	100%	96%
15	Lower Snake River Basins	100%	98%	100%	100%	100%	100%	100%	100%	99%
16	Grande Ronde River	100%	97%	96%	100%	100%	100%	80%	100%	98%
17	Imnaha River	100%	100%	94%	100%	100%	100%	0%	100%	99%
18	Sheep and Granite Creeks	100%	100%	100%	100%	100%	100%	100%	100%	100%
19	Hells Canyon Complex	100%	100%	100%	100%	100%	100%	100%	100%	100%
20	Powder River Basin	100%	97%	98%	100%	100%	100%	75%	100%	98%
21	Clearwater River	100%	98%	100%	100%	94%	91%	86%	88%	97%
22	Mainstem Upper Columbia River	100%	93%	93%	100%	97%	96%	89%	86%	94%
23	Mainstem Snake River	93%	93%	94%	100%	100%	100%	90%	94%	95%

UNIT	UNIT NAME	DAMS	AGRICULTURE AND AGRICULTURE DIVERSIONS	GRAZING	DEVELOPMENT	FOREST MANAGEMENT	ROADS	MINING	OTHER	TOTAL
24	Malheur River Basin	100%	100%	100%	100%	100%	100%	100%	100%	100%
25	Jarbidge River	100%	100%	100%	100%	100%	100%	100%	100%	100%
26	Southwest Idaho River Basins	88%	100%	100%	100%	100%	100%	100%	100%	100%
27	Salmon River Basin	100%	98%	100%	100%	100%	100%	80%	94%	99%
28	Little Lost River	100%	100%	100%	100%	0%	100%	0%	100%	100%
29	Coeur d'Alene River Basin	100%	96%	100%	100%	98%	94%	85%	96%	98%
30	Kootenai River Basin	100%	100%	100%	100%	99%	100%	100%	100%	100%
31	Clark Fork River Basin	99%	97%	100%	100%	99%	98%	93%	97%	99%
32	Saint Mary River Basin	100%	100%	100%	100%	100%	100%	0%	100%	100%

**A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY**

34. Pursuant to Executive Order No. 13211, “Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use,” issued May 18, 2001, Federal agencies must prepare and submit a “Statement of Energy Effects” for all “significant energy actions.” The purpose of this requirement is to ensure that all Federal agencies “appropriately weigh and consider the effects of the Federal Government’s regulations on the supply, distribution, and use of energy.”<sup>16</sup>
35. The Office of Management and Budget provides guidance for implementing this Executive Order, outlining nine outcomes that may constitute “a significant adverse effect” when compared with the regulatory action under consideration:
- Reductions in crude oil supply in excess of 10,000 barrels per day (bbls);
  - Reductions in fuel production in excess of 4,000 barrels per day;
  - Reductions in coal production in excess of 5 million tons per year;
  - Reductions in natural gas production in excess of 25 million Mcf per year;
  - Reductions in electricity production in excess of 1 billion kilowatts-hours per year or in excess of 500 megawatts of installed capacity;
  - Increases in energy use required by the regulatory action that exceed the thresholds above;
  - Increases in the cost of energy production in excess of one percent;
  - Increases in the cost of energy distribution in excess of one percent; or
  - Other similarly adverse outcomes.<sup>17</sup>
36. Two of these criteria are relevant to this analysis: (1) reduction in electricity production in excess of one billion kilowatts-hours per year or in excess of 500 megawatts (MWs) of installed capacity<sup>18</sup> and (2) increases in the cost of energy production in excess of one percent. Below, the analysis assesses whether the electricity industry is likely to experience a “significant adverse effect” as a result of critical habitat designation for the bull trout.
37. This analysis finds that hydropower production in the Upper Willamette River Unit (Unit 4) has the potential to be affected as a result of critical habitat for bull trout, as discussed in Chapter 4. Anticipated conservation costs in the Upper Willamette River unit are primarily related to installation of temperature control devices and trap and haul activities

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<sup>16</sup> Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27, Office of Management and Budget, July 13, 2001, <http://www.whitehouse.gov/omb/memoranda/m01-27.html>.

<sup>17</sup> Ibid.

<sup>18</sup> Installed capacity is the “total manufacturer-rated capacity for equipment such as turbines, generators, condensers, transformers, and other system components” and represents the maximum flow of energy from the plant or the maximum output of the plant.

planned for salmon and steelhead in combination with bull trout in the Willamette River Basin Flood Control Project area. Due to the overlap with salmon species, there is uncertainty about the extent to which these activities would not occur if critical habitat is not designated, i.e., whether these costs are incremental to bull trout critical habitat. This energy impacts analysis assumes that hydropower impacts associated with the unoccupied portion of critical habitat in the Upper Willamette River unit are incremental to this rulemaking. To the extent that these actions would have occurred absent critical habitat for bull trout, impacts may be overstated.

38. In addition, it is possible that the timing of releases at some dams located in unoccupied stream reaches could be altered as part of conservation efforts resulting from bull trout critical habitat.<sup>19</sup> While alterations in the timing of water releases may still pass the same volume of water through the turbines, demand for power varies temporally, thus the value of power changes throughout the day and year. To the extent that flow change recommendations are required to be passed at times when it is less valuable, there may be an associated economic cost. However, the extent to which temporal shifts may result from critical habitat designation in areas other than the Willamette River Unit is unknown.

#### A.2.1 EVALUATION OF WHETHER CRITICAL HABITAT WILL RESULT IN A REDUCTION IN ELECTRICITY PRODUCTION IN EXCESS OF ONE BILLION KILOWATT-HOURS PER YEAR OR IN EXCESS OF 500 MWS OF INSTALLED CAPACITY

39. While recent Biological Opinions have been issued on the impacts of the Willamette River Basin Flood Control Project on bull trout and salmon and steelhead species, some aspects of the implementation of these opinions is not yet certain.<sup>20</sup> Among the uncertainties are the particular methods that will be used to control water temperature below the projects. According to BPA, who markets electricity from the project, the establishment of temperature control devices may result in lost power generation of 8.9 average MWs<sup>21</sup> across Lookout Point and Detroit Dams, or approximately 4.85MWs at Lookout Point, which is located in an unoccupied portion of proposed critical habitat for bull trout.<sup>22</sup> However, BPA also reports that capital investment projects, such as were conducted at Shasta Dam in California or Cougar Dam in Oregon, can be more cost-

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<sup>19</sup> Ibid.

<sup>20</sup> U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office. "USFWS Final Biological Opinion on the Willamette River Basin Flood Control Project, Endangered Species Act Section 7 Consultation Biological Opinion On the Continued Operation and Maintenance of the Willamette River Basin Project and Effects to Oregon Chub, Bull Trout, and Bull Trout Critical Habitat Designated Under the Endangered Species Act," July 11, 2008; NOAA's National Marine Fisheries Service (NMFS) Northwest Region, "Endangered Species Act Section 7(a)(2) Consultation Biological Opinion & Magnuson-Stevens Fishery Conservation & Management Act Essential Fish Habitat Consultation, Consultation on the "Willamette River Basin Flood Control Project," July 11, 2008.

<sup>21</sup> Average megawatts are an average measure of the total electricity produced in one year. Over the course of a year, an average MW is equal to 8.760 MW hours (24 hours multiplied by 365 days per MW).

<sup>22</sup> BPA Fact Sheet. Downloaded on December 18, 2009 from <http://www.bpa.gov/corporate/pubs/>; "Estimated Costs of the Willamette BiOp", Bonneville Power Administration Fact Sheet. Available at: [http://www.salmonrecovery.gov/Files/ResearchReportsPublications/Estimated\\_costs\\_of\\_the\\_Willamette\\_BiOp.pdf](http://www.salmonrecovery.gov/Files/ResearchReportsPublications/Estimated_costs_of_the_Willamette_BiOp.pdf)

effective than flow releases over the long-term. Thus, it appears likely that, over the long term, BPA will invest in infrastructure that will alleviate the need for flow releases and associated lost electricity production. Conservatively assuming that 4.85 average MW, or 42.5 million kilowatt hours (KWH),<sup>23</sup> are lost due entirely to bull trout critical habitat designation, this would represent approximately 4.3 percent of the one billion MWH threshold established by OMB, or 0.01 percent of hydropower production in the Northwest of 261,605 million KWH.<sup>24</sup> No impacts on installed capacity are expected.

#### A.2.1 EVALUATION OF WHETHER CRITICAL HABITAT WILL RESULT IN AN INCREASE IN THE COST OF ENERGY PRODUCTION IN EXCESS OF ONE PERCENT

40. The following analysis considers the probability that a reduction of 4.85 average MWs (42.5 million KWH) of hydropower production will lead to an increase in the cost of energy production in excess of one percent. Although not specified by OMB, this analysis conservatively examines the impacts of these changes on regional energy production, as opposed to national energy production.
41. This screening-level analysis assumes that because the lost production represents a small amount of regional generating capacity, BPA will purchase lost power from an alternate source. In this case, it is assumed that lost power would be replaced with electricity from a gas turbine peaking facility. The analysis next examines the net change in the cost of energy production that would occur if an average 4.85 average MWs are switched to gas production. This cost is then compared to the total regional cost of energy production. As noted above, there is uncertainty as to the timeframe over which any reduction might occur, as well as the likelihood that this impact is incremental to bull trout critical habitat designation.
42. Exhibits A-6 through A-8 present the results of the energy impacts analysis. Exhibit A-6 presents the regional net electricity generation by fuel type in 2007. As shown, hydroelectricity production represented 67 percent of total regional electricity production. Exhibit A-7 presents the average operating expenses for major U.S. Investor-Owned Electric Utilities. As shown, gas turbines and small scale operators have the highest expenses per KWH, while hydroelectric utilities have the lowest expenses. Exhibit A-8 presents the analysis of the regional impacts associated with moving 4.85 average MWs to gas production. As demonstrated in the exhibit, this would result in an increase of 0.03 percent in the regional costs of energy production, which is far less than the OMB threshold of one percent nationally.

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<sup>23</sup> The conversion of average annual MW to KWH is as follows: 4.85 MW of continuous energy production multiplied by 8,760 MW hours per annual MW and 1,000 kilowatt hours per MW hour.

<sup>24</sup> 1990 - 2007 Net Generation by State by Type of Producer by Energy Source (EIA-906), Available at: [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sprdshts.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html).

## EXHIBIT A-6. NET GENERATION BY FUEL TYPE, 2007 (MILLION KWH)

FUEL TYPE	WA	OR	ID	MT	TOTAL	PERCENT
Hydro	157,658	67,175	18,043	18,729	261,605	67%
Gas	14,575	29,715	3,315	212	47,817	12%
Petroleum	74	29	0	957	1,060	0%
Coal	17,114	8,703	167	36,714	62,698	16%
Nuclear	16,217	0	0	0	16,217	4%
Other <sup>1</sup>	1,056	354	137	38	1,586	0%
<b>Total</b>	<b>206,694</b>	<b>105,976</b>	<b>21,662</b>	<b>56,650</b>	<b>390,982</b>	<b>100%</b>

Note:

<sup>1</sup> Other includes Other, Other Biomass, Other Gases, net of Pumped Storage. Net generation is gross generation less plant use (pumped storage regarded as plant use).

Source: 1990 - 2007 Net Generation by State by Type of Producer by Energy Source (EIA-906), Available at: [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sprdshts.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html).

EXHIBIT A-7. AVERAGE OPERATING EXPENSES FOR MAJOR U.S. INVESTOR-OWNED ELECTRIC UTILITIES (MILLS PER KWH)<sup>1</sup>

EXPENSE	2007	2006	2005	2004	2003	AVERAGE
<b>Operating</b>						
Nuclear	9.20	8.93	8.39	8.30	8.86	8.74
Fossil Steam	3.49	3.23	2.97	2.68	2.50	2.97
Hydroelectric	7.71	5.11	5.26	5.05	4.50	5.53
Gas Turbine and Small Scale	2.89	3.00	2.97	2.73	2.76	2.87
<b>Maintenance</b>						
Nuclear	5.79	5.68	5.23	5.38	5.23	5.46
Fossil Steam	3.39	3.19	2.96	2.96	2.73	3.05
Hydroelectric	5.17	3.44	3.60	3.64	3.01	3.77
Gas Turbine and Small Scale	2.53	2.29	2.15	2.16	2.26	2.28
<b>Fuel</b>						
Nuclear	5.01	4.85	4.54	4.58	4.60	4.72
Fossil Steam	24.02	23.17	21.77	18.21	17.35	20.90
Hydroelectric	0.00	0.00	0.00	0.00	0.00	0.00
Gas Turbine and Small Scale	56.69	52.46	53.73	45.20	43.91	50.40
<b>Total</b>						
Nuclear	20.00	19.46	18.16	18.26	18.69	18.91
Fossil Steam	30.90	29.59	27.70	23.85	22.58	26.92
Hydroelectric	12.88	8.55	8.86	8.69	7.51	9.30
Gas Turbine and Small Scale	62.11	57.75	58.85	50.09	48.93	55.55

Note:

<sup>1</sup> A mill is equal to one thousandth of one U.S. dollar, or one tenth of one cent.

Source: Energy Information Administration. Electric Power Annual 2007. Available at: [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sprdshts.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html)

## EXHIBIT A-8. INCREASE IN REGIONAL COST OF ENERGY PRODUCTION

FUEL TYPE	ACTUAL REGIONAL ENERGY PRODUCTION IN 2007, MILLION KWH (BASELINE)	REGIONAL ENERGY PRODUCTION IN 2007 ASSUMING 42,500,000 KWHR MOVED FROM HYDRO TO GAS, MILLION KWH (ALTERNATIVE)	AVERAGE OPERATING COST 2003 TO 2007, \$/KWH	ESTIMATED COST OF ANNUAL ENERGY PRODUCTION IN BASELINE 2007, \$	ESTIMATED COST OF ANNUAL ENERGY PRODUCTION IN ALTERNATIVE, \$
Hydro	261,605	261,563	0.00930	2,432,406,275	2,432,406,275
Gas	47,817	47,859	0.05555	2,656,019,753	2,658,381,892
Petroleum	1,060	1,060	0.02692	28,546,979	28,546,979
Coal	62,698	62,698	0.02692	1,688,069,079	1,688,069,079
Nuclear	16,217	16,217	0.01891	306,730,608	306,730,608
Other	1,586	1,586	0.05555	88,074,682	88,074,682
<b>Total</b>	<b>390,982</b>	<b>390,982</b>	<b>-</b>	<b>7,199,847,374</b>	<b>7,202,209,513</b>
Cost difference				2,362,139	
Percent change				0.03%	

## APPENDIX B | THREE PERCENT DISCOUNT RATE EXHIBITS AND UNDISCOUNTED STREAM OF IMPACTS

EXHIBIT B-1 ANNUAL BASELINE IMPACTS BY UNIT (UNDISCOUNTED)

UNIT	NAME	YEAR	PROJECT MODIFICATIONS		ADMINISTRATIVE COSTS
			LOW	HIGH	
1	Olympic Peninsula	2010-2029	\$19,157,143	\$19,157,143	\$489,050
2	Puget Sound	2010-2029	\$69,166,148	\$69,166,148	\$895,081
3	Lower Columbia River Basins	2010-2029	\$75,900	\$185,181	\$89,750
4	Upper Willamette River	2010-2029	\$5,669,347	\$5,809,569	\$22,196
5	Hood River	2010-2029	\$30,297	\$97,567	\$8,303
6	Lower Deschutes River	2010-2029	\$159,037	\$318,962	\$33,720
7	Odell Lake	2010-2029	\$2,279	\$9,777	\$1,997
8	Mainstem Lower Columbia River	2010-2029	\$128,651	\$306,494	\$36,181
9	Klamath River Basin	2010-2029	\$33,852	\$125,914	\$29,154
10	Upper Columbia River Basins	2010-2029	\$78,255	\$468,102	\$596,633
11	Yakima River	2010-2029	\$345,839	\$488,869	\$511,059
12	John Day River	2010-2029	\$159,189	\$359,797	\$87,951
13	Umatilla River	2010-2029	\$16,661	\$77,043	\$15,415
14	Walla Walla River Basin	2010-2029	\$20,715	\$95,793	\$37,915
15	Lower Snake River Basins	2010-2029	\$25,664	\$96,485	\$20,688
16	Grande Ronde River	2010-2029	\$53,758	\$215,106	\$77,276
17	Imnaha River	2010-2029	\$16,026	\$78,448	\$20,798
18	Sheep and Granite Creeks	2010-2029	\$1,140	\$5,579	\$3,345
19	Hells Canyon Complex	2010-2029	\$123,362	\$244,658	\$27,908
20	Powder River Basin	2010-2029	\$181,554	\$360,067	\$29,430
21	Clearwater River	2010-2029	\$429,694	\$1,384,320	\$182,895
22	Mainstem Upper Columbia River	2010-2029	\$96,807	\$230,629	\$138,570
23	Mainstem Snake River	2010-2029	\$9,208	\$9,882	\$40,198
24	Malheur River Basin	2010-2029	\$156,907	\$264,074	\$18,249
25	Jarbidge River	2010-2029	\$173,745	\$173,745	\$27,011
26	Southwest Idaho River Basins	2010-2029	\$587,381	\$1,613,023	\$189,880

UNIT	NAME	YEAR	PROJECT MODIFICATIONS		ADMINISTRATIVE COSTS
			LOW	HIGH	
27	Salmon River Basin	2010-2029	\$805,182	\$2,714,195	\$567,488
28	Little Lost River	2010-2029	\$15,378	\$54,018	\$14,439
29	Coeur d'Alene River Basin	2010-2029	\$89,221	\$318,623	\$58,099
30	Kootenai River Basin	2010-2029	\$43,984	\$162,439	\$45,132
31	Clark Fork River Basin	2010-2029	\$753,466	\$2,351,065	\$566,821
32	Saint Mary River Basin	2010-2029	\$556,809	\$556,809	\$9,431

## EXHIBIT B-2 ANNUAL INCREMENTAL IMPACTS BY UNIT (UNDISCOUNTED)

UNIT	NAME	YEAR	PROJECT MODIFICATIONS		ADMINISTRATIVE COSTS
			LOW	HIGH	
1	Olympic Peninsula	2010-2029	\$0	\$0	\$163,200
2	Puget Sound	2010-2029	\$0	\$0	\$298,696
3	Lower Columbia River Basins	2010-2011, 2013-2029	\$18,975	\$46,295	\$491,080
		2012	\$150,975	\$178,295	
4	Upper Willamette River	2010-2029	\$1,693,441	\$1,735,326	\$13,910
5	Hood River	2010-2029	\$22,856	\$73,603	\$7,966
6	Lower Deschutes River	2010-2029	\$93,403	\$187,327	\$14,312
7	Odell Lake	2010-2029	\$0	\$0	\$1,174
8	Mainstem Lower Columbia River	2010-2029	\$0	\$0	\$12,068
9	Klamath River Basin	2010-2029	\$87,047	\$323,779	\$40,904
10	Upper Columbia River Basins	2010-2029	\$7,736	\$46,287	\$198,990
11	Yakima River	2010-2029	\$51,677	\$73,049	\$170,472
12	John Day River	2010-2029	\$37,341	\$84,397	\$29,468
13	Umatilla River	2010-2029	\$3,412	\$15,780	\$5,142
14	Walla Walla River Basin	2010-2029	\$4,243	\$19,620	\$13,692
15	Lower Snake River Basins	2010-2029	\$7,666	\$28,820	\$6,900
16	Grande Ronde River	2010-2029	\$4,046	\$16,190	\$31,257
17	Imnaha River	2010-2029	\$0	\$0	\$6,937
18	Sheep and Granite Creeks	2010-2029	\$0	\$0	\$1,116
19	Hells Canyon Complex	2010-2029	\$113,873	\$225,838	\$9,307
20	Powder River Basin	2010-2029	\$167,588	\$332,369	\$21,698
21	Clearwater River	2010-2029	\$64,207	\$206,852	\$61,024

UNIT	NAME	YEAR	PROJECT MODIFICATIONS		ADMINISTRATIVE COSTS
			LOW	HIGH	
22	Mainstem Upper Columbia River	2010-2029	\$0	\$0	\$46,198
23	Mainstem Snake River	2010-2029	\$2,302	\$2,470	\$23,148
24	Malheur River Basin	2010-2029	\$52,302	\$88,025	\$11,132
25	Jarbidge River	2010-2029	\$0	\$0	\$9,011
26	Southwest Idaho River Basins	2010-2029	\$185,489	\$509,376	\$63,321
27	Salmon River Basin	2010-2029	\$51,395	\$173,246	\$189,246
28	Little Lost River	2010-2029	\$1,337	\$4,697	\$4,815
29	Coeur d'Alene River Basin	2010-2029	\$320,003	\$1,251,419	\$89,441
30	Kootenai River Basin	2010-2029	\$0	\$0	\$15,055
31	Clark Fork River Basin	2010-2029	\$182,471	\$483,372	\$205,315
32	Saint Mary River Basin	2010-2029	\$0	\$0	\$3,640

**EXHIBIT B-3. SUMMARY OF PROSPECTIVE BASELINE CONSERVATION EFFORT COSTS BY UNIT  
(ANNUALIZED, 3 PERCENT DISCOUNT RATE)**

UNIT #	CRITICAL HABITAT UNIT	ANNUAL COSTS	
		LOW END	HIGH END
1	Olympic Peninsula	\$18,600,000	\$18,600,000
2	Puget Sound	\$67,200,000	\$67,200,000
3	Lower Columbia River Basins	\$73,700	\$180,000
4	Upper Willamette River	\$5,500,000	\$5,640,000
5	Hood River	\$29,400	\$94,700
6	Lower Deschutes River	\$154,000	\$310,000
7	Odell Lake	\$2,210	\$9,490
8	Mainstem Lower Columbia River	\$125,000	\$298,000
9	Klamath River Basin	\$32,900	\$122,000
10	Upper Columbia River Basins	\$76,000	\$454,000
11	Yakima River	\$336,000	\$475,000
12	John Day River	\$155,000	\$349,000
13	Umatilla River	\$16,200	\$74,800
14	Walla Walla River Basin	\$20,100	\$93,000
15	Lower Snake River Basins	\$24,900	\$93,700
16	Grande Ronde River	\$52,200	\$209,000
17	Imnaha River	\$15,600	\$76,200

UNIT #	CRITICAL HABITAT UNIT	ANNUAL COSTS	
		LOW END	HIGH END
18	Sheep and Granite Creeks	\$1,110	\$5,420
19	Hells Canyon Complex	\$120,000	\$238,000
20	Powder River Basin	\$176,000	\$350,000
21	Clearwater River	\$417,000	\$1,340,000
22	Mainstem Upper Columbia River	\$94,000	\$224,000
23	Mainstem Snake River	\$8,940	\$9,590
24	Malheur River Basin	\$152,000	\$256,000
25	Jarbidge River	\$169,000	\$169,000
26	Southwest Idaho River Basins	\$570,000	\$1,570,000
27	Salmon River Basin	\$782,000	\$2,640,000
28	Little Lost River	\$14,900	\$52,400
29	Coeur d'Alene River Basin	\$86,600	\$309,000
30	Kootenai River Basin	\$42,700	\$158,000
31	Clark Fork River Basin	\$732,000	\$2,280,000
32	Saint Mary River Basin	\$541,000	\$541,000
<b>Total</b>		<b>\$96,300,000</b>	<b>\$104,000,000</b>
Note: Totals may not sum due to rounding.			

## EXHIBIT B-4. SUMMARY OF INCREMENTAL CONSERVATION EFFORT COSTS BY UNIT (ANNUALIZED, 3% DISCOUNT RATE)

UNIT #	CRITICAL HABITAT UNIT	PREVIOUSLY PROPOSED AREAS		INCREMENTAL CRITICAL HABITAT		TOTAL INCREMENTAL CONSERVATION EFFORT COSTS	
		LOW END	HIGH END	LOW END	HIGH END	LOW END	HIGH END
1	Olympic Peninsula	\$0	\$0	\$0	\$0	\$0	\$0
2	Puget Sound	\$0	\$0	\$0	\$0	\$0	\$0
3	Lower Columbia River Basins	\$18,400	\$44,900	\$7,880	\$7,880	\$26,300	\$52,800
4	Upper Willamette River	\$1,640,000	\$1,680,000	\$0	\$0	\$1,640,000	\$1,680,000
5	Hood River	\$22,200	\$71,500	\$0	\$0	\$22,200	\$71,500
6	Lower Deschutes River	\$90,700	\$181,900	\$0	\$0	\$90,700	\$182,000
7	Odell Lake	\$0	\$0	\$0	\$0	\$0	\$0
8	Mainstem Lower Columbia River	\$0	\$0	\$0	\$0	\$0	\$0
9	Klamath River Basin	\$84,500	\$314,000	\$0	\$0	\$84,500	\$314,000
10	Upper Columbia River Basins	\$7,510	\$44,900	\$0	\$0	\$7,510	\$44,900
11	Yakima River	\$50,200	\$70,900	\$0	\$0	\$50,200	\$70,900
12	John Day River	\$36,300	\$81,900	\$0	\$0	\$36,300	\$81,900
13	Umatilla River	\$3,310	\$15,300	\$0	\$0	\$3,310	\$15,300
14	Walla Walla River Basin	\$4,120	\$19,000	\$0	\$0	\$4,120	\$19,000
15	Lower Snake River Basins	\$7,440	\$28,000	\$0	\$0	\$7,440	\$28,000
16	Grande Ronde River	\$3,930	\$15,700	\$0	\$0	\$3,930	\$15,700
17	Imnaha River	\$0	\$0	\$0	\$0	\$0	\$0
18	Sheep and Granite Creeks	\$0	\$0	\$0	\$0	\$0	\$0
19	Hells Canyon Complex	\$111,000	\$219,000	\$0	\$0	\$111,000	\$219,000
20	Powder River Basin	\$163,000	\$323,000	\$0	\$0	\$163,000	\$323,000
21	Clearwater River	\$62,300	\$201,000	\$0	\$0	\$62,300	\$201,000
22	Mainstem Upper Columbia River	\$0	\$0	\$0	\$0	\$0	\$0
23	Mainstem Snake River	\$2,230	\$2,400	\$0	\$0	\$2,230	\$2,400
24	Malheur River Basin	\$50,800	\$85,500	\$0	\$0	\$50,800	\$85,500

UNIT #	CRITICAL HABITAT UNIT	PREVIOUSLY PROPOSED AREAS		INCREMENTAL CRITICAL HABITAT		TOTAL INCREMENTAL CONSERVATION EFFORT COSTS	
		LOW END	HIGH END	LOW END	HIGH END	LOW END	HIGH END
25	Jarbidge River	\$0	\$0	\$0	\$0	\$0	\$0
26	Southwest Idaho River Basins	\$180,000	\$495,000	\$0	\$0	\$180,000	\$495,000
27	Salmon River Basin	\$49,900	\$168,000	\$0	\$0	\$49,900	\$168,000
28	Little Lost River	\$1,300	\$4,560	\$0	\$0	\$1,300	\$4,560
29	Coeur d'Alene River Basin	\$73,800	\$264,000	\$237,000	\$951,000	\$311,000	\$1,210,000
30	Kootenai River Basin	\$0	\$0	\$0	\$0	\$0	\$0
31	Clark Fork River Basin	\$177,000	\$469,000	\$0	\$0	\$177,000	\$469,000
32	Saint Mary River Basin	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total</b>		<b>\$2,840,000</b>	<b>\$4,620,000</b>	<b>\$245,000</b>	<b>\$959,000</b>	<b>\$3,090,000</b>	<b>\$5,760,000</b>

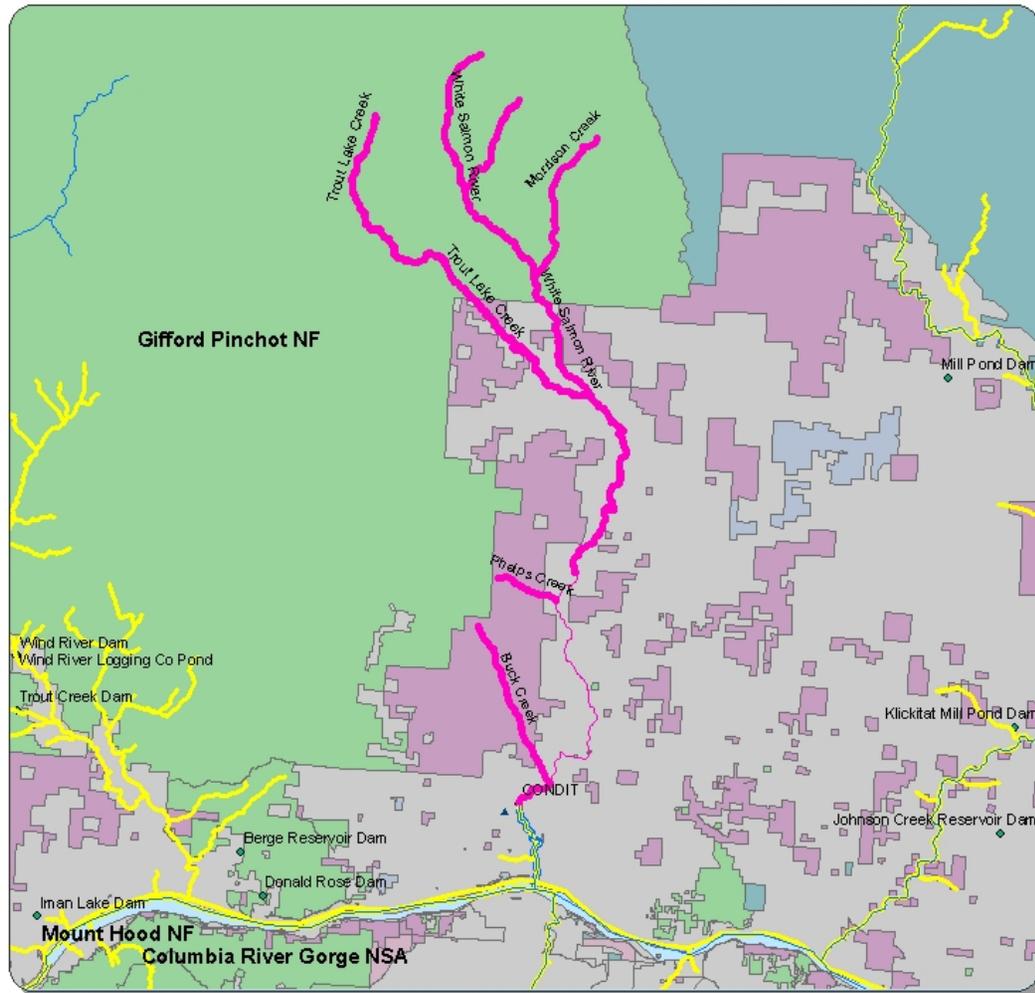
Note: Totals may not sum due to rounding.

## APPENDIX C | MAPS OF INCREMENTAL AREAS

1. To assist in identifying incremental impacts, this appendix contains maps of the newly proposed unoccupied critical habitat areas that do not overlap with salmon habitat (“newly proposed incremental habitat”). These are the areas where incremental impacts are most likely to result from designation of critical habitat. Newly proposed unoccupied habitat is shown in bold pink on these maps. Salmon habitat is shown in bold yellow. The focus of the incremental analysis was on the areas depicted as bold pink with no overlapping bold yellow.
2. The following acronyms are used on the maps:

NF	National Forest
NSA	National Scenic Area
RD	Ranger District
NP	National Park

EXHIBIT C-1. NEWLY PROPOSED INCREMENTAL CRITICAL HABITAT IN UNIT 3: LOWER COLUMBIA RIVER BASIN

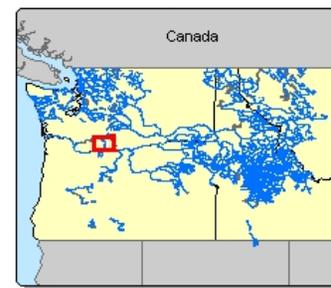


Lower Columbia River Basin

1325 291



Map Area

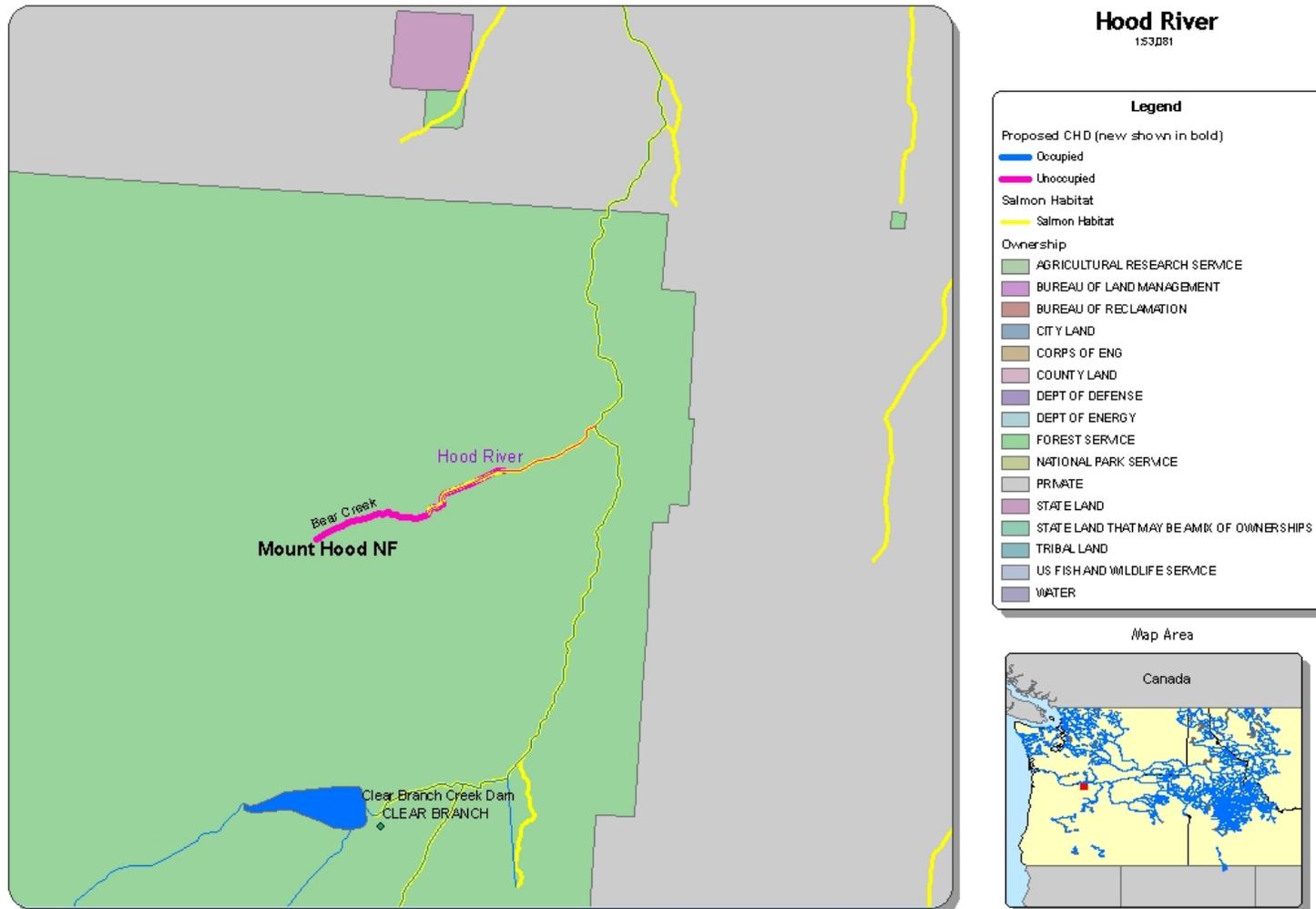


Source:

1. US Fish and Wildlife Service, Field Office
2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA



EXHIBIT C-2. NEWLY PROPOSED INCREMENTAL CRITICAL HABITAT IN UNIT 5: HOOD RIVER



Source:  
 1. US Fish and Wildlife Service, Field Office  
 2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA

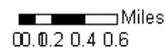
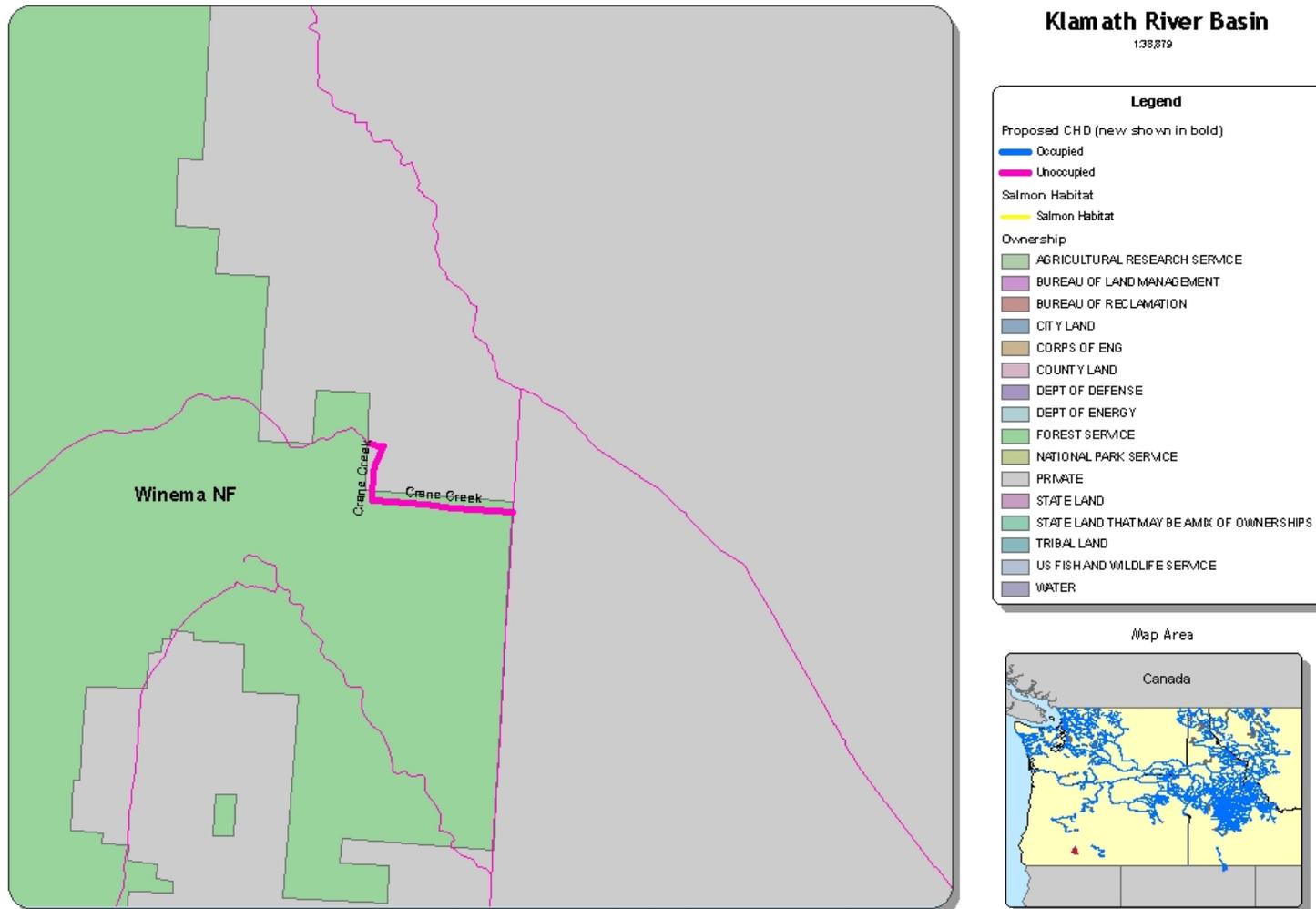


EXHIBIT C-3. NEWLY PROPOSED INCREMENTAL CRITICAL HABITAT IN UNIT 9: KLAMATH RIVER BASIN

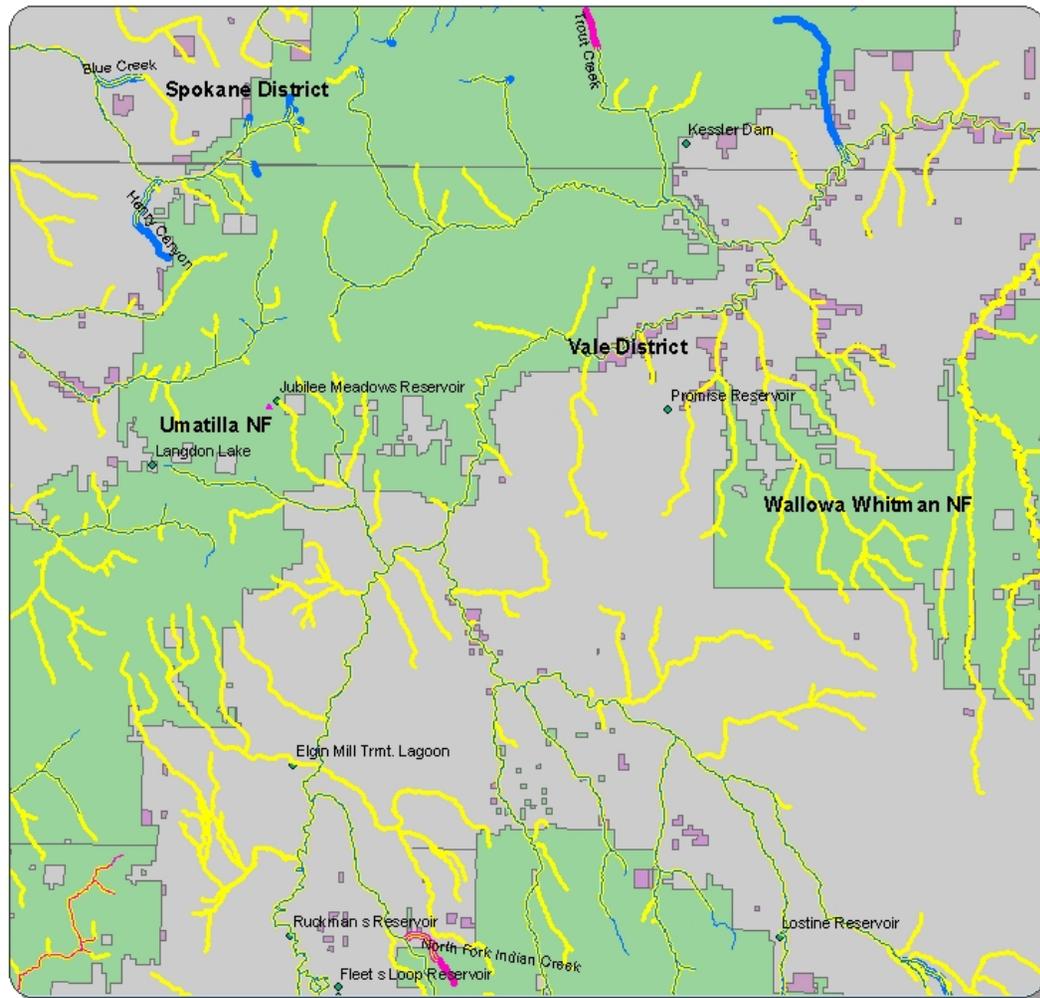


Source:  
 1. US Fish and Wildlife Service, Field Office  
 2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA

0.0510.2.3 Miles

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EXHIBIT C-4. NEWLY PROPOSED INCREMENTAL CRITICAL HABITAT IN UNIT 16: GRANDE RONDE RIVER



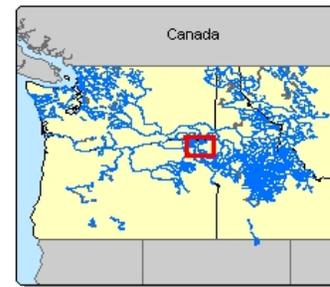
**Grande Ronde River**

1:437,458

**Legend**

- Proposed CHD (new shown in bold)
  - Occupied
  - Unoccupied
- Salmon Habitat
  - Salmon Habitat
- Ownership
  - AGRICULTURAL RESEARCH SERVICE
  - BUREAU OF LAND MANAGEMENT
  - BUREAU OF RECLAMATION
  - CITY LAND
  - CORPS OF ENG
  - COUNTY LAND
  - DEPT OF DEFENSE
  - DEPT OF ENERGY
  - FOREST SERVICE
  - NATIONAL PARK SERVICE
  - PRIVATE
  - STATE LAND
  - STATE LAND THAT MAY BE AMIX OF OWNERSHIPS
  - TRIBAL LAND
  - US FISH AND WILDLIFE SERVICE
  - WATER

Map Area



**Source:**

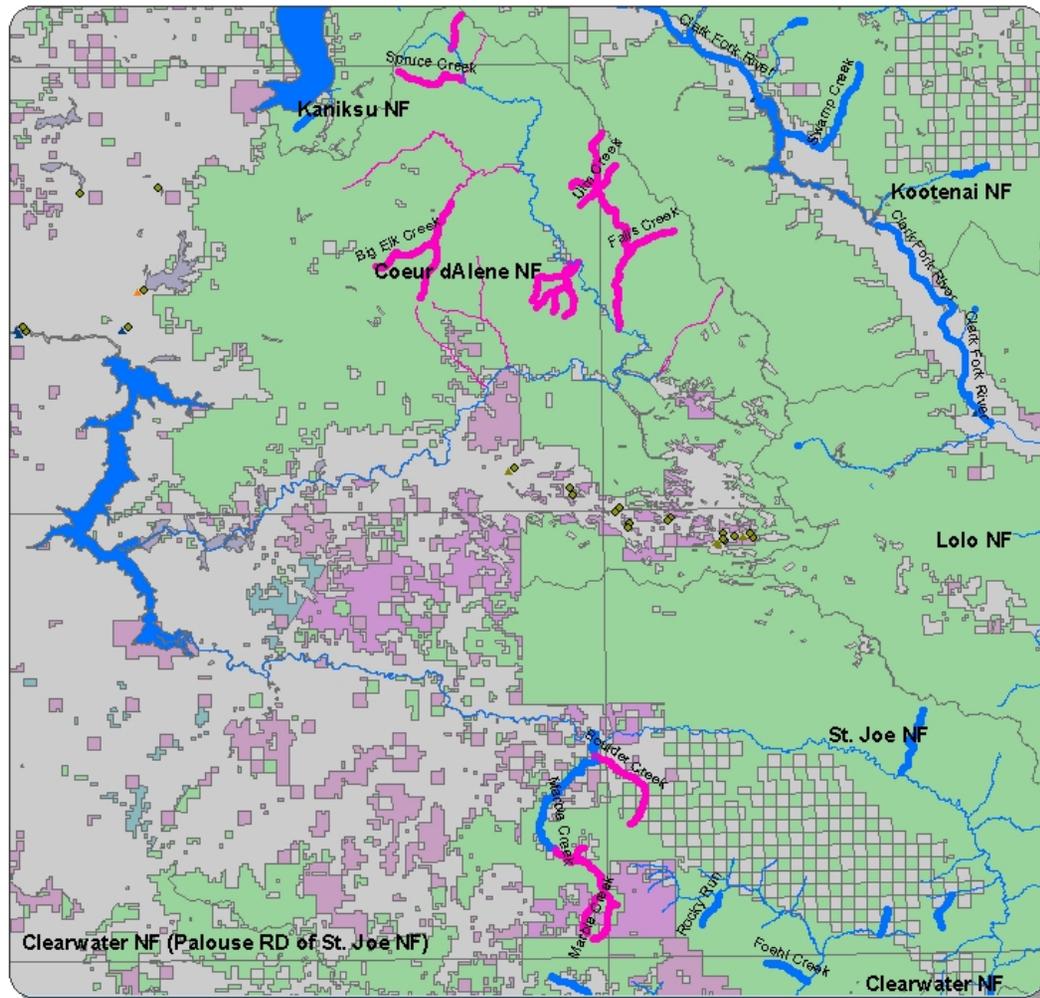
1. US Fish and Wildlife Service, Field Office
2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA



**IEc**

INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT C-5. NEWLY PROPOSED INCREMENTAL CRITICAL HABITAT IN UNIT 29: COEUR D'ALENE RIVER BASIN

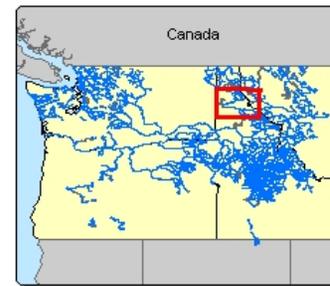


**Coeur D'Alene River Basin**

1:667,892



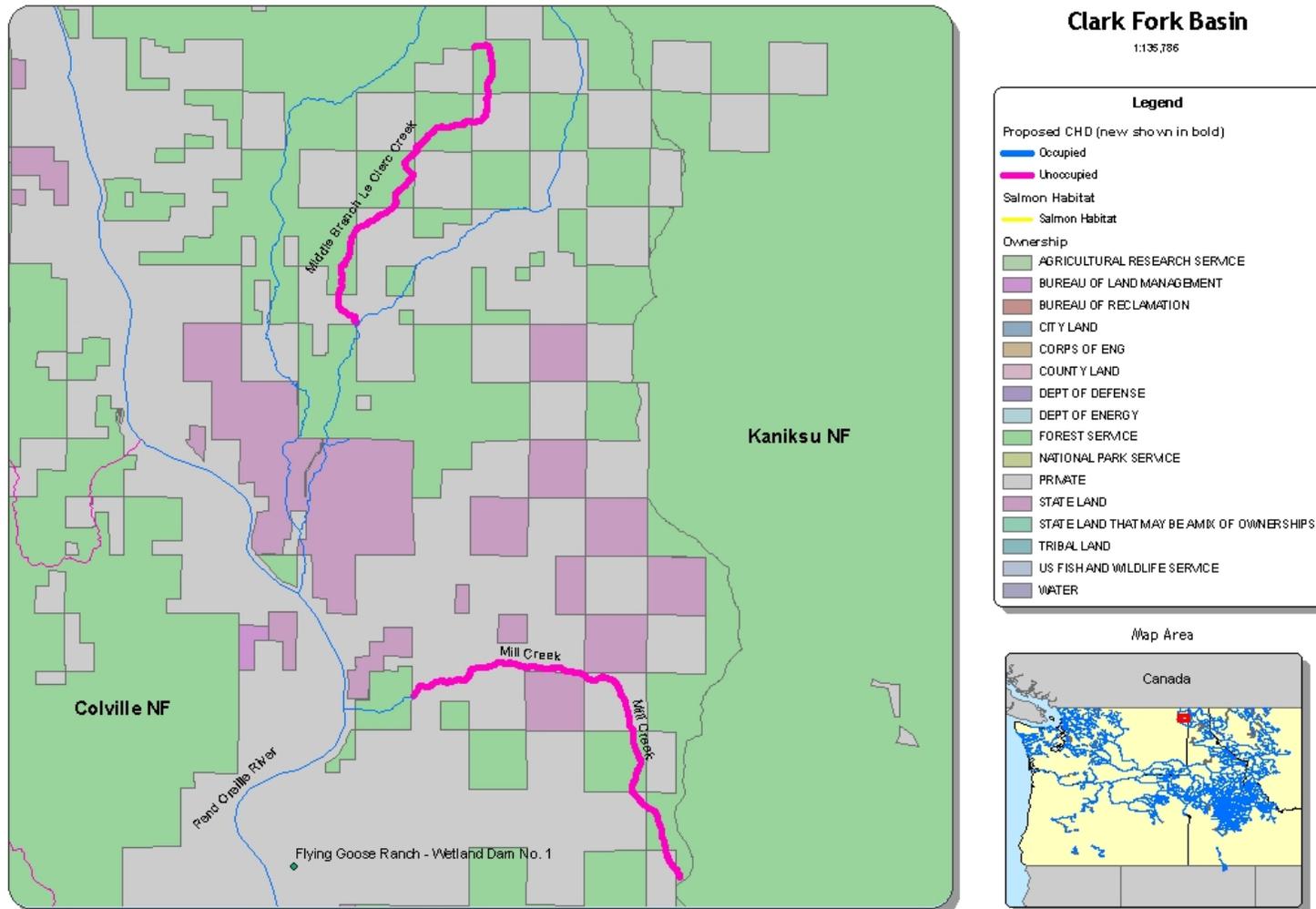
Map Area



Source:  
 1. US Fish and Wildlife Service, Field Office  
 2. Environmental Systems Research Institute, Inc. (ESRI),  
 Redlands, California, USA



EXHIBIT C-6. NEWLY PROPOSED INCREMENTAL CRITICAL HABITAT IN UNIT 31: CLARK FORK BASIN



Source:  
 1. US Fish and Wildlife Service, Field Office  
 2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA

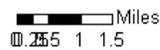
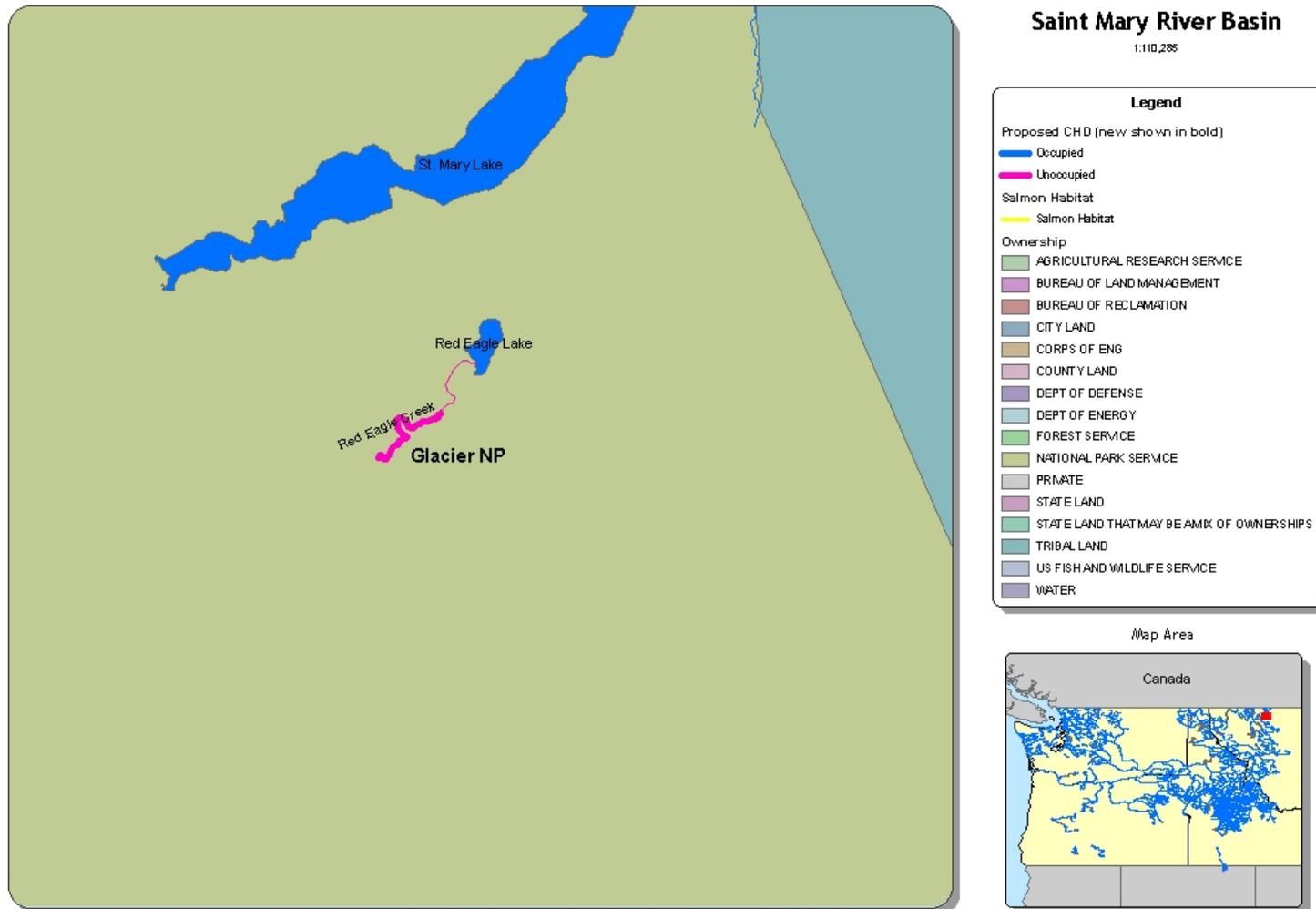


EXHIBIT C-7. NEWLY PROPOSED INCREMENTAL CRITICAL HABITAT IN UNIT 32: SAINT MARY RIVER BASIN



Source:  
 1. US Fish and Wildlife Service, Field Office  
 2. Environmental Systems Research Institute, Inc. (ESRI),  
 Redlands, California, USA

**APPENDIX D | SUPPLEMENTAL ADMINISTRATIVE COST  
INFORMATION**

1. This appendix provides additional detail regarding the calculation of administrative costs by unit and by activity.

EXHIBIT D-1. SHARE OF FIELD OFFICE CONSULTATIONS ASSIGNED TO EACH CRITICAL HABITAT UNIT

UNIT	NAME	BOISE	KLAMATH	MONTANA	NEVADA	WESTERN WASHINGTON	OREGON	EASTERN WASHINGTON	CENTRAL WASHINGTON
1	Olympic Peninsula	0.00%	0.00%	0.00%	0.00%	33.18%	0.00%	0.00%	0.00%
2	Puget Sound	0.00%	0.00%	0.00%	0.00%	60.73%	0.00%	0.00%	0.00%
3	Lower Columbia River Basins	0.00%	0.00%	0.00%	0.00%	6.09%	0.00%	0.00%	0.00%
4	Upper Willamette River	0.00%	0.00%	0.00%	0.00%	0.00%	5.01%	0.00%	0.00%
5	Hood River	0.00%	0.00%	0.00%	0.00%	0.00%	1.86%	0.00%	0.00%
6	Lower Deschutes River	0.00%	0.00%	0.00%	0.00%	0.00%	7.62%	0.00%	0.00%
7	Odell Lake	0.00%	0.00%	0.00%	0.00%	0.00%	0.45%	0.00%	0.00%
8	Mainstem Lower Columbia River	0.00%	0.00%	0.00%	0.00%	0.00%	8.17%	0.00%	0.00%
9	Klamath River Basin	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
10	Upper Columbia River Basins	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	22.76%	48.59%
11	Yakima River	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	24.09%	51.41%
12	John Day River	0.00%	0.00%	0.00%	0.00%	0.00%	19.34%	0.00%	0.00%
13	Umatilla River	0.00%	0.00%	0.00%	0.00%	0.00%	3.48%	0.00%	0.00%
14	Walla Walla River Basin	0.00%	0.00%	0.00%	0.00%	0.00%	7.44%	0.00%	0.00%
15	Lower Snake River Basins	0.00%	0.00%	0.00%	0.00%	0.00%	4.67%	0.00%	0.00%
16	Grande Ronde River	0.00%	0.00%	0.00%	0.00%	0.00%	17.39%	0.00%	0.00%
17	Imnaha River	0.00%	0.00%	0.00%	0.00%	0.00%	4.70%	0.00%	0.00%
18	Sheep and Granite Creeks	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
19	Hells Canyon Complex	3.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	Powder River Basin	0.00%	0.00%	0.00%	0.00%	0.00%	6.65%	0.00%	0.00%
21	Clearwater River	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	54.62%	0.00%
22	Mainstem Upper Columbia River	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.44%	0.00%
23	Mainstem Snake River	0.00%	0.00%	0.00%	0.00%	0.00%	9.08%	0.00%	0.00%

UNIT	NAME	BOISE	KLAMATH	MONTANA	NEVADA	WESTERN WASHINGTON	OREGON	EASTERN WASHINGTON	CENTRAL WASHINGTON
24	Malheur River Basin	0.00%	0.00%	0.00%	0.00%	0.00%	4.12%	0.00%	0.00%
25	Jarbidge River	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%
26	Southwest Idaho River Basins	23.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
27	Salmon River Basin	70.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
28	Little Lost River	1.80%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
29	Coeur d'Alene River Basin	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	16.57%	0.00%
30	Kootenai River Basin	0.00%	0.00%	8.30%	0.00%	0.00%	0.00%	3.51%	0.00%
31	Clark Fork River Basin	0.00%	0.00%	89.35%	0.00%	0.00%	0.00%	17.86%	0.00%
32	Saint Mary River Basin	0.00%	0.00%	2.35%	0.00%	0.00%	0.00%	0.00%	0.00%

## EXHIBIT D-2. FORECAST ANNUAL NUMBER OF FORMAL BASELINE CONSULTATIONS BY ACTIVITY, BY UNIT

UNIT	NAME	DAMS	DEVELOPMENT	FOREST MANAGEMENT	MINING	ROADS	IRRIGATION DIVERSIONS	GRAZING	NON-NATIVE SPECIES	OTHER	TOTAL
1	Olympic Peninsula	0.09	0.19	2.89	0	1.28	0.05	0	0.14	1.09	5.74
2	Puget Sound	0.17	0.35	5.29	0	2.34	0.09	0	0.26	2.00	10.50
3	Lower Columbia River Basins	0.02	0.03	0.53	0	0.23	0.01	0	0.03	0.20	1.05
4	Upper Willamette River	0.07	0.01	0.06	0	0.18	0.04	0.04	0.01	0.26	0.68
5	Hood River	0.03	0.01	0.02	0	0.07	0.02	0.01	0.01	0.10	0.25
6	Lower Deschutes River	0.11	0.02	0.10	0	0.27	0.07	0.05	0.02	0.39	1.03
7	Odell Lake	0.01	0	0.01	0	0.02	0	0	0	0.02	0.06
8	Mainstem Lower Columbia River	0.12	0.02	0.11	0	0.29	0.07	0.06	0.02	0.42	1.11
9	Klamath River Basin	0.43	0	0	0	0	0	0.14	0	0.29	0.86
10	Upper Columbia River Basins	1.38	0.07	1.50	0	0.83	0.21	0	0	4.98	8.96
11	Yakima River	1.46	0.07	1.59	0	0.88	0.22	0	0	5.27	9.48

UNIT	NAME	DAMS	DEVELOPMENT	FOREST MANAGEMENT	MINING	ROADS	IRRIGATION DIVERSIONS	GRAZING	NON-NATIVE SPECIES	OTHER	TOTAL
12	John Day River	0.28	0.06	0.25	0	0.69	0.17	0.14	0.06	0.99	2.63
13	Umatilla River	0.05	0.01	0.04	0	0.12	0.03	0.02	0.01	0.18	0.47
14	Walla Walla River Basin	0.11	0.02	0.10	0	0.27	0.06	0.05	0.02	0.38	1.01
15	Lower Snake River Basins	0.07	0.01	0.06	0	0.17	0.04	0.03	0.01	0.24	0.63
16	Grande Ronde River	0.25	0.05	0.22	0	0.62	0.15	0.12	0.05	0.89	2.36
17	Imnaha River	0.07	0.01	0.06	0	0.17	0.04	0.03	0.01	0.24	0.64
18	Sheep and Granite Creeks	0	0	0.02	0	0.01	0.01	0	0	0.02	0.07
19	Hells Canyon Complex	0.04	0	0.15	0.03	0.10	0.05	0.02	0.03	0.13	0.57
20	Powder River Basin	0.09	0.02	0.09	0	0.24	0.06	0.05	0.02	0.34	0.90
21	Clearwater River	0.14	0	0.27	0	0.82	0	0	0	0.96	2.18
22	Mainstem Upper Columbia River	0.02	0	0.04	0	0.11	0	0	0	0.13	0.30
23	Mainstem Snake River	0.13	0.03	0.12	0	0.32	0.08	0.06	0.03	0.47	1.23
24	Malheur River Basin	0.06	0.01	0.05	0	0.15	0.04	0.03	0.01	0.21	0.56
25	Jarbridge River	0	0	0.43	0	0	0	0	0	0.29	0.71
26	Southwest Idaho River Basins	0.27	0	1.05	0.20	0.68	0.34	0.17	0.24	0.91	3.85
27	Salmon River Basin	0.81	0	3.13	0.61	2.02	1.01	0.50	0.71	2.73	11.51
28	Little Lost River	0.02	0	0.08	0.02	0.05	0.03	0.01	0.02	0.07	0.29
29	Coeur d'Alene River Basin	0.04	0	0.08	0.05	0.25	0	0	0	0.29	0.71
30	Kootenai River Basin	0.06	0	0.27	0.11	0.25	0.02	0.04	0	0.12	0.86
31	Clark Fork River Basin	2.06	0	2.77	1.15	2.44	0.26	0.38	0	0.95	10.00
32	Saint Mary River Basin	0.01	0	0.07	0.03	0.06	0.01	0.01	0	0.02	0.20
<b>Total</b>		<b>8.44</b>	<b>1.00</b>	<b>21.45</b>	<b>2.19</b>	<b>15.92</b>	<b>3.14</b>	<b>2.00</b>	<b>1.71</b>	<b>25.57</b>	<b>81.42</b>

## EXHIBIT D-3. FORECAST ANNUAL NUMBER OF INFORMAL BASELINE CONSULTATIONS BY ACTIVITY, BY UNIT

UNIT	NAME	DAMS	DEVELOPMENT	FOREST MANAGEMENT	MINING	ROADS	IRRIGATION DIVERSIONS	GRAZING	NON-NATIVE SPECIES	OTHER	TOTAL
1	Olympic Peninsula	1.52	1.99	0.62	0.09	5.26	0.57	0.00	0.47	45.65	56.17
2	Puget Sound	2.78	3.64	1.13	0.17	9.63	1.04	0.00	0.87	83.55	102.81
3	Lower Columbia River Basins	0.28	0.37	0.11	0.02	0.97	0.10	0.00	0.09	8.38	10.31
4	Upper Willamette River	0.03	0.14	0.34	0.01	0.21	0.09	0.09	0.04	0.67	1.60
5	Hood River	0.01	0.05	0.13	0.00	0.08	0.03	0.03	0.01	0.25	0.60
6	Lower Deschutes River	0.04	0.21	0.52	0.01	0.32	0.14	0.13	0.05	1.01	2.44
7	Odell Lake	0.00	0.01	0.03	0.00	0.02	0.01	0.01	0.00	0.06	0.14
8	Mainstem Lower Columbia River	0.05	0.22	0.56	0.01	0.34	0.15	0.14	0.06	1.09	2.62
9	Klamath River Basin	0.29	0.00	0.14	0.00	0.14	0.00	0.14	0.71	0.86	2.29
10	Upper Columbia River Basins	2.11	1.31	4.55	0.27	4.24	1.32	0.46	0.42	30.52	45.21
11	Yakima River	2.24	1.39	4.82	0.28	4.49	1.40	0.49	0.45	32.30	47.84
12	John Day River	0.11	0.53	1.33	0.03	0.80	0.36	0.33	0.14	2.57	6.19
13	Umatilla River	0.02	0.09	0.24	0.00	0.14	0.06	0.06	0.02	0.46	1.11
14	Walla Walla River Basin	0.04	0.20	0.51	0.01	0.31	0.14	0.13	0.05	0.99	2.38
15	Lower Snake River Basins	0.03	0.13	0.32	0.01	0.19	0.09	0.08	0.03	0.62	1.50
16	Grande Ronde River	0.10	0.47	1.19	0.02	0.72	0.32	0.30	0.12	2.31	5.57
17	Imnaha River	0.03	0.13	0.32	0.01	0.19	0.09	0.08	0.03	0.62	1.50
18	Sheep and Granite Creeks	0.01	0.00	0.05	0.02	0.08	0.01	0.02	0.01	0.07	0.28
19	Hells Canyon Complex	0.05	0.04	0.44	0.14	0.70	0.12	0.14	0.12	0.61	2.36
20	Powder River Basin	0.04	0.18	0.46	0.01	0.28	0.12	0.11	0.05	0.88	2.13
21	Clearwater River	0.41	0.82	1.09	0.14	6.01	0.00	0.27	0.68	10.79	20.21
22	Mainstem Upper Columbia River	0.06	0.11	0.15	0.02	0.82	0.00	0.04	0.09	1.47	2.75
23	Mainstem Snake River	0.05	0.25	0.62	0.01	0.38	0.17	0.16	0.06	1.21	2.91
24	Malheur River Basin	0.02	0.11	0.28	0.01	0.17	0.08	0.07	0.03	0.55	1.32

UNIT	NAME	DAMS	DEVELOPMENT	FOREST MANAGEMENT	MINING	ROADS	IRRIGATION DIVERSIONS	GRAZING	NON-NATIVE SPECIES	OTHER	TOTAL
25	Jarbidge River	0.00	0.00	0.43	0.43	0.43	0.00	0.14	0.00	0.86	2.29
26	Southwest Idaho River Basins	0.34	0.24	2.98	0.98	4.74	0.83	0.98	0.83	4.15	16.08
27	Salmon River Basin	1.02	0.73	8.91	2.92	14.17	2.48	2.92	2.48	12.41	48.05
28	Little Lost River	0.03	0.02	0.23	0.07	0.36	0.06	0.07	0.06	0.32	1.22
29	Coeur d'Alene River Basin	0.12	0.25	0.33	0.04	1.82	0.00	0.08	0.21	3.27	6.13
30	Kootenai River Basin	0.11	0.05	0.51	0.70	1.22	0.08	0.18	0.04	1.29	4.19
31	Clark Fork River Basin	1.58	0.27	5.04	7.50	10.99	0.88	1.83	0.22	9.97	38.28
32	Saint Mary River Basin	0.02	0.00	0.12	0.20	0.24	0.02	0.05	0.00	0.17	0.82
<b>Total</b>		<b>13.54</b>	<b>13.95</b>	<b>38.50</b>	<b>14.13</b>	<b>70.44</b>	<b>10.78</b>	<b>9.53</b>	<b>8.49</b>	<b>259.92</b>	<b>439.28</b>

EXHIBIT D-4. FORECAST ANNUAL NUMBER OF BASELINE TECHNICAL ASSISTANCE EFFORTS BY ACTIVITY, BY UNIT

UNIT	NAME	DAMS	DEVELOPMENT	FOREST MANAGEMENT	MINING	ROADS	IRRIGATION DIVERSIONS	GRAZING	NON-NATIVE SPECIES	OTHER	TOTAL
1	Olympic Peninsula	0.09	0.28	0	0	0.62	0	0	0	1.23	2.23
2	Puget Sound	0.17	0.52	0	0	1.13	0	0	0	2.26	4.08
3	Lower Columbia River Basins	0.02	0.05	0	0	0.11	0	0	0	0.23	0.41
4	Upper Willamette River	0.16	0.02	0.04	0	0.01	0.01	0.01	0.01	0.24	0.49
5	Hood River	0.06	0.01	0.01	0	0	0	0	0.01	0.09	0.18
6	Lower Deschutes River	0.24	0.03	0.05	0	0.01	0.01	0.01	0.02	0.36	0.74
7	Odell Lake	0.01	0	0	0	0	0	0	0	0.02	0.04
8	Mainstem Lower Columbia River	0.26	0.04	0.06	0	0.01	0.01	0.01	0.02	0.39	0.79
9	Klamath River Basin	0	0	0	0	0	0	0	0	0	0
10	Upper Columbia River Basins	4.49	2.33	1.22	0.25	2.80	0.49	0.20	0.14	11.27	23.18
11	Yakima River	4.75	2.47	1.30	0.27	2.96	0.51	0.21	0.15	11.92	24.53

UNIT	NAME	DAMS	DEVELOPMENT	FOREST MANAGEMENT	MINING	ROADS	IRRIGATION DIVERSIONS	GRAZING	NON-NATIVE SPECIES	OTHER	TOTAL
12	John Day River	0.61	0.08	0.14	0	0.03	0.03	0.03	0.06	0.91	1.88
13	Umatilla River	0.11	0.01	0.02	0	0	0	0	0.01	0.16	0.34
14	Walla Walla River Basin	0.23	0.03	0.05	0	0.01	0.01	0.01	0.02	0.35	0.72
15	Lower Snake River Basins	0.15	0.02	0.03	0	0.01	0.01	0.01	0.01	0.22	0.45
16	Grande Ronde River	0.55	0.07	0.12	0	0.02	0.02	0.02	0.05	0.82	1.69
17	Imnaha River	0.15	0.02	0.03	0	0.01	0.01	0.01	0.01	0.22	0.46
18	Sheep and Granite Creeks	0.01	0	0.03	0.02	0.11	0.02	0.01	0.01	0.05	0.27
19	Hells Canyon Complex	0.12	0.01	0.26	0.13	0.94	0.17	0.12	0.12	0.40	2.27
20	Powder River Basin	0.21	0.03	0.05	0	0.01	0.01	0.01	0.02	0.31	0.65
21	Clearwater River	0.27	0.27	0.27	0.27	0.55	0	0.14	0	3.55	5.33
22	Mainstem Upper Columbia River	0.04	0.04	0.04	0.04	0.07	0	0.02	0	0.48	0.73
23	Mainstem Snake River	0.29	0.04	0.06	0	0.01	0.01	0.01	0.03	0.43	0.88
24	Malheur River Basin	0.13	0.02	0.03	0	0.01	0.01	0.01	0.01	0.19	0.40
25	Jarbridge River	0	0	0	0	0	0	0	0	0	0
26	Southwest Idaho River Basins	0.83	0.09	1.75	0.92	6.38	1.18	0.83	0.79	2.71	15.47
27	Salmon River Basin	2.48	0.26	5.22	2.74	19.07	3.53	2.48	2.35	8.10	46.24
28	Little Lost River	0.06	0.01	0.13	0.07	0.49	0.09	0.06	0.06	0.21	1.18
29	Coeur d'Alene River Basin	0.08	0.08	0.08	0.08	0.17	0	0.04	0	1.08	1.62
30	Kootenai River Basin	0.15	0.02	0.17	0.57	0.61	0.05	0.10	0	0.34	2.01
31	Clark Fork River Basin	1.47	0.09	1.68	6.06	6.41	0.55	1.04	0	2.36	19.65
32	Saint Mary River Basin	0.04	0	0.04	0.16	0.16	0.01	0.03	0	0.03	0.47
<b>Total</b>		<b>18.22</b>	<b>6.96</b>	<b>12.91</b>	<b>11.58</b>	<b>42.71</b>	<b>6.75</b>	<b>5.42</b>	<b>3.90</b>	<b>50.92</b>	<b>159.36</b>

## EXHIBIT D-5. ANNUALIZED BASELINE ADMINISTRATIVE COSTS BY ACTIVITY

UNIT	NAME	DAMS	DEVELOPMENT	FOREST MGMT	MINING	ROADS	IRRIGATION DIVERSIONS	GRAZING	NON- NATIVE SPECIES	OTHER	TOTAL
1	Olympic Peninsula	\$11,500	\$16,200	\$44,600	\$632	\$53,700	\$4,450	\$0	\$5,150	\$321,000	\$457,000
2	Puget Sound	\$21,100	\$29,700	\$81,700	\$1,160	\$98,200	\$8,150	\$0	\$9,430	\$587,000	\$837,000
3	Lower Columbia River Basins	\$2,120	\$2,980	\$8,190	\$116	\$9,850	\$818	\$0	\$946	\$58,900	\$83,900
4	Upper Willamette River	\$1,360	\$1,130	\$3,230	\$48	\$3,900	\$1,230	\$1,080	\$455	\$8,300	\$20,700
5	Hood River	\$509	\$423	\$1,210	\$18	\$1,460	\$460	\$405	\$170	\$3,110	\$7,760
6	Lower Deschutes River	\$2,070	\$1,720	\$4,910	\$73	\$5,930	\$1,870	\$1,640	\$691	\$12,600	\$31,500
7	Odell Lake	\$123	\$102	\$291	\$4	\$351	\$111	\$97	\$41	\$747	\$1,870
8	Mainstem Lower Columbia River	\$2,220	\$1,840	\$5,270	\$78	\$6,360	\$2,010	\$1,760	\$741	\$13,500	\$33,800
9	Klamath River Basin	\$7,910	\$0	\$952	\$0	\$952	\$0	\$2,950	\$4,760	\$9,720	\$27,200
10	Upper Columbia River Basins	\$144,000	\$12,200	\$52,700	\$2,030	\$42,800	\$12,200	\$3,280	\$2,970	\$285,000	\$558,000
11	Yakima River	\$40,300	\$12,900	\$55,700	\$2,150	\$45,300	\$12,900	\$3,470	\$3,140	\$302,000	\$478,000
12	John Day River	\$5,390	\$4,480	\$12,800	\$189	\$15,500	\$4,880	\$4,290	\$1,800	\$32,900	\$82,200
13	Umatilla River	\$946	\$785	\$2,240	\$33	\$2,710	\$855	\$752	\$316	\$5,770	\$14,400
14	Walla Walla River Basin	\$2,330	\$1,930	\$5,520	\$82	\$6,670	\$2,100	\$1,850	\$777	\$14,200	\$35,400
15	Lower Snake River Basins	\$1,270	\$1,050	\$3,010	\$45	\$3,640	\$1,150	\$1,010	\$424	\$7,740	\$19,300
16	Grande Ronde River	\$4,740	\$3,940	\$11,300	\$166	\$13,600	\$4,280	\$3,770	\$1,580	\$28,900	\$72,200
17	Imnaha River	\$1,280	\$1,060	\$3,030	\$45	\$3,660	\$1,150	\$1,010	\$426	\$7,780	\$19,400
18	Sheep and Granite Creeks	\$122	\$30	\$641	\$182	\$842	\$203	\$172	\$171	\$763	\$3,130
19	Hells Canyon Complex	\$1,020	\$253	\$5,350	\$1,520	\$7,020	\$1,690	\$1,430	\$1,420	\$6,370	\$26,100
20	Powder River Basin	\$1,810	\$1,500	\$4,290	\$63	\$5,170	\$1,630	\$1,440	\$603	\$11,000	\$27,500
21	Clearwater River	\$4,930	\$5,750	\$11,400	\$1,200	\$52,100	\$0	\$1,960	\$4,550	\$89,000	\$171,000
22	Mainstem Upper Columbia River	\$107,000	\$783	\$1,550	\$163	\$7,090	\$0	\$267	\$619	\$12,100	\$130,000
23	Mainstem Snake River	\$2,470	\$2,050	\$5,850	\$86	\$7,070	\$2,230	\$1,960	\$823	\$15,000	\$37,600
24	Malheur River Basin	\$1,120	\$929	\$2,660	\$39	\$3,210	\$1,010	\$890	\$374	\$6,830	\$17,100

UNIT	NAME	DAMS	DEVELOPMENT	FOREST MGMT	MINING	ROADS	IRRIGATION DIVERSIONS	GRAZING	NON- NATIVE SPECIES	OTHER	TOTAL
25	Jarbidge River	\$0	\$0	\$8,860	\$2,860	\$2,860	\$0	\$952	\$0	\$9,720	\$25,200
26	Southwest Idaho River Basins	\$6,940	\$1,720	\$36,400	\$10,300	\$47,800	\$11,500	\$9,760	\$9,680	\$43,300	\$177,000
27	Salmon River Basin	\$20,800	\$5,140	\$109,000	\$30,900	\$143,000	\$34,400	\$29,200	\$28,900	\$129,000	\$530,000
28	Little Lost River	\$528	\$131	\$2,770	\$785	\$3,630	\$876	\$742	\$736	\$3,290	\$13,500
29	Coeur d'Alene River Basin	\$1,500	\$1,740	\$3,460	\$2,820	\$15,800	\$0	\$596	\$1,380	\$27,000	\$54,300
30	Kootenai River Basin	\$1,710	\$369	\$7,280	\$6,770	\$12,400	\$928	\$1,800	\$292	\$10,700	\$42,200
31	Clark Fork River Basin	\$155,000	\$1,880	\$74,200	\$72,500	\$114,000	\$9,990	\$18,600	\$1,490	\$82,200	\$530,000
32	Saint Mary River Basin	\$392	\$0	\$1,850	\$1,890	\$2,550	\$262	\$473	\$0	\$1,390	\$8,810
Total		\$554,000	\$115,000	\$572,000	\$139,000	\$739,000	\$123,000	\$97,600	\$84,900	\$2,150,000	\$4,570,000

## EXHIBIT D-6. ANNUALIZED INCREMENTAL ADMINISTRATIVE COSTS BY ACTIVITY

UNIT	NAME	DAMS	DEVELOPMENT	FOREST MANAGEMENT	MINING	ROADS	IRRIGATION DIVERSIONS	GRAZING	NON- NATIVE SPECIES	OTHER	TOTAL
1	Olympic Peninsula	\$3,850	\$5,410	\$14,900	\$211	\$17,900	\$1,490	\$0	\$1,720	\$107,000	\$153,000
2	Puget Sound	\$7,050	\$9,910	\$27,200	\$386	\$32,800	\$2,720	\$0	\$3,150	\$196,000	\$279,000
3	Lower Columbia River Basins	\$1,690	\$2,380	\$6,540	\$93	\$7,860	\$652	\$0	\$755	\$439,000	\$459,000
4	Upper Willamette River	\$853	\$708	\$2,030	\$30	\$2,450	\$771	\$678	\$285	\$5,200	\$13,000
5	Hood River	\$488	\$406	\$1,160	\$17	\$1,400	\$442	\$388	\$163	\$2,980	\$7,440
6	Lower Deschutes River	\$877	\$729	\$2,080	\$31	\$2,520	\$793	\$698	\$293	\$5,350	\$13,400
7	Odell Lake	\$72	\$60	\$171	\$3	\$206	\$65	\$57	\$24	\$439	\$1,100
8	Mainstem Lower Columbia River	\$739	\$615	\$1,760	\$26	\$2,120	\$669	\$589	\$247	\$4,510	\$11,300
9	Klamath River Basin	\$11,100	\$0	\$1,340	\$0	\$1,340	\$0	\$4,150	\$6,680	\$13,600	\$38,200
10	Upper Columbia River Basins	\$48,100	\$4,060	\$17,600	\$678	\$14,300	\$4,080	\$1,090	\$990	\$95,100	\$186,000

UNIT	NAME	DAMS	DEVELOPMENT	FOREST MANAGEMENT	MINING	ROADS	IRRIGATION DIVERSIONS	GRAZING	NON- NATIVE SPECIES	OTHER	TOTAL
11	Yakima River	\$13,400	\$4,300	\$18,600	\$718	\$15,100	\$4,310	\$1,160	\$1,050	\$101,000	\$159,000
12	John Day River	\$1,810	\$1,500	\$4,290	\$63	\$5,180	\$1,630	\$1,440	\$603	\$11,000	\$27,500
13	Umatilla River	\$315	\$262	\$749	\$11	\$904	\$285	\$251	\$105	\$1,920	\$4,810
14	Walla Walla River Basin	\$839	\$698	\$1,990	\$30	\$2,410	\$759	\$668	\$280	\$5,120	\$12,800
15	Lower Snake River Basins	\$423	\$352	\$1,010	\$15	\$1,210	\$383	\$337	\$141	\$2,580	\$6,450
16	Grande Ronde River	\$1,920	\$1,590	\$4,550	\$67	\$5,490	\$1,730	\$1,520	\$640	\$11,700	\$29,200
17	Imnaha River	\$425	\$353	\$1,010	\$15	\$1,220	\$385	\$338	\$142	\$2,590	\$6,480
18	Sheep and Granite Creeks	\$41	\$10	\$214	\$61	\$281	\$68	\$57	\$57	\$255	\$1,040
19	Hells Canyon Complex	\$340	\$84	\$1,780	\$506	\$2,340	\$564	\$478	\$475	\$2,120	\$8,700
20	Powder River Basin	\$1,330	\$1,110	\$3,160	\$47	\$3,810	\$1,200	\$1,060	\$444	\$8,120	\$20,300
21	Clearwater River	\$1,650	\$1,920	\$3,800	\$399	\$17,400	\$0	\$655	\$1,520	\$29,700	\$57,000
22	Mainstem Upper Columbia River	\$35,600	\$261	\$518	\$54	\$2,370	\$0	\$89	\$207	\$4,040	\$43,200
23	Mainstem Snake River	\$1,420	\$1,180	\$3,370	\$50	\$4,070	\$1,280	\$1,130	\$474	\$8,660	\$21,600
24	Malheur River Basin	\$682	\$567	\$1,620	\$24	\$1,960	\$617	\$543	\$228	\$4,160	\$10,400
25	Jarbidge River	\$0	\$0	\$2,960	\$953	\$953	\$0	\$318	\$0	\$3,240	\$8,420
26	Southwest Idaho River Basins	\$2,310	\$574	\$12,100	\$3,440	\$15,900	\$3,840	\$3,250	\$3,230	\$14,500	\$59,200
27	Salmon River Basin	\$6,920	\$1,720	\$36,300	\$10,300	\$47,600	\$11,500	\$9,730	\$9,650	\$43,200	\$177,000
28	Little Lost River	\$176	\$44	\$923	\$262	\$1,210	\$292	\$247	\$246	\$1,100	\$4,500
29	Coeur d'Alene River Basin	\$1,110	\$1,290	\$20,300	\$9,970	\$11,700	\$0	\$441	\$1,020	\$37,700	\$83,600
30	Kootenai River Basin	\$569	\$123	\$2,430	\$2,260	\$4,130	\$310	\$600	\$98	\$3,560	\$14,100
31	Clark Fork River Basin	\$52,200	\$700	\$27,600	\$27,000	\$42,500	\$3,720	\$6,940	\$554	\$30,600	\$192,000
32	Saint Mary River Basin	\$151	\$0	\$714	\$730	\$984	\$101	\$182	\$0	\$539	\$3,400
<b>Total</b>		<b>\$199,000</b>	<b>\$42,900</b>	<b>\$225,000</b>	<b>\$58,400</b>	<b>\$272,000</b>	<b>\$44,600</b>	<b>\$39,100</b>	<b>\$35,500</b>	<b>\$1,200,000</b>	<b>\$2,110,000</b>

APPENDIX E | INCREMENTAL MEMORANDUM

## **Incremental Effects Memo for Proposed Bull Trout Critical Habitat**

**Designation Objectives:** The proposed bull trout critical habitat units represent habitat-based population distributions associated with known occurrence records for this species, and other areas that are essential to the species' conservation (i.e., unoccupied habitat). The spatial arrangement of the proposed critical habitat units includes areas representative of the geographic distribution of the species across its range. The proposed critical habitat units occur within six conservation units, which were defined considering the species distribution, abundance, trend, and connectivity needs. Physical and biological factors that were taken into account included (1) conserving the opportunity for diverse life-history expression; (2) conserving the opportunity for genetic diversity; (3) ensuring that bull trout are distributed across representative habitats; (4) ensuring sufficient connectivity among populations; (5) ensuring sufficient habitat to support population viability; (6) threats; and (7) ensuring sufficient redundancy in population units.

**Designation Summary:** We are proposing to designate 31 critical habitat units within the geographical area occupied by the species at the time of listing. In the Klamath Basin, we are proposing to designate essentially all habitat that was known to be occupied at the time of listing, and some essential unoccupied habitat. In the other five recovery units (Coastal, Mid-Columbia, Upper Snake, Columbia Headwaters, St. Mary), we are proposing to designate the essential areas that were occupied at the time of listing, focusing on species strongholds. We are also proposing to designate some limited but essential unoccupied habitat. The proposed critical habitat designation includes lands under Federal, Tribal and private ownership subject to recreational use, mining, livestock grazing, transportation projects, irrigation, commercial timber harvest, agriculture, and dam/hydropower operations. Since bull trout exhibit both resident and migratory life history strategies, the proposed designation includes tributaries, mainstem rivers, lakes, marine shoreline, and headwater areas.

**Jeopardy Analysis:** The jeopardy analysis is focused not only on these population relationships, but also on the habitat conditions that support them. The jeopardy analysis considers the range-wide status of the bull trout, the factors responsible for that condition, and the species' survival and recovery needs. It also characterizes the condition of the bull trout in the area affected by the proposed Federal action (i.e., the action area), and the survival and recovery role of the action area in the conservation of the bull trout at the interim recovery unit and range-wide scales. That context is then used to determine the significance of adverse and beneficial effects of the proposed Federal action, and any cumulative effects for purposes of making the jeopardy determination. The jeopardy analysis also considers any conservation measures that may be proposed by a Federal action agency to minimize or compensate for adverse project effects to the bull trout or to promote its recovery.

**Adverse Modification Analysis:** The key factor related to the adverse modification determination is whether, with implementation of the proposed Federal action, the affected critical habitat will continue to, or have the capability to serve its intended conservation role for the species. This can be met by retaining or regaining the proper function of those physical and biological features of the habitat necessary to support the life cycle needs of the bull trout. Activities that may destroy or adversely modify critical habitat are those that would alter those

physical and biological features to an extent that appreciably reduces the intended conservation function of the designated critical habitat at the range-wide scale.

**Activities of Potential Concern:** Activities that may result in the adverse effects of bull trout critical habitat could include those that: (1) alter flows (e.g., groundwater pumping, impoundment, water diversion, and hydropower generation); (2) alter stream bank and riparian areas (e.g., vegetation manipulation, timber harvest, road construction and maintenance, prescribed fire, livestock grazing, off-road vehicle use, power transmission line or pipeline construction/repair, mining, development); (3) alter channel geometry or morphology (e.g., channelization, impoundment, road and bridge construction, deprivation of substrate source (e.g., dam or levee construction, stream re-channelization, gravel mining, etc.), destruction and alteration of aquatic or riparian vegetation, reduction of available floodplain, removal of gravel or floodplain terrace materials, excessive sedimentation from mining, livestock grazing, road construction, timber harvest, off-road vehicle use, other types of watershed and floodplain disturbances); (4) alter water chemistry (e.g., release of chemical or biological pollutants into the surface water or connected groundwater at a point source or by dispersed release); (5) introduce or augment non-native species (e.g., fish stocking, use of live bait fish, aquaculture, improper construction and operation of canals, inter-basin water transfers); and (6) create barriers to migration (e.g., new water diversions, impoundments, and hydropower generation where effective fish passage facilities, mechanisms, or procedures are not provided). These types of activities would require section 7 consultation only in cases where there is Federal involvement (e.g., a project is proposed, funded, or authorized by a Federal agency).

### **Baseline Impacts**

When consulting under section 7 in designated critical habitat, independent analyses are conducted for jeopardy to the species and adverse modification of critical habitat. In occupied bull trout habitat, any adverse modification determination would likely result in a jeopardy determination for the same action. As such, project modifications that may be needed to minimize impacts to the species would coincidentally minimize impacts to critical habitat. Accordingly, in occupied critical habitat it is unlikely that an analysis would identify a difference between measures needed to avoid the destruction or adverse modification of critical habitat from measures needed to avoid jeopardizing the species. Absent reasonably foreseeable economic impacts that are distinctly attributable to the critical habitat portion of the analysis, economic impacts from conservation efforts that avoid adverse modification of critical habitat coincidental to avoiding jeopardizing the species would be coextensive with the impacts of bull trout listing and within the regulatory baseline. We estimate that adding an adverse modification analysis to an analysis for jeopardy would result in an approximate 33 percent increase in administrative costs.

In addition to economic impacts associated with conservation actions coincidental to bull trout listing, the incremental cost of the bull trout critical habitat designation is also limited by the extent to which bull trout benefit from existing regulations that impose conservation requirements for other species (e.g., the Federal Power Act, Wilderness Act, Clean Water Act, Endangered Species Act, or existing fisheries management directives such as the Northwest Forest Plan, INFISH, and PACFISH). For example, the March 2003 Draft Economic Report on

proposed critical habitat for bull trout in the Columbia and Klamath Basins concluded that the cost of dams and dam modification dominate a large portion of the estimated project modification costs, but was unable to determine whether the absence of bull trout from these systems would substantially reduce the costs to the facilities because listed salmon species were also present (Executive Summary p. 3).

Bull Trout Proposed Critical Habitat Areas	Occupied critical habitat	Unoccupied critical habitat
Stream and river miles		
Lake and reservoir acres		
Miles with salmon overlap		
Miles with no salmon overlap		
Lake/reservoir acres with salmon overlap		
Lake/reservoir acres with no salmon overlap		

### **Incremental Impacts**

In occupied areas, all administrative economic impacts associated with the costs of reinitiating section 7 consultation because of a new critical habitat designation would appropriately be considered an incremental effect of the designation. The economic impacts associated with the existing bull trout critical habitat designation were analyzed using coextensive methodology in previous economic analyses. A significant percentage of the proposed critical habitat in the Columbia and Klamath River Basins, and the Coastal-Puget Sound, Jarbidge River, and St. Mary Belly River Basins was ultimately excluded in the final designation under section 4(b)(2) of the Act. As a result, there was no need for Federal agencies to reinitiate section 7 consultation in the excluded areas, since they were not designated as critical habitat. However, Federal agencies may need to reinitiate consultation in those areas if they are designated as critical habitat in the critical habitat revision. They may also be required to initiate a new consultation in any areas designated in the critical habitat revision that weren't designated in the 2005 rule. There have been [INSERT NUMBER] reinitiations of consultation in areas that were designated as critical habitat in the 2005 final designation.

For a new section 7 consultation in occupied areas, the jeopardy analysis and the adverse modification analysis would be analyzed separately. Costs associated with the jeopardy analysis would be in the baseline, and the costs associated with the adverse modification analysis would be attributable to the designation. In consultations involving unoccupied critical habitat, there may be incremental project modification costs that would be attributable to the designation of critical habitat and additive to incremental administrative costs. In these cases, we believe a reasonable method to determine the potential incremental economic impacts of these activities would be to assume that if activities with a Federal nexus would alter the physical and biological features to an extent that appreciably reduces the conservation value of critical habitat for bull trout, the costs associated with conservation measures implemented to mitigate those impacts would be attributable to critical habitat designation. In cases where we determine that an adverse modification finding may be likely, we work with the Federal agency involved to identify reasonable and prudent alternatives that would eliminate or reduce those impacts to a point

where adverse modification is no longer likely. The resulting project modifications would appropriately be considered to be an incremental cost of the critical habitat designation.

### **Key Findings of Previous Analyses and Recommendations**

Three tables below reflect the findings of the June 2005 Economic Analysis prepared for the designation of bull trout critical habitat in the Coastal-Puget Sound, Jarbidge River, and Saint Mary-Belly River Basins. The economic analysis indicated the Coastal-Puget Sound population represented about 99 percent of the retrospective costs (\$244 million), which were co-extensive with listed salmon. Annualized (pre-exclusion) prospective costs were estimated to be \$61.8 million, with 98 percent of that cost in the Coastal Puget-Sound region. Since all costs would likely be reduced with an incremental analysis, reanalyzing the areas proposed for designation in the Jarbidge River and Saint Mary-Belly River that were previously analyzed and determined to be nominal would appear to be unnecessary, and we should be able to rely on the previous analysis. However, the analysis should explain the rationale for this approach and the proposed rule or Notice of Availability should specifically solicit comments on these assumptions. Importantly, in the Coastal Puget-Sound area, the new analysis must differentiate baseline costs associated with salmon conservation activities from the incremental effect of bull trout designation in areas where the two species overlap.

The Columbia-Klamath Basin Tables reflect the findings of the September 2004 Final Economic Analysis for the Columbia and Klamath River Basins. Table ES-4 indicates that mining, roads, forest management, irrigation, grazing, and other (including HCP) categories individually make up a relatively small proportion (< \$4 million annually for these activities combined) of the total coextensive cost of designation (approximately \$18 million annually). Since those costs would be expected to be reduced using an incremental analysis methodology, re-analyzing those activities may not be necessary for purposes of the new economic analysis. Similarly, Table ES-5 indicates that project modification and administrative costs are wide-ranging, depending on the particular area. Reanalyzing units/areas with less than \$1 million in annual total costs would appear to be unnecessary, since an incremental analysis would be expected to further reduce the estimated coextensive costs. Under this approach, 8 of the 25 units would be reevaluated on an incremental basis where there is geographic overlap between the previous designation and the proposed revised designation. The analysis should explain the rationale for this approach and the proposed rule or Notice of Availability should specifically solicit comments on these assumptions.

Any areas proposed in the critical habitat revision that were not evaluated in the previous economic analyses should be identified and discussed to determine the appropriate level of economic analysis required.

**Table ES-4**  
**Highest Cost Watersheds in Coastal-Puget Sound Population:**  
**Proposed Critical Habitat**

Watershed Name (HUC Code)	CHSU	Annualized Prospective Costs	Highest Cost Category	Highest Cost Category (% Impact)
Lower Green River (1711001303)	Lower Green	\$9,190,000	Development	93%
Lake Washington (1711001203)	Lake Washington	\$7,322,000	Development & Non-Hydro	43% & 33%
Lower Puyallup River (1711001405)	Puyallup	\$5,793,000	Development	93%
Middle Green River (1711001302)	Lower Green	\$3,263,000	Non-Hydro	94%
Skokomish River (1711001701)	Skokomish	\$2,600,000	Hydro	84%
Snohomish River (1711001102)	Snohomish/ Skykomish	\$2,517,000	Development	88%
Baker River (1710000508)	Lower Skagit	\$2,264,000	Hydro	84%
Puget Sound/ East Passage <sup>u</sup> (1711001904)	Puget Sound Marine	\$1,634,000	Development	86%
Lower Skagit River/ Nookachamps Creek (1711000702)	Lower Skagit	\$1,347,000	Development	89%
Chambers Creek <sup>u</sup> (1711001906)	Puget Sound Marine	\$1,232,000	Development	99%

<sup>u</sup> Chambers Creek and Puget Sound/East Passage HUC watershed are both “nearshore marine habitat HUCs” and costs are adjusted to reflect this type of designation (see Section 2.2.1).

**Table ES-5  
Summary of Economic Impacts Associated with Bull Trout  
Conservation Activities in the Jarbidge River Population**

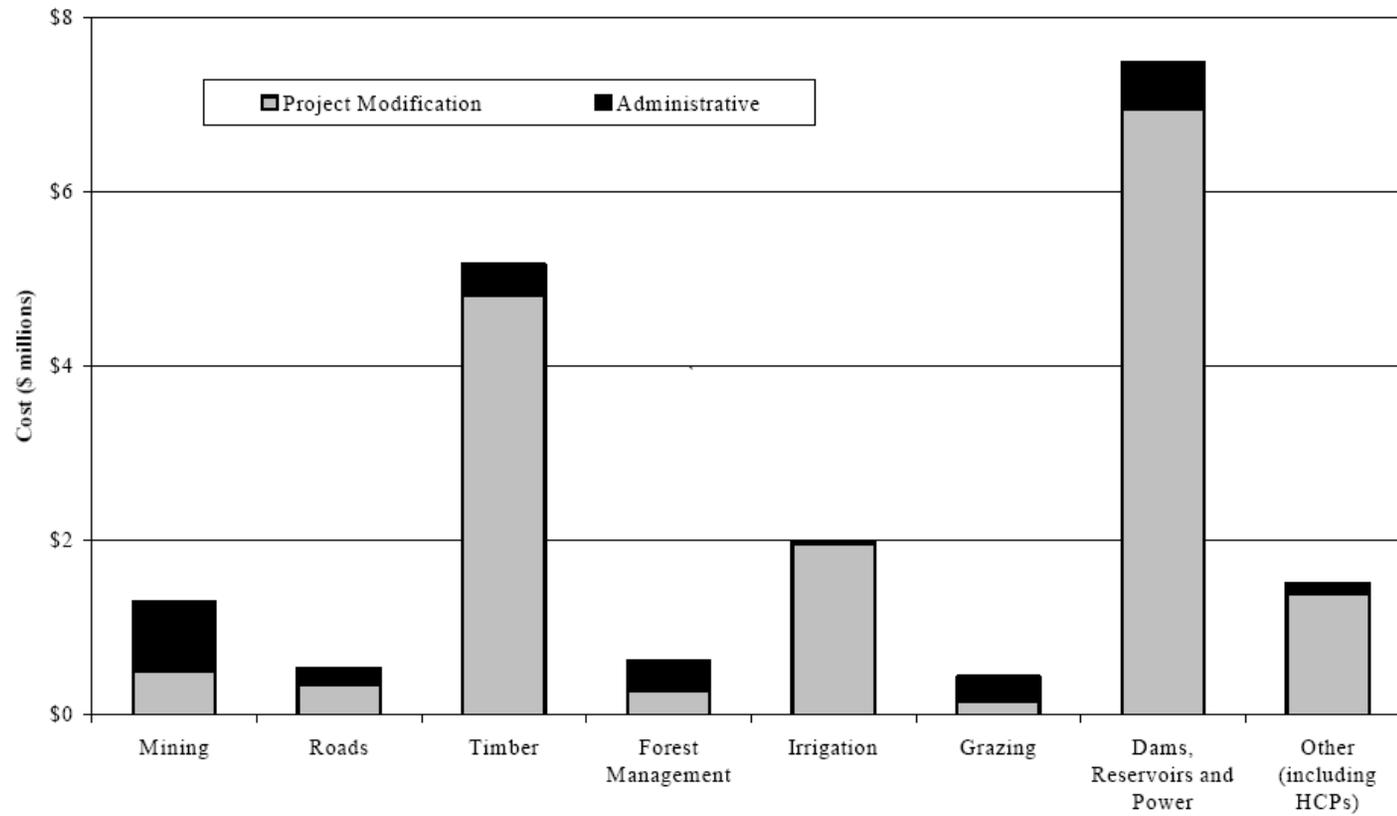
Category of Impact	Retrospective (Total) (1998–2004)	Prospective (Total) (2005–2024)		Prospective (Annualized)
		3%	7%	
Roads and Transportation	\$344,000	\$536,000	\$382,000	\$36,000
Grazing	\$578,000	\$1,427,000	\$1,032,000	\$117,000
Mining	\$0	\$0	\$0	\$0
Recreation	\$0	\$0	\$0	\$0
State and Federal Agencies	\$440,000	\$922,000	\$657,000	\$62,000
<b>Total Impact</b>	<b>\$1,362,000</b>	<b>\$2,885,000</b>	<b>\$2,071,000</b>	<b>\$215,000</b>

Additional detail on the results of the analysis, including detailed cost estimates for each watershed, can be found in Appendix D. The map attachment to this report contains a map (Map 13) of the affected area within each watershed shaded according to relative costs (darker shading indicates higher costs).

**Table ES-6  
Summary of Economic Impacts Associated with Bull Trout  
Conservation Activities in the Saint Mary-Belly River Population**

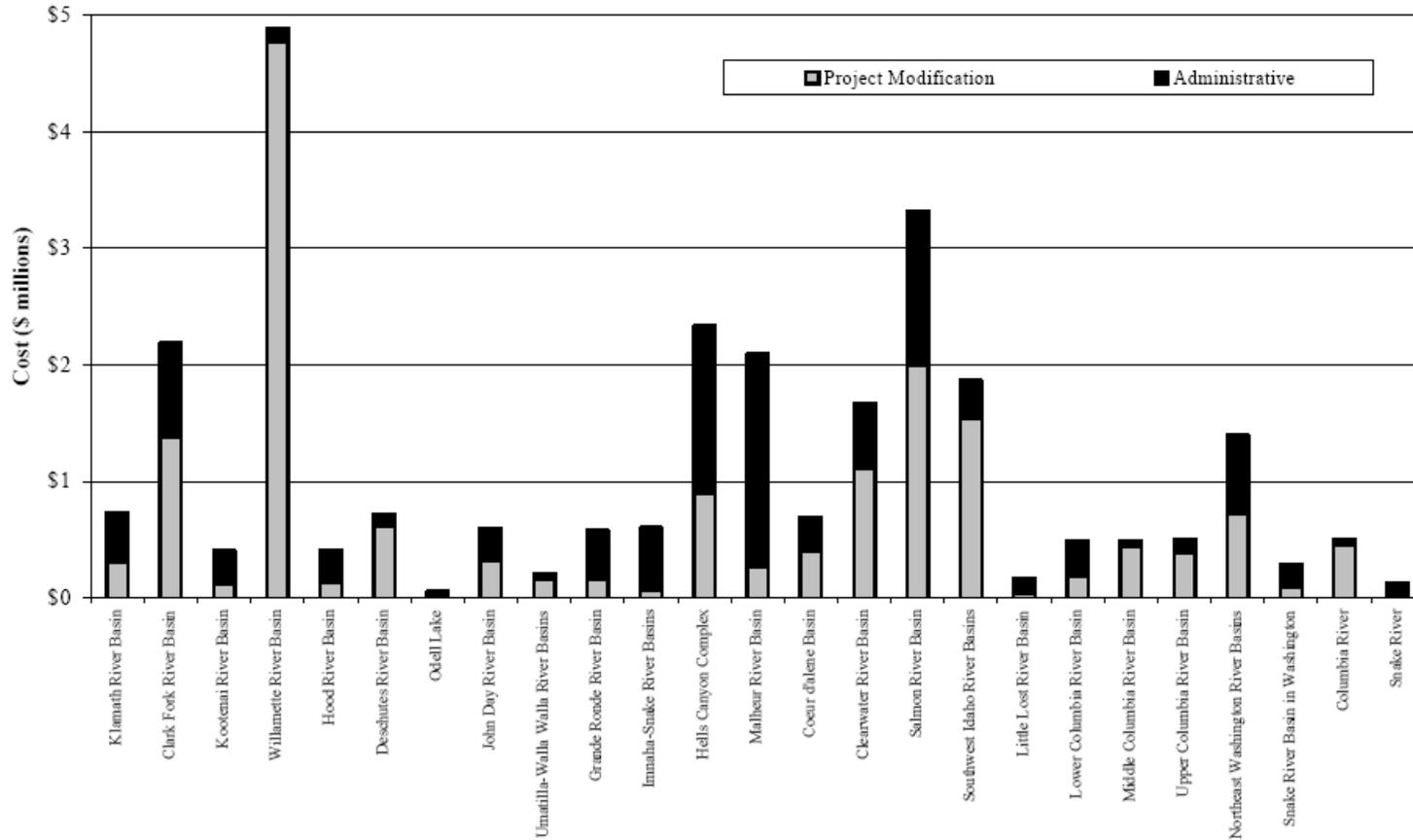
Category of Impact	Retrospective (Total) (1998–2004)	Prospective (Total) (2005–2024)		Prospective (Annualized)
		3%	7%	
Agriculture	\$0	\$813,084	\$578,984	\$54,652
Project Modifications	\$0	\$7,701,800	\$5,198,200	\$490,700
Mining	\$0	\$0	\$0	\$0
Recreation	\$0	\$0	\$0	\$0
State and Federal Agencies	\$1,098,000	\$3,905,337	\$2,780,929	\$262,500
Blackfeet Tribe	\$0	\$297,500	\$211,900	\$20,000
<b>Total Impact</b>	<b>\$1,098,000</b>	<b>\$12,717,700</b>	<b>\$8,770,000</b>	<b>\$827,800</b>

ES-4  
Annualized Total Cost By Activity Impacted, High Range (\$ millions)



ES-8

ES-5  
 Annualized Total Cost By Unit, High Range (\$ millions)



Costs associated with the development of HCPs (\$1,090,000 annually) have not been allocated to the unit level due to uncertainty as to their location.

APPENDIX F | COMPARISON OF SALMON AND BULL TROUT  
PRIMARY CONSTITUENT ELEMENTS

### **Bull Trout PCEs<sup>1</sup>**

- (1) Springs, seeps, groundwater sources, and subsurface water connectivity (hyporehlic flows) to contribute to water quality and quantity and provide thermal refugia.
- (2) Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent or seasonal barriers.
- (3) An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
- (4) Complex river, stream, lake, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates to provide a variety of depths, gradients, velocities, and structure.
- (5) Water temperatures ranging from 2° to 15° Celsius (C) (36° to 59° Fahrenheit (F)), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life history stage and form, geography, elevation, diurnal and seasonal variation, shade, such as that provided by riparian habitat, and local groundwater influence.
- (6) Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12%) of fine substrate less than 0.85 mm (0.03 in) in diameter and minimal substrate embeddedness of these fines in larger substrates are characteristic of these conditions.
- (7) A natural hydrograph, including peak,

### **Salmon PCEs<sup>2</sup>**

- (1) Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development.
- (2) Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility:
  - Water quality and forage supporting juvenile development;
  - Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
- (3) Freshwater migration corridors free of obstruction with water quantity and quality conditions:
  - Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival;
- (4) Estuarine areas free of obstruction with water quality:
  - Water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh and saltwater;
  - Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels;
  - Juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.

<p>high, low, and base flows within historic or seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.</p> <p>(8) Sufficient water quantity such that normal reproduction, growth and survival are not inhibited.</p> <p>(9) Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, small mouth bass), inbreeding (brook trout), or competitive (e.g., brown trout) species present.</p>	<p>(5) Nearshore marine areas free of obstruction with water quality and quantity conditions:</p> <ul style="list-style-type: none"> <li>• Forage including aquatic invertebrates and fishes, supporting growth and maturation;</li> <li>• Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.</li> </ul> <p>(6) Offshore marine areas with water quality conditions and foraging:</p> <ul style="list-style-type: none"> <li>• Aquatic invertebrates and fishes supporting growth and maturation.</li> </ul>
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### PCEs for Bull Trout and Salmon Compared

PCE attribute identified	Bull Trout <sup>1</sup>	Salmon <sup>2</sup>
Water temperature	1, 5	
Water Quantity	1, 8	1, 2, 3, 4
Water Quality	1, 8	1, 2, 3, 4, 5, 6
Food base	3	2, 4, 5, 6
Channel complexity	4	2, 3, 4, 5
Substrate	6	1
Hydrograph	7	3
Predation/competition/inbreeding	9	
Migratory corridors	2	3
Springs, seeps, other subsurface input	1	
Permanent water	8	
Estuarine areas		4
Nearshore marine areas		5
Offshore marine areas		6

### Special Management Considerations for Bull Trout and Salmon Compared

Type of Activities Considered	Bull Trout <sup>1</sup>	Salmon <sup>2</sup>
Forestry	X	X
Grazing and other rangeland activities	X	X
Agriculture	X	X
Road building and maintenance	X	X
Channel modifications/diking/erosion control	X	X
Urbanization	X	X
Sand and gravel mining	X	X
Mineral mining		X
Dams	X	X
Irrigation impoundments and withdrawals	X	X
Wetland loss/removal		X
Exotic/invasive species introductions	X	X
Impediments to migration	X	X
Harvest of prey species		X
Discharging pollutants	X	

<sup>1</sup> Proposed Rule–Designation of Critical Habitat for Bull Trout in the Coterminous United States

<sup>2</sup> Final Rule–National Oceanic and Atmospheric Administration: Designation of Critical Habitat for 12 Evolutionarily Significant Units of West Coast Salmon and Steelhead in Washington, Oregon, and Idaho; 70 FR 52521-52522, September 2, 2005

APPENDIX G | ALLOCATION OF COSTS FROM PREVIOUS ANALYSES

EXHIBIT G-1. PERCENTAGE OF COSTS FROM PREVIOUS PROPOSALS ALLOCATED TO PROPOSED CRITICAL HABITAT UNITS

		Critical Habitat Units (CHUs) from Previous Proposals ("Old CHUs")																												
New CHUs (2009 Proposed Rule)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
New CHU #	New Unit Name	Klamath RB	Clark Fork RB	Kootenai RB	Willamette RB	Hood River RB	Deschutes RB	Odell Lake	John Day RB	Umatilla-Walla Walla	Grande Ronde	Imnaha/Snake	Hells Canyon	Malheur RB	Coeur d'Alene Lake	Clearwater RB	Salmon RB	Southwest ID	Little Lost RB	Lower Columbia	Middle Columbia	Upper Columbia	NE Washington RBs	Snake RB WA	Columbia R	Snake R	Jarbridge River Basin	Olympic Peninsula RBs	Puget Sound	St. Mary - Belly Rivers
1	Olympic Peninsula	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	91%	0%	0%
2	Puget Sound	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	93%	0%
3	Lower Columbia River Basins	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
4	Upper Willamette River	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
5	Hood River	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
6	Lower Deschutes River	0%	0%	0%	0%	0%	66%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
7	Odell Lake	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8	Mainstem Lower Columbia River	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	57%	0%	0%	0%	0%
9	Klamath River Basin	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
10	Upper Columbia River Basins	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
11	Yakima River	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
12	John Day River	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
13	Umatilla River	0%	0%	0%	0%	0%	0%	0%	0%	45%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
14	Walla Walla River Basin	0%	0%	0%	0%	0%	0%	0%	0%	55%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
15	Lower Snake River Basins	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	
16	Grande Ronde River	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
17	Imnaha River	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	93%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
18	Sheep and Granite Creeks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
19	Hells Canyon Complex	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
20	Powder River Basin	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	60%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

New CHUs (2009 Proposed Rule)		Critical Habitat Units (CHUs) from Previous Proposals ("Old CHUs")																												
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
New CHU #	New Unit Name	Klamath RB	Clark Fork RB	Kootenai RB	Willamette RB	Hood River RB	Deschutes RB	Odell Lake	John Day RB	Umatilla-Walla Walla	Grande Ronde	Imnaha/Snake	Hells Canyon	Malheur RB	Coeur d'Alene Lake	Clearwater RB	Salmon RB	Southwest ID	Little Lost RB	Lower Columbia	Middle Columbia	Upper Columbia	NE Washington RBs	Snake RB WA	Columbia R	Snake R	Jarbridge River Basin	Olympic Peninsula RBs	Puget Sound	St. Mary - Belly Rivers
21	Clearwater River	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
22	Mainstem Upper Columbia River	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	43%	0%	0%	0%	0%
23	Mainstem Snake River	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%
24	Malheur River Basin	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
25	Jarbridge River	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%
26	Southwest Idaho River Basins	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	98%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
27	Salmon River Basin	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
28	Little Lost River	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
29	Coeur d'Alene River Basin	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
30	Kootenai River Basin	0%	0%	99%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
31	Clark Fork River Basin	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
32	Saint Mary River Basin	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
	TOTAL	100%	100%	99%	100%	100%	66%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	91%	93%	100%