

APPENDIX A
COSTS OF PROPOSED, RECOMMENDED, PRESCRIBED, AND
SPECIFIED ENVIRONMENTAL MEASURES FOR THE
KLAMATH HYDROELECTRIC PROJECT

This page intentionally left blank.

Table A-1. Summary of capital costs, annual costs, annual energy costs, and total annualized costs of environmental measures proposed by PacifiCorp and recommended by others and considered by staff for inclusion in the Staff Alternative for the Klamath Hydroelectric Project. (Source: Staff)

Legend: P = Proposed; S = Staff Alternative; S+M = Staff Alternative with mandatory conditions; 2-D = Alternative with removal of Copco No. 1 and Iron Gate developments; 4-D = Alternative with removal of J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate developments

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|------------------------|-----------------------|------------------------------|--------------------------------|---------------------------------------|--------------------------------|
| Geology and Soils Measures | | | | | | | |
| 1. Sediment and gravel resource management plan development | Oregon Fish & Wildlife, NMFS, FWS, Cal Fish & Game, Bureau of Land Management, Hoopa Valley Tribe | \$15,000 | \$15,000 | \$0 | \$17,020 | S, S+M, 2-D | a |
| 2. Gravel mapping and augmentation plan | Oregon Fish & Wildlife, NMFS, FWS, Cal Fish & Game, Bureau of Land Management, Hoopa Valley Tribe | \$79,070 | \$0 | \$0 | \$10,670 | S, S+M | a |
| 3. Gravel mapping and augmentation plan | None | \$40,000 | \$0 | \$0 | \$5,400 | 2-D | a, b |
| 4. Place 100-200 cubic yards of spawning gravel in the J.C. Boyle bypassed reach and 1,800 to 3,500 cubic yards of spawning gravel downstream of Iron Gate | PacifiCorp | \$428,340 | \$74,540 | \$0 | \$132,360 | P | c |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 5. Implement sediment augmentation in the J.C. Boyle bypassed reach and downstream of Iron Gate dam | Oregon Fish & Wildlife, NMFS, FWS, Cal Fish & Game | \$396,300 | \$80,430 | \$0 | \$133,910 | S, S+M | a |
| 6. Implement sediment augmentation in the J.C. Boyle bypassed reach | Bureau of Land Management | \$214,480 | \$38,650 | \$0 | \$67,600 | 2-D | a, b |
| 7. Gravel/sediment monitoring after augmentation | PacifiCorp, Oregon Fish & Wildlife, NMFS, FWS, Cal Fish & Game, Bureau of Land Management | \$0 | \$20,000 | \$0 | \$20,000 | P, S, S+M, 2-D | a |
| 8. Remove and manage sediment in refugia areas downstream of Iron Gate, including sediment barriers to fish passage | Siskiyou Co. | \$0 | \$229,920 | \$0 | \$229,920 | None | a |
| 9. Flow continuation provisions at J.C. Boyle powerhouse | PacifiCorp, Oregon Fish & Wildlife, Hoopa Valley Tribe, Interior | \$6,615,320 | \$5,800 | \$0 | \$898,760 | P, S, S+M, 2-D | c |
| 10. Monitoring and maintenance plan to reduce chances of water conveyance system failure and excess use of emergency overflow spillway | Oregon Fish & Wildlife | \$10,000 | \$0 | \$0 | \$1,350 | None | a |
| 11. Plan for restoration of slope failures along J.C. Boyle bypassed reach | Oregon Fish & Wildlife, Interior | \$3,030,000 | \$0 | \$0 | \$409,000 | S, S+M, 2-D, 4-D | a |
| 12. Development of an action plan that establishes protocols to be followed in the event of a water conveyance system failure | Oregon Fish & Wildlife, Bureau of Land Management, Interior | \$10,000 | \$0 | \$0 | \$1,350 | S, S+M, 2-D, 4-D | a |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|--|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 13. Development of a plan to restore the river from J.C. Boyle dam to Copco reservoir to mitigate effects from use of the emergency spillway; and develop monitoring protocols based on channel cross sections to determine effectiveness of restoration activities. | Interior | \$800,000 | \$0 | \$0 | \$107,990 | None | a |
| Water Quantity Measures | | | | | | | |
| 1. Project operation management plan and water quantity reporting | Oregon Fish & Wildlife, Hoopa Valley Tribe | \$10,000 | \$10,000 | \$0 | \$11,350 | S, S+M, 2-D | a |
| 2. Project-wide gage installation and reporting plan | Oregon Fish & Wildlife, Hoopa Valley Tribe, NMFS, Cal Fish & Game | \$25,000 | \$0 | \$0 | \$3,370 | S, S+M, 2-D | a |
| 3. Project-wide gage installation and reporting plan | None | \$10,000 | \$0 | \$0 | \$1,350 | 4-D | a, b |
| 4. Link River bypassed reach discharge gage | Oregon Fish & Wildlife | \$64,420 | \$10,740 | \$0 | \$19,440 | None | c |
| 5. J.C. Boyle bypassed reach discharge gage | PacifiCorp, Oregon Fish & Wildlife, Cal Fish & Game, NMFS, Bureau of Land Management | \$64,420 | \$10,740 | \$0 | \$19,440 | P, S, S+M, 2-D | c |
| 6. Shovel Creek discharge gage | Oregon Fish & Wildlife, Cal Fish & Game, NMFS, FWS | \$64,420 | \$10,740 | \$0 | \$19,440 | None | c |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|--|--|------------------------------|--|---------------------------------------|--|---------------------------------------|
| 7. Copco No. 2 bypassed reach discharge gage | Oregon Fish & Wildlife, Cal Fish & Game, FWS, NMFS, Hoopa Valley Tribe | \$64,420 | \$10,740 | \$0 | \$19,440 | S, S+M, 2-D | a |
| 8. Install a Parshall flume at the Spring Creek diversion | PacifiCorp, Oregon Fish & Wildlife, Cal Fish & Game | \$48,320 | \$2,580 | \$0 | \$9,100 | P, S, S+M, 2-D, 4-D | c |
| 9. Install a Parshall flume at the Fall Creek diversion | Oregon Fish & Wildlife, Cal Fish & Game | \$48,320 | \$2,580 | \$0 | \$9,100 | S, S+M, 2-D, 4-D | c |
| 10. Ensure operation of continuously recording USGS gages at Keno, Spencer Creek, and downstream of J.C. Boyle powerhouse | Bureau of Land Management, Oregon Fish and Wildlife, Cal Fish & Game | \$64,420 | \$10,740 | \$0 | \$19,440 | S+M | c, d |
| 11. Maintain the approach channel at the A canal to ensure of flow of at least 1,200 cfs into the canal with the water of Upper Klamath Lake at elevation 4,137 ft. | Reclamation | \$0 | \$10,000 | \$0 | \$10,000 | None | a |
| 12. Provide Reclamation with real-time reservoir elevations and releases for project facilities | Reclamation | \$10,000 | \$0 | \$0 | \$1,350 | S, S+M, 2-D | a |
| 13. Add Spring Creek diversion to the project | PacifiCorp | \$52,610 (the net investment value was not included in the No-action Alternative) | \$71,940 | -\$159,470 (gain of 3,305 MWh at Fall Creek powerhouse) | -\$80,420 | P, S, S+M, 2-D, 4-D | e |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|--|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| Water Quality Measures | | | | | | | |
| 1. Water quality resource management plan | PacifiCorp, Oregon Fish & Wildlife, Hoopa Valley Tribe, Forest Service | \$120,000 | \$90,000 | \$0 | \$106,200 | P, S, S+M | a |
| 2. Water quality resource management plan | None | \$15,000 | \$20,000 | \$0 | \$22,020 | 2-D | a, b |
| 3. Water quality resource management plan | None | \$10,000 | \$3,470 | \$0 | \$4,820 | 4-D | a, b |
| 4. Implement turbine venting at Iron Gate | Staff | \$27,650 | \$0 | \$69,580 (loss of 1,442 MWh) | \$73,310 | S, S+M | f |
| 5. Temperature control feasibility plan | NMFS, FWS, Forest Service | \$75,000 | \$0 | \$0 | \$10,120 | S, S+M | a |
| 6. Keno reservoir water quality plan | NMFS, FWS | \$20,000 | \$20,000 | \$0 | \$22,700 | None | a, g |
| 7. Temperature monitoring | Conservation Groups | \$0 | \$0 | \$0 | \$0 | None | a, h |
| 8. <i>Microcystis</i> monitoring in Copco and Iron Gate reservoirs and downstream to the ocean | Conservation Groups, FWS | \$20,000 | \$66,000 | \$0 | \$68,700 | None | a, i |
| 9. <i>Microcystis</i> monitoring, project reservoirs and immediately downstream of Iron Gate dam | Staff | \$20,000 | \$48,000 | \$0 | \$50,700 | S, S+M | a |
| 10. <i>Microcystis</i> monitoring, project reservoirs and immediately downstream of Iron Gate dam | None | \$20,000 | \$24,000 | \$0 | \$26,700 | 2-D | a, b |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|--|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 11. <i>Microcystis</i> removal | Siskiyou Co. | \$0 | \$20,000 | \$0 | \$20,000 | None | a |
| 12. Address licensee's share of TDML effects on Klamath River water quality in Keno reservoir | OWRD | \$0 (Unknown) | \$0 (Unknown) | \$0 | \$0 | None | a |
| 13. Funding for measures to address Keno water quality problems | Klamath Tribes | \$60,000 | \$15,000 | \$0 | \$23,100 | None | a, j |
| 14. Hypolimnetic oxygenation system at Iron Gate reservoir | PacifiCorp | \$2,248,330 | \$259,540 | \$0 | \$563,030 | P | k, l |
| Aquatic Resource Measures | | | | | | | |
| 1. Funding of programs specified by the Shasta Valley and Siskiyou Resource Conservation districts to facilitate juvenile fish outmigration, habitat enhancements, riparian projects to increase shading, enhanced streamflows and monitoring | Siskiyou Co. | \$13,282,000 | \$0 | \$0 | \$1,792,860 | None | a |
| 2. Provide minimum flows in the Keno reach within 10% of inflow | FWS, NMFS, Oregon Fish & Wildlife, Cal Fish & Game | \$0 | \$0 | \$0 | \$0 | None | a, m |
| 3. If inflows exceed 500 cfs, provide a total minimum flow of 500 cfs, or 70% of inflow; whichever is greater, from the Keno dam. If inflow is less than 500 cfs, provide all inflow. Provide a ramping rate of 0.1 foot per hour when salmonid fry and listed sucker juveniles are present. For the rest of the year, provide a ramping rate of 0.2 foot per hour | Hoopa Valley Tribe | \$0 | \$0 | \$0 | \$0 | None | a |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|---------------------------------------|---------------------------------------|--|---------------------------------------|
| 4. Keno reach: minimum flow: 625 cfs or inflow as available; on a 24-hour basis, when inflow is greater than 625 cfs, flows must be maintained within 10% of inflow. Limit ramping to 1 inch per hour and up to 300 cfs per 24-hour period | Conservation Groups | \$0 | \$0 | \$0 | \$0 | None | a |
| 5. Boyle bypassed reach minimum flow: increase minimum flow from 100 cfs to 200 cfs with a ramping rate limit of 150 cfs per hour | PacifiCorp | \$241,590 | \$5,580 | \$1,156,460 (loss of 23,968 MWh) | \$1,194,650 | P, S, 2-D | c |
| 6. Boyle bypassed reach minimum flow: 470 cfs or 40% proportional inflow, whichever is greater. If 40% of inflow is greater than 470 cfs, provide the average of the previous 3 days. Limit ramping to 2 inches per hour, except during seasonal high flow events | Bureau of Land Management | \$500,000 | \$6,000 | \$6,517,470 (loss of 135,077 MWh) | \$6,590,960 | S+M | a |
| 7. If inflows exceed 500 cfs, provide a total minimum flow of 500 cfs, or 70% of inflow; whichever is greater, from the J.C. Boyle dam. If inflow is less than 500 cfs, provide all inflow. Provide a ramping rate of 0.1 foot per hour when salmonid fry and listed sucker juveniles are present. For the rest of the year, provide a ramping rate of 0.2 foot per hour | Hoopa Valley Tribe | \$500,000 | \$6,000 | \$10,978,610 (loss of 227,536 MWh) | \$11,052,100 | None | a |
| 8. Boyle bypassed reach minimum flow: 640 cfs or 40% proportional inflow, whichever is greater. If 40% of inflow is greater than 730 cfs, provide the average of the previous 3 days. Limit ramping rates to 1 inch per hour and 300 cfs per 24-hour period | Oregon Fish & Wildlife, NMFS, Cal Fish & Game | \$500,000 | \$6,000 | \$7,288,740 (loss of 151,062 MWh) | \$7,362,230 | None | a |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|--|-------------------------------|------------------------------|--|---------------------------------------|--|---------------------------------------|
| 9. Maintain ROR conditions at JC Boyle dam | Oregon Fish & Wildlife, Cal Fish & Game | \$0 | \$0 | \$725,200 (loss in energy value due to shift of 48,769 MWh from on-peak to off-peak generation) | \$725,200 | 2-D | a |
| 10. Maintain ROR conditions in the J.C. Boyle peaking reach except for 1 day per week when peaking operations are allowed, preferably on a weekend. Limit ramping rate to 2 inches per hour, except during flushing flows | Bureau of Land Management | \$0 | \$0 | \$621,000 (loss in energy value due to shift of 41,762 MWh from on-peak to off-peak generation) | \$621,000 | S+M | a |
| 11. If inflows exceed 500 cfs, provide a total minimum flow of 500 cfs, or 70% of inflow; whichever is greater, in the J.C. Boyle peaking reach. If inflow is less than 500 cfs, provide all inflow. Provide a ramping rate of 0.1 foot per hour when salmonid fry and listed sucker juveniles are present. For the rest of the year, provide a ramping rate of 0.2 foot per hour | Hoopla Valley Tribe | \$0 | \$0 | \$0 (no additional loss over the bypass flow releases) | \$0 | None | a |
| 12. Provide a minimum flow of 720 cfs to the J.C. Boyle peaking reach with a ramping rate limit of 1 inch per hour and 300 cfs per 24-hours | Oregon Fish & Wildlife, Cal Fish & Game, Conservation Groups | \$0 | \$0 | \$0 (no additional loss over the bypass flow releases) | \$0 | None | a |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|--|---------------------------------------|--|---------------------------------------|
| 13. If inflows exceed 500 cfs, provide a total minimum flow of 500 cfs, or 70% of inflow; whichever is greater, from Copco No. 1 dam. If inflow is less than 500 cfs, provide all inflow. Provide a ramping rate of 0.1 foot per hour when salmonid fry and listed sucker juveniles are present. For the rest of the year, provide a ramping rate of 0.2 foot per hour | Hoopa Valley Tribe | \$0 | \$0 | \$0 | \$0 | None | a |
| 14. Maintain ROR conditions at Copco No. 1 dam | Oregon Fish & Wildlife, Cal Fish & Game | \$0 | \$0 | \$231,590 (loss in energy value due to shift of 15,574 MWh from on-peak to off-peak generation) | \$231,590 | None | a |
| 15. Copco No. 2 bypassed reach minimum flow: 10 cfs, improve release gate at the dam. Limit ramping rate to 125 cfs per hour (2 inches/hr) | PacifiCorp | \$80,530 | \$0 | \$0 | \$10,870 | P | c |
| 16. Copco No. 2 bypassed reach minimum flow: 70 cfs, improve release gate at the dam. Limit ramping rate to 125 cfs per hour (2 inches/hr) | Staff | \$80,530 | \$0 | \$206,510 (loss of 4,280 MWh) | \$217,380 | S, S+M, 2-D | c |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|--|-------------------------------|------------------------------|--|---------------------------------------|--|---------------------------------------|
| 17. If inflows exceed 500 cfs, provide a total minimum flow of 500 cfs, or 70% of inflow; whichever is greater, in the Copco No. 2 bypass reach. If inflow is less than 500 cfs, provide all inflow. Provide a ramping rate of 0.1 foot per hour when salmonid fry and listed sucker juveniles are present. For the rest of the year, provide a ramping rate of 0.2 foot per hour | Hoopa Valley Tribe | \$500,000 | \$6,000 | \$3,048,920 (loss of 63,190 MWh) | \$3,122,410 | None | a |
| 18. Copco No. 2 bypassed reach minimum flow: 730 cfs or 40% inflow, whichever is greater. When flows are greater than 730 cfs, provide the average of the previous 3 days. When flows are less than 730 cfs, provide all inflow. Limit ramping rates to 1 inch per hour and 300 cfs per 24-hours | Oregon Fish & Wildlife, NMFS, FWS, Cal Fish & Game, Hoopa Valley Tribe | \$500,000 | \$6,000 | \$4,612,030 (loss of 95,586 MWh) | \$4,685,520 | None | a |
| 19. Maintain ROR conditions at Copco No. 2 dam | Oregon Fish & Wildlife, Cal Fish & Game | \$0 | \$0 | \$261,670 (loss in energy value due to shift of 17,597 MWh from on-peak to off-peak generation) | \$261,670 | 2-D | a |
| 20. Fall Creek bypassed reach continuous minimum flow of 5 cfs | PacifiCorp | \$0 | \$0 | \$28,610 (loss of 593 MWh) | \$28,610 | P, S, S+M, 2-D, 4-D | a |
| 21. Fall Creek bypassed reach continuous minimum flow of 40% of inflow | Oregon Fish & Wildlife, FWS, Cal Fish & Game | \$100,000 | \$0 | \$244,190 (loss of 5,061 MWh) | \$257,690 | None | a |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|--|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 22. Spring Creek minimum flow of 100% from July 1 to August 31 and 1 cfs, or inflow, if less, for the rest of the year | PacifiCorp | \$0 | \$0 | \$48,250 (loss of 1,000 MWh) | \$48,250 | P | a |
| 23. Spring Creek minimum flow of 100% from June 1 to September 15 and 4 cfs for the rest of the year | Oregon Fish & Wildlife, FWS, Cal Fish & Game | \$0 | \$0 | \$91,140 (loss of 1,889 MWh) | \$91,140 | S, S+M, 2-D, 4-D | a |
| 24. Run-of-river at Iron Gate with ramping rate limits of 125 cfs/hr (2 inches per hour) and 300 cfs per day for inflows greater than 1,750 cfs and 50 cfs per hour and 150 cfs per day when inflows are less than 1,750 cfs. | Oregon Fish & Wildlife | \$0 | \$0 | \$0 | \$0 | None | a |
| 25. Variable minimum flows downstream of Iron Gate dam. Provide a ramping rate of 0.1 foot per hour when salmonid fry and listed sucker juveniles are present. For the rest of the year, provide a ramping rate of 0.2 foot per hour. | Hoopa Valley Tribe | \$0 | \$0 | \$0 | \$0 | None | a |
| 26. Variable minimum flows downstream of Iron Gate dam with a ramping rate of 1 inch per hour and 300 cfs per day. | Cal Fish & Game | \$0 | \$0 | \$0 | \$0 | None | a |
| 27. Variable minimum flows downstream of Iron Gate dam with a ramping rate limit of 1 inch per hour | Forest Service | \$0 | \$0 | \$0 | \$0 | None | a |
| 28. Seasonal high flow events in J.C. Boyle bypassed reach, with a downramp rate of 2 inches an hour (Bureau of Land Management excludes this from its measure) and 300 cfs per 24 hours | Oregon Fish & Wildlife, Bureau of Land Management, Cal Fish & Game | \$0 | \$0 | \$210,710 (loss of 4,367 MWh) | \$210,710 | S, S+M, 2-D | a |
| 29. Seasonal high flow events in Copco No. 2 bypassed reach, with a downramp rate of 2 inches an hour and 300 cfs per 24 hours | Oregon Fish & Wildlife, FWS, Cal Fish & Game | \$0 | \$0 | \$177,760 (loss of 3,684 MWh) | \$355,510 | None | a |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 30. Develop a plan to provide temporary enhanced flows on an emergency basis (feasibility of implementing this plan would be addressed in Water Quality 1) | Oregon Fish & Wildlife, NMFS, FWS, Cal Fish & Game | \$20,000 | \$3,340 | \$0 (Unable to quantify) | \$6,040 | S, S+M | a |
| 31. Fish passage resource management plan | Oregon Fish & Wildlife, Cal Fish & Game | \$30,000 | \$10,000 | \$0 | \$14,050 | S, S+M, 2-D | a, i |
| 32. Fish passage resource management plan | None | \$10,000 | \$2,000 | \$0 | \$3,350 | 4-D | a, b |
| 33. Integrated Fish Passage and Disease Management Program – disease and water quality components | Staff | \$0 | \$393,570 | \$0 | \$393,570 | S, S+M | a |
| 34. Integrated Fish Passage and Disease Management Program – fish passage components | Staff | \$31,993,300 | \$141,320 | \$55,540 (loss of 1,151 MWh) | \$4,515,440 | S | a |
| 35. Determine if anadromous fish passage is feasible and if so, design a permanent smolt collection facility at or upstream of J.C. Boyle dam, modify adult collection facilities at Iron Gate, and implement a trap and haul reintroduction | PacifiCorp (alternative prescription - not proposed) | \$10,000 | \$0 | \$0 | \$1,350 | None | a, n |
| 36. Keno fish ladder modifications | NMFS, Interior, Cal Fish & Game | \$5,771,770 | \$333,850 | \$0 | \$1,112,950 | None | o |
| 37. Develop a plan to evaluate the need for a listed sucker fish ladder at Keno | FWS | \$10,000 | \$0 | \$0 | \$1,350 | None | a |
| 38. Keno fish ladder to accommodate listed sucker | Oregon Fish & Wildlife, Hoopa Valley Tribe | \$11,552,190 | \$423,980 | \$0 | \$1,983,340 | None | a |
| 39. Keno spillway evaluation and modification for downstream fish passage | Oregon Fish & Wildlife, NMFS, Interior, Cal Fish & Game | \$179,990 | \$47,690 | \$0 | \$71,990 | None | m, o |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 40. Improve the existing fish ladder at Boyle dam | PacifiCorp | \$1,938,600 | \$0 | \$0 | \$261,680 | P, S, 2-D | o |
| 41. J.C. Boyle fish ladder | NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$13,962,790 | \$41,450 | \$0 | \$1,926,210 | S+M | o |
| 42. Construct, operate year-round, maintain, and evaluate a fish screen at Boyle dam | Oregon Fish & Wildlife, NMFS, Interior, Cal Fish & Game | \$36,653,020 | \$51,810 | \$11,000 (loss of 228 MWh) | \$5,010,390 | S, S+M, 2-D | o |
| 43. J.C. Boyle gulper to protect fish from entrainment and facilitate downstream passage | PacifiCorp | \$4,773,950 | \$106,310 | \$0 | \$750,720 | P | o |
| 44. J.C. Boyle spillway modification for fish passage | NMFS, Interior, Cal Fish & Game | \$3,879,070 | \$10,360 | \$0 | \$533,970 | None | o, p |
| 45. J.C. Boyle tailrace barrier | NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$8,601,810 | \$21,930 | \$3,670 (loss of 76 MWh) | \$1,186,700 | None | o, p |
| 46. Juvenile trap and haul facility at J.C. Boyle dam if agencies determine that self-sustaining runs of anadromous fish can be established upstream | PacifiCorp (alternative prescription- not proposed) | \$21,916,770 | \$213,990 | \$11,000 (loss of 228 MWh) | \$3,183,410 | None | o, i, q |
| 47. Copco No. 1 fish ladder | NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$20,837,550 | \$29,580 | \$448,920 (loss of 9,304 MWh) | \$3,291,240 | S+M | o |
| 48. Copco No. 1 fish screen and bypass | NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$27,445,800 | \$36,980 | \$13,080 (loss of 271 MWh) | \$3,754,800 | S+M | o |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 49. Copco No. 1 spillway modification for fish passage | NMFS, Interior, Cal Fish & Game | \$2,904,650 | \$7,400 | \$0 | \$399,480 | S+M | o, p |
| 50. Copco No. 1 tailrace barrier | NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$7,385,560 | \$15,510 | \$4,340 (loss of 90 MWh) | \$1,016,790 | None | o, p |
| 51. Copco No. 2 fish ladder | NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$4,384,840 | \$29,580 | \$0 | \$621,460 | S+M, 2-D | o |
| 52. Copco No. 2 fish screen and bypass | NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$25,253,040 | \$36,980 | \$13,510 (loss of 280 MWh) | \$3,459,250 | S+M, 2-D | o |
| 53. Copco No. 2 spillway modification for fish passage | NMFS, Interior, Cal Fish & Game | \$289,770 | \$3,700 | \$0 | \$42,810 | None | o, p |
| 54. Copco No. 2 tailrace barrier | NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$6,866,580 | \$15,510 | \$4,490 (loss of 93 MWh) | \$946,880 | None | o, p |
| 55. Natural bedrock sill removal at Copco No. 2 bypassed reach | NMFS, Interior | \$193,490 | \$5,180 | \$0 | \$31,300 | None | o, p |
| 56. Fall Creek fish ladder | PacifiCorp, NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$89,990 | \$14,310 | \$0 | \$26,460 | P, S, S+M, 2-D, 4-D | o |
| 57. Fall Creek fish screen and bypass | PacifiCorp, NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$643,810 | \$23,850 | \$270 (loss of 6 MWh) | \$111,020 | P, S, S+M, 2-D, 4-D | o |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 58. Fall Creek tailrace barrier | NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$132,540 | \$12,090 | \$0 | \$29,980 | None | o, p |
| 59. Spring Creek fish ladder | PacifiCorp, NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$269,980 | \$14,310 | \$0 | \$50,750 | P, S, S+M, 2-D, 4-D | o |
| 60. Spring Creek fish screen and bypass | PacifiCorp, NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$261,330 | \$20,150 | \$0 | \$55,430 | P, S, S+M, 2-D, 4-D | o |
| 61. Iron Gate fish ladder | NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$28,909,690 | \$112,820 | \$456,540 (loss of 9,462 MWh) | \$4,471,710 | S+M | o |
| 62. Iron Gate fish screen and bypass | NMFS, Interior, Oregon Fish & Wildlife, Cal Fish & Game | \$19,037,500 | \$40,290 | \$10,950 (loss of 227 MWh) | \$2,621,000 | S+M | o |
| 63. Iron Gate spillway modification for fish passage | NMFS, Interior, Cal Fish & Game | \$780,250 | \$8,060 | \$0 | \$113,380 | S+M | o, p |
| 64. Tailrace barrier at Iron Gate | Oregon Fish & Wildlife, Cal Fish & Game | \$7,939,470 | \$16,950 | \$3,670 (loss of 76 MWh) 0 | \$1,092,320 | None | a, r |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|--|--------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 65. Trap and haul facility at Iron Gate | PacifiCorp (alternative prescription- not proposed) | \$1,696,150 | \$91,550 | \$0 | \$320,500 | S | o |
| 66. Pacific lamprey management plan | FWS | \$829,180 | \$0 | \$0 | \$111,930 | None | a |
| 67. Evaluate juvenile salmonid passage through lakes and reservoirs | PacifiCorp (alternative prescription- not proposed) | \$807,950 | \$0 | \$0 | \$109,060 | None | s |
| 68. Evaluate juvenile salmonid survival during hauling | PacifiCorp (alternative prescription- not proposed) | \$820,950 | \$0 | \$0 | \$110,820 | None | i, s |
| 69. Evaluate adult salmonid spawning success at targeted areas and survival during hauling | PacifiCorp (alternative prescription- not proposed) | \$579,800 | \$0 | \$0 | \$78,260 | None | i, s |
| 70. Evaluate smolt to adult return of fish released downstream of Iron Gate dam | PacifiCorp (alternative prescription- not proposed) | \$219,310 | \$0 | \$0 | \$29,600 | None | i, s |
| 71. Monitor young salmonids in upper tributaries to assess survival rates and outmigration timing | PacifiCorp (alternative prescription- not proposed) | \$400,730 | \$0 | \$0 | \$54,090 | None | s |
| 72. Develop a fish passage plan | Siskiyou Co. | \$0 Too general to estimate | \$0 | \$0 | \$0 | None | a, i |
| 73. Fishway O&M plan | NMFS, Interior | \$10,000 | \$0 | \$0 | \$1,350 | S, S+M, 2-D | a, t |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 74. Transfer operational responsibilities for facilities at Link River dam to Reclamation | PacifiCorp | -\$3,540,210 | -\$26,840 | \$0 | -\$504,710 | P | c, u, v |
| 75. Remove Keno from the licensed project | PacifiCorp | -\$3,935,470 | -\$57,980 | \$0 | -\$589,210 | P, S, S+M, 2-D, 4-D | c, u |
| 76. Removal of Keno dam (in some cases, only if meeting water quality standards and/or if fish passage is not feasible) | IFR/PCFFA, Resighini Rancheria, Hoopa Valley Tribe, Oregon Fish & Wildlife, Cal Fish & Game | \$3,411,650 | \$0 | \$0 | \$460,520 | None | a |
| 77. Decommissioning and dam removal plan for Keno development | IFR/PCFFA, Resighini Rancheria, Hoopa Valley Tribe, Oregon Fish & Wildlife, Cal Fish & Game | \$75,000 | \$0 | \$0 | \$10,120 | None | a |
| 78. Remove J.C. Boyle development from the licensed project | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMC, Oregon Fish & Wildlife, Cal Fish & Game | -\$10,284,780 | -\$1,250,910 | \$15,874,250 (Loss of 329,000 MWh) | \$13,235,060 | 4-D | c, u |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 79. Removal of J.C. Boyle dam (in some cases, only if meeting water quality standards and/or if fish passage is not feasible) | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMC, Oregon Fish & Wildlife, Cal Fish & Game | \$18,911,170 | \$0 | \$0 | \$2,552,710 | 4-D | a |
| 80. Decommissioning and dam removal plan for J.C. Boyle development | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMC, Oregon Fish & Wildlife, Cal Fish & Game | \$150,000 | \$0 | \$0 | \$20,250 | 4-D | a |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|--------------------------------------|---------------------------------------|--|---------------------------------------|
| 81. Remove Copco No. 1 development from the licensed project | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMF, Oregon Fish & Wildlife, Cal Fish & Game | -\$4,335,030 | -\$828,930 | \$5,114,500 (Loss of 106,000 MWh) | \$3,700,410 | 2-D, 4-D | c, u |
| 82. Removal of Copco No. 1 dam (in some cases, only if meeting water quality standards and/or if fish passage is not feasible) | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMF, Oregon Fish & Wildlife, Cal Fish & Game | \$20,367,880 | \$0 | \$0 | \$2,749,340 | 2-D, 4-D | a |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 83. Decommissioning and dam removal plan for Copco No. 1 development | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMC, Oregon Fish & Wildlife, Cal Fish & Game | \$250,000 | \$0 | \$0 | \$33,750 | 2-D, 4-D | a |
| 84. Remove Copco No. 2 development from the licensed project | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMC, Oregon Fish & Wildlife, Cal Fish & Game | -\$4,006,850 | -\$1,072,670 | \$6,513,750 (Loss of 135,000 MWh) | \$4,900,220 | 4-D | c, u |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 85. Removal of Copco No. 2 dam (in some cases, only if meeting water quality standards and/or if fish passage is not feasible) | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMC, Oregon Fish & Wildlife, Cal Fish & Game | \$3,730,950 | \$0 | \$0 | \$503,620 | 4-D | a |
| 86. Decommissioning and dam removal plan for Copco No. 2 development | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMC, Oregon Fish & Wildlife, Cal Fish & Game | \$75,000 | \$0 | \$0 | \$10,120 | 4-D | a |
| 87. Remove Fall Creek development from the licensed project | IFR/PCFFA, Resighini Rancheria and Hoopa Valley Tribe, Oregon Fish & Wildlife, Cal Fish & Game | -\$87,670 | -\$215,820 | \$761,000 (Loss of 15,772 MWh) | \$533,340 | None | c, u |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 88. Removal of Fall Creek and Spring Creek diversion dams (in some cases, only if fish passage is not feasible) | IFR/PCFFA, Resighini Rancheria and Hoopa Valley Tribe, Oregon Fish & Wildlife, Cal Fish & Game | \$1,389,950 | \$0 | \$0 | \$187,620 | None | a |
| 89. Decommissioning and dam removal plan for Fall Creek development, including Spring Creek diversion | IFR/PCFFA, Resighini Rancheria and Hoopa Valley Tribe, Oregon Fish & Wildlife, Cal Fish & Game | \$50,000 | \$0 | \$0 | \$6,750 | None | a |
| 90. Remove Iron Gate development from the licensed project | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMC, Oregon Fish & Wildlife, Cal Fish & Game | -\$7,462,480 | -\$715,110 | \$5,597,000 (Loss of 116,000 MWh) | \$3,874,570 | 2-D, 4-D | c, u |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 91. Removal of Iron Gate dam (in some cases, only if meeting water quality standards and/or if fish passage is not feasible) | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMC, Oregon Fish & Wildlife, Cal Fish & Game | \$36,853,410 | \$0 | \$0 | \$4,974,630 | 2-D, 4-D | a |
| 92. Decommissioning and dam removal plan for Iron Gate development | IFR/PCFFA, Resighini Rancheria, Quartz Valley Indian Community, Klamath, Karuk, Hoopa Valley and Yurok tribes, Conservation Groups, NMFS, PFMC, Oregon Fish & Wildlife, Cal Fish & Game | \$250,000 | \$0 | \$0 | \$33,750 | 2-D, 4-D | a |
| 93. Remove East Side and West Side developments from the project | PacifiCorp, Oregon Fish and Wildlife, NMFS, FWS | -\$588,980 | -\$353,260 | \$907,100 (loss of 18,800 MWh) | \$474,340 | P, S, S+M, 2-D, 4-D | c, u |
| 94. East Side and West Side decommissioning plan and implementation | PacifiCorp, Oregon Fish & Wildlife, NMFS, FWS | \$906,240 | \$0 | \$0 | \$122,330 | P, S, S+M, 2-D, 4-D | c |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|--|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 95. East Side and West Side operation conditions if not decommissioned (no operation of powerhouses if flows are less than 500 cfs) | Oregon Fish & Wildlife | \$0 | \$0 | \$3,090 (loss of 64 MWh) | \$3,090 | None | a |
| 96. If East Side and West Side not decommissioned, consult with NMFS regarding operating conditions | NMFS | \$10,000 | \$0 | \$0 | \$1,350 | None | a |
| 97. East Side and West Side fish screen and bypass | NMFS, Interior | \$30,370,580 | \$333,850 | \$6,180 (loss of 128 MWh) | \$4,439,570 | None | o |
| 98. East Side and West Side tailrace barriers | NMFS, Interior | \$5,709,460 | \$47,690 | \$2,080 (loss of 43 MWh) | \$820,450 | None | o |
| 99. Conduct a limiting factors study | PacifiCorp (alternative prescription- not proposed) | \$34,830 | \$0 | \$0 | \$4,700 | None | a |
| 100. Anadromous fish restoration funding | Klamath Tribes | \$0 | \$250,000 | \$0 | \$250,000 | None | a, n |
| 101. Fish and wildlife habitat restoration plan | Oregon Fish & Wildlife | \$15,000 | \$20,000 | \$0 | \$22,020 | None | a |
| 102. Fishery technical advisory group formation (fish passage implementation committee, hatchery advisory group) | Oregon Fish & Wildlife, Hoopa Valley Tribe, Klamath tribes, Interior | \$0 | \$10,000 | \$0 | \$10,000 | S, S+M, 2-D | a |
| 103. Hatchery stakeholders consultation if project decommissioned | Yurok Tribe | \$0 | \$4,400 | \$0 | \$4,400 | None | a |
| 104. Continue current funding level (80%) for Iron Gate Hatchery | PacifiCorp | \$0 | \$0 | \$0 | \$0 | P, S, S+M | a |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|--|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 105. Increase funding of Iron Gate Hatchery operations to 100% | NMFS, FWS, Cal Fish & Game, Forest Service | \$0 | \$125,000 | \$0 | \$125,000 | S, S+M, | a |
| 106. Fund Iron Gate Hatchery operations for five years | None | \$0 | \$47,330 | \$0 | \$47,330 | 2-D, 4-D | a, b |
| 107. Construct a facility at Iron Gate Hatchery for marking 25% of released fall Chinook salmon | PacifiCorp, Forest Service, FWS, Cal Fish & Game | \$853,620 | \$118,650 | \$0 | \$233,880 | P | c |
| 108. Construct a facility at Iron Gate Hatchery for marking 100% of released Chinook salmon | NMFS | \$1,707,240 | \$474,590 | \$0 | \$705,040 | S, S+M | a |
| 109. Mark 100% of released coho salmon | FWS | \$0 | \$4,750 | \$0 | \$4,750 | S, S+M | a |
| 110. Implement a hatchery and genetics management plan for Iron Gate Hatchery | NMFS, Cal Fish & Game | \$0 | \$3,500,000 | \$0 | \$3,500,000 | S, S+M | a |
| 111. Minor upgrades at Iron Gate Hatchery | PacifiCorp | \$0 | \$107,370 | \$0 | \$107,370 | P, S, S+M | c |
| 112. Rehabilitate the Fall Creek rearing ponds and fund 100% of the operation and maintenance costs for this facility | Cal Fish & Game | \$200,000 | \$150,000 | \$0 | \$177,000 | S, S+M | a |
| 113. Fish disease risk monitoring and management plan | Oregon Fish & Wildlife, NMFS, FWS, Siskiyou Co., Cal Fish & Game | \$20,000 | \$350,000 | \$0 | \$352,700 | S+M | a, i |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|--------------------------------|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 114. Identify, in consultation with agencies, and fund instream flow and habitat enhancements in mainstem reaches and tributaries with native fish and wildlife, within and above the project, including flow restoration, land acquisition, and working with other cooperative landowners on land and water management improvement projects to improve instream habitat | Oregon Fish & Wildlife | \$0 | \$0 | \$0 | \$0 | None | a, w |
| 115. J.C. Boyle bypassed reach sidecast material removal | NMFS, Interior | \$2,084,000 | \$5,620 | \$0 | \$286,930 | S+M | o |
| 116. Upstream and downstream fish passage habitat protection and enhancement plan | NMFS, FWS | \$34,830 | \$30,130 | \$0 | \$34,830 | None | a |
| 117. Plan for restoring fish habitat upstream and downstream of project | NMFS, FWS | \$20,000 | \$50,000 | \$0 | \$52,700 | None | a |
| 118. Aquatic resource monitoring management plan | Oregon Fish & Wildlife | \$30,000 | \$154,770 | \$0 | \$158,820 | None | a |
| 119. Aquatic resource monitoring management plan | FWS, Bureau of Land Management | \$30,000 | \$92,860 | \$0 | \$96,610 | S+M | a |
| 120. Aquatic resource monitoring management plan | Staff | \$30,000 | \$65,660 | \$0 | \$69,710 | S | a |
| 121. Aquatic resource monitoring management plan | None | \$20,000 | \$40,250 | \$0 | \$42,950 | 2-D | a, b |
| 122. Aquatic resource monitoring management plan | None | \$20,000 | \$20,210 | \$0 | \$22,820 | 4-D | a, b |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 123. Shovel and Negro creeks flow enhancements by eliminating irrigation diversions | PacifiCorp | \$579,820 | \$8,910 | \$0 | \$87,180 | P, S, S+M, 2-D | c |
| 124. Agency notification of unanticipated harm to non-federally listed fish and wildlife | Oregon Fish & Wildlife | \$0 | \$5,000 | \$0 | \$5,000 | S, S+M, 2-D | a |
| 125. Develop an anadromous fish monitoring plan for fish returning to Iron Gate dam, spawning populations in tributaries, and outmigrating smolts from those tributaries | FWS, NMFS | \$50,000 | \$322,430 | \$0 | \$329,180 | None | a |
| 126. Monitor introduced and resident salmonids for disease | PacifiCorp (alternative prescription- not proposed) | \$219,310 | \$0 | \$0 | \$29,600 | S+M | i, s |
| 127. Use monitoring and modeling to assess project effects on anadromous fish downstream of Iron Gate dam | Forest Service | \$50,000 | \$1,720 | \$0 | \$8,470 | S, S+M | a |
| Terrestrial Resources Measures | | | | | | | |
| 1. Vegetation management plan | PacifiCorp, Oregon Fish & Wildlife, Bureau of Land Management, Hoopa Valley Tribe | \$64,420 | \$27,810 | \$0 | \$36,510 | P, S, S+M | c |
| 2. Vegetation management plan | None | \$50,000 | \$20,000 | \$0 | \$26,750 | 2-D | a, b |
| 3. Vegetation management plan | None | \$15,000 | \$5,000 | \$0 | \$7,020 | 4-D | a, b |
| 4. Upland vegetation management plan | PacifiCorp, Interior | \$0 | \$0 | \$0 | \$0 | P, S, S+M | a, x |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 5. Vegetation management plan to re-establish ethnobotanical resources | PacifiCorp, Interior | \$0 | \$0 | \$0 | \$0 | P, S, S+M, 2-D, 4-D | a, x |
| 6. Use native plants for screening purposes at selected recreational sites | PacifiCorp | \$10,740 | \$220 | \$0 | \$1,670 | P, S, S+M | c |
| 7. Control noxious weeds | PacifiCorp, Bureau of Land Management, Oregon Fish & Wildlife | \$0 | \$15,680 | \$0 | \$15,680 | P, S, S+M | c |
| 8. Control noxious weeds | None | \$0 | \$11,000 | \$0 | \$11,000 | 2-D | a, b |
| 9. Control noxious weeds | None | \$0 | \$5,000 | \$0 | \$5,000 | 4-D | a, b |
| 10. Protective measures for sensitive plants along transmission-line rights-of-way | PacifiCorp | \$7,520 | \$860 | \$0 | \$1,880 | P, S, S+M | c |
| 11. Protective measures for sensitive plants along transmission-line rights-of-way | None | \$5,000 | \$500 | \$0 | \$1,170 | 2-D | a, b |
| 12. Protective measures for sensitive plants along transmission-line rights-of-way | None | \$3,000 | \$200 | \$0 | \$600 | 4-D | a, b |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|--|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 13. Riparian habitat monitoring plan | PacifiCorp, FWS | \$0 | \$0 | \$0 | \$0 | P, S, S+M | a, x |
| 14. Restore and protect riparian and wetland habitats | PacifiCorp, FWS | \$216,900 | \$8,160 | \$0 | \$37,440 | P, S, S+M | c |
| 15. Restore and protect riparian and wetland habitats | None | \$100,000 | \$3,000 | \$0 | \$16,500 | 2-D | a, b |
| 16. Restore and protect riparian and wetland habitats | None | \$10,000 | \$500 | \$0 | \$1,850 | 4-D | a, b |
| 17. Develop a wildlife resource management plan | PacifiCorp, Oregon Fish & Wildlife, Bureau of Land Management, Cal Fish & Game | \$53,690 | \$21,480 | \$0 | \$28,730 | P, S, S+M | c |
| 18. Develop a wildlife resource management plan | None | \$20,000 | \$10,000 | \$0 | \$12,700 | 2-D | a, b |
| 19. Develop a wildlife resource management plan | None | \$10,000 | \$2,000 | \$0 | \$3,350 | 4-D | a, b |
| 20. Install wildlife crossings along J.C. Boyle intake canal | PacifiCorp, Oregon Fish & Wildlife, Bureau of Land Management | \$322,120 | \$1,930 | \$0 | \$45,410 | P, S, S+M, 2-D | c |
| 21. Develop a wildlife crossing inspection and maintenance plan | Oregon Fish & Wildlife | \$10,000 | \$0 | \$0 | \$1,350 | S, S+M, 2-D | a, y |
| 22. Avian collision and electrocution protection plan | PacifiCorp, Oregon Fish & Wildlife, FWS | \$0 | \$0 | \$0 | \$0 | P, S, S+M, 2-D, 4-D | a, y |
| 23. Install bat roosting structures near project facilities | PacifiCorp | \$21,470 | \$430 | \$0 | \$3,330 | P, S, S+M | c |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|---------------------------------------|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 24. Install bat roosting structures near project facilities | None | \$10,000 | \$200 | \$0 | \$1,550 | 2-D | a, b |
| 25. Construct backwater areas for amphibian habitat | PacifiCorp | \$12,880 | \$320 | \$0 | \$2,060 | P, S, S+M | c |
| 26. Wetland protection measures at Copco Village | PacifiCorp | \$0 | \$110 | \$0 | \$110 | P, S, S+M | c |
| 27. Install pond turtle basking structures | PacifiCorp, Bureau of Land Management | \$16,110 | \$320 | \$0 | \$2,490 | P, S, S+M | c |
| 28. Protective measures for unique habitat at Shovel Creek Meadow | PacifiCorp | \$0 | \$110 | \$0 | \$110 | P, S, S+M | c |
| 29. Develop a road access plan and close non-essential roads | PacifiCorp | \$107,370 | \$5,370 | \$0 | \$19,860 | P, S, S+M, 2-D | c |
| Threatened and Endangered Species Measures | | | | | | | |
| 1. Monitor project waters for federally listed suckers every 3 years | FWS | \$0 | \$0 | \$0 | \$0 | S, S+M | a, z |
| 2. Agency notification of unanticipated harm to state or federally listed fish and wildlife | Oregon Fish & Wildlife | \$5,000 | \$0 | \$0 | \$670 | S, S+M, 2-D | a |
| 3. Develop a bald eagle management plan for the project | FWS | \$15,000 | \$10,000 | \$0 | \$12,020 | S, S+M | a |
| 4. Develop a bald eagle management plan for the project | None | \$15,000 | \$6,000 | \$0 | \$8,020 | 2-D | a, b |
| 5. Annual monitoring of bald eagle nest occupancy | PacifiCorp, FWS | \$0 | \$5,370 | \$0 | \$5,370 | P, S, S+M | c |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| Recreational Resources Measures | | | | | | | |
| 1. Link River trail enhancements | Interior | \$10,000 | \$1,000 | \$0 | \$2,350 | None | a |
| 2. Upper Boyle reservoir car-top boater access | PacifiCorp | \$150,320 | \$540 | \$0 | \$20,830 | P, S, S+M, 2-D | aa |
| 3. Construct a Boyle reservoir loop trail that also links Topsy Campground, Sportsman's Park and Pioneer Park | PacifiCorp, Interior | \$107,370 | \$540 | \$0 | \$15,030 | P, S, S+M, 2-D | aa |
| 4. Pioneer Park recreation area | PacifiCorp | \$762,360 | \$5,370 | \$0 | \$108,280 | P, S, S+M, 2-D | aa |
| 5. Boyle Bluffs recreation area | PacifiCorp | \$1,115,840 | \$1,070 | \$0 | \$151,700 | P, S, S+M, 2-D | a |
| 6. Boyle reservoir dispersed recreation site management | PacifiCorp | \$75,160 | \$2,150 | \$0 | \$12,300 | P, S, S+M, 2-D | a |
| 7. Acquisition and development of a potable water system and assistance in overall O&M of Topsy Campground | Oregon Parks & Rec, Bureau of Land Management | \$100,000 | \$10,000 | \$0 | \$23,500 | S, S+M, 2-D | a |
| 8. Provide law enforcement and O&M at Frain Ranch boater campground and day use area | Oregon Parks & Rec | \$0 | \$10,000 | \$0 | \$10,000 | None | a |
| 9. Improve scouting trails at the Caldera and Hell's Corner rapids | Interior, Oregon Parks & Rec, Bureau of Land Management | \$5,000 | \$3,000 | \$0 | \$3,670 | S+M | a |
| 10. Develop an off-highway vehicle management program | PacifiCorp, Interior | \$10,000 | \$5,000 | \$0 | \$6,350 | P, S, S+M, 2-D | a |
| 11. Design and construct a hiking trail from J.C. Boyle powerhouse to Copco | Oregon Parks & Rec, Interior | \$200,000 | \$10,000 | \$0 | \$37,000 | None | a |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 12. Enhancements and O&M at Klamath River Campground | Bureau of Land Management | \$10,000 | \$10,000 | \$0 | \$11,350 | S+M | a |
| 13. O&M of the Spring Island boater access site | Bureau of Land Management | \$0 | \$10,000 | \$0 | \$10,000 | S+M | a |
| 14. Replace the bridge over the Klamath River in the upper Frain Ranch area | Interior | \$100,000 | \$0 | \$0 | \$13,500 | None | a |
| 15. Design a non-motorized trail to connect with the new upper Boyle reservoir boat access and the existing non-motorized trail that provides access to the Keno reach | Interior | \$5,000 | \$3,000 | \$0 | \$3,670 | None | a |
| 16. Boyle bypassed reach angler and boater access | PacifiCorp, Interior, Bureau of Land Management | \$85,900 | \$540 | \$0 | \$12,140 | P, S, S+M, 2-D | aa |
| 17. Boyle bypassed reach boating flow release | Oregon Parks & Rec | \$0 | \$0 | \$842,740 (loss of 17,466 MWh) | \$842,730 | None | a |
| 18. Old foundations day use area on the Boyle peaking reach | PacifiCorp | \$71,130 | \$0 | \$0 | \$9,600 | P, S, S+M, 2-D | aa, bb |
| 19. O&M cost for old foundations day use area on the Boyle peaking reach | Staff | \$0 | \$500 | \$0 | \$500 | S, S+M, 2-D | a |
| 20. Boyle peaking reach fishing access enhancements | PacifiCorp | \$370,440 | \$2,150 | \$0 | \$52,150 | P, S, S+M | aa |
| 21. Project patrols of dispersed sites in the Boyle peaking reach | PacifiCorp | \$0 | \$540 | \$0 | \$540 | P, S, S+M | aa |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|---------------------------------------|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 22. Stateline Take-out enhancements | PacifiCorp, Bureau of Land Management | \$89,120 | \$2,150 | \$0 | \$14,180 | P, S, S+M | aa |
| 23. Copco No. 2 day use area and boater takeout | None | \$141,890 | \$2,000 | \$0 | \$21,150 | 2-D | a, b |
| 24. Mallard Cove enhancements | PacifiCorp | \$257,700 | \$6,440 | \$0 | \$41,230 | P, S, S+M | aa |
| 25. Copco Cove enhancements | PacifiCorp | \$57,980 | \$2,150 | \$0 | \$9,980 | P, S, S+M | aa |
| 26. Closure of dispersed sites on Copco Reservoir and Iron Gate Reservoir for overnight camping | PacifiCorp | \$0 | \$430 | \$0 | \$430 | P, S, S+M | aa |
| 27. Fall Creek trail enhancements | PacifiCorp | \$37,580 | \$500 | \$0 | \$5,570 | P, S, S+M, 2-D, 4-D | aa |
| 28. Install fencing at city of Yreka water supply intakes near the Fall Creek powerhouse | Staff | \$5,000 | \$400 | \$0 | \$1,070 | S, S+M, 2-D, 4-D | a |
| 29. Fall Creek recreation area modifications | PacifiCorp | \$40,800 | \$270 | \$0 | \$5,780 | P, S, S+M | aa |
| 30. Jenny Creek recreation area modifications | PacifiCorp | \$71,940 | \$1,070 | \$0 | \$10,780 | P, S, S+M | aa |
| 31. Wanaka Springs enhancements | PacifiCorp | \$214,980 | \$5,370 | \$0 | \$34,390 | P, S, S+M | aa |
| 32. Camp Creek enhancements | PacifiCorp | \$3,890,900 | \$16,110 | \$0 | \$541,320 | P, S, S+M | aa |
| 33. Juniper Point enhancements | PacifiCorp | \$180,390 | \$5,370 | \$0 | \$29,720 | P, S, S+M | aa |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|---|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 34. Mirror Cove enhancements | PacifiCorp | \$360,360 | \$10,740 | \$0 | \$59,380 | P, S, S+M | aa |
| 35. Overlook Point recreational modifications | PacifiCorp | \$50,400 | \$900 | \$0 | \$7,700 | P, S, S+M | aa |
| 36. Long Gulch boat launch enhancements | PacifiCorp | \$213,610 | \$4,300 | \$0 | \$33,130 | P, S, S+M | aa |
| 37. Long Gulch bluff recreation area | PacifiCorp | \$1,727,250 | \$6,750 | \$0 | \$239,900 | P, S, S+M | aa |
| 38. Long Gulch to Iron Gate Hatchery and Bogus Creek trails | PacifiCorp | \$8,400 | \$230 | \$0 | \$1,360 | P, S, S+M | aa |
| 39. Iron Gate Hatchery recreation area enhancements | PacifiCorp | \$35,010 | \$0 | \$0 | \$4,730 | P, S, S+M | aa |
| 40. O&M of Iron Gate Hatchery recreation area | Staff | \$0 | \$2,000 | \$0 | \$2,000 | S, S+M | aa |
| 41. Public access at Happy Camp | Forest Service | \$150,320 | \$540 | \$0 | \$20,830 | None | aa |
| 42. Finalization and implementation of programmatic elements of the RRMP and supplemental O&M to account for replacement of recreation facilities, as needed | PacifiCorp, Bureau of Land Management, Oregon Parks & Rec | \$1,223,290 | \$37,180 | \$0 | \$202,300 | P, S, S+M | aa |
| 43. Finalization and implementation of programmatic elements of the RRMP | None | \$13,800 | \$500 | \$0 | \$2,360 | 2-D | a, b |
| 44. Finalization and implementation of programmatic elements of the RRMP | None | \$337,570 | \$5,000 | \$0 | \$6,350 | 4-D | a, b |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|--|----------------------------|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 45. Flow information plan | Oregon Fish & Wildlife | \$10,000 | \$0 | \$0 | \$1,350 | S, S+M, 2-D | a |
| 46. Recreation stakeholder group information | Oregon Fish & Wildlife | \$0 | \$5,000 | \$0 | \$5,000 | None | a |
| 47. Project patrols on project lands and waters by PacifiCorp personnel | PacifiCorp, Interior | \$0 | \$32,210 | \$0 | \$32,210 | P, S, S+M | aa |
| 48. Project patrols on project lands and waters by Siskiyou and Klamath county law enforcement | PacifiCorp | \$0 | \$42,950 | \$0 | \$42,950 | P | aa |
| 49. Increased on-river patrols | Forest Service | \$0 | \$20,000 | \$0 | \$20,000 | None | a |
| 50. Fund a Klamath County Sheriff's Department land-based deputy to patrol project roads | Interior | \$0 | \$40,000 | \$0 | \$40,000 | None | a |
| 51. Fund a Klamath County Sheriff's Department water-based deputy to patrol J.C. Boyle and Keno reservoirs | Interior | \$0 | \$40,000 | \$0 | \$40,000 | None | a |
| 52. Fund a communications firm to analyze the feasibility of establishing and improving an emergency/early warning system | Interior | \$20,000 | \$0 | \$0 | \$2,700 | S, S+M | a |
| 53. Increase on-river patrols and management presence and improving three river access sites (below Iron Gate dam, near Interstate 5, and the Indian Creek site near Happy Camp) in the Middle Klamath Reach | Interior | \$150,320 | \$41,000 | \$0 | \$61,290 | None | a |
| 54. Interpretation and education program | PacifiCorp, Interior | \$316,750 | \$2,680 | \$0 | \$45,440 | P, S, S+M | cc |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|---------------------------------------|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 55. Interpretation and education program | None | \$100,000 | \$1,300 | \$0 | \$14,800 | 2-D | a, b |
| Land Use and Aesthetic Resources Measures | | | | | | | |
| 1. Develop a cooperative management agreement with Bureau of Land Management | Interior | \$5,000 | \$0 | \$0 | \$670 | None | a |
| 2. Site specific plans for activities that could affect Bureau of Land Management-managed that are not analyzed in the FERC NEPA document | Bureau of Land Management | \$0 | \$0 | \$0 | \$0 | S+M | a |
| 3. NEPA analysis for activities not included in FERC NEPA document | Bureau of Land Management | \$0 | \$0 | \$0 | \$0 | S+M | a |
| 4. Annual consultation with Bureau of Land Management | PacifiCorp, Bureau of Land Management | \$0 | \$2,000 | \$0 | \$2,000 | P, S+M | a |
| 5. Finalization of road management plan | PacifiCorp, Bureau of Land Management | \$10,000 | \$20,000 | \$0 | \$21,350 | P, S, S+M | a |
| 6. Finalization of road management plan | None | \$10,000 | \$10,000 | \$0 | \$11,350 | 2-D | a, b |
| 7. Finalization of road management plan | None | \$10,000 | \$2,000 | \$0 | \$3,350 | 4-D | a, b |
| 8. Implementation of the visual resource management plan | PacifiCorp, Bureau of Land Management | \$378,240 | \$0 | \$0 | \$51,060 | P, S, S+M | a |
| 9. Implementation of the visual resource management plan | None | \$200,000 | \$0 | \$0 | \$27,000 | 2-D | a, b |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|-------------------------------------|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 10. Include Fall Creek and Copco No. 2 powerhouses in the visual resource management plan | Staff | \$50,000 | \$1,000 | \$0 | \$7,750 | S, S+M, 2-D | a |
| 11. Include Fall Creek powerhouse in the visual resource management plan | None | \$25,000 | \$500 | \$0 | \$3,870 | 4-D | a b |
| Cultural Resources Measures | | | | | | | |
| 1. Survey of Bureau of Land Management lands | Bureau of Land Management | \$150,000 | \$0 | \$0 | \$20,250 | S, S+M, 2-D | a, dd |
| 2. Conduct intensive survey of five sites on Bureau of Land Management lands (and treatment as appropriate) | Bureau of Land Management | \$100,000 | \$0 | \$0 | \$13,500 | S, S+M, 2-D | a, dd |
| 3. Finalize the HPMP and evaluate annually | Interior, Bureau of Land Management | \$20,000 | \$7,000 | \$0 | \$9,700 | S, S+M, 2-D, 4-D | a, cc |
| 4. Develop vandalism awareness program | Interior | \$0 | \$0 | \$0 | \$0 | S, S+M | a |
| 5. Develop an erosion protection program for cultural sites | Interior | \$0 | \$0 | \$0 | \$0 | None | a |
| 6. Develop monitoring program for sensitive cultural sites with surveillance cameras and patrols | Interior | \$100,000 | \$100,000 | \$0 | \$113,500 | None | a |
| 7. Tribal access to traditional gathering sites | Interior | \$10,000 | \$0 | \$0 | \$1,350 | S, S+M, 2-D | a |
| 8. Financial support of tribal participation in mitigation programs | Interior | \$0 | \$5,000 | \$0 | \$5,000 | None | a |
| 9. Protection of cultural sites at Boyle development | PacifiCorp | \$5,153,960 | \$112,740 | \$0 | \$808,440 | P, S, S+M, 2-D | c |

| Environmental Measures | Recommending Entity | Capital Costs (2006\$) | Annual Costs (2006\$) | Annual Energy Costs (2006\$) | Total Annualized Cost (2006\$) | Alternatives to which measure applies | Notes (listed at end of table) |
|---|----------------------------|-------------------------------|------------------------------|-------------------------------------|---------------------------------------|--|---------------------------------------|
| 10. Protection of cultural sites at Copco No. 1 development | PacifiCorp | \$966,370 | \$0 | \$0 | \$130,440 | P, S, S+M | c |
| 11. Protection of cultural sites at Iron Gate development | PacifiCorp | \$798,860 | \$5,370 | \$0 | \$113,200 | P, S, S+M | c |

^a Cost estimate by staff.

^b All action alternatives would have environmental measures associated with them, even if the measures are not specifically recommended by any entity in relation to a specific alternative (i.e., the two and four dam removal alternatives). We include these measures in this table to present realistic action alternatives, including measures that would likely be included if the Commission should license these alternatives. In such cases, we indicate “none” in the recommending entity column.

^c Cost estimate from PacifiCorp 7/21/04 application deficiency response.

^d Not adopted unless flow regime specified in the license requires measurement of J.C. Boyle reservoir inflow.

^e Cost estimate from PacifiCorp license application.

^f Cost estimate from PacifiCorp AIR AR-1 response 5/16/05.

^g Not adopted unless Keno is determined to be jurisdictional. If so, then the measure would be included in the cost of the water quality management plan

^h Cost for this measure would be included in the cost for the water quality management plan.

ⁱ A related measure is included as part of the staff Integrated Fish Passage and Disease Management Program (measures A-34b and A-34c).

^j Not adopted unless Keno is determined to be jurisdictional. If so, then the measure could be included in the cost of the water quality management plan.

^k Cost estimate from PacifiCorp AIR AR-1(b) response filed 10/17/05.

^l Not adopted, but could be implemented later after evaluation of potential adverse effects.

^m This would be adopted if Keno is determined to be jurisdictional.

ⁿ Implementation costs for this measure would be covered by other measures.

^o Cost estimate from PacifiCorp 4/25/06 Attachment E – CH2M Hill cost estimates.

^p The tailrace barriers, spillway modifications, and removal of the bedrock sill in the Copco No. 2 bypassed reach prescribed by Interior and NMFS would not be implemented if PacifiCorp can demonstrate that they are not needed based on site-specific studies. To estimate the cost of the Staff and Mandatory alternative, we have assumed that spillway modifications would be required at Copco No. 1 and Iron Gate dams, but that the other measures would not be implemented.

^q The location of this facility would be dependent on the study results.

^r The cost and energy losses for this measure were based on estimates from PacifiCorp 4/25/06 Attachment E for a tailrace barrier at Copco No. 1

^s Cost estimate from PacifiCorp 4/25/06 adaptive reintroduction plan, April 2006.

^t The annual cost of this measure would be included in the O&M cost of the facilities.

^u Under this measure, we remove the net investment, the O&M cost, and the annual average generation of the development from the licensed project.

^v Operation of Link River dam is not within the Commission’s jurisdiction.

^w All elements of this plan are included in other recommendations of the Oregon Fish & Wildlife.

- x Cost included under the vegetation management plan.
- y Cost included under the wildlife management plan.
- z The cost for this monitoring would be included in the staff-recommended aquatic resource monitoring plan.
- aa Cost estimate from PacifiCorp revised Recreational Resource Management Plan 9/29/04, Exhibit D.
- bb We would not include construction of the trail between this day use area and the Spring Island Boater access site in our recommended measure.
- cc This measure would be adopted, although we would modify it to be consistent with PacifiCorp's proposed 3-year evaluation frequency.
- dd This measure would be adopted, but would be limited to sites on Bureau of Land Management lands within the APE for the project as defined in the new project license.