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5.0 ECONOMIC ANALYSIS

This section compares costs associated with the No-Action Alternative (existing condition) with costs associated with Alternative 1 for the Middle Fork American River Project (MFP or Project). This analysis includes a comparison of economic benefits; costs of new environmental programs, measures, and facilities; and power generation. All costs are provided in 2010 United States dollars and all analyses are predicated on a new license with a 50-year term being granted. Table 5-1 provides a summary of the assumptions used to prepare this economic analysis.

5.1 NO-ACTION ALTERNATIVE COSTS

The No-Action Alternative represents the existing condition. The No-Action Alternative is described in Placer County Water Agency's (PCWA) Application for New License (PCWA 2011). Under this alternative, there will be no change in the current operation or maintenance of the MFP. PCWA will not provide any additional environmental programs, measures, or facilities above those provided in the existing license. The annualized operating cost of the existing MFP is approximately \$25,985,000 (Table 5-2).

5.2 ALTERNATIVE 1 COSTS

Alternative 1 includes modification of existing Project facilities, and construction of new Project facilities and Project recreation facilities and features (capital costs); and implementation of new environmental programs, measures, and facilities, as described in Section 2.0 – Elements Analyzed. The annualized operating costs associated with Alternative 1 are \$28,359,610 (Table 5-3).

5.2.1 Capital Improvements

Under Alternative 1, several construction projects will be implemented to modify existing facilities or develop new facilities to improve operations and maintenance of the MFP, enhance environmental resources, and/or meet the requirements specified in new environmental programs and measures. These projects include:

- Hell Hole Reservoir Seasonal Storage Increase Improvement;
- Modification of Duncan Creek, North Fork Long Canyon, and South Fork Long Canyon diversion dams;
- Outlet works modifications at French Meadows, Hell Hole, and Middle Fork Interbay dams;
- Construction of four new gages;
- Construction of new recreation facilities and features; and
- Replacement of existing recreation facility water supply systems.

Total capital costs associated with Hell Hole Reservoir Seasonal Storage Increase Improvement and the small diversion modifications, including permitting, are \$11,980,000. Capital costs associated with outlet works modifications, construction of new gages, construction of new recreation facilities and features, and replacement of existing recreation facility water supply systems are captured within new environmental programs, measures, and facilities, as described below. As a result of MFP capital improvements under Alternative 1, depreciation costs increase by \$291,600 annually over the term of the new license, as shown on Table 5-3.

5.2.2 New Environmental Programs, Measures, and Facilities

Under Alternative 1, new environmental programs, measures, and facilities will be implemented, which are designed to protect or enhance environmental and cultural resources over the term of the new license. The annualized costs associated with implementation of the new environmental programs, measures, and facilities are \$1,843,410. This includes additional operation and maintenance costs and capital and one-time costs associated with implementation of new environmental programs, measures, and facilities. A summary of these costs is included in Table 5-4.

5.3 COMPARISON OF GENERATION PRODUCTION AND BENEFIT

Under the No-Action Alternative, the MFP will continue to generate an annual average of 1,039,078 megawatt hours (MWh) of electricity, which results in a gross annual benefit of \$47,548,964 and a net annual benefit of \$21,563,964 (Table 5-5).

Conditions included in Alternative 1 result in a 5.12% loss of generation. As a result, Alternative 1 will produce an annual average of 985,877 MWh of electricity (an annual average energy generation loss of 53,201 MWh compared to the No-Action Alternative). This results in a gross annual benefit of \$45,527,334 and a net annual benefit of \$17,167,724. Compared to the No-Action Alternative, this represents an annual reduction in net annual benefit of \$4,396,240 (Table 5-5).

LITERATURE CITED

Placer County Water Agency (PCWA). 2011. Application for New License. Filed with FERC February 23, 2011.

TABLES

Table 5-1. Summary of Assumptions Used in the Economic Analysis.

| Assumption | Value |
|---|--------------|
| Base Year for Costs and Benefits | 2010 |
| 2009 Energy Value (\$/MWh) ¹ | \$38/MWh |
| 2010 Capacity Value (\$/kW-year) ² | \$36/kW-year |
| Period of Analysis ³ | 50 Years |
| In-Service Period | 2013 |
| Incremental Cost of Capital | 4.8% |
| Capitalized Interest Rate | 6.2% |

¹The energy price Cal-ISO reported in its Annual Report on Market Issues and Performance for 2009 is \$37.69 (rounded to \$38/MWh). Refer to Table 3.1 - Monthly Wholesale Costs: 2009, page 3.4, Total 2009 Average Cost of Energy (\$/MWh load), 2009 Annual Report on Market Issues and Performance, California Independent System Operator (Cal-ISO), Department of Market Monitoring, Folsom, CA, April 2010.

²Verbal communication between PCWA and staff of the Northern California Power Agency, 651 Commerce Drive, Roseville, CA. August 5, 2010.

³PCWA is requesting a 50-year license term for the Middle Fork American River Project. Assuming a March 2013 in-service period, this results in a new license expiration of February 28, 2063.

Table 5-2. No-Action Alternative – Costs Associated with the Middle Fork American River Project (2010 Dollars).

| Cost Component | Middle Fork American River Project |
|---|------------------------------------|
| | Annualized Cost (2010\$) |
| Relicensing Costs | \$725,000 |
| Capital Costs ¹ | \$0 |
| New Environmental Measures ² | \$0 |
| Operations and Maintenance | \$14,040,000 |
| Depreciation ³ | \$10,000,000 |
| Interest Expense Paid ⁴ | \$220,000 |
| Insurance | \$1,000,000 |
| Total Expenses | \$25,985,000 |

¹Any capital costs associated with existing MFP facilities are included in Operations and Maintenance.

²Any existing environmental measures are included in Operations and Maintenance.

³Refer to Exhibit D of PCWA's Application for New License (February 2011) for a description of the method used for determining depreciation.

⁴Interest expense incurred to complete relicensing process.

Table 5-3. Alternative 1 – Costs Associated with the Middle Fork American River Project (2010 Dollars).

| Cost Component | Middle Fork American River Project |
|--|------------------------------------|
| | Annualized Cost (2010\$) |
| Relicensing Costs | \$725,000 |
| Capital Costs (modified/new facilities) ¹ | \$239,600 |
| New Environmental Measures ² | \$1,843,410 |
| Operations and Maintenance | \$14,040,000 |
| Depreciation ³ | \$10,291,600 |
| Interest Expense Paid ⁴ | \$220,000 |
| Insurance | \$1,000,000 |
| Total Expenses | \$28,359,610 |

¹Includes one-time capital costs for Hell Hole Reservoir Seasonal Storage Increase Improvement, small diversion dam modifications, and permitting costs. Total capital costs for these construction projects are \$11,980,000.

²Cost of additional operation and maintenance and one-time capital costs associated with new environmental measures.

³Depreciation increases under Alternative 1 to account for new capital improvements. Refer to Exhibit D of PCWA's Application for New License (February 2011) for a description of the method used for determining depreciation.

⁴Interest expense incurred to complete relicensing process. Capital improvements in Alternative 1 are expected to be funded from power sales revenue, therefore, no additional interest expenses will be incurred.

Table 5-4. Alternative 1 – Cost of Environmental Programs, Measures, and Facilities for the Middle Fork American River Project (2010 Dollars).

| Environmental Program, Measure, or Facility | Total Capital and One-time Costs (2010\$) | Annual O&M Costs ¹ (2010\$) | Total Annualized Costs ² (2010\$) |
|--|---|--|--|
| COMPLIANCE | | | |
| Additional PCWA Compliance Staff | | \$420,000 | \$420,000 |
| Subtotal | \$0 | \$420,000 | \$420,000 |
| WATER AND AQUATIC RESOURCES | | | |
| Implement Instream Flow and Reservoir Minimum Pool Measures ³ | \$2,500,000 | \$60,000 | \$110,000 |
| Subtotal | \$2,500,000 | \$60,000 | \$110,000 |
| Implement Streamflow and Reservoir Elevation Gaging Plan ⁴ | \$100,000 | \$120,000 | \$122,000 |
| Subtotal | \$100,000 | \$120,000 | \$122,000 |
| Implement Aquatic Monitoring Plans | | | |
| Water Temperature | \$56,000 | \$43,200 | \$44,320 |
| Fish Population | | \$57,000 | \$57,000 |
| Hardhead Sampling | \$34,000 | \$7,000 | \$7,680 |
| Entrainment | \$25,000 | \$5,000 | \$5,500 |
| Foothill Yellow-legged Frog | | \$60,300 | \$60,300 |
| Special Purpose - Annual Maintenance Surveys | | \$1,890 | \$1,890 |
| Geomorphology | | \$25,200 | \$25,200 |
| Riparian | | \$16,800 | \$16,800 |
| Benthic Macroinvertebrate Monitoring Plan | | \$5,600 | \$5,600 |
| Bioaccumulation Monitoring Plan | | \$17,000 | \$17,000 |
| Water Quality Monitoring | | \$22,500 | \$22,500 |
| Western Pond Turtle Monitoring Plan | | \$20,000 | \$20,000 |
| Subtotal | \$115,000 | \$281,490 | \$283,790 |
| Implement Sediment Management Plan | | | |
| Overall Cost Savings | | (\$78,230) | (\$78,230) |
| Monitoring and Reporting, Annual Consultation | | \$12,000 | \$12,000 |
| Post-construction Effectiveness Monitoring | | \$300 | \$300 |
| Ralston Afterbay Methylmercury Monitoring | \$5,500 | \$4,800 | \$4,910 |
| Channel Sediment Conditions Monitoring | | \$18,000 | \$18,000 |
| Ralston Afterbay Hardhead Monitoring | | \$3,500 | \$3,500 |
| Foothill Yellow-legged Frog Protection Measures | | \$700 | \$700 |
| Subtotal | \$5,500 | (\$38,930) | (\$38,820) |

Table 5-4. Alternative 1 – Cost of Environmental Programs, Measures, and Facilities for the Middle Fork American River Project (2010 Dollars).

| Environmental Program, Measure, or Facility | Total Capital and One-time Costs (2010\$) | Annual O&M Costs ¹ (2010\$) | Total Annualized Costs ² (2010\$) |
|---|---|--|--|
| TERRESTRIAL RESOURCES | | | |
| Implement Bald Eagle Management Plan | | | |
| Power Pole Replacement/Retrofit | \$33,000 | | \$660 |
| Annual Active Nest Monitoring | | \$17,700 | \$17,700 |
| 5-year Nest and Winter Roost Surveys and Reporting | | \$11,550 | \$11,550 |
| Mortality Monitoring and Reporting | | \$2,000 | \$2,000 |
| Annual Agency Consultation | | \$1,800 | \$1,800 |
| Subtotal | \$33,000 | \$33,050 | \$33,710 |
| Implement Vegetation and Integrated Pest Management Plan | | | |
| Vegetation Management | | | |
| Trimming by Hand and with Equipment | | \$24,800 | \$24,800 |
| Herbicide and Fungicide Use | | \$10,100 | \$10,100 |
| Noxious Weed Management | | | |
| Manual and Chemical Treatment | | \$19,350 | \$19,350 |
| Monitoring and Reporting of Treated Noxious Weed Populations | | \$5,700 | \$5,700 |
| Monitoring Following Ground Disturbing Activities | | \$3,760 | \$3,760 |
| Manual and Chemical Treatment Following Ground Disturbing Activities | | \$10,105 | \$10,105 |
| Revegetation | | \$2,350 | \$2,350 |
| Truck and Equipment Cleaning | | \$18,500 | \$18,500 |
| Noxious Weed Training Program | | \$4,800 | \$4,800 |
| Pest Management | | | |
| Physical Control and Over-the-Counter Rodenticide Use | | \$500 | \$500 |
| Rodenticide Use - Fumigants | | \$7,700 | \$7,700 |
| Special-Status Plant and Noxious Weed Inventory Surveys | | \$60,000 | \$60,000 |
| Water Quality Monitoring | | \$3,636 | \$3,636 |
| Environmental Training Program | | \$6,800 | \$6,800 |
| Annual Agency Consultation | | \$9,000 | \$9,000 |
| Subtotal | \$0 | \$187,101 | \$187,101 |
| RECREATION RESOURCES | | | |
| Implement Recreation Plan | | | |
| Routine Operation, Maintenance, and Administration | | \$225,000 | \$225,000 |
| Heavy Maintenance | | \$90,000 | \$90,000 |
| Specific Modifications and Enhancements at Existing Project Recreation Facilities | | | |
| Upper Hell Hole Campground | \$34,775 | | \$696 |
| Hell Hole Campground | \$67,100 | | \$1,342 |
| Big Meadows Campground | \$149,045 | | \$2,981 |
| Hell Hole Vista | \$23,855 | | \$477 |
| Hell Hole General Parking Area and Hell Hole Boat Ramp Parking Area | \$52,450 | | \$1,049 |
| Hell Hole Boat Ramp Potable Water Supply Near Hell Hole Reservoir | \$35,400 | | \$708 |
| Hell Hole Boat Ramp Extension | \$225,000 | \$2,250 | \$6,750 |
| Ahart Campground | \$220,000 | | \$4,400 |
| French Meadows Campground | \$750,000 | | \$15,000 |
| Lewis Campground | \$80,000 | | \$1,600 |
| Poppy Campground | \$110,000 | | \$2,200 |
| Coyote Group Campground | \$200,000 | | \$4,000 |
| Gates Group Campground | \$184,925 | | \$3,699 |

Table 5-4. Alternative 1 – Cost of Environmental Programs, Measures, and Facilities for the Middle Fork American River Project (2010 Dollars).

| Environmental Program, Measure, or Facility | Total Capital and One-time Costs (2010\$) | Annual O&M Costs ¹ (2010\$) | Total Annualized Costs ² (2010\$) |
|---|---|--|--|
| RECREATION RESOURCES (continued) | | | |
| Implement Recreation Plan | | | |
| Specific Modifications and Enhancements at Existing Project Recreation Facilities | | | |
| French Meadows Picnic Area | \$30,000 | | \$600 |
| French Meadows Boat Ramp Extension | \$130,000 | \$5,200 | \$7,800 |
| French Meadows RV Dump Station | \$16,900 | | \$338 |
| McGuire Boat Ramp | \$26,325 | | \$527 |
| Consolidation of Poppy Campground Trailhead and McGuire Boat Ramp Parking Areas | \$150,000 | | \$3,000 |
| McGuire Picnic Area Conversion to Group Campground | \$260,000 | | \$5,200 |
| Ralston Picnic Area | \$24,895 | | \$498 |
| Indian Bar Rafting Access | \$184,340 | | \$3,687 |
| French Meadows South Shore Water Supply (French Meadows Campground Water Supply) | \$75,000 | | \$1,500 |
| French Meadows North Shore Water Supply (Dolly Creek Water Supply) | \$75,000 | | \$1,500 |
| New Project Recreation Facilities | | | |
| Duncan Creek Diversion Primitive Recreation Site | \$100,800 | | \$2,016 |
| Ralston Afterbay Sediment Removal Access Point Boat Ramp | \$20,475 | \$1,500 | \$1,910 |
| Ellicott Bridge Parking Area | \$100,000 | | \$2,000 |
| Trail Improvements | | | |
| Hell Hole Reservoir Trail | \$300,000 | | \$6,000 |
| Poppy Trail | \$25,000 | | \$500 |
| French Meadows Reservoir Trail | \$188,591 | | \$3,772 |
| Middle Fork American River Gage above Ralston Afterbay Access Trail | \$20,050 | | \$401 |
| Duncan Creek Gage below Diversion Dam Access Trail | \$19,010 | | \$380 |
| Middle Fork American River Access Trail below Middle Fork Interbay | \$250,000 | | \$5,000 |
| Trail-related Enhancements (self-registration boxes) | \$15,000 | \$3,000 | \$3,300 |
| Other Costs | | | |
| Visitor Surveys and Vehicle Counts | | \$4,500 | \$4,500 |
| Dissemination of Real-time Flow and Reservoir WSE Information | | \$20,500 | \$20,500 |
| Recreation Opportunity Marketing (maps, brochures) | | \$8,500 | \$8,500 |
| Fish Stocking | | \$59,000 | \$59,000 |
| Annual Consultation and Reporting | | \$12,000 | \$12,000 |
| 6-year Reporting | | \$4,800 | \$4,800 |
| Recreation Use Monitoring and Reporting | | \$27,120 | \$27,120 |
| Subtotal | \$4,143,936 | \$463,370 | \$546,249 |
| Implement Visual Resource Management Plan | | | |
| Landscape Rehabilitation Plan | | \$1,700 | \$1,700 |
| Painting | | \$900 | \$900 |
| Periodic Visual Condition Assessment | | \$2,400 | \$2,400 |
| Annual Coordination Meeting | | \$4,500 | \$4,500 |
| Subtotal | \$0 | \$9,500 | \$9,500 |

Table 5-4. Alternative 1 – Cost of Environmental Programs, Measures, and Facilities for the Middle Fork American River Project (2010 Dollars).

| Environmental Program, Measure, or Facility | Total Capital and One-time Costs (2010\$) | Annual O&M Costs ¹ (2010\$) | Total Annualized Costs ² (2010\$) |
|--|---|--|--|
| LAND MANAGEMENT | | | |
| Implement Transportation System Management Plan | | | |
| Annual and Periodic Maintenance of Project Roads, Project Recreation Facility Access Roads, and Project Trails | \$2,100,000 | \$50,000 | \$92,000 |
| Periodic Condition Assessment | | \$15,000 | \$15,000 |
| Consultation and Reporting | | \$12,000 | \$12,000 |
| Subtotal | \$2,100,000 | \$77,000 | \$119,000 |
| Implement Fire Suppression and Prevention Plan | | | |
| Annual Activities | | \$6,000 | \$6,000 |
| Update of the Fire Plan | | \$3,000 | \$3,000 |
| Subtotal | \$0 | \$9,000 | \$9,000 |
| CULTURAL RESOURCES | | | |
| Implement Historic Properties Management Plan | | | |
| Employee Education | | \$6,800 | \$6,800 |
| Public Education | | \$6,150 | \$6,150 |
| Avoidance of NRHP-eligible Sites (consultation and buffers) | | \$6,000 | \$6,000 |
| Monitoring During Heavy Maintenance of Project Recreation Facilities | | \$3,600 | \$3,600 |
| Cultural Resources Site Condition Monitoring | | \$6,100 | \$6,100 |
| Additional Cultural Resource Survey | | \$730 | \$730 |
| Annual Consultation and Reporting | | \$12,500 | \$12,500 |
| Subtotal | \$0 | \$41,880 | \$41,880 |
| TOTAL | \$8,997,436 | \$1,663,461 | \$1,843,410 |

¹Operation and maintenance costs annualized over the term of the new license (50 years).²Total one-time capital costs plus total operation and maintenance costs annualized over the term of the new license (50 years).³Capital costs associated with infrastructure modifications necessary to implement new instream flow measures (i.e., outlet works modifications).⁴Capital costs associated with infrastructure modifications necessary to implement Streamflow and Reservoir Elevation Gaging Plan (i.e., installation of four new gages).

Table 5-5. Comparison of Annual Project Benefits and Costs for the No-Action Alternative and Alternative 1.

| Item | No-Action Alternative (2010\$) | Alternative 1 (2010\$) |
|---|--------------------------------|------------------------|
| Dependable Operating Capacity (MW) | 224 | 224 |
| Average Annual Energy Production (MWh) ¹ | 1,039,078 | 985,877 |
| Annual Energy Production Benefit (\$) | \$39,484,964 | \$37,463,334 |
| Annual Capacity Benefit (\$) | \$8,064,000 | \$8,064,000 |
| Gross Annual Benefit (\$) | \$47,548,964 | \$45,527,334 |
| Annual Cost (\$) | \$25,985,000 | \$28,359,610 |
| Net Annual Benefit (\$) | \$21,563,964 | \$17,167,724 |
| Change in Net Annual Benefit from No-Action Alternative (\$) ² | | \$4,396,240 |
| Reduction in Annual Energy Production (MWh) ³ | | 53,201 |
| Percent Reduction of Annual Energy Production (%) ⁴ | | 5.12% |

¹Generation from French Meadows, Middle Fork, Ralston, and Oxbow powerhouses is averaged over a 40-year period of record (1967–2006). Hell Hole Powerhouse began operation in 1983; therefore, annual net generation is averaged over a 24-year period of record (1983–2006). The average annual energy production under the No-Action Alternative represents the sum of the average net generation for the five Project powerhouses based on their respective period of record. The average annual energy for Alternative 1 reflects the reduced generation that would have occurred if the new measures were in effect.

²The change in net annual energy benefits is calculated by subtracting the net annual benefit under Alternative 1 from the net annual benefit under the No-Action Alternative.

³The reduction in annual energy is calculated by subtracting the average annual energy production under Alternative 1 from the average annual energy production under the No-Action Alternative.

⁴The percent reduction of annual energy is calculated by dividing the reduction in annual energy produced under Alternative 1 by the average annual energy produced under the No-Action Alternative.