# APPLICATION FOR NEW LICENSE
# MAJOR PROJECT – EXISTING DAM

# VOLUME I: EXHIBITS A – D

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**EXHIBIT A – PROJECT DESCRIPTION**
**EXHIBIT B – PROJECT OPERATIONS AND RESOURCE UTILIZATION**
**EXHIBIT C – CONSTRUCTION HISTORY**
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## YUBA-BEAR HYDROELECTRIC PROJECT
## FERC Project No. 2266-096

## SECURITY LEVEL: PUBLIC

***Chicago Park Powerhouse***

NID Nevada Irrigation District

Prepared by
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April 2011

NID

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April 15, 2011

**Via Electronic Submittal (eFile)**

Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

**Subject:** **Yuba-Bear Hydroelectric Project**
**FERC Project No. 2266-096**
**Transmittal of Final License Application**

Dear Secretary Bose:

Pursuant to 18 CFR § 5.17, Nevada Irrigation District (NID or Licensee), as owner and operator of the Yuba-Bear Hydroelectric Project, FERC No. 2266, (Project) files with the Federal Energy Regulatory Commission (FERC) the attached Application for License for a Major Project – Existing Dam - (FLA). This FLA filing includes five volumes, the contents of which are shown in the Index of Final License Application Materials attached to this transmittal letter.

NID is filing all portions of the FLA following the Commission's e-Filing guidelines. One portion, Appendix E12 to Exhibit E, must be filed by Digital Versatile Discs (DVD) because the size and format of the material included in Appendix E12 preclude uploading it to FERC's e-Library system. Appendix E12 includes the Operations Model (HEC-ResSim) for the Yuba-Bear/Drum-Spaulding Projects, hydrologic information, technical memoranda for relicensing studies, and a helicopter video of Project facilities and stream reaches. NID will file an original and seven copies of Appendix E12 on DVDs.

## PROPOSED PROJECT BACKGROUND

The Yuba-Bear Hydroelectric Project is located in northern California in Sierra, Nevada, and Placer counties along the western slope of the Sierra Nevada Range geomorphic provinces. Portions of the Project are on public land managed by either the United States Department of Agriculture (USDA), Forest Service (Forest Service) as part of the Tahoe National Forest (TNF) and by the United States Department of Interior (USDOI), Bureau of Land Management (BLM) as part of the Sierra Resource Management Area. The existing Project consists of four developments - Bowman, Dutch Flat, Chicago Park, and Rollins – which, in total include 13 main dams with a combined usable storage capacity of 210,823 acre-feet of water; four water conduits; four powerhouses and switchyards with a combined authorized installed capacity of 79.32 megawatts (MW); one 9-mile-long, 60-kilovolt transmission line; 17 campgrounds and associated boat launches, trails, and other recreation facilities; and other appurtenant facilities and structures.

NID's proposed Project includes all existing Project facilities and one new powerhouse – the Rollins Upgrade. The new powerhouse would be located within the existing FERC Project Boundary on NID-owned land adjacent to the existing Rollins Powerhouse. NID's proposed Project also includes a slight expansion of the existing FERC Project Boundary to encompass some roads and environmental measures, including proposed minimum flow releases.

NID proposes to operate the proposed Project in the same fashion that it has historically operated the existing Project – first and foremost to meet the growing water supply demand of its District.

**COORDINATION WITH PACIFIC GAS AND ELECTRIC COMPANY'S DRUM-SPAULDING PROJECT RELICENSING – JOINT EXHIBIT E**

NID has coordinated the relicensing of its Yuba-Bear Hydroelectric Project with Pacific Gas and Electric Company's (PG&E) relicensing of its Drum-Spaulding Project (FERC Project No. 2310). NID and PG&E are cooperating and coordinating with each other on their relicensing efforts for many reasons, including: 1) the hydro projects are operationally interrelated and generally have physical features located in common watersheds; and 2) the two projects have the same license expiration date of April 30, 2013.

To this end, and because FERC declared in its May 22, 2008, Scoping Document 1 that it intended to prepare a multi-project environment impact statement for both projects, NID and PG&E have prepared a joint, two-project, Exhibit E, Environmental Report, and included the Exhibit E in their respective applications for a new license. This joint Exhibit E document is identical in each application. However, some section of Exhibit E and some Exhibit E appendices only address either the Yuba-Bear Hydroelectric Project or the Drum-Spaulding Project. For example, Exhibit E treats the projects separately and distinctly in key areas, such as proposed measures and Project economics. Exhibit E also provides information such as a description of the affected river basins, applicable laws, and affected environment that is generally applicable to both projects.

**SECTION 106 COMPLIANCE**

With the Notice of Intent to File an Application for a New License (NOI) on April 9, 2008, NID requested, pursuant to 36 CFR § 800.2(c)(4) that FERC authorize NID to initiate consultation, as described in Section 106 of the National Historic Preservation Act, with the California State Historic Preservation Officer (SHPO), tribes, the Forest Service, BLM and others regarding relicensing of the Project. By letter of June 10, 2008, FERC granted the request thereby designating NID the non-federal representative for Section 106 informal consultation.

**ENDANGERED SPECIES ACT PROTECTION**

With the NOI filing, NID also requested that FERC, pursuant to Section 7 of the Endangered Species Act, designate NID as the non-federal representative for the purpose of informal consultation with the United States Department of Commerce, National Marine Fisheries Service and USDOI, Fish and Wildlife Service for the Project. By letter of June 10, 2008, FERC granted NID's request.

**PROPOSED PROTECTION, MITIGATION AND ENHANCEMENT MEASURES**

Appendix E3 of Exhibit E of the FLA provides NID's proposed protection, mitigation and enhancement (PM&E) measures. These measures reflect NID's analysis of relicensing study results to date, and in some instances are informed by limited discussions with other Relicensing Participants.

NID affirms its continued commitment to working collaboratively and cooperatively with other interested Relicensing Participants as this Integrated Licensing Process for the Yuba-Bear Hydroelectric Project moves forward. NID is fully committed to working with interested Relicensing Participants to develop approaches, solutions and measures that address as many of the Relicensing Participants' interests as reasonably possible.

**FINAL LICENSE APPLICATION DISTRIBUTION**

NID will make the information from this FLA (with the exception of Critical Energy Infrastructure Information (CEII) and Privileged materials) available to all interested Relicensing Participants by:

- posting the FLA to the public Project Relicensing website: http://www.nid-relicensing.com/

- making a hardcopy of Volumes I, II and III, the public portions of the FLA, available to the public during regular business hours (8:30 a.m.– 4:30 p.m., Monday through Friday) at NID's place of business:

  Nevada Irrigation District
  1036 West Main Street
  Grass Valley, CA 95945

  The public is instructed to contact Mr. Ron Nelson or his designee by telephone at (530) 273-6185 to make an appointment to review the information.

- making a hardcopy of Volumes I, II and III, the public portions of the FLA, available at the following public libraries in the Project region:

  Nevada County Public Library
  Grass Valley Library - Royce Branch
  207 Mill Street

  Nevada County Public Library
  Madelyn Helling Library
  980 Helling Way

Grass Valley, CA 95945-6711
Placer County Public Library
350 Nevada Street
Auburn, CA 95603-3720

Nevada City, CA 95959-8619
Yuba County Public Library
303 2nd Street
Marysville, CA 95901-6011

NID will also publish a notice of the availability of the FLA (within 15 days of the date it is filed with FERC) in the following newspapers of general circulation:

The Union
464 Sutton Way
Grass Valley, CA 95945
Tel: (530) 273-9561

Auburn Journal
P.O. Box 5910
Auburn, CA 95604
Tel: (530) 885-5656

Appeal-Democrat
P.O. Box 431
Marysville, CA 95901
Tel: (530) 741-2345

The Mountain Messenger
313 Main
Downieville, CA 95936
Tel: (530) 289-3242

Any party may also request a hard copy of the Public volumes of the FLA by contacting Ron Nelson, General Manager, (530) 273-6185 or by e-mail at nelson@nid.dst.ca.gov.

NID looks forward to working with FERC and other interested parties on the Yuba-Bear Hydroelectric Project relicensing. If you have any questions regarding the FLA, please contact me.

Sincerely,

Ron Nelson
General Manager

cc: Alan Mitchnick, FERC Project Coordinator
FERC Project No. 2266 Relicensing Participants Mailing List (via electronic mail)

Attachment: Yuba-Bear Hydroelectric Project Index of Final License Application Materials

Enclosure: Yuba-Bear Hydroelectric Project Final License Application

# INDEX OF FINAL LICENSE APPLICATION FOR THE YUBA-BEAR HYDROELECTRIC PROJECT (FERC PROJECT NO. 2266)

Section 6.7. Land Use

Section 6.8. Cultural Resources

Section 6.9. Aesthetic Resources

Section 6.10. Socio-Economic Resources

Section 6.11. Air Quality

Section 6.12. Noise

Section 7. NID's Economic Analysis – Yuba-Bear Hydroelectric Project

Section 8. PG&E's Economic Analysis – Drum-Spaulding Project

Section 9. Consistency with Comprehensive Plans

Section 10. Consultation Documentation

Section 11. References Cited

**Part 2:**

Appendix E1. List of Parties Consulted

Appendix E2. NID's Replies to Comments on the Yuba-Bear Hydroelectric Project Draft License Application

Appendix E3. NID's Proposed Measures included in the Proposed Yuba-Bear Hydroelectric Project

Appendix E4. NID's Proposed Implementation Plans included in the Proposed Yuba-Bear Hydroelectric Project

- Clear and Trap Creeks Stabilization Plan
- Invasive Weeds Management Plan on Federal Land
- Vegetation Management Plan on Federal Land
- Recreation Facilities Plan
- Transportation Management Plan
- Fire Prevention and Response Plan on Federal Land
- Historic Properties Management Plan (*due to its Privileged content, this plan is located in Vol. IV of NID's FLA*)
- Visual Resources Management Plan on Federal Land

Appendix E5. NID's Miscellaneous Information Related to Measures included in the Proposed Yuba-Bear Hydroelectric Project

Appendix E6. PG&E's Replies to Comments on the Draft License Application – Drum-Spaulding Project

Appendix E7. PG&E's Proposed Measures and Rationale Statements – Drum-Spaulding Project

Appendix E8. PG&E's Proposed Implementation Plans included in the Proposed Drum-Spaulding Project

- Recreation Facilities Plan
- Transportation Management Plan for Primary Project Roads
- Fire Prevention and Response Plan on Federal Land
- Historic Properties Management Plan (*due to its Privileged content, this plan is located in Vol. IV of PG&E's FLA*)
- Visual Resources Management Plan on Federal Land

Appendix E9. PG&E's Discussion of Wise Powerhouse Operations – Drum-Spaulding Project

Appendix E10. PG&E's Miscellaneous Information Related to Proposed Measures – Drum-Spaulding Project

Appendix E11. PG&E's Background Information on Water Resources – Drum-Spaulding Project

**Part 3:**

Appendix E12. Operations Model and Technical Memoranda

- HEC-ResSim Operations Model for the Yuba-Bear Hydroelectric Project and the Drum-Spaulding Project, Including Five Model Scenarios Referenced in Exhibit E Pre-Loaded with Results
- Hydrology and Power Generation DVD for the Yuba-Bear Hydroelectric Project and the Drum-Spaulding Project
- Technical Memoranda for NID's and PG&E's Relicensing Studies
- Helicopter Video of Yuba-Bear Hydroelectric Project Facilities and Affected River Reaches

| | | |
|---|---|---|
| **Volume III** | **Security Level: Public** | |
| | Transmittal Letter | |
| | Exhibit F. | List of General Design Drawings |
| | Exhibit G. | Project Maps |
| | Exhibit H. | Miscellaneous Filing Materials |
| **Volume IV** | **Security Level: Privileged** | |
| | Transmittal Letter | |
| | Historic Properties Management Plan | |
| **Volume V** | **Security Level: Critical Energy Infrastructure Information (CEII)** | |
| | Transmittal Letter | |
| | Exhibit F. | General Design Drawings (CEII Version) |

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# Application for a New License Major Project – Existing Dam

## Summary of Final License Application

Yuba-Bear Hydroelectric Project
FERC Project No. 2266-096

Prepared by:
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April 2011

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# SUMMARY OF FINAL LICENSE APPLICATION

## 1.0 Introduction

Nevada Irrigation District (NID or Licensee) is filing with the Federal Energy Regulatory Commission (FERC) this Application for License for a Major Project - Existing Dam, also referred to as the Final License Application or FLA, for its existing Yuba-Bear Hydroelectric Project, FERC No. 2266 (Project). The Project is located in the Middle Yuba River, Canyon Creek and the Bear River in northern California in Sierra, Nevada, and Placer counties along the western slope of the Sierra Nevada (Figure 1). The Project's current license expires April 30, 2013.

The primary benefits of the Project are:

- A clean supply of water to the region – the Project represents over 81 percent of NID's water supply storage
- A clean, renewable source of electricity for over 45,000 homes[1]
- 40.32 megawatts (MW) of power to help meet the State of California's Renewable Portfolio Standards (RPS) for renewable power
- Approximately 160,000 person-days of recreation each year at Project recreation facilities, primarily at Jackson Meadows and Rollins reservoirs
- Instream flow releases to support stream fisheries and recreation

This Summary provides background information on the relicensing process and summarizes information contained in the FLA.

## 2.0 Coordination with Drum-Spaulding Project Relicensing

NID has historically closely coordinated the operations of its Yuba-Bear Hydroelectric Project with Pacific Gas and Electric Company's (PG&E) Drum-Spaulding Project (FERC Project No. 2310). The projects overlap in part in the Yuba River and Bear River basins and many of the projects' facilities are hydraulically interconnected. Both projects have licenses that expire on April 30, 2013. FERC recognized the interrelated operations of the projects in its October 6, 2008, revised Scoping Document 2, stating that it intended to prepare a multi-project environmental impact statement that will be used by FERC to determine whether, and under what conditions, to issue new hydropower licenses to each project. For these reasons and others, NID has coordinated and cooperated with PG&E in the preparation of its Yuba-Bear Hydroelectric Project FLA.

1 Estimate based on average household electricity consumption of 6,000 kWh/year in California.

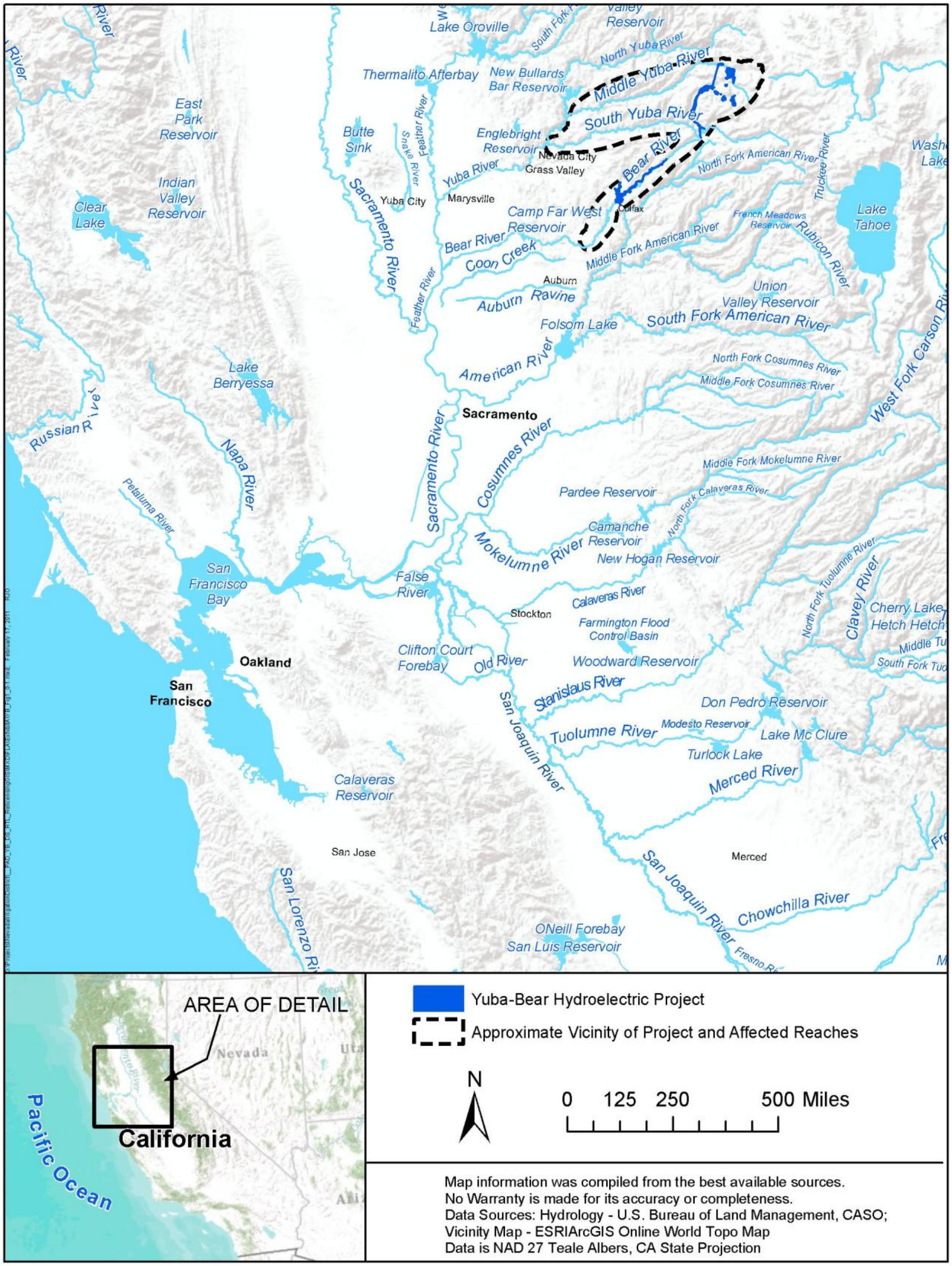


**Figure 1. Yuba-Bear Hydroelectric Project in relation to San Francisco Bay, California.**

# 3.0 Relicensing Process

NID has prepared its FLA in conformance with Title 18 of the Code of Federal Regulations (CFR), Chapter 1 (Federal Energy Regulatory Commission, Department of Energy), Subchapter B (Regulations under the Federal Power Act), Part 5 (Integrated License Application Process), commonly referred to as FERC's Integrated Licensing Process, or ILP.

## 3.1 Milestones

Table 1 lists the Yuba-Bear Hydroelectric Project's major relicensing milestones.

**Table 1. Yuba-Bear Hydroelectric Project's major relicensing milestones.**

| Date | Action |
|---|---|
| April 11, 2008 | NID filed Notice of Intent and Pre-Application Document |
| September 25, 2008 | NID filed Proposed Study Plan |
| January 23, 2009 | NID filed Licensee's Revised Study Plan |
| February 23, 2009 | FERC issued its Study Plan Determination that approved Licensee's Revised Study Plan with modifications |
| September 17, 2009 | NID filed Study Progress Report |
| March 17, 2010 | NID filed Initial Study Report |
| September 17, 2010 | NID filed Study Progress Report |
| November 4, 2010 | NID filed its Draft License Application |
| March 17, 2011 | NID filed Updated Study Report |

Pursuant to 18 CFR § 5.17, NID files its FLA no later than 24 months before the existing license expires.

## 3.2 Study Status

This FLA contains the analysis of existing, relevant and reasonably available information, including the results to date of 39 studies NID conducted, most of which jointly with PG&E, to investigate potential effects of the Yuba-Bear Hydroelectric Project, and the Yuba-Bear Hydroelectric Project and Drum-Spaulding Project in combination, on various biological, recreational and cultural resources. Beginning in September 2009, NID and PG&E reported study results for the FERC-approved studies to federal and State of California agencies, local agencies, tribes, non-governmental organizations and unaffiliated members of the public.[2] The results for each study were made available in technical memoranda.

As of the date of this filing, 21 studies are complete, 18 are in progress and one will begin in late April 2011. These studies in progress or to begin include:

1. Channel Morphology (Study 2.2.1)
2. Instream Flow (Study 2.3.1)

[2] Within this FLA, federal and State of California agencies, local agencies, tribes, non-governmental organizations and unaffiliated members of the public, together with NID and PG&E, are collectively referred to as the "Relicensing Participants."

3. Fish Entrainment (Study 2.3.5)
4. Fish Barriers (Study 2.3.16)
5. 2011 Dutch Flat No. 2 Conduit Entrainment Netting (Study 2.3.17)
6. Special-Status Wildlife – California Wildlife Habitat Relationships (Study 2.4.1)
7. Wildlife Movement (Study 2.4.2)
8. Special-Status Plants (Study 2.5.1)
9. Riparian Habitat (2.6.1)
10. ESA-Listed Wildlife – Valley Elderberry Longhorn Beetle (Study 2.7.2)
11. ESA-Listed Plants (Study 2.7.3)
12. ESA-Listed and Fully Protected Wildlife – California Wildlife Habitat Relationships (Study 2.7.4)
13. CESA-Listed Plants (Study 2.7.6)
14. Recreation Flow (Study 2.8.1)
15. Recreation Use and Visitor Surveys for the Yuba-Bear Hydroelectric Project (Study 2.8.2a)
16. Roads and Trails (Study 2.9.1)
17. Historic Properties for the Yuba-Bear Hydroelectric Project (Study 2.12.1a)
18. Native American Traditional Cultural Properties for the Yuba-Bear Hydroelectric Project (Study 2.13.1a)

Much of the remaining study work is minor, such as performing botanical surveys on 10 acres of land that have recently been added to the FERC Project Boundary (over 3,500 adjoining acres have already been surveyed during the relicensing), or modifying a technical memorandum to be consistent with analysis in the FLA. NID believes there is a very low probability that the information developed during completion of the studies will change the environmental analysis or NID's proposed measures in this FLA. However, if the information does, NID will amend its FLA.

NID expects to complete all the studies, including filing final technical memoranda with FERC, by October 31, 2011. A technical memorandum for each study completed or in progress (excluding Study 2.3.17 that does not begin until late April 2011) is included in this Exhibit E in Appendix E12.

# 4.0 Summary of License Application

## 4.1 FLA Organization

The FLA is composed of five volumes. Volume I contains Public information and includes:

- Transmittal Letter
- Summary
- Initial Statement
- Glossary, including definitions of terms, acronyms and abbreviations
- Exhibit A. Project Description
- Exhibit B. Project Operations and Resource Utilization
- Exhibit C. Construction History and Proposed Construction Schedule
- Exhibit D. Statement of Project Costs and Financing

Volume II contains Public information and includes Exhibit E, the Environmental Report. As described above, NID and PG&E have prepared a joint Exhibit E that is identical in each application. Some of the information in Exhibit E is generally applicable to both projects, such as a description of the affected river basins, applicable laws, and affected environment. Other information in Exhibit E pertains only to the Yuba-Bear Hydroelectric Project, such as the description of the Project effects, Project economics and NID's proposed protection, mitigation and enhancement (PM&E) measures. Specifically, Exhibit E includes:

- Table of Contents
- Glossary
- Organizational Summary of Exhibit E
- General Description of the River Basins
- Cumulative Effects – Geographic and Temporal Scope
- Applicable Laws
- Project Facilities and Operations
- Environmental Analysis
- Economic Analysis
- Consistency With Comprehensive Plans
- Consultation and Documentation
- References Cited

Exhibit E also includes 12 appendices. The appendices that pertain in whole or in part to the Yuba-Bear Hydroelectric Project include:

- Appendix E1. List of Parties Consulted
- Appendix E2. NID's Replies to Comments on the Yuba-Bear Hydroelectric Project DLA
- Appendix E3. NID's Proposed Measures
- Appendix E4. NID's Proposed Implementation Plans
  - Clear and Trap Creeks Stabilization Plan
  - Invasive Weeds Management Plan on Federal Land
  - Vegetation Management Plan on Federal Land
  - Recreation Facilities Plan
  - Transportation Management Plan
  - Fire Prevention and Response Plan on Federal Land
  - Visual Resources Management Plan on Federal Land
- Appendix E5. NID's Miscellaneous Information Related to Proposed Measures
- Appendix E12. Operations Model, Hydrologic Information, Technical Memoranda and Project Videos

Volume III contains Public information and includes:

- Exhibit F. General Design Drawings
- Exhibit G. Project Maps
- Exhibit H. Miscellaneous Filing Materials

Volume IV contains Privileged information, and is therefore filed with FERC but not made available to the public. However, Volume IV is provided to those Relicensing Participants that have a need for the information, such as the Advisory Council on Historic Preservation; United States Department of Agriculture, Forest Service (Forest Service); United States Department of Interior (USDOI), Bureau of Land Management (BLM); State Historic Preservation Officer (SHPO), and affected Native American tribes. This volume includes:

- Historic Properties Management Plan (HPMP)

Volume V contains Critical Energy Infrastructure Information), and is therefore filed with FERC but not made available to the public. Volume V includes:

- Exhibit F. General Design Drawings
- Rollins Upgrade Supporting Design Report

## 4.2 FLA Summary

### Exhibit A - Project Description

Exhibit A provides a detailed description of all existing and proposed Project facilities, including the physical composition, dimensions, and general configuration of Project dams, spillways, penstocks, powerhouses, tailraces and other structures; the normal maximum surface area and normal maximum surface elevation, gross storage capacity, and usable storage capacity of Project reservoirs; type, and rated capacity of Project turbines or generators; the length, voltage, and interconnections of Project transmission lines; and the specifications of mechanical, electrical, and transmission equipment.

<u>Existing Project Facilities</u>
The existing Project consists of 13 dams (combined usable storage of 210,823 acre-feet, or ac-ft); four water conduits; four powerhouses (combined capacity of 79.32 MW); one 9.0-mile-long, 60-kilovolt transmission line; 17 campgrounds and associated boat launches, trails and other recreation facilities; and other appurtenant facilities and structures.

<u>Proposed Project Facilities</u>
NID proposes several changes to the existing Project facilities, each of which is described below.

*New Generation*

NID proposes to include one new generating facility in the new license: Rollins No. 2 Powerhouse. The new facility would more effectively capture the combined releases from Rollins Reservoir. The new powerhouse would be constructed entirely on District-owned land adjacent to the existing Rollins Powerhouse location in a lay down area just below the existing parking lot on the right bank of the river. The existing powerhouse would be unaltered and remain in full operation. The new powerhouse would house a single Francis turbine with a maximum flow of 600 cubic feet per second (cfs) and synchronous generator combination yielding a maximum capacity of 11.4 MW, and an average annual generation of 18.4 GWh. This new facility would be a remotely operable, unmanned installation. The upgrade would require modifications to the existing penstock and power tunnel to allow for a new bifurcation to route flow to the new generation facility, and replacement of the Rollins Powerhouse Switchyard in order to route the new penstock. The upgrade would occur entirely within the existing FERC Project Boundary and affect less than 1 acre of NID-owned land. Figure 2 shows the general layout of the proposed Rollins Upgrade. With the addition of the Rollins Upgrade to the Project, the Project's capacity would increase to 90.6 MW.

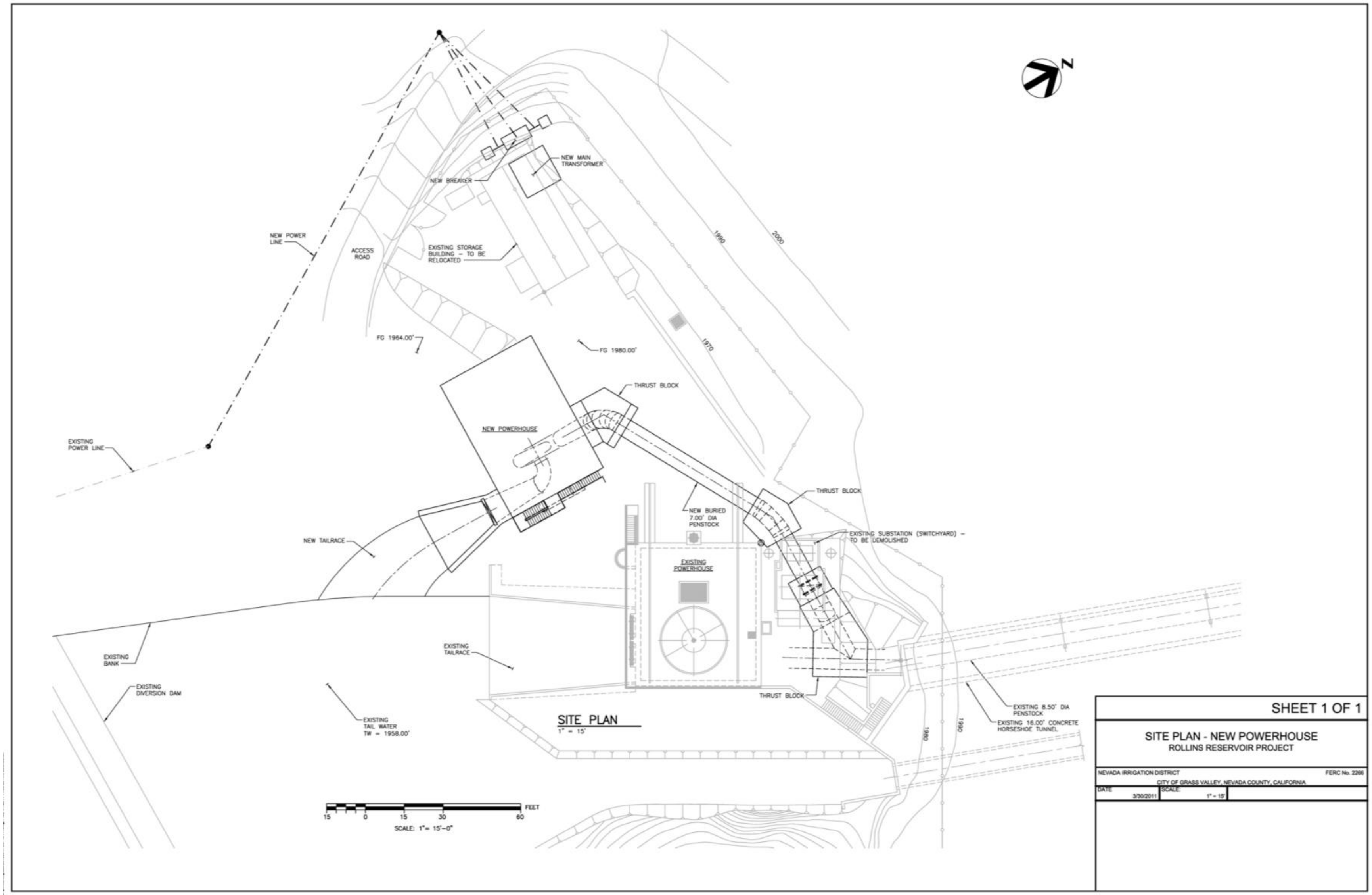


**Figure 2. Anticipated layout of proposed Rollins No. 2 Powerhouse (existing Project features shown in grayscale).**

*Project Boundary Modifications for Inclusion of Primary Project Roads*

NID proposes to modify the existing Project boundary to include the following 12 existing Primary Project access road segments:

- The addition of the area which incorporates the Primary Project portion of French Lake Dam Road (Forest Service Road 843-20), including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Milton Pipeline Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Wilson Creek Diversion Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Bunkhouse Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Texas Creek Diversion Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Bowman-Spaulding Canal Berm Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Bowman-Spaulding Canal Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Stump Canyon Siphon Intake Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Canyon Siphon Low Level Valve Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of "B" Alarm Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Chicago Park Forebay Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Chicago Park Powerhouse Access Road, including a right-of-way of 20 feet on road centerline

All of the above road segments are Primary Project access roads (i.e., used almost exclusively by NID to access Project facilities) and are included in NID's proposed Transportation Management

Plan, which can be found in Appendix E4 of Exhibit E. All the road segments are within NID's proposed FERC Project Boundary.

*Streamflow Gages*

NID proposes to add to the Project three new streamflow gages for the purpose of monitoring compliance with minimum flow releases. The new gages will be located on the downstream face of the diversion facilities at Texas, Fall and Rucker creeks. Each gage will consist of a fixed orifice, sized to deliver the minimum instream flows proposed in this FLA for Texas, Fall and Rucker creeks downstream of the Bowman-Spaulding Conduit crossing. The gages will be named YB-317, YB-318 and YB-319, respectively. Each gage will be located within the existing FERC Project Boundary. A more detailed description of the new gages is provided in Appendix E5.

*Recreation Facilities*

NID's proposed Project includes a Recreation Facilities Plan, which is included in Appendix E4. The plan includes many components including replacement and upgrade of existing recreation facilities and evaluation for new recreation facilities over the term of the new license. However, at this time, the plan includes the addition of the following specific new facilities:

- Jackson Meadows Reservoir
  - Additional parking for up to 20 boats with trailers (double spaces) at or near the existing Pass Creek Boat Launch to accommodate boat ramp use during the high water period typically through July when the lower boat launch parking area is not useable.
  - Replace the existing Woodcamp Boat Launch to California Department of Boating and Waterways standards.
  - Construct a non-motorized trail from Aspen Group Campground to the Aspen Picnic Area parking area.

- Milton Diversion Impoundment:
  - Provide up to two parking areas (native surface) with vehicle barriers and directional signage along north shoreline that allows parking in designated parking areas only.
  - Provide up to 5 walk-in campsites along impoundment shoreline adjacent to the designated parking areas each with a steel fire ring.
  - One car-top boat launch that allows direct vehicle access to the shoreline for boat launching purposes only.

- Canyon Creek:
  - Install animal-resistant food lockers at nine sites.

- Sawmill Lake:
  - Up to 10 primitive walk-in campsites (1 accessible campsite); install table, fire ring/grill, tent pad, site marker, and signage at each campsite.
  - A single gravel/native surface parking area with barriers including information kiosk.
  - One 2-unit vault restroom

- Bowman Lake:
  - One parking area (native surface) with vehicle barriers and directional signage at Jackson Creek inflow along the north shoreline/Bowman Lake Road.
  - One information kiosk at the junction of Bowman Lake Road and Graniteville Road near the dam.
  - Fourteen primitive campsites each with a picnic table, fire ring, site marker and signage along the north shoreline.

- Dutch Flat No. 2 Forebay:
  - One information kiosk

- Dutch Flat Afterbay:
  - One day use area along the shoreline of the afterbay if a suitable location can be found on either NID or BLM land. Potential improvements may include facilities such as picnic tables, a vault restroom, signage or information kiosk and a defined parking area.

All but two of the proposed Project recreation facilities are located within the proposed FERC Project Boundary. These are: 1) the primitive campsites at the "Tree Camp" located along the north shoreline of Bowman Lake on NFS land; and 2) the walk-in campground at Sawmill Lake on NID land. Given the uncertainty of the final footprint for these two facilities, for each facility NID will request FERC expand the FERC Project Boundary to include the facility once the final design of the facility is complete and prior to construction. Note that NID's environmental studies (e.g., botanical and cultural) have included the areas in which the facilities are proposed even through the final design is not complete and the area is outside the existing FERC Project Boundary.

## Exhibit B - Project Operations and Resource Utilization

Exhibit B presents a complete overview of existing Project operations. Reservoir information includes reservoir area-capacity curves; reservoir water surface elevation curves; reservoir rule curves; and spillway rating curves. The median historical reservoir water surface elevations are presented as a proxy for the reservoir rule curve. Powerhouse information includes: installed capacity; historic and simulated average annual energy and dependable capacity; tailwater curves; flow duration curves; and powerhouse capability versus head curves. Figure 3 provides a Project flow schematic, and shows the hydraulic interconnection between the Yuba-Bear Hydroelectric Project and Drum-Spaulding Project.

Existing Operations

In general, the Project is characterized by high elevation storage and lower elevation power generation via a network of natural and man-made conveyances. Water is stored and released from the upper reservoirs based on NID's consumptive needs and combined reservoir storage targets developed as part of the Consolidated Contract with PG&E. Discretionary releases are made from Jackson Meadows Reservoir and Jackson, French, Faucherie, and Sawmill lakes during the spring runoff season through late fall. These releases are conveyed to Bowman Lake via the Milton-Bowman Tunnel (releases from Jackson Meadows Reservoir), Jackson Creek (releases from Jackson Lake), and Canyon Creek (releases from French, Faucherie, and Sawmill lakes). This water is then stored and released from Bowman Dam through Bowman Powerhouse into the Bowman-Spaulding Conduit Diversion Impoundment.

While the majority of the Bowman-Spaulding Conduit flow is provided by releases at Bowman Lake, five small diversion structures, known as "feeders," on creeks that run perpendicular to the alignment of the Bowman-Spaulding Conduit also provide water to the conduit. These feeders augment flows in the conduit up to the conduit's capacity, and spill the remainder of the augmented flow into their respective natural drainages downstream of the conduit. Two types of feeders occur on the Bowman-Spaulding Conduit: diversion dams on Texas Creek and Fall Creek; and side water inflows from Clear, Trap, and Rucker creeks. The diversion dam-style feeders utilize spillways and outlet conduits to release water downstream into the creek, while the side water style feeders utilize dump gates on the downstream side of the Bowman-Spaulding Conduit to make releases into drainages.

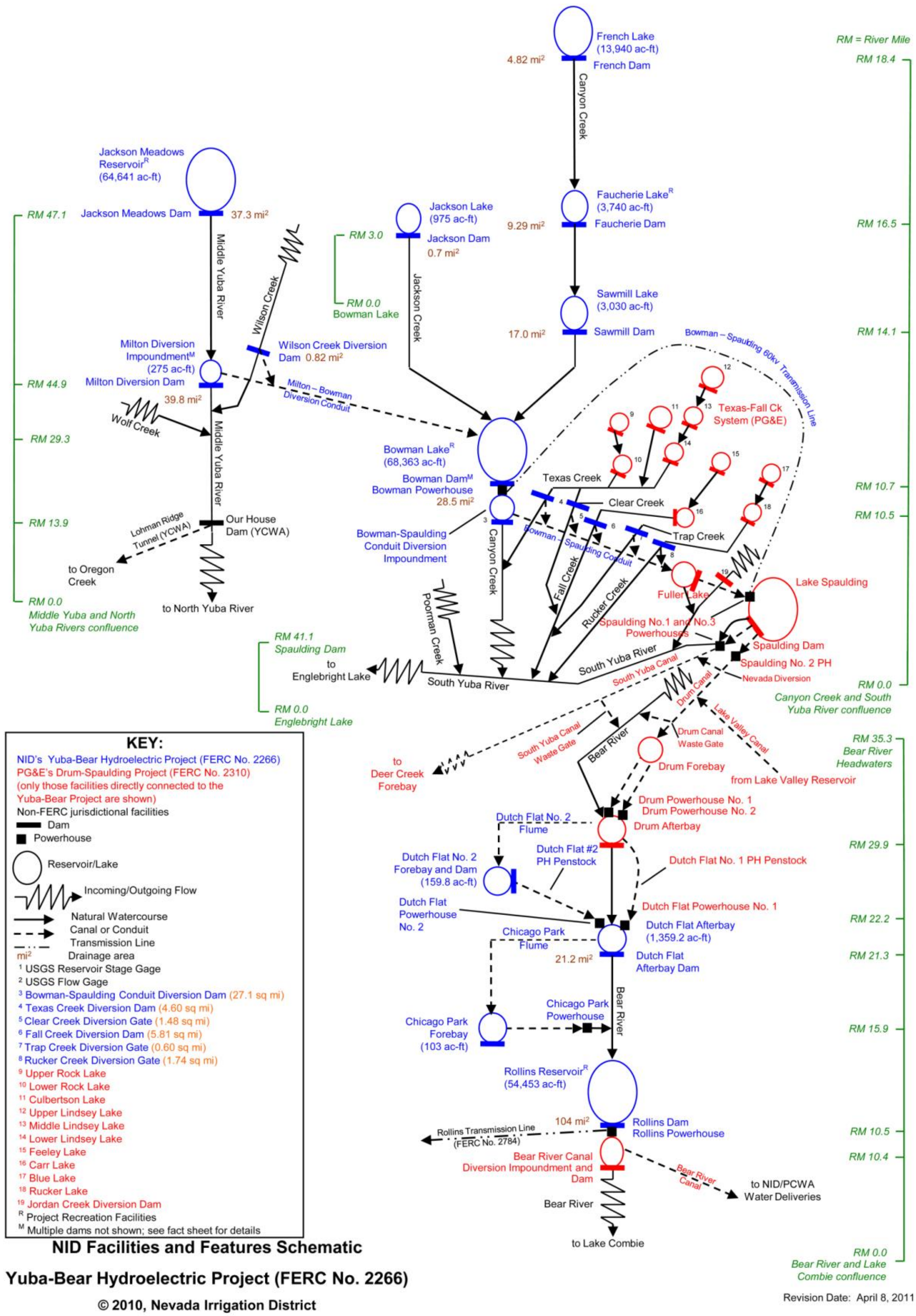


**Figure 3. Yuba-Bear Hydroelectric Project flow schematic.**

Flows upstream of the Bowman-Spaulding Conduit in Texas, Fall, and Rucker creeks are regulated by upstream reservoirs owned and operated by PG&E. These are Culbertson, Upper Rock, Lower Rock, Upper Lindsey, Middle Lindsey, and Lower Lindsey lakes in the Texas Creek watershed; Carr and Feeley lakes in the Fall Creek watershed; and Blue and Rucker lakes in the Rucker Creek watershed.

The Bowman-Spaulding Conduit discharges into PG&E's Drum-Spaulding Project's Fuller Lake, where it then is diverted to a second section of the Bowman-Spaulding Conduit before it is utilized for power generation at PG&E's Drum-Spaulding Project's Spaulding No. 3 Powerhouse. PG&E then passes the water through the Drum-Spaulding Project's Lake Spaulding into the Drum-Spaulding Project's Drum and South Yuba canals. Water transported into the Drum Canal is passed through the Drum-Spaulding Project's Drum Forebay and then diverted from the Drum-Spaulding Project's Drum Afterbay, located on the Bear River, into the Yuba-Bear Hydroelectric Project's Dutch Flat No. 2 Flume, Dutch Flat No. 2 Forebay, and Dutch Flat No. 2 Powerhouse. Water transported by PG&E into the South Yuba Canal is passed through PG&E's Deer Creek Forebay and Deer Creek Powerhouse prior to being released into South Fork Deer Creek. Once released, a portion of the water may be diverted by NID to meet downstream consumptive demand. Daily volumes into each canal are scheduled by PG&E and NID for downstream consumptive demand and discretionary hydropower generation.

Water from Dutch Flat No. 2 and the Drum-Spaulding Project's Dutch Flat No. 1 powerhouses discharge into the Project's Dutch Flat Afterbay located on the Bear River, where the water is then delivered via the Chicago Park Flume to the Project's Chicago Park Powerhouse by way of the Project's Chicago Park Forebay. Daily volumes are scheduled for downstream consumptive demand and discretionary hydroelectric power generation. The Chicago Park Powerhouse discharges into the Bear River roughly 1 mile upstream of the Project's Rollins Reservoir.

With a gross storage capacity of roughly 59,000 ac-ft, Rollins Reservoir is the Project's major low-elevation storage reservoir.[3] Located near Interstate 80 and State Highway 174, Rollins Reservoir is a multipurpose facility that meets municipal, irrigation, domestic water supply, recreation, and power generation needs. Rollins Reservoir is generally kept as high as possible through the recreation season of Memorial Day through Labor Day. This is accomplished through upstream deliveries into the Bear River watershed by the Drum-Spaulding Project's Drum and Lake Valley canals. The Drum Canal is supplied by a combination of Yuba-Bear Hydroelectric Project's transfers out of the Middle Yuba River via the Milton-Bowman Tunnel and Canyon Creek via the Bowman-Spaulding Conduit watersheds, along with Drum-Spaulding Project reservoirs and natural runoff in the South Yuba and North Fork of the North Fork American river watersheds.

Besides physical (e.g., size of dams and tunnels) and hydrologic (e.g., natural runoff) constraints, major factors that constrain NID's normal operation of the Project include, but are not limited to; public and employee safety; conditions in the current FERC Project license; conditions in the NID/PG&E Consolidated Contract; other agreements made with PG&E and Davis-Grunsky Agreement reservoir elevation requirements; and other downstream water supply demand and

[3] Gross storage estimate based on NID's 2007 reservoir bathymetry study.

associated requirements. The Consolidated Contract, Davis-Grunsky Agreement, and some of the other agreements expire at the same time as the existing FERC license.

Proposed Operations
In general, NID proposes to operate the proposed Project in a similar manner to how the existing Project is currently operated, but with some increases in minimum flow releases and addition of ramping rates, as described in Exhibit E of the FLA.

**Exhibit C – Construction History and Proposed Construction Schedule**

Exhibit C provides the Project's construction history and construction of NID's proposed new facilities.

Existing Project
In the early 1960s, NID began construction of the Yuba-Bear Hydroelectric Project in cooperation with PG&E. Their Consolidated Contract provided security for the Project's financial backing. PG&E agreed to pay NID all estimated annual capital, operations and maintenance costs of $5.0 million, approximately $3.5 million for annual debt service and purchase the power generated. The first phase of Project construction included two new hydroelectric power plants and construction of the 66,000 acre Rollins Reservoir. The new development included work up and down the entire length of the old 1920s system. At Jackson Meadows, a dam was constructed. Another new dam was built at Faucherie Lake, replacing the earlier 1850s era dam. Other dams in the high mountains were also renovated. A major alteration was the replacement of the Milton-Bowman Conduit. The old wood stave conduit constructed in 1928 was replaced with steel-reinforced concrete pipe. The original Milton-Bowman Tunnel was enlarged and repaired in numerous locations, and old transitional connections replaced with modern elements. The Fall Creek and Texas Creek diversions were rebuilt with older elements abandoned in place. A new powerhouse at Dutch Flat – named the Dutch Flat No. 2 Powerhouse since PG&E already had a Dutch Flat No. 1 Powerhouse. Part of this work included building the Dutch Flat Afterbay Dam to store water exiting the Dutch Flat No. 2 Powerhouse before it enters the Bear River. Its release could then be controlled to provide water to another new powerhouse, the Chicago Park Powerhouse.

The Yuba-Bear Hydroelectric Project entered a second phase of construction in the 1980s. A powerhouse was also added at Rollins Reservoir and Bowman Reservoir, along with a new transmission line for the Bowman powerhouse.

Proposed Construction
NID expects that it will take about 3 years to bring the new Rollins Powerhouse Upgrade on line. NID anticipates that contracting and final design of the Rollins Powerhouse Upgrade will occur in the first year following issuance of a new license by FERC. Equipment procurement and funding authorization will occur in the second year following license issuance. Construction will occur in the third year following license issuance and will proceed in four phases. Access would occur over existing roads, and likely not require any modification to the roads. In the first phase, site preparation would occur including ground disturbing activities to create a construction laydown area, exposure of the existing pipe for addition of the bifurcation, and prepare the area

for addition on the new building. The latter would affect the existing access road in the immediate area of the existing powerhouse. Excavated material would be piled on site for backfilling purposes in Phase 3.

NID anticipates that in the second phase, a temporary bulkhead or cofferdam would be constructed from the existing tailrace wall to the north bank of the river. The cofferdam or bulkhead would isolate the construction work in the bed from the stream. The area enclosed by the cofferdam or bulkhead would be minor. Then, standing water enclosed by the cofferdam or bulkhead would be allowed to settle, and pumped into the tailrace. The area of the new powerhouse and tailrace would be excavated down to the foundation level. The concrete foundation would then be placed, followed by the new walls of the tailrace and powerhouse. The last portion of this phase would be installation of the turbine and generator. During this phase, the bifurcation and new penstock would be installed as well.

In the third phase, the area would be backfilled around the new powerhouse walls using material that was excavated from the area in Phase 1, and stoplogs or a tailrace gate would be placed in the tailrace to stop water from entering the draft tube. The cofferdam would then be removed. Backfilling around the new bifurcation and penstock would also occur during this phase.

In the fourth phase, the remainder of the powerhouse equipment would be installed and the roof of the powerhouse completed. Equipment testing would occur during this phase. In this phase, site clean-up and remediation would occur including stabilizing all slopes and finalizing drainage and paving of the road and access areas. Any excess clean material (e.g., excavated dirt) or construction material would be properly disposed of off-site. Final as-built drawings would be prepared and filed with FERC.

NID expects that construction of the four new streamflow gages will occur within 2 years of license issuance. Construction of the new recreation facilities will be phased, with completion of all facilities within 10 years of license issuance.

**Exhibit D - Statement of Project Costs and Financing**

Exhibit D provides a statement of Project costs and financing. It also includes a statement of the estimated annual value of Project power. All costs are provide using FERC current cost method and are in 2010 U.S. dollars.

<u>Existing Project</u>
NID anticipates that, if the changes proposed by NID were not incorporated into the Project, over the next 30 years NID’s annual Project operations and maintenance cost is projected to be $9 million for its existing facilities and an annual cost related to existing Project recreation facilities would be about $1 million (e.g., assumes replacement of all existing recreation facilities and existing annual operating expenses). Power generation on average is expected to be about 275 gigawatt (GWh) per year. Based on these costs and anticipated average annual power generation and power values, NID estimates its annual excess revenue to be about $13.9 million.

Proposed Project

NID estimates construction of the Rollins Upgrade to be is $22 million. NID estimates that the additional annual cost related to the implementation of NID's proposed non-recreation measures as described in Exhibit E is $954,000 and the additional annual cost related to the implementation of NID's proposed recreation measures as described in Exhibit E is $120,000. Total Project recreation costs as shown in the Exhibit E Recreation Facilities Plan, for both existing and proposed recreation facilities amounts to $1.25 million (i.e., includes total recreation costs over the next 30 years, of which about $1.1 million are already planned under the existing Project). Power generation, excluding the Rollins Upgrade, on average is expected to be about 269 GWh per year. Including the Rollins Upgrade, power generation on average is expected to be about 287 GWh per year. Based on these costs and anticipated average annual power generation and power values, NID estimates its annual excess revenue under the proposed Project to be approximately $14.0 million.

## Exhibit E – Environmental Report

Exhibit E is a joint exhibit for both the Yuba-Bear Hydroelectric Project and Drum-Spaulding Project, and provides an overview of the river basins, vegetation, climate, geology and topography, land uses and population information, major water uses and description of each project's facilities. The individual resource sections provide descriptions of the affected environment, environmental effects of each project, and describe unavoidable adverse impacts, if any, as a result of the operation of each project. The environmental report relies on existing, relevant and reasonably available information and the results of the FERC-approved studies. Provided below is a brief summary of the PM&E measures contained in the existing license, and those proposed by NID for inclusion in the new license.

Existing Project

The existing license for the Yuba-Bear Hydroelectric Project requires NID to consult annually with the Forest Service, USDOI, Fish and Wildlife Service (USFWS), and other agencies with regard to measures needed to ensure protection and development of the natural resource values of the Project area.

The existing license includes the minimum release flow requirement shown in Table 1. These minimum flows equate to about 47,000 ac-ft of water annually, through this varies by water year. Only water released at Milton Diversion Dam, Bowman-Spaulding Diversion Dam and from Bowman-Spaulding Conduit is "lost" for water supply (i.e., ~4,000 ac-ft, or 9% of committed minimum flow release water).

**Table 2. Existing minimum flow requirements for the Project.**

| From | To | Release (cfs) | Period | Applicable Water Year |
|---|---|---|---|---|
| Jackson Meadows Dam | Middle Yuba River | 5 | Continuous | All |
| Milton Diversion Dam | Middle Yuba River | 3 | Continuous | All |
| Jackson Lake Dam | Jackson Creek | 0.75 | Continuous | All |
| French Lake Dam | Canyon Creek to Bowman Reservoir | 2.5 | Continuous | All |
| Bowman-Spaulding Diversion Dam | Canyon Creek | 3<br>2 | 4/1 to 10/31<br>11/1 to 3/31 | All |
| Dutch Flat Afterbay Dam | Bear River | 10<br>5 | 5/1 to 10/31<br>11/1 to 4/30 | All |

**Table 2. (continued)**

| From | To | Release (cfs) | Period | Applicable Water Year |
|---|---|---|---|---|
| Rollins Dam[1] | Bear River | 75<br>20 | 5/1 to 10/31<br>11/1 to 4/30 | Normal[2] |
| | | 40<br>15 | 5/1 to 10/31<br>11/1 to 4/30 | Less than Normal[2] |

[1] As measured at the Colfax-Grass Valley streamflow gage (Bear River at Highway 174 crossing).
[2] Normal and Less than Normal are based on monthly precipitation at Lake Spaulding.

- Jackson Meadows Dam. No more than releases of 15 cfs over 30 minutes when releases are in the range of 5 to 125 cfs, or greater than 15 cfs over 15 minutes when releases are at a level of 125 cfs or greater. In addition, the flow changes in the Middle Yuba River below Jackson Meadows Dam are limited to four changes (i.e., two increases and two decreases) per year, except in cases of emergency and/or uncontrolled spills.
- Rollins Dam. One foot in 6 hours or 3 inches during any 1 hour as measured at the Colfax-Grass Valley streamflow gage.
- Jackson Meadows Reservoir. In Normal and Wet Water Years, not less than 10,000 ac-ft from October 1 through May 31 and not less than 21,000 ac-ft from June 1 through September 30; and in Dry Water Years, not less than 3,000 ac-ft from October 1 through May 31 and not less than 21,000 ac-ft from June 1 through September 30. For the purpose of this measure, a dry year is one in which the April-July run-off forecast made by the California Department of Water Resources (CDWR) on May 1 for the Bowman area-Middle Yuba River and Canyon Creek is for less than 70,000 ac-ft.
- Milton Diversion Dam Impoundment. An elevation of 5,686 feet year-round except when repair to the Milton-Bowman Tunnel is necessary, at which time the normal pool may be drawn to a minimum elevation of 5,678 feet.
- Rollins Reservoir. A minimum pool year-round of not less than 5,000 ac-ft.

NID is required to, in consultation with the United States Geological Survey, install and maintain recorders for determining the stage and flows in streams from which water is diverted or released, and the amount of water retained in storage.

The current license provides that NID cooperate with the Forest Service, USFWS, and California Department of Fish and Game (CDFG) in planning the location of deer-proof fences, crosswalks, escape ramps, and such other reasonable structures necessary to protect deer and to maintain these facilities.

The existing license prohibits the use of pesticides or herbicides on National Forest System (NFS) lands for any purpose without the prior written approval of the Forest Service.

Last, the existing license requires that prior to any ground-disturbing activity, NID consult with the SHPO and the Forest Service, if the work is on NFS land, about the need for a cultural resources survey and salvage work.

Proposed Project

NID's proposed Project includes 31 PM&E measures, many of which are also in the existing license. In developing its proposed PM&E measures, NID followed three principles:

- Protect NID's water supply, today and into the future
- Use best available science to identify problem areas and fix them, and look for opportunities for enhancement at reasonable costs
- With regards to streamflows, in general, provide by month at least 80 percent of the habitat for rainbow trout that would occur if the Project was not there, and protect/enhance other aquatic resources.

The table below lists NID's proposed PM&E measures, and is followed by a narrative summary of the proposed measures by resource area. The complete list of NID's proposed measures is located in Appendix E3 of Exhibit E.

**Table 3. Measures included in NID's proposed Yuba-Bear Hydroelectric Project.**

| NID Proposed Measure | Description |
|---|---|
| **GENERAL** | |
| YB-GEN1 | Annual Consultation with Forest Service and BLM |
| YB-GEN2 | Annual Employee Training |
| YB-GEN3 | Annual Review of Special-Status Species Lists and Assessment of New Species on Federal Land |
| YB-GEN4 | Consultation Regarding New Ground Disturbing Activities on Federal Land |
| YB-GEN5 | Consultation Regarding New Facilities on Federal Land |
| YB-GEN6 | Development and Implementation of Coordinated Operations Plan for Yuba-Bear Hydroelectric Project and Drum-Spaulding Project |
| **GEOLOGY AND SOILS** | |
| YB-G&S1 | Development and Implementation of Rollins Upgrade Construction Erosion Control and Restoration Plan |
| YB-G&S2 | Development and Implementation of Recreation Facilities Construction Erosion Control and Restoration Plan |
| YB-G&S3 | Implement Clear and Trap Creeks Stabilization Plans[1] |
| **WATER RESOURCES** | |
| YB-WR1 | Development and Implementation of Rollins Upgrade Construction Hazardous Material Spill Prevention, Control and Countermeasures Plan |
| YB-WR2 | Development and Implementation of Recreation Facilities Construction Hazardous Material Spill Prevention, Control and Countermeasures Plan |
| **AQUATIC RESOURCES** | |
| YB-AQR1 | Streamflows |
| YB-AQR2 | Fish Stocking in Bowman Lake |
| YB-AQR3 | Jackson Meadows Reservoir Minimum Pool |
| YB-AQR4 | Milton Diversion Impoundment Normal Pool |
| YB-AQR5 | Rollins Reservoir Minimum Pool |
| YB-AQR6 | Faucherie Lake Minimum Pool |
| **AQUATIC RESOURCES (continued)** | |
| YB-AQR7 | Fish Stocking in Rollins Reservoir |
| **TERRESTRIAL RESOURCES** | |
| YB-TR1 | Implement Invasive Species Management Plan on Federal Land[1] |
| YB-TR2 | Implement Vegetation Management Plan on Federal Land[1] |
| YB-TR3 | Pesticide and Herbicide Use Restrictions on Federal Land |
| YB-TR4 | Consult When Replacing Canal Wildlife Escape Facilities |
| YB-TR5 | Monitor Animal Losses in Project Canals |
| YB-TR6 | Bat Management |

**Table 3. (continued)**

| NID Proposed Measure | Description |
|---|---|
| **RECREATION RESOURCES** | |
| YB-RR1 | Implement Recreation Facilities Plan[1] |
| YB-RR2 | Provide Recreation Flow Information |
| YB-RR3 | Provide Supplemental Flows in Canyon Creek Below French Dam for Whitewater Boating |
| **LAND USE** | |
| YB-LU1 | Implement Transportation Management Plan[1] |
| YB-LU2 | Implement Fire Prevention and Response Plan on Federal Land[1] |
| **CULTURAL RESOURCES** | |
| YB-CR1 | Implement Historic Properties Management Plan[2] |
| **AESTHETIC RESOURCES** | |
| YB-AER1 | Implement Visual Resource Management Plan on Federal Land[1] |

[1] Plan included in Appendix E4 of FLA.
[2] Plan included in Volume IV of FLA, and is considered Privileged.

General Measures

NID proposes six general measures in the FLA. The first two measures address the effects of constructing, operating, and maintaining the Project on NFS and BLM land and the protection of agency resources. These two measures will ensure annual coordination between the relevant agencies and NID and provide NID's employees with annual training related to special-status species, noxious weeds, and cultural resources. The third measure provides for an annual review of the current list of special-status species (species that are Forest Service Sensitive species or on the Tahoe National Forest's Watch List that might occur on NFS land in the Project area, or species that are on BLM's Sensitive list that might occur on federal land administered by BLM in the Project area) to allow for the development of studies for any newly listed species that may be directly affected by Project operations. The fourth and fifth measures address the effects of new ground-disturbing activities and facilities on NFS and BLM lands, specifically ensuring consultation between NID and the relevant agency prior to conducting ground-disturbing activities or constructing new facilities. The sixth general measure provides that NID will consult with PG&E to develop and implement a plan to coordinate operations between the Yuba-Bear Hydroelectric Project and Drum-Spaulding Project to coordinate such that flow-related measures in each new license can be met. NID has not included the Coordination Agreement in this FLA since, at this time, the contents of the two new licenses are unknown.

Geology and Soils Resource Measures

NID proposes three measures related to geology and soils. The first two measures address the development and implementation of erosion and control and restoration plans for construction of the Rollins Upgrade and new recreation facilities. These plans, the Rollins Upgrade Construction Erosion Control and Restoration Plan and Recreation Facilities Construction Erosion Control and Restoration Plan, will be developed in consultation with the appropriate agencies and filed with FERC at least 90-days prior to construction. The third measure, the Clear and Trap Creeks Channel Stabilization Plan, will assess stabilization of two stream channels directly downstream of the Bowman-Spaulding Conduit, which have (and will continue to) serve as emergency spill channels for conduit releases. NID has not included the erosion control plans in the FLA. The plans will be developed in consultation with appropriate agencies once final designs are developed. The Clear and Trap Creeks Channel Stabilization Plan is included in Appendix E4 of Exhibit E.

Water Resource Measures

NID proposes two measures related to water resources, both addressing hazardous material spill prevention, control and countermeasures (SPCC) plans for construction of the Rollins Upgrade and new recreation facilities. For both plans, NID will consult with the appropriate agencies on the development on the plan and file the plan with FERC at least 90-days prior to construction. Like the erosion control plans, NID has not included the SPCC plans in the FLA. The plans will be developed in consultation with appropriate agencies once final designs are developed.

Aquatic Resource Measures

NID proposes seven measures related to aquatic resources. The first measure deals with Minimum and Targeted minimum flow releases. A Minimum Streamflow is a streamflow that NID shall meet, and failure to meet a Minimum Streamflow requirement shall be reported to FERC according to FERC regulations. A Target Streamflow is a streamflow that NID shall make a reasonable effort to achieve on a year-round basis. Failure to meet a Target Streamflow shall not result in a reportable event to FERC. Minimum and Target streamflows may be comprised of any one or any combination of the following sources: releases through a Project dam (e.g., through a low-level outlet), turbine releases, controlled or uncontrolled spill over a Project dam spillway or canal waste gate, accretion, and other sources, and will be measured in two ways: as the 24-hour average flow (mean daily flow) in cubic feet per second (cfs) and as a 15-minute flow (instantaneous flow) in cfs. Tables 4 and 5 list NID's proposed Minimum and Target streamflows.

**Table 4. Minimum Streamflows[1] in cubic feet per second (cfs) for the Yuba-Bear Hydroelectric Project by month and Water Year Type.**

| Month | Critically Dry Water Year | Dry Water Year | Below Normal Water Year | Above Normal Water Year | Wet Water Year |
|---|---|---|---|---|---|
| **MIDDLE YUBA RIVER - BELOW JACKSON MEADOWS DAM** | | | | | |
| October | 10 | 10 | 12 | 12 | 12 |
| November | 10 | 10 | 10 | 10 | 10 |
| December | 10 | 10 | 10 | 10 | 10 |
| January | 10 | 10 | 10 | 10 | 10 |
| February | 10 | 10 | 10 | 10 | 10 |
| March | 10 | 10 | 10 | 10 | 10 |
| April | 50 | 50 | 50 | 50 | 50 |
| May | 10 | 10 | 10 | 10 | 10 |
| June | 10 | 10 | 12 | 12 | 12 |
| July | 10 | 10 | 12 | 25 | 25 |
| **MIDDLE YUBA RIVER - BELOW JACKSON MEADOWS DAM (continued)** | | | | | |
| August | 10 | 10 | 12 | 25 | 25 |
| September | 10 | 10 | 12 | 20 | 20 |
| **MIDDLE YUBA RIVER - BELOW MILTON MAIN DIVERSION DAM** | | | | | |
| October | 3 | 5 | 12 | 12 | 12 |
| November | 3 | 5 | 8 | 8 | 8 |
| December | 3 | 5 | 8 | 8 | 8 |
| January | 3 | 5 | 8 | 8 | 8 |
| February | 3 | 5 | 8 | 8 | 8 |
| March | 3 | 5 | 8 | 8 | 8 |

**Table 4. (continued)**

| Month | Critically Dry Water Year | Dry Water Year | Below Normal Water Year | Above Normal Water Year | Wet Water Year |
|---|---|---|---|---|---|
| **MIDDLE YUBA RIVER - BELOW MILTON MAIN DIVERSION DAM (continued)** | | | | | |
| April | 3 | 5 | 8 | 8 | 8 |
| May | 3 | 5 | 8 | 8 | 8 |
| June | 3 | 5 | 12 | 12 | 12 |
| July | 3 | 5 | 12 | 25 | 25 |
| August | 3 | 5 | 12 | 25 | 25 |
| September | 3 | 5 | 12 | 20 | 20 |
| **CANYON CREEK – BELOW FRENCH DAM** | | | | | |
| October | 5 | 5 | 5 | 5 | 5 |
| November | 5 | 5 | 5 | 5 | 5 |
| December | 5 | 5 | 5 | 5 | 5 |
| January | 5 | 5 | 5 | 5 | 5 |
| February | 5 | 5 | 5 | 5 | 5 |
| March | 5 | 5 | 5 | 5 | 5 |
| April | 5 | 5 | 5 | 5 | 5 |
| May | 5 | 5 | 5 | 5 | 5 |
| June | 5 | 5 | 5 | 5 | 5 |
| July | 5 | 5 | 5 | 5 | 5 |
| August | 5 | 5 | 5 | 5 | 5 |
| September | 5 | 5 | 5 | 5 | 5 |
| **CANYON CREEK – BELOW FAUCHERIE DAM** | | | | | |
| October | 5 | 5 | 5 | 5 | 5 |
| November | 5 | 5 | 5 | 5 | 5 |
| December | 5 | 5 | 5 | 5 | 5 |
| January | 5 | 5 | 5 | 5 | 5 |
| February | 5 | 5 | 5 | 5 | 5 |
| March | 5 | 5 | 5 | 5 | 5 |
| April | 5 | 5 | 5 | 5 | 5 |
| May | 5 | 5 | 5 | 5 | 5 |
| June | 5 | 5 | 5 | 5 | 5 |
| July | 5 | 5 | 5 | 5 | 5 |
| August | 5 | 5 | 5 | 5 | 5 |
| September | 5 | 5 | 5 | 5 | 5 |
| **CANYON CREEK – BELOW SAWMILL DAM** | | | | | |
| October | 5 | 5 | 5 | 5 | 5 |
| November | 5 | 5 | 5 | 5 | 5 |
| December | 5 | 5 | 5 | 5 | 5 |
| January | 5 | 5 | 5 | 5 | 5 |
| February | 6 | 6 | 5 | 5 | 5 |
| March | 6 | 5 | 5 | 5 | 5 |
| April | 10 | 5 | 5 | 5 | 5 |
| May | 5 | 5 | 5 | 5 | 5 |
| June | 5 | 5 | 5 | 5 | 5 |
| July | 5 | 5 | 5 | 5 | 5 |
| **CANYON CREEK – BELOW SAWMILL DAM (continued)** | | | | | |
| August | 5 | 5 | 5 | 5 | 5 |
| September | 5 | 5 | 5 | 5 | 5 |
| **CANYON CREEK – BELOW BOWMAN DAM AND BOWMAN-SPAULDING CONDUIT DIVERSION DAM** | | | | | |
| October | 3 | 4 | 5 | 5 | 5 |
| November | 3 | 4 | 5 | 5 | 5 |
| December | 3 | 4 | 5 | 5 | 5 |
| January | 3 | 4 | 5 | 5 | 5 |
| February | 3 | 4 | 5 | 5 | 5 |

**Table 4. (continued)**

| Month | Critically Dry Water Year | Dry Water Year | Below Normal Water Year | Above Normal Water Year | Wet Water Year |
|---|---|---|---|---|---|
| **CANYON CREEK – BELOW BOWMAN DAM AND BOWMAN-SPAULDING CONDUIT DIVERSION DAM (continued)** | | | | | |
| March | 3 | 4 | 5 | 5 | 5 |
| April | 3 | 4 | 5 | 5 | 5 |
| May | 3 | 4 | 5 | 5 | 5 |
| June | 3 | 4 | 5 | 5 | 5 |
| July | 3 | 4 | 5 | 5 | 5 |
| August | 3 | 4 | 5 | 5 | 5 |
| September | 3 | 4 | 5 | 5 | 5 |
| **BEAR RIVER – BELOW DUTCH FLAT AFTERBAY DAM AND CHICAGO PARK POWERHOUSE** | | | | | |
| October | 10 | 10 | 10 | 10 | 10 |
| November | 5 | 5 | 5 | 5 | 5 |
| December | 5 | 5 | 5 | 5 | 5 |
| January | 5 | 5 | 5 | 5 | 5 |
| February | 5 | 5 | 5 | 5 | 5 |
| March | 5 | 5 | 5 | 5 | 5 |
| April | 17 | 17 | 5 | 5 | 5 |
| May | 17 | 17 | 17 | 17 | 17 |
| June | 10 | 17 | 17 | 17 | 17 |
| July | 10 | 10 | 10 | 10 | 10 |
| August | 10 | 10 | 10 | 10 | 10 |
| September | 10 | 10 | 10 | 10 | 10 |
| **BEAR RIVER – BELOW ROLLINS DAM[2]** | | | | | |
| October | 40 | 40 | 40 | 75 | 75 |
| November | 15 | 15 | 15 | 20 | 20 |
| December | 15 | 15 | 15 | 20 | 20 |
| January | 15 | 15 | 15 | 20 | 20 |
| February | 15 | 15 | 15 | 20 | 20 |
| March | 15 | 15 | 15 | 20 | 20 |
| April | 15 | 15 | 15 | 20 | 20 |
| May | 40 | 40 | 40 | 75 | 75 |
| June | 40 | 40 | 40 | 75 | 75 |
| July | 40 | 40 | 40 | 75 | 75 |
| August | 40 | 40 | 40 | 75 | 75 |
| September | 40 | 40 | 40 | 75 | 75 |

1 To be clear, the Minimum Streamflow shall be measured in two ways: as a 15-minute flow (instantaneous flow) and as the 24-hour average flow (mean daily flow). The instantaneous flow is the flow value used to construct the mean daily flow, and is an instantaneous flow reading taken every 15 minutes. The mean daily flow is the average of instantaneous flow readings from midnight of one day to midnight of the next day.

2 NID's proposed minimum flow release for Rollins Dam is the same as the minimum flow releases for this facility in Article 33 in the existing license with a slight adjustment for Licensee's proposed water year types. Article 33 includes two water year types and NID proposes five water year types.

**Table 5. Minimum Streamflows and Target Streamflows in cubic feet per second (cfs) for the Yuba-Bear Hydroelectric Project. The Target Streamflows and Minimum Streamflows shall apply to all Water Year types described in Part 2 of this measure.**

| Facility | Minimum Streamflow[2] | Target Streamflow |
|---|---|---|
| Jackson Creek - Below Jackson Lake Dam[1] | 0.3 | 0.75 |
| Texas Creek -Below Texas Creek Diversion Dam[3] | 0.6 | 1.5 |
| Fall Creek -Below Fall Creek Diversion Dam[3] | 0.2 | 0.5 |
| Rucker Creek - Below Rucker Creek Diversion Gate[3] | 0.3 | 0.75 |

[1] During years where the reservoir is not at its full storage capacity on July 1, the Target and Minimum streamflows shall be adjusted by July 15 of each year according the following formula:

$$(0.80*[storage^{July1}]*0.504)/(153)$$

where: 0.80 is used to account for evaporation in the lake; 0.504 is the conversion from acre-feet to cfs; and 153 is the number of days from July 1-November 30. The Target and Minimum streamflows as adjusted on July 15 shall remain in effect until June 30 of the following year.

[2] Compliance monitoring and reporting for Minimum Streamflows shall only apply for the period from July 1 through October 31. Gates on the dams shall be set to release the required minimum flow for the entire winter season on November 1 or at the time when access to the dam is no longer possible due to winter conditions, whichever is earlier.

[3] Target and Minimum streamflows at these locations are based on upstream minimum flow requirements contained in the Drum-Spaulding Project (FERC Project No. 2310) license. If the upstream requirements are modified, these Target and Minimum streamflows in Table 1b shall be modified in kind.

Where facility modification is required to implement the efficient release of Minimum or Target streamflows, NID shall submit applications for permits within 1 year after license issuance and complete such modifications as soon as reasonably practicable. Prior to completion of such required facility modifications, NID shall make a good faith effort to provide the specified Minimum and Target streamflows within the capabilities of the existing facilities.

There are no Minimum or Target streamflow requirements in Wilson Creek below Wilson Creek Diversion Dam and in Clear and Trap creeks below the Bowman-Spaulding Conduit, and in the Bear River below Chicago Park Powerhouse other than the upstream minimum streamflow releases from Dutch Flat Afterbay Dam, which would flow past the powerhouse.

NID shall not change the low-level outlet releases into the Middle Yuba River below Jackson Meadows Dam greater than 45 cfs in any one hour period when flows in the outlet begin at less than 50 cfs, or at a rate greater than 200 cfs in any one hour at all times, as measured at the existing gage YB-301. These flow ramping rates are intended to produce a maximum rate of stage change of 0.6 foot per hour in the Middle Yuba River below Jackson Meadows Dam.

NID shall not change the flow releases nor cause vertical fluctuations in the stream levels in the Bear River below Rollins Dam greater than 0.5 foot in any one hour period as measured at the existing gage YB-196.

For the purpose of compliance with the above ramping rates, flows in cfs will be measured in 15-minute intervals (instantaneous flow), which NID shall record as required by USGS standards at ramping rate compliance gages.

Within 90 days of license issuance, NID shall in each year in each of the months of February, March, April and May determine water year type as described in Table 6. NID shall use this determination in implementing articles and conditions of the license that are dependent on water year type. Water year types shall be defined as:

**Table 6. Water Year types for the Yuba-Bear Hydroelectric Project.**

| Water Year Type | DWR Estimate of Total Unimpaired Runoff in the Yuba River at Smartville in Thousand Acre-Feet |
|---|---|
| Critically Dry | Equal to or Less than 900 |
| Dry | 901to 1,460 |
| Below Normal | 1,461 to 2,190 |
| Above Normal | 2,191 to 3,240 |
| Wet | Greater than 3,240 |

In each of the months of February through May, the water year type shall be based on CDWR water year forecast of unimpaired runoff in the Yuba River at Smartville, as set forth in DWR's Bulletin 120 entitled "*Water Year Conditions in California*." CDWR's forecast published in February, March and April shall apply from the 15th day of that month to the 14th day of the next month. From May 15 to February 14 of the following year, the water year type shall be based on CDWR's forecast published in May.

By March 15 of the second or subsequent Dry or Critically Dry water year, NID shall notify the Forest Service, BLM, SWRCB and CDFG of NID's persistent drought concerns. By May 15 of these same years, NID shall consult with representatives from the Forest Service, BLM, SWRCB and CDFG to discuss operational plans to manage the drought conditions, if necessary. If the parties specified above agree on a revised operational plan, NID may begin implementing the revised operational plan as soon as it files documentation of the agreement with FERC.

NID shall measure and document compliance with Minimum and Target streamflows and ramping rate requirements in publicly-available and readily accessible formats. Minimum and Target streamflows and ramping rate compliance monitoring locations are listed in Table 7.

**Table 7. Minimum and Target streamflow and ramping rate compliance monitoring locations for the Yuba-Bear Hydroelectric Project.**

| Location | USGS Gage No. | Licensee Gage No. | Gage Name | Location (Latitude and Longitude) | | Elevation (ft) |
|---|---|---|---|---|---|---|
| Middle Yuba River – at Jackson Meadows Dam | -- | YB-301 | Middle Yuba River at Jackson Meadows Dam | 39°30'58" | 120°33'40" | 5,800 |
| Middle Yuba River – below Milton Diversion Dam | 11408550 | YB-304 | Middle Yuba River below Milton Dam | 39°31'19" | 120°34'57" | 5,690 |
| Jackson Creek – below Jackson Dam | 11414700 | YB-312 | Jackson Creek below Jackson Lake | 39°27'53" | 120°33'46" | 6,570 |
| Canyon Creek – below French Dam | 11414410 | YB-306 | Canyon Creek below French Lake | 39°25'16" | 120°32'30" | 6,590 |
| Canyon Creek – below Faucherie Dam | 11414450 | YB-308 | Canyon Creek below Faucherie Lake | 39°25'46" | 120°34'06" | 6,080 |
| Canyon Creek – below Sawmill Dam | 11414470 | YB-310 | Canyon Creek below Faucherie Lake | 39°26'44" | 120°36'05" | 5,790 |
| Canyon Creek – below Bowman Dam and Bowman-Spaulding Diversion Dam | 11416500 | YB-315 | Canyon Creek below Bowman Lake | 39°26'23" | 120°39'37" | 5,300 |
| Texas Creek – below Texas Creek Diversion Dam | -- | YB-317 | Texas Creek below Texas Creek Diversion Dam | 39°21'20" | 120°39'52" | 5,400 |
| Fall Creek - below Fall Creek Diversion Dam | -- | YB-318 | Fall Creek below Fall Creek Diversion Dam | 39°22'51" | 120°40'52" | 5,350 |
| Rucker Creek - below Rucker Creek Diversion Gate | -- | YB-319 | Rucker Creek below Rucker Creek Diversion Gate | 39°24'17" | 120°40'32" | 5,300 |
| Bear River – below Dutch Flat Afterbay Dam | 11421770 | YB-197 | Bear River below Dutch Flat Afterbay Near Dutch Flat, CA | 39°12'49" | 120°50'39" | 2,600 |

**Table 7. (continued)**

| Location | USGS Gage No. | Licensee Gage No. | Gage Name | Location (Latitude and Longitude) | | Elevation (ft) |
|---|---|---|---|---|---|---|
| Bear River – below Rollins Dam | 11422500 | YB-196 | Bear River below Rollins Dam Near Colfax, CA | 39°30'58" | 120°33'40" | 1,927 |

NID's second measure that pertains to aquatic resources requires NID to maintain a minimum pool at Jackson Meadows Reservoir of not less than 10,000 ac-ft in wet and above normal water years and not less than 3,000 ac-ft in below normal, dry and critically dry years.

The third measure related to aquatic resources is that NID shall, maintain a normal pool in Milton Diversion Dam Impoundment at an elevation of 5,686 feet year around, except when repair to the Milton-Bowman Conduit is necessary, at which time the normal pool may be drawn to a minimum elevation of 5,678 feet.

Per the fourth proposed measure, the Rollins Reservoir minimum pool will be maintained at all times at not less than 5,000 acre-feet, except during Critically Dry Water Years. Faucherie Lake's minimum pool with be maintained at all times at not less than 249 acre-feet, as proposed in the sixth measure for aquatic resources.

The sixth and seventh measures require ND to reimburse CDFG for fish stocking in Bowman Lake and Rollins Reservoir.

Terrestrial Resource Measures

NID proposes six measures to benefit terrestrial resources. The first measure is implementation of an Invasive Species Management Plan. The plan will address the inventory, control and monitoring of target invasive plant and aquatic species on federal lands within the FERC Project Boundary. The second proposed measure is implementation of a Vegetation Management Plan, which deals with routine operation and maintenance requirements for vegetation control near Project facilities and access roads within the FERC Project Boundary, and the protection of sensitive resources and revegetation on federal lands. Both plans are included in Appendix E4 of Exhibit E.

The third measure deals with pesticide and herbicide use on federal lands. During the annual consultation meeting described in General Measures, NID shall submit a request for approval of planned uses of pesticides or herbicides on NFS or BLM lands, as appropriate, for the upcoming year. Excepting in emergency situations, NID will adhere to that schedule and otherwise not use pesticides and herbicides on federal lands without written approval.

The fourth and fifth proposed measures address the loss of wildlife in Project canals. The fourth measure requires NID to consult with the appropriate agencies prior to replacing or retrofitting existing wildlife escape facilities along Project canals on NFS land or public land administered by BLM. The fifth measure requires NID to monitor animal mortality in Project canals, and annually report the results to CDFG, BLM and/or the Forest Service, as appropriate. If there is an increasing trend in animal mortalities, additional measures to address suspected Project-related causes may be developed in consultation with the appropriate agencies. This measure will assure that trends in canal mortality are identified and proper actions will be put in place, if needed.

The sixth proposed measure addresses bat management in Project facilities, requiring, in the first full calendar year after license issuance, documentation of all known bat roosts within Project buildings (e.g., powerhouses, storage buildings valve houses), dams, or other structures. If bats or signs of roosting are present where staff have a routine presence (i.e., at least daily or weekly), NID will attempt, where feasible to place humane exclusion devices to prevent occupation of the structure by bats. NID will consult with the appropriate agencies during this process, including at the annual consultation meeting.

Recreational Resource Measures

NID proposes three measures related to recreational resources. First, NID proposes to implement its Recreation Facilities Plan, which will provide enhanced recreation opportunities and minimize recreation-use impacts to natural, historic, and prehistoric resources within the FERC Project Boundary. The plan is included in Appendix E4 of Exhibit E.

In the second measure, NID will provide real-time flow information via the internet from May 1 through November 30 at ten locations: 1) Jackson Meadows Reservoir; 2) French Lake; 3) Faucherie Lake; 4) Sawmill Lake; 5) Jackson Lake; 6) Bowman Lake; 7) Rollins Lake; 8) Middle Yuba River below Milton Diversion Dam; 9) Canyon Creek below Bowman Dam; and 10) Bear River below Rollins Dam. This information will allow recreationists to better understand whether there are suitable, opportunistic flows for their activities.

For the third proposed measure, NID will provide, in all water year types, a Recreational Streamflow in Canyon Creek below French Dam starting between September 1 and September 30 of each year a target streamflow of between 120 cfs and 150 cfs over a continuous 24-hour period as measured at gage YB-306.

Land Use Resource Measures

NID proposes two measures with regard to land use. The first measure is the implementation of the Transportation Management Plan. The second measure is the implementation of the Fire Prevention and Response Plan on Federal Land. Both plans are included in Appendix E4 of the Exhibit E.

Cultural Resource Measures

NID proposes to implement the Historic Properties Management Plan, which is included in Volume IV of the FLA. The plan has been developed in consultation with SHPO, the Forest Service, BLM and tribes. Specifications are included in the plan to avoid or manage any potential Project-related adverse effects on properties that are unevaluated, eligible for, or listed on the National Register of Historic Places.

Aesthetic Resource Measures

NID proposes one measure related to aesthetic resources, the implementation of a Visual Resources Management Plan on federal land. The plan specifies measures to be taken by NID to mitigate visual impacts and requires NID to consult with the Forest Service or BLM, as appropriate, regarding appropriate visual quality measures. The plan is included in Appendix E4 of Exhibit E.

Economics

In the Exhibit E (Section 7) economic analysis, Licensee provides: annual operations and maintenance costs for the Project; estimated costs for implementing NID's proposed PM&E measures; and the estimated value of developmental resources.

Under NID's Proposed Project, consumptive water deliveries are expected to be unchanged. Currently, NID is expected to experience water delivery shortages in (and following) Critically Dry Water Years. These shortages will also occur in the future, but will not be increased by the Proposed Project. NID's proposed Project dedicates 67,000 ac-ft of water to streamflows as compared to 47,000 ac-ft in existing license. Of this, about 10,000 ac-ft is "lost" to water supply, but almost all occurs in Above Normal and Wet water years when the Project is able to store and convey adequate water for streamflow increase without affecting water supply.

**Exhibit F - Design Drawings**

This exhibit provides 65 design drawings that show the plan, profile, elevation view and cross-sections for each existing Project structure or major facility.

**Exhibit G - Project Maps**

This exhibit contains 27 maps that show the location of and FERC Project Boundary around, existing and proposed Project roads, generation facilities, and transmission and distribution lines.

Existing FERC Project Boundary

The total area within the existing FERC Project Boundary is 6,252.6 acres. The majority of land in the boundary is owned by NID (4,056.3 acres). There are approximately 1,749.3 acres of federal land of which 1,540.8 acres are managed by the Forest Service as part of the Tahoe National Forest, and 208.5 acres are managed by BLM as part of the Sierra Resource Management Area.

Proposed FERC Project Boundary

As a result of NID's proposed changes to the Project as described in Exhibit A, the area within the FERC Project Boundary under the proposed Project is 125.4 acres less than the area within the existing FERC Project Boundary. This includes a decrease of 37.8 acres of federal land, including a decrease of 60.4 acres on Forest Service managed land and an increase of 22.6 acres on BLM administered land.

**Exhibit H - Miscellaneous Filing Materials**

Exhibit H provides additional required information including: 1) a discussion of the coordination of Project operations with other water and electrical systems; 2) a discussion of the need for the electricity generated by the Project; 3) data showing the annual cost of power produced by the Project and alternative sources and cost of alternative power; 4) a statement of need for the proposed Project facilities; 5) a list of studies completed for the proposed developments; 6) a statement of NID's financial and personnel resources; 7) a statement of measures taken or planned to ensure safe management, operation, and maintenance of the Project; 8) a discussion of NID's record of compliance with the terms and conditions of the existing license; and 9) Project operations during flood conditions.

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# <u>Application for a New License Major Project – Existing Dam</u>

## Initial Statement

Yuba-Bear Hydroelectric Project
FERC Project No. 2266-096

Prepared by:
Nevada Irrigation District
1036 West Main Street
Grass Valley, CA 95945
www.nid-relicensing.com

April 2011

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# Initial Statement

## Before The Federal Energy Regulatory Commission

*Application for a New License for a Major Project – Existing Dam*

## 1.0 Introduction

The Nevada Irrigation District (NID, Licensee or Applicant) has prepared this Initial Statement, as part of its Application for a New Major License from the Federal Energy Regulatory Commission (FERC) for the Yuba-Bear Hydroelectric Project (Project), FERC Project No. 2266. This Initial Statement is prepared in conformance with Title 18 of the Code of Federal Regulations (CFR), Subchapter B (Regulations under the Federal Power Act), Part 5 (Integrated Licensing Process). In particular, this Initial Statement conforms to the regulations in 18 CFR § 4.51(a), which pertains to the contents of an Initial Statement, and in 18 CFR § 5.18(a)(5)(iii), which require in part that the Application for a New License include certain general information. This application is being filed under the integrated license process (ILP), as defined by 18 CFR § 5.18.

## 2.0 Applicant and Requested Term of New License

NID formally applies to FERC for a new license for the Yuba-Bear Hydroelectric Project (Project), FERC Project Number 2266, a water power project, as described in this Application for a New License. The initial license for the Project (No. 2266), issued by the Federal Power Commission (FERC's predecessor) to NID on June 24, 1963, was effective on May 1, 1963, for a term ending April 30, 2013.

On November 3, 2008, NID filed with FERC a Notice of Intent to File an Application for a New License for the Project by April 30, 2011. NID proposes to continue operating the Project for the next 50 years with the addition of a new 11.4 megawatt (MW) Rollins Upgrade and the adoption of the 31 resource management measures proposed in its license application. NID requests a new 50-year license for the Project because Licensee anticipates incurring major expenses for construction of the Rollins Upgrade and implementing protection, mitigation, and enhancement measures, including constructing and refurbishing recreation facilities and management of numerous historic properties during the next license term.

## 3.0 Location of the Project

The location of the Project is:

| | |
|---|---|
| State: | California |
| Counties: | Nevada, Placer and Sierra |
| Township or nearby town: | City of Grass Valley |
| Stream or other body of water: | Middle Yuba River; Canyon Creek, Fall Creek, Rucker Creek, and Bear River |

## 4.0 Licensee's Name, Business Address and Telephone Number

The exact name and business address of Licensee is:

Nevada Irrigation District
1036 West Main Street
Grass Valley, CA 95945
Tel: (530) 273-6185

## 5.0 Licensee's Authorized Agent

The exact name, business address and telephone number of the person authorized to act for Licensee as an agent for this Application for a New License are:

Mr. Ron Nelson
General Manager
Nevada Irrigation District
1036 West Main Street
Grass Valley, CA 95945
Tel: (530) 273-6185
nelson@nidwater.com

## 6.0 Licensee's Organizational Status

Licensee is a pubic agency formed pursuant to California State law. Licensee is claiming preference under Section 7(a) of the Federal Power Act.

## 7.0 Pertinent Statutory and Regulatory Requirements of the State of California

The statutory or regulatory requirements of California, the State in which the Project is located, that affect the Project with respect to: 1) bed and banks; 2) appropriation, diversion, and use of water for power purposes; 3) right to engage in the business of developing, transmitting, and distributing power; and 4) any other business necessary to accomplish the purposes of the license under the Federal Power Act, are:

- *California Fish and Game Code § 1601* – Requires that parties notify the California Department of Fish and Game (CDFG) prior to conducting any work in a streambed.
- *California Water Code §101* - Allows for appropriation and use of water for power purposes.
- *California Water Code § 3160; Title 23 California Code of Regulations § 3855* - Regulates the filing and issuance of water quality certificate to applicants otherwise required to obtain such a certificate under federal law.
- *California Water Code § 6102* – Requires owners of dams to cooperate with the California Division of Safety of Dams (CDSOD) in the inspection and maintenance of dams.
- *Division 11 of the California Water Code* - Allows irrigation districts such as NID to engage in the business of developing, transmitting, and distributing electricity.

The steps which Licensee has taken or plans to take to comply with each of the laws cited above are described below.

- Licensee will submit a Section 1601 notification to CDFG should work in a streambed be required.
- Licensee has acquired the water rights necessary to operate the Project.
- Licensee will file an application for a water quality certificate with the State Water Resources Control Board (SWRCB) within 60 days from the date that FERC issues a notice that Applicant's application for new license is ready for environmental analysis [18 CFR § 4.34(b)(5)].
- Licensee cooperates with CDSOD on annual inspections of Project dams.
- Licensee has demonstrated its ability to engage in the business of developing, transmitting, and distributing power under the appropriate California statute.

## 8.0 Proprietary Rights Necessary to Construct, Operate and Maintain the Project

Licensee owns all existing Project facilities and has the necessary proprietary rights, title, and interest in lands and water to operate and maintain the Project. No Project facilities are federally owned or operated.

Licensee will be undertaking the construction of a new powerhouse adjacent to the existing Rollins Powerhouse and the construction of recreation facilities as part of its license proposal. Licensee holds the necessary proprietary rights, title, and interest in lands and water to operate and maintain the proposed new Project facilities.

# 9.0 Counties, Cities, Other Political Subdivisions and Indian Tribes Affected by the Project

The name and mailing address of the counties in which the Project is located are:

County of Nevada
Board of Supervisors
Eric Rood Administrative Center
950 Maidu Avenue
Nevada City, CA 95959-8600

County of Sierra
Board of Supervisors
100 Courthouse Square, Suite 11
Downieville, CA 95936

County of Placer
Board of Supervisors
175 Fulweiler Avenue
Auburn, CA 95603-4543

The Project is not located within any designated cities, towns or subdivisions nor does the Project use any federal or State of California facilities.

The mailing address of cities and towns that have a population of 5,000 or more people and are located within 15 miles of any Project dam include:

City of Grass Valley
Mayor
125 East Main Street
Grass Valley, CA 95945-6506

City of Auburn
Mayor
1225 Lincoln Way
Auburn, CA 95603-5004

Besides NID, no irrigation districts own or operate facilities within the Project. The Project is located within the following irrigation district, drainage district, planning/zoning areas, or similar special purpose political subdivision:

Nevada Irrigation District
1036 West Main Street
Grass Valley, CA 95945-5424

Sierra Nevada Conservancy
Jim Branham, Executive Director
11521 Blocker Drive, Suite 205
Auburn, CA 95603

Nevada County Resource
Conservation District Manager &
Bear River Watershed Coordinator
113 Presley Way, Suite 1
Grass Valley, CA 95945-5846

Placer County Resource
Conservation District
Director
251 Auburn Ravine, Suite 107
Auburn, CA 95603-3719

Nevada County Local Agency
Formation Commission
Executive Officer
950 Maidu Avenue
Nevada City, CA 95959

Placer County Local Agency
Formation Commission
Commission Clerk
145 Fulweiler Ave., Suite 110
Auburn, CA 95603

Nevada City
Mayor
317 Broad Street
Nevada City, CA 95959-2405

City of Colfax
Mayor
P.O. Box 702
Colfax, CA 95713-0702

Sierra County Local Agency
Formation Commission
Executive Officer
P.O. Box 530
Downieville, CA 95936

The Project is not located within any Federal special purpose political subdivision.

No parties divert water directly from the Project facilities and features for irrigation or domestic water uses. However, after water is used for power generation at Project facilities, water may be diverted downstream for other uses such as power, irrigation, domestic water supply and recreation.

In addition to the parties noted above, Licensee has reason to believe that the following political subdivisions in the general area of the Project would likely be interested in or affected by this relicensing:

Yuba County Board of Supervisors
Yuba County Government Center
915 8th Street, Suite 109
Marysville, CA 95901

Yuba County Water Agency
General Manager
1220 F Street
Marysville, CA 95901

Placer County Water Agency
General Manager
PO Box 6570
Auburn, CA 95604-6570

City of Marysville
Mayor
P.O. Box 150
Marysville, CA 95901-0150

City of Lincoln
Mayor
600 Sixth Street
Lincoln, CA 95648-1878

City of Rocklin
City Manager
3970 Rocklin Road
Rocklin, CA 95677-2720

Town of Loomis
Mayor
3665 Taylor Road
Loomis, CA 95650

City of Roseville
Mayor
311 Vernon Street
Roseville, CA 95678-2649

South Sutter Water District
2464 Pacific Avenue
Trowbridge, CA 95659-9604

Indian tribes that may be affected by the Project include:

Colfax-Todds Valley Consolidated Tribe
Lavina Suehead, Chairperson
P.O. Box 4884
Auburn, CA 95604

Tsi-Akim Maidu
Don Ryberg, Chair
Grayson Coney, Cultural Director
P.O. Box 1316
Colfax, CA 95713-1316

Greenville Rancheria of Maidu Indians
Kyle Self, Chairperson
P.O. Box 279
410 Main Street
Greenville, CA 95947-0279

Shingle Springs Band of Miwok Indians
Nicholas Fonseca, Chairperson
P.O. Box 1340
Shingle Springs, CA 95682-1340

United Auburn Indian Community
Of the Auburn Rancheria
David Keyser, Chairperson
Marcos Guerrero
10720 Indian Hill Road
Auburn, CA 95603

Tsi-Akim Maidu
Eileen Moon, Vice Chairperson
1275 East Main Street
Grass Valley, CA 95945

Maidu Cultural and Development Group
Warren Gorbet, Chairperson
Lorena Gorbet
P.O. Box 458
Greenville, CA 95947

Mechoopda Indian Tribe of Chico
Rancheria
Dennis Ramirez, Chairperson
Mike DeSpain, OEPP Director
125 Mission Ranch Road
Chico, CA 95926

Washoe Tribe of Nevada & California
Wanda Batchelor, Chairperson
Darrel Cruz, Cultural/THPO
919 U.S. Highway 395 South
Gardnerville, NV 89410-8968

Todds Valley Miwok-Maidu Cultural
Foundation
John Boche, Chairperson
PO Box 4884
Auburn, CA 95604

Maidu/Miwok
Rose Enos
15310 Bancroft Road
Auburn, CA 95603-8464

Nisenan/Maidu
April Moore
19630 Placer Hills Road
Colfax, CA 95713-9617

Pakan-Yani Band of Strawberry Valley Rancheria
Cathy Bishop, Chairperson
P.O. Box 667
Marysville, CA 95901

Pakan-Yani Band of Strawberry Valley Rancheria
Chris Logan
P.O. Box 667
Marysville, CA 95901

Pakan-Yani Band of Strawberry Valley Rancheria
Pearl Wagner, Representative
2594 C Street
Oroville, CA 95960-6525

Nevada City Rancheria
Richard Johnson, Chairperson
Virginia Covert, Vice Chair
P.O. Box 825
Nevada City, CA 95959

Licensee will include the parties above on the Yuba-Bear Hydroelectric Project relicensing Contact List, and will make a copy of this Application for a New License, including Exhibit G maps, available to each party listed above.

## 10.0 Federal, State and Local Agencies That May Be Interested in the Project

Licensee believes the following federal, State of California, and local agencies might be interested in the Yuba-Bear Hydroelectric Project relicensing. By including this list here, Licensee does not imply that each of these agencies will be interested in the Yuba-Bear Hydroelectric Project relicensing, or agencies not included in this list would not be interested in the relicensing.

Federal Agencies

Tahoe National Forest
Forest Supervisor
631 Coyote Street
Nevada City, CA 95959-2250

U. S. Fish and Wildlife Service
Branch Chief – Energy and Power
2800 Cottage Way, Suite W-2605
Sacramento, CA 95825-1846

U. S. Army Corps of Engineers
Chief – Regulatory Branch
Sacramento District
1325 J Street
Sacramento, CA 95814-2922

NOAA Fisheries Service
Southwest Region
501 West Ocean Blvd.
Long Beach, CA 90802

National Park Service
Outdoor Recreation Planner
600 Harrison Street, Suite 600
San Francisco, CA 94107-1390

U. S. Forest Service
Regional Hydropower Assistance Team
650 Capitol Mall, Suite 8-200
Sacramento, CA 95814-4700

U.S. Environmental Protection Agency
Regional Director
Pacific Southwest Regional Office
75 Hawthorne Street
San Francisco, CA 94105-3922

U.S. Bureau of Indian Affairs
Area Director
Regional Office
2800 Cottage Way
Sacramento, CA 95825-1885

Federal Emergency Management Agency
Mr. Gregor Blackburn - Mitigation
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

Advisory Council on Historic Preservation
Office of Federal Agency Programs
1100 Pennsylvania Ave., Suite 803
Washington, D.C. 20004

U. S. Bureau of Land Management
James Eicher
Mother Lode Office
5152 Hillsdale Circle
El Dorado Hills, CA 95762

U.S. Fish and Wildlife Service
Mike Healy, Habitat Restoration Coord.
4001 North Wilson Way
Stockton, CA 95205-2486

U. S. Bureau of Reclamation
Director
South-Central California Area Office
1243 N Street
Fresno, CA 93721-1813

California Bay-Delta Authority
Upper Yuba River Studies Program
Program Manager
650 Capital Mall, Fifth Floor
Sacramento, CA 95814-95814

U.S. Geological Survey
California Water Science Center
Director
6000 J Street, Placer Hall
Sacramento, CA 95819-2605

State of California Agencies

California Department of Boating and Waterways
Director
2000 Evergreen Street, Suite 100
Sacramento, CA 95815

California Department of Transportation
CALTRANS
Director – District 10
P.O. Box 2048
Stockton, CA 95201

Regional Water Quality Control Board
Central Valley Region
Executive Officer
11020 Sun Center Drive, #200
Sacramento, CA 95670-3888

State Water Resources Control Board
Section 401 Coordinator
1001 I Street
P. O. Box 2000
Sacramento, CA 95812-2048

California Department of
Water Resources
1416 Ninth Street, 11th Floor
P.O. Box 942836
Sacramento, CA 95814-5511

California Department of Parks
and Recreation
Office of Historic Preservation
Milford Wayne Donaldson, SHPO
1725 23rd St., Suite 100
Sacramento, CA 95816

California Department of Forestry
and Fire Protection
Northern Region HQ/OPS
6105 Airport Rd.
Redding, CA, 96002

California Department of Fish and Game
MaryLisa Lynch
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670-4503

California Department of Fish and Game
Ann Manji, FERC Projects Coordinator
601 Locust St.
Redding, CA 96001

Local Agencies

Nevada County Planning Department
Janet Hayes
950 Maidu Avenue
Nevada City, CA 95959

Sierra County Department of Planning
Tim Beals, Director
P.O. Box 530
Downieville, CA 95936

Placer County Planning Department
Mr. Paul Thompson
Planning Services Manager
3091 County Center Drive, Suite 140
Auburn, CA 95603

Licensee will include the parties above on the Yuba-Bear Hydroelectric Project relicensing Contact List, and will make a copy of this Application for a New License, including Exhibit G maps, available to each party listed above.

# 11.0 Businesses, Non-Governmental Organizations and Members of the Public That May Be Interested in the Project

For informational purposes, Licensee provides to FERC the following list of businesses, non-governmental organization (NGOs) and members of the public that have specifically asked Licensee to include them on the Yuba-Bear Hydroelectric Project relicensing Contact List, or Licensee has reason to believe that the party would likely be interested in the relicensing. By including this list here, Licensee does not imply that each of these businesses, NGOs and members of the public will be interested in the Yuba-Bear Hydroelectric Project relicensing, or businesses, NGOs or members of the public not included in this list would not be interested in the relicensing.

Pacific Gas and Electric Company
Director, Hydro Relicensing
David Moller
Mail Code N11D
245 Market Street, Rm. 1147
San Francisco, CA 94105-0001

Natural Heritage Institute
Director of NHI Legal Services
Richard Roos-Collins
100 Pine Street, Suite 1550
San Francisco, CA 94111

American Whitewater
Conservation Director
Dave Steindorf
4 Baroni Drive
Chico, CA 95928-4314

California Hydropower Reform Coalition
Director
Keith Nakatani
436 14th Street, Suite 801
Oakland, CA 94612-2726

California Sportfishing
Protection Alliance
Jim Crenshaw, President
1360 Neilson Street
Berkeley, CA 94702-1116

California Trout
Jeff Thompson, Executive Director
870 Market Street, Suite 528
San Francisco, CA 94102-3023

Friends of the River
Ron Stork, Senior Policy Advocate
1418 20th Street, Suite 100
Sacramento, CA 95811

Trout Unlimited
Chuck Bonham, Director
2239 5th Street
Berkeley, CA 94710

Foothill Water Network
Coordinator
Julie Leimbach
P.O. Box 713
Lotus, CA 95651-0713

Sierra Nevada Alliance
Executive Director
Joan Clayburgh
P.O. Box 7989
South Lake Tahoe, CA 96158-7989

American Rivers
Associate Director, Dam Programs
Steve Rothert
432 Broad Street
Nevada City, CA 95959

South Yuba River Citizens League
Executive Director
Jason Rainey
216 Main Street
Nevada City, CA 95959-2509

Sierra Club
Mother Lode Chapter
Barbara Williams, Chair
801 K Street, Suite 2700
Sacramento, CA 95814-2700

Environmental Defense Fund
Cynthia Koehler, Senior Attorney
California Regional Office
123 Mission Street, 28th Floor
San Francisco, CA 94105-1551

Environmental Advocates
Chris Sproul
5135 Anza Street
San Francisco, CA 94121

Federation of Fly Fishers
Northern California Council
Frank Rinella
P.O. Box 1017
Meadow Vista, CA 95722-1017

Granite Bay Flycasters
Heath Wakelee
4155 Tahoe Vista Dr.
Rocklin, CA 95765-5089

Ophir Area Property Owners Assoc.
Ron Otto
P.O. Box 752
Newcastle, CA 95658-0752

Sierra Nevada Conservancy
Jim Branham, Executive Director
11521 Blocker Dr. Suite 205
Auburn, CA 95603-4654

Hooked Up
Tyrone Gorre
P.O. Box 1538
Meadow Vista, CA 95722

Bill Jacobson
Sierra Salmon Alliance
17069 Vintage Drive
Grass Valley, CA 95949

Licensee will include the parties above on the Yuba-Bear Hydroelectric Project relicensing Contact List, and will make a copy of this Application for New License, including Exhibit G, available to each party listed above.

## 12.0 Readily Accessible, Reviewable and Reproducible Information

This Application for a New License as well as other information required under 18 CFR § 5.2 and § 16.7 is available to businesses, NGOs and members of the public for inspection, review and reproduction (at a reasonable cost of reproduction and postage) during regular business hours (8:00 a.m. - 5:00 p.m., Monday through Friday) at Licensee's place of business; that is:

Nevada Irrigation District
1036 West Main Street
Grass Valley, CA 95945

The public is instructed to contact Mr. Ron Nelson or his designee by telephone at (530) 273-6185 to make an appointment to review the information.

A copy of this Application for a New License is also available at the following public libraries in the Project region:

Nevada County Public Library
Grass Valley Library - Royce Branch
207 Mill Street
Grass Valley, CA 95945-6711

Nevada County Public Library
Madelyn Helling Library
980 Helling Way
Nevada City, CA 95959-8619

Placer County Public Library
350 Nevada Street
Auburn, CA 95603-3720

Yuba County Public Library
303 2nd Street
Marysville, CA 95901-6011

In addition, in conformance with 18 CFR § 5.2 and to facilitate the distribution of documents and information regarding the Yuba-Bear Hydroelectric Project relicensing, Licensee maintains a Yuba-Bear Hydroelectric Project Relicensing Website at www.nid-relicensing.com. Information and relicensing documents (except for excessively large documents), including this Application for a New License, are available in portable document format (.PDF) on the Website.

## 13.0 Notice of Availability of Application

As required by 18 CFR § 4.32 (b)(6), Licensee will publish a notice of the availability of this Application for a New License twice within 14 days of the date it is filed with FERC in the following newspapers of general circulation:

The Union
464 Sutton Way
Grass Valley, CA 95945

Auburn Journal
P.O. Box 5910
Auburn, CA 95604

Appeal-Democrat
P.O. Box 431
Marysville, CA 95901

The Mountain Messenger
313 Main
Downieville, CA 95936

A copy of the draft publication is attached. Licensee will promptly file with FERC proof of publication.

# 14.0 Exhibits

The Exhibits that are filed as part of this Application for a New License for Major Project – Existing Dam are:

- Exhibit A – Project Description
- Exhibit B – Project Operations and Resource Utilization
- Exhibit C – Construction History and Proposed Construction Schedule
- Exhibit D – Statement of Costs and Financing
- Exhibit E – Environmental Report
- Exhibit F – General Design Drawings
- Exhibit G – Project Maps
- Exhibit H – Miscellaneous Material

The foregoing Initial Statement and exhibits listed above are hereby made part of this Application for a New License for Major Project – Existing Dam.

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## SUBSCRIPTION AND VERIFICATION

This Application For a New License is executed in the State of California, City of Grass Valley, and County of Nevada by Ron Nelson, General Manager of the Nevada Irrigation District, 1036 West Main Street, Grass Valley, CA 95945-5424, being first duly sworn, deposes and says that the contents of this application for new license are true to the best of his knowledge or belief, and signs the application this 13TH day of April 2011.

NEVADA IRRIGATION DISTRICT

By: Ron Nelson
Ron Nelson, General Manager

Subscribed and sworn to before me, a Notary Public of the State of California, this ____ day of April 2011.

______________________________
Notary Public
in and for the County of Nevada,
State of California

My commission expires ____________________

Please see attached California All-Purpose Acknowledgment Form

{SEAL}

# CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

State of California

County of NEVADA

On APRIL 13, 2011 before me, LISA FRANCIS TASSONE, NOTARY PUBLIC
Date — Here Insert Name and Title of the Officer

personally appeared RON NELSON
Name(s) of Signer(s)

LISA FRANCIS TASSONE
Commission # 1799476
Notary Public - California
Nevada County
My Comm. Expires May 27, 2012

Place Notary Seal Above

who proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity~~(ies)~~, and that by his/~~her/their~~ signature~~(s)~~ on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Lisa Francis Tassone
Signature of Notary Public

## OPTIONAL

*Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.*

### Description of Attached Document

Title or Type of Document: ______

Document Date: ______ Number of Pages: ______

Signer(s) Other Than Named Above: ______

### Capacity(ies) Claimed by Signer(s)

Signer's Name: ______
- ☐ Individual
- ☐ Corporate Officer — Title(s): ______
- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
Top of thumb here

Signer's Name: ______
- ☐ Individual
- ☐ Corporate Officer — Title(s): ______
- ☐ Partner — ☐ Limited ☐ General
- ☐ Attorney in Fact
- ☐ Trustee
- ☐ Guardian or Conservator
- ☐ Other: ______

Signer Is Representing: ______

RIGHT THUMBPRINT OF SIGNER
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# ATTACHMENT 1

## Draft Public Notice to Be Placed by Licensee in Local Periodicals Twice within 14 days of Licensee Filing the Application with FERC

**Announcement of Filing of Application**
**Before the Federal Energy Regulatory Commission**
**for a New License Major Project – Existing Dam**
**for the**
**Yuba-Bear Hydroelectric Project**

Nevada Irrigation District (NID) owns and operates the Federal Energy Regulatory Commission (FERC)-licensed Yuba-Bear Hydroelectric Project, a water power project in Nevada, Placer and Sierra counties, California, on the Middle Yuba River, Canyon Creek, Fall Creek, Rucker Creek and Bear River. The Project is composed of four developments - Bowman, Dutch Flat, Chicago Park and Rollins. The current FERC license for the Project expires on April 30, 2013.

On April ***[to be completed]*** 2011, NID applied to FERC for a New License for a Major Project - Existing Dam. The application describes the Project facilities, Project operation, estimated costs related to continued operations, and general information. The application also includes a description of environmental and recreational resources in the vicinity of the Project; an assessment of potential adverse environmental impacts associated with continued Project operation and maintenance; and NID's proposed resource management measures to protect and enhance environmental and recreation resources, and mitigate any Project impacts.

As required by 18 CFR § 4.32(b)(6), at this time NID announces the availability for inspection and reproduction of the application. The application has been made available in electronic format to pertinent resource agencies and Native American Tribes, and a paper copy is available for inspection and reproduction during regular business hours at the public libraries in Grass Valley, Nevada City, Auburn and Marysville and at NID's office at 1036 West Main Street, Grass Valley, CA (tel: 530 273-6185). A copy of the application may also be obtained upon request from NID after reasonable reimbursement to NID for postage and reproduction.

Upon acceptance for filing, FERC will publish subsequent notices soliciting additional pubic participation.

Questions regarding this notice should be addressed to Ron Nelson, General Manager, NID, at (530) 273-6185.

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# GLOSSARY - DEFINITION OF TERMS, ACRONYMS AND ABBREVIATIONS

| Term | Definition |
|---|---|
| **A** | |
| A | Ampere |
| ac | acre |
| ac-ft | acre-feet or acre-foot, the amount of water needed to cover one acre, to a depth of one foot (43,560 cubic feet, or 325,900 gallons). |
| accretion flow | The incremental flow between two points. Also known as local inflow. |
| ACHP | Advisory Council on Historic Preservation |
| ADA | Americans with Disabilities Act |
| adit | An almost vertical pipe or short horizontal passage, entering a tunnel, either to add water from a conduit, sluice, or other water source, or, as a maintenance access tunnel (also referred to as a portal). |
| afterbay | A reservoir located immediately downstream from a powerhouse, sometimes used to re-regulate flows to the river or stream. |
| AGC | Automatic Generation Control, used to support California electric regulation system. |
| AIR | Additional Information Request, issued by FERC. |
| anabat | An electronic instrument used to detect and record high frequency vocalization of bats. |
| annual maintenance | Work performed to maintain serviceability, or repair failures, during the year in which they occur. This includes preventive and/or cyclic maintenance, performed in the year in which it is scheduled to occur. Unscheduled or catastrophic failures of components or assets may need to be repaired as a part of annual maintenance. There are three types of annual maintenance actions:<br>*Repair.* Work to restore a damaged, broken, or worn-out fixed asset, component, or item of equipment, to normal operating condition. Repairs may be done as annual maintenance or deferred maintenance activities<br>*Preventive Maintenance.* Scheduled servicing, repairs, inspections, adjustments, and replacement of parts that result in fewer breakdowns and fewer premature replacements, and help achieve the expected life of the fixed asset. Inspections are a critical part of preventive maintenance, as they provide the information for scheduling maintenance and evaluating its effectiveness.<br>*Cyclic Maintenance.* Preventive maintenance activities that recur on a periodic and scheduled cycle. Typical cyclic maintenance includes re-roofing or repainting buildings, or refinishing signs. Cyclic maintenance schedules are normally adjusted, depending upon the condition of the component or asset. If a roof has reached the scheduled time of replacement, but has remaining useful life, the maintenance may be delayed to utilize additional life. |
| APE | Area of Potential Effect, as pertaining to Section 106 of the National Historic Preservation Act. |
| AR | American Rivers |
| automatic/semi-automatic/manual powerhouses | An automatic powerhouse can be started, stopped, and have its load and voltage changed, from a remote or master station, via supervisory control. A semi-automatic powerhouse, with SCADA, may allow a remote station to change load and/or voltage, and may allow a remote shutdown, but must be started manually. A semi-automatic powerhouse, without SCADA, will send alarms to a remote or master station. A manual powerhouse must have all its functions performed at the powerhouse. |
| AW | American Whitewater |
| **B** | |
| BA | Biological Assessment |
| BAOT | Boats at one time |
| Base-loaded | Generation around-the-clock |
| Basin Plan | The RWQCB Water Quality Control Plan for the Sacramento and San Joaquin rivers. |
| BC | Before Christ |
| BDAC | Bay-Delta Advisory Committee |
| BEPA | Bald Eagle Protection Act |

## Glossary. (continued)

| Term | Definition |
|---|---|
| **B (continued)** | |
| Black Start Capability | The ability of a unit to start up, without the use of an external transmission or distribution voltage power source |
| BLM | U.S. Department of the Interior, Bureau of Land Management |
| BMI | Benthic Macroinvertebrates |
| BMP | Best Management Practice |
| BO | Biological Opinion |
| BOD | Biochemical Oxygen Demand |
| BOR | U.S. Department of the Interior, Bureau of Reclamation |
| BP | Before Present |
| bypass flow | Bypass flows (cfs) are those flows that are required to be released into a stream. |
| **C** | |
| C | Celsius |
| CAA | Clean Air Act |
| CALFED | An interagency committee with management and regulatory responsibility for the Bay-Delta Estuary. |
| Cal-IPC | California Invasive Plant Council |
| CalTrans | California Department of Transportation |
| capital improvement | The construction, installation, or assembly of a new fixed asset, or the significant alteration, expansion, or extension of an existing fixed asset, to accommodate a change of purpose. |
| CDBAW | California Department of Boating and Waterways |
| CDEC | California Data Exchange Center |
| CDF | California Department of Forestry and Fire Protection |
| CDFA | California Department of Food and Agriculture |
| CDFG | California Department of Fish and Game |
| CDPR | California Department of Parks and Recreation |
| CD-ROM | Compact Disc-Read-Only Memory |
| CDSOD | California Division of Safety of Dams, within the CDWR |
| CDWR | California Department of Water Resources |
| CEC | California Energy Commission |
| CEQA | California Environmental Quality Act |
| CESA | California Endangered Species Act |
| CFR | Code of Federal Regulations |
| cf or $ft^3$ | cubic feet |
| cfs | cubic feet per second. One cfs equals approximately 1.98 ac-ft per day. |
| CHRIS | California Historical Resources Information Center |
| cm | Centimeter |
| CNDDB | California Natural Diversity Data Base |
| CNPPA | California Native Plant Protection Act |
| CNPS | California Native Plant Society |
| CNPS-1A | Plant presumed by the CNPS to be extinct in California. |
| CNPS-1B | Plant considered by the CNPS as rare or endangered in California and elsewhere. |
| CNPS-2 | Plant considered by the CNPS as rare or endangered in California, but more common elsewhere. |
| CNPS-3 | Plant that requires more information by the CNPS before assigning to other lists. |
| CNPS-4 | Plant considered by the CNPS as a plant of limited distribution. |
| COE | U.S. Department of Defense, Army Corps of Engineers |
| Commission | Federal Energy Regulatory Commission; also referred to as FERC. |
| component | A named data set in an operation model that is a building block for a condition. |

## Glossary. (continued)

| Term | Definition |
|---|---|
| **C (continued)** | |
| conceptual design for recreation facilities | A conceptual design is the designer's initial communication to convey proposed design solutions. Conceptual designs for a facility may consist of diagrammatic sketches, bubble diagrams, line diagrams, preliminary floor plans, or renderings. A conceptual design is prepared prior to a site development plan. (Forest Service Handbook 7309.11, Chapter 30.) |
| condition | The main building block of a scenario, containing the data used by the operation model to simulate the system. At this time, the only condition defined by components is 'Turbine Generator.' |
| conduit | A pipe, flume, or canal used for diverting or moving water from one point to another, usually used when there is no existing streambed or waterway. |
| Control Area | An electric system, bounded by interconnection metering and telemetry, capable of controlling generation to maintain its interchange schedule with other control areas, and contributing to frequency regulation of the interconnection. A Control Area operates its AGC on a tie-line frequency bias. |
| CORP | California Outdoor Recreation Plan |
| CPUC | California Public Utility Commission |
| CRLF | California red-legged frog |
| CRMP | Cultural Resource Management Plan |
| CSBP | California Stream Bioassessment Procedure |
| CSPA | California Sportfishing Protection Alliance |
| CRWQCB | California Regional Water Quality Control Board |
| CSC | California Special Concern Species, an administrative designation by CDFG. |
| cu yd or $yd^3$ | cubic yard |
| CVP | Federal Central Valley Project |
| CVPIA | Central Valley Project Improvement Act |
| CVRWQCB | Central Valley Regional Water Quality Control Board |
| CWA | Clean Water Act |
| CWHR | California Wildlife Habitat Relationships System |
| CZMA | Coastal Zone Management Act |
| **D** | |
| Dam Base Width or DBW | The width of a dam at its widest point along the foundation. |
| Dam Crest Elevation or DCE | The elevation of a dam at its lowest point along the crest. |
| Dam Crest Width or DCW | The width of a dam at its crest. |
| dam fish release requirement | The flow that must be released to the stream downstream of the dam; also known as minimum streamflow release requirement, or bypass flow. |
| Dam Height or DH | The height of the dam, from the dam crest (top of dam) to the stream channel at the downstream toe of the dam. |
| Dam Low Level Outlet Control | The type of gate and/or valve that controls the release, from the low level outlet. |
| Dam Low Level Outlet Type | A description of the low level outlet facilities. |
| Dam Max Low Level Outlet Capacity | The flow that can be discharged through the low level outlet at the normal maximum water surface. |
| Dam Max Spillway Discharge | The maximum flow the spillway can pass, with the water surface at the crest of the dam. |
| Dam Slope – Upstream Face | The slope of the upstream face of the dam. |
| Dam Slope – Downstream Face | The slope of the downstream face of the dam. |
| Dam Spillway Control | The type of device that controls the spillway. |
| Dam Spillway Crest Elevation | The elevation of the lowest point of the spillway. |
| Dam Spillway Type | The type of spillway. |
| Dam Type | A description of the type of dam. |
| Dam Year Placed in Service | The first calendar year water was impounded behind the dam. |
| dbh | diameter at breast height |
| DEA | Draft Environmental Assessment |

## Glossary. (continued)

| Term | Definition |
|---|---|
| **D (continued)** | |
| decommission | Demolition, dismantling, removal, obliteration, and/or disposal of a deteriorated or otherwise unneeded asset or component, including necessary cleanup work. This action eliminates maintenance needs for the fixed asset. Portions of an asset or component may remain, if they do not cause problems or require maintenance. |
| deferred maintenance | Maintenance that was not performed when it should have been, or when it was scheduled, and which, therefore, was put off or delayed for a future period. There are three types of deferred maintenance actions:<br>*Repair*. Work to restore a damaged, broken, or worn-out fixed asset, component, or item of equipment to normal operating condition. Repairs may be done as annual maintenance or deferred maintenance activities.<br>*Rehabilitation*. Renovation or restoration of an existing fixed asset, or any of its components, in order to restore the functionality, or life, of the asset. Because there is no significant expansion or change of purpose for the fixed asset, the work primarily addresses deferred maintenance.<br>*Replacement*. Substitution or exchange of an existing fixed asset or component, with one having essentially the same capacity and purpose. Replacement eliminates deferred maintenance needs for the replaced fixed asset or component. The decision to replace a fixed asset or component is usually reached when replacement, rather than repair or rehabilitation, is more cost effective, more environmentally sound, or in the best interest of the government. The size or capacity of the existing fixed asset is not significantly expanded in a replacement. Replacement of an asset or component usually occurs when it nears or has exceeded its useful life. |
| ° | Degree(s) |
| DEIS | Draft Environmental Impact Statement |
| DEM | Digital Elevation Model. The format of the USGS digital elevation data sets, containing elevation values primarily derived from the USGS topographic map series. |
| dependable capacity | The maximum dependable output (in units of power, e.g., MW) of a generator or a group of generators under a combination of adverse hydrologic conditions and high electrical demand. |
| discharge | water released by a plant |
| Dispatch | Given performance data for a specific plant, a calculation that determines the most efficient way to divide flow among the units in many powerhouses. |
| distribution system | The substations, transformers, and lines that convey electricity from high-power transmission lines to the consumer. Usually 115 kV and lower voltage. |
| DLA | Draft License Application |
| DO | Dissolved oxygen |
| DOC | Dissolved organic carbon |
| Draft EA | Draft Environmental Assessment |
| Draft EIR | Draft Environmental Impact Report |
| **E** | |
| EA | Environmental Assessment |
| EAP | Emergency Action Plan |
| ECPA | Electric Consumers Protection Act |
| EFH | Essential Fish Habitat |
| EIA | Energy Information Administration |
| EIR | Environmental Impact Report |
| EIS | Environmental Impact Statement |
| El. | Elevation |
| EPT | Orders of benthic insects: Ephemeroptera, Plecoptera, and Tricoptera |
| ESA | Federal Endangered Species Act |
| ESU | Evolutionarily significant unit |
| EVC | Existing Visual Condition |
| Exhibit E | The portion of an application for a new license that addresses environmental effects of the proposed Project. |

**Glossary. (continued)**

| Term | Definition |
|---|---|
| **F** | |
| 401 Certification | Water quality certification issued by the SWRCB, the California agency responsible for administering Section 401 of the Clean Water Act. |
| F | Fahrenheit |
| FAC | Federal Advisory Committee |
| FACA | Federal Advisory Committee Act |
| FARM | Framework for Archaeological Research and Management of Forests of the North Central Sierra Nevada |
| FC | Federal Candidate Species, a species or subspecies currently proposed as a candidate for listing under the ESA. |
| FE | A species or subspecies listed as endangered under the Federal Endangered Species Act. |
| FEA | Final Environmental Assessment |
| FESA | Federal Endangered Species Act |
| FEMA | Federal Emergency Management Agency |
| FEPD | A federally-listed endangered species currently proposed for delisting from the ESA. |
| FERC | Federal Energy Regulatory Commission, or Commission |
| FERC Project Boundary | The area surrounding Project facilities and features, as delineated in Exhibit G or K of the FERC license, which is required for the normal operation and maintenance of the Project. |
| FGDC | Federal Geographic Data Committee. Promotes the coordinated development, use, sharing, and dissemination of geographic data. |
| FHSA | Federal Historic Sites Act |
| FHWA | Federal Highway Administration |
| fixed asset | A constructed feature, such as a building, road, campground, trail, or other item of infrastructure. Real property improvements. Facilities in the general sense. |
| fixed asset component | A subsystem, major item of equipment, or other portion of a fixed asset. Examples of components include: roof for a building, deck for a bridge, pavement for a road, interpretive kiosk at a viewing area, and site furnishings (tables, grills, etc.) at a campground. |
| flashboards | Removable boards installed seasonally in reservoir spillways, to temporarily increase storage capacity. |
| flood elevation | The reservoir elevation at which the plant's reservoir spills. |
| FLPMA | Federal Land Policy and Management Act |
| flume | A lined structure, commonly made of wood, metal or concrete, used for conveyance of water, usually where no streambed exists or the topography is not suitable for a canal or tunnel. |
| FMP | Fire Management Plan |
| FMU | Fire Management Unit |
| forebay | A reservoir upstream from the powerhouse, from which water is drawn into a tunnel or penstock, for delivery to the powerhouse. |
| Forest Service | United States Department of Agriculture, Forest Service |
| FOW | Forced Oil and Water Cooled |
| FP | A species or subspecies designated as "fully protected" under the CDFG Code. |
| FPA | Federal Power Act |
| FPD | Federal Proposed Delisting, a federally listed species currently proposed for delisting from the ESA. |
| fps | feet per second |
| FPT | A species or subspecies proposed for listing, as either threatened or endangered, under the Federal Endangered Species Act. |
| Francis Turbine | A radial-inflow reaction turbine, where flow through the runner is radial to the turbine shaft. |
| Frequency Regulation | The ability of a Control Area to assist the interconnected system in maintaining scheduled frequency. |
| FSC | Federal Species of Concern. An administrative designation by USFWS (former category 2 species). |
| FSM | Forest Service Manual |
| FSS | A species or subspecies designated as "sensitive" by the USFS. |

**Glossary. (continued)**

| Term | Definition |
|---|---|
| **F (continued)** | |
| FSV | A species designated by the Sierra Nevada Framework, as moderate to high vulnerability, and species of concern. |
| FT | A species or subspecies listed as threatened, under the Federal Endangered Species Act. |
| ft | foot or feet |
| FTPD | A federally listed, threatened species, currently proposed for delisting from the ESA. |
| FWCA | Fish and Wildlife Coordination Act |
| FYLF | Foothill yellow-legged frog |
| **G** | |
| G | Giga |
| g | Gram |
| gate leakage | The amount of water that leaks through the wicket gates for each unit when the gates are closed. |
| generator | A machine powered by a turbine that converts rotating mechanical energy into electrical potential. |
| GIS | Geographic Information System |
| GMP | General Management Plan |
| gpd | gallons per day |
| gpm | gallons per minute |
| GPS | Global Positioning System |
| grizzly | A metal grating across the entry to a water conduit |
| gross head | The difference between the headwater elevation and the tailwater elevation. |
| GWh | Gigawatt hour (equals one million kilowatt hours) |
| **H** | |
| H | Horizontal |
| "H"-frame structure | A wood pole transmission structure that consists of two wood poles with a horizontal cross arm above the conductor. |
| HA | Commercially or recreationally harvested species; a non-protected species. |
| HABS | Historic American Building Survey |
| HABTAT | IFIM simulation model |
| HAER | Historic American Engineering Record |
| HCP | Habitat Conservation Plan |
| head | The vertical height of water that represents potential energy. |
| head loss | The amount of head that is lost (to friction, etc.) between the headwater (reservoir/forebay/intake) and the tailwater. |
| HEC-ResSim | U.S. Army Corps of Engineers — Hydrologic Engineering Center (USACE-HEC) Reservoir Simulation (HEC-ResSim) model, Version 3.0. Also referred to as ResSim. |
| HEP | Habitat Evaluation Procedures |
| HLCTS | Hydropower License Compliance Tracking System |
| hp | horsepower |
| HPMP | Historic Properties Management Plan |
| hr | Hour |
| HREZ | Heritage Resource Emphasis Zones |
| HRMA | Heritage Resource Management Area |
| HSC | Habitat Suitability Criteria |
| HSI | Habitat Suitability Indices |
| HUC | Hydrologic unit codes developed by the Water Resources Council, corresponding to hierarchal classification of hydrologic drainage basins in the United States. Each hydrologic unit is identified by a unique hydrologic unit code. |
| HVAC | Heating Ventilation and Air Conditioning System |
| Hz | hertz (cycles per second) |

**Glossary. (continued)**

| Term | Definition |
|---|---|
| **I** | |
| ICD | Initial Consultation Document, also known as PAD |
| IFIM | USFWS Instream Flow Incremental Methodology |
| IHA | Indicators of Hydrologic Alteration |
| ILP | Integrated Licensing Process |
| Immediate Vicinity | The area extending to about one mile out from a Project feature. |
| In. | Inch |
| inflow | The flow water entering a plant's reservoir. |
| Initial License | The first license for a project issued by FERC. |
| Installed capacity | The nameplate MW rating of a generator or group of generators. |
| Interchange | Electric power that flows from one entity to another. |
| Interested Parties | All governmental agencies, non-governmental organizations, Native American tribes, and unaffiliated members of the public that routinely participate in FERC relicensings in California, or that have advised NID and/or PG&E that they wish to become involved in one or more of the relicensing proceedings. NID and PG&E are considered Interested Parties. |
| ISO | California Independent System Operator |
| ITA | Indian Trust Asset |
| **J** | |
| **K** | |
| K | kilometer; 1,000 meters |
| Kcfs | thousand cubic feet per second |
| Kg | kilogram; 1,000 grams |
| kg/day | kilograms per day |
| kg/ha | kilograms per hectare |
| kg/yr | kilograms per year |
| km | kilometer |
| kV | Kilovolt; 1,000 volts |
| kVA | kilovolt amperes |
| KVP | Key View Point |
| kW | kilowatt; 1,000 watts |
| kWh | kilowatt-hour; 1,000 watt hours |
| **L** | |
| L | Liter |
| lb | Pound |
| LCMMP | Land Coordinated Mapping and Monitoring Program |
| LEO | Law Enforcement Officer |
| level | reservoir surface elevation |
| level fluctuation | The change in reservoir surface elevation. |
| level fluctuation limits | A constraint specifying the number of feet allowed between the maximum elevation and minimum elevation achieved each day. |
| level fluctuation rates | A constraint specifying the maximum allowable rate of elevation change for the reservoir. |
| License Application | Application for a new license; submitted to FERC no less than two years in advance of expiration of an existing license. |
| Licensee | Either Nevada Irrigation District if the term is used in the Yuba-Bear Hydroelectric PAD, or Pacific Gas and Electric Company if the term is used in the Drum-Spaulding Project PAD or the Rollins Transmission Line Project PAD. |
| Licensees | Nevada Irrigation District and Pacific Gas and Electric Company |
| license term | The period for which a license is issued by FERC; usually between 30 and 50 years. |
| load shapes | The daily schedule of power pricing and the hour duration of each price. |

## Glossary. (continued)

| Term | Definition |
|---|---|
| **L (continued)** | |
| local inflow | The incremental inflow between two plants (also known as Accretion Flows). |
| LOP | Limited operating periods |
| LRMP | Land and Resource Management Plan |
| LWD | Large woody debris |
| **M** | |
| µ | Micro |
| µg | microgram |
| µg/l | micrograms per liter (equals parts per billion, or ppb) |
| µmho/cm | micromhos per centimeter; a measurement of conductivity |
| M | Mega |
| m | Meter |
| m | Milli |
| mainstream plane | A plant located on the main stream that runs through the system. Not a plant on a side or tributary stream. |
| maintenance | The act of keeping fixed assets in acceptable condition. It includes preventive maintenance normal repairs, replacement of parts and structural components, and other activities needed to preserve a fixed asset so that it continues to provide acceptable service and achieves its expected life. Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than those originally intended. Maintenance includes work needed to meet laws, regulations, codes, and other legal direction as long as the original intent or purpose of the fixed asset is not changed. |
| mbf | million board feet |
| MBTA | Migratory Bird Treaty Act |
| MCA/T | Mandatory conditioning agencies/tribes |
| MCL | Maximum contaminant level |
| Meeting Participant | A Relicensing Participant that attends a specific meeting. Meeting Participants are different for each meeting. |
| metadata | "Data about data." Describes the content, quality, condition, purpose, and other characteristics of data. |
| mg | Milligram |
| mg/l | milligrams per liter (equals parts per million, or ppm) |
| $mgC/m^2$ | milligrams of carbon per square meter |
| mi | Mile |
| mills/kWh | 0.1 cent per kilowatt hour, equivalent to $$/mwh |
| minimum daily average flow | The lowest average flow in any one day. |
| minimum elevation | The lowest allowable reservoir elevation. At elevations below the minimum, the operations model will set the daily discharge to 0 cfs. |
| minimum flow unit | A small unit that is installed specifically to generate power from the minimum instantaneous flow when released through a low level outlet. Typically this unit is separate from the powerhouse, and therefore requires handling outside of the core scheduling routines. |
| minimum instantaneous flow | A lowest flow that occurs. |
| MIR | Minimal implementation requirement; a USFS system. |
| MIS | USFS Management Indicator Species |
| mm | millimeters |
| MNBMC | Species designated by the USFWS as a Migratory Bird of Management Concern because of: (1) Documented or apparent population declines; (2) small or restricted populations; or (3) dependence on restricted or vulnerable habitats. |
| MOA | Memorandum of Agreement |
| MOU | Memorandum of Understanding |

**Glossary. (continued)**

| Term | Definition |
|---|---|
| **M (continued)** | |
| MPN | Most probable number |
| mps | meters per second |
| msl | mean sea level |
| must-run | Energy or ancillary services necessary to maintain system reliability. |
| MVA | megavolt-ampere |
| MW | megawatt; equal to 1,000 kw |
| MWh | megawatt-hours; equal to 1,000 kwh |
| Mya | Million Years ago |
| **N** | |
| n | Nano |
| NAAQS | National Ambient Air Quality Standards |
| NAVD 83 | North American Datum 1983. Based on a definition of the size and shape of the earth. It is the datum for map projections and coordinates within the United States and throughout North America. |
| NAGPRA | Native American Graves Protection and Repatriation Act |
| NAHC | California Native American Heritage Commission |
| National Register | National Register of Historical Places |
| natural inflow | The flow that a point in the system would have received, if there were no upstream plants in the system. This flow is equal to the sum of all upstream accretion inflows. Also known as unimpaired or unregulated flows. |
| NCIC | North Central Information Center |
| NDA | no data available |
| NEPA | National Environmental Policy Act |
| NEPA | National Energy Policy Act |
| NERC | North American Electric Reliability Corporation |
| Nevada Irrigation District | The current FERC license holder and owner/operator of the Nevada Irrigation District Yuba-Bear Hydroelectric Project. |
| new construction | The erection, construction, installation, or assembly of a new fixed asset. |
| New License | A license issued for a project for which FERC has issued an initial license. |
| NFMA | National Forest Management Act |
| NGO | Non-Governmental Organizations |
| NGVD | National Geodetic Vertical Datum |
| NHA | National Hydropower Association |
| NHI | Natural Heritage Institute |
| NHPA | National Historic Preservation Act |
| NID | The Nevada Irrigation District, which owns, operates, and holds the current license to the Yuba-Bear Hydroelectric Project (FERC Project No. 2266). Also referred to individually as Licensee, or with PG&E as Licensees. |
| NLT | No later than |
| NMFS | Department of Commerce, National Marine Fisheries Service |
| NMWSE | Normal maximum water surface elevation |
| NOAA | National Oceanic and Atmospheric Administration |
| NOAA Fisheries | U.S. Department of Agriculture, National Marine Fisheries Service |
| Normal operating capacity | The maximum MW output of a generator or group of generators under normal maximum head and flow conditions. |
| NOI | Notice of Intent |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Parks Service |
| NRCS | Natural Resource Conservation Act |

**Glossary. (continued)**

| Term | Definition |
|---|---|
| **N (continued)** | |
| NRHP | National Register of Historical Places |
| NTU | Nephelometric turbidity unit |
| NWI | National Wetlands Inventory |
| NWS | National Weather Service |
| **O** | |
| O&M | operation and maintenance |
| OEP | FERC Office of Energy Projects (formerly Office of Hydropower Licensing). |
| OHP | State Office of Historic Preservation |
| OHV | Off highway vehicle |
| operations | Activities related to the normal performance of the functions for which a fixed asset or component is intended to be used. Costs such as utilities (electricity, water, sewage), fuel, janitorial services, window cleaning, rodent and pest control, upkeep of grounds, vehicle rentals, waste management, and personnel costs for operating staff are generally included within the scope of operations and are not considered maintenance costs. |
| ORV | Off-road vehicle ***or*** Outstanding Remarkable Views |
| OS | Office of the Solicitor |
| oz | Ounce |
| **P** | |
| PA | Programmatic Agreement |
| PAC | Protected activity center |
| PAD | Pre-Application Document |
| PAD Questionnaire | Questionnaire developed and circulated by NID and PG&E to gather existing, relevant, and reasonably available information for inclusion in the Yuba-Bear Hydroelectric Project, Drum-Spaulding Project and Rollins Transmission Line Project PADs. |
| PAOT | people at one time |
| PCT | Pacific Crest Trail |
| PCWA | Placer County Water Agency |
| PDF | portable document format |
| peaking | Operation of generating facilities to meet maximum instantaneous electrical demands. |
| penstock | An inclined pipe through which water flows from a forebay or tunnel to the powerhouse turbine. |
| penstock capacity | The maximum design flow in the penstock. |
| penstock connections | The type of connections in the penstock both within the cans themselves and between cans. |
| penstock diameter | The nominal diameter of the penstock. |
| penstock length | The length of the penstock from the tunnel or upstream inlet to the turbine shut off valve. |
| maximum penstock velocity | The maximum velocity in the penstock at the "penstock capacity," as defined above. This will occur at the smallest penstock diameter. |
| penstock supports | The type of supports for the penstock. |
| penstock type | A description of the type of pipe, and whether the pipe is surface or buried. |
| pf | power factor |
| PG&E | Pacific Gas and Electric Company, which owns, operates, and holds the current license to the Drum-Spaulding Project (FERC Project No. 2310) and the Rollins Transmission Line Project (FERC Project No. 2784). Also referred to a Licensee, or, when with NID, as Licensees. |
| PH | Powerhouse |
| pH | The measure of the acidity or alkalinity of a substance or liquid. |

## Glossary. (continued)

| Term | Definition |
|---|---|
| **P (continued)** | |
| plant operation type | A reference to the manner in which water is scheduled though a plant. At this time, there are seven operating types:<br>Diversion Plant: A plant that cannot control its daily release. A plant that uses an uncontrolled outlet to divert water from one watershed basin to another.<br>Fill and Spill: A plant that peaks with the loadshape, but gives priority to the upstream plant, and will spill in order for the upstream plant to follow the loadshape as closely as possible.<br>Non-Generating: A plant that peaks its discharge to follow the loadshape.<br>Strictly Peaking: A plant that peaks its discharge. Attempts to schedule water in highest value periods of day. Can instantaneously (in a 15 minute increment) change load.<br>Peaking with Ramp Rates: A plant where the water discharge still closely follows the loadshape (plant will Peak); however, the plant is constrained by ramping rates.<br>Pure Run of River: A plant where inflows are equal to outflows on an instantaneous basis.<br>Re-regulating: A plant designed to regulate peaked discharge from upstream plants into smooth discharges. This plant releases constant outflows for the whole day. Re-regulating plants may or may not be constrained by ramping rates. If so, then they are required to ramp between days. |
| powerhouse maximum capability | Maximum megawatt output generated by the specific powerhouse. For powerhouses with two units, this value is the maximum simultaneous total output generated. |
| PHABSIM | Physical Habitat Simulation Models |
| PM&E measures | Facilities, operations, and management activities undertaken for the purpose of protecting or mitigating impacts that would result, due to operation and maintenance of the proposed Project, or for the purpose of enhancing resources that would be affected by the proposed Project. |
| PMF | Probable Maximum Flood |
| PMP | Probable Maximum Precipitation |
| POAOR | California Public Opinion and Attitudes in Outdoor Recreation Survey |
| Posted File | A file that either NID or PG&E has placed on its respective Relicensing Website. |
| Power Factor | The ratio of actual power to apparent power. Power factor is the cosine of the phase angle difference between the current and voltage of a given phase. Unity power factor exists when the voltage and current are in phase. |
| ppb | parts per billion |
| ppm | parts per million |
| Project | Either NID's Yuba-Bear Hydroelectric Project (FERC Project No. 2266), PG&E's Drum-Spaulding Project (FERC Project No. 2310), or the Rollins Transmission Line Project (FERC Project No. 2784). |
| PAA | Project Affected Area. The geographic area in which a specific resource is potentially affected by Project presence, operation, or maintenance. The extent of the geographic area is dependant on the resource (i.e., water, recreation, or cultural resources). |
| Project Area | The area within the FERC Project Boundary. |
| Project Boundary | The boundary defined in the license issued by FERC for the Project, outlining the geographic area needed for the Project operations and maintenance. |
| Project Drainage Basins | Combination of the Middle Yuba River, Yuba River, and Bear River drainage basins. |
| Project Region | An area on the order of county or national forest size that surrounds the Project. |
| Project Vicinity | The area surrounding the Projects, on the order of a U.S. Geological Survey 1:24,000 topographic quadrangles. |
| Project Viewshed | The area from which project features are visible. The land base from which the project may be seen. |
| Project Works | All of the infrastructure associated with the operations of the project. |
| projects | Two or more of the following projects: NID's Yuba-Bear-Hydroelectric Project, PG&E's Drum-Spaulding Project, and PG&E's Rollins Transmission Line Project. |
| Proposed PM&E Measure | A PM&E measure proposed by a Relicensing Participant, to modify project facilities and operations, and other management activities, as conditions of the new license, for the purpose of protecting a resource from or mitigating impacts that would result from continued project operations and maintenance, or for the purpose of enhancing resources that would be affected by continued project operation and maintenance. |
| proposed Project | The Yuba-Bear Hydroelectric Project or Drum-Spaulding Project, as proposed by NID or PG&E, respectively, in its application for new license. The proposed Project includes PM&E measures. |

**Glossary. (continued)**

| Term | Definition |
|---|---|
| **P (continued)** | |
| protection | All of the relays and other equipment used to open the necessary circuit breakers, to separate pieces of equipment from each other when trouble develops. |
| protective relay | A device whose function is to detect defective lines or apparatus, or other power system conditions of an abnormal or dangerous nature, and to initiate appropriate control circuit action. |
| PSEA | Pacific Service Employees Association |
| psi | pounds per square inch |
| PSR | Pacific Southwest Region of USFS |
| PURPA | Public Utilities Regulatory Policies Act |
| PWC | personal water craft |
| PWD | Persons with Disabilities |
| PX | California Power Exchange |
| **Q** | |
| QF | A qualifying facility, a cogenerator, or small power producer that sells its excess power to a utility. |
| **R** | |
| ramping | The act of increasing or decreasing stream flows from a powerhouse, dam, or division structure. |
| ramping rates | Constraints on the rate at which a plant's discharge can change. |
| ramping rate curve | The river flow vs. stage curve relationship, at the point where ramping rate compliance is measured. |
| RCA | Riparian Conservation Areas, as defined by TNF. |
| RCO | Riparian Conservation Objectives, as defined by TNF. |
| RD | Recreation Day, which equals a visit by a person to a Project development for recreation purposes during any portion of a 24-hour period. |
| Reach | A stretch of stream between readily identifiable endpoints (such as structures or stream confluence). |
| Regulated hydrology | The hydrology of project-affected streams, subsequent to construction of the project. |
| relicensing | The process of acquiring a new license for a project that has an existing license from FERC, sometimes called the "relicensings," if referred to collectively, or the "relicensing" if referred to individually. |
| Relicensing Contact List | List of Interested Parties that have provided to NID and/or PG&E an e-mail address, to which NID and PG&E may forward information regarding the relicensings. Also referred to as Contact List. |
| Relicensing Participants | Interested Parties, which include NID and PG&E, that routinely actively take part (i.e., attend meetings/workshops, and make filings) in one or more of the relicensing proceedings. |
| relicensing proceedings | Relicensing of two or more of the following projects: NID's Yuba-Bear Hydroelectric Project; PG&E's Drum-Spaulding Project; and PG&E's Rollins Transmission Line Project. Sometimes referred to as the Relicensings. |
| reservoir | The water retained by a dam. Also referred to as headwater, storage, forebay, or headpond. |
| reservoir drainage area | The area that drains into the reservoir. |
| reservoir gross storage | Reservoir storage at maximum normal water surface elevation. |
| reservoir length | The distance between the two most distant points on the reservoir shore, at normal maximum water surface elevation. |
| reservoir max storage capacity | The gross volume of water that can be stored in the reservoir. |
| reservoir NMWS elevation | The elevation of the lowest spill crest (if uncontrolled), the top of the gates (for gates), at the top of the dam. |
| reservoir surface area | The surface area of the reservoir at the normal maximum water surface elevation. |
| reservoir storage curve | A curve that defines a reservoir's volume in ac-ft at various surface elevations. |
| reservoir useable capacity | A volume measurement of the amount of water that can be stored for generation, down to a minimum level. |
| reservoir width | The maximum distance between the two most distant points on the reservoir shore, at normal maximum water surface elevation, taken at a right angle to the line at reservoir length. |
| ResSim | U.S. Army Corps of Engineers — Hydrologic Engineering Center (USACE-HEC) Reservoir Simulation (HEC-ResSim) model, Version 3.0. Also known as HEC-ResSim. |
| RIMS | Records & Information Management System |
| Riparian | Relating to the bank of a natural course of water. |

## Glossary. (continued)

| Term | Definition |
|---|---|
| **R (continued)** | |
| riparian vegetation | The vegetation immediately adjacent to a body of water. Typically, a structurally diverse community, consisting of herbaceous shrub and woody components. |
| RM | River mile, as measured along the river course, from downstream to upstream. |
| RNA/ACEC | Research Natural Area/Area of Critical Environmental Concern |
| ROD | Record of Decision |
| ROS | Recreation Opportunity Spectrum |
| ROW | Right-of-way |
| rpm | revolutions per minute |
| RRMP | Redding Resource Management Plan |
| RTD | Resistance temperature detector |
| RTU | Remote terminal unit, or remote telemetry unit. A remotely located piece of equipment used for collecting data, and/or for operating equipment via SCADA. |
| run-of-the-river | A hydro project that uses the flow of a stream with little or no reservoir capacity for storing water. |
| RVD | Recreation Visitor Days |
| RWQCB | Regional Water Quality Control Board |
| **S** | |
| SCADA | Supervisory Control And Data Acquisition system |
| scenario | A collection of settings that constitutes a Res-Sim™ operation model run. Output data for a run are referenced by the scenario name. |
| SCORP | State Comprehensive Outdoor Recreation Plan |
| SD1 | Scoping Document 1: A document issued by FERC summarizing the relicensing process for a Project; generally issued following the first public meeting after the NOI. |
| SD2 | Scoping Document 2: A document issued by FERC summarizing the relicensing process for a Project; generally issued following the first public meeting after the NOI |
| SE | A species or subspecies listed as endangered, under the CESA. |
| Secchi | A method of measuring surface water transparency in a reservoir. |
| Section 106 | Refers to Section 106, of the National Historic Preservation Act. |
| Setting | A collection of conditions that form the building blocks of a scenario. A setting is made up of conditions. |
| SHPO | California Department of Parks and Recreation, Office of Historic Preservation, State Historic Preservation Officer |
| sidestream plant | A plant that is not on the main fork of the river. A plant that is located on a sidestream, or minor tributary. |
| SIP | State implementation plan |
| siphon | A pipe section or conduit that crosses a stream channel or ravine. |
| site development plan for recreation facilities | A site development plan depicts the logical and progressive establishment or replacement of improvement, buildings, pedestrian and vehicular circulation ways, and utilities needed for effective use of the site (not detailed construction drawings). Physical conditions, opportunities, needs, zoning and management objectives shape the site development plan. A site development plan consists of two parts: a site survey plan and a development plan. The site survey consists of the basic site information and all existing features. The development plan provides conceptual and specific proposed improvements. A site development plan is prepared after a conceptual design. (Forest Service Handbook 7309.11, Chapter 20.) |
| SL | Standard Length |
| Sluice | An artificial channel for conducting water, with a valve or floodgate to regulate the flow. |
| SM | Stream mile. (See RM or River Mile.) |
| SMS | USFWS Scenery Management System |
| SMZ | Streamside Management Zone, as defined by TNF |
| SNEP | Sierra Nevada Ecosystem Project |
| SNFPA | Sierra Nevada Forest Plan Amendment |
| SNTEMP | USFWS' Stream Network Temperature Model |
| SNYLF | Sierra Nevada yellow-legged frog |

**Glossary. (continued)**

| Term | Definition |
|---|---|
| **S (continued)** | |
| SOHA | Spotted owl habitat areas |
| SRMP | BLM's Sierra Resource Management Plan |
| SSWD | South Sutter Water District |
| SPI | Sierra Pacific Industries, Inc. |
| Special-Status Species | Species or subspecies, listed under the FESA or CESA as endangered or threatened, or by a Federal or State agency as a species of special concern, sensitive species, fully protected species, or management indicator species. |
| spill | Water passes over a spillway without going through the units. |
| spill channel | Property down gradient from a conduit, for which an easement over private property or withdrawal under FERC license has been granted. A spill channel is used when it becomes necessary to release water from a section of conduit. |
| spillway | A passage for releasing surplus water from a reservoir. |
| spillway capacity curve | A curve that defines the maximum spill in cfs, for the spillway at given reservoir elevations. |
| SPT | Sediment Pass-Through |
| sq ft or $ft^2$ | square foot |
| sq mi or $mi^2$ | square mile |
| SR | A species or subspecies listed as rare under the CESA. |
| ST | A species or subspecies listed as threatened under the CESA. |
| stage | The river surface elevation in feet, based on a local datum. |
| state | State of California |
| station use | Energy used to operate the generating facility's auxiliary equipment. |
| STATSGO | State Soil Geographic Database |
| STNF | Shasta Trinity National Forest |
| STNF-LRMP | Shasta Trinity National Forest Land Resources Management Plan |
| stoplogs | Removable logs installed seasonally in reservoir spillways, to temporarily increase storage capacity. |
| STORET | USEPA's computerized water quality data storage system. |
| Study Area | The geographic area covered by a specific study. |
| Study Description | A detailed description of an individual study. |
| Study Plan | The aggregate of all study descriptions. |
| SUP | Special Use Permit, issued by the USFS. |
| surge chamber | A structure, similar to a holding tank, located on a tunnel or penstock, which is used to absorb and attenuate the overflow, and prevent any disruption, due to a sudden change in water pressure through a tunnel or penstock. |
| SWDU | Statement of Water Diversion and Use |
| switching center | The main control center for any given river system, which is responsible for operation of the automatic, semiautomatic, and manual powerhouses on that river system. The Switching Center is staffed 24 hours a day. |
| SWP | State Water Project |
| SWRCB | State Water Resources Control Board |
| **T** | |
| tailrace | Channel through which water is discharged from the powerhouse turbines. |
| tailwater curve | A curve that defines the tailwater elevation of the range of powerhouse flows. |
| tailwater elevation | The elevation where all energy from the water passing the turbine had been extracted. (Can be the turbine centerline or the river surface elevation at the point of powerhouse discharge.) |
| TCP | Traditional Cultural Property |
| TDS | total dissolved solids |
| technical memoranda | Reports that contain the results of a relicensing study or portion of a relicensing study. |
| TES | Threatened, Endangered. or Sensitive Species |
| THP | Timber Harvest Plan |

**Glossary. (continued)**

| Term | Definition |
|---|---|
| **T (continued)** | |
| three-winding transformer | A transformer with a primary, secondary, and tertiary winding, which may be used to connect generation with two different voltage transmission circuits, or with both distribution and transmission circuits, without the use of additional transformers. |
| TLP | Traditional Licensing Procedure, as defined by FERC regulations |
| TMDL | total maximum daily load |
| TN | total nitrogen |
| TNC | The Nature Conservancy |
| TNF | Tahoe National Forest |
| TNF LRMP | Tahoe National Forest Land Resources Management Plan |
| TP | total phosphorous |
| TPN | total persulfate nitrogen |
| trash rack | A mechanism, found on a dam or intake structure, which clears the water of debris before the water passes through the structure. |
| TRP | Traditional Relicensing Procedure, as defined by FERC regulations. |
| TSP | total soluble phosphorus |
| TSS | total suspended solids |
| tunnel capacity | The maximum design flow in the tunnel. |
| tunnel diameter | The nominal design size of the tunnel. |
| tunnel length | The length of the tunnel from the upstream portal to the downstream portal. |
| tunnel lining | The type of lining in the tunnel, if any. |
| tunnel maximum tunnel velocity | The maximum velocity in the tunnel at the "capacity" and at the nominal diameter, as defined above. |
| tunnel type | Either pressure or free flow. |
| turbine | A machine that converts the energy of a stream of water into the mechanical energy of rotation. This energy is then used to turn an electrical generator or other device. Also called a "water wheel". |
| TWD | Tailwater Depression Unit |
| **U** | |
| Unimpaired hydrology | Synthesized hydrology of Project-affected streams with no developments. |
| Unit | A term referring to the combined turbine-generator machine |
| US | United States |
| USACE | U.S. Department of Defense, Army Corps of Engineers |
| USC | United States Code |
| USDA | U.S. Department of Agriculture |
| USDOC | U.S. Department of Commerce |
| USDOD | U.S. Department of Defense |
| USDOI | U.S. Department of Interior |
| USEPA | U.S. Environmental Protection Agency |
| USFS | U.S. Department of Agriculture, Forest Service |
| USFWS | U.S. Department of Interior, Fish and Wildlife Service |
| USGS | U.S. Department of Interior, Geological Survey |
| UTM | Universal Transverse Mercator. The map projection upon which the UTM Coordinate System is based. |
| **V** | |
| V | Volts |
| VELB | Valley elderberry longhorn beetle |
| VFW | Veterans of Foreign Wars |
| VMS | USFS Visual Management System |
| VQO | Visual Quality Objectives, a USFS visual classification system. |

**Glossary. (continued)**

| Term | Definition |
|---|---|
| VQI | Visual Quality Index, a USFS visual classification system. |
| VRM | Visual Resource Management |
| **W** | |
| W | Watts |
| Watch List | A list prepared by an individual National Forest LRMP, of plants and animal species that are locally rare (as opposed to declining throughout their range), and are of public concern, occur as disjunct populations, are newly described taxa, or lacking sufficient information on population size, threats, trends, or distribution. These species are not on the FSS list. |
| water withdrawals | Water that is withdrawn from the reservoir, therefore not available for energy generation, and which is lost from the system. Withdrawals can be either positive or negative. |
| WBWG | Bat species designated by the Western Bat Working Group as High Priority, because they are imperiled, or at high risk of imperilment. |
| WECC | Western Electricity Coordinating Council |
| WHR | California Wildlife Habitat Relationships Database |
| WPT | Western Pond Turtle |
| WSEL | Water surface elevation |
| WSRA | Wild & Scenic Rivers Act |
| WUA | Weighted Usable Area |
| **X** | |
| **Y** | |
| ya | Years ago |
| YCWA | Yuba County Water Agency |
| yd | yard |
| YOY | young-of-the-year |
| **Z** | |

# <u>Application for a New License</u>
# <u>Major Project – Existing Dam</u>

## Exhibit A
## Project Description

Yuba-Bear Hydroelectric Project
FERC Project No. 2266-096

NID Nevada Irrigation District

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April 2011

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**EXHIBIT A**

# Project Description

## 1.0 Introduction

The Nevada Irrigation District (NID or Licensee) has prepared this Exhibit A, Report on Project Description, as part of its Application for License for a Major Project - Existing Dam - (Application) from the Federal Energy Regulatory Commission (FERC) for the Yuba-Bear Hydroelectric Project (Project), FERC Project No. 2266. This report is prepared in conformance with Title 18 of the Code of Federal Regulations (CFR), Subchapter B (Regulations under the Federal Power Act), Part 5 (Integrated Licensing Process). In particular, this report conforms to the regulations in 18 CFR § 5.18(a)(5)(iii), which require in part that the Application include an Exhibit A, Project Description, in conformance with 18 CFR § 4.51(f)(3). This Exhibit A describes, in detail, all existing and proposed Project facilities. As a reference, 18 CFR § 4.51(b) states:

> Exhibit A is a description of the project. This exhibit need not include information on project works maintained and operated by the U.S. Army Corps of Engineers, the Bureau of Reclamation, or any other department or agency of the United States, except for any project works that are proposed to be altered or modified. If the project includes more than one dam with associated facilities, each dam and the associated component parts must be described together as a discrete development. The description for each development must contain:
>
> (1) The physical composition, dimensions, and general configuration of any dams, spillways, penstocks, powerhouses, tailraces, or other structures, whether existing or proposed, to be included as part of the project;
>
> (2) The normal maximum surface area and normal maximum surface elevation (mean sea level), gross storage capacity, and usable storage capacity of any impoundments to be included as part of the project;
>
> (3) The number, type, and rated capacity of any turbines or generators, whether existing or proposed, to be included as part of the project;
>
> (4) The number, length, voltage, and interconnections of any primary transmission lines, whether existing or proposed, to be included as part of the project (see 16 U.S.C. 796(11));
>
> (5) The specifications of any additional mechanical, electrical, and transmission equipment appurtenant to the project; and
>
> (6) All lands of the United States that are enclosed within the project boundary described under paragraph (h) of this section (Exhibit G), identified and tabulated by legal subdivisions of a public land survey of the affected area or, in the absence of a public land survey, by the best available legal description. The tabulation must show the total acreage of the lands of the United States within the project boundary.

Besides this introductory material, this exhibit includes six sections. The Project's location is described in Section 2.0. Section 3.0 describes other existing water projects in the basins in which the Project is located. Section 4.0 provides details of the existing Project facilities dimensions, physical features, and other pertinent information, arranged by Project Development. Section 5.0 describes the area within the FERC Project Boundary, including the legal description for all parcels owned by the United States. Section 6.0 describes Licensee's proposed new facilities. Section 7.0 provides a bibliography of the references consulted to develop this exhibit.

See Exhibit B for a description of Project operations, Exhibit C for a construction schedule for proposed new facilities, Exhibit D for costs and financing information, and Exhibit E for a discussion of potential environmental effects and Licensee's proposed resource management measures. Project design drawings and maps are included in Exhibits F and G, respectively. Exhibit H contains a detailed description of the need for the electricity provided by the Project, the availability of electrical energy alternatives, and other miscellaneous information.

# 2.0 Project Location

The Yuba-Bear Hydroelectric Project is located in northern California in Sierra, Nevada, and Placer counties along the western slope of the Sierra Nevada geomorphic provinces. A portion of the Project is on United States land managed by the United States Department of Agriculture (USDA), Forest Service as part of the Tahoe National Forest (TNF), and a smaller portion on United States land administered by the United States Department of Interior (USDOI) Bureau of Land Management (BLM) as part of the Sierra Resource Management Area.

The Project ranges in elevation from French Lake at elevation 6,665 feet (ft) to Rollins Reservoir at elevation 2,171 ft.[1]

Project facilities are located in three major basins: 1) on the Middle Yuba River and on Wilson Creek, a tributary to the main stem, of the Middle Yuba River; 2) on Canyon Creek, Jackson Creek, Texas Creek, Clear Creek, Fall Creek, Trap Creek, and Rucker Creek, which are all tributaries to the South Yuba River; and 3) on the main stem of the Bear River. The Middle Yuba River, South Yuba River and Bear River are part of the Sacramento River basin, which drains into the Sacramento – San Joaquin Delta, and then into San Francisco Bay. Figure 1.0-1 illustrates the general regional location of the Project. The map does not display the FERC Project Boundary, which could not be shown at the map scale, but highlights the general region of the Project for contextual purposes.

[1] All elevation data in this exhibit are in National Geodetic Vertical Datum of 1929 (NGVD 29) unless otherwise specified.

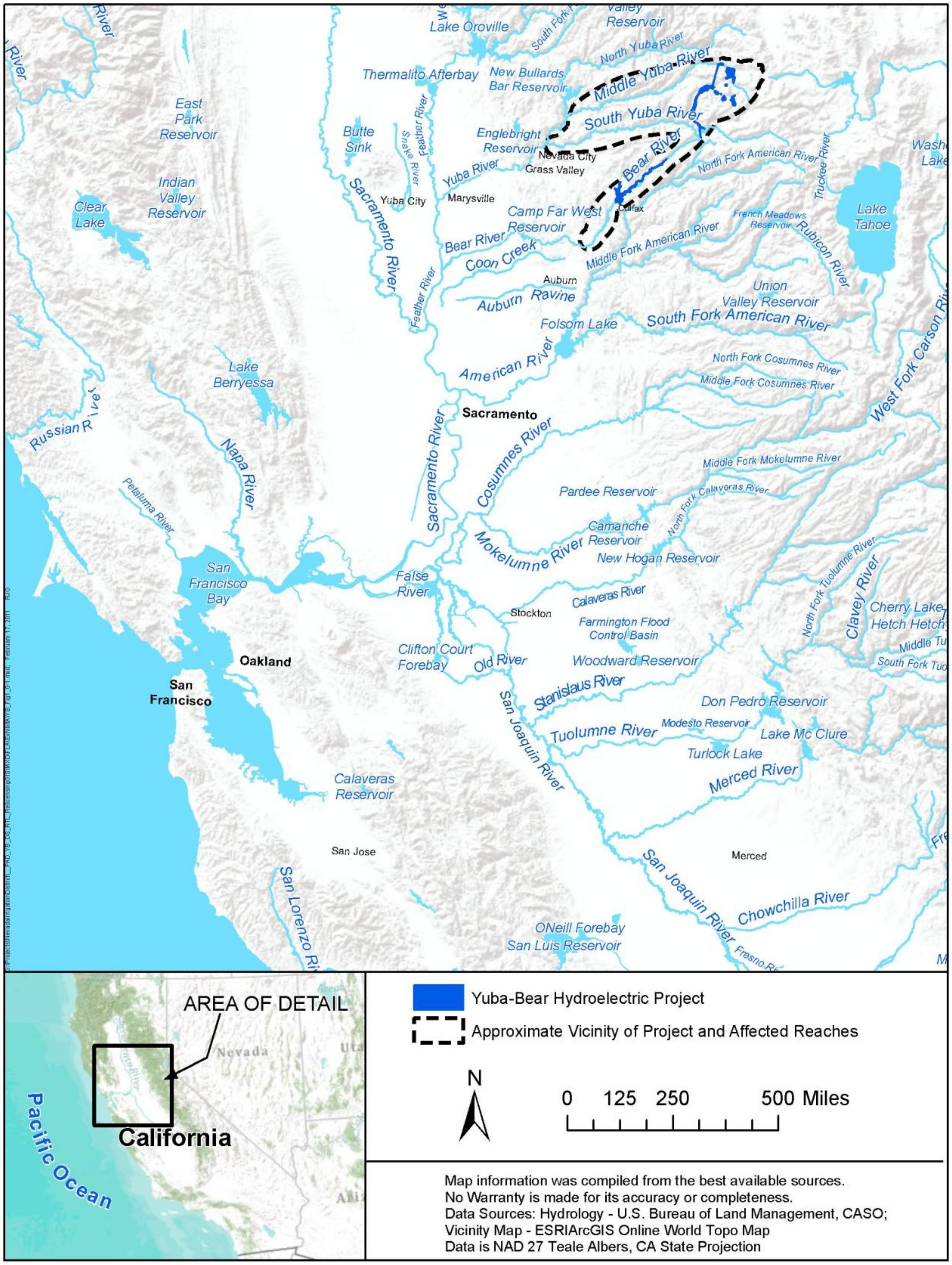


**Figure 1.0-1. Yuba-Bear Hydroelectric Project area in relation to San Francisco Bay, California, and tributary watersheds.**

# 3.0 Existing Water Projects in the Yuba and Bear River Basins

Including the Yuba-Bear Hydroelectric Project, there are eleven existing hydroelectric projects located in the Yuba River and Bear River basins. Together, these projects have a combined FERC-authorized capacity of 664.41 megawatts (MW). The Yuba-Bear Hydroelectric Project represents approximately 11 percent of the total capacity. Table 3.0-1 summarizes the existing FERC projects in the Yuba River and Bear River basins; these projects are also shown in Figure 3.0-1.

**Table 3.0-1. Existing FERC licensed water projects in the Yuba and Bear River basins.**

| FERC Project Number | Project Name | License Holder[1] | Waterway | River Watershed | License Expiration Date | FERC Authorized Capacity, MW |
|---|---|---|---|---|---|---|
| 1403 | Narrows | PG&E | Yuba River | Yuba | January 2023 | 12.00 |
| 2246 | Yuba River | YCWA | Yuba River | Yuba | March 2016 | 361.90 |
| 3075 | Virginia Ranch Dam | BVID | Yuba River | Yuba | Exempt | 1.00 |
| 6780 | Deadwood Creek | YCWA | Deadwood Creek | Yuba | August 2038 | 19.63 |
| 5930 | Scotts Flat | NID | Deer Creek | Yuba | Exempt | 0.83 |
| 2266 | Yuba-Bear | NID | Yuba, Bear Rivers and tributaries | Yuba, Bear | April 2013 | 79.32 |
| 2310 | Drum-Spaulding | PG&E | South Yuba, Bear, North Fork American Rivers and tributaries | Yuba, Bear, North Fork American | April 2013 | 190.0 |
| 2981 | Lake Combie | NID | Bear River | Bear | Exempt | 1.50 |
| 7731 | Combie North Aqueduct | NID | Bear River | Bear | Exempt | 0.35 |
| 2997 | Camp Far West | SSWD | Bear River | Bear | June 2021 | 6.80 |
| 7580 | Vanjop No. 1 | SSWD | Bear River | Bear | Exempt | 0.42 |

[1] PG&E = Pacific Gas and Electric Company
YCWA = Yuba County Water Agency
BVID = Browns Valley Irrigation District
NID = Nevada Irrigation District
SSWD = South Sutter Water District

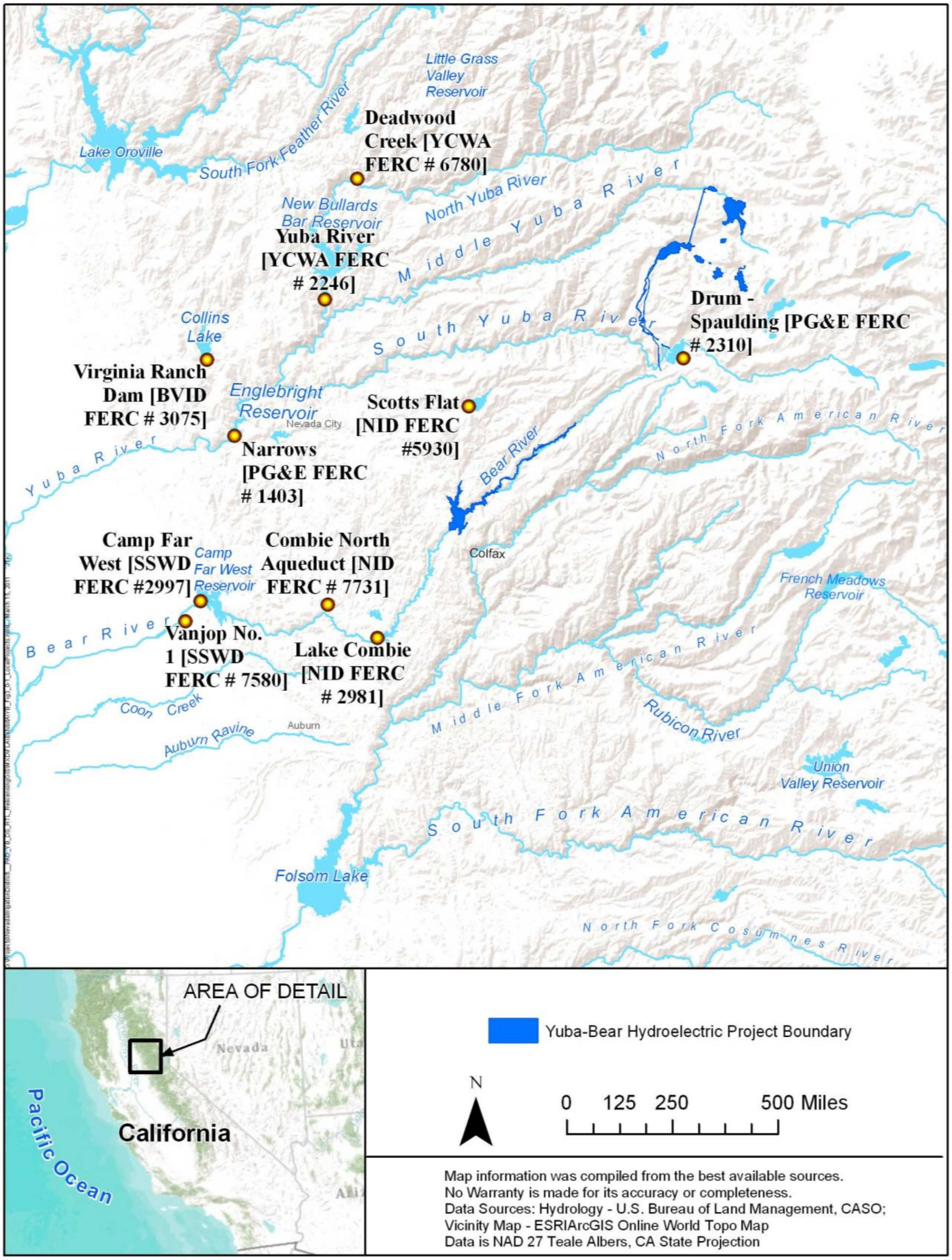


**Figure 3.0-1. Existing FERC licensed water projects in the Yuba River and Bear River basins.**

The main stem of the Yuba River includes two United States Army Corps of Engineers' (USACE) debris dams. The more upstream facility is Englebright Dam, which is located 24 miles upstream of the Yuba River's confluence with the Feather River, was constructed in 1941 by the California Debris Commission, a predecessor of USACE, which owns and operates the dam and related facilities. The primary purpose of the dam when constructed was to trap sediment derived from historical hydraulic mining operations in the Yuba River watershed. Hydraulic mining in the Sierra Nevada was halted in 1884 but resumed on a limited basis until the 1930s. Although no hydraulic mining in the upper Yuba River watershed resumed after construction of the dam, the historical mining sites continued to contribute sediment to the river, and sediment that had settled into the upper reaches of the Yuba River was gradually being carried downstream. The dam forms USACE's Englebright Reservoir, which is about 9 miles long and has a useable storage capacity of about 70,000 ac-ft.

Daguerre Point Dam, located 12.6 miles downstream of Englebright Dam and 11.4 miles upstream of the Yuba River's confluence with the Feather River, was also constructed by the California Debris Commission to prevent hydraulic mining debris from the Yuba River watershed from flowing into the Feather and Sacramento rivers, thereby reducing their channel conveyance. The dam, which was constructed in 1906 and rebuilt in 1964 following damage from floods, has no appreciable storage.

# 4.0 Project Facilities and Features

On June 24, 1963, the Federal Power Commission, predecessor to FERC, granted to NID an initial license to construct and operate the Yuba-Bear Hydroelectric Project. The initial license had a term that expired on April 30, 2013, and called for the construction or enlargement of 10 reservoirs and the construction of two powerhouses. On October 14, 1977, FERC approved NID's request to amend the initial license to include the construction and operation of the Rollins Powerhouse and on December 17, 1982, FERC approved NID's request to amend the initial license to include the construction and operation of the Bowman Powerhouse and Bowman-Spaulding Transmission Line. Commercial operation of the original two units began on November 21, 1965. The Rollins Powerhouse began commercial operation on August 20, 1980, and the Bowman Powerhouse began commercial operation on September 19, 1986.

Today, the existing Project consists of four developments - Bowman, Dutch Flat, Chicago Park, and Rollins - each of which is described below. The existing Project can store about 218,700 acre-feet (ac-ft) of water (gross storage) and generated an average of about 354.3 gigawatt-hours (GWh) of power annually from 1972 through 2007. The total installed capacity is 79.32 megawatts (MW) and the dependable capacity is 44.2 MW.

Figure 4.0-1 is a flow schematic showing the Project facilities. Figure 4.0-2, located at the end of this exhibit, shows Project facilities. Project facilities and features are described below by development.

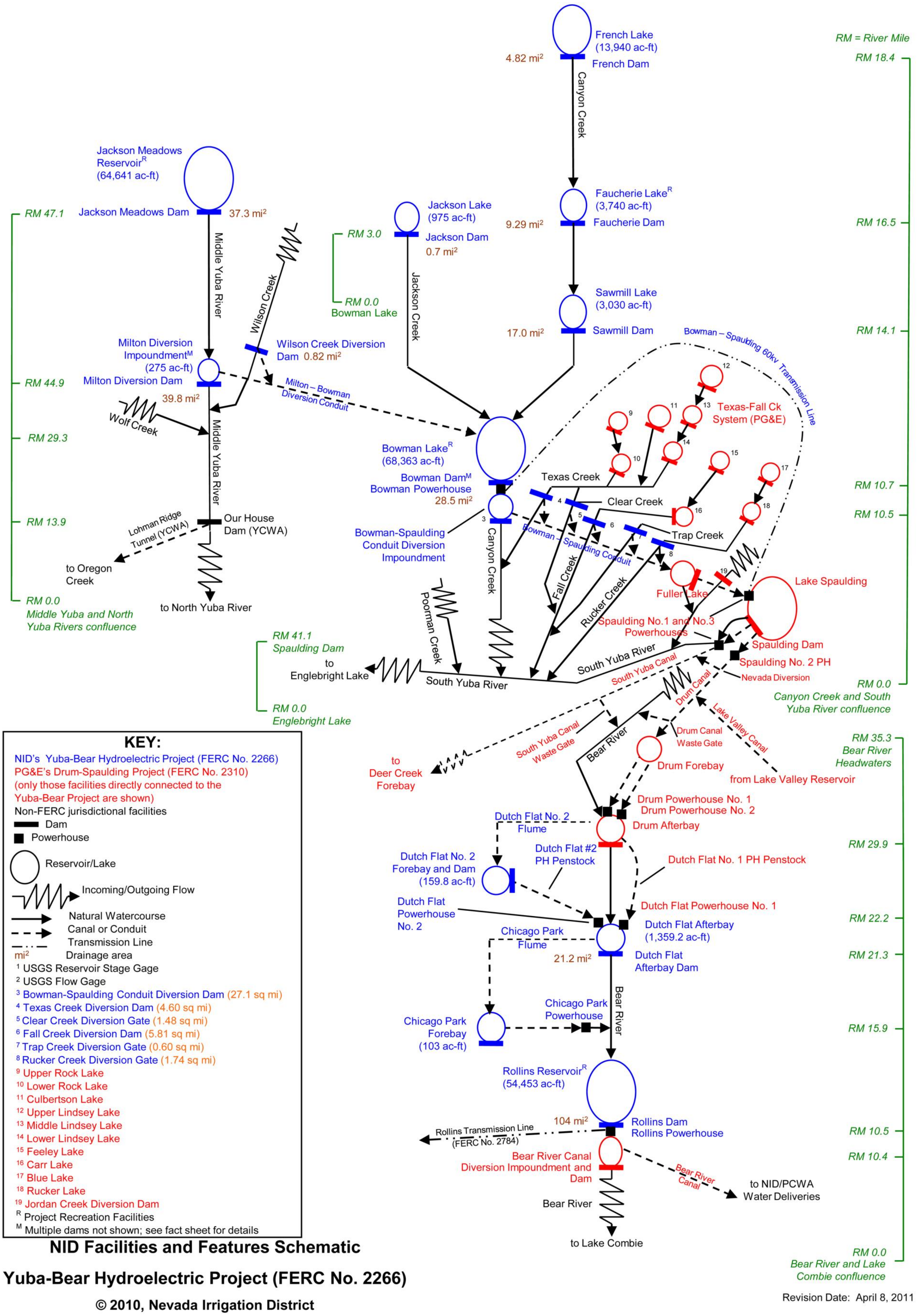


**Figure 4.0-1. Yuba-Bear Hydroelectric Project flow schematic.**

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## 4.1 Bowman Development

The Bowman Development is located primarily on the Middle Yuba River and Canyon Creek, a tributary to the South Yuba River, and includes the uppermost Project features that range from French Lake Dam at an elevation of 6,665.0 ft (dam crest) to the Bowman Powerhouse at an elevation of 5,396.9 (turbine centerline) ft. The Bowman Development includes seven reservoirs/impoundments, including three of the four major Project storage reservoirs (Jackson Meadows, Bowman Lake, and French Lake); one conduit (Milton-Bowman); one transmission line (Bowman-Spaulding); and one powerhouse (Bowman). Table 4.1-1 summarizes the dimensions, physical features, and other pertinent information for each facility or feature, excluding recreation facilities associated with the Bowman Development that are described in Section 4.1.1. Representative photographs of the non-recreation facilities and features are provided in Figure 4.1-1.

**Table 4.1-1. Description of Yuba-Bear Hydroelectric Project facilities and features – Bowman Development.**

| JACKSON MEADOWS DAM AND RESERVOIR | |
|---|---|
| River Mile | 47.1 (Middle Yuba River) |
| Construction Period | 1963-1965 |
| Placed in Service | 1965 |
| **Jackson Meadows Dam** | -- |
| Hazard Classification | High |
| Type | Zoned embankment with a core, filter zones, and rockfill shells |
| Height | 195 feet |
| Crest | -- |
| Elevation | El. 6,044.5 feet |
| Width | 31 feet |
| Length | 1,530 feet |
| Base | -- |
| Elevation | El. 5,904.1 feet |
| Width | 650 feet, approximately |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | 2.5H:1V |
| Downstream Face (Horizontal to Vertical) | 1.4H:1V |
| Fish Ladder | -- |
| **Jackson Meadows Dam Spillway** | -- |
| Type | Gated ogee spillway |
| Crest | -- |
| Elevation | El. 6,021 feet |
| Length | 102.0 feet |
| Control | Three bays each with a 30-feet-wide by 15-feet-high radial gate |
| Hoist Type | -- |
| Maximum Discharge | 40,000 cfs at zero freeboard |
| **Jackson Meadows Dam Low-Level Outlet** | -- |
| Number, Size, & Control | One outlet: 12-foot-diameter horseshoe tunnel, 236 feet long, connected to a 363-foot-long section of tunnel containing one 42-inch-diameter pipe (controlled by a 36-inch-diameter Howell-Bunger valve) and one 24-inch-diameter pipe. Both pipes controlled with butterfly valves. |
| Outlet Invert Elevation | El. 5,933.0 feet |
| Maximum Capacity | 760.1 cfs |
| Trash Rack | Four racks around intake tower. Two racks are 10 feet high by 8 feet wide and two racks are 10 feet high by 12 feet wide. |

## Table 4.1-1. (continued)

| JACKSON MEADOWS DAM AND RESERVOIR (continued) | |
|---|---|
| **Jackson Meadows Reservoir** | --- |
| Normal Maximum Water Surface Elevation | El. 6,036 feet |
| Normal Minimum Water Surface Elevation | El. 5,980 feet |
| Drainage Area | 37.3 square miles |
| Gross Storage at normal maximum water surface el. | 67,435 acre-feet [based on Licensee's 2007-2008 bathymetric studies] |
| Usable Storage | 64,641 acre-feet [based on Licensee's 2007-2008 bathymetric studies] |
| Surface Area at normal maximum water surface el. | 1,008 acres |
| Length | 2.8 miles |
| Width | 1.4 miles |
| Maximum Depth | 144 feet |
| Shoreline Length | 9.9 miles |
| Closest Upstream Facility | No upstream facilities |
| Closest Downstream Facility | Milton Reservoir, part of the Yuba-Bear Hydroelectric Development, 1.6 miles downstream |
| **MILTON DAM AND IMPOUNDMENT** | |
| River Mile | 44.9 (Middle Yuba River) |
| Construction Period | 1926-1927 |
| Placed in Service | 1927 |
| **Milton Main Dam** | -- |
| Hazard Classification | Low |
| Type | Concrete arch dam (acts as ungated and uncontrolled spillway) |
| Height | 37 feet |
| Crest | -- |
| Elevation | El. 5,690 feet |
| Width | 2.0 feet |
| Length | 286 feet |
| Base | -- |
| Elevation | El. 5,653 feet |
| Width | 8.9 feet |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | Vertical |
| Downstream Face (Horizontal to Vertical) | Varies |
| Maximum Dam Discharge | approximately 50,000 cfs |
| **Milton Main Dam Low-Level and Auxiliary Outlet** | -- |
| Number, Size, & Control | One 24-inch-diameter iron pipe controlled by a 24-inch slide gate (low level); One 8-inch-diameter pipe controlled by an 8-inch slide gage (auxiliary) |
| Outlet Invert Elevation | El. 5,663 feet (low level); El. 5,673 feet (auxiliary) |
| Maximum Capacity | 113 cfs (low level); 5 cfs (auxiliary) |
| Trash Rack | 5 feet high by 6 feet wide |
| **Milton South Dam[1]** | -- |
| Hazard Classification | Low |
| Type | Concrete arch dam |
| Height | 30 feet |
| Crest | -- |
| Elevation | El. 5,696 feet |
| Width | 2 feet |
| Length | 140 feet |
| Base | -- |
| Elevation | El. 5,666 feet |
| Width | 4.2 feet |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | Vertical |
| Downstream Face (Horizontal to Vertical) | Varies |
| Maximum Dam Discharge | 450 cfs (via Milton-Bowman pipe intake) |
| Trash Rack | 6 feet high in a 9-foot radius attached to the Milton-Bowman pipe intake. |

**Table 4.1-1. (continued)**

| MILTON DAM AND IMPOUNDMENT (continued) | |
|---|---|
| **Milton Diversion Impoundment** | -- |
| Normal Maximum Water Surface Elevation | El. 5,690.0 feet |
| Normal Minimum Water Surface Elevation | El. 5,686.0 feet |
| Drainage Area | 39.8 square miles |
| Gross Storage at normal maximum water surface el. | 275 acre-feet |
| Usable Storage | 275 acre-feet |
| Surface Area at normal maximum water surface el. | 100 acres |
| Length | 0.4 miles |
| Width | 0.2 miles |
| Maximum Depth | 37 feet |
| Shoreline Length | 1.3 miles |
| Closest Upstream Facility | Jackson Meadows Reservoir, part of the Yuba-Bear Hydroelectric Development, 1.6 miles upstream |
| Closest Downstream Facility | Milton-Bowman Diversion Conduit, part of the Yuba-Bear Hydroelectric Development, immediately downstream |
| **MILTON-BOWMAN DIVERSION CONDUIT** | |
| Description | Diverts flow from Milton Reservoir to the Bowman Reservoir. |
| Sizes, Length, and Construction | 3,315-foot-long, 84-inch-diameter, concrete pipeline flowing to a 22,623-foot-long, 7.5-foot-high by 9.5-foot-wide tunnel |
| Upstream Invert Elevation | El. 5,680 feet |
| Maximum Flow Capacity | 450 cfs |
| Closest Upstream Facility | Milton South Dam, part of the Yuba-Bear Hydroelectric Development, immediately upstream |
| Closest Downstream Facility | Bowman Lake, part of the Yuba-Bear Hydroelectric Development, approximately 5 miles downstream via the Milton-Bowman Diversion Conduit |
| **WILSON CREEK DIVERSION DAM AND CONDUIT** | |
| River Mile | 0.5 (Wilson Creek) |
| Construction Period | unknown |
| Placed in Service | unknown |
| Type | Grouted rubble (acts as ungated and uncontrolled spillway) |
| Height | 3 feet |
| Elevation | El. 5,690 feet |
| Maximum Diversion Capacity | 3.5 cfs |
| **JACKSON LAKE DAM AND RESERVOIR** | |
| Location/Legal Description | Latitude 39° 27' 52" Longitude 120° 33' 49" in SW 1/4 T 19N, R 13E in Nevada County about 9.6 miles east of Graniteville |
| River Mile | 3.0 (Jackson Creek) |
| Construction Period | 1941-1942 |
| **Jackson Lake Dam** | -- |
| Hazard Classification | High |
| Type | Homogeneous earth embankment dam |
| Height | 28 feet |
| Crest | -- |
| Elevation | El. 6,596.0 feet |
| Width | 8 feet |
| Length | 772 feet |
| Base | -- |
| Elevation | El. 6,568 feet, approximately |
| Width | 134 feet, approximately |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | 2.5H:1V |
| Downstream Face (Horizontal to Vertical) | 2.0H:1V |
| **Jackson Lake Dam Spillway** | -- |
| Type | Sharp crested weir |
| Crest | -- |
| Elevation | El. 6,592.67 feet |

## Table 4.1-1. (continued)

| | |
|---|---|
| **JACKSON LAKE DAM AND RESERVOIR (continued)** | |
| Length | 50.0 feet |
| Control | Uncontrolled |
| Maximum Discharge | 1,481 cfs |
| **Jackson Lake Dam Low-Level Outlet** | -- |
| Number, Size, & Control | One 18-inch-diameter steel pipe controlled by an 18-inch slide gate operated by hand from the control house on the dam crest |
| Outlet Invert Elevation | El. 6,570 feet |
| Maximum Capacity | 60 cfs |
| Trash Rack | 30-inch rail trash rack |
| **Jackson Lake Reservoir** | -- |
| Normal Maximum Water Surface Elevation | El. 6,592.67 feet |
| Normal Minimum Water Surface Elevation | El. 6,570.0 feet |
| Drainage Area | 0.70 square miles |
| Gross Storage at normal maximum water surface el. | 1,334 acre-feet |
| Usable Storage | 975 acre-ft |
| Surface Area at normal maximum water surface el. | 52 acres |
| Length | 0.4 miles |
| Width | 0.3 miles |
| Maximum Depth | 54 feet |
| Shoreline Length | 1.1 miles |
| Closest Upstream Facility | No upstream facilities |
| Closest Downstream Facility | Bowman Lake, part of the Yuba-Bear Hydroelectric Development, 2.9 miles downstream |
| **FRENCH LAKE DAM AND RESERVOIR** | |
| River Mile | 18.4 (Canyon Creek) |
| Construction Period | First stage in mid-1800's, second stage 1940's |
| **French Lake Dam** | -- |
| Hazard Classification | High |
| Type | Rockfill dam with reinforced gunite on upstream face |
| Height | 70 feet |
| Crest | -- |
| Elevation | Dam crest El. 6,665 feet |
| Width | 15 feet |
| Length | 200 feet |
| Base | -- |
| Elevation | 6,598.5 feet |
| Width | 210 feet approximately |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | 1H:1V |
| Downstream Face (Horizontal to Vertical) | 1.4H:1V |
| **French Lake Spillway** | -- |
| Type | Weir wall |
| Crest | -- |
| Elevation | El. 6,660.28 feet |
| Length | 100 feet |
| Control | Uncontrolled |
| Maximum Discharge | 3,810 cfs at zero freeboard |
| **French Lake Dam Low-Level Outlet** | -- |
| Number, Size, & Control | One outlet: 4-foot by 5-foot-high box culvert formed in wet rubble masonry on the bottom and two sides capped with a 15-inch thick reinforced concrete slab "Outlet Trunk." Controlled by a 42-inch square gate at the upstream face, hydraulically operated from control house on dam crest. |
| Outlet Invert Elevation | El. 6,594.9 feet |
| Maximum Capacity | 650 cfs (estimated) |
| Trash Rack | Grizzly of unknown dimensions |

**Table 4.1-1. (continued)**

| | |
|---|---|
| **FRENCH LAKE DAM AND RESERVOIR (continued)** | |
| **French Lake Reservoir** | -- |
| Normal Maximum Water Surface Elevation | 6,660.28 feet |
| Normal Minimum Water Surface Elevation | 6,608 feet |
| Drainage Area | 4.82 square miles |
| Gross Storage at normal maximum water surface el. | 13,940 acre-feet |
| Usable Storage | 13,940 acre-feet |
| Surface Area at normal maximum water surface el. | 356 acres |
| Length | 1.6 miles |
| Width | 0.5 miles |
| Maximum Depth | 65 feet |
| Shoreline Length | 5.3 miles |
| Closest Upstream Facility | No upstream facilities |
| Closest Downstream Facility | Faucherie Lake, part of the Yuba-Bear Hydroelectric Development, 1.3 miles downstream |
| **FAUCHERIE LAKE DAM AND RESERVOIR** | |
| River Mile | 16.5 (Canyon Creek) |
| Construction Period | Originally 1880's, rebuilt in 1963-1964 |
| Placed in Service | 1964 |
| **Faucherie Lake Dam** | -- |
| Hazard Classification | High |
| Type | Zoned embankment with sloping core and filter zones dam |
| Height | 65 feet |
| Crest | -- |
| Elevation | El. 6,131 feet |
| Width | 24 feet |
| Length | 665 feet |
| Base | -- |
| Elevation | El. 6,064.4 feet |
| Width | 230 feet |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | 2.5H:1V |
| Downstream Face (Horizontal to Vertical) | 1.4H:1V |
| **Faucherie Lake Spillway** | -- |
| Type | Concrete sharp crested weir |
| Crest | -- |
| Elevation | El. 6,123 feet |
| Width | 5.5 feet |
| Length | 150 feet |
| Control | Uncontrolled |
| Maximum Discharge | 10,000 cfs at zero freeboard |
| **Faucherie Lake Dam Low-Level Outlet** | -- |
| Number, Size, & Control | Two 24-inch No. 265 series sluice gates with one integral 6-inch sluice gate. Sluice gates open by single stem hydraulic cylinders. |
| Outlet Invert Elevation | 6,090 feet |
| Maximum Capacity | 288.5 cfs |
| Trash Rack | Metal rack, 8 feet 4 inches by 8 feet 4 inches |
| **Faucherie Lake Reservoir** | -- |
| Normal Maximum Water Surface Elevation | El. 6,123 feet |
| Normal Minimum Water Surface Elevation | El. 6,090 feet |
| Drainage Area | 9.29 square miles |
| Gross Storage at normal maximum water surface | 3,980 acre-feet |
| Usable Storage | 3,740 acre-feet |
| Surface Area at normal maximum water surface el. | 150 acres |
| Length | 0.7 miles |
| Width | 0.6 miles |

## Table 4.1-1. (continued)

| | |
|---|---|
| **FAUCHERIE LAKE DAM AND RESERVOIR (continued)** | |
| Maximum Depth | 42 feet |
| Shoreline Length | 2.4 miles |
| Closest Upstream Facility | French Lake, part of the Yuba-Bear Hydroelectric Development, 1.3 miles upstream |
| Closest Downstream Facility | Sawmill Lake, part of the Yuba-Bear Hydroelectric Development, 1.5 miles downstream |
| **SAWMILL LAKE DAM AND RESERVOIR** | |
| River Mile | 14.1 (Canyon Creek) |
| Construction Period | 1910 and enlarged in 1941 |
| **Sawmill Lake Dam** | -- |
| Hazard Classification | Low |
| Type | Rockfill dam with gunite upstream face and derrick placed stone on downstream face |
| Height | 60 feet |
| Crest | -- |
| Elevation | Dam crest El. 5,865 feet, parapet El. 5,867 feet |
| Width | 5 feet |
| Length | 384 feet |
| Base | -- |
| Elevation | El. 5,805 feet |
| Width | 155 feet, approximately |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | 1H:1V |
| Downstream Face (Horizontal to Vertical) | 1H:1V |
| **Sawmill Lake Spillway** | -- |
| Type | Overflow |
| Crest | -- |
| Elevation | El. 5,860 feet |
| Length | 230 feet |
| Control | Uncontrolled |
| Maximum Discharge | 15,000 cfs at zero freeboard |
| **Sawmill Lake Dam Low-Level Outlets** | -- |
| Number, Size, & Control | One 24-inch-diameter steel pipe with a 24-inch-diameter slide gate operated manually from the dam crest |
| Outlet Invert Elevation | El. 5,805 ft |
| Maximum Capacity | 160 cfs |
| Trash Rack | Steel rail trash rack |
| **Sawmill Lake Reservoir** | -- |
| Normal Maximum Water Surface Elevation | El. 5,860 feet |
| Normal Minimum Water Surface Elevation | El. 5,805 feet |
| Drainage Area | 17.0 square miles |
| Gross Storage at normal maximum water surface el. | 3,030 acre-feet |
| Usable Storage | 3,030 acre-feet |
| Surface Area at normal maximum water surface el. | 113 acres |
| Length | 0.8 miles |
| Width | 0.4 miles |
| Maximum Depth | 55 feet |
| Shoreline Length | 2.6 miles |
| Closest Upstream Facility | Faucherie Lake, part of the Yuba-Bear Hydroelectric Development, 1.5 miles upstream |
| Closest Downstream Facility | Bowman Lake, part of the Yuba-Bear Hydroelectric Development, 0.8 miles downstream |
| **BOWMAN DAM AND RESERVOIR** | |
| River Mile | 10.7 (Canyon Creek) |
| Construction Period | North Dam: Several major construction periods; 1869, 1876, and 1926-1927<br>South Dam: 1926-1928 |
| Placed in Service | 1928 |

## Table 4.1-1. (continued)

| BOWMAN DAM AND RESERVOIR (continued) | |
|---|---|
| **Bowman North Dam**[2] | -- |
| Hazard Classification | High |
| Type | Rockfill |
| Height | 175 feet |
| Crest | -- |
| Elevation | Dam crest El. 5,567 feet, parapet wall 5,569.5 feet |
| Width | 15 feet |
| Length | 700 feet |
| Base | -- |
| Elevation | El. 5,400 feet, approximately |
| Width | 350 feet, approximately |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | 0.75H:1.0V from base to El. 5,537 feet; 0.5H:1V from El. 5,537 feet to crest |
| Downstream Face (Horizontal to Vertical) | 1.4H:1V |
| **Bowman North Dam Low-Level Outlet and Penstock Intake** | -- |
| Number & Size | One outlet consisting of a 62-inch-ID steel pipe that bifurcates into two pipes just past the downstream toe of the dam. One pipe is the 62-inch-ID powerhouse penstock. The other pipe is a 70-inch-ID pipe going to an outlet valve control house. Just prior to the control house, the 70-inch pipe bifurcates into two pipes. Both pipes are reduced down to 42 inches ID. |
| Outlet Invert Elevation | El. 5,400 feet |
| Control | Intake controlled by a hydraulically operated Broome gate.<br>Outlet controlled by one 24-inch bypass butterfly valve; one 8-inch gate valve drain pipe; and one 30-inch bypass butterfly valve. |
| Maximum Capacity | 400 cfs |
| Trash Rack | 3 metal racks, 6 feet wide by 7.5 feet high |
| **Bowman South Dam** | -- |
| Hazard Classification | High |
| Type | Concrete arch |
| Height | 135 feet |
| Crest | -- |
| Elevation | El. 5,563.6 feet |
| Width | 7 feet, approximately |
| Length | 400 feet |
| Base | -- |
| Elevation | El. 5,435 feet, approximately |
| Width | 65 feet |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | Vertical |
| Downstream Face (Horizontal to Vertical) | Varies, near vertical |
| **Bowman South Dam Spillway** | -- |
| Type | Concrete gated and ungated spillway sections |
| Crest | -- |
| Elevation | Two levels: Five uncontrolled overflow bays crest El. 5,563.6 feet and seven radial gates crest El. 5,557.2 feet |
| Length | 175 feet |
| Control | Seven 140-inch by 70-inch Calico radial gates and five uncontrolled overflow bays |
| Hoist Type | Hoists operated with portable power packs or manually |
| Maximum Discharge | Gated spillway: 4,000 cfs at water surface El. 5,563 feet<br>Ungated spillway: 25,000 cfs at water surface El. 5,567 feet |
| **Bowman South Dam Low-Level Outlet** | -- |
| Number, Size & Control | None |
| **Bowman Lake Reservoir** | -- |
| Normal Maximum Water Surface Elevation | El. 5,562 feet |
| Normal Minimum Water Surface Elevation | El. 5,400 feet |

## Table 4.1-1. (continued)

| | |
|---|---|
| **BOWMAN DAM AND RESERVOIR (continued)** | |
| Drainage Area | 28.5 square miles |
| Gross Storage at normal maximum water surface el. | 68,363 acre-feet [based on Licensee's 2007-2008 bathymetric studies] |
| Usable Storage | 68,363 acre-feet [based on Licensee's 2007-2008 bathymetric studies] |
| Surface Area at normal maximum water surface el. | 827 acres |
| Length | 2.6 miles |
| Width | 0.8 miles |
| Maximum Depth | 162 feet |
| Shoreline Length | 7.6 miles |
| Closest Upstream Facility | Sawmill Lake, part of the Yuba-Bear Hydroelectric Development, 0.8 miles upstream |
| Closest Downstream Facility | Bowman Powerhouse, part of the Yuba-Bear Hydroelectric Development, immediately downstream |
| **BOWMAN PENSTOCK** | |
| **Bowman Penstock** | -- |
| Number and Type | One submerged |
| Construction | Concrete encased, interior coating only |
| Size | 62-inch-diameter |
| Length | 77 feet 2 inches |
| Maximum Flow Capacity | 375 cfs |
| **BOWMAN POWERHOUSE** | |
| **Bowman Powerhouse** | -- |
| Location | Immediately downstream of Bowman North Dam |
| Placed in Service (Began Commercial Operation) | September 19, 1986 |
| Plant Operation | Manual |
| Normal Type of Operation | Base loaded |
| Structure | -- |
| Type | Indoor powerhouse, reinforced concrete |
| Construction Period | 1984-1986 |
| Approximate Size | 41feet by 39 feet below ground, 40 feet by 23 feet above ground |
| Turbine | -- |
| Number of Units | One |
| Type | Horizontal Francis |
| Manufacturer | Axel Johnson Inc. |
| Upgrades | N/A |
| Nameplate Output | 4,452 HP |
| Nameplate Capability | 3,600 kW |
| Nameplate Rated Head | 135 feet |
| Speed | 450 RPM |
| Nameplate Rated Flow | 313 cfs |
| Turbine Centerline Elevation | 5,396.90 feet |
| Generator | -- |
| Type | 3-phase synchronous generator, Type 5000-A |
| Manufacturer | Yaksawa Electric Manufacturing Co. |
| Upgrades | N/A |
| Nameplate Output | 4,000 KVA |
| Nameplate Capability | 3,600 kW |
| Power Factor | 0.9 |
| Voltage | 4,160 Volts |
| Speed | 450 RPM |
| Governor | -- |
| Type | Hydraulic power control unit |
| Manufacturer | Axel Johnson |
| Closest Upstream Facility | Bowman North Dam, part of the Yuba-Bear Hydroelectric Development, immediately upstream |
| Closest Downstream Facility | Bowman-Spaulding Conduit Diversion Dam, part of the Yuba-Bear Hydroelectric Development, immediately downstream. |

**Table 4.1-1. (continued)**

| BOWMAN SWITCHYARD | |
|---|---|
| **Bowman Switchyard** | -- |
| Location | North of powerhouse |
| Size | 50 feet by 50 feet |
| Transformer Type | Westinghouse – OPT oil filled OA/FA 1254. 3 phase, 65º C Rise |
| Transformer Nameplate Rating | HV – 60 Kv LV – 4160v 5200 / 4000 KVA |
| Maximum Capacity | -- |
| Voltage Rating | H.T. – 350 Kv L.T. – 60 Kv |
| High Voltage Breakers | ACB 4.16 Kv 1200A 250 MVA |
| Associated Transmission Line within FERC License | Bowman-Spaulding 60 kV, FERC 2266 |

[1] Milton South Dam does not have a low-level outlet. The Milton-Bowman Diversion Conduit is the outlet from this dam.
[2] The Bowman North Dam does not have a spillway; there are two spillways on the Bowman South Dam, one gated and one uncontrolled.


**Figure 4.1-1. Views of Bowman Development facilities and features.**

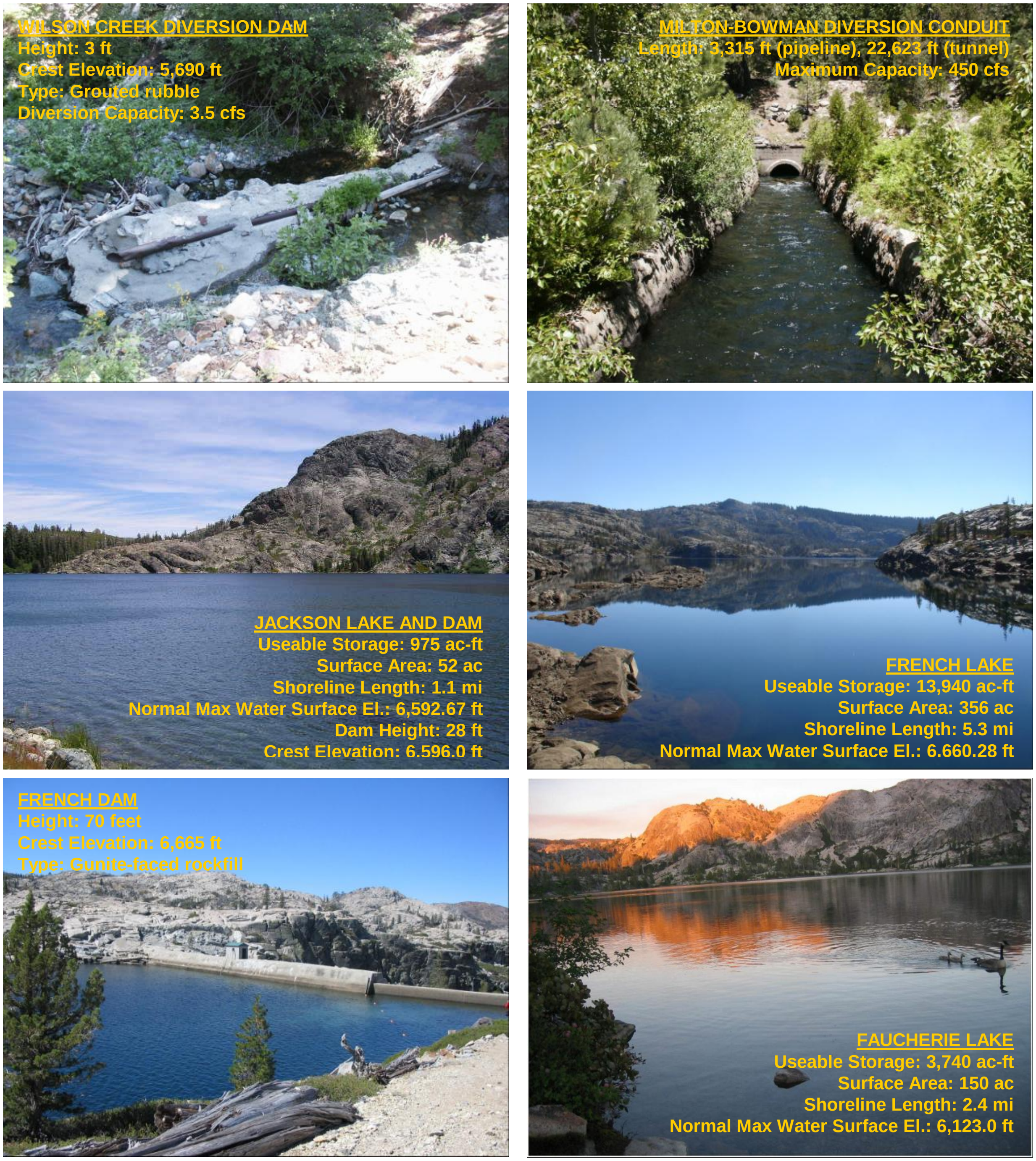
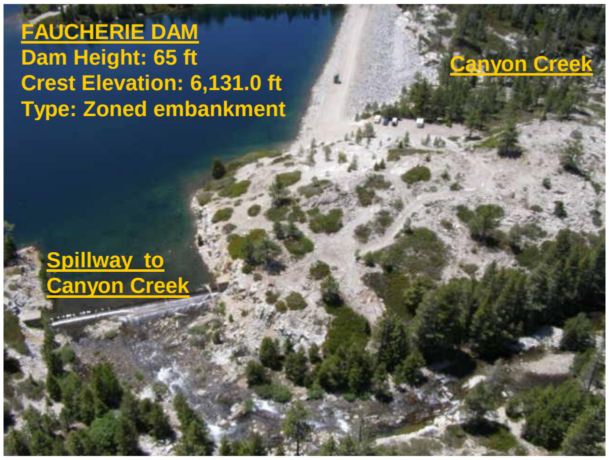
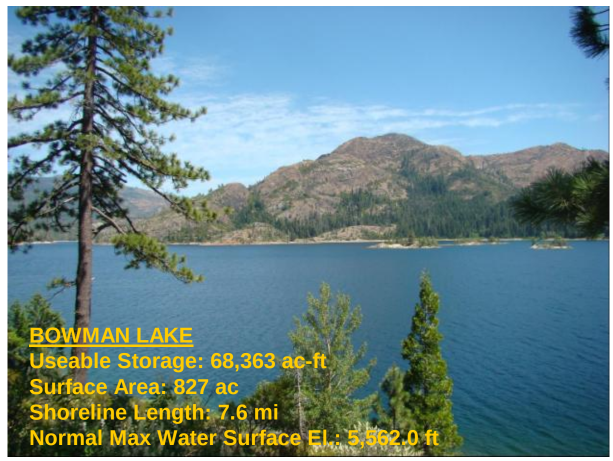



**Figure 4.1-1. (continued)**







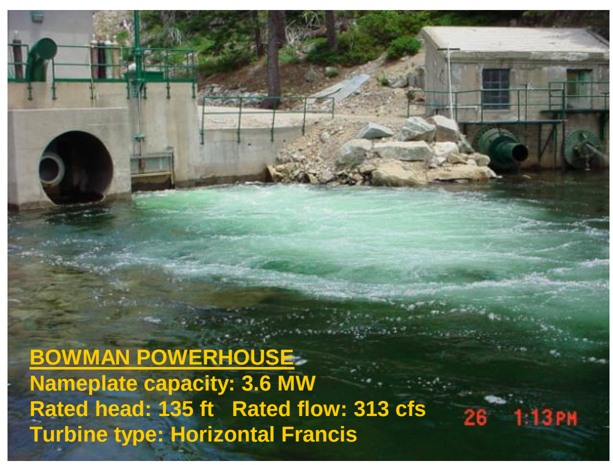



**Figure 4.1-1. (continued)**


**Figure 4.1-1. (continued)**

### 4.1.1 Bowman Development Recreation Facilities

The Bowman Development includes recreation facilities at Jackson Meadows Reservoir, Milton Diversion Dam Impoundment, Faucherie Lake, and Bowman Lake. Each of the facilities by reservoir/impoundment is described below.

#### 4.1.1.1 Jackson Meadows Reservoir Recreation Facilities

Jackson Meadows Reservoir recreation facilities consist of eight campgrounds, two picnic areas, and two boat launches. As a whole, the recreation facilities provide overnight camping at 131 developed campsites, five group camping sites (150 persons-at-one-time [PAOT]), and 10 boat-in campsites. In addition, the recreation facilities provide 17 total picnic sites. All facilities are managed by the Forest Service through a concessionaire. Table 4.1-2 lists the facilities. Representative photographs of the recreation facilities are shown in Figure 4.1-2. In addition to these facilities, Jackson Meadow Vista Point is located at the east end of Jackson Meadows Dam, and a campground on Jackson Point is accessible only by boat.

**Table 4.1-2. Jackson Meadows Reservoir developed recreation facilities.**

| Campground | Typical Season (open/close) | Manager | Restrooms | Boat Launch | Parking Spaces | Picnic Sites | Camp Sites | PAOT Capacity |
|---|---|---|---|---|---|---|---|---|
| **RECREATION FACILITIES ON EAST SIDE OF RESERVOIR** | | | | | | | | |
| Aspen Group Campground | mid May/late Sept | Forest Service (concessionaire) | 3 vault (8 stalls) | none | 35 | none | 3 | 100 |
| Aspen Picnic Area | mid May/late Sept | Forest Service (concessionaire) | 2 vault (5 stalls) | none | 30 (informal) | 11 | none | 55 |
| Pass Creek Campground | mid May/late Sept | Forest Service (concessionaire) | 2 flush/1vault (10 stalls) | none | none | none | 30 (9 overflow) | 150 (45 overflow) |
| Pass Creek Boat Ramp | mid May/late Sept | Forest Service (concessionaire) | 1 vault (2 stalls) | 3 lanes (concrete) | 43 (23 main / 20 auxiliary) | none | none | N/A |
| East Meadow Campground | mid May/late Sept | Forest Service (concessionaire) | 3 flush (9 stalls) | none | 6 (overflow) | none | 46 | 230 |
| Jackson Meadows Vista | mid May/late Sept | Forest Service (concessionaire) | 1 vault (1 stall) | none | 8 (informal) | none | none | none |

**Table 4.1-2. (continued)**

| Campground | Typical Season (open/close) | Manager | Restrooms | Boat Launch | Parking Spaces | Picnic Sites | Camp Sites | PAOT Capacity |
|---|---|---|---|---|---|---|---|---|
| **RECREATION FACILITIES ON WEST SIDE OF RESERVOIR** | | | | | | | | |
| Findley Campground | mid May/late Sept | Forest Service (concessionaire) | 1 flush (4 stalls) | none | none | none | 14 | 70 |
| Firtop Campground | mid May/late Sept | Forest Service (concessionaire) | 1 flush (2 stalls) | none | none | none | 12 | 60 |
| Woodcamp Campground | mid May/late Sept | Forest Service (concessionaire) | 1 flush/1 vault (6 stalls) | none | none | none | 20 | 100 |
| Woodcamp Picnic | mid May/late Sept | Forest Service (concessionaire) | 2 vault (5 stalls) | none | 35 (informal) | 6 | none | 130 |
| Woodcamp Boat Ramp | mid May/late Sept | Forest Service (concessionaire) | 1 vault (2 stalls) | 1 lane (concrete) | 36 | none | none | N/A |
| Silvertip Group | mid May/late Sept | Forest Service (concessionaire) | 2 vault (4 stalls) | none | 15 (informal) | none | 2 | 50 |
| Jackson Point Boat-In Campground | mid May/late Sept | Forest Service (concessionaire) | 2 pit (2 stalls) | none | none | none | 10 | 50 |


Aspen Group Campground (Hill Unit)

Aspen Picnic Area


Pass Creek Campground


Pass Creek Overflow Campground

**Figure 4.1-2. Views of Bowman Development recreation facilities at Jackson Meadows Reservoir.**


Pass Creek Boat Launch (main ramp)


Pass Creek Boat Launch (auxiliary ramp)


East Meadow Campground


Findley Campground


Fir Top Campground


Silvertip Group Campground


Woodcamp Picnic Area


Woodcamp Boat Launch

**Figure 4.1-2. (continued)**

#### 4.1.1.2 Milton Diversion Dam Impoundment Recreation Facilities

Along the north shore of the Milton Diversion Dam Impoundment, Licensee maintains six dispersed campsites with rock fire rings. A site identification and angler information sign are located near the impoundment inflow along with a single-unit vault toilet and several gravel/dirt access spurs for vehicle parking and informal boat launching (Figure 4.1-3).


Information Signs

Restroom

**Figure 4.1-3. Views of Bowman Development recreation facilities at Milton Diversion Impoundment.**

#### 4.1.1.3 Faucherie Lake Recreation Facilities

Faucherie Lake Group Campground is located on the north shore of the reservoir, and accommodates 50 people at two group sites (Table 4.1-3). Overall, the group camp consists of eight picnic tables, two steel fire rings, six animal resistant food lockers, three animal-resistant trash receptacles, one animal resistant recycling receptacle, and a single, two-unit toilet building. On-site parking accommodates six VAOT (3 VAOT at each group site); however, additional parking is available at the day use and boat launch parking area. Each group site has four to five tent pads available. In addition, the rustic Faucherie Lake Day Use and Boat Launch facility is located adjacent to the group campground. The facility consists of an informal single-lane boat ramp, double-unit vault restroom, and a parking area (14 VAOT). Representative photographs of the recreation facilities are shown in Figure 4.1-4.

**Table 4.1-3. Faucherie Lake developed recreation facilities.**

| Facility | Typical Season | | Manager | Facility Type | Boat Launch | Parking | Picnic sites | Camp-sites | PAOT Capacity |
|---|---|---|---|---|---|---|---|---|---|
| | Open | Close | | | | | | | |
| Faucherie Group Campground | Mid May | Late Sept | Forest Service | developed | none | 6 | none | 2 | 50 |
| Faucherie Day Use & Boat Launch | Mid May | Late Sept | Forest Service | developed | 1-lane (informal) | 14 | none | none | 50 |


Faucherie Lake Group Campground

Faucherie Lake Group Campground

Faucherie Lake Day Use and Boat Launch

Faucherie Lake Day Use and Boat Launch

**Figure 4.1-4. Views of Bowman Development recreation facilities at Faucherie Lake.**

In addition, Licensee maintains a rustic, 16-unit campground, Canyon Creek Campground, located along Canyon Creek approximately 1.1 miles downstream of Faucherie Lake. The campground is managed by the Forest Service. Table 4.1-4 lists the campground details; and representative photographs of the campground are shown in Figure 4.1-5.

**Table 4.1-4. Canyon Creek developed recreation facilities.**

| Facility | Typical Season | | Manager | Facility type | Boat Launch | Parking | Picnic sites | Campsites | PAOT Capacity |
|---|---|---|---|---|---|---|---|---|---|
| | Open | Close | | | | | | | |
| Canyon Creek Campground | Mid - May | Late - Sept. | Forest Service | developed | none | none | none | 16 | 80 |


Canyon Creek Campground


Canyon Creek Campground

**Figure 4.1-5. Views of Bowman Development recreation facilities along Canyon Creek.**

### 4.1.1.4 Bowman Lake Recreation Facilities

Licensee owns a developed campground near the Milton-Bowman Diversion tunnel outlet at the northeastern end of the reservoir that is managed by the Forest Service (Table 4.1-5). The facility has a toilet, a camping information sign, and consists of 11 campsites, each with a fire ring and picnic table. An informal boat launch ramp is located at the campground as well. In addition, 14 primitive dispersed campsites are located along the north shoreline each with only a steel fire ring/grill unit. Representative photographs of the recreation facilities are shown in Figure 4.1-6.

**Table 4.1-5. Bowman Lake developed recreation facilities.**

| Facility | Typical Season | | Manager | Facility type | Boat Launch | Parking | Picnic sites | Campsites | PAOT Capacity |
|---|---|---|---|---|---|---|---|---|---|
| | Open | Close | | | | | | | |
| Bowman Lake Campground | Mid - May | Late - Sept. | Forest Service | developed | informal | none | none | 11 | 55 |


Bowman Lake Campground


Bowman Lake Campground

**Figure 4.1-6. Views of Bowman Development recreation facilities at Bowman Lake.**

Primitive Campsites

Informal Boat Launch

**Figure 4.1-6. (continued)**

## 4.2 Dutch Flat Development

The Dutch Flat Development begins at the Bowman-Spaulding Conduit on Canyon Creek (El. 5,400.0 ft – crest of Bowman-Spaulding Conduit Diversion Dam) and ends at the Dutch Flat No. 2 Powerhouse (turbine centerline elevation 2,735 ft) on the Bear River. The development includes one diversion impoundment (Bowman-Spaulding Conduit Diversion Impoundment), one reservoir (Dutch Flat No. 2 Forebay), two conduits (Bowman-Spaulding and Dutch Flat No. 2 Conduit), and one powerhouse (Dutch Flat No. 2). The dimensions, physical features, and other pertinent information for each facility and feature are provided in Table 4.2-1. Representative photographs of the facilities and features are provided in Figure 4.2-1. The Dutch Flat Development does not include any existing developed recreation facilities; however, an undeveloped parking area is located at Dutch Flat No. 2 Forebay on NID land.

**Table 4.2-1. Description of Yuba-Bear Hydroelectric Project facilities and features – Dutch Flat Development.**

| BOWMAN-SPAULDING CONDUIT DIVERSION DAM | |
|---|---|
| River Mile | 10.5 (Canyon Creek) |
| Original Construction Period | 1926 - 1927 |
| Placed in Service | 1927 |
| Hazard Classification | Low |
| Type | Concrete |
| Height | 21 feet |
| Crest | -- |
| Elevation | El. 5,400 feet |
| Width | 18 inches |
| Length | 150 feet |
| Base | -- |
| Elevation | El. 5,379 feet |
| Width | 3 feet 6 inches |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | Vertical |
| Downstream Face (Horizontal to Vertical) | Varies |
| Normal Maximum Water Surface Elevation | El. 5,398 feet |

## Table 4.2-1. (continued)

| | |
|---|---|
| **BOWMAN-SPAULDING CONDUIT DIVERSION DAM (continued)** | |
| Normal Minimum Water Surface Elevation | El. 5,393.8 feet |
| Drainage Area | 27.1 sq. mi. |
| **Bowman-Spaulding Conduit Diversion Dam Low-Level Outlet** | -- |
| Number & Size | One 30-inch-diameter |
| Outlet Invert Elevation | El. 5,380 feet |
| Control | Model 101 Calico 30-inch-diameter slide gate |
| Maximum Capacity | 80 cfs |
| Closest Upstream Facility | Bowman Powerhouse, part of the Yuba-Bear Hydroelectric Project, immediately upstream |
| Closest Downstream Facility | Bowman-Spaulding Conduit, part of the Yuba-Bear Hydroelectric Project, immediately downstream |
| **BOWMAN-SPAULDING CONDUIT** | |
| General Description | Diverts flows below Bowman Reservoir and Dam to PG&E's Lake Spaulding via 40,501 feet of canals and flumes with 16,192 feet of tunnels. |
| Hydraulic Capacity | 300 cfs |
| Tunnel No. 3 | Horseshoe tunnel; 10 feet wide by 11 feet high with 5-foot radius. Approximate length: 796 feet. Max flow capacity 300 cfs. Inlet El. 5,391.18 feet. Outlet El. 5,390.13 feet. |
| Cut and Cover Section | Cut and cover section over Canyon Creek Inlet El. 5,390.13 feet. Outlet El. 5,390.06 feet. |
| Tunnel No. 1 | Horseshoe tunnel; 10 feet wide by 11 feet high with 5-foot radius. Approximate length: 1,645 feet. Max flow capacity 300 cfs. Inlet El. 5,390.06 feet. Outlet El. 5,387.9 feet. |
| Canal No. 1 | Trapezoid channel; 5.5 feet high by 8 feet wide base with 1H:4V and 1H:1V side slopes. Approximate length: 1,133.75 feet. Max flow capacity 300 cfs. Inlet El. 5,390.31 feet. Outlet El. 5,389.87 feet. |
| Tunnel No. 2 | Horseshoe tunnel; 10 feet wide by 11 feet high with 5-foot radius. Approximate length: 7,443 feet. Max flow capacity 300 cfs. Inlet El. 5,387.26 feet. Outlet El. 5,378.5 feet. |
| Pipe No. 1 | 84-inch concrete pipe: concrete pipe; 80-inch-inside-diameter. Approximate length: 1,619.78 feet. Inlet El. 5,378.5 feet. Outlet El. 5,377.00 feet. |
| Canal No. 2 | Canal: trapezoid channel; 5.5 feet high by 6 to 8 feet wide base with 4H:3V side slopes. Approximate length: 4,821 feet. Max flow capacity 300 cfs. Inlet El. 5,379.3 feet. Outlet El. 5,375.41 feet. |
| Texas Creek Bypass Tunnel No.4 | Horseshoe tunnel; 10 feet wide by 11 feet high with 5-foot radius. Approximate length: 109 feet. Inlet El. 5,371.65 feet. Outlet approximate El. 5,371.0 feet. |
| Tunnel No. 5 | Horseshoe tunnel; 10 feet wide by 11 feet high with 5-foot radius on top. Approximate length: 390 feet. Max flow capacity 300 cfs. Inlet approximate El. 5,370.8 feet. Outlet El. 5,370.26 feet. |
| **TEXAS CREEK DIVERSION DAM** | |
| River Mile | 0.6 (Texas Creek) |
| Original Construction Period / Placed In Service | unknown |
| Hazard Classification | Low |
| Type | Concrete |
| Height | 21 feet |
| Crest | 50 |
| Elevation | El. 5,385.75 feet |
| Base | -- |
| Elevation | El. 5,375.75 feet |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | Vertical |
| Downstream Face (Horizontal to Vertical) | Varies |
| Normal Maximum Water Surface Elevation | El. 5,385.75 feet |
| Normal Minimum Water Surface Elevation | El. 5,375.75 feet |
| Drainage Area | 4.6 sq. mi. |
| **Texas Creek Diversion Dam Low-Level Outlet** | -- |
| Number & Size | One 30-inch-diameter |
| Outlet Invert Elevation | El. 5,376 feet |

**Table 4.2-1. (continued)**

| | |
|---|---|
| **TEXAS CREEK DIVERSION DAM (continued)** | |
| Control | Model 101 Calico 30-inch diameter slide gate |
| Maximum Capacity | 80 cfs |
| Closest Upstream Facility | Bowman-Spaulding Conduit, part of the Yuba-Bear Hydroelectric Project, immediately upstream |
| Closest Downstream Facility | Bowman-Spaulding Conduit, part of the Yuba-Bear Hydroelectric Project, immediately downstream |
| Concrete Bridge Flume Section / Shear Structure | Back Wall height: 7.5 feet. Opposite wall height: 5.5 feet. Floor width: 9 feet 10 inches. Outlet is restricted to 3.5-foot-high opening. Max flow capacity 300 cfs. Excess flow is spilled back to Texas Creek below diversion. Inlet El. 5,373.12 feet. Outlet approximate El. 5,373.0 feet. |
| East Texas Creek Tunnel | Horseshoe tunnel; 10 feet wide by 11 feet high with 5-foot radius. Approximate length: 90 feet. Max flow capacity 300 cfs. Inlet approximate El. 5,373.0 feet. Outlet approximate El. 5,372.75 feet. |
| Box Car Wasteway | Maximum flow capacity – 300 cfs |
| Canal Section | Trapezoid channel; 5 feet high by 6 feet wide base with 1H:1V side slopes. Approximate length: 6,000 feet. Max flow capacity 325 cfs. Inlet approximate El. 5,372.75 feet. Outlet El. 5,364.89 feet. |
| Clear Creek Tunnel | Horseshoe tunnel; 9 feet wide by 10.5 feet high with 4.75-foot radius. Approximate length: 2,350 feet. Max flow capacity 325 cfs. Inlet El. 5,364.89 feet. Outlet El. 5,354.40 feet. |
| Clear Creek Wasteway | Maximum flow capacity – 325 cfs |
| Christmas Tree Wasteway | Maximum flow capacity – 325 cfs |
| Canal Section | Trapezoid channel; 6 feet high by 12 to 13 feet wide base with 1H:1V side slopes. Approximate length: 5,928 feet. Max flow capacity 325 cfs. Inlet El. 5,356.15 feet. Outlet El. 5,349.57 feet. |
| Fall Creek Cross Flume | Length: 128 feet. Max Flow capacity 325 cfs. "U" shaped metal flume. Width at top 14 feet. Depth at center 7.3 feet with 1 foot freeboard. Inlet El. 5,351.75 feet. Outlet El. 5,351.75 feet |
| **FALL CREEK DIVERSION DAM** | |
| River Mile | 2.0 (Fall Creek) |
| Original Construction Period / Placed In Service | unknown |
| Hazard Classification | Low |
| Type | Concrete |
| Height | 5.5 feet |
| Crest | 74.5 |
| Elevation | El. 5,368.68 feet |
| Base | -- |
| Elevation | El. 5,363.18 feet |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | Vertical |
| Downstream Face (Horizontal to Vertical) | Varies |
| Normal Maximum Water Surface Elevation | El. 5,368.68 feet |
| Normal Minimum Water Surface Elevation | El. 5,363,18 feet |
| Drainage Area | 5.81 sq. mi. |
| **Fall Creek Diversion Dam Low-Level Outlet** | -- |
| Number & Size | One 30-inch-diameter |
| Outlet Invert Elevation | El. 5,363.5 feet |
| Control | Model 101 Calico 30-inch diameter slide gate |
| Maximum Capacity | 80 cfs |
| Closest Upstream Facility | Bowman-Spaulding Conduit, part of the Yuba-Bear Hydroelectric Project, immediately upstream |
| Closest Downstream Facility | Bowman-Spaulding Conduit, part of the Yuba-Bear Hydroelectric Project, immediately downstream |
| Fall Creek Diversion Flume | Length: 204 feet. Max flow capacity 100 cfs. "U" shaped metal flume. |
| Canal Section | Trapezoid channel; 4 to 7 feet high by 12 to 13 feet wide base with 4H:1V side slopes. Approximate length: 12,325 feet. Max flow capacity 325 cfs. Inlet El. 5,353.7 feet. Outlet El. 5,347.4 feet. |
| Camp 19 Wasteway | Maximum flow capacity – unknown |

**Table 4.2-1. (continued)**

| | |
|---|---|
| **CLEAR CREEK DIVERSION** | |
| **Clear Creek Diversion** | Approximate width: 50 feet |
| **TRAP CREEK DIVERSION** | |
| **Trap Creek Diversion** | Approximate width: 50 feet. Trap Creek drops into this section. |
| Trap Creek Wasteway | Maximum flow capacity – 325 cfs |
| **RUCKER CREEK DIVERSION** | |
| Rucker Creek Wasteway | Maximum flow capacity – 325 cfs |
| **Rucker Creek Diversion** | Approximate width: 123 feet. Rucker Creek drops into this section. |
| Rucker Creek Tunnel | Horseshoe tunnel; 7.5 feet wide by 7.6 feet high with 4.22-foot radius. Approximate length: 2,965 feet. Inlet El. 5,343.5 feet. Outlet El. 5,332.7 feet. |
| **BOWMAN-SPAULDING CONDUIT (DOWNSTREAM SECTION)** | |
| Canal Section (below PG&E's Fuller Lake Dam) | Trapezoid channel; 5.5 feet high by 10 feet wide base with 1H:1V side slopes. Approximate length: 2,682 feet. Max flow capacity 325 cfs. Inlet El. 5,331.57 feet. Outlet El. 5,329.99 feet. |
| Zion Hill Tunnel | Horseshoe tunnel; 7.5 feet wide by 7.6 feet high with 4.22-foot radius. Approximate length: 547 feet. Max flow capacity 325 cfs. Inlet El. 5,329.99 feet. Outlet El. 5,328.66 feet. |
| Jordan Hill Wasteway | Maximum flow capacity – 325 cfs |
| Canal Section | Trapezoid channel; 5.5 feet high by 10 feet wide base with 1H:1V side slopes. Approximate length: 382 feet. Max flow capacity 325 cfs. Inlet El. 5,328.66 feet. Outlet El. 5,328.30 feet. |
| Jordan Creek Inverted Siphon | 7.5-foot-inside-diameter steel pipe. Inlet El. 5,328.30 feet. Outlet El. 5,326.80 feet. |
| Canal Section | Trapezoid channel; 5.5 feet high by 10 feet wide base with 1H:1V side slopes. Approximate length: 961 feet. Max flow capacity 325 cfs. Inlet El. 5,326.80 feet. Outlet El. 5,325.90 feet. |
| **DUTCH FLAT NO. 2 CONDUIT** | |
| Hydraulic Capacity | 610 cfs |
| Intake Structure Control | Invert El. 3,345.6 feet, controlled by a 14-foot-square vertical slide gate with screen slot or stop logs. |
| Operating Constraints | Minimum and maximum operating elevations at PG&E's Drum Afterbay: 3,355.6 and 3,382.6 feet, respectively. |
| Dutch Flat No. 2 Conduit Intake Tunnel | Inlet El. 3,348.6 feet. Outlet El. 3,349.16 feet. Concrete-lined horseshoe tunnel; 12-foot 7-inch base width, 7-foot 2.5-inch vertical wall below a 6-foot radius top section. Length: 530 feet. |
| Dutch Flat No. 2 Flume | Concrete flume, 7.5 feet high by 14 feet wide concrete flume, 19,099 feet long. Inlet El. 3,349.16 feet. Outlet El. 3,331.75 feet. |
| Dutch Flat No. 2 Flume Intake Wasteway | Size: 12-foot long spillway chute. Length: 98.5 feet. Max discharge capacity 610 cfs. |
| Stump Canyon Siphon Intake Wasteway | Size: 12.5-foot long spillway chute. Length: 200 feet. Max discharge capacity 610 cfs. |
| Stump Canyon Siphon | Steel pipeline. Inlet El. 3,331.75 feet. Outlet El. 3,327.78 feet. Size: 9-foot-inside-diameter. Length: 1,145 feet. |
| Canal Section | Trapezoid channel; 6.5 feet high by 10 feet wide base with 1.5H:1V and 1H:1V side slopes. Approximate length: 3,914 feet. Inlet El. 3,327.78 feet. Outlet El. 3,324.52 feet. |
| **DUTCH FLAT NO. 2 FOREBAY** | |
| River Mile | Off-channel |
| Construction Period | 1964-1965 |
| Placed in Service | 1965 |
| **Dutch Flat No. 2 Forebay** | -- |
| Hazard Classification | High |
| Type | Earth fill |
| Height | 77 feet |
| Crest | -- |
| Elevation | El. 3,336 feet |
| Width | 20 feet |
| Length | 440 feet |

**Table 4.2-1. (continued)**

| DUTCH FLAT NO. 2 FOREBAY (continued) | |
|---|---|
| Base | -- |
| Elevation | 3,267 feet |
| Width | 280 feet |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | 3H:1V |
| Downstream Face (Horizontal to Vertical) | 2H:1V from crest to El. 3,280 feet then 2.5V:1V to toe |
| **Dutch Flat No. 2 Forebay Spillway** | -- |
| Type | Overflow |
| Crest | -- |
| Elevation | El. 3,331.6 feet |
| Width | 63-foot-long spillway chute |
| Length | 250 |
| Control | Uncontrolled spillway |
| Maximum Discharge | 4,500 cfs at zero freeboard |
| **Dutch Flat No. 2 Forebay Low-Level Outlet** | -- |
| Number, Size, & Control | One 24-inch-diameter |
| Outlet Invert Elevation | El. 3,295 feet |
| Maximum Capacity | 134.0 cfs |
| Trash Rack | 6 feet 9 inches by 4 feet metal grizzly |
| **Dutch Flat No. 2 Penstock Intake** | -- |
| Number, Size, & Control | One 8-foot square concrete tunnel with automatic emergency-shutoff knife gate |
| Outlet Invert Elevation | El. 3,300 feet |
| Maximum Capacity | 610 cfs |
| Trash Rack | Yes |
| **Dutch Flat No. 2 Forebay** | -- |
| Normal Maximum Water Surface Elevation | El. 3,330.0 feet |
| Normal Minimum Water Surface Elevation | El. 3,323.0 |
| Drainage Area | 0.10 square miles |
| Gross Storage at normal maximum water surface el. | 177.9 acre-feet |
| Usable Storage | 159.8 acre-feet |
| Surface Area at normal maximum water surface el. | 8 acres |
| Length | 0.2-mile |
| Width | 0.1-mile |
| Maximum Depth | 61 feet |
| Shoreline Length | 0.5-mile |
| Closest Upstream Facility | Dutch Flat No. 2 Conduit, part of NID's Yuba-Bear Hydroelectric Project, located immediately upstream |
| Closest Downstream Facility | Dutch Flat No. 2 Powerhouse, part of NID's Yuba-Bear Hydroelectric Project, located immediately downstream |
| **DUTCH FLAT NO. 2 POWERHOUSE PENSTOCK** | |
| **Dutch Flat No. 2 Powerhouse Penstock** | -- |
| Number and Type | One |
| Construction | Steel penstock 3/8-inch thick |
| Size | 8-foot square, concrete tunnel leading to 6-foot 6-inch diameter steel penstock |
| Length | 1,370.2 ft |
| Maximum Flow Capacity | 610 cfs |
| **DUTCH FLAT NO. 2 POWERHOUSE** | |
| Placed in Service (Began Commercial Operation) | 1965 |
| Plant Operation | Automatic, operated from PG&E's Drum Switching Center located in the Drum No. 1 Powerhouse. |
| Normal Type of Operation | Intermediate loads with some peaking |
| Structure | -- |
| Type | Outdoor powerhouse, reinforced concrete |
| Construction Period | 1964-1965 |
| Approximate Size | 60 feet wide by 72 feet wide |

**Table 4.2-1. (continued)**

| | |
|---|---|
| Turbine | -- |
| Number of Units | One |
| Type | Vertical axis Francis |
| Manufacturer | Leffel |
| Upgrades | Rewound May 1982 |
| **DUTCH FLAT NO. 2 POWERHOUSE (continued)** | |
| Nameplate Output | 31,000 HP |
| Nameplate Capacity | 24.57 MW |
| Nameplate Rated Head | 581 feet |
| Speed | 450 RPM |
| Nameplate Rated Flow | 600 cfs |
| Turbine Centerline Elevation | El. 2,735.0 feet |
| Generator | -- |
| Type | 3 phase, 60 cycle Synchronous |
| Manufacturer | Westinghouse |
| Upgrades | Rewind in 1982 |
| Nameplate Output | 27,300 kVA |
| Nameplate Capacity | 27,300 kVA |
| Power Factor | 0.90 |
| Voltage | 6,900 Volts |
| Speed | 450 RPM |
| Governor | -- |
| Type | Cabinet |
| Manufacturer | Woodward |
| Turbine Shutoff Valve | Butterfly valve |
| Closest Upstream Facility | Dutch Flat No. 2 Forebay, part of NID's Yuba-Bear Hydroelectric Project, located immediately upstream |
| Closest Downstream Facility | Dutch Flat Afterbay, part of NID's Yuba-Bear Hydroelectric Project, located immediately downstream |
| **DUTCH FLAT NO. 2 POWERHOUSE SWITCHYARD** | |
| Dutch Flat No.2 Powerhouse Switchyard | -- |
| Location | North side of unit. |
| Size | 24 feet by 30 feet |
| Transformer Type | Westinghouse Type SL |
| Transformer Nameplate Rating | 26,000 kVA |
| Maximum Capacity | 26,000 kVA |
| Voltage Rating | 115,000 – 6,900 volts |
| High Voltage Breakers | Westinghouse 3-phase oil circuit breaker, outdoor type GM |
| Associated Transmission Line within FERC License | Power fed to PG&E 115kV Drum-Rio Oso Line |


**Figure 4.2-1. Views of Dutch Flat Development facilities and features.**


**Figure 4.2-1. (continued)**


**Figure 4.2-1. (continued)**

## 4.3 Chicago Park Development

The Chicago Park Development begins at the Dutch Flat Afterbay Dam (El. 2,755 ft) on the Bear River and ends at the Chicago Park Powerhouse (El. 2,240 ft) on the Bear River. The development includes one reservoir (Dutch Flat Afterbay), one conduit (Chicago Park Conduit), and one powerhouse (Chicago Park). The dimensions, physical features, and other pertinent information for each facility and feature are provided in Table 4.3-1. Representative photographs of the facilities and features are provided in Figure 4.3-1. The Chicago Park Development does not include any existing developed recreation facilities; however several undeveloped recreation sites are located at Dutch Flat Afterbay. On NID land, an undeveloped parking area is located to the east of where the Dutch Flat No. 2 Powerhouse Penstock enters the afterbay. An undeveloped parking area and informal launch ramp are located on PG&E land to the west of where the Dutch Flat No. 2 Powerhouse Penstock enters the afterbay. A single undeveloped parking area is located on private land on the south side of the afterbay. Several roadside parking areas beyond the dam on the north side of the afterbay for approximately 0.25 mile are located on BLM land. Of note, the Chicago Park Forebay and Powerhouse area do not have any developed recreation facilities, but do provide undeveloped recreation opportunities.

**Table 4.3-1. Description of Yuba-Bear Hydroelectric Project facilities and features – Chicago Park Development.**

| DUTCH FLAT AFTERBAY | |
|---|---|
| River Mile | 21.3 (Bear River) |
| Construction Period | 1964-1965 |
| **Dutch Flat Afterbay Dam** | -- |
| Hazard Classification | High |
| Type | Earth and rockfill |
| Height | 165 feet |
| Crest | -- |
| Elevation | El. 2,755.0 feet |
| Width | 20 feet |
| Length | 495 feet |
| Base | -- |

**Table 4.3-1. (continued)**

| DUTCH FLAT AFTERBAY (continued) | |
|---|---|
| Elevation | El. 2,580.5 feet |
| Width | 410 feet |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | 2.5H:1V |
| Downstream Face (Horizontal to Vertical) | 2H:1V |
| **Dutch Flat Afterbay Spillway** | -- |
| Type | Ogee overflow |
| Crest | -- |
| Elevation | El. 2,741 feet |
| Width | 100 feet |
| Length | 405 feet |
| Control | Uncontrolled |
| Hoist Type | N/A |
| Maximum Discharge | Approximately 21,500 cfs |
| **Dutch Flat Afterbay Low-Level Outlet** | -- |
| Number, Size & Control | Two outlet pipes. One 42-inch-diameter hydraulically controlled, and one 12-inch-diameter manually controlled. |
| Outlet Invert Elevation | 2,640 feet |
| Maximum Capacity | 150 cfs (combined) |
| Trash Rack | 8 feet wide by 6 feet high |
| **Dutch Flat Afterbay Reservoir** | -- |
| Normal Maximum Water Surface Elevation | El. 2,741.0 feet |
| Normal Minimum Water Surface Elevation | El. 2,729.0 feet |
| Drainage Area | 21.2 square miles |
| Gross Storage at spillway crest elevation | 1,359.2 acre-feet [based on Licensee’s 2007-2008 bathymetric studies] |
| Usable Storage | 1,359.2 acre-feet [based on Licensee’s 2007-2008 bathymetric studies] |
| Surface Area at normal maximum water surface el. | 38 acres |
| Length | 0.9 miles |
| Width | 0.08-mile |
| Maximum Depth | 170 feet |
| Shoreline Length | 1.9 miles |
| Closest Upstream Facility | Dutch Flat No. 2 Powerhouse, part of NID’s Yuba-Bear Hydroelectric Project, located immediately upstream |
| Closest Downstream Facility | Chicago Park Conduit, part of NID’s Yuba-Bear Hydroelectric Project, located immediately downstream |
| **CHICAGO PARK CONDUIT** | |
| Hydraulic Capacity | 1,100 cfs |
| Operating Constraints | Minimum and maximum operating elevations at PG&E’s Dutch Flat Afterbay: 2,740.0 and 2,729.0 feet, respectively. |
| Chicago Park Conduit | -- |
| Intake Elevation | El. 2,720.0 feet |
| Trash Rack | 32 feet high by 41.5 feet wide |
| Flume | 16,225 feet of concrete flume; flow width 18 feet wide, flow depth 10 feet with one foot of freeboard. |
| Chicago Park Conduit Intake Wasteway | Maximum flow capacity: 1,100 cfs |
| Little York Wasteway | Maximum flow capacity: 1,100 cfs |
| Width | 39-foot-long spillway chute |
| Length | 217 feet |
| Little York Basin | Rolled impervious fill with cobbles on upstream and downstream face. Dam is 10 feet wide at the crest, crest El. 2,721.0 feet, upstream slope of 3H:1V, downstream slope 2.5H:1V. Normal water-surface elevation 2,718.18 feet. |
| Canal | 4,148 feet of gunite-lined ditch, 14-foot-wide base with 1.5H:1V and 1H:1V side slopes, flow depth of 10 feet. |
| **CHICAGO PARK FOREBAY** | |
| River Mile | Off-channel |
| Construction Period | 1965 |

**Table 4.3-1. (continued)**

| **CHICAGO PARK FOREBAY (continued)** | |
|---|---|
| **Chicago Park Forebay Dam** | -- |
| Hazard Classification | Low |
| Type | Earth fill with gunite face |
| Height | 35 feet |
| Crest | -- |
| Elevation | El. 2,720 feet |
| Width | 15 feet |
| Length | 200 feet |
| Base | -- |
| Elevation | 2,682.01 feet |
| Width | 50 feet (approximately) |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | 2.5H:1.0V |
| Downstream Face (Horizontal to Vertical) | 1.4H:1.0V |
| Fish Ladder | None |
| **Chicago Park Forebay Spillway** | -- |
| Type | Side channel, located on canal upstream of forebay, spills to Steephollow Creek |
| Crest | -- |
| Elevation | 2,717.3 feet |
| Width | 40-foot-long spillway chute |
| Length | 427 feet |
| Control | Uncontrolled |
| Hoist Type | N/A |
| Maximum Discharge | 1,100 cfs |
| **Chicago Park Forebay Low-Level Outlet** | -- |
| Number, Size, & Control | One 24-in diameter sluice gate |
| Outlet Invert Elevation | 2,689.0 feet |
| Maximum Capacity | Approximately 75 cfs |
| Trash Rack | None |
| **Chicago Park Powerhouse Penstock Intake** | |
| Number, Size, & Control | One 11-foot square concrete tunnel with automatic emergency-shutoff knife gate |
| Outlet Invert Elevation | El. 2,690.0 feet |
| Maximum Capacity | 1,167 cfs |
| Trash Rack | Yes |
| **Chicago Park Forebay Reservoir** | -- |
| Normal Maximum Water Surface Elevation | El. 2,716 feet |
| Normal Minimum Water Surface Elevation | El. 2,710 feet |
| Drainage Area | |
| Gross Storage at normal maximum water surface el. | 103 acre-feet |
| Usable Storage | 103 acre-feet |
| Surface Area at normal maximum water surface el. | 7 acres |
| Length | 0.3 mile |
| Width | 0.03 mile |
| Maximum Depth | 31 feet |
| Shoreline Length | 0.7 mile |
| Closest Upstream Facility | Chicago Park Conduit, part of NID's Yuba-Bear Hydroelectric Project, located immediately upstream |
| Closest Downstream Facility | Chicago Park Powerhouse, part of NID's Yuba-Bear Hydroelectric Project, located immediately downstream |
| **CHICAGO PARK PENSTOCK** | |
| **Chicago Park Powerhouse Penstock** | -- |
| Number and Type | One |
| Construction | Steel penstock 3/8-inch thick |
| Size | 11-foot square, concrete tunnel leading to steel penstock composed of four sections with diameters of 10, 9.75, 9.5, and 9.25 feet |
| Length | 2,200 ft |

**Table 4.3-1. (continued)**

| | |
|---|---|
| **CHICAGO PARK PENSTOCK (continued)** | |
| Maximum Flow Capacity | 1,167 cfs |
| **CHICAGO PARK POWERHOUSE** | |
| Placed in Service (Began Commercial Operation) | November 29, 1965 |
| Plant Operation | Automatic, operated with SCADA control from PG&E's Drum Switching Center located in the Drum No. 1 Powerhouse |
| Normal Type of Operation | Intermediate loads with peaking |
| Structure | -- |
| Type | Indoor powerhouse above ground concrete structure |
| Approximate Size | 65.5 feet wide by 86 feet wide |
| Turbine | -- |
| Number of Units | One |
| Type | Vertical Francis |
| Manufacturer | Leffel |
| Upgrades | -- |
| Nameplate Output | 50,000 HP |
| Nameplate Rated Head | 480.0 feet |
| Speed | 300 RPM |
| Nameplate Rated Flow | 1,100cfs |
| Turbine Centerline Elevation | El. 2,240.0 feet |
| Generator | -- |
| Type | Outdoor umbrella type (synchronous) |
| Manufacturer | Westinghouse |
| Upgrades | Rewind 1981 |
| Nameplate Output | 44,000 kVA |
| Nameplate Capacity | 39 MW |
| Power Factor | 0.9 |
| Voltage | 11,500 volts |
| Speed | 300 RPM |
| Governor | -- |
| Type | Cabinet |
| Manufacturer | Woodward |
| Closest Upstream Facility | Chicago Park Forebay, part of NID's Yuba-Bear Hydroelectric Project, located immediately upstream |
| Closest Downstream Facility | Rollins Reservoir, part of NID's Yuba-Bear Hydroelectric Project, located immediately downstream |
| **CHICAGO PARK SWITCHYARD** | |
| Chicago Park Switchyard | -- |
| Location | East of unit |
| Size | 35 feet by 24 feet |
| Transformer Type | Westinghouse 3-phase transformer |
| Transformer Nameplate Rating | 41,500 kVA |
| Maximum Capacity | 41,500 kVA |
| Voltage Rating | 115 kV |
| High Voltage Breakers | SF6 power circuit breaker, type 121 PM 40-2 |
| Associated Transmission Line within FERC License | Power fed to PG&E 115kV Drum-Rio Oso Line |
| | |

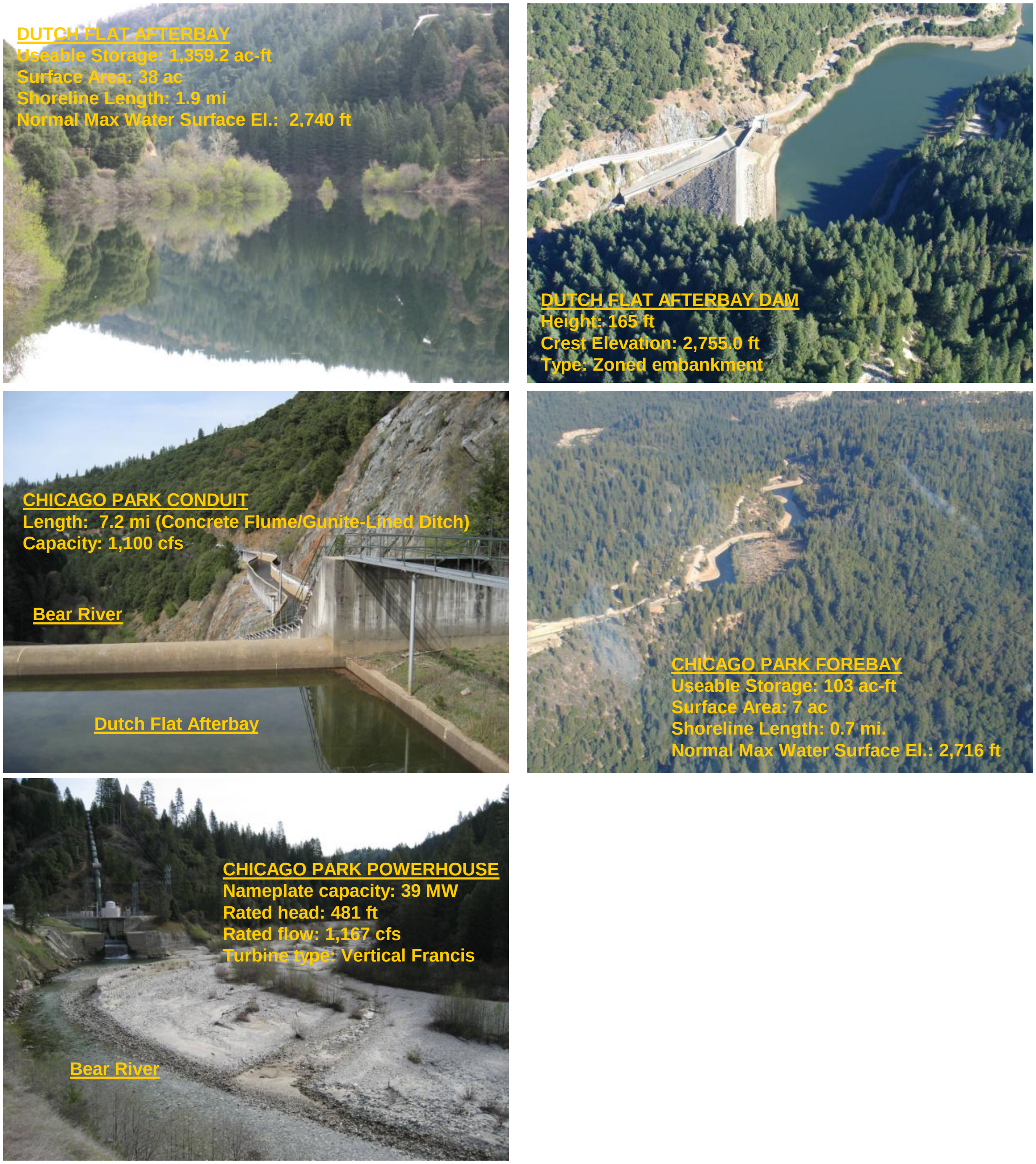



**Figure 4.3-1. Views of Chicago Park Development facilities and features.**

## 4.4 Rollins Development

The Rollins Development, which includes one reservoir and one powerhouse, is the lowest elevation of the Project developments. It includes the largest Project storage reservoir – Rollins Reservoir - at an elevation of 2,171 ft, and one powerhouse (Rollins). Table 4.4-1 provides the dimensions, physical features, and other pertinent information for each facility and feature excluding recreation facilities associated with Rollins Reservoir, which are described in Section 4.4.1. Figure 4.4-1 includes photographs of Rollins Development facilities and features.

**Table 4.4-1. Description of Yuba-Bear Hydroelectric Project facilities and features – Rollins Development.**

| ROLLINS DAM AND RESERVOIR | |
|---|---|
| River Mile | 10.5 (Bear River) |
| Construction Period | 1964-1965 |
| **Rollins Dam** | -- |
| Hazard Classification | High |
| Type | Zoned embankment with river-run sand and gravel shell, impervious core, and pervious filter zones. |
| Height | 252.5 feet |
| Crest | -- |
| Elevation | El. 2,187.5 feet |
| Width | 30 feet |
| Length | 1,260 feet |
| Base | -- |
| Elevation | 1,930.0 feet |
| Width | Approximately 900 feet |
| Slope | -- |
| Upstream Face (Horizontal to Vertical) | 2.5H:1V |
| Downstream Face (Horizontal to Vertical) | 2H:1V |
| **Rollins Dam Spillway** | -- |
| Type | Uncontrolled concrete ogee crest |
| Crest | -- |
| Elevation | El. 2,171.0 feet |
| Width | 316.0 feet |
| Length | 620-foot-long spillway chute |
| Control | Uncontrolled |
| Maximum Discharge | 70,000 cfs at zero freeboard |
| **Rollins Dam Low-Level Outlet and Penstock Intake** | -- |
| Number, Size & Control | Single combined intake tower; common tunnel bifurcates into low-level outlet tunnel (controlled by Howell-Bunger valve) and Rollins Powerhouse Penstock |
| Outlet Invert Elevation | El. 2,022 feet (top of trash rack / intake tower approximately el. 2,030 feet) |
| Maximum Capacity | Approximately 2,840 cfs |
| Trash Rack | 19 feet wide by 11.5 feet high |
| **Rollins Dam Low-Level Outlet** | -- |
| Number, Size & Control | One 5-foot-diameter pipe controlled by a Howell-Bunger valve |
| Outlet Invert Elevation | El. 2,022 feet |
| Maximum Capacity | Approximately 2,000 cfs |
| Trash Rack | 19 feet wide by 11.5 feet high |
| **Rollins Reservoir** | -- |
| Normal Maximum Water Surface Elevation | El. 2,171.0 feet |
| Normal Minimum Water Surface Elevation | El. 2,030.0 feet (Davis-Grunsky recreation minimum elevation: 2,150 feet |
| Drainage Area | 104 square miles |
| Gross Storage at normal maximum water surface el. | 58,682 acre-feet [based on Licensee's 2007-2008 bathymetric studies] |
| Usable Storage | 54,453 acre-feet [based on Licensee's 2007-2008 bathymetric studies] |
| Surface Area. | 788 acres (at spillway crest elevation) |
| Length | 3.3 miles |
| Width | 1.8 miles |
| Maximum Depth | 209 feet |
| Shoreline Length | 19 miles |
| Closest Upstream Facility | Chicago Park Powerhouse, part of NID's Yuba-Bear Hydroelectric Project, located immediately upstream |

**Table 4.4-1. (continued)**

| ROLLINS DAM AND RESERVOIR (continued) | |
|---|---|
| Closest Downstream Facility | Rollins Powerhouse, part of NID's Yuba-Bear Hydroelectric Project, located immediately downstream |
| **ROLLINS PENSTOCK** | |
| **Rollins Penstock** | -- |
| Number and Type | One |
| Construction | Steel penstock 3/8-inch thick housed in tunnel (20 feet wide by 16 feet high with 8-foot radius). |
| Size | 8.5-foot-diameter |
| Length | 524 feet |
| Maximum Flow Capacity | 840 cfs [existing powerhouse maximum] |
| **ROLLINS POWERHOUSE** | |
| Placed in Service (Began Commercial Operation) | August 20, 1980 |
| Plant Operation | Automatic, operated with SCADA controls from PG&E's Drum Switching Center located in the Drum No. 1 Powerhouse. |
| Normal Type of Operation | Base loaded |
| Structure | -- |
| Type | Outdoor powerhouse, aboveground, reinforced concrete |
| Construction Period | 1980 |
| Approximate Size | 52.5 feet wide by 56 feet wide |
| Turbine | -- |
| Number of Units | One |
| Type | Vertical-axis Francis |
| Manufacturer | S. Morgan Smith |
| Upgrades | New Voith Runner in 1987 |
| Nameplate Output | 16,300 HP |
| Nameplate Capacity | 12.15 MW |
| Nameplate Rated Head | 208 feet |
| Speed | 277 RPM |
| Nameplate Rated Flow | 840 cfs |
| Turbine Centerline Elevation | El. 1,960.0 feet |
| Generator | -- |
| Type | Alternating Current Generator |
| Manufacturer | Westinghouse |
| Upgrades | Rewound April 2004 |
| Nameplate Output | 13,500 kVA |
| Nameplate Capability | 12.15 MW |
| Power Factor | 0.9 |
| Voltage | 6,600 volts |
| Speed | 277 RPM |
| Governor | -- |
| Type | Cabinet |
| Manufacturer | Woodward |
| Closest Upstream Facility | Rollins Dam, part of NID's Yuba-Bear Hydroelectric Project, located immediately upstream |
| Closest Downstream Facility | Bear River Canal Diversion Dam, part of PG&E's Drum-Spaulding Project, located immediately downstream |
| **ROLLINS SWITCHYARD** | |
| **Rollins Switchyard** | -- |
| Location | North of unit |
| Size | 24 feet by 46 feet |
| Transformer Type | G.E. RSL |
| Transformer Nameplate Rating | 12,000 kVA, 65C degree rise |
| Maximum Capacity | 12,000 kVA |
| Voltage Rating | 6,600 kV to 66,160 kV |
| Associated Transmission Line within FERC License | PG&E 60 kV Rollins Line, FERC Project No. 2784 |


**Figure 4.4-1. Views of Rollins Development facilities and features.**

### 4.4.1 Rollins Development Recreation Facilities

The Rollins Development includes recreation facilities at Rollins Reservoir. These facilities are described below.

Four campgrounds are located at Rollins Reservoir – Orchard Springs, Greenhorn, Peninsula, and Long Ravine campgrounds (Table 4.4-2). In all, these campgrounds provide 332 developed campsites that offer different camping opportunities for tents, RVs, and at small wood/log cabins. Each campground complex offers a boat launching facility. Orchard Springs, Greenhorn, and Long Ravine campgrounds offer a predominantly high-density camping experience with minimal space and screening between campsites, and many sites grouped together in tight loops/areas. Peninsula Campground offers a low-to-medium density camping experience at three major loops with moderate screening between sites in a predominantly forested setting. All the campgrounds, except Peninsula Campground, are open year-round. Figure 4.4-2 shows representative photographs of the recreation facilities.

**Table 4.4-2. Rollins Reservoir developed recreation facilities.**

| Facility | Typical Season | Manager | Facility Type | Boat Launch | Parking | Picnic Sites | Camp Sites | PAOT Capacity |
|---|---|---|---|---|---|---|---|---|
| Orchard Springs | Year-round | NID | developed | 2-lane | 150 | none | 101 | unknown |
| Greenhorn | Year-round | NID (concessionaire) | developed | 2-lane | 143 | 3 | 79 | unknown |
| Peninsula | April 15 - September 15 | NID (concessionaire) | developed | 2-lane | 50 | unknown | 67 | unknown |
| Long Ravine | Year-round | NID (concessionaire) | developed | 2-lane | 72 | none | 85 | unknown |

Orchard Springs Campground

Orchard Springs Boat Launch

Greenhorn Campground

Greenhorn Boat Launch

**Figure 4.4-2. Views of Rollins Reservoir developed recreation facilities.**

Peninsula Campground

Peninsula Boat Launch

Long Ravine Campground

Long Ravine Boat Launch

**Figure 4.4-2. (continued)**

# 5.0 Area within the Existing FERC Project Boundary

The existing FERC Project Boundary, consisting of lands necessary for the safe operations and maintenance of the Project and other purposes, such as recreation, shoreline control, and protection of environmental resources, encompasses 6,252.6 acres of land in Nevada, Placer, and Sierra counties, California.

Within the upper elevations of the boundary (i.e., above El. 3,000 ft), major landholders include the Forest Service, timber companies (e.g., Sierra Pacific Industries, Inc.), PG&E, and NID. Lands around mid-elevation along the Bear River are primarily United States owned land, administered by BLM. Lands in the lower Project elevations contain private resident tracts and are near urban areas. Table 5.0-1 summarizes, by Project Development, land areas and ownership within the existing FERC Project Boundary.[2] The Bowman-Spaulding Transmission Line, part of the Bowman Development, is shown separately.

**Table 5.0-1. Summary of land ownership within the Yuba-Bear Hydroelectric FERC Project Boundary by Project Development.**

| Development | Forest Service (ac) | BLM (ac) | NID (ac) | Other Private (ac) | Total | |
|---|---|---|---|---|---|---|
| | | | | | (ac) | % |
| Bowman | 1,283.8 | -- | 2,348.9 | 142.3 | 3,775.0 | 60% |
| Dutch Flat | 221.3 | 14.0 | 46.9 | 136.2 | 418.4 | 7% |
| Chicago Park | 0.1 | 54.1 | 38.4 | 73.2 | 165.8 | 3% |
| Rollins | -- | 140.4 | 1,618.4 | 61.2 | 1,820.0 | 29% |
| Bowman-Spaulding Transmission Line | 35.6 | -- | 3.7 | 34.1 | 73.4 | 1% |
| **Total** | **1,540.8** | **208.5** | **4,056.3** | **447.0** | **6,252.6** | **100%** |
| **Percent** | **25%** | **3%** | **65%** | **7%** | **100%** | **--** |

In general, the FERC Project Boundary is placed as a buffer to ensure that all Project facilities, features, and primary access roads have been encompassed. While there is no set distance that is used for all types of facilities, the following ranges have been used for defining the FERC Project Boundary:

- The FERC Project Boundary around reservoirs is often placed at a contour line a set number of feet above the high water line. In several instances, the FERC Project Boundary around reservoirs is defined by surveyed metes and bounds that were meant to follow a contour line above the high water line and/or parcel boundary.
- The FERC Project Boundary around man-made water ways, including canals, flumes, tunnels, pipelines, and penstocks, is between 25 and 100 feet on each side of the waterway.
- The FERC Project Boundary is placed 25 feet on either side of transmission lines and roads.
- The FERC Project Boundary is always placed to encompass all recreation sites, facilities, and roads that are part of the Project.

## 5.1 Lands of the United States Within the Existing FERC Project Boundary

As shown in Table 5.0-1, approximately 25 percent of the land (1,540.8 acres) within the FERC Project Boundary is owned by the United States and managed by the Forest Service as part of the TNF, and another 3 percent of the land (208.5 acres) is United States-owned land administered by BLM as the Sierra Resource Management Area. Table 5.1-1 identifies by Public Land Survey System Township, Range and Section (all sections in the Mount Diablo Baseline & Meridian) United State-owned land within the existing FERC Project Boundary.

[2] Refer to Exhibit G, Section 1.1, for a detailed description of the data sources used to calculate land ownership within the FERC Project Boundary.

**Table 5.1-1. Lands of the United States enclosed within the FERC Project Boundary by Project Development and managing federal agency.**

| Ownership | Township | Range | Section | Total Acres |
|---|---|---|---|---|
| **BOWMAN DEVELOPMENT** | | | | |
| Forest Service | 18N | 12E | 2 | 0.8 |
| | | | 3 | 76.1 |
| | | | 4 | 32.3 |
| | | | 5 | 28.5 |
| | | | 8 | 17.3 |
| | | | 9 | 48.1 |
| | | | 11 | 0.5 |
| | | | 13 | <0.1 |
| | | | 24 | <0.1 |
| | | 13E | 6 | 12.0 |
| | | | 17 | 10.6 |
| | | | 18 | 67.6 |
| | | | 20 | 37.5 |
| | | | 21 | 26.4 |
| | 19N | 12E | 11 | <0.1 |
| | | | 12 | 64.7 |
| | | | 13 | <0.1 |
| | | | 14 | 25.3 |
| | | | 23 | 25.0 |
| | | | 26 | 21.7 |
| | | | 27 | <0.1 |
| | | | 34 | 25.2 |
| | | 13E | 6 | <0.1 |
| | | | 17 | <0.1 |
| | | | 18 | 129.1 |
| | | | 19 | <0.1 |
| | | | 20 | 423.3 |
| | | | 28 | 1.3 |
| | | | 29 | <0.1 |
| | | | 30 | 169.2 |
| | | | 31 | <0.1 |
| | | | 32 | 41.3 |
| | | | *Forest Service - Subtotal* | *1,283.8* |
| | | | **Bowman Development - Total** | **1,283.8** |
| **BOWMAN-SPAULDING TRANSMISSION LINE** | | | | |
| Forest Service | 17N | 12E | 6 | 8.3 |
| | | | 7 | <0.1 |
| | | | 8 | 2.2 |
| | 18N | | 5 | 0.1 |
| | | | 8 | 5.2 |
| | | | 18 | 8.3 |
| | | | 19 | <0.1 |
| | | | 30 | 7.8 |
| | | | 31 | 3.7 |
| | | | *Forest Service - Subtotal* | *35.6* |
| | | | **Bowman-Spaulding Transmission Line - Total** | **35.6** |
| **CHICAGO PARK DEVELOPMENT** | | | | |
| BLM | 15N | 10E | 4 | 16.5 |
| | | | 5 | <0.1 |
| | | | 6 | 26.5 |
| | 16N | | 27 | <0.1 |
| | | | 33 | <0.1 |
| | | | 34 | 11.1 |
| | | | *BLM - Subtotal* | *54.1* |
| Forest Service | 16N | 10E | 26 | 0.1 |
| | | | *Forest Service - Subtotal* | *0.1* |
| | | | **Chicago Park Development - Total** | **54.2** |

**Table 5.1-1. (continued)**

| Ownership | Township | Range | Section | Total Acres |
|---|---|---|---|---|
| **DUTCH FLAT DEVELOPMENT** | | | | |
| BLM | 16N | 10E | 23 | 7.3 |
| | | | 27 | 6.7 |
| | | | *BLM - Subtotal* | *14.0* |
| Forest Service | 16N | 10E | 23 | <0.1 |
| | | | 24 | 32.0 |
| | | | 26 | 13.8 |
| | | | 27 | <0.1 |
| | | 11E | 18 | 30.1 |
| | | | 19 | <0.1 |
| | 17N | | 1 | <0.1 |
| | | 12E | 6 | 54.4 |
| | 18N | 11E | 36 | 29.6 |
| | | 12E | 8 | 19.8 |
| | | | 18 | 27.9 |
| | | | 19 | <0.1 |
| | | | 30 | 13.7 |
| | | | *Forest Service - Subtotal* | *221.3* |
| | | | **Dutch Flat Development - Total** | **235.3** |
| **ROLLINS DEVELOPMENT** | | | | |
| BLM | 15N | 10E | 6 | 11.1 |
| | | | 7 | <0.1 |
| | | 9E | 10 | 17.9 |
| | | | 12 | 61.7 |
| | | | 13 | <0.1 |
| | | | 14 | 49.7 |
| | | | *BLM - Subtotal* | *140.4* |
| | | | **Rollins Development - Total** | **140.4** |
| | | | **Total** | **1,749.3** |

Source: Exhibit G maps, based on best available public land ownership data sets.

# 6.0 Proposed Changes

## 6.1 New Generating Facilities

### 6.1.1 Rollins No. 2 Powerhouse

NID proposes to include one new generating facility in the new license: Rollins No. 2 Powerhouse. The new facility would more effectively capture the combined releases from Rollins Reservoir. The existing powerhouse consists of one vertical-axis, Francis turbine with a rated capacity of 12.15 MW at a head of 208 feet and maximum flow of 840 cfs. At this time, NID anticipates that the new powerhouse would be constructed entirely on privately-owned land adjacent to the existing powerhouse location in a lay down area just below the existing parking lot on the right bank of the river. The existing powerhouse would be unaltered and remain in full operation.

The current design concept for the new powerhouse includes a 58-foot-by-40-foot concrete building that would house a single Francis turbine with a maximum flow of 600 cfs and synchronous generator combination yielding a maximum capacity of 11.4 MW. This new facility would be a remotely operable, unmanned installation. The upgrade would require modifications to the existing penstock to allow for a new bifurcation to route flow to the new generation facility, and replacement of the Rollins Powerhouse Switchyard in order to route the new penstock. The upgrade would occur entirely within the existing FERC Project Boundary and affect less than 1 acre of NID-owned land.

A picture of the approximate location and an anticipated layout drawing of the proposed Rollins No. 2 Powerhouse are shown in Figures 6.1-1 and 6.1-2, respectively.


**Figure 6.1-1. Anticipated location of proposed Rollins No. 2 Powerhouse (existing Rollins Dam and Powerhouse are shown).**

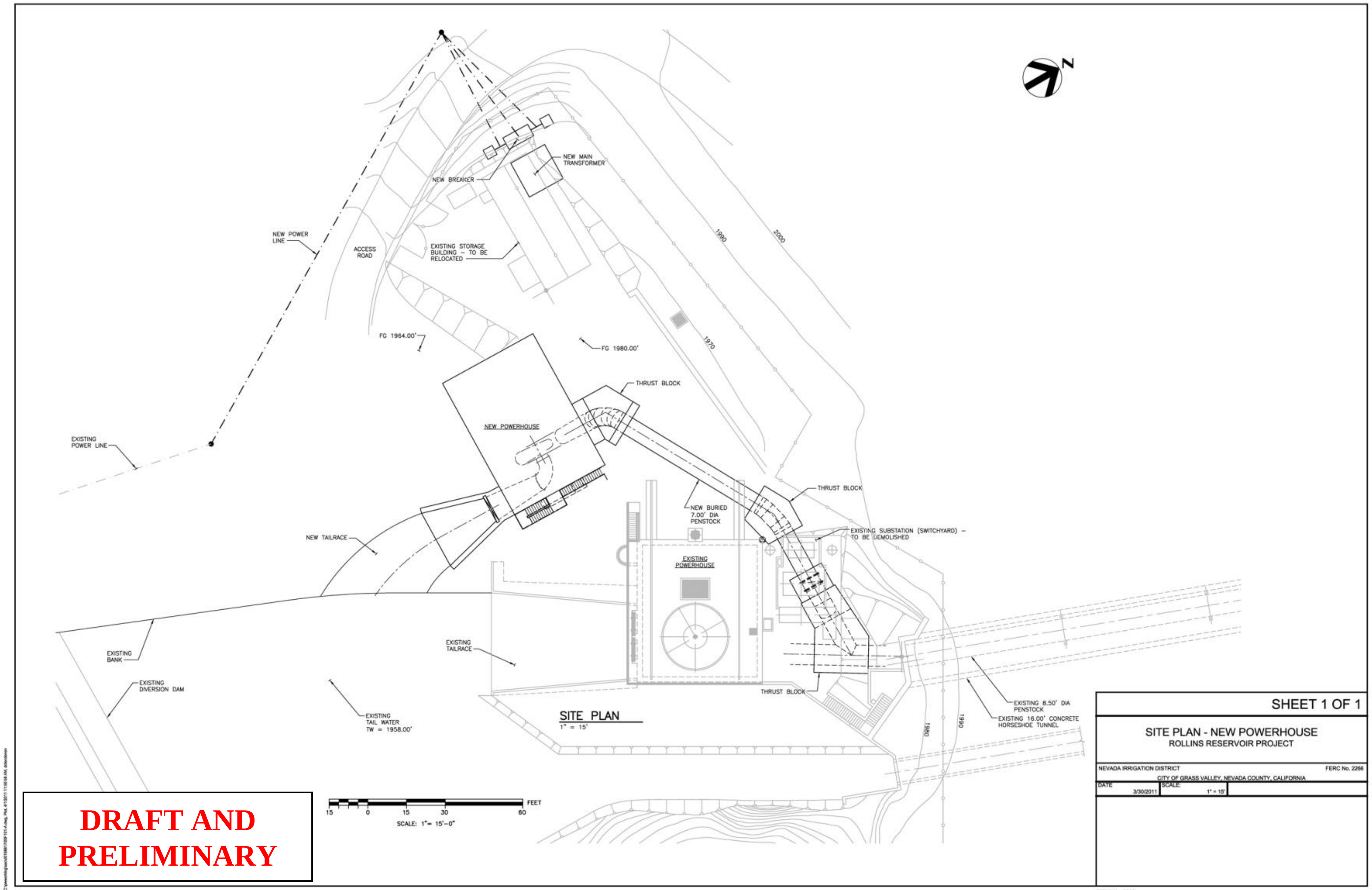



**Figure 6.1-2. Anticipated layout of proposed Rollins No. 2 Powerhouse (existing Project features shown in grayscale).**

## 6.2 New Non-Generating Facilities

NID proposes to add to or modify the existing Project through the non-generating facilities described below.

**Project Reservoir Storage Modifications**

NID does not propose any storage modifications to Project reservoirs. However, NID reserves the right to increase the gross and/or useable storage of Project reservoirs through means including, but not limited to, dredging and sluicing. In the event that a storage modification is proposed over the term of the new license, NID will consult with and obtain all necessary permits from required local, state and federal agencies, and will file with FERC a Request for License Amendment.

**Primary Project Access Roads**

NID does not propose any additional Primary Project access roads.

**Streamflow Gages**

NID proposes to add to the Project three new streamflow gages for the purpose of monitoring compliance with minimum flow releases. The new gages will be located on the downstream face of the diversion facilities at Texas, Fall and Rucker creeks. Each gage will consist of a fixed orifice, sized to deliver the minimum instream flows proposed in this FLA for Texas, Fall and Rucker creeks downstream of the Bowman-Spaulding Conduit crossing. The gages will be named YB-316, YB-317 and YB-318, respectively. Each gage will be located within the existing FERC Project Boundary. A more detailed description of the new gages is provided in Appendix E5.

**Recreation Facilities**

NID's proposed Project includes a Recreation Facilities Plan, which is included in Appendix E4. The plan includes many components including replacement and upgrade of existing recreation facilities and evaluation for new recreation facilities over the term of the new license. However, at this time, the plan includes the addition of the following specific new facilities:

- Jackson Meadows Reservoir
  - Additional parking for up to 20 boats with trailers (double spaces) at or near the existing Pass Creek Boat Launch to accommodate boat ramp use during the high water period typically through July when the lower boat launch parking area is not useable.
  - Replace the existing Woodcamp Boat Launch to California Department of Boating and Waterways standards.
  - Construct a non-motorized trail from Aspen Group Campground to the Aspen Picnic Area parking area.

- Milton Diversion Impoundment:
  - Provide up to two parking areas (native surface) with vehicle barriers and directional signage along north shoreline that allows parking in designated parking areas only.
  - Provide up to 5 walk-in campsites along impoundment shoreline adjacent to the designated parking areas each with a steel fire ring.
  - One car-top boat launch that allows direct vehicle access to the shoreline for boat launching purposes only.

- Canyon Creek:
  - Install animal-resistant food lockers at nine sites.

- Sawmill Lake:
  - Up to 10 primitive walk-in campsites (1 accessible campsite); install table, fire ring/grill, tent pad, site marker, and signage at each campsite.
  - A single gravel/native surface parking area with barriers including information kiosk.
  - One 2-unit vault restroom

- Bowman Lake:
  - One parking area (native surface) with vehicle barriers and directional signage at Jackson Creek inflow along the north shoreline/Bowman Lake Road.
  - One information kiosk at the junction of Bowman Lake Road and Graniteville Road near the dam.
  - Fourteen primitive campsites each with a picnic table, fire ring, site marker and signage along the north shoreline.

- Dutch Flat No. 2 Forebay:
  - One information kiosk

- Dutch Flat Afterbay:
  - One day use area along the shoreline of the afterbay if a suitable location can be found on either NID or BLM land. Potential improvements may include facilities such as picnic tables, a vault restroom, signage or information kiosk and a defined parking area.

## 6.3 Proposed Changes to FERC Project Boundary

NID does not propose any changes to existing Yuba-Bear Hydroelectric Project FERC Project Boundary except for the following:

- The use of contours derived from the USGS National Elevation Dataset 1/3 arc second digital elevation model as a partial replacement to survey metes and bounds that are used in the existing license to define the FERC Project Boundary around Jackson Meadows Reservoir, Bowman Reservoir, French Lake, Jackson Lake, Sawmill Lake, Faucherie Lake, Dutch Flat Forebay, and Dutch Flat Afterbay. Where the derived contour lines exceeded 200 horizontal feet from the Project Reservoir normal maximum water surface, 200 foot horizontal buffers of the aforementioned reservoir's maximum water surface were used to define the Project Boundary.

- The removal of the area that incorporates the mineral survey area south of Dutch Flat Afterbay
- The modification of the boundary to more accurately contain and encompass several recreation sites (East Meadow Campground, Fir Top Campground, Bowman Lake Campground and Canyon Creek Area Campground)
- The addition of the area which incorporates the Primary Project portion of French Lake Dam Road (Forest Service Road 843-20), including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Milton Pipeline Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Wilson Creek Diversion Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Bunkhouse Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Texas Creek Diversion Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Bowman-Spaulding Canal Berm Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Bowman-Spaulding Canal Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Stump Canyon Siphon Intake Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Canyon Siphon Low Level Valve Access Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of "B" Alarm Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Chicago Park Forebay Road, including a right-of-way of 20 feet on road centerline
- The addition of the area which incorporates the Primary Project portion of Chicago Park Powerhouse Access Road, including a right-of-way of 20 feet on road centerline

For a description of the overall changes in area between the existing Project Boundary and the Proposed Project Boundary, by Project development, see Table 6.3-2 below.

**Table 6.3-2. Lands of the United States enclosed within the proposed FERC Project Boundary by Project Development and managing federal agency.**

| Ownership | Township | Range | Section | Total |
|---|---|---|---|---|
| **BOWMAN DEVELOPMENT** | | | | |
| Forest Service | 18N | 12E | 2 | 2.0 |
| | | | 3 | 62.2 |
| | | | 4 | 20.9 |
| | | | 5 | 22.4 |
| | | | 8 | 2.6 |
| | | | 9 | 24.4 |
| | | | 11 | 20.3 |
| | | | 12 | 7.3 |
| | | | 13 | <0.1 |
| | | 13E | 6 | 3.7 |
| | | | 8 | 0.4 |
| | | | 17 | 8.3 |
| | | | 18 | 60.5 |
| | | | 20 | 47.6 |
| | | | 21 | 33.0 |
| | 19N | 12E | 11 | <0.1 |
| | | | 12 | 69.1 |
| | | | 13 | <0.1 |
| | | | 14 | 27.6 |
| | | | 23 | 6.3 |
| | | | 26 | 22.4 |
| | | | 27 | <0.1 |
| | | | 34 | 25.2 |
| | | 13E | 6 | <0.1 |
| | | | 17 | <0.1 |
| | | | 18 | 126.9 |
| | | | 19 | <0.1 |
| | | | 20 | 434.2 |
| | | | 21 | <0.1 |
| | | | 28 | 1.0 |
| | | | 29 | <0.1 |
| | | | 30 | 186.9 |
| | | | 31 | <0.1 |
| | | | 32 | 31.9 |
| | | | *Forest Service - Subtotal* | **1,247.1** |
| | | | **Bowman Total** | **1,247.1** |

## Table 6.3-2. (continued)

| Ownership | Township | Range | Section | Total |
|---|---|---|---|---|
| **DUTCH FLAT DEVELOPMENT** | | | | |
| BLM | 16N | 10E | 23 | 7.3 |
| | | | 27 | 6.6 |
| | | | *BLM - Subtotal* | **13.9** |
| Forest Service | 16N | 10E | 23 | <0.1 |
| | | | 24 | 35.2 |
| | | | 26 | 14.6 |
| | | | 27 | <0.1 |
| | | 11E | 17 | <0.1 |
| | | | 18 | 30.3 |
| | | | 19 | <0.1 |
| | 17N | | 1 | <0.1 |
| | | 12E | 6 | 29.1 |
| | 18N | 11E | 25 | <0.1 |
| | | | 36 | 29.8 |
| | | 12E | 8 | 23.4 |
| | | | 18 | 28.3 |
| | | | 19 | <0.1 |
| | | | 30 | 14.4 |
| | | | *Forest Service - Subtotal* | **205.1** |
| | | | **Dutch Flat Total** | **219.0** |
| **Ownership** | **Township** | **Range** | **Section** | **Total** |
| **CHICAGO PARK DEVELOPMENT** | | | | |
| BLM | 15N | 10E | 4 | 16.3 |
| | | | 5 | <0.1 |
| | | | 6 | 47.8 |
| | 16N | | 27 | <0.1 |
| | | | 33 | <0.1 |
| | | | 34 | 12.9 |
| | | | *BLM - Subtotal* | **77.0** |
| | | | **Chicago Park Total** | **77.0** |
| **ROLLINS DEVELOPMENT** | | | | |
| BLM | 15N | 10E | 6 | 3.6 |
| | | | 7 | <0.1 |
| | | 9E | 10 | 17.9 |
| | | | 12 | 67.3 |
| | | | 13 | <0.1 |
| | | | 14 | 51.4 |
| | | | *BLM - Subtotal* | **140.2** |
| | | | **Rollins Total** | **140.2** |

**Table 6.3-2. (continued)**

| BOWMAN-SPAULDING TRANSMISSION LINE | | | | |
|---|---|---|---|---|
| Forest Service | 17N | 12E | 6 | 6.9 |
| | | | 7 | <0.1 |
| | | | 8 | 1.8 |
| | 18N | | 8 | 3.2 |
| | | | 18 | 6.7 |
| | | | 19 | <0.1 |
| | | | 30 | 6.5 |
| | | | 31 | 3.1 |
| | | | *Forest Service - Subtotal* | **28.2** |
| | | | **Bowman-Spaulding Transmission Line Total** | **28.2** |
| | | | **Total** | **1,711.5** |

# 7.0 References Cited

Federal Energy Regulatory Commission (FERC). Date Annotated License Conditions in Existing Federal Energy Regulatory Commission License.

_____. Exhibit Drawings, FERC Project No. 2266 (latest revisions).

de Rubertis. 2002. 2001 Review of Safety, Bowman North Dam, FERC No. 2266, Yuba-Bear Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Bowman South Dam, FERC No. 2266, Yuba-Bear Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Dutch Flat Afterbay Dam, FERC No. 2266, Yuba-Bear Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Dutch Flat No. 2 Forebay Dam, FERC No. 2266, Yuba-Bear Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Faucherie Dam, FERC No. 2266, Yuba-Bear Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, French Lake Dam, FERC No. 2266, Yuba-Bear Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Jackson Lake Dam, FERC No. 2266, Yuba-Bear Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Jackson Meadows Dam, FERC No. 2266, Yuba-Bear Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Rollins Dam, FERC No. 2266, Yuba-Bear Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Sawmill Dam, FERC No. 2266, Yuba-Bear Project, Nevada Irrigation District, Colfax, California.

Henwood Energy Services, Inc. 2002. Emergency Action Plan, Yuba-Bear River Project, FERC Project No. 2266 – CA, Vols 1 and 2.

United States of America Federal Power Commission (FPC). 1963. Project No. 2266, Order Issuing License (Major).

United States Geological Survey (USGS). 2002. Water Resources Data, California Water Year 2002, Vol 4. Northern Central Valley Basins and the Great Basin from Honey Lake Basin to the Oregon State Line.

# Application for a New License
# Major Project – Existing Dam

## Exhibit B
## Project Operations and Resource Utilization

Yuba-Bear Hydroelectric Project
FERC Project No. 2266-096

Prepared by:
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April 2011

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**EXHIBIT B**

# Project Operations and Resource Utilization

## 1.0 Introduction

The Nevada Irrigation District (NID or Licensee) has prepared this Exhibit B, Report on Project Operations and Resource Utilization, as part of its Application for License for a Major Project – Existing Dam – (Application) from the Federal Energy Regulatory Commission (FERC) for the Yuba-Bear Hydroelectric Project (Project), FERC Project No. 2266. This exhibit is prepared in conformance with Title 18 of the Code of Federal Regulations (CFR), Subchapter B (Regulations under the Federal Power Act), Part 4 (Licenses, Permits, Exemptions, and Determination of Project Costs), Subpart F (Application for License for Major Project – Existing Dam). In particular, this report conforms to the regulations in 18 CFR § 4.51(c), and describes Project operations as proposed by the Licensee in this application for new license. This Exhibit B describes all Project operations in detail. As a reference, 18 CFR § 4.51(c) states:

Exhibit B is a statement of project operation and resource utilization. If the project includes more than one dam with associated facilities, the information must be provided separately for each such discrete development. The exhibit must contain:

(1) A statement whether operation of the powerplant will be manual or automatic, an estimate of the annual plant factor, and a statement of how the project will be operated during adverse, mean, and high water years;

(2) An estimate of the dependable capacity and average annual energy production in kilowatt-hours (or a mechanical equivalent), supported by the following data:

- (i) The minimum, mean, and maximum recorded flows in cubic feet per second of the stream or other body of water at the powerplant intake or point of diversion, with a specification of any adjustment made for evaporation, leakage, minimum flow releases (including duration of releases), or other reductions in available flow; monthly flow duration curves indicating the period of record and the gauging stations used in deriving the curve; and a specification of the period of critical stream flow used to determine the dependable capacity;
- (ii) An area-capacity curve showing the gross storage capacity and usable storage capacity of the impoundment, with a rule curve showing the proposed operation of the impoundment and how the usable storage capacity is to be utilized;
- (iii) The estimated hydraulic capacity of the powerplant (minimum and maximum flow through the powerplant) in cubic feet per second;
- (iv) A tailwater rating curve; and
- (v) A curve showing powerplant capability versus head and specifying maximum, normal, and minimum heads;

(3) A statement, with load curves and tabular data, if necessary, of the manner in which the power generated at the project is to be utilized, including the amount of power to be used on-site, if any, the amount of power to be sold, and the identity of any proposed purchasers; and

(4) A statement of the applicant's plans, if any, for future development of the project or of any other existing or proposed water power project on the stream or other body of water, indicating the approximate location and estimated installed capacity of the proposed developments.

Besides this introductory material, this report includes seven sections. Section 2.0 provides historical and current (No-Action Alternative) overviews of NID's operation of the Project and a brief description of how current operations would change under the new license as proposed by NID. Section 3.0 details the hydrologic characteristics of the Project including: 1) climatology, 2) water rights, 3) basin water transfers and diversions, 4) regulated and unimpaired hydrologic records, and 5) NID's selection of representative dry, normal, and wet water years. Section 4.0 describes Project operations in typical dry, normal, and wet water years, including reservoir and powerhouse operations, planning, hydraulic operations, gate operations, and normal Project access routes. Section 5.0 describes Project operating constraints imposed by FERC, the Division of Safety of Dams (DSOD), and others for the existing and proposed Project.

Section 6.0 provides much of the information required in 18 CFR § 4.51(c)(1). Specifically, this section provides a detailed description of operations by development based on Licensee's No-Action Alternative. For each reservoir, NID's existing gross and usable storage capacities, storage capacity curves, a typical operating curve, storage curves in the representative dry, normal, and wet water years, and a spillway rating curve are described. For each existing Project flow release point, NID describes the manner in which releases were made and modeled monthly, period of record, and representative dry, normal, and wet water year flow duration curves are presented. For powerhouses, operations and plant control, annual plant factor and energy, powerhouse capability versus head, dependable capacity powerhouse hydraulic capacity, turbine and generator efficiency curves, monthly flow duration curves, and tailwater rating curves are provided. Other physical, regulatory, and contractual constraints are also described.

Section 7.0 describes NID's plans for future development to be included in the new license. Section 8.0 includes a list of references cited in this exhibit.

See Exhibit A for a description of Project facilities and features, Exhibit C for a construction history and construction schedule, Exhibit D for costs and financing information, and Exhibit E for a discussion of potential environmental effects and Licensee's proposed resource management measures. Project design drawings and maps are addressed in Exhibits F and G, respectively. Exhibit H contains a detailed description of the need for the electricity provided by the Project, the availability of electrical energy alternatives, and other miscellaneous information.

All elevation data in this exhibit are in National Geodetic Vertical Datum of 1929 (NGVD 29) unless otherwise specified.

# 2.0 Yuba-Bear Hydroelectric Project Operations Overview

This exhibit presents a complete overview of the existing Project's physical system (natural and man-made), operations, and hydrologic data. A description is included of the location and background of land and water resources, Project features (e.g., dams, reservoirs, diversions, powerhouses), and details of the hydrologic gaging/monitoring system located throughout the Project basin. This section also contains the historical regulated hydrologic Project record and the synthesized unimpaired Project flow data throughout the basin.

The configuration of the existing Project is presented in schematic form in Figure 2.0-1. The existing Project consists of eleven reservoirs and thirteen main dams with total gross and usable storage capacities of 218,700 and 210,823 acre-feet (ac-ft), respectively, with four powerhouses and associated switchyards with a combined licensed capacity of 79.32 MW. The Project is comprised of four developments: Bowman, Dutch Flat, Chicago Park, and Rollins, as discussed in Exhibit A. The Project includes over 25 miles of canals and conduits, a 9-mile transmission line, and other appurtenant facilities and structures.

## 2.1 Project History

The Project's current FERC license was issued on May 1, 1963, with a 50-year term expiring on April 30, 2013. NID operates the existing Project in tandem with Pacific Gas and Electric Company's (PG&E) Drum-Spaulding Project (FERC Project No. 2310). Together, the two projects are located in the Middle Yuba River, South Yuba River, Canyon Creek, Deer Creek, Fall Creek, Rucker Creek, Bear River, North Fork of the North Fork American River, Coon Creek, and Auburn Ravine basins. The two projects are intimately interconnected at both upstream and downstream reaches.

NID is a public, non-profit agency formed pursuant to California State law (Water Code § 20500 et seq.). NID is owned and operated for and by people that reside or own land within its boundaries. NID was formed on August 15, 1921, by Nevada County voters following a four-year campaign led by the Nevada County farm adviser and local agriculturalists who were convinced that reliable, year-around water supply was vital to building a better community in the Sierra Nevada foothills. At its formation, 202,000 acres were included in NID boundaries. Five years later, in 1926, residents of Placer County chose to join NID and 66,500 acres were added to NID's service territory.

Parts of the hydraulic systems used today by NID were constructed from the advanced systems of dams, canals, ditches, flumes, and tunnels built by gold miners in the mid to late 1800s. French Dam was constructed by miners in 1858 and 1859 and is the oldest NID dam still in use.

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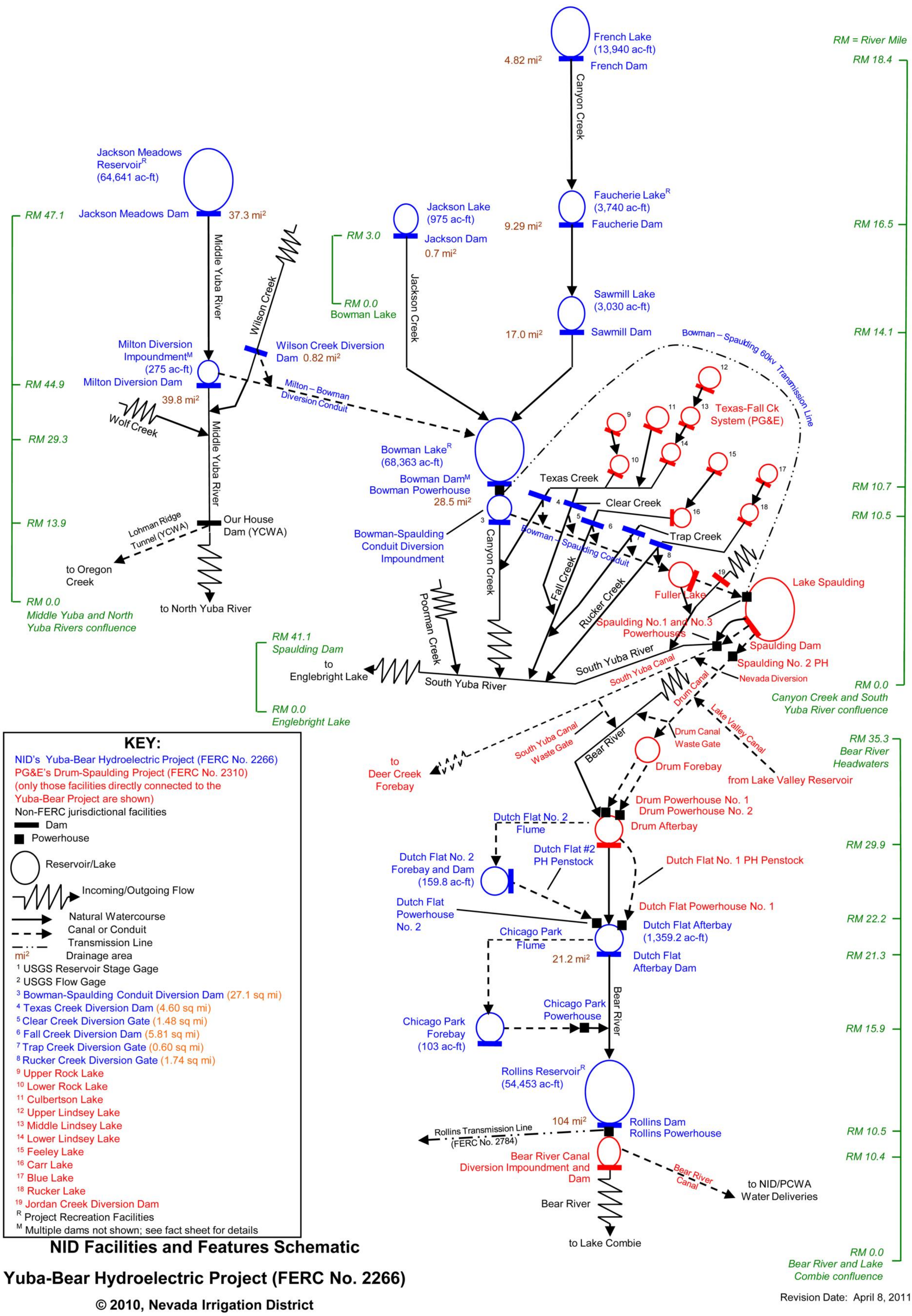


**Figure 2.0-1. Yuba-Bear Hydroelectric Project flow schematic.**

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PG&E's South Yuba Canal dates back to 1853 and is still used to carry NID water (along with discretionary hydropower releases in excess of NID demand) from Lake Spaulding to the Grass Valley and Nevada City area. Bowman Lake was built in 1872 by a mining company to collect water for hydraulic mining at what is now known as Malakoff Diggins State Historical Park, the world's largest hydraulic mining site where gold miners used jets of water to wash away gravel and carve huge escarpments into the terrain looking for gold. The debris would clog, fill, and drown downstream flood plains, rivers, and streams, creating flooding problems for farmers.

By 1880, it was estimated that approximately 100 million cubic yards of gravel was washed away and discharged into the Middle and South Yuba rivers and into the Yuba and Feather rivers. In June of 1883, English Lake Dam on the Middle Yuba River failed, releasing 6 million cubic feet of water at an elevation of 6,000 feet. The dam failure resulted in a 60-foot-high flood wave, which traveled at 10 miles per hour with a roar heard for miles. The flood wave resulted in several downstream dam failures, washing away farmhouses, livestock, miners' cabins, equipment, flumes, bridges, roads, buildings, and factories. Several miners lost their lives. The sediment deposited in the streams and rivers from the hydraulic mining, along with debris from the dam failure, was carried downstream, reportedly covering 18-20 inches deep for many miles. The loss of water, flumes, and hydraulic mining equipment left over 100 hydraulic miners out of work and turned the nearby mining communities into instant ghost towns.

In 1884, legal rulings made it illegal to discharge tailing into the streams and rivers. Eventually, mining declined and the water was increasingly used for irrigation and power generation. Through the 1920's, NID obtained rights to mountain waters and water systems developed by mining companies and private water companies were brought together to help shape NID's hydraulic infrastructure. By 1927, NID purchased portions of Empire Company, Excelsior Water and Power Company, the New Blue Point Mine, North Bloomfield Water and Power Company, and PG&E's Deer Creek and Gold Hill systems, and began delivering water to local farmers.

After forming in 1921, NID constructed canals and flumes in the 1920's through the 1940's to tie in the early water systems built by the gold miners to meet the demands of local agriculture. In the 1950's the demand for water service increased and, in an attempt to maintain local control over water, NID partnered with PG&E to develop the Yuba-Bear Hydroelectric Project as PG&E began an initiative to develop the Yuba and Bear rivers for hydroelectricity in the 1950s. Through the relationship with PG&E, NID enhanced their ability to provide water to its customers. By the 1960's, NID began building major system improvements including chlorination and water treatment plants for drinking water in the growing foothill communities.

The initial FERC license for the Project, issued by the Federal Power Commission (FERC's predecessor) to NID on June 24, 1963, was effective on May 1, 1963, for a 50-year term ending April 30, 2013. A key component to the Project was the addition of over 135,000 ac-ft of storage in addition to the first powerhouses added to NID's system.

Today, NID has a service territory of 287,000 acres, and provides domestic water to homes and businesses and irrigation water to farms in Nevada, Placer, and Yuba counties. Agricultural water customers use most of the water supplied by NID. Many of NID's reservoirs are also used for recreation by local residents and tourists for boating, fishing, and camping.

## 2.2 Current Project Operations Overview

In general, the Project is characterized by high elevation storage and lower elevation power generation via a network of natural and man-made conveyances. Water is stored and released from the upper reservoirs (also known as the "Mountain Division") based on NID's consumptive needs and combined reservoir storage targets developed as part of the Consolidated Contract with PG&E. Discretionary releases are made from Jackson Meadows Reservoir and Jackson, French, Faucherie, and Sawmill lakes during the spring runoff season through late fall. These releases are conveyed to Bowman Lake via the Milton-Bowman Tunnel (releases from Jackson Meadows Reservoir), Jackson Creek (releases from Jackson Lake), and Canyon Creek (releases from French, Faucherie, and Sawmill lakes). This water is then stored and released by Bowman Dam through Bowman Powerhouse into the Bowman-Spaulding Conduit Diversion Impoundment.

While the majority of the Bowman-Spaulding Conduit flow is provided by releases at Bowman Lake, five small diversion structures (known as "feeders") on creeks that run perpendicular to the alignment of the Bowman-Spaulding Conduit also provide water to the conduit. These feeders augment flows in the conduit up to its capacity, and spill the remainder into their respective natural drainages downstream of the conduit. Two types of feeders occur on the Bowman-Spaulding Conduit: diversion dams on Texas Creek and Fall Creek; and side water inflows from Clear, Trap, and Rucker creeks. The diversion dam-style feeders utilize spillways and outlet conduits to release water downstream into the creek, while the side water style feeders utilize dump gates on the downstream side of the Bowman-Spaulding Conduit to make releases into drainages.

Flows upstream of the Bowman-Spaulding Conduit in Texas, Fall, and Rucker creeks are regulated by upstream reservoirs owned and operated by PG&E. These are Culbertson, Upper Rock, Lower Rock, Upper Lindsey, Middle Lindsey, and Lower Lindsey lakes in the Texas Creek watershed; Carr and Feeley lakes in the Fall Creek watershed; and Blue and Rucker lakes in the Rucker Creek watershed.

Bowman-Spaulding Conduit discharges into PG&E's Fuller Lake, where it then is diverted to a second section of the Bowman-Spaulding Conduit before it is utilized by PG&E for power generation at Spaulding No. 3 Powerhouse (part of PG&E's Drum-Spaulding Project). PG&E then passes this water through PG&E's Lake Spaulding into PG&E's Drum and South Yuba canals. Water transported into the Drum Canal is passed through PG&E's Drum Forebay and then diverted from PG&E's Drum Afterbay, located on the Bear River, into the Dutch Flat No. 2 Flume, Forebay, and Powerhouse. Water transported by PG&E into the South Yuba Canal is passed through PG&E's Deer Creek Forebay and Deer Creek Powerhouse prior to being released into South Fork Deer Creek. NID re-diverts most of this water out of South Fork Deer Creek, approximately 0.1 mile downstream, to meet consumptive demand. Daily volumes into each canal are scheduled by PG&E and NID for downstream consumptive demand and discretionary hydropower generation.

Water from the Project's Dutch Flat No. 2 and PG&E's Dutch Flat No. 1 powerhouses discharge into the Project's Dutch Flat Afterbay located on the Bear River, where the water is then delivered via the Chicago Park Flume to the Project's Chicago Park Powerhouse by way of the Project's Chicago Park Forebay. Daily volumes are scheduled for downstream consumptive demand and discretionary hydroelectric power generation. These waters are discharged into the Bear River roughly 1.5 miles upstream of the high water line of the Project's Rollins Reservoir.

With a gross storage capacity of roughly 59,000 ac-ft, Rollins Reservoir is the Project's major low-elevation storage reservoir[1]. Located near Interstate 80 and State Highway 174, Rollins Reservoir is a multipurpose facility that meets municipal, irrigation, domestic water supply, recreation, and power generation needs. Under existing operations, Rollins Reservoir is generally kept as high as possible through the recreation season of Memorial Day through Labor Day. This is accomplished through upstream deliveries into the Bear River watershed by PG&E's Drum and Lake Valley canals. The Drum Canal is supplied by a combination of Licensee's water transfers out of the Middle Yuba River (via the Milton-Bowman Tunnel) and Canyon Creek (via the Bowman-Spaulding Conduit) watersheds, along with PG&E reservoirs and natural runoff in the South Yuba and North Fork of the North Fork American river watersheds.

A significant decrease in reservoir storage is generally experienced during the outage period of the Drum Canal, which occurs in the last two weeks of September each year. Rollins Reservoir storage is generally recovered through natural runoff and canal flows in the fall and early winter months. The primary purposes of the Drum Canal outage are as follows: 1) annual maintenance / repair of canal lining and structure; 2) cleaning of debris, sediment, and algae from the canal bottoms and side walls to improve conveyance capacity; and 3) maintenance of Spaulding No. 1 Powerhouse, which directly feeds the Drum Canal via Drum Tunnel. This two-week outage results in a significant reduction of net inflows into Drum Afterbay, Dutch Flat Afterbay, and Rollins Reservoir on the Bear River (at this time of year, typical Drum Canal imports represent over 90 percent of the overall inflow into Rollins Reservoir, due to the low level of unimpaired accretion typically experienced in late summer / early fall. Drum and Dutch Flat afterbays are negligibly affected due to their relatively low minimum instream flow requirements, but Rollins Reservoir is significantly affected due to the relatively high level of instream flow and water delivery demands from the reservoir in this time period. In an average water year, Rollins Reservoir is drawn down by approximately 900 acre-feet per day during the Drum Canal outage due to the mismatch between supply (Drum Canal plus unimpaired accretion) and demand (minimum instream flow and water deliveries into both the Bear River and the Bear River Canal). See Figure 2.2-1 for a graphical representation of this phenomenon.

[1] Gross storage estimate based on NID's 2007 reservoir bathymetry study.

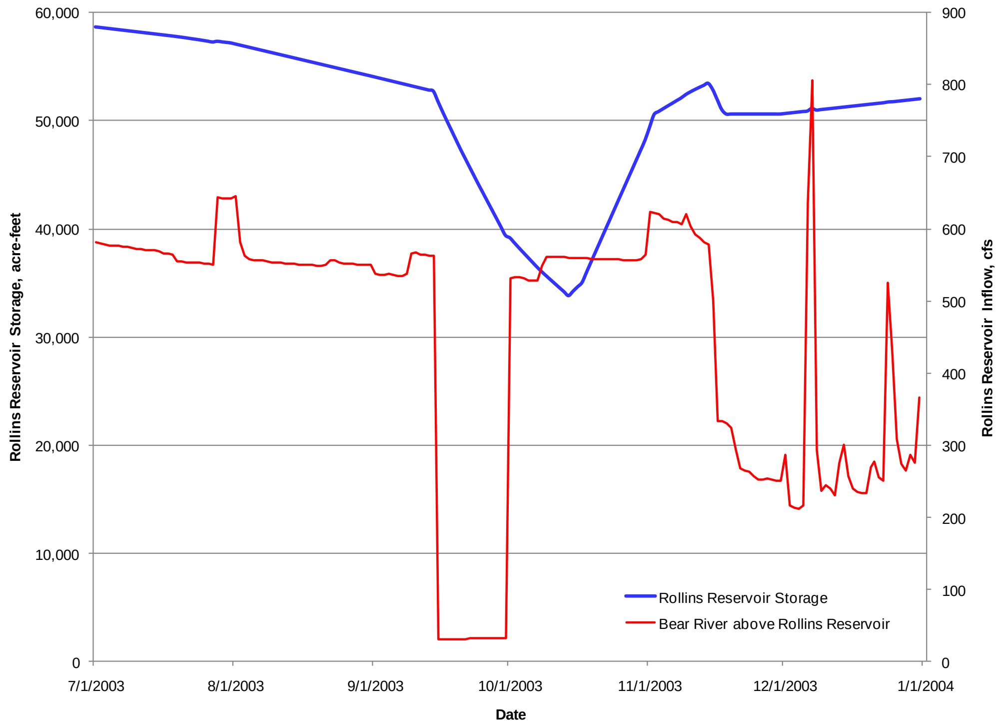



**Figure 2.2-1. Rollins Reservoir storage and inflow in water year 2003 in response to the Drum Canal outage; water year 2003 is representative of the general trend across the period of record.**

Besides physical (e.g., size of dams and tunnels) and hydrologic (e.g., natural runoff) constraints, major factors that constrain Licensee's normal operation of the Project include, but are not limited to; public and employee safety; conditions in the current FERC Project license; conditions in the NID/PG&E Consolidated Contract; other agreements made with PG&E and Davis-Grunsky Agreement reservoir elevation requirements; and other downstream water supply demand and associated requirements. The Consolidated Contract, Davis-Grunsky Agreement, and some of the other agreements expire at the same time as the existing FERC license.

The medians of the historical daily storage values illustrating the normal fill and spill operation of these reservoirs are presented in Figure 2.2-2[2].

[2] Median daily storage quantities reported are based on historical area-capacity estimates; see Exhibit A for revised gross and usable storage estimates.

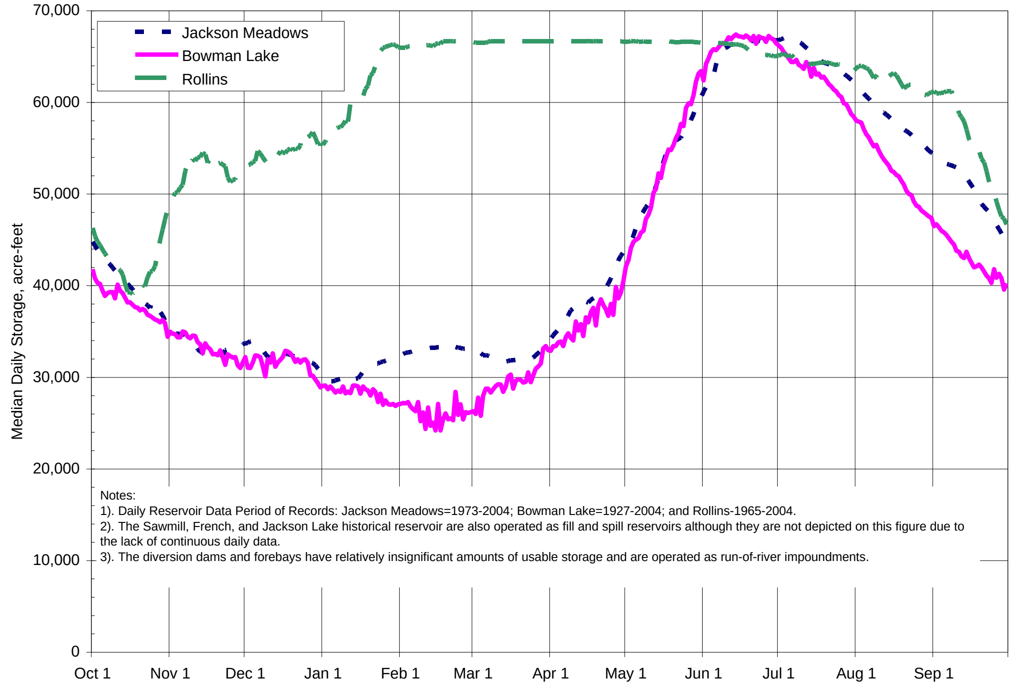



**Figure 2.2-2. Median historical daily reservoir storage for Jackson Meadows, Bowman, and Rollins reservoirs (storage values based on pre-relicensing area-capacity information).**

## 2.3 Current Powerhouse Operation Overview

Project powerhouses (Bowman, Dutch Flat No. 2, Chicago Park, and Rollins) have a total licensed capacity of 79.32 MW and generated an annual average of 354.3 GWh from 1971 to 2007,[3] based on historical data. Chicago Park and Dutch Flat No. 2 powerhouses generated an annual average of 270.7 GWh from 1972 to 2007 and all four Project powerhouses generated an annual average of 329.1 GWh from 1987 to 2007, based on historical data.

Bowman Powerhouse is operated as a base-loaded plant to meet daily downstream water demands. Dutch Flat No. 2 and Chicago Park powerhouses are operated to meet intermediate loads with some peaking operation. Rollins Powerhouse is operated as a base-loaded plant generating power according to irrigation water demand and water conditions.

Dutch Flat No.2, Chicago Park, and Rollins powerhouses are automatic with supervisory control and data acquisition system (SCADA) controls; these powerhouses are controlled by PG&E's Drum Switching Center, located at Drum No. 1 Powerhouse. Bowman Powerhouse is locally, manually controlled.

[3] Annual average generation statistics include Rollins Powerhouse generation from 1981-2007 and Bowman Powerhouse generation from 1987-2007.

Detailed powerhouse operation information is presented in Section 6 for each of the four developments.

## 2.4 Licensee's Operations Model (ResSim)

The comparison of the Licensees' No-Action Alternative and Proposed Project is accomplished via the Licensees' Operations Model. The program utilized to develop the Operations Model was the United States Army Corps of Engineers - Hydrologic Engineering Center (HEC) Reservoir Simulation (ResSim) Version 3.0.

See Exhibit E, Section 6.2, for a description of the Licensees' Operations Model for the Yuba-Bear Hydroelectric and Drum-Spaulding projects.

## 2.5 NID's No-Action Alternative - Operations Overview

In FERC's revised SD2 dated October 6, 2008, FERC noted that, in addition to Licensees' Proposed Action, and alternative proposed actions, it would consider in its environmental analysis a No-Action Alternative. As a result, NID is providing some additional information regarding that No-Action Alternative here.

The comparison of the No-Action Alternative to the historical operations yields similar results; in this instance, for the Yuba-Bear Hydroelectric Project, the results differ slightly. The difference here is primarily due to: 1) NID and PG&E's modified winter/spring operations since 1997; 2) the use of usable storage estimates generated by the Licensee's 2007-2009 bathymetric studies, where applicable; 3) the re-operation between PG&E's Dutch Flat No. 1 and NID's Dutch Flat No. 2 powerhouses; and 4) the use of WY2001-2009 annual average water demands. These four items are discussed in greater detail below.

### 2.5.1 NID and PG&E's Modified Winter/Spring Operations Since 1997

Following the 1997 New Year's storm, PG&E and NID implemented Winter/Spring Operating Plans for their respective Project water conveyances. The plans specify reduced maximum flow rates in canals and flumes to be utilized during forecasted storm events, which provide adequate freeboard to support safe operation of the facilities. The Winter/Spring Operating Plans result in a reduced amount of hydropower generation during the winter and spring months, as compared to operations prior to implementation of the Plans. The reduction in hydropower generation is due to persistent lower canal flow rates in these months, which results in direct reductions in water availability to several Project powerhouses during the winter and spring months.

Under Licensees' No-Action Alternative Operations Model, these Winter/Spring Operating Plans' flow rates are utilized during the winter and spring months for the Period of Record (WY1976 – WY2008), even though these Operating Plans have only been in place since WY1997.

### 2.5.2 Bathymetric Studies

NID and PG&E performed bathymetric studies in the following reservoirs between 2007 and 2009:

- <u>NID's Yuba-Bear Hydroelectric Project</u>
  - Jackson Meadows Reservoir (decreased by 1,783 ac-ft as compared to historical data)
  - Bowman Lake (increased by 1,213 ac-ft as compared to historical data)
  - Dutch Flat Afterbay (decreased by 640 ac-ft as compared to historical data)
  - Rollins Reservoir (decreased by 7,306 ac-ft as compared to historical data)

- <u>PG&E's Drum-Spaulding Project</u>
  - Blue Lake (no change as compared to historical data)
  - Lake Spaulding (increased by 878 ac-ft as compared to historical data)
  - Lake Fordyce (decreased by 548 ac-ft as compared to historical data)
  - Lake Valley Reservoir (decreased by 62 ac-ft as compared to historical data)
  - Rock Creek Reservoir (decreased by 64 ac-ft as compared to historical data)

These studies resulted in revised estimates of gross and usable storage capacities; these values are provided in each Licensee's Exhibit A. These revised values are used under the No-Action Alternative in the Operations Model.

### 2.5.3 Re-Operation of Dutch Flat No. 1 and No. 2 Powerhouses

In Licensee's No Action Alternative, the operations of the Drum-Spaulding Project would be coordinated with the operations of NID's Yuba-Bear Hydroelectric Project. Historically, PG&E and NID coordinated operations of Dutch Flat No. 1 and Dutch Flat No. 2 pursuant to the existing power contract relationship. Effectively, Dutch Flat No. 1 and Dutch Flat No. 2 have been dispatched based on operational or efficiency considerations regardless of water ownership (e.g., NID and PG&E water has run through whichever powerhouse or combination of powerhouses that are the most efficient based on the amount of water available). In the No Action Alternative, Licensees will dispatch Dutch Flat No. 1 and Dutch Flat No. 2 based solely on water rights (e.g., PG&E water will be run through Dutch Flat No. 1 and NID water will be run through Dutch Flat No. 2).

### 2.5.4 Water Delivery Demand

Licensee has used the WY2001-WY2009 annual average water demand in the No-Action Alternative as shown in Table 2.5.4-1.

**Table 2.5.4-1. Recent historical water demands, by Yuba-Bear Hydroelectric Project delivery point.**

| Water Delivery Point | Recent Historical Demand (acre-feet/year)[1] |
|---|---|
| NID-1[2] | 9,045 |
| NID-2[2] | 34,373 |
| NID-3[2] | 60,606 |
| NID-4[2] | 35,451 |
| PCWA-1[2,3] | 9,659 |
| PCWA-2[2,4] | 13,197 |
| PCWA-3[2,4] | 15,095 |
| PCWA-4[2,4] | 4,546 |
| PCWA-5[2,4] | 62,144 |

[1] Based on 2001-2009 average demand. Demands do not include Project conveyance losses.
[2] Demand derived from historical NID water demands and projected demand in NID Raw Water Master Plan; PCWA's projected demands were provided to PG&E by PCWA in March 2011.
[3] Demand in PCWA's Zone 3.
[4] Demand in PCWA's Zone 1.

## 2.6 NID's Proposed Project – Operations Overview

NID's Proposed Project includes the operating assumptions made in the No-Action Alternative along with additional PM&E measures relevant to Project operations and resource utilization, including minimum streamflows and reservoir minimum pools. In addition, in Licensees' cumulative effects analyses, NID is evaluating all operating scenarios under the assumption of projected[4] water supply demands during the course of the next License term as projected by PCWA and NID for their respective consumptive water demands. The projected water supply demands are discussed in greater detail in Exhibit E, Section 3; see Appendix E3 within Exhibit E for a detailed list and description of NID's Proposed Project measures.

These two items have been captured by the ResSim Operations Model.

Exhibit E, Section 6.2 presents the impact of the Licensees' Proposed Project on reservoir elevations, stream and man-made conveyance flows, and power generation, as estimated by the Operations Model.

[4] NID's projected consumptive water demands for use in Licensees' Proposed Project Operations Model are based on recent historical trends, anticipated water demand increases based on the Raw Water Master Plan 2032 projections, and a continued increase in demands through the year 2062. PCWA's projected consumptive water demands through 2062 for use in Licensees' Proposed Project Operations Model were provided to PG&E in March 2011, and the anticipated trend for demand increases was presented by PCWA in their January 31, 2011 comment letter on Licensees' DLAs.

# 3.0 Hydrology

## 3.1 General

The Project drainage basins are located on the western slope of the Sierra Nevada mountain range on the Middle and South Yuba rivers (and their tributaries) and the Bear River. Elevations in the Project drainage basins range from 8,373 feet at the peak of English Mountain to 2,171 feet at Rollins Reservoir. French Lake is the highest Project reservoir at elevation 6,660 feet. As indicated on Figure 1.0-1, presented in Exhibit A, the Yuba and Bear rivers drain westerly into the Feather River flowing in a west-southwesterly direction until it converges with the Sacramento River. The Sacramento River flows generally south and then west toward the Pacific Ocean through the San Francisco-San Joaquin Bay Delta into the San Francisco Bay complex.

## 3.2 Climatology

The Yuba and Bear river basins have dry, warm summers with little to no precipitation; and cold, wet winters with moderate to heavy precipitation, usually in the form of snow above elevation 5,000 feet. Annual temperatures in the Project range from below zero degrees Fahrenheit (°F) to above 100°F.

Average annual precipitation obtained from the California Department of Water Resources, Division of Flood Management, California Data Exchange Center (CDEC) stations in the project basin ranges from approximately 47 inches at Colfax, CA (2.5 miles south of Rollins Reservoir) at elevation 2,400 feet to approximately 67 inches at Bowman Lake at elevation 5,562 feet. The monthly averages for the Bowman and Colfax stations are provided in Table 3.2-1.

**Table 3.2-1. Average precipitation in the Project basins.**

| AVERAGE PRECIPITATION, INCHES | | |
|---|---|---|
| **Month** | **City of Colfax** | **Bowman Dam** |
| January | 9.4 | 12.7 |
| February | 7.7 | 10.4 |
| March | 6.8 | 9.4 |
| April | 3.9 | 5.2 |
| May | 1.8 | 3.2 |
| June | 0.5 | 1.2 |
| July | 0.1 | 0.2 |
| August | 0.2 | 0.5 |
| September | 0.5 | 0.8 |
| October | 2.7 | 4.1 |
| November | 5.6 | 8.2 |
| December | 7.9 | 11.0 |
| **Yearly** | **47.0** | **66.8** |

## 3.3 Snow Course Records

The runoff into the Yuba River and its tributaries above an elevation of 5,000 feet generally originates from snowmelt. The area receives high flows during the snowmelt period, typically from March through late June, and low flows occur during late summer and early fall after the snowmelt has run off. Low flows also occur during the late fall and winter when temperatures are below freezing and precipitation remains in the form of snow pack. The average April 1 snowpack depths (snow water equivalent) measured at the active snow courses on the Yuba River range from 21.3 to 55.8 inches with an average of 38.1 inches. Information regarding the active snow courses in the Yuba River basin is summarized in Table 3.3-1.

**Table 3.3-1. Active snow courses in the Yuba River basin.**

| Snow Course Name | CDEC Station ID | Year Established | Aspect | Exposure | Elevation (ft) | Months Measured | April 1 Avg. Water Equivalent Depth (in) |
|---|---|---|---|---|---|---|---|
| **ACTIVE CDEC SNOW COURSES ON THE YUBA RIVER (INCLUDING THE NORTH, MIDDLE, AND SOUTH YUBA RIVERS)** | | | | | | | |
| Webber Peak | WPK | 1922 | east | dense forest | 7,800 | Feb, Mar, Apr, May | 41.9 |
| Castle Creek 5 | CC5 | 1946 | level | open timber | 7,400 | Jan, Feb, Mar, Apr, May | 52.1 |
| Meadow Lake | MWL | 1920 | northeast | open timber high brush | 7,200 | Feb, Mar, Apr, May | 55.8 |
| Red Mountain | RDM | 1918 | northeast | open timber wood debris | 7,200 | Feb, Mar, Apr, May | 51.9 |
| English Mountain | ENM | 1927 | level | open timber | 7,100 | Feb, Mar, Apr, May | 45.4 |
| Donner Summit | DNS | 1910 | south | open timber | 6,900 | Feb, Mar, Apr, May | 38.6 |
| Furnace Flat | FNF | 1918 | east | open timber | 6,700 | Feb, Mar, Apr, May | 48.4 |
| Yuba Pass | YBP | 1937 | southeast | grassy meadow | 6,700 | Feb, Mar, Apr, May | 29.6 |
| Findley Peak | FNP | 1927 | northeast | grassy meadow scattered rocks | 6,500 | Feb, Mar, Apr, May | 29.8 |
| Lake Fordyce | FOD | 1918 | northwest | cleared reservoir site | 6,500 | Feb, Mar, Apr, May | 40.9 |
| Robinson Cow Camp | RCW | 1972 | west | grassy meadow | 6,480 | Feb, Mar, Apr, May | 42.5 |
| Sunnyside Meadow | SSM | 1972 | level | grassy meadow | 6,300 | Feb, Mar, Apr, May | 55.4 |
| Cisco | CCO | 1918 | north | open meadow scattered willows | 5,900 | Feb, Mar, Apr, May | 27.6 |
| Chapman Creek | CMC | 1968 | northwest | grassy meadow | 5,850 | Feb, Mar, Apr, May | 23.7 |
| Bowman Lake | BOM | 1927 | southwest | open meadow scattered rocks | 5,650 | Feb, Mar, Apr, May | 22.3 |
| Lexington | LXN | 1972 | level | along road brush | 5,600 | Feb, Mar, Apr, May | 30.7 |
| Gibsonville | GBN | 1950 | level | grassy meadow | 5,400 | Feb, Mar, Apr, May | 28.7 |
| Lake Spaulding | SPD | 1927 | level | grassy meadow | 5,200 | Feb, Mar, Apr, May | 21.3 |
| Chalk Bluff | CHK | 1986 | level | along road brush | 4,850 | Feb, Mar, Apr | n/a |

## 3.4 Water Rights

There are several types of water rights in California including: riparian, appropriative, reserved, and Pueblo rights. The riparian and appropriative water rights (discussed below) are often conflicting in nature and have resulted in numerous legal battles since the early 1900's. The reserved water rights are set aside by the federal government for public domain land and Pueblo rights are a municipal right based on Spanish and Mexican law.

Riparian rights entitle a landowner with property adjacent to a source of water to use water flowing naturally past their property and do not require permits or licenses. Riparian rights do not entitle a water user to divert water to storage in a reservoir for use in the dry season or to use water on land outside of the watershed.

The appropriative water rights tie back to the gold mining days beginning in 1849 when miners built extensive networks of waterways and flumes to divert water from its natural course. Miners staked the claim on the water and land under a "finders-keepers" rule and hierarchies were established on a "first in time, first in right" basis. This position became an important feature of today's appropriative water rights. An appropriative water right is a legal entitlement authorizing water to be diverted from a specified source and put to beneficial, non-wasteful use. The holder of an appropriative water right does not own the water but simply holds the right to use it.

The legal history of the conflict between the two water rights started when the common law of riparian rights was adopted shortly after California became the 31st state in 1850. One year later, the California legislature recognized the appropriative right system as having the force of law. Up to the early 1900's, mines and non-riparian farmers controlled and used water as they wished with no permission required from administrative or judicial bodies. The conflicting water rights resulted in numerous legal disputes that eventually resulted in a constitutional amendment requiring water use to be "reasonable and beneficial." This included municipal and industrial uses, irrigation, hydroelectric generation, livestock watering, recreational use, fish and wildlife protection, and enhancement and aesthetic enjoyment.

The Water Commission Act of 1914, a predecessor to today's California Water Code provisions governing appropriation, created the State Water Rights Board, which later evolved into the State Water Resources Control Board (SWRCB), which has the authority to administer permits and licenses for surface water.

NID holds a combination of pre-and post-1914 appropriative rights for various beneficial uses including domestic, irrigation, industrial, municipal, hydroelectric power, recreation, and mining.

NID's water rights related to the Yuba-Bear Hydroelectric Project are summarized in Table 3.4-1.

**Table 3.4-1. NID's Yuba-Bear Hydroelectric Project water rights.**

| License, Permit, Application, or Statement No. | Source | Priority Date | Place of Storage or Diversion | Direct Diversion Amount (cfs) | Storage Amount (ac-ft) |
|---|---|---|---|---|---|
| S4716 | Canyon Creek | 1873 | Sawmill Lake | Not Applicable (Pre-1914 Rights) | |
| S4717 | Canyon Creek | 1859 | French Lake | | |
| S13330 | Middle Yuba River | 1854 | Milton Diversion Impoundment | | |
| S13800 | Canyon Creek | 1872 | Bowman Reservoir | | |
| S13801 | Canyon Creek | 1872 | Faucherie Lake | | |
| S13927 | South Yuba River | 1874 | PG&E's South Yuba Canal | | |
| S13928 | South Yuba River | 1874 | PG&E's Drum Canal | | |
| S14354 | Bear River | 1853 | Rollins Reservoir | | |
| S14355 | Bear River | 1853 | PG&E's Bear River Canal | | |
| S14356 | Canyon Creek | 1872 | Bowman Reservoir | | |
| 12795 (7/10/1991) | Jackson Creek | 5/7/1919 | Jackson Lake | --- | 970 (1/1 – 12/31) |
| | Canyon Creek | | Faucherie Lake | --- | 3980 (1/1 – 12/31) |
| | Canyon Creek | | Sawmill Lake | --- | 1221 (1/1 – 12/31) |
| | Canyon Creek | | Bowman Lake | --- | 58829 (1/1 – 12/31) |
| | Canyon Creek | | Bowman-Spaulding Conduit | 146 (4/15 – 9/30) | --- |
| | Texas Creek | | Bowman-Spaulding Conduit | 30 (4/15 – 9/30) | --- |
| | Fall Creek | | Bowman-Spaulding Conduit | 15 (4/15 – 9/30) | --- |
| | Trap Creek | | Bowman-Spaulding Conduit | 5 (4/15 – 9/30) | --- |
| 12796 (7/10/1991) | Middle Yuba River | 3/25/1921 | Jackson Meadows and Bowman Reservoirs | --- | 60,000 (1/1 – 12/31) |
| 12797 (7/10/1991) | Middle Yuba River | 3/25/1921 | Jackson Meadows and Bowman Reservoirs | --- | 60,000 (12/1 – 7/15) |
| 12798 (7/10/1991) | Jackson Creek | 6/3/1921 | Jackson Lake | --- | 970 (12/1 – 7/15) |
| | Canyon Creek | | Faucherie Lake | --- | 2,993 (12/1 – 7/15) |
| | Canyon Creek | | Sawmill Lake | --- | 3,030 (12/1 – 7/15) |
| | Canyon Creek | | Bowman Reservoir | --- | 47,530 (12/1 – 7/15) |
| | Canyon Creek | | Bowman-Spaulding Conduit | 152 (1/1 – 12/31) | --- |
| | Texas Creek | | Bowman-Spaulding Conduit | 30 (1/1 – 12/31) | --- |
| | Fall Creek | | Bowman-Spaulding Conduit | 15 (1/1 – 12/31) | --- |
| | Trap Creek | | Bowman-Spaulding Conduit | 5 (1/1 – 12/31) | --- |
| 10350 (11/26/1968) | Bear River | 11/22/1921 | Rollins Reservoir | --- | 6,945 (11/30 – 6/1) |
| Permit No. 11626 (Lic. In Progress) | Bear River | 11/22/1921 | Rollins Reservoir | --- | 65,000 (11/30 – 6/1) |
| Permit No. 13770 (Lic. In Progress) | Middle Yuba River | 9/8/1926 | Jackson Meadows, Milton and Bowman Reservoirs | --- | 50,000 (1/1 – 6/30, 10/1 – 12/1)) |
| 8809 (1/20/1964) | Bear River | 3/26/1929 | Bear River Canal | 120 (4/1 – 10/31) | --- |
| 4544 (2/11/1957) | Middle Yuba River, Canyon Creek & Others Not Listed | 11/7/1934 | PG&E's Drum Canal | 135 (1/1 – 12/31) | --- |
| 1707 (12/15/1936) | Middle Yuba River, Canyon Creek & Others Not Listed | 11/7/1924 | PG&E's South Yuba Canal | 126 (1/1 – 12/31) | --- |

**Table 3.4-1. (continued)**

| License, Permit, Application or Statement No. | Source | Priority Date | Place of Storage or Diversion | Direct Diversion Amount (cfs) | Storage Amount (ac-ft) |
|---|---|---|---|---|---|
| 12799 (7/10/1991) | Clear Creek | 6/16/1930 | Bowman-Spaulding Conduit | 5 (10/1 - 9/30) | --- |
| | Fall Creek | | | 10 (12/1 – 7/31) | --- |
| | Trap Creek | | | 5 (1/1 – 7/31) | --- |
| 12800 (7/10/1991) | Clear Creek | 6/16/1930 | Bowman-Spaulding Conduit | 5 (4/15 – 9/30) | --- |
| | Fall Creek | | | 10 (4/15 – 7/31) | --- |
| | Trap Creek | | | 5 (4/15 – 7/31) | --- |
| 12802 (7/10/1991) | Texas Creek | 11/27/1934 | Bowman-Spaulding Conduit | 68 (1/1 – 6/30) | --- |
| | Clear Creek | | | 13.6 (1/1 – 7/31) | --- |
| | Fall Creek | | | 75.7 (12/1 – 7/31) | --- |
| | Trap Creek | | | 8.6 (4/15 – 6/30) | --- |
| | Rucker Creek | | | 25 (1/1 – 12/31) | --- |
| 12803 (7/10/1991) | Wilson Creek | 11/27/1934 | Milton-Bowman Conduit | 3.5 (1/1 – 12/31) | --- |
| | | | Bowman Reservoir | --- | 680 (11/1 – 6/30) |
| 12801 (7/10/1991) | Wilson Creek | 11/27/1934 | Milton-Bowman Conduit and Bowman Lake | 2.7 (1/1 – 12/31) | 680 (11/1 – 6/30) |
| Permit No. 5815 (Lic. In Progress) | Clear Creek | 11/27/1934 | Bowman-Spaulding Conduit | 30 (1/1 – 12/31) | 6,000 (11/1 – 6/30) |
| | Texas Creek | | | 70 (1/1 – 12/31) | 14,000 (11/1 – 6/30) |
| | Fall Creek | | | 85 (1/1 – 12/31) | 17,000 (11/1 – 6/30) |
| | Trap Creek | | | 15 (1/1 – 12/31) | 3,000 (11/1 – 6/30) |
| | Rucker Creek | | | 25 (1/1 – 12/31) | 5,000 (11/1 – 6/30) |
| 10016 (3/5/1973) | South Yuba River | 9/3/1953 | PG&E's Lake Spaulding | 200 (9/1 – 6/30) | --- |
| Permit No. 13772 (Lic. In Progress) | South Yuba River | 3/6/1961 | Rollins Reservoir | 200 (9/1 – 6/30) | 18,000 (11/1 – 6/30) |
| Permit No. 13773 (Lic. In Progress) | Middle Yuba River | 4/6/1961 | Jackson Meadows and Bowman Reservoirs | --- | 50,000 (10/1 – 6/30) |
| 9903 (4/19/1972) | Bear River | 2/5/1963 | Chicago Park Flume | 1,056 (1/1 – 12/31) | --- |
| 9902 (4/19/1972) | Bear River | 2/5/1963 | Dutch Flat No. 2 Flume | 550 (1/1 – 12/31) | --- |
| S10591 (Riparian Right) | Damfine Spring | 1967 | Jackson Meadows Campground | --- | --- |
| S10592 (Riparian Right) | Unnamed Tributary to Pass Creek | 1967 | Jackson Meadows Campground | --- | --- |
| Permit No. 16953 (Lic. In Progress) | Bear River | 1/9/1976 | Rollins Reservoir | 700 (1/1 – 12/31) | 62,080 (11/30 – 6/1) |
| Permit No. 19158 (Lic. In Progress) | Canyon Creek | 10/22/1982 | Bowman Reservoir | 322 (1/1 – 12/31) | 65,000 (1/1 – 7/31) |

## 3.5 Basin Transfers and Diversions

The Project includes two out-of-basin transfers and eight in-basin transfers. A basin transfer, for the purpose of this exhibit, is a bypass or diversion of water by a man-made conduit from a natural stream segment into a neighboring stream segment, either within or out of the natural basin. PG&E's Drum-Spaulding Project also contains basin transfers and diversions that contribute water to NID powerhouses. NID's basin transfers are summarized in Table 3.5-1.

**Table 3.5-1. Basin transfers and diversions associated with the Yuba-Bear Hydroelectric Project.**

| Conduit Name | Maximum Flow Capacity (cfs) | From | To | Powerhouse Downstream of Diversion |
|---|---|---|---|---|
| Milton-Bowman Diversion Conduit | 450 | Middle Yuba River | Canyon Creek | Bowman |
| Wilson Creek Diversion Conduit | 3.5 | Wilson Creek | Canyon Creek (Milton-Bowman Diversion Conduit) | Bowman |
| Bowman-Spaulding Conduit | 300 | Canyon Creek | South Yuba River (PG&E's Lake Spaulding) | Spaulding No. 3 (PG&E) |
| Texas Creek Diversion | 80 | Texas Creek | | |
| Clear Creek Diversion | 13.6 | Clear Creek | | |
| Fall Creek Diversion | 80 | Fall Creek | | |
| Trap Creek Diversion | 325 | Trap Creek | | |
| Rucker Creek Diversion | 325 | Rucker Creek | | |
| Dutch Flat No. 2 Flume | 610 | Bear River (Drum Afterbay) | Bear River (Dutch Flat Afterbay) | Dutch Flat No. 2 |
| Chicago Park Flume | 1,100 | Bear River (Dutch Flat Afterbay) | Bear River (Chicago Park Powerhouse) | Chicago Park |

## 3.6 Relicensing Hydrologic Records

The Project Relicensing Hydrology and Power Generation Data digital versatile disc (Hydrology DVD) (NID and PG&E, 2010e), contains both regulated and unimpaired hydrological data for the Project flow and reservoir gages. In this relicensing, these data are used to characterize the hydrologic conditions during Project operations (regulated flow) and to characterize and synthesize unimpaired flow data. Unimpaired flow is defined as the hydrologic response of the Project basin with no influence (i.e., regulation) of stream flow by man-made structures such as dams or diversions.

### 3.6.1 Regulated Hydrologic Records

There are 27 flow and reservoir existing gaging stations in the vicinity of the Project: 10 reservoir (elevation or storage) gaging stations; 9 stream flow gaging stations; 5 tunnel and canal gages; and 2 powerhouse flow gaging stations. Table 3.6.1-1 summarizes physical information such as location, elevation, and period of record for the USGS and NID gages. Table 3.6.1-2 summarizes USGS and Licensee flow gage data such as mean annual flows and maximum and minimum recorded flows. It should be noted that USGS-listed drainage areas may vary slightly from those calculated by Licensees for use in unimpaired hydrology development.

## Table 3.6.1-1. Active USGS and NID gages.

| USGS Gage No. | Licensee Gage No. (YB-xx) | Gage Name | Comment | Location | Elevation (feet) | USGS Listed Drainage Area (sq. mi.) | Period of Record (Start) | Period of Record (End) |
|---|---|---|---|---|---|---|---|---|
| **RIVER FLOW GAGES** | | | | | | | | |
| 11422500 | YB-196 | Bear River below Rollins Dam near Colfax CA | Measures releases from Bear River Canal Diversion Dam and spills over Rollins Lake Dam | Latitude 39°07'53" Longitude 120°57'29" | 1,996 | 105 | April 1912 | Present |
| 11421790 | YB-197 | Bear River below Dutch Flat Afterbay near Dutch Flat CA | Measures releases from and spills over Dutch Flat Afterbay Dam | Latitude 39°12'49" Longitude 120°50'39" | 2,600 | 21.5 | December 1965 | Present |
| 11407900 | YB-301 | Middle Yuba River below Jackson Meadows Dam near Sierra City CA | Measures releases from Jackson Meadows Dam | Latitude 39°30'58" Longitude 120°33'40" | N/A | 38.3 | October 1964 | Present |
| 11408550 | YB-304 | Middle Yuba River below Milton Dam CA | Measures releases from and spills over Milton Dam | Latitude 39°31'19" Longitude 120°34'57" | 5,690 | 39.9 | October 1987 | Present |
| 11414410 | YB-306 | Canyon Creek below French Lake CA | Measure low flow releases from French Lake | Latitude 39°25'16" Longitude 120°32'28" | 6,680 | 4.6 | October 1979 | Present |
| 11414450 | YB-308 | Canyon Creek below Faucherie Lake CA | Measures low flow releases from Faucherie Lake | Latitude 39°25'46" Longitude 120°34'06" | 6,080 | 9.0 | October 1978 | Present |
| 11414470 | YB-310 | Canyon Creek below Sawmill Lake CA | Measures low flow releases from Sawmill Lake | Latitude 39°26'44" Longitude 120°36'05" | 5,790 | 16.4 | October 1975 | Present |
| 11414700 | YB-312 | Jackson Creek below Jackson Lake CA | Measures low flow releases from Jackson Lake | Latitude 39°27'53" Longitude 120°33'46" | 6,570 | 0.65 | January 1989 | Present |
| 11416500 | YB-315 | Canyon Creek below Bowman Lake CA | Measures releases from and spills over Bowman Lake Dam | Latitude 39°26'23" Longitude 120°39'37" | 5,100 | 28.3 | January 1927 | Present |
| **TUNNEL AND CANAL FLOW GAGES** | | | | | | | | |
| 11416100 | YB-14 | Bowman-Spaulding Canal at Jordan Creek Siphon CA | Measures Flow in Bowman-Spaulding Canal below Fuller Lake | Latitude 39°20'32" Longitude 120°38'26" | 5,340 | NA | October 1964 | Present |
| 11421760 | YB-239 | Dutch Flat No 2 Flume near Blue Canyon CA | Measures flow in Dutch Flat No 2 Flume upstream of Dutch Flat No. 2 Forebay | Latitude 39°15'16" Longitude 120°46'28" | N/A | NA | October 1965 | Present |
| 11421780 | YB-245 | Chicago Park Flume near Dutch Flat CA | Measures flow in Chicago Park Flume above Chicago Park Forebay | Latitude 39°12'55" Longitude 120°50'23" | N/A | NA | November 1965 | Present |
| 11408000 | YB-303 | Milton-Bowman Tunnel Outlet near Graniteville CA | Measures flow in the Milton-Bowman Tunnel | Latitude 39°27'37" Longitude 120°36'37" | 5,593 | NA | June 1928 | Present |
| 11416000 | YB-314 | Bowman-Spaulding Canal Intake near Graniteville CA | Measures flow in Bowman-Spaulding Canal below Bowman-Spaulding Impoundment | Latitude 39°26'26" Longitude 120°39'30" | N/A | NA | October 1927 | Present |
| **POWERHOUSE FLOW GAGES** | | | | | | | | |
| NA | YB-258 | Chicago Park Powerhouse | Reported flow is a back-calculation of powerhouse generation data, based on a plant efficiency curve | | N/A | NA | | |
| 11421900 | YB-279 | Rollins Powerhouse near Colfax CA | Reported flow is a back-calculation of powerhouse generation data, based on a plant efficiency curve | Latitude 39°08'04" Longitude 120°57'09" | N/A | NA | August 1980 | Present |

**Table 3.6.1-1. (continued)**

| USGS Gage No. | Licensee Gage No. (YB-xx) | Gage Name | Comment | Location | Elevation (feet) | Drainage (sq. mi.) | Period of Record (Start) | Period of Record (End) |
|---|---|---|---|---|---|---|---|---|
| **RESERVOIR STORAGE GAGES** | | | | | | | | |
| 11421800 | YB-195 | Rollins Reservoir near Colfax CA | Measures water elevation at Rollins Reservoir | Latitude 39°08'08" Longitude 120°56'57" | NA | 104 | December 1964 | Present |
| NA | YB-238 | Dutch Flat Forebay | Measures water elevation at Dutch Flat No. 2 Forebay | | NA | NA | | |
| NA | YB-240 | Dutch Flat Afterbay | Measures water elevation at Dutch Flat Afterbay | | NA | 21.5 | | |
| 11407800 | YB-300 | Jackson Meadows Reservoir near Sierra City CA | Measures water elevation at Jackson Meadows Reservoir | Latitude 39°30'33" Longitude 120°33'08" | NA | 37.4 | November 1964 | Present |
| NA | YB-302 | Milton Diversion Impoundment | Measures water elevation at Milton Diversion Impoundment | | NA | 39.8 | | |
| 11414400 | YB-305 | French Lake near Cisco CA | Measures water elevation at French Lake | Latitude 39°25'16" Longitude 120°32'28" | NA | 4.6 | April 1979 | Present |
| 11414440 | YB-307 | Faucherie Lake near Cisco CA | Measures water elevation at Faucherie Lake | Latitude 39°25'45" Longitude 120°34'04" | NA | 9.0 | October 1978 | Present |
| 11414465 | YB-309 | Sawmill Lake near Graniteville CA | Measures water elevation at Sawmill Lake | Latitude 39°26'44" Longitude 120°36'02" | NA | 16.4 | October 1979 | Present |
| 11414690 | YB-311 | Jackson Lake near Sierra City CA | Measures water elevation at Jackson Lake | Latitude 39°27'52" Longitude 120°33'44" | NA | 0.65 | October 1979 | Present |
| 11415500 | YB-313 | Bowman Lake near Graniteville CA | Measures water elevation at Bowman Lake | Latitude 39°27'01" Longitude 120°39'09" | NA | 27.1 | October 1960 | Present |

NA = Not Applicable
N/A = Not Available

**Table 3.6.1-2. Summary of active USGS and NID stream, canal, tunnel, and powerhouse flow gages.**

| USGS Gage No. | Licensee Gage No. (YB-xx) | Gage Name | Mean Annual (cfs) | | | | Mean Monthly (cfs) | | Daily (cfs) | | Instantaneous (cfs) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Mean | Median | Highest (year) | Lowest (year) | Highest (month) | Lowest (month) | Highest (date) | Lowest (date) | Peak (date) | Minimum (date) |
| **RIVER FLOW GAGES** | | | | | | | | | | | | |
| 11422500 | 196 | Bear River below Rollins Dam near Colfax CA | 397 | 381 | 972 (1983) | 19 (1977) | 738 (Mar) | 111 (Oct) | 22,800 (Jan 2, 1997) | 0.5 (Nov 17, 1964) | 34,300 (Jan 2, 1997) | N/A |
| 11421790 | 197 | Bear River below Dutch Flat Afterbay near Dutch Flat CA | 29 | 23 | 90.9 (2008) | 5.5 (1977) | 70 (Apr) | 11 (Periodic) | 3,400 (Feb 17, 1986) | 0.08 (Periodic) | 4,240 (Feb 17, 1986) | N/A |
| 11407900 | 301 | Middle Yuba River below Jackson Meadows Dam near Sierra City CA | 116 | 102 | 241 (1982) | 12 (1977) | 222 (Jun) | 55 (Jan) | 3,190 (Dec 20, 1981) | 0.0 (Periodic) | 10,000 (Jan 31, 1963) | N/A |
| 11408550 | 304 | Middle Yuba River below Milton Dam CA | 28 | 11 | 146 (1995) | 3.5 (1990) | 128 (May) | 3.7 (Nov) | 6,860 (Jan 2, 1997) | 0.77 (Nov 3, 1990) | 10,200 (Jan 31, 1963) | N/A |

## Table 3.6.1-2. (continued)

| USGS Gage No. | Licensee Gage No. (YB-xx) | Gage Name | Mean Annual (cfs) | | | | Mean Monthly (cfs) | | Daily (cfs) | | Instantaneous (cfs) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Mean | Median | Highest (year) | Lowest (year) | Highest (month) | Lowest (month) | Highest (date) | Lowest (date) | Peak (date) | Minimum (date) |
| **RIVER FLOW GAGES (continued)** | | | | | | | | | | | | |
| 11414410 | 306 | Canyon Creek below French Lake CA | 3.0 | 3.0 | 3.2 (1993) | 2.8 (2002) | 3.1 (Periodic) | 2.9 (Sep) | 3.2 (Periodic) | 2.3 (Sep 25, 1997) | N/A | N/A |
| 11414450 | 308 | Canyon Creek below Faucherie Lake CA | 3.0 | 3.0 | 3.3 (2004) | 2.8 (1994) | 3.1 (Dec) | 2.9 (Periodic) | 3.4 (Periodic) | 2.6 (Periodic) | N/A | N/A |
| 11414470 | 310 | Canyon Creek below Sawmill Lake CA | 11 | 8.3 | 29 (1993) | 3.5 (1997) | 17 (Sep) | 4.4 (Jul) | 128 (Periodic) | 2.5 (Periodic) | 128 (Mar 8, 1993) | N/A |
| 11414700 | 312 | Jackson Creek below Jackson Lake CA | 1.6 | 1.7 | 2.2 (1998) | 1.2 (1996) | 1.5 (Periodic) | 1.2 (Periodic) | 12 (Sep 30, 1998) | 0.0 (Periodic) | N/A | N/A |
| 11416500 | 315 | Canyon Creek below Bowman Lake CA | 35 | 21 | 165 (1965) | 0.8 (1931) | 136 (Jun) | 2.9 (Aug) | 5,500 (Jan 2, 1997) | 0.0 (Periodic) | 5,520 (Jan 2, 1997) | N/A |
| **TUNNEL AND CANAL FLOW GAGES** | | | | | | | | | | | | |
| 11416100 | 14 | Bowman-Spaulding Canal at Jordan Creek Siphon CA | 215 | 217 | 304 (1983) | 78 (1977) | 256 (Sep) | 187 (Nov) | 335 (Periodic) | 0.0 (Periodic) | N/A | 0.0 (Periodic) |
| 11421760 | 239 | Dutch Flat No 2 Flume near Blue Canyon CA | 320 | 350 | 544 (1984) | 24 (1977) | 384 (May) | 222 (Sep) | 626 (Sep 29, 1983) | 0.0 (Periodic) | N/A | 0.0 (Periodic) |
| 11421780 | 245 | Chicago Park Flume near Dutch Flat CA | 584 | 599 | 949 (1984) | 109 (1977) | 749 (May) | 360 (Sep) | 1,130 (Nov 19, 1983) | 0.0 (Periodic) | N/A | 0.0 (Periodic) |
| 11408000 | 303 | Milton-Bowman Tunnel Outlet near Graniteville CA | 84 | 85 | 133 (1998) | 14.5 (1977) | 145 (Sep) | 36 (Jan) | 438 (Nov 4, 1972) | 1.1 (Periodic) | N/A | N/A |
| 11416000 | 314 | Bowman-Spaulding Canal Intake near Graniteville CA | 164 | 164 | 236 (1970) | 64 (1952) | 238 (Aug) | 85 (May) | 345 (Sep 5, 1986) | 0.0 (Periodic) | N/A | 0.0 (Periodic) |
| **POWERHOUSE FLOW GAGES** | | | | | | | | | | | | |
| 11421900 | 279 | Rollins Powerhouse near Colfax CA | 604 | 591 | 948 (2006) | 337 (1988) | 748 (May) | 309 (Nov) | 3,080 (Apr 4, 1999) | 0.0 (Periodic) | N/A | 0.0 (Periodic) |

N/A = Not Available
Note: pre-Project gages are not included in this table.

### 3.6.2 Unimpaired Hydrologic Records

NID, in cooperation with PG&E, synthesized unimpaired daily stream flow data for the Project. For the purposes of this discussion, the entire Yuba and Bear rivers region is divided into two major sub-regions, the Upper Basin and the Lower Basin. The dividing line between the two basins lies roughly northwest-southeast, intersecting the headwaters of the Bear River on the northwest, and coinciding with the outlet of the Bowman-Spaulding conduit to the southeast.

Data were synthesized using two methods: summation and proration. Insufficient data density and poor data quality prevented the application of the gage summation method regionally. However, it did work very well for two basins that had good data and that were largely unimpaired. Hence, these two basins were utilized as reference basins. The reference basin unimpaired hydrographs were then applied to the other basins by means of proration.

The gage summation method synthesizes an unimpaired stream flow by honoring a mass balance for all points where gaging station records were available. For reservoirs, the buffering of basin through-flows can be removed if the reservoir changes in storage are utilized to calculate (back out) the original flow. Reservoir inflows, otherwise unknown, can be determined using the hydrologic water budget equation:

$$\Delta S = Q_{inflow} + Q_{outflow} + Q_{losses}$$

Where $\Delta S$ is the change in storage (cfs), $Q_{inflow}$ is the inflow (cfs), $Q_{outflow}$ is the outflow (cfs), and $Q_{losses}$ is the sum of all losses, e.g., evaporation, seepage, and leakage (cfs). The summation method also assimilates stream flow gage data from contributing drainage areas and accounts for losses from diversion flows.

The second approach, the proration method, can potentially characterize unimpaired flows throughout a region of interest by utilizing one reference basin that is representative and has good gage data. The proration method gives an estimate of unimpaired flows for a given watershed of interest by scaling the reference hydrograph as follows:

$$Q_{target} = \left( \frac{A_{target}}{A_{reference}} \right) Q_{reference}$$

Where $Q_{target}$ is the flow (cfs) for the sub-basin of interest, $Q_{reference}$ is the flow (cfs) for the reference basin, $A_{target}$ is the drainage area (sq mi) for the sub-basin of interest, and $A_{reference}$ is the drainage area (sq mi) for the reference basin. Solving for $Q_{target}$ (the only unknown in the equation) gives the synthesized flow value. The result is a synthetic unimpaired hydrograph for the sub-basin of interest. The proration method is very effective when applied to watersheds with similar physical characteristics (e.g., climate, topography, elevation, and geology).

In this study, it was determined that gage summation was not feasible due to data limitations. Therefore, two suitable reference basins were chosen; one for the Upper Basin and one for the Lower Basin so that proration could be utilized.

The South Yuba watershed above the stream gage at Cisco was used as the reference watershed for proration in the Upper Basin. The South Yuba River above Cisco gage is within the Upper Basin and is representative of the other sub-basins of interest; it has very good data quality and availability for the entire period of record; and its hydrology is largely unimpaired.

The Pilot Creek watershed above Stumpy Meadows Reservoir was used as the reference watershed in the Lower Basin. Although it was outside (to the south of) the region of interest, it is representative of the Lower Basin's hydrology, it has good data quality, and its hydrology is completely unimpaired.

Mean daily unimpaired stream flows were synthesized for eleven locations in four regions, where the first three regions are located in the Upper Basin:

- Upper Basin
  - Middle Yuba River Region – 3 locations
  - Canyon Creek Region – 5 locations
- Lower Basin – 2 locations

These locations represent the major junctures in the Project hydraulic system with respect to man-made structures (e.g., dams, reservoirs, diversion tunnels, and canals) that are used to manage water and regulate flow throughout NID's Yuba-Bear Hydroelectric Project, as well as throughout PG&E's Drum-Spaulding Project.

The historical period of record used to synthesize the unimpaired flow data is from water year 1976 through water year 2008 (October 1, 1975 through September 30, 2008). This study period includes the wettest and driest years in the overall record and the largest extended drought period.

The analysis of each site, including the attempt to use gage summation data, and the approach to using proration is described below. Synthesized mean daily flows and other statistics (e.g., mean monthly flows, mean annual flows, etc.) for each site are included in the Project Relicensing Hydrology and Power Generation Data DVD, included in Appendix E12 of Exhibit E.. Additional details regarding development of the unimpaired flow data can also be found on the DVD.

**Middle Yuba River Region – Jackson Meadows Reservoir Dam**

This location corresponds to the site of an existing flow gage on the Middle Yuba River below Jackson Meadows Dam. Unimpaired flow data for this site were initially evaluated for the summation method using gage data from two locations, whereby:

mean daily change in reservoir storage at Jackson Meadows Reservoir
\+ mean daily stream flow below Jackson Meadows Dam
= unimpaired flow.

The reference gage for Jackson Meadows Reservoir is USGS 11407800, YB-300. The relicensing period of record is largely complete, although interpolation was used occasionally to replace missing data. This gage measured storage volume to the nearest 100 ac-ft, thus daily flows back-calculated from reservoir operations are in increments of 50 cfs (1 ac-ft/day = 0.5 cfs).

There are two reference gage records for the flow location on the Middle Yuba River below Jackson Meadows Dam. The first is USGS 11407900, which is no longer in operation. It provided a complete data set from WY 1964 through WY 1986. The second gage is USGS 11407815, which has been in operation since July 1994 with no missing data; however it records regulated flow through the reservoir only, where spillway flows bypass the gage location.

Owing to the lack of spill flow records and the six-year gap between the two streamflow data sets, these data were deemed unusable for the summation method. Alternatively, the South Yuba at Cisco reference basin hydrology was applied to calculate unimpaired flow via proration, primarily by area, then with secondary corrections for rainfall and elevation differences. A third scaling factor was then applied, utilizing monthly scaling factors that are based on the Middle Yuba River below Jackson Meadows (YB-301) gage summation from Oct 1975 - Dec 1986 and based on the Middle Yuba River below Milton (YB-304) gage summation from Jan 1987 - Sep 2008.

**Middle Yuba River Region – Milton Diversion Impoundment Diversion Dam**

This location corresponds to the site of an existing flow gage on the Middle Yuba River below Milton Diversion Impoundment Diversion Dam. Unimpaired flow data for this site were initially evaluated for the summation method using gage data from four locations, whereby:

mean daily change in reservoir storage at Jackson Meadows Reservoir
\+ mean daily change in reservoir storage at Milton Diversion Impoundment
\+ mean daily stream flow below Milton Diversion Impoundment Diversion Dam in Middle Yuba River
\+ mean daily flow at the Milton-Bowman Diversion Conduit outlet
= unimpaired flow.

Licensee used the same method as described for the Jackson Meadows Dam watershed to prorate flows for this basin.

**Middle Yuba River Region – Wilson Creek**

This site is not gaged; hence the South Yuba at Cisco reference basin hydrology was applied to calculate unimpaired flow via proration, primarily by area, then with minor corrections for rainfall and elevation differences.

**Canyon Creek Region – Jackson Lake Dam**

This location corresponds to the site of an existing stream flow gage on Jackson Creek downstream of Jackson Lake. Unimpaired flow data for this site were initially evaluated for the summation method using gage data from two locations, whereby:

  mean daily change in reservoir storage at Jackson Lake
+ mean daily stream flow below Jackson Lake
= unimpaired flow.

The reference gage for Jackson Lake is USGS 11414690, YB-311; there are no missing data.

The reference gage for the flow location on Jackson Creek below Jackson Lake is USGS 11414700, YB-312. The data record begins in January 1989. The current data record is for low-flow events only and for several WYs data was extremely sparse.

Owing to the lack of stream flow data on Jackson Creek, these data were deemed unusable for the summation method. Alternatively, the South Yuba at Cisco reference basin hydrology was applied to calculate unimpaired flow via proration, primarily by area, then with minor corrections for rainfall and elevation differences.

**Canyon Creek Region – French Lake Dam**

This location corresponds to the site of an existing stream flow gage on Canyon Creek downstream of French Lake. Unimpaired flow data for this site were initially evaluated for the summation method using gage data from two locations, whereby:

  mean daily change in reservoir storage at French Lake
+ mean daily stream flow below French Lake
= unimpaired flow.

The reference gage for French Lake is USGS 11414400, YB-305. The data record begins January 1989, with missing data for various months and years.

The reference gage for the flow location on Canyon Creek below French Lake is USGS 11414410, YB-306. The data record begins January 1989, with missing data for various months and years. The gage is primarily used for low-flow compliance purposes and is not a full-flow gage.

Owing to the lack of both streamflow and storage data, these data were deemed unusable for the summation method. Alternatively, the South Yuba at Cisco reference basin hydrology was applied to calculate unimpaired flow via proration, primarily by area, then with minor corrections for rainfall and elevation differences.

**Canyon Creek Region – Faucherie Lake Dam**

This location corresponds to the site of an existing stream flow gage on Canyon Creek downstream of Faucherie Lake. Unimpaired flow data for this site were initially evaluated for the summation method using gage data from two locations, whereby:

mean daily change in reservoir storage at Faucherie Lake
\+ mean daily stream flow below Faucherie Lake
= unimpaired flow.

The reference gage for Faucherie Lake is USGS 11414440, YB-307. The data record begins January 1989, with missing data for various months and years.

The reference gage for the flow location on Canyon Creek below Faucherie Lake is USGS 11414450, YB-308. The data record begins January 1989, with missing data for various months and years. The gage is primarily used for low-flow compliance purposes and is not a full-flow gage.

Owing to the lack of both streamflow and storage data, these data were deemed unusable for the summation method. Alternatively, South Yuba at Cisco reference basin hydrology was applied to calculate unimpaired flow via proration, primarily by area, then with minor corrections for rainfall and elevation differences.

**Canyon Creek Region – Sawmill Lake Dam**

This location corresponds to the site of an existing stream flow gage on Canyon Creek downstream of Sawmill Lake. Unimpaired flow data for this site were initially evaluated for the summation method using gage data from two locations, whereby:

mean daily change in reservoir storage at Sawmill Lake
\+ mean daily stream flow below Sawmill Lake
= unimpaired flow.

The reference gage for Sawmill Lake is USGS 11414465, YB-309. The data record begins January 1989, with missing data for various months and years.

The reference gage for the flow location on Canyon Creek below Sawmill Lake is USGS 11414470, YB-310. The data record begins January 1989, with missing data for various months and years. The gage is primarily used for low-flow compliance purposes and is not a full-flow gage.

Owing to the lack of both streamflow and storage data, these data were deemed unusable for the summation method. Alternatively, South Yuba at Cisco reference basin hydrology was applied to calculate unimpaired flow via proration, primarily by area, then with minor corrections for rainfall and elevation differences.

## Canyon Creek Region – Bowman Lake Dam

This location corresponds to the site of two existing stream flow gages measuring outflow from Bowman Lake; one on Canyon Creek downstream of Bowman-Spaulding Impoundment and one in the Bowman-Spaulding Conduit downstream of Bowman-Spaulding Impoundment, both of which are immediately downstream of Bowman Lake. Unimpaired flow data for this site were initially evaluated for the summation method using gage data from two locations, whereby:

mean daily change in reservoir storage at Bowman Lake
\+ mean daily change in reservoir storage at Jackson Lake
\+ mean daily change in reservoir storage at French Lake
\+ mean daily change in reservoir storage at Faucherie Lake
\+ mean daily change in reservoir storage at Sawmill Lake
\+ mean daily stream flow below Bowman-Spaulding Impoundment
\+ mean daily flow at the Bowman-Spaulding Diversion Conduit inlet
– mean daily flow at the Milton-Bowman Diversion Conduit outlet
= unimpaired flow.

The reference gage for Bowman Lake is USGS 11415500, YB-313. The relicensing period of record is largely complete, although interpolation was used occasionally to replace missing data.

Refer to the previous sections for a discussion of Jackson Lake, French Lake, Faucherie Lake, and Sawmill Lake.

There are two reference gage records for the flow location below Jackson Meadows Lake. The first is USGS 11416500, YB-315, and the second is USGS 11416000, YB-314. Bowman Lake outflow data are complete.

Owing to the inconsistency and poor quality of the reservoir storage data for Jackson, French, Faucherie, and Sawmill lakes subsequent to January 1989, these data were deemed unusable for the summation method. Alternatively, South Yuba at Cisco reference basin hydrology was applied to calculate unimpaired flow via proration, primarily by area, then with minor corrections for rainfall and elevation differences.

## South Yuba River Region – Cisco Gage

This site corresponds to the site of the existing flow gage on the South Yuba River near Cisco Grove. The unimpaired flow data for this site was initially evaluated by the summation method using gage data from multiple locations, whereby:

mean daily change in reservoir storage at Kidd Lake
\+ mean daily change in reservoir storage at Upper Peak Lake
\+ mean daily change in reservoir storage at Lower Peak Lake
\+ mean daily stream flow at the Cisco gage on the South Yuba River
= unimpaired flow.

The reference gages for the upstream lakes are USGS 11413940, 11413943, and 11413945, respectively. Historically, data have not been collected during the winter months. Interpolation was used to fill data gaps since these lakes would simply fill during the winter months and because they are very small relative to the drainage area for the Cisco gage.

The reference gage for the stream flow is USGS 11414000. There are multiple instances of missing data during WYs 1995 to 1997 where interpolation was used for the smaller events and reconstruction methodologies when storm events were missed.

In general, the quality and quantity of data for this basin are very good and the watershed is largely unimpaired. Hence, this basin was used as the reference basin for proration in the Upper Basin region.

**Lower Basin Region – Dutch Flat Afterbay Dam**

Owing to numerous instances of ungaged inflows and/or outflows or of missing data, these data were deemed unusable for the summation method. Alternatively, Pilot Creek above Stumpy Meadows reference basin hydrology was applied to calculate unimpaired flow via proration, primarily by area, then with a minor correction for rainfall differences.

**Lower Basin Region – Rollins Reservoir Dam**

Owing to numerous instances of ungaged inflows and/or outflows or of missing data, these data were deemed unusable for the summation method. Alternatively, Pilot Creek above Stumpy Meadows reference basin hydrology was applied to calculate unimpaired flow via proration, primarily by area, then with a minor correction for rainfall differences. An additional scaling factor was then applied to the proration, based on the gage summation using the average monthly Towle Diversion data set from water years 1976 through 1992. For water years 1993 through 2008, a monthly average of the 1976-1992 data set was applied in each year.

## 3.7 Representative Dry, Normal, and Wet Water Years

FERC regulations require that an applicant describe project operation in representative adverse (dry), mean (normal), and high (wet) water years. Dry, normal, and wet water year determinations were made by assessing the California Department of Water Resources (CDWR) unimpaired runoff forecast data for the Yuba River watershed. The CDWR estimates the anticipated volume of unimpaired runoff from April through July and for the full water year based on snow pack measurements and anticipated precipitation. The forecasts are updated for four consecutive months beginning February 1, and the final April through July forecast is published by CDWR on May 1 of each year. CDWR does not provide unimpaired runoff forecasts for the Bear River. The Licensee selected representative dry, normal, and wet water years based on the CDWR Yuba River at Smartville Bulletin 120 Full Water Year Runoff forecasts.

The CDWR's historical Full Water Year Runoff forecasts for this location are shown chronologically in Figure 3.7-1 and ranked by water year from driest to wettest in Figure 3.7-2.

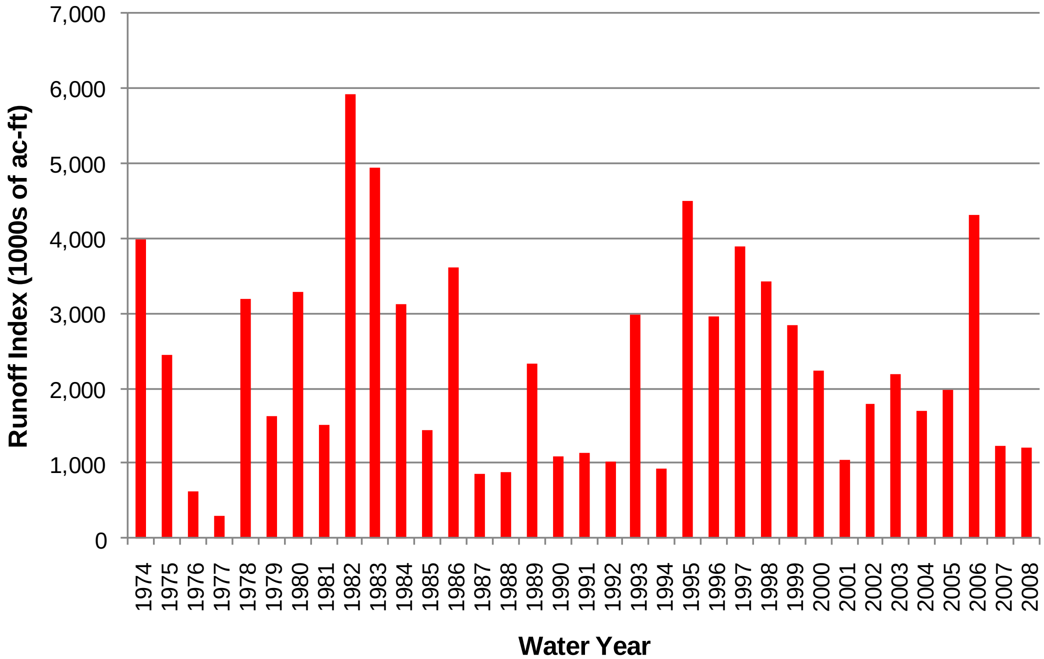



**Figure 3.7-1. Yuba River at Smartville May 1 forecast for Full Water Year unimpaired runoff, 1974-2008.**

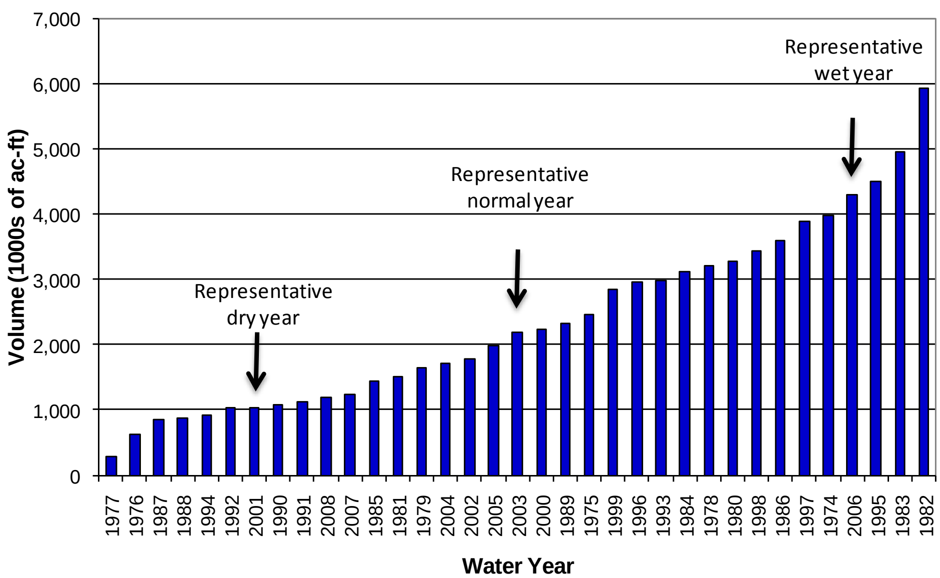



**Figure 3.7-2. Yuba River at Smartville May 1 forecast for Full Water Year unimpaired runoff ranked in order of increasing runoff, 1974-2008.**

Based on CDWR's May 1 Full Water Year forecast from water years 1974 through 2008, the lowest forecasted unimpaired runoff year was 1977 with 290,000 acre-feet and the largest was 1982 with 5,920,000 acre-feet. The average and median forecasted runoff for this location are 2,357,000 and 2,190,000 acre-feet, respectively.

For the purposes of this FLA,

- 2001 is considered the representative dry water year
- 2003 is considered the representative normal water year
- 2006 is considered the representative wet water year

# 4.0 Operations Planning and Forecasting

The hydrologic and hydraulic operation planning for the Project is intended to manage the basin runoff throughout the annual hydrologic cycle for irrigation, municipal water supply, power generation, and recreation. The Project utilizes storage capacity within its reservoirs to temporarily store the high spring runoff that occurs during the snowmelt season. Historically, the April-July unimpaired runoff in the Yuba River watershed (measured by CDWR at the "Yuba River near Smartville plus Deer Creek" location) is 42.5 percent of the water year unimpaired runoff based on the 50-year average from 1951-2000.

Stored water is gradually released during summer and fall to augment stream flows and meet consumptive water demands. The storage reservoirs are generally operated in accordance with target storage curves to achieve reservoir levels and storage capacity that manages the available water effectively.

In general, weekly and daily operations of the Project are prioritized in the following order: 1) safety; 2) regulatory requirements; 3) irrigation and domestic consumptive demands; and 4) power generation. The Project is also operated to comply with limits on diversion for generation or storage for consumptive uses as specified by the Licensee's water rights licenses and permits.

The operation planning forecasting for the Project is completed by the Licensee in cooperation with PG&E. Together, the two parties perform monthly snow surveys in the Project watershed during the winter months and this data, combined with snow course data from CDWR, and other hydrologic data provide the information necessary to develop runoff forecasts. In addition, NID uses larger scale snowmelt runoff forecasts generated by CDWR in the form of Bulletin 120 Forecasts.

Additionally, NID uses the output of PG&E's SOCRATES inflow forecasting tool. Using this forecasting model, a water management plan is developed in order to achieve, if possible, end of the month storage targets for the storage reservoirs; Jackson Meadows, Bowman, French, Sawmill, Jackson, Faucherie, and Rollins reservoirs. The control reservoirs (Milton, Dutch Flat No.2 Forebay, Dutch Flat Afterbay, Chicago Park Forebay, and the Project's diversion dams) have minimal storage and are operated as regulating reservoirs and run-of-river reservoirs, generally reshaping and diverting the flows from upstream storage reservoirs for downstream power generation, irrigation, and consumption purposes.

Reservoir elevations at Rollins, Dutch Flat No. 2 Forebay, and Dutch Flat Afterbay are monitored continuously using the Licensee's SCADA telemetry. All reservoirs, with the exception of Milton, Dutch Flat No. 2 Forebay, and Dutch Flat Afterbay, are monitored using a Geomation system (dam failure early warning system). The SCADA telemetry is monitored 24 hours per day from PG&E's Drum Switching Center.

## 4.1 Dry, Normal, and Wet Water Year Reservoir Operation

Project operation can be dramatically different in certain seasons depending on the current and forecasted water year conditions. The total river inflow and the expected volume of runoff dictate the operation of the reservoirs in the late winter and spring. The storage reservoirs (i.e., Jackson Meadows, Bowman, Rollins, French, Sawmill, Jackson, and Faucherie) are operated to capture spring runoff from snowmelt for irrigation, domestic water supply, power generation, and recreation while meeting applicable minimum instream flow and other regulatory and contractual operating requirements. Depending on the amount of snow pack estimated in the watershed above Project reservoirs, the Licensee may make larger releases from reservoirs prior to the spring snowmelt period for power generation purposes. This "pre-release" also can result in a reduction of spring spills, which increases the watershed yield from a consumptive water and power generation standpoint.

In normal and wet years, the reservoirs generally fill from the spring runoff and are gradually drawn down from June through December. In dry years, these reservoirs may not spill, depending on the timing and volume of the snowmelt. The remaining project reservoirs (forebays, afterbays, and diversion reservoirs) are operated at or near their normal pool elevation throughout the entire year for dry, normal, and wet water years.

Modeled elevation curves and flow duration curves are presented in Section 6 below to characterize the operation of the Project's reservoirs and powerhouses during the representative dry (2001), normal (2003), and wet (2006) water years.

## 4.2 Gate Operations, Maintenance, Inspection, and Access

Ongoing Project maintenance includes testing gates and valves at the dams and intakes throughout the year, when impact to Project operations can be minimized. All spill gates are operated in the spring and fall, consistent with the DSOD gate operations certificates. Canal spill gates are operated at least once every year to perfect prescriptive spill rights at each location.

NID typically conducts annual maintenance on the powerhouses during the fall (September through November), when consumptive water and power demand is generally low. Bowman Powerhouse is an exception. The outage at Bowman is typically in June. Each powerhouse is taken out of service for one to two weeks on a staggered schedule. Maintenance includes inspections of equipment in the powerhouse and switchyard, and may include replacing parts, calibrating components, etc. Annual maintenance does not typically require a reservoir drawdown, but downstream Project operations can be affected by certain outages.

The Project's gated spillways, located at Jackson Meadows and Bowman dams, can be accessed by various means throughout the year. During winter, access may require the use of over-snow vehicles or helicopters.

NID obtains access to Project facilities over a number of roads, including those that fall under the jurisdiction of the Tahoe National Forest (TNF). A brief summary of the gate operation and inspection for each project dam is provided below.

- Jackson Meadows Reservoir Dam: Three spillway radial gates are operated by hoists, located on the hoist deck at the same elevation as the dam crest. The hoists are operated with power supplied from a stationary propane-fired generator on the left abutment, and also may be raised by using a gasoline powered operator. The spillway gates are operated in the normal course of operations, but at least once annually. District personnel inspect the dam on the ground at least weekly. The spillway requires periodic maintenance to remove trash and debris from the outlet channel and to make repairs as needed. FERC and DSOD inspect the facilities at least once annually.
- Milton Diversion Dam: The spillway is ungated.
- Jackson Lake Dam: The spillway is ungated.
- French Lake Dam: The spillway is ungated.
- Faucherie Lake Dam: The spillway is ungated.
- Sawmill Lake Dam: The spillway is ungated.
- Bowman Reservoir Dam: There are no gates or spillway features on the North Dam. On the South Dam, seven of twelve bays are fitted with radial gates measuring 140 inches wide by 70 inches tall. The remaining 5 bays are uncontrolled overflow bays. The radial gates are raised and lowered on wire ropes connected to hoists on the crest. The hoists are operated manually or with a portable power pack. An operator visits the dam, powerhouse, and outlet works every day; FERC and DSOD inspect the facilities at least once annually.
- Dutch Flat No. 2 Forebay: The spillway is ungated.
- Dutch Flat Afterbay: The spillway is ungated.
- Chicago Park Forebay: The spillway is ungated.
- Rollins Reservoir: The spillway is ungated.

# 5.0 Regulatory/Contractual Operating Constraints

## 5.1 FERC Operating Constraints Under the Current License

The initial license included articles numbered 1 through 50 (articles 12, 13, 17, 20, and 21 were blank). Since the initial license, FERC has added 27 articles, numbered 51 through 78, to the license (article 57 was not issued) and subsequently deleted 3 articles in their entirety (60, 61, and 65). As a result, the existing license contains 69 articles. Of these, 20 (articles 25, 26, 36, 37, 46-48, 51-56, 58, 59, 62, 63, 66, 67, and 75) may be considered "expired" or "out of date" since each pertains to a construction activity that has been completed, a filing related to a construction activity that has been completed, or another activity that has been completed. As a result, the existing license contains 49 "active" articles. Of these, 19 (Articles 1 through 24, excluding those listed above) were part of the FPC's "standard" articles included in most licenses, and 30 (Article 25 through 78, excluding those listed above) can be considered "Project-specific" articles.

There are seven articles from the current FERC license related to the hydraulic operation of the project, including minimum flow requirements, normal pool elevations, ramping rates, and releases during flood events. The following bulleted lists summarize these articles, which are also provided below.

- Article 29 specifies seasonal minimum storage requirements at Jackson Meadows Reservoir for wet/normal water years;
- Article 30 specifies a year-round normal pool at Milton Diversion Impoundment;
- Article 31 specifies a minimum pool elevation at Rollins Dam;
- Article 32 specifies minimum releases for fish below Jackson Meadows Reservoir, Milton Diversion Impoundment, Jackson Lake, French Lake, Bowman-Spaulding Canal, and Dutch Flat Afterbay;
- Article 33 specifies flow requirements below Rollins Dam;
- Article 34 specifies ramping rates below Rollins Dam; and
- Article 42 specifies that Project reservoirs are operated such that releases are not greater than those that would occur under natural stream conditions.

**Article 29.** Licensee shall maintain the following minimum pools in the Jackson Meadows Reservoir:

| Water Year Type | Period | Minimum Pool (acre-feet) |
|---|---|---|
| Normal or Wet | June 1 – September 30 | 21,000 |
| | October 1 – May 31 | 10,000 |
| Dry | June 1 – September 30 | 21,000 |
| | October 1 – May 31 | 3,000 |

A dry water year is one in which the April-July Bulletin 120 run-off forecast made by the CDWR on May 1 for the combined Middle Yuba River and Canyon Creek watersheds is for less than 70,000 acre-feet.

*[Included in June 24, 1963 Order Issuing License, and has not been amended. Key Words: Jackson Meadows Reservoir, minimum pool]*

**Article 30.** Licensee shall maintain a normal pool in Milton Diversion Reservoir at an elevation of 5,686 feet year around, except when repair to the Milton Bowman Tunnel is necessary, at which time the normal pool may be drawn to a minimum elevation of 5,678 feet.

*[Included in June 24, 1963 Order Issuing License, and has not been amended. Key Words: Milton Diversion Impoundment, minimum pool]*

**Article 31.** Licensee shall maintain a minimum pool in Rollins Reservoir at all times of not less than 5,000 acre-feet.

*[Included in June 24, 1963 Order Issuing License, and has not been amended. Key Words: Rollins Reservoir, minimum pool]*

**Article 32.** Licensee shall maintain minimum releases for maintenance of fish life below the various reservoirs in accordance with the following schedule:

| From | To | Release (cfs) | Period |
|---|---|---|---|
| Jackson Meadows Reservoir Dam | Middle Yuba River | 5 | Continuous |
| Milton Diversion Dam | Middle Yuba River | 3 | Continuous |
| Jackson Lake Dam | Jackson Creek | 0.75 | Continuous |
| French Lake Dam | Canyon Creek to Bowman Reservoir | 2.5 | Continuous |
| Bowman-Spaulding Canal Diversion Dam | Canyon Creek | 3<br>2 | 4/1 to 10/31<br>11/1 - 3/31 |
| Dutch Flat Afterbay Dam | Bear River | 10<br>5 | 5/1 to 10/31<br>11/1 to 4/30 |

*[Included in June 24, 1963 Order Issuing License and amended by 72 FERC 62,041 Order Amending Article 32 issued July 21, 1995, to require Licensee to maintain minimum release from Jackson Lake to Jackson Creek. Key Words: minimum flow]*

**Article 33.** The Licensee shall maintain minimum releases for maintenance of fish life below Rollins Reservoir into the Bear River in accordance with the following schedule:

| Water Year Type | Period | Release (cfs) |
|---|---|---|
| Normal or Wet | May 1 – October 31 | 75 |
| | November 1 – April 30 | 20 |
| Dry | May 1 – October 31 | 40 |
| | November 1 – April 30 | 15 |

Releases to be measured at USGS gage Bear River below Rollins Dam, near Colfax, CA (11422500).

Normal water conditions are defined as follows: Water conditions that shall be deemed to prevail any month of the year if the water supply indicator for that month equals or exceeds the following:

| October 1 to | Inches |
|---|---|
| November 1 | 1 |
| December 1 | 7 |
| January 1 | 12 |
| February 1 | 20 |
| March 1 | 26 |
| April 1 | 34 |
| May 1 | 36 |
| June1 | 40 |
| July 1 | 42 |
| August 1 | 42 |
| September 1 | 43 |
| October 1 | 44 |

The water supply indicator for any calendar month shall be the total precipitation of inches of water as measured in reasonable accordance with the accepted practices of the United States Weather Bureau at the existing Lake Spaulding precipitation gage for the period from October 1 up to the beginning of the month in question. In other words, the water supply indicator is the cumulative quantity at this gage from October 1 to the end of the month of interest.

*[Included in June 24, 1963 Order Issuing License, and has not been amended except temporarily during construction of the Rollins Powerhouse as described in Article 54. Key Words: minimum flow, water supply indicator, water year type]*

**Article 34.** The Licensee shall not change the flow releases nor cause vertical fluctuations in the stream levels below Rollins Dam greater than one foot in six hours or three inches during any one hour. Fluctuations in stream levels shall be measured at USGS gage Bear River below Rollins Dam, near Colfax, CA (11422500).

The Licensee shall not change the flow releases nor cause vertical fluctuations in the stream levels below Jackson Meadows Dam greater than 15 cubic feet per second (cfs) every thirty minutes when releases are in the range of 5 to 125 cfs, or greater than 15 cfs every fifteen minutes when releases are at a level of 125 cfs or greater. The minimum flow release and all regulations into the Middle Fork Yuba River below Jackson Meadows Dam will be gaged and documented at the point of release by a sonic gage that will be maintained by the Licensee (USGS gage 11407900, Middle Yuba River below Jackson Meadows Dam, near Sierra City).

Flow changes in the Middle Yuba River below Jackson Meadows Dam will be limited to four changes (two increases and two decreases) per year, except in cases of emergency and/or controlled spills, when releases shall be made by the Licensee from the low-level release valve or by mutual agreement between the California Department of Fish and Game and the Licensee.

*[Included in June 24, 1963 Order Issuing License and amended by 67 FERC 62,115 Order Amending License and Approving Revised Exhibit L Drawings issued May 11, 1994 to improve downstream conditions and improve efficiency of current measuring facilities. Key Words: ramping rate]*

## 5.2 DSOD Operating Constraints

The DSOD Certificate of Approval, dated October 14, 2008, for the Jackson Meadows Dam states: "Water may be impounded to Elevation 6,036.00, U.S.G.S. Datum, the top of the radial gates. The spillway gates shall be held in the full open position every season between October 1 and May 1, both dates inclusive."

Prior to the October 14, 2008 Certificate of Approval, the DSOD authorized NID to impound water between April 1 and April 15, to Elevation 6,028.0 feet. After April 15, the water level in the reservoir may be increased to elevation 6,035.0 feet. The Certificate of Approval also states that during April, if the National Weather Service forecast 6 inches or more of rain in the next 24-hour period at the New Bullards Bar Reservoir and the Jackson Meadows Reservoir elevation rises to elevation 6,030.0 feet, personnel with a standby motor generator must be stationed at the Jackson Meadows Dam.

Prior to the April 22, 2004 Certificate of Approval, the DSOD authorized NID to impound water up to elevation 6,035.0 feet with no date restrictions and the spillway gates were authorized to be full open every season between November 1 and April 1, inclusive.

DSOD operating constraints will not be affected under the proposed Project.

## 5.3 Other Operating Constraints

### 5.3.1 Faucherie Lake Minimum Pool (SWRCB)

Faucherie Lake must maintain a minimum gross storage of 249 ac-ft as a condition of a water right license.

### 5.3.2 Davis-Grunsky Grant Requirements

The Davis-Grunsky Act of 1960 was a statewide program that provided financial assistance to local public agencies for the development, control, and conservation of the water resources of California. Assistance consisted of grants and low-interest loans to eligible local agencies. Grants were issued for part of the construction costs of any dam and reservoir allocated for recreation and the enhancement of fish and wildlife or for the construction of initial water supplies and sanitary facilities related to recreation use.

In accordance with the Licensee's Davis-Grunsky grant requirement, which expires in 2013, Rollins Reservoir must be kept between an elevation of 2,170 feet (65,000 acre-feet) and 2,150 feet (50,700 acre-feet) from April 30 through September 10. In a dry water year, the reservoir is allowed to go below elevation 2,150 feet.

### 5.3.3 Other Operating Constraints

NID has a practice of trying to keep at least one boat ramp usable at Jackson Meadows and Rollins reservoirs through Labor Day with minimum reservoir elevations of 5,993.5 (30,202 ac-ft) and 2,130 feet (37,966 ac-ft), respectively. This is a not a requirement of the existing FERC license or any agreement.

## 5.4 Operating Constraints under the Proposed Project

See Exhibit E, Appendix E3 for a detailed description of operating constraints (including minimum instream flows, instream flow ramping rates, and minimum reservoir elevations) under Licensees' Proposed Project.

# 6.0 Project Operations by Development

Presented below, by development, is a depiction of Project operations under Licensees' No-Action Alternative. For reference, NID has provided a description of historical conditions where appropriate.

Due to a general lack of historical flow and storage data, much of the information provided below is based on the output of Licensees' Operations Model, which has been developed to represent an approximation of Project operations under various operating alternatives.. For the purpose of describing existing conditions, NID has utilized the Licensees' No-Action Alternative model run output. NID believes that this model output represents the best available data source for describing the existing Project at several locations where historical data are sparse, and that the descriptions below are adequate and reasonable for the purposes of this application for a new license.

## 6.1 Bowman Development

The Bowman Development includes seven reservoirs, the Milton-Bowman Diversion Conduit, and Bowman Powerhouse. Jackson Meadows Reservoir, Jackson Lake, French Lake, Faucherie Lake, Sawmill Lake, and Bowman Lake operate as storage reservoirs to temporarily store spring runoff that accumulates during the snowmelt season. This water is gradually released during summer and fall to augment stream flows and meet consumptive water demands. The Milton Diversion Impoundment operates as a flow control feature diverting up to 450 cfs into the Milton-Bowman Diversion Conduit to Bowman Reservoir.

Bowman Powerhouse is located below Bowman Reservoir at the base of Bowman North Dam on Canyon Creek. The Powerhouse receives water from five reservoirs in the South Yuba River watershed and one reservoir in the Middle Yuba River watershed. This indoor powerhouse is a manual plant operated as a base-loaded plant, generating using water conveyed for daily downstream water demands. Bowman Powerhouse has a licensed installed capacity of 3.6 MW with a synchronous generator and a Francis turbine with a rated nameplate hydraulic capacity of 313 cfs. Historically, Bowman Powerhouse generated an average of 13,089 MWh from 1987 to

2007 and has a dependable capacity of 0.8 MW based on average daily power generation data as estimated in the Licensees' No-Action Alternative Operations Model run over the period of July-August 1977, which represents a period of adverse water conditions coupled with high demand for electricity.

### 6.1.1 Reservoir Operation

#### 6.1.1.1 Jackson Meadows Reservoir

Jackson Meadows Reservoir's normal-maximum and normal-minimum operating elevations are 6,036.0 feet and 5,980.0 feet, respectively. The reservoir's gross storage capacity of 67,435 acre-feet is the volume of water between the top of the radial gates in a closed position, at elevation 6,036.0 feet, and the bottom of the reservoir, at approximately elevation 5,885.0 feet. The reservoir's usable storage capacity is 64,641 acre-feet based on the volume of water between the normal-maximum operating elevation and the outlet tunnel intake elevation, 5,933.0 feet.

The area-capacity curve showing the gross and usable storage capacities of Jackson Meadows Reservoir is provided in Figure 6.1.1-1. A bathymetric survey was performed in May 2007 to determine if sedimentation has significantly altered the area-capacity curve since the Project was constructed. Results of the survey indicate that the storage capacity has been reduced by 1,783 acre-feet, or 2.6 percent, from the as-built survey at the spillway crest elevation. The surface area at the spillway crest elevation is 1,008 acres.

Modeled daily storage for Jackson Meadow Reservoir for each water year is graphically presented in Figure 6.1.1-2. As indicated on the figure, the reservoir storage and elevation can fluctuate significantly from year to year although the median and mean curves represent general reservoir operation.

Operation of Jackson Meadows Reservoir in terms of storage for the representative dry (2001), normal (2003), and wet (2006) water years is shown in Figure 6.1.1-3. The range of reservoir elevations in the representative dry (2001), normal (2003), and wet (2006) water years and annual elevation fluctuation in Jackson Meadows Reservoir are summarized in Table 6.1.1-1.

**Table 6.1.1-1. Modeled minimum and maximum elevations in Jackson Meadows Reservoir in the representative dry (2001), normal (2003), and wet (2006) water years.**

| Water Year | Minimum Daily Elevation (feet) | Average Daily Elevation (feet) | Maximum Daily Elevation (feet) | Annual Elevation Fluctuation (feet) |
|---|---|---|---|---|
| 2001 (Dry Year) | 5,980 | 6,000 | 6,019 | 39 |
| 2003 (Normal Year) | 5,992 | 6,013 | 6,036 | 44 |
| 2006 (Wet Year) | 5,997 | 6,018 | 6,034 | 37 |

Rule curve elevations for Licensee's No-Action Alternative Operations Model run are shown in Figure 6.1.1-4 to demonstrate how the reservoir was operated. The maximum and minimum reservoir elevations are also shown on Figure 6.1.1-4. Rule curve elevations were developed to contain existing license reservoir operation requirements, available storage, and contracts or agreements with other parties regarding reservoir storage or elevation. Details regarding the regulatory and contractual operating constraints are discussed in Section 5.

The spillway rating curve for Jackson Meadows Dam is presented in Figure 6.1.1-5. The elevation of the spillway crest for the dam with the gates open is 6,021.0 feet.

Drainage area into Jackson Meadows Reservoir is about 37.3 sq mi, and is unregulated. Since the reservoir is operated to capture and store the spring runoff, discharge below Jackson Meadows Dam into the Middle Yuba River is regulated, as indicated in the flow duration curves shown in Figure 6.1.1-6, based on Licensee's No-Action Alternative Operations Model run for 1976 through 2008. Figure 6.1.1-7 shows flow duration curves during the representative dry (2001), normal (2003), and wet (2006) water years.

Flow releases from the dam are regulated though a 12-foot-diameter horseshoe tunnel measuring 236 feet long, connected to a 363-foot section of tunnel containing one 42-inch-diameter pipe and one 24-inch-diameter pipe. Control of the low-level outlet is presented in Exhibit A.

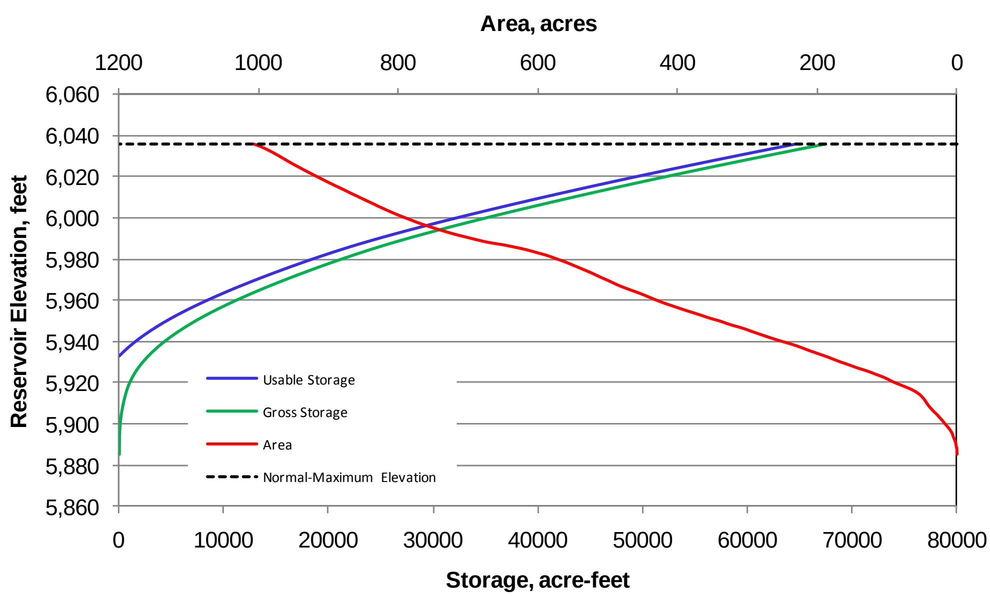



**Figure 6.1.1-1. Jackson Meadows Reservoir area-capacity curve.**

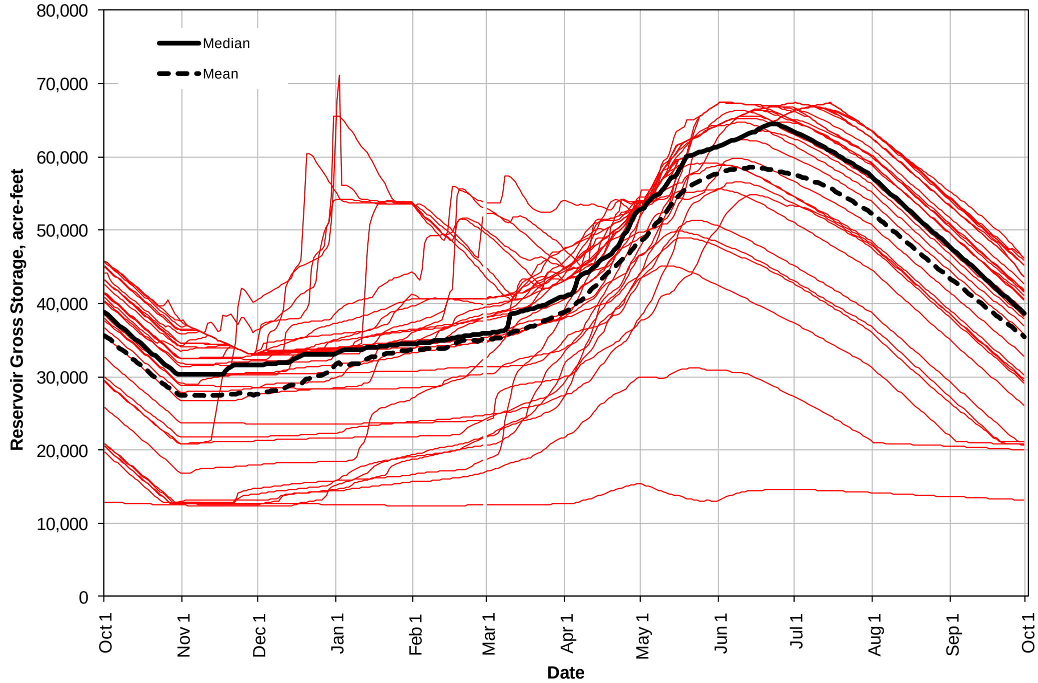



**Figure 6.1.1-2. Jackson Meadows Reservoir daily modeled median and mean storage for water years 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

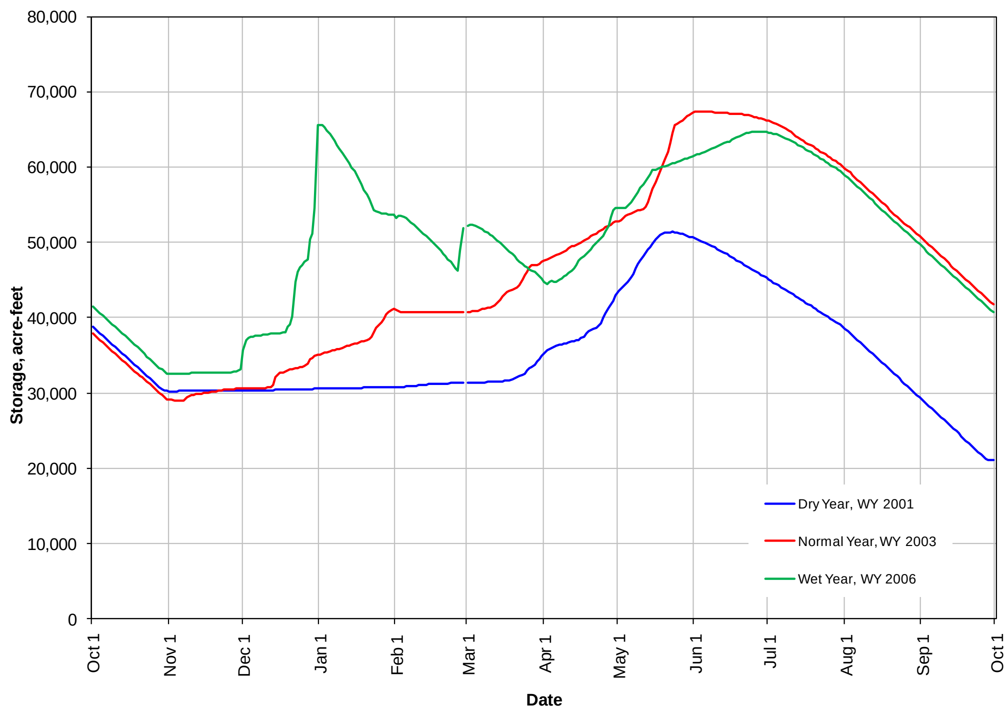



**Figure 6.1.1-3. Modeled daily storage in Jackson Meadows Reservoir in the representative dry (2001), normal (2003), and wet (2006) water years under Licensee's No-Action Alternative Operations Model run.**

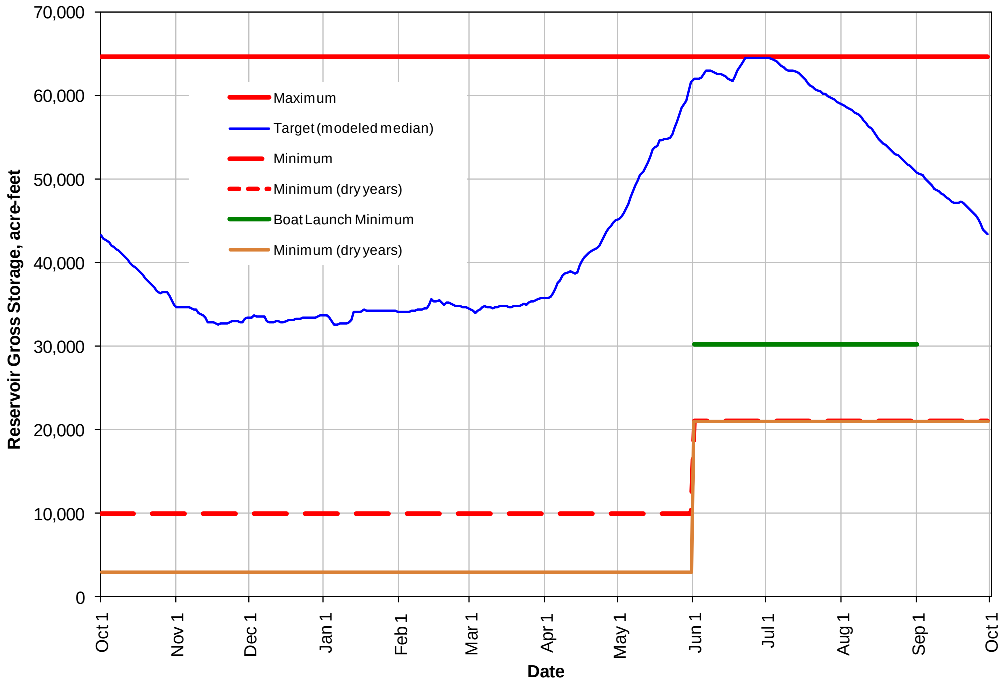



**Figure 6.1.1-4. Jackson Meadows Reservoir rule curve under Licensee's No-Action Alternative Operations Model run.**

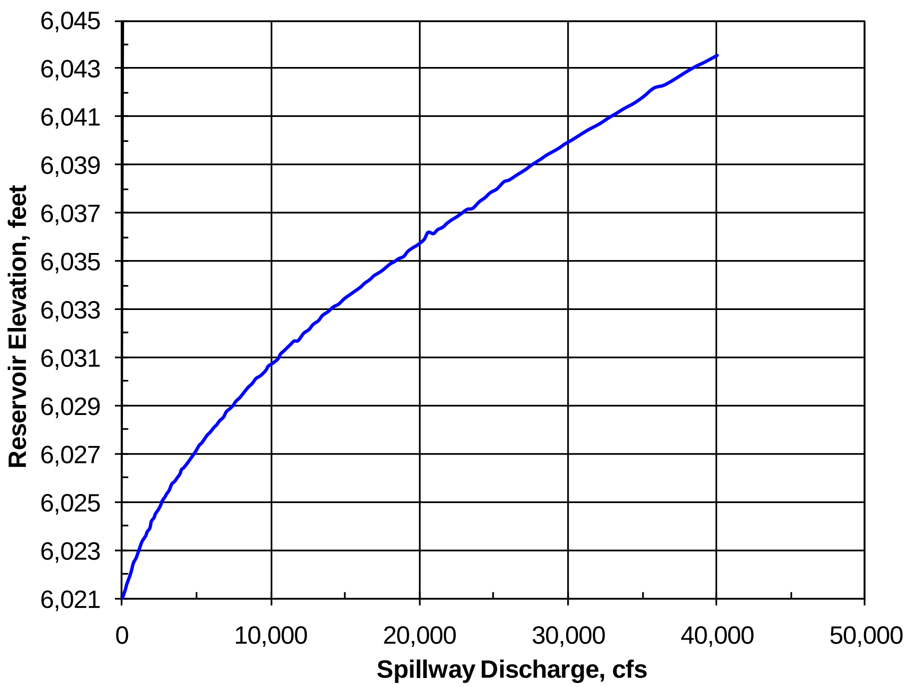



**Figure 6.1.1-5. Jackson Meadows Reservoir spillway rating curve.**

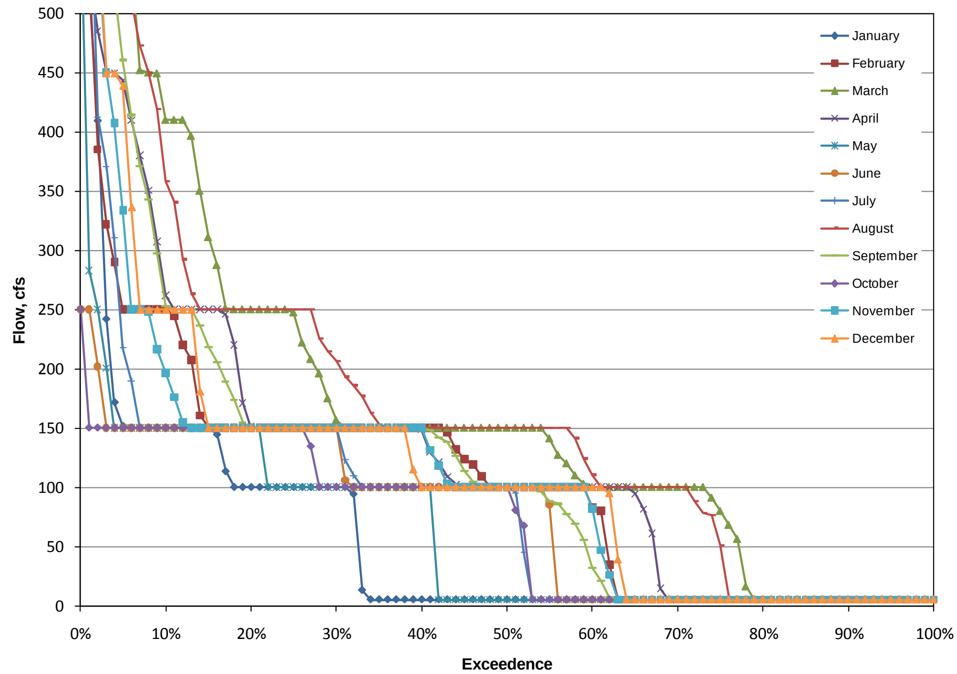



**Figure 6.1.1-6. Modeled monthly flow duration curves for Middle Yuba River below Jackson Meadows Reservoir for water years 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

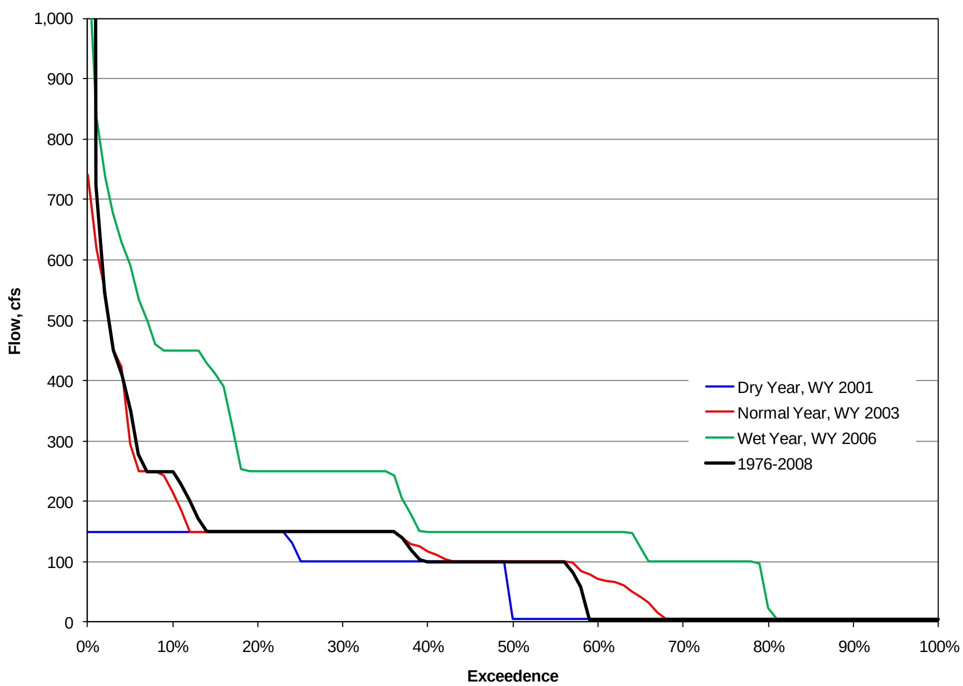



**Figure 6.1.1-7. Modeled flow duration curves for Middle Yuba River below Jackson Meadows Reservoir in the representative dry (2001), normal (2003), and wet (2006) water years and for the period of record under Licensee's No-Action Alternative Operations Model run.**

#### 6.1.1.2 Milton Diversion Impoundment

Milton Diversion Impoundment's normal-maximum and normal-minimum operating elevations are 5,690 feet and 5,686.0 feet, respectively. The reservoir's gross storage capacity of 275 acre-feet is the volume of water between elevation 5,690 feet (spillway crest) and the bottom of the low-level outlet, approximately equal to elevation 5,663.0 feet. Water can be diverted into the Milton-Bowman Diversion Tunnel at water surface elevations above 5,680 ft, the invert of the diversion tunnel and bottom of the intake trash rack. The reservoir's usable storage capacity is equal to the gross storage capacity.

The area-capacity curve showing the gross and usable storage capacity of Milton Diversion Impoundment is provided in Figure 6.1.1-8. No studies have been conducted to determine if sedimentation has significantly altered the area-capacity curve since the Project was constructed. The surface area at the normal-maximum operating elevation is 100 acres.

Milton Diversion Dam Impoundment is maintained at a relatively static elevation and is used primarily to maintain minimum stream flow requirements in the Middle Yuba River below Milton Diversion Dam and for diversions into the Milton-Bowman Conduit. Storage graphs (other than the storage-capacity curve) are, therefore, not presented in this document.

The spillway rating curve for Milton Dam is presented in Figure 6.1.1-9. The elevation of the spillway crest for the dam is 5,690 feet.

Drainage area into Milton Diversion Impoundment is about 39.8 square miles. Inflows are regulated by local accretion and releases from Jackson Meadows Reservoir. Milton Diversion Impoundment operates as a flow control feature, diverting up to 450 cfs into the Milton-Bowman Diversion Conduit to Bowman Lake.

There are no rule curve requirements for Milton Diversion Impoundment, as can be seen in the flow duration curves shown in Figures 6.1.1-10 and 6.1.1-11. Flow duration curves for the Milton-Bowman Tunnel are provided in Figures 6.1.1-12 and 6.1.1-13. Both sets of flow duration curves are based on Licensee's No-Action Alternative Operations Model run for 1976 through 2008. Minimum-streamflow requirements below Milton Diversion Impoundment Diversion Dam will continue to be recorded at the compliance point USGS Gage 11408550 (Middle Yuba River below Milton Dam, CA) located approximately 0.1 miles downstream of Milton Diversion Impoundment Diversion Dam.

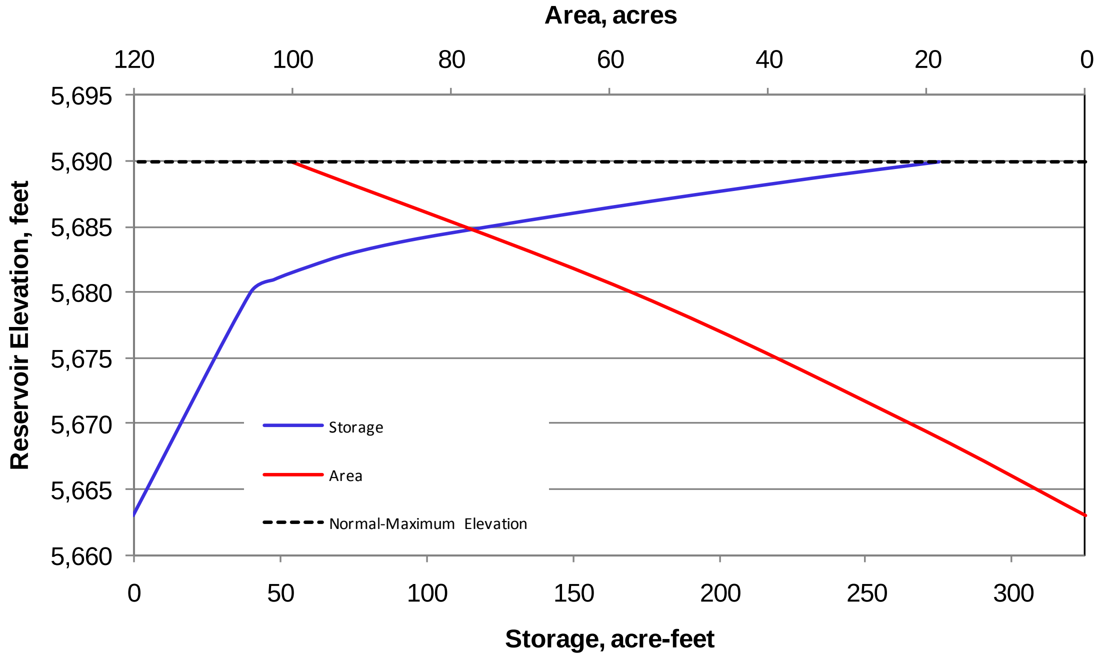
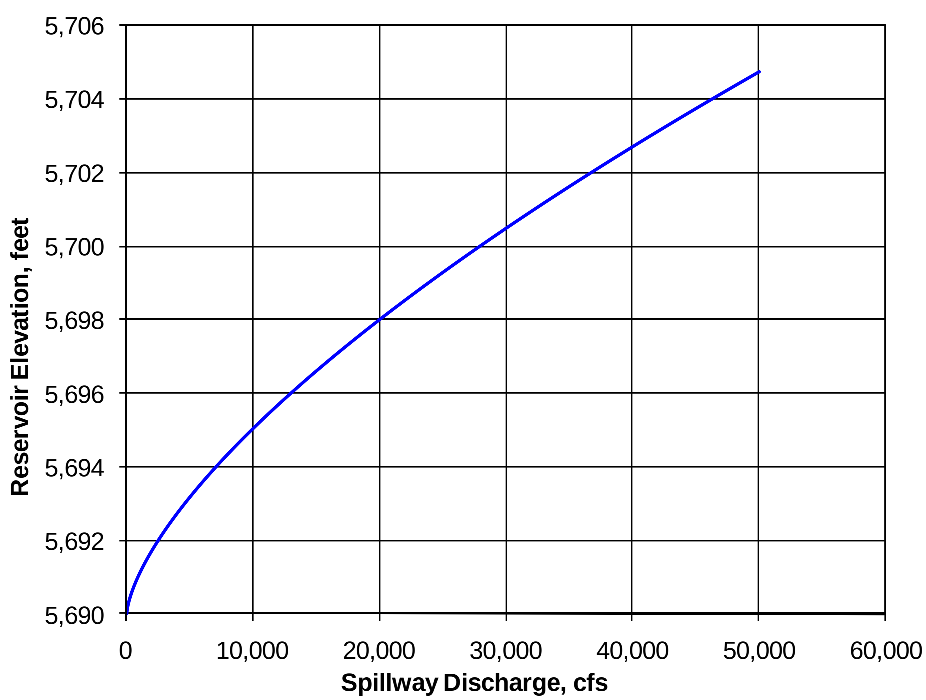



**Figure 6.1.1-8. Milton Diversion Impoundment area-capacity curve. Gross and usable storage capacities are equal.**




Note: This curve was created using the equation
$Q = 3.087 (L)(H)^{1.5}$, where Q = flow in cfs, L = spillway length in feet, and H = head over spillway in feet.

**Figure 6.1.1-9. Milton Diversion Impoundment spillway rating curve.**

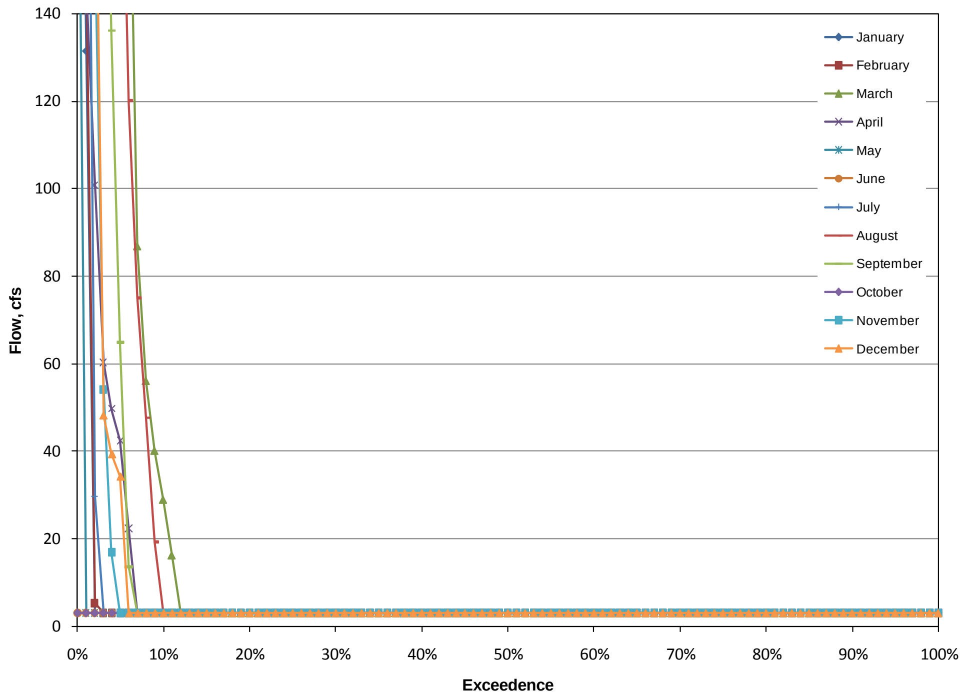



**Figure 6.1.1-10. Modeled monthly flow duration curves for Middle Yuba River below Milton Diversion Dam for water years 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

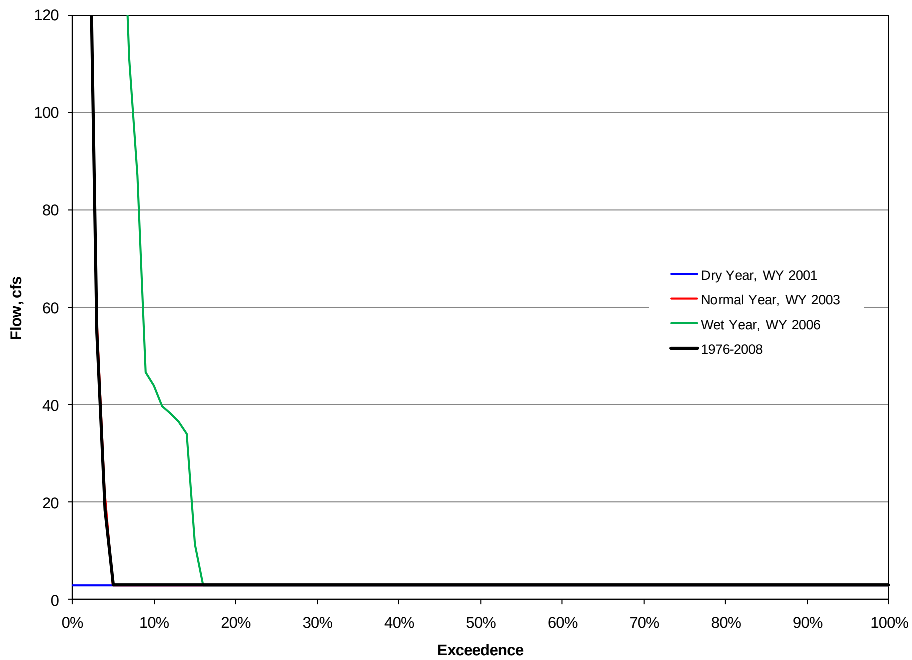



**Figure 6.1.1-11. Modeled flow duration curves for Middle Yuba River below Milton Diversion Dam in the representative dry (2001), normal (2003), and wet (2006) water years and for the period of record under Licensee's No-Action Alternative Operations Model run. Note that the "Normal Year" shown is nearly identical to the "1976-2008" average, and is therefore partially obscured.**

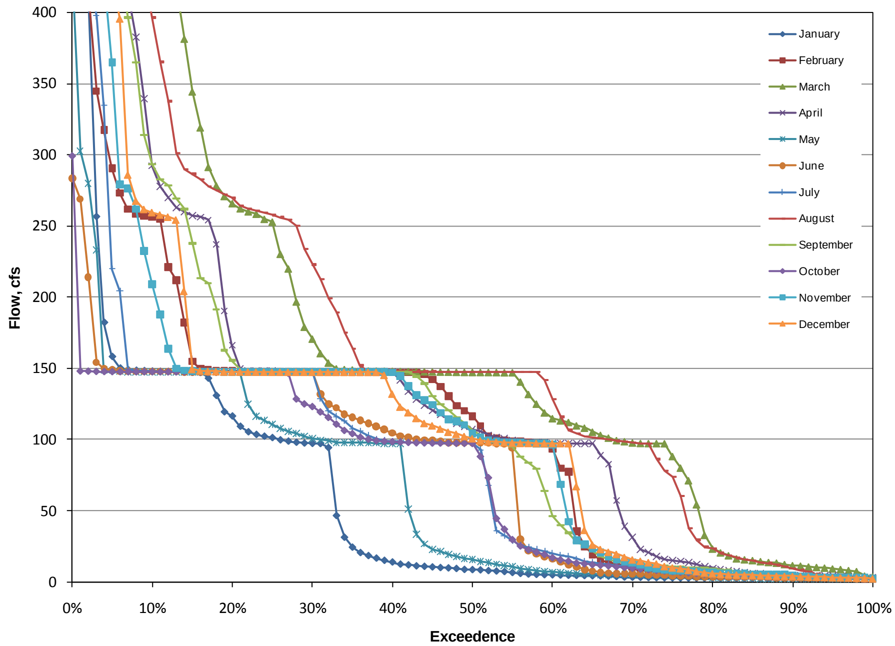



**Figure 6.1.1-12. Modeled monthly flow duration curves for Milton-Bowman Tunnel outlet for water years 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

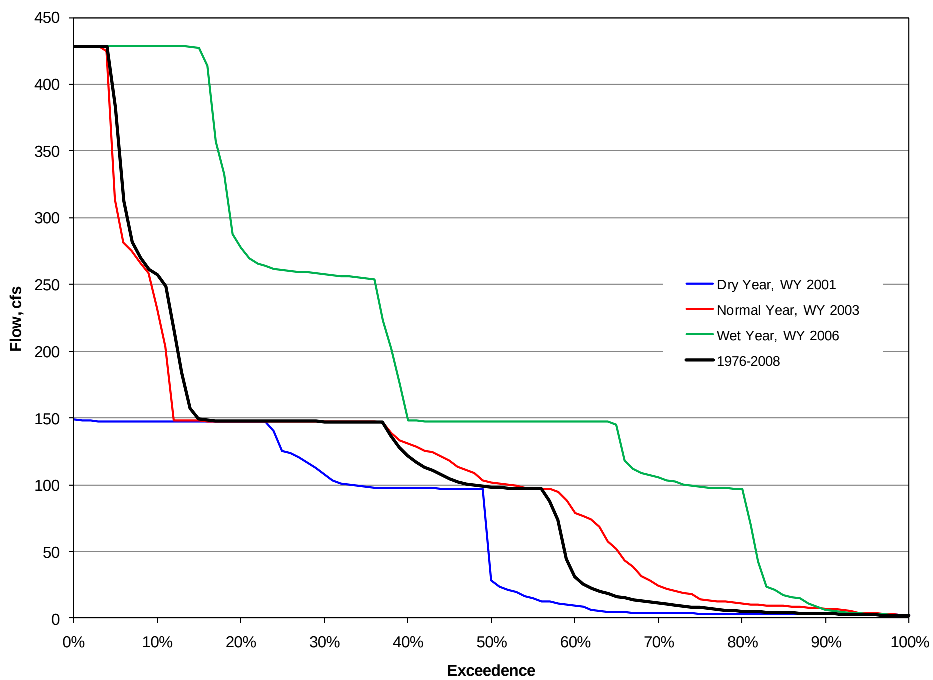



**Figure 6.1.1-13. Modeled flow duration curves for Milton-Bowman Tunnel outlet in the representative dry (2001), normal (2003), and wet (2006) water years and for the period of record under Licensee's No-Action Alternative Operations Model run.**

#### 6.1.1.3 Jackson Lake

Jackson Lake's normal-maximum and normal-minimum operating elevations are 6,592.67 feet and 6,570.0 feet, respectively. The reservoir's gross storage capacity of 1,334 acre-feet is the volume of water between the spillway crest, at elevation 6,592.67 feet, and the bottom of the reservoir, approximately equal to elevation 6,538.0 feet. The reservoir's usable storage capacity is 975 acre-feet based on the volume of water between the normal-maximum pool elevation and the intake inlet elevation, 6,570.0 feet.

The area-capacity curve showing the gross and usable storage capacities of Jackson Lake is provided in Figure 6.1.1-14. No studies have been conducted to determine if sedimentation has significantly altered the area-capacity curve since the Project was constructed. The surface area at the spillway crest elevation is 52 acres.

Modeled daily storage for Jackson Lake for each water year is graphically presented in Figure 6.1.1-15. As indicated on the figure, the reservoir storage and elevation can fluctuate significantly from year to year although the historical median and mean curves represent the general reservoir operation.

Operation of Jackson Lake in terms of storage for the representative dry (2001), normal (2003), and wet (2006) water years is shown in Figure 6.1.1-16. The range of reservoir elevations in the representative dry (2001), normal (2003, and wet (2006) water years and annual elevation fluctuation in Jackson Lake are summarized in Table 6.1.1-2.

**Table 6.1.1-2. Modeled minimum and maximum elevations in Jackson Lake in the representative dry (2001), normal (2003), and wet (2006) water years.**

| Water Year | Minimum Daily Elevation (feet) | Average Daily Elevation (feet) | Maximum Daily Elevation (feet) | Annual Elevation Fluctuation (feet) |
|---|---|---|---|---|
| 2001 (Dry Year) | 6,581 | 6,585 | 6,591 | 10 |
| 2003 (Normal Year) | 6,583 | 6,586 | 6,592 | 9 |
| 2006 (Wet Year) | 6,583 | 6,586 | 6,592 | 9 |

Rule curve elevations for Licensee's No-Action Alternative Operations Model run are shown in Figure 6.1.1-17 to demonstrate how the reservoir was operated. Normal-maximum and normal-minimum operating elevations are also shown on Figure 6.1.1-17. Rule curve elevations were developed to contain existing license reservoir operation requirements, available storage, and contracts or agreements with other parties regarding reservoir storage or elevation. Details regarding the regulatory and contractual operating constraints are discussed in Section 5.

The spillway rating curve for Jackson Lake Dam is presented in Figure 6.1.1-18. The elevation of the spillway crest for the dam is 6,592.67 feet.

Drainage area into Jackson Lake is about 0.70 sq mi, and is unregulated. Since the reservoir is operated to capture and store the spring runoff, discharge below Jackson Lake Dam into Jackson Creek is regulated, as indicated in the flow duration curves shown in Figure 6.1.1-19, based on Licensee's No-Action Alternative Operations Model run for water years 1976 through 2008.

Figure 6.1.1-20 shows flow duration curves during the representative dry (2001), normal (2003), and wet (2006) water years. Actual daily flow measurements will continue to be recorded at the compliance point USGS Gage 11414700 (Jackson Creek below Jackson Lake, CA) located immediately downstream of Jackson Lake Dam.

Flow releases from the dam are regulated though an 18-inch-diameter steel pipe. Control of the low-level outlet is presented in Exhibit A.

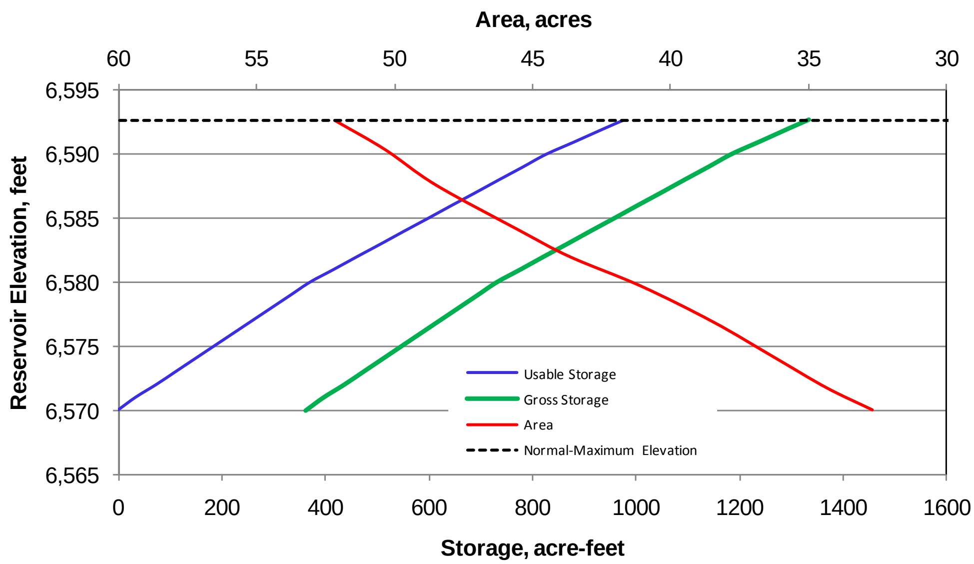



**Figure 6.1.1-14. Jackson Lake area-capacity curve.**

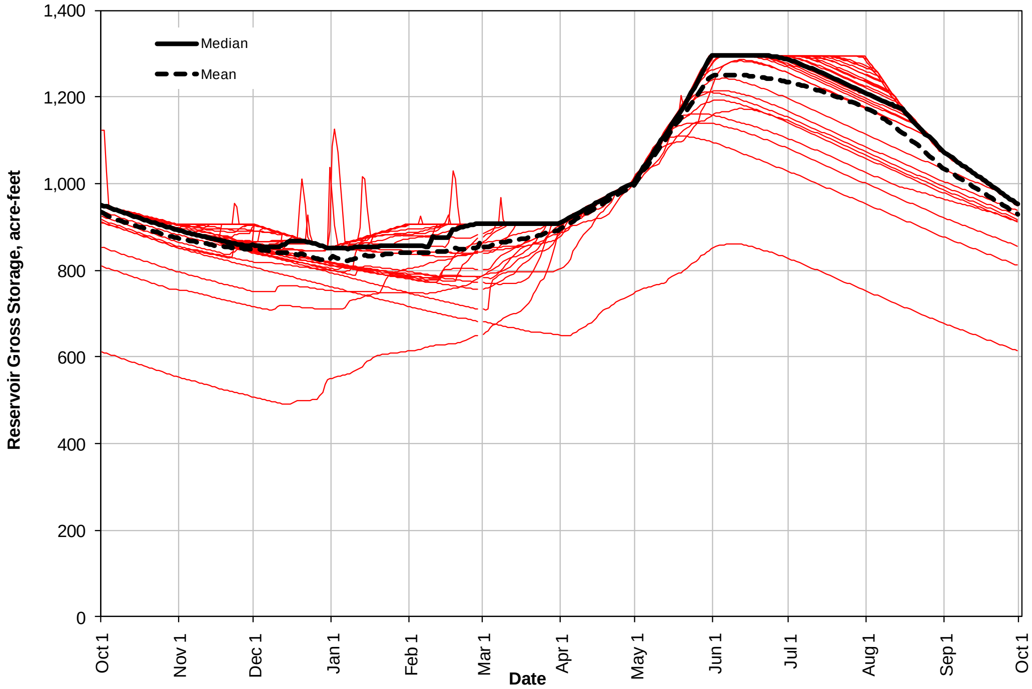



**Figure 6.1.1-15. Jackson Lake daily modeled median and mean storage for water years 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

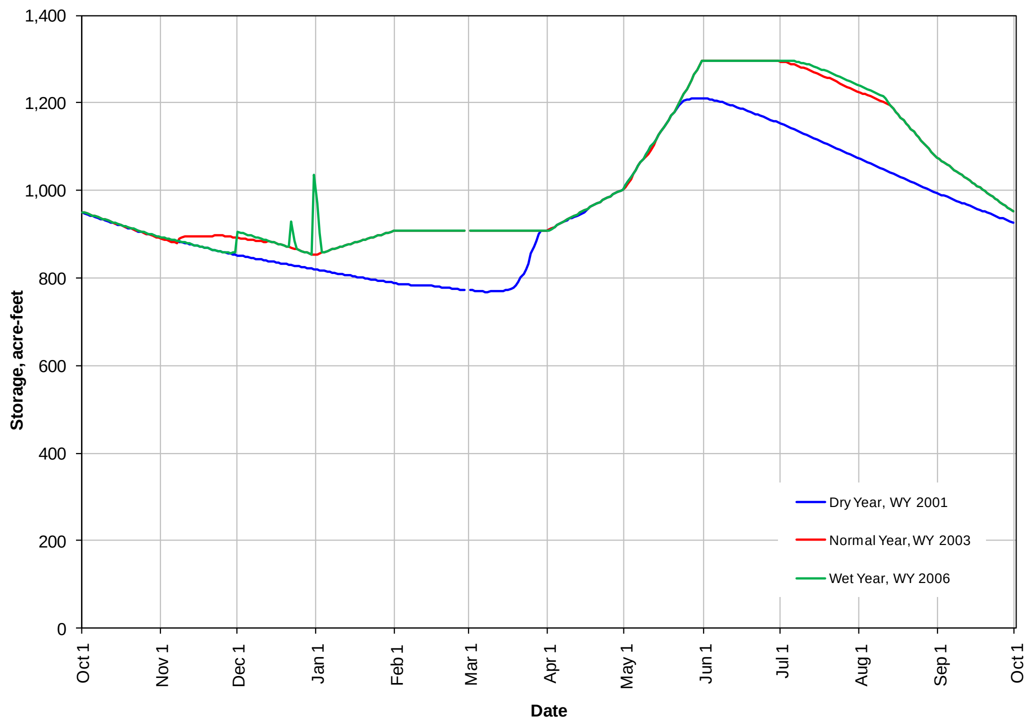



**Figure 6.1.1-16. Modeled daily storage in Jackson Lake in the representative dry (2001), normal (2003), and wet (2006) water years under Licensee's No-Action Alternative Operations Model run.**

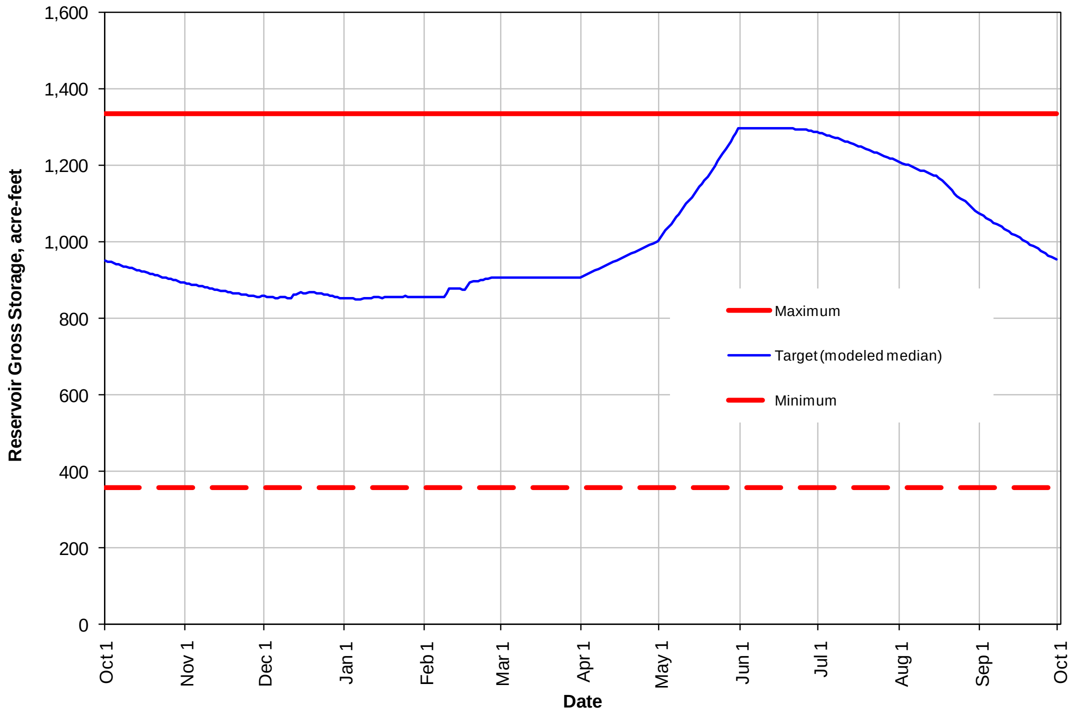
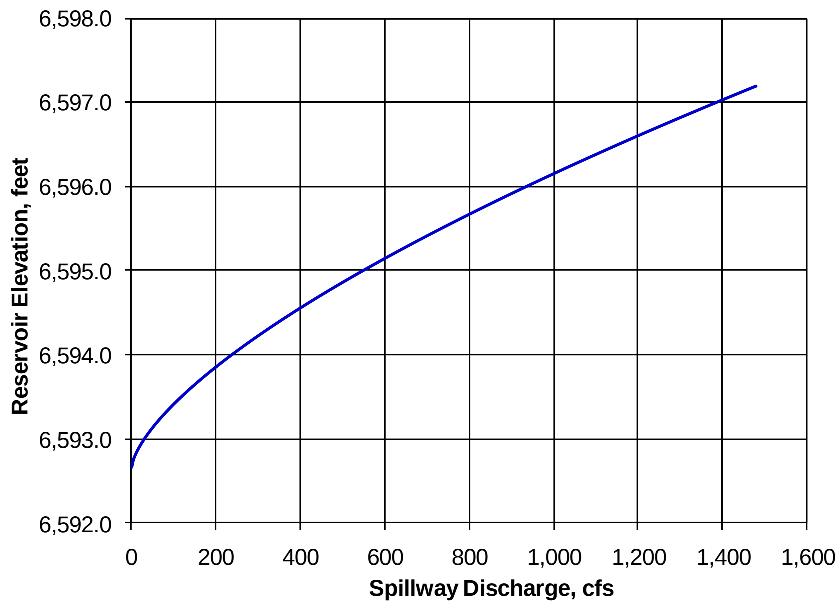



**Figure 6.1.1-17. Jackson Lake rule curve under Licensee's No-Action Alternative Operations Model run.**




Note: This curve was created using the equation
**Q = 3.087 (L)(H)1.5, where Q = flow in cfs, L = spillway length in feet, and H = head over spillway in feet.**

**Figure 6.1.1-18. Jackson Lake Dam spillway rating curve.**

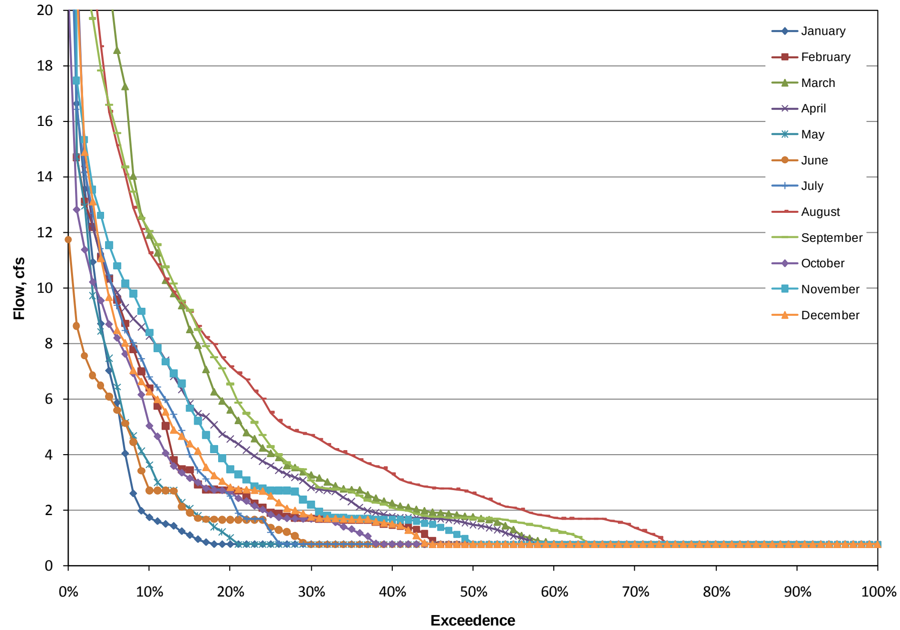



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**Figure 6.1.1-19. Modeled monthly flow duration curves for Jackson Creek below Jackson Lake for the relicensing period of record of 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

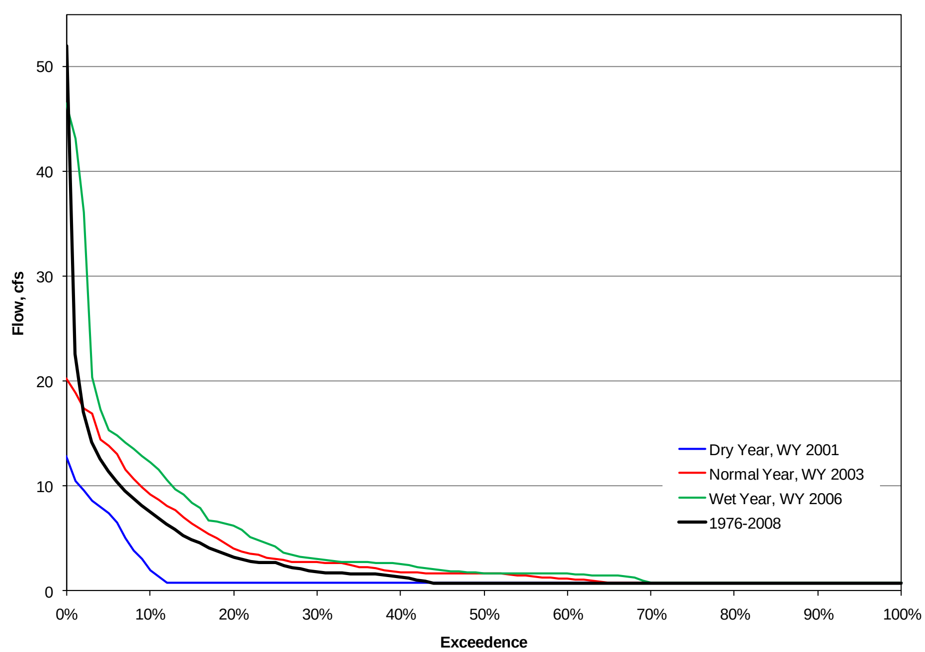


**Figure 6.1.1-20. Modeled flow duration curves for Jackson Creek below Jackson Lake in the representative dry (2001), normal (2003), and wet (2006) water years and for the period of record under Licensee's No-Action Alternative Operations Model run.**

#### 6.1.1.4 French Lake

French Lake's normal-maximum and normal-minimum operating elevations are 6,660.28 feet and 6,608.0 feet, respectively. The reservoir's gross storage capacity of 13,940 acre-feet is the volume of water between the spillway crest, at elevation 6,660.28 feet, and the bottom of the reservoir, at approximate elevation 6,594.9 feet. The reservoir's usable storage capacity is the same as the gross storage capacity.

The area-capacity curve showing the gross and usable storage capacity of French Lake is provided in Figure 6.1.1-21. No studies have been conducted to determine if sedimentation has significantly altered the area-capacity curve since the Project was constructed. The surface area at the normal-maximum operating elevation is 356 acres. A complete area rating curve is unavailable.

Modeled daily storage for French Lake for each water year is graphically presented in Figure 6.1.1-22. As indicated on the figure, the reservoir storage and elevation can fluctuate significantly from year to year although the historical median and mean curves represent the general reservoir operation.

Operation of French Lake in terms of storage for the representative dry (2001), normal (2003), and wet (2006) water years is shown in Figure 6.1.1-23. The range of reservoir elevations in the representative dry (2001), normal (2003), and wet (2006) water years and annual elevation fluctuation in French Lake are summarized in Table 6.1.1-3.

**Table 6.1.1-3. Modeled minimum and maximum elevations in French Lake in the representative dry (2001), normal (2003), and wet (2006) water years.**

| Water Year | Minimum Daily Elevation (feet) | Average Daily Elevation (feet) | Maximum Daily Elevation (feet) | Annual Elevation Fluctuation (feet) |
|---|---|---|---|---|
| 2001 (Dry Year) | 6,629 | 6,640 | 6,655 | 26 |
| 2003 (Normal Year) | 6,630 | 6,644 | 6,660 | 31 |
| 2006 (Wet Year) | 6,630 | 6,644 | 6,660 | 31 |

Rule curve elevations for Licensee's No-Action Alternative Operations Model run are shown in Figure 6.1.1-24 to demonstrate how the reservoir was operated. The maximum and minimum reservoir elevations are also shown on Figure 6.1.1-24. Rule curve elevations were developed to contain existing license reservoir operation requirements, available storage, and contracts or agreements with other parties regarding reservoir storage or elevation. Additionally, median daily reservoir operation was used for establishing rule curve elevations if no operational requirements are specified or for periods where no requirements are in effect. Details regarding the regulatory and contractual operating constraints are discussed in Section 5.

The spillway rating curve for French Lake Dam is presented in Figure 6.1.1-25. The elevation of the spillway crest for the dam is 6,660.28 feet.

Drainage area into French Lake is about 4.82 sq mi, and is unregulated. Since the reservoir is operated to capture and store the spring runoff, discharge below French Lake Dam into Canyon

Creek is regulated, as indicated in the flow duration curves shown in Figure 6.1.1-26, based on Licensee's No-Action Alternative Operations Model run for 1976 through 2008. Figure 6.1.1-27 shows the flow duration curves during the representative dry (2001), normal (2003), and wet (2006) water years. Actual daily flow measurements will continue to be recorded at the compliance point USGS Gage 11414410 (Canyon Creek below French Lake, CA) located immediately downstream of French Lake Dam.

Flow releases from the dam are regulated though a 4-foot by 5-foot-high box culvert formed in wet rubble masonry on the bottom and two sides capped with a 15-inch thick reinforced concrete slab "Outlet Trunk."Control of the low-level outlet is presented in Exhibit A.

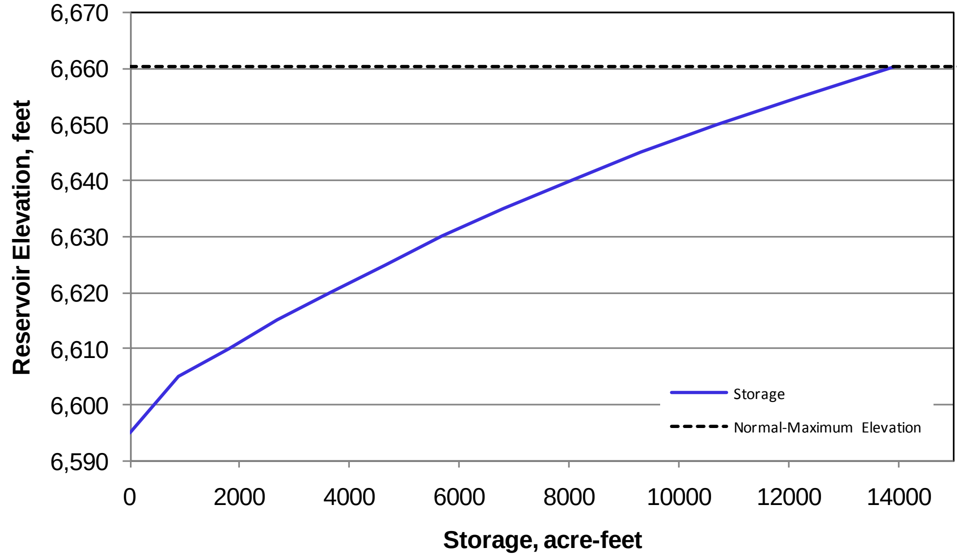


**Figure 6.1.1-21. French Lake area-capacity curve. Gross and usable storage capacities are equal.**

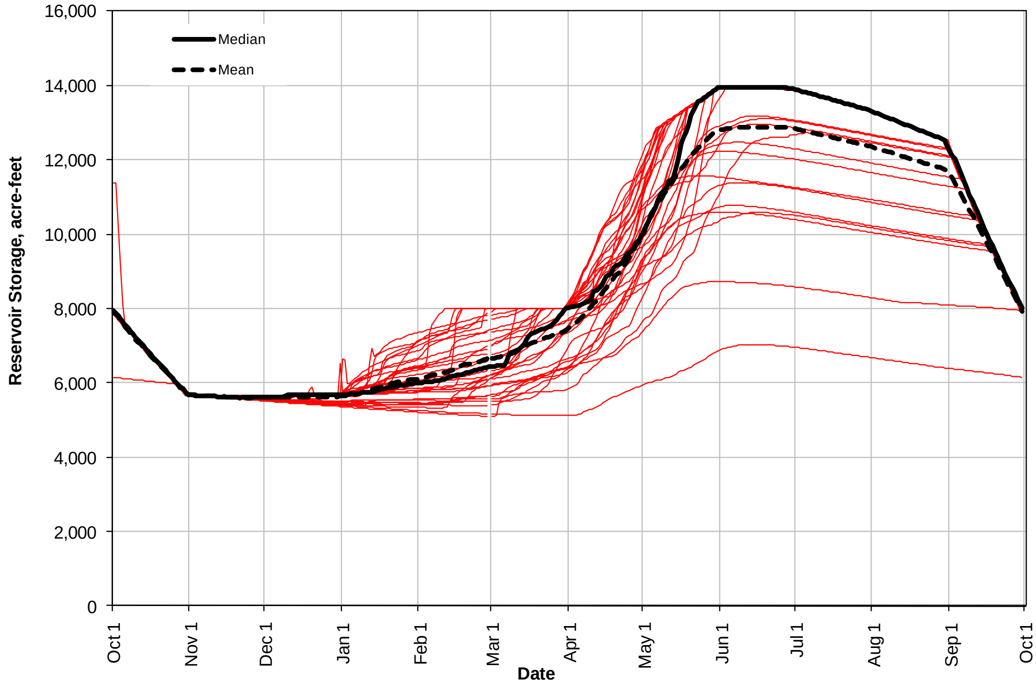


**Figure 6.1.1-22. French Lake daily modeled median and mean storage for water years 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

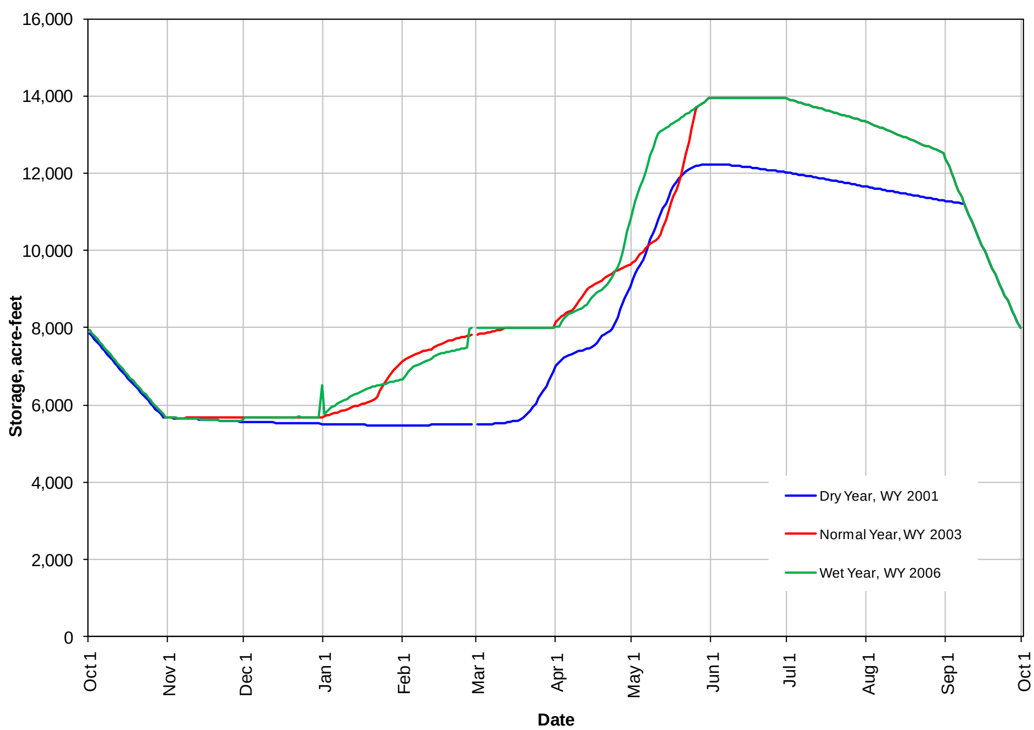


**Figure 6.1.1-23. Modeled daily storage in French Lake in the representative dry (2001), normal (2003), and wet (2006) water years under Licensee's No-Action Alternative Operations Model run.**

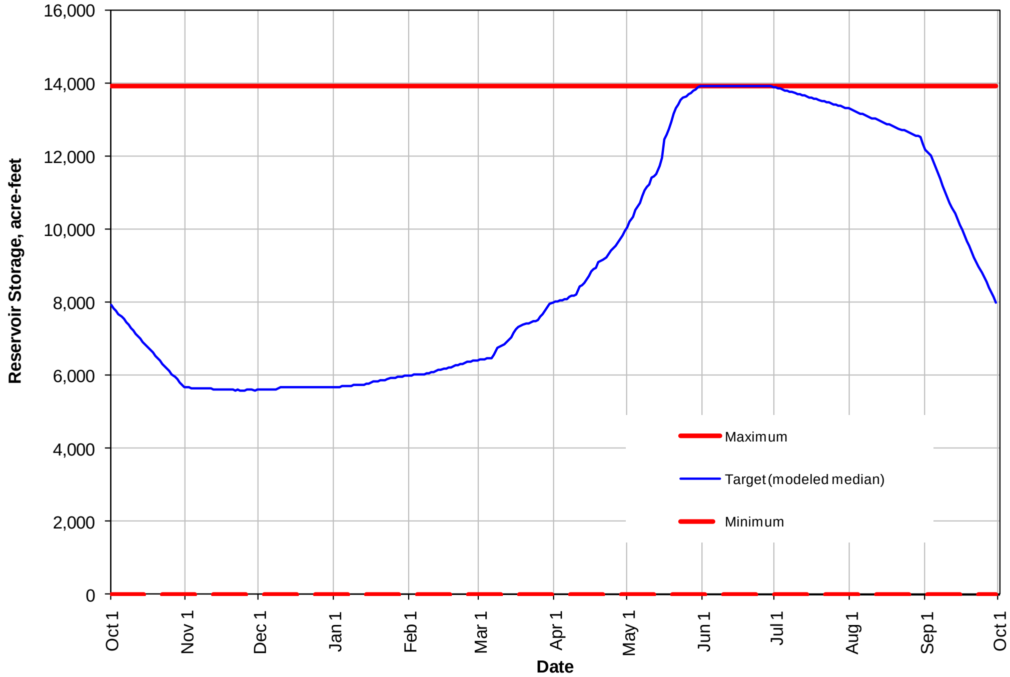


**Figure 6.1.1.24. French Lake rule curve under Licensee's No-Action Alternative Operations Model run.**


Note: This curve was created using the equation
**Q = 3.087 (L)(H)1.5, where Q = flow in cfs, L = spillway length in feet, and H = head over spillway in feet.**

**Figure 6.1.1.25. French Lake spillway rating curve.**

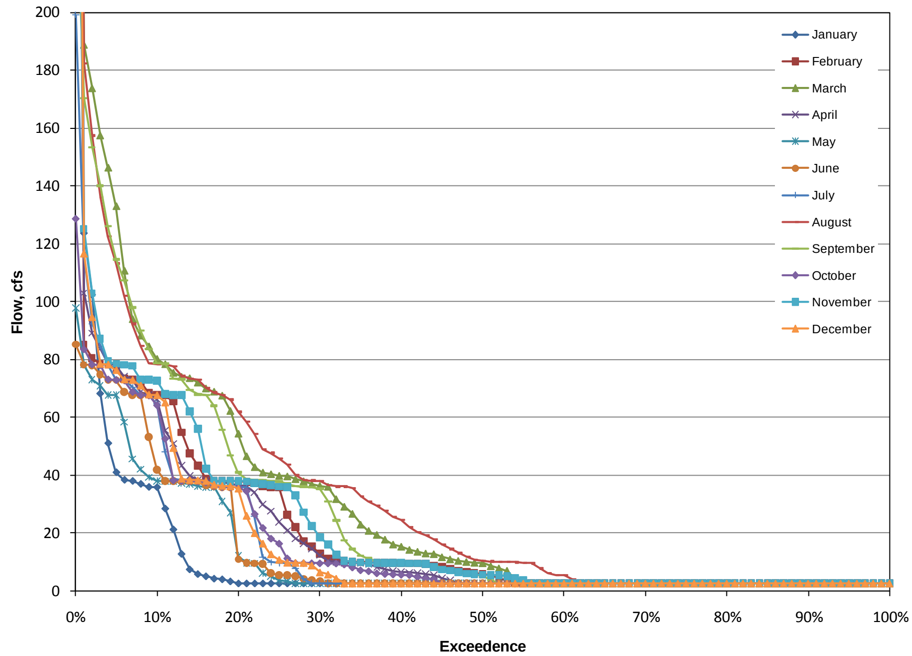


**Figure 6.1.1-26. Modeled monthly flow duration curves for Canyon Creek below French Lake for the relicensing period of record of 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

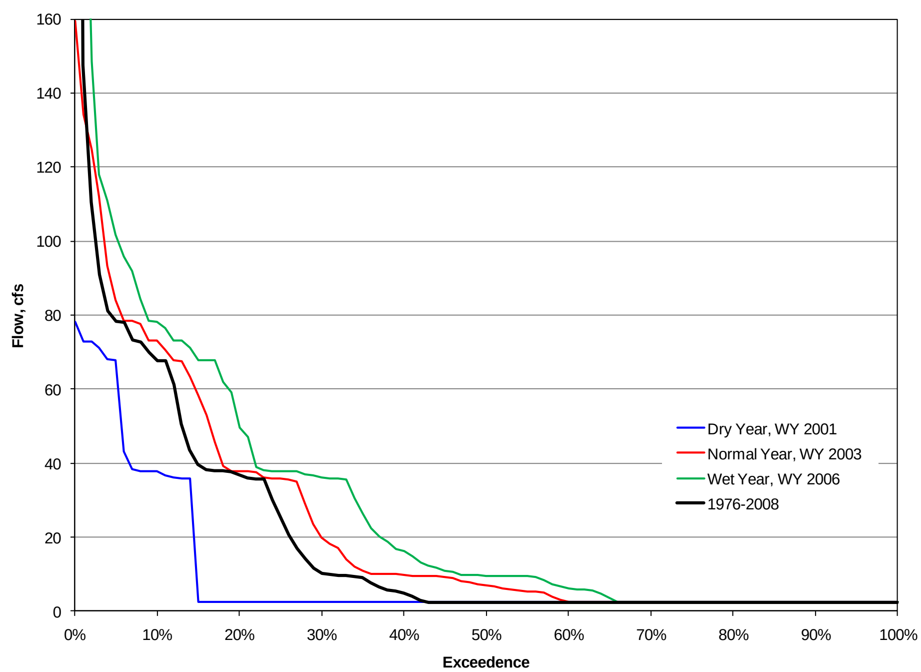


**Figure 6.1.1-27. Modeled flow duration curves for Canyon Creek below French Lake Dam in the representative dry (2001), normal (2003), and wet (2006) water years and for the period of record under Licensee's No-Action Alternative Operations Model run.**

### 6.1.1.5 Faucherie Lake

Faucherie Lake's normal-maximum and normal-minimum operating elevations are 6,123.0 feet and 6,090.0 feet, respectively. The reservoir's gross storage capacity of 3,980 acre-feet is the volume of water between the spillway crest, at elevation 6,123.0 feet, and elevation 6,086.0 feet. The reservoir's usable storage capacity is 3,740 acre-feet based on the volume of water between the normal-maximum pool elevation and the intake inlet elevation, 6,090 feet.

The area-capacity curve showing the gross and usable storage capacities of Faucherie Lake is provided in Figure 6.1.1-28. No studies have been conducted to determine if sedimentation has significantly altered the area-capacity curve since the Project was constructed. The surface area at the normal-maximum operating elevation is 150 acres.

Modeled daily storage for Faucherie Lake for each water year is graphically presented in Figure 6.1.1-29. As indicated on the figure, the reservoir storage and elevation can fluctuate significantly from year to year although the historical median and mean curves represent the general reservoir operation.

Operation of Faucherie Lake in terms of storage for the representative dry (2001), normal (2003), and wet (2006) water years is shown in Figure 6.1.1-30. The reservoir in the representative dry (2001) and normal (2003) water years generally remains at full storage capacity. The range of reservoir elevations in the representative dry (2001), normal (2003), and wet (2006) water years and annual elevation fluctuation in Faucherie Lake are summarized in Table 6.1.1-4.

**Table 6.1.1-4. Modeled minimum and maximum elevations in Faucherie Lake in the representative dry (2001), normal (2003), and wet (2006) water years.**

| Water Year | Minimum Daily Elevation (feet) | Average Daily Elevation (feet) | Maximum Daily Elevation (feet) | Annual Elevation Fluctuation (feet) |
|---|---|---|---|---|
| 2001 (Dry Year) | 6,122 | 6,123 | 6,123 | 2 |
| 2003 (Normal Year) | 6,123 | 6,123 | 6,123 | 0 |
| 2006 (Wet Year) | 6,108 | 6,121 | 6,125 | 17 |

Rule curve elevations for Licensee's No-Action Alternative Operations Model run are shown in Figure 6.1.1-31 to demonstrate how the reservoir was operated. The maximum and minimum reservoir elevations are also shown on Figure 6.1.1-31. Rule curve elevations were developed to contain existing license reservoir operation requirements, available storage, and contracts or agreements with other parties regarding reservoir storage or elevation. Additionally, median daily modeled reservoir operation was used for establishing rule curve elevations if no operational requirements are specified or for periods where no requirements are in effect. Details regarding the regulatory and contractual operating constraints are discussed in Section 5.

Faucherie and Sawmill reservoir storages are generally drafted in alternating years (i.e., when one of the reservoirs is drafted in the fall months, the other reservoir remains at or near its full storage capacity). This operation is evident in Figures 6.1.1-30 and 31 below.

 

The spillway rating curve for Faucherie Lake Dam is presented in Figure 6.1.1-32. The elevation of the spillway crest for the dam is 6,123.0 feet.

Drainage area into Faucherie Lake is about 9.29 square miles. Inflows are regulated by local accretion and releases from French Lake. Since the reservoir is operated to capture and store the spring runoff, discharge below Faucherie Lake Dam into Canyon Creek is regulated, as indicated in the flow duration curves shown in Figure 6.1.1-33, based on Licensee's No-Action Alternative Operations Model run for 1976 through 2008. Figure 6.1.1-34 shows flow duration curves during the representative dry (2001), normal (2003), and wet (2006) water years. Actual daily flow measurements will continue to be recorded at the compliance point USGS Gage 11414450 (Canyon Creek below Faucherie Lake, CA) located immediately downstream of Faucherie Lake Dam.

Flow releases from the dam are regulated though two 24-inch-diameter sluice gates. Control of the low-level outlet is presented in Exhibit A.

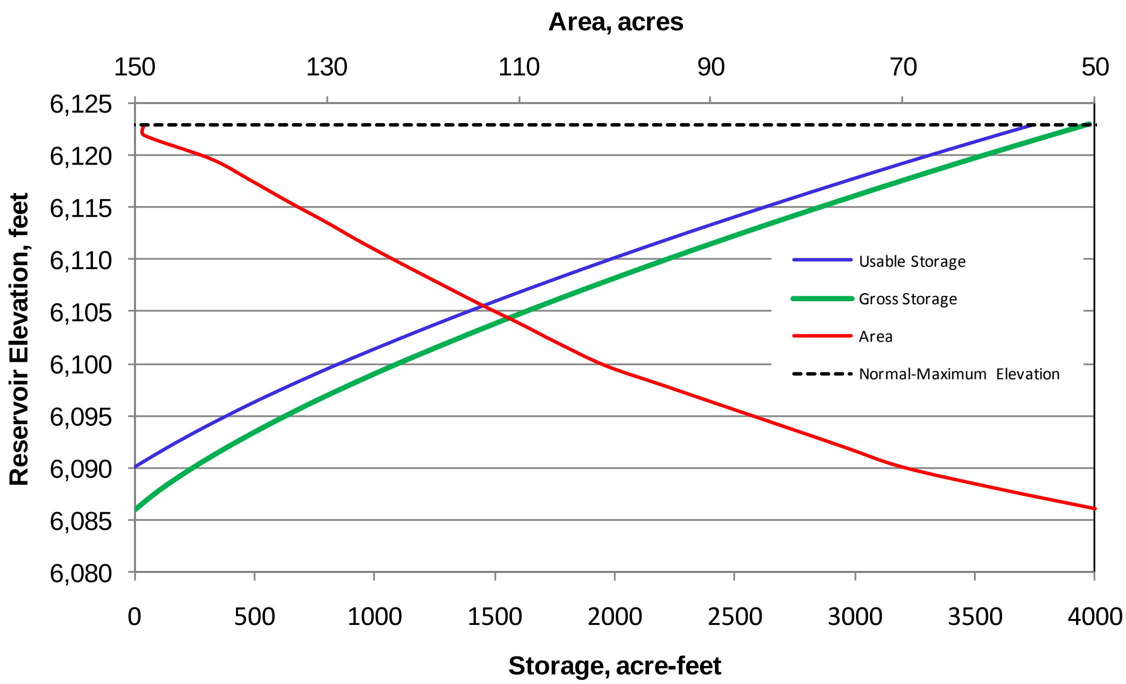


**Figure 6.1.1-28. Faucherie Lake area-capacity curve.**

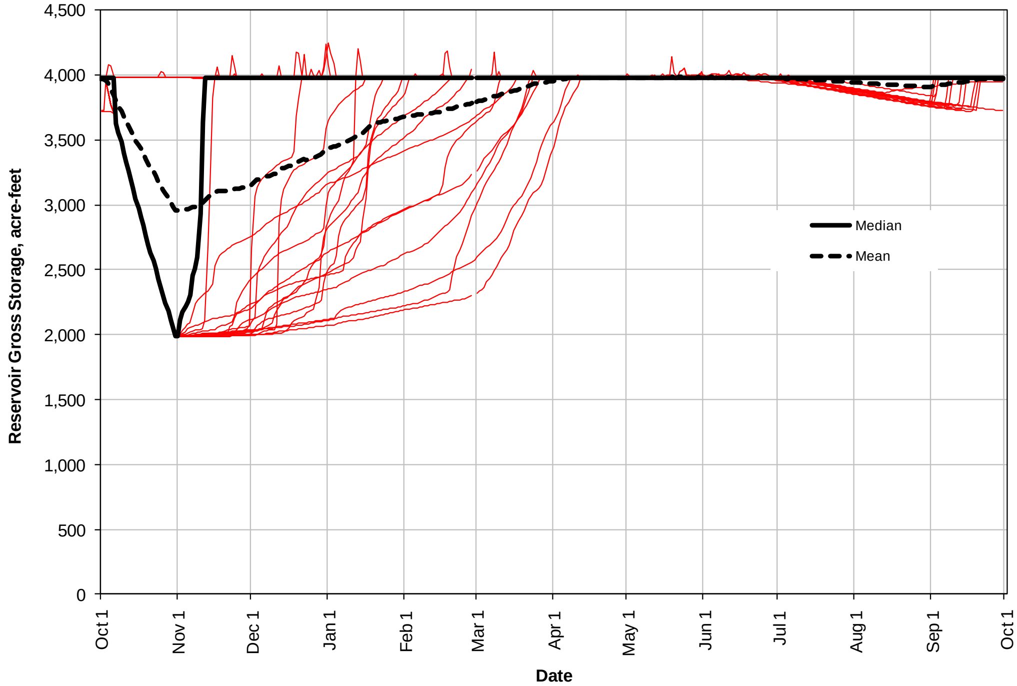


**Figure 6.1.1-29. Faucherie Lake daily modeled median and mean storage for water years 1976 through 2008 under Licensee's No-Action Alternative Operations Model run. Note that Faucherie and Sawmill lakes generally have storage drafts in alternating years. Values greater than normal-maximum storage are modeling artifacts and should generally not be considered as accurate.**

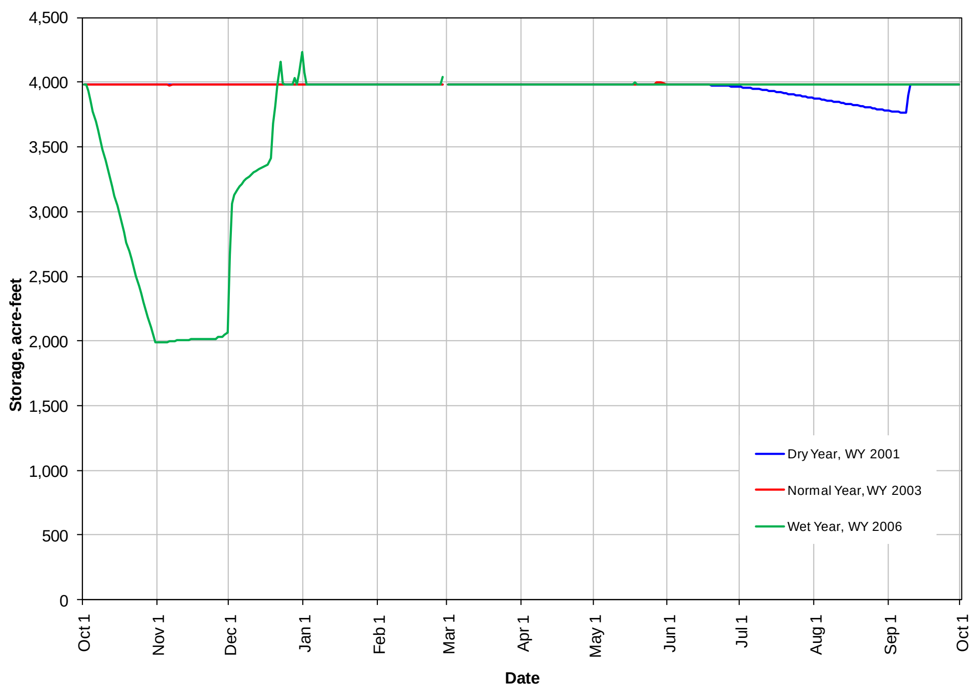


**Figure 6.1.1-30. Modeled daily storage in Faucherie Lake in the representative dry (2001), normal (2003), and wet (2006) water years under Licensee's No-Action Alternative Operations Model run. Values greater than normal-maximum storage are modeling artifacts and should generally not be considered as accurate.**

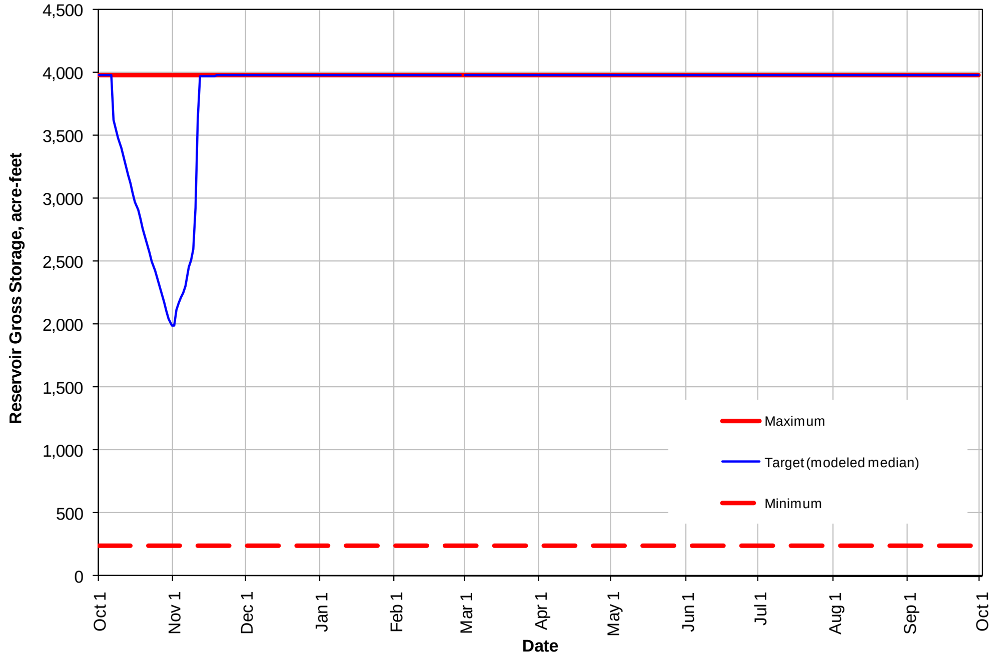


**Figure 6.1.1-31. Faucherie Lake rule curve under Licensee's No-Action Alternative Operations Model run. Note that Faucherie and Sawmill lakes generally have storage drafts in alternating years.**

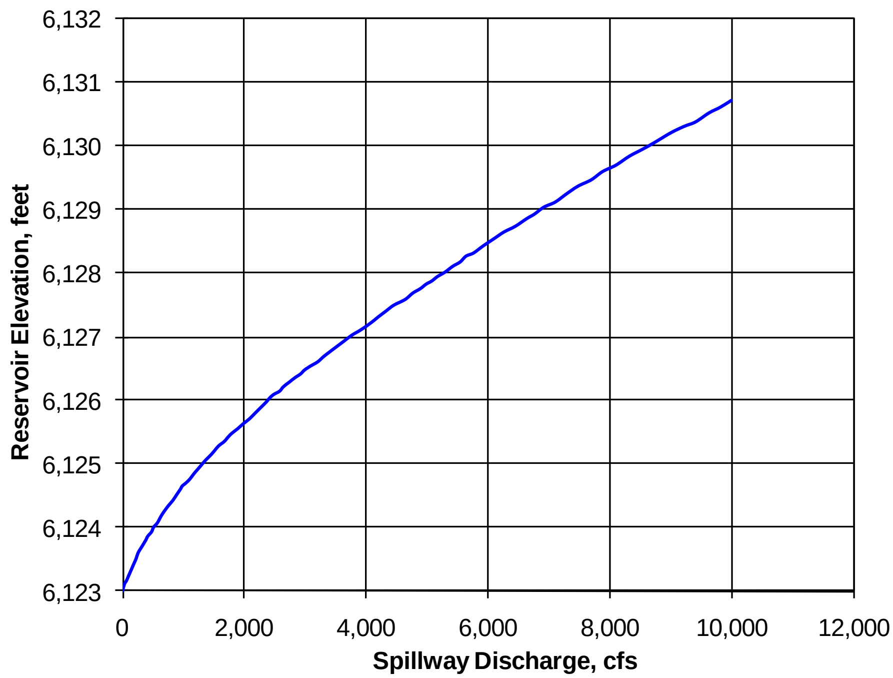


**Figure 6.1.1-32. Faucherie Lake Dam spillway rating curve.**

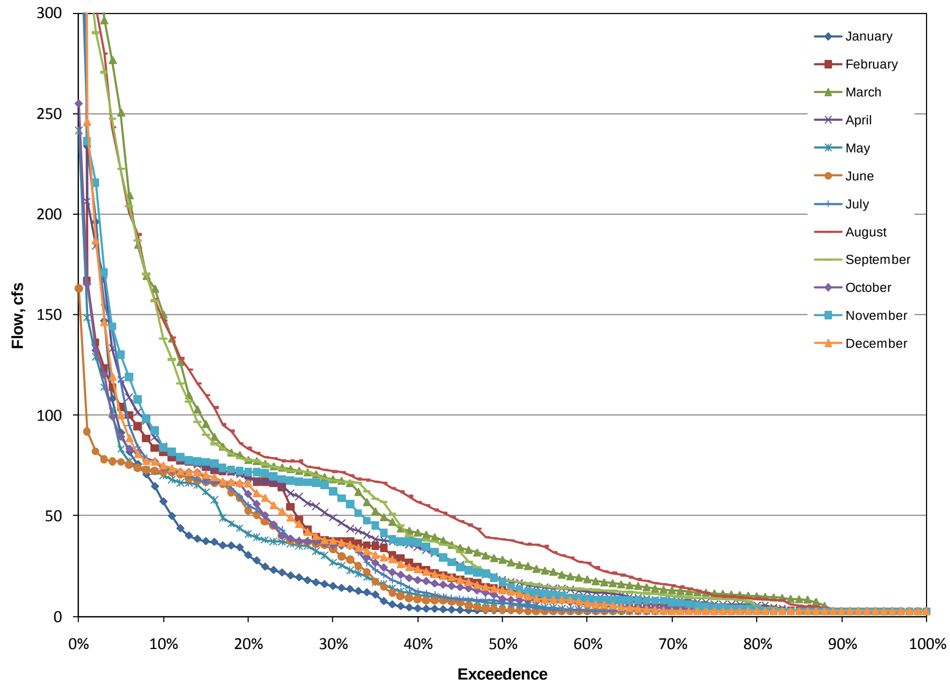


**Figure 6.1.1-33. Modeled monthly flow duration curves for Canyon Creek below Faucherie Lake for water years 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

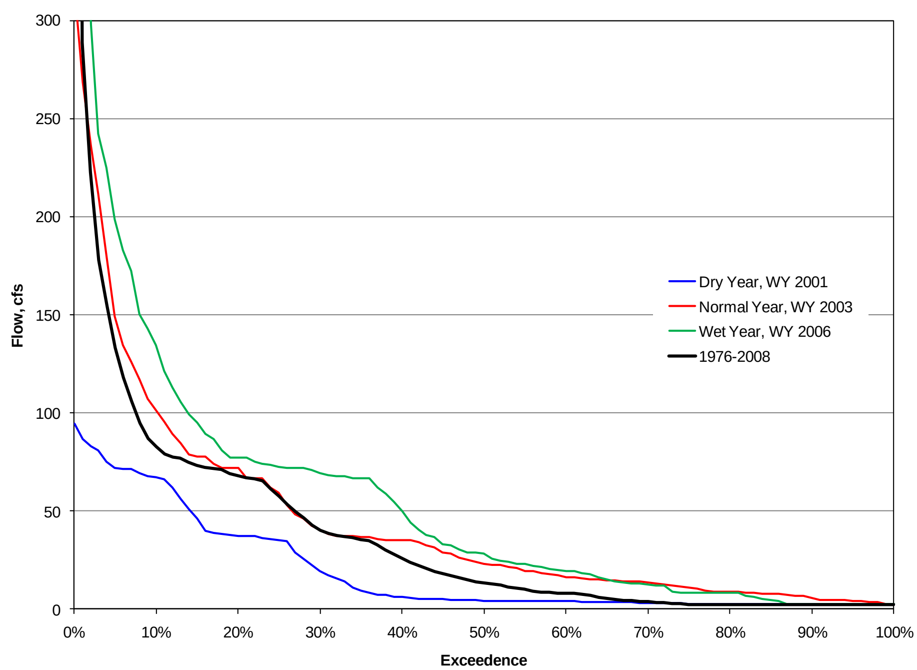


**Figure 6.1.1-34. Modeled flow duration curves for Canyon Creek below Faucherie Lake Dam in the representative dry (2001), normal (2003), and wet (2006) water years and for the period of record under Licensee's No-Action Alternative Operations Model run.**

### 6.1.1.6 Sawmill Lake

Sawmill Lake's normal-maximum and normal-minimum operating elevations are 5,860.0 feet and 5,805.0 feet, respectively. The reservoir's gross storage capacity of 3,030 acre-feet is the volume of water between the normal-maximum water-surface elevation and the bottom of the reservoir, approximately equal to elevation 5,805.0 feet. The reservoir's usable storage capacity is the same as the gross storage capacity.

The area-capacity curve showing the gross and usable storage capacity of Sawmill Lake is provided in Figure 6.1.1-35. No studies have been conducted to determine if sedimentation has significantly altered the area-capacity curve since the Project was constructed. The surface area at the normal-maximum water-surface elevation is 113 acres.

Modeled daily storage for Sawmill Lake for each water year is graphically presented in Figure 6.1.1-36. As indicated on the figure, the reservoir storage and elevation can fluctuate significantly from year to year although the median and mean curves represent the general reservoir operation.

Operation of Sawmill Lake in terms of storage for the representative dry (2001), normal (2003), and wet (2006) water years is shown in Figure 6.1.1-37. The range of reservoir elevations in the representative dry (2001), normal (2003), and wet (2006) water years and annual elevation fluctuation in Sawmill Lake are summarized in Table 6.1.1-5.

**Table 6.1.1-5. Modeled minimum and maximum elevations in Sawmill Lake in the representative dry (2001), normal (2003), and wet (2006) water years.**

| Water Year | Minimum Daily Elevation (feet) | Average Daily Elevation (feet) | Maximum Daily Elevation (feet) | Annual Elevation Fluctuation (feet) |
|---|---|---|---|---|
| 2001 (Dry Year) | 5,843 | 5,855 | 5,860 | 17 |
| 2003 (Normal Year) | 5,843 | 5,858 | 5,861 | 18 |
| 2006 (Wet Year) | 5,851 | 5,860 | 5,862 | 12 |

Rule curve elevations for Licensee's No-Action Alternative Operations Model run are shown in Figure 6.1.1-38 to demonstrate how the reservoir was operated. The maximum and minimum reservoir elevations are also shown on Figure 6.1.1-38. Storages from Faucherie and Sawmill lakes are generally drafted in alternating years (i.e., when one of the reservoirs is drafted in the fall months, the other reservoir remains at or near its full storage capacity). Rule curve elevations were developed to contain existing license reservoir operation requirements, available storage, and contracts or agreements with other parties regarding reservoir storage or elevation. Additionally, median daily reservoir operation was used for establishing rule curve elevations if no operational requirements are specified or for periods where no requirements are in effect. Details regarding the regulatory and contractual operating constraints are discussed in Section 5.

The spillway rating curve for Sawmill Lake Dam is presented in Figure 6.1.1-39. The elevation of the spillway crest for the dam is 5,860.0 feet.

Drainage area into Sawmill Lake is about 17 square miles. Inflows are regulated by local accretion and two upstream reservoirs. Since the reservoir is operated to capture and store the spring runoff, discharge below Sawmill Lake Dam into Canyon Creek is regulated, as indicated in the flow duration curves shown in Figure 6.1.1-40, based on Licensee's No-Action Alternative Operations Model run for 1976 through 2008. Figure 6.1.1-41 shows flow duration curves during the representative dry (2001), normal (20030, and wet (2006) water years. Actual daily flow measurements will continue to be recorded at the compliance point USGS Gage 11414470 (Canyon Creek below Sawmill Lake, CA) located immediately downstream of Sawmill Lake Dam.

Flow releases from the dam are regulated though a 24-inch-diameter steel pipe. Control of the low-level outlet is presented in Exhibit A.

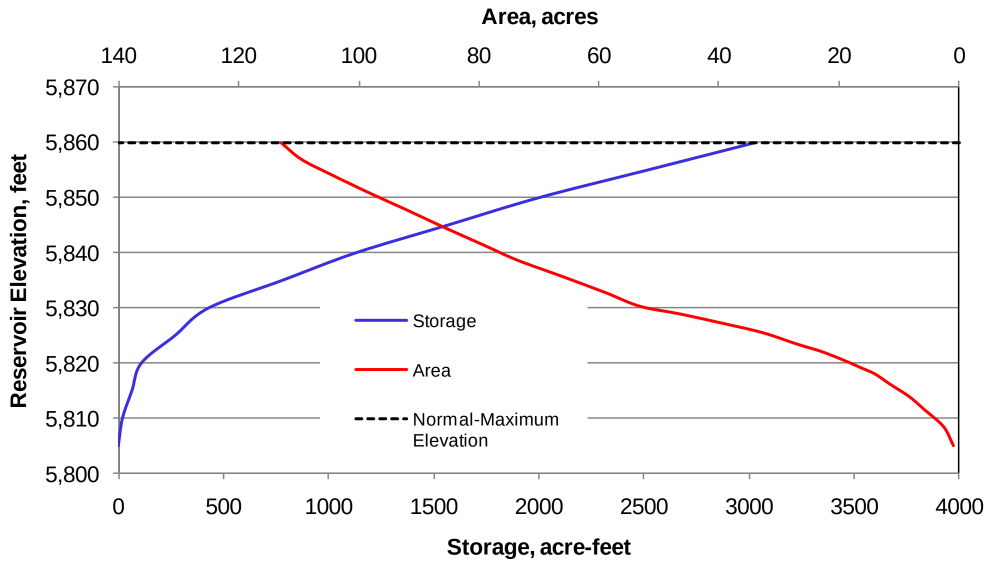


**Figure 6.1.1-35. Sawmill Lake area-capacity curve. Gross and usable storage capacities are equal.**

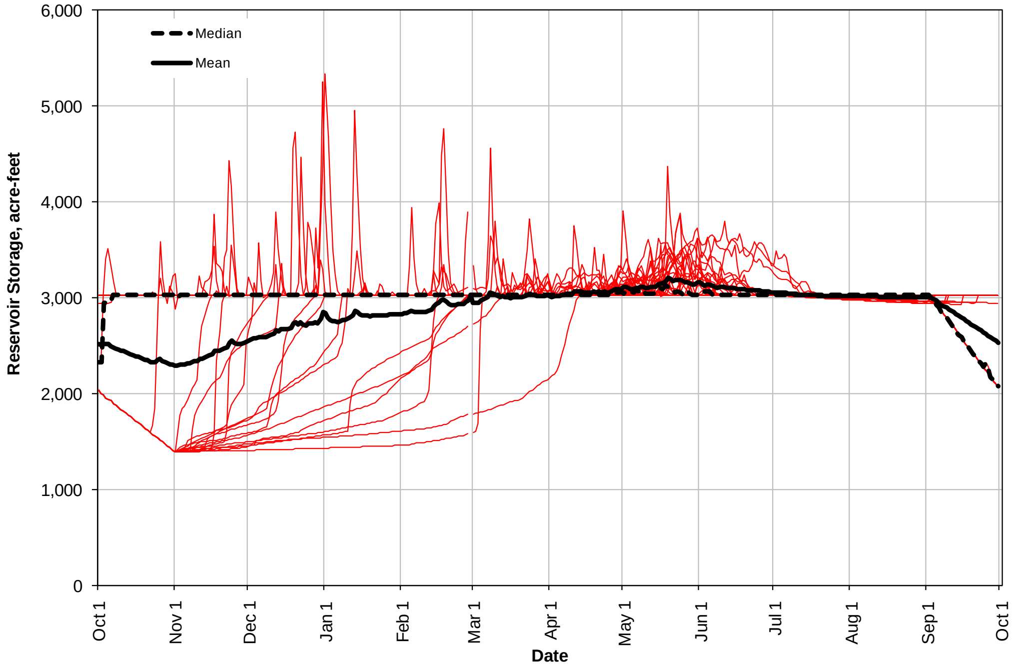


**Figure 6.1.1-36. Sawmill Lake daily modeled median and mean storage for water years 1976 through 2008 under Licensee's No-Action Alternative Operations Model run. Values greater than normal-maximum storage are modeling artifacts and should generally not be considered as accurate.**

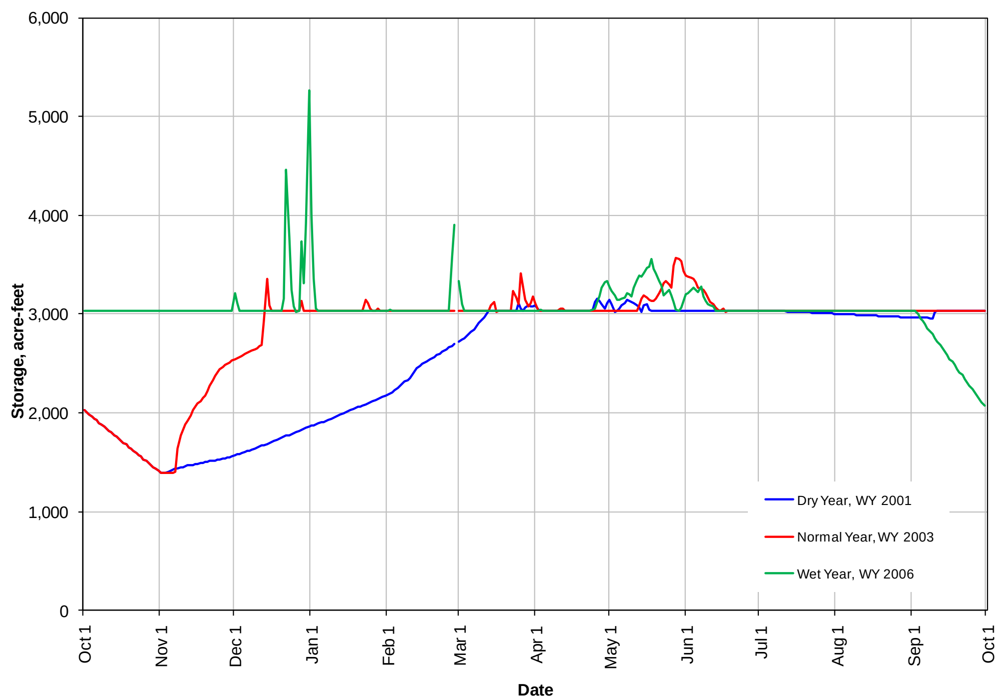


**Figure 6.1.1-37. Modeled daily storage in Sawmill Lake in the representative dry (2001), normal (2003), and wet (2006) water years under Licensee's No-Action Alternative Operations Model run. Values greater than normal-maximum storage are modeling artifacts and should generally not be considered as accurate.**

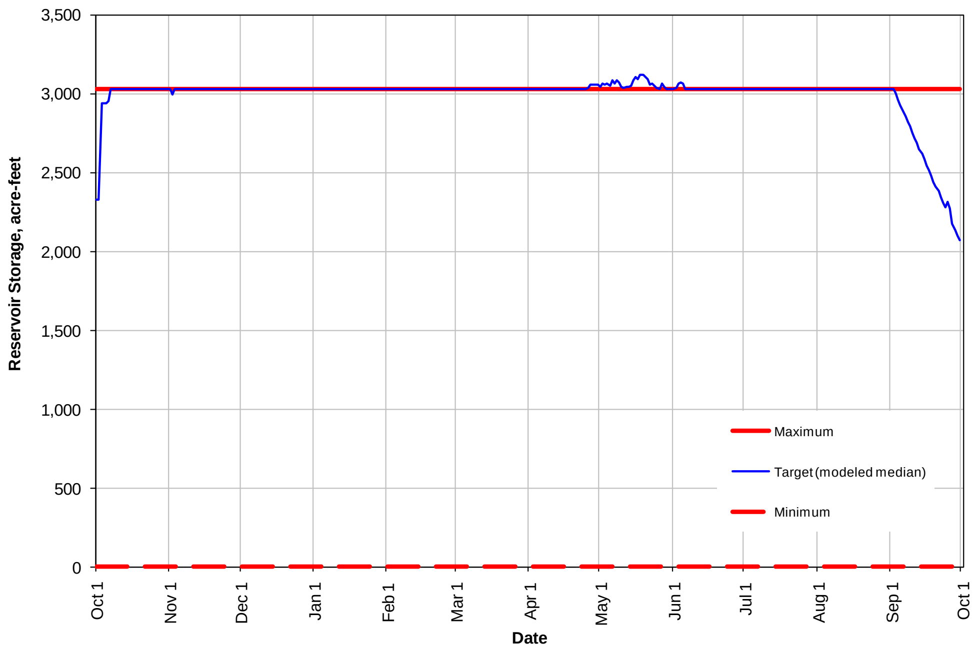


**Figure 6.1.1-38. Sawmill Lake rule curve under Licensee's No-Action Alternative Operations Model run. Note that Faucherie and Sawmill lakes generally have storage drafts in alternating years.**

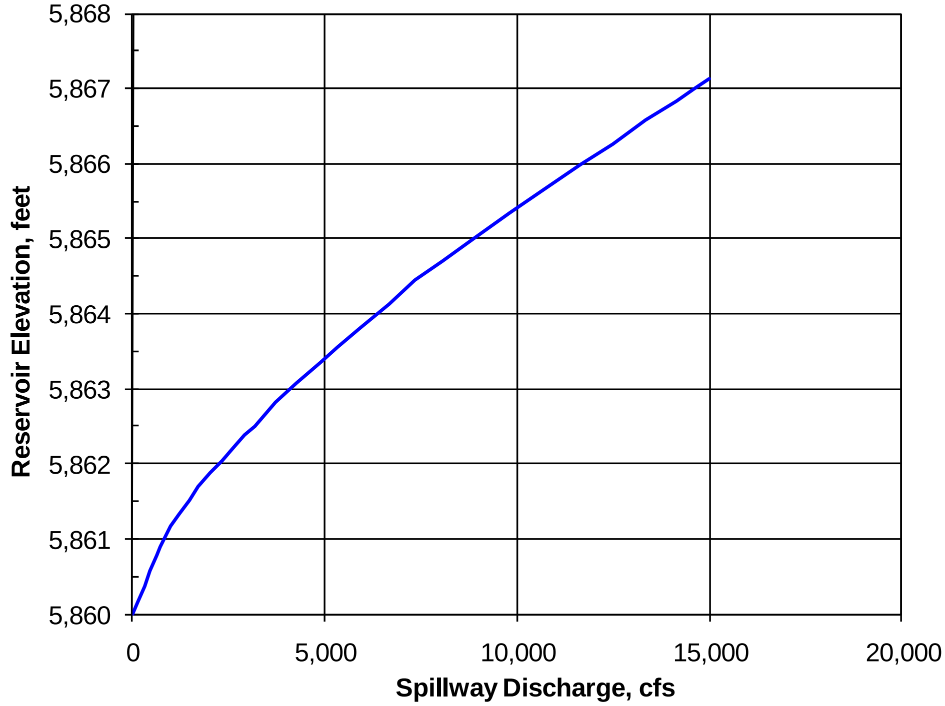


**Figure 6.1.1-39. Sawmill Lake Dam spillway rating curve.**

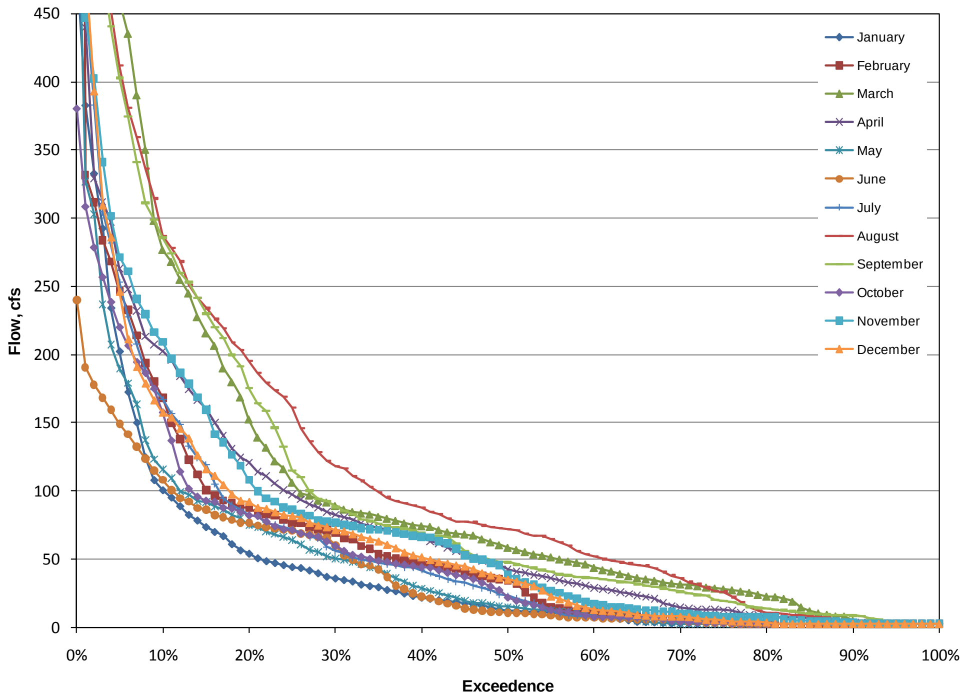


**Figure 6.1.1-40. Modeled monthly flow duration curves for Canyon Creek below Sawmill Lake for the 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

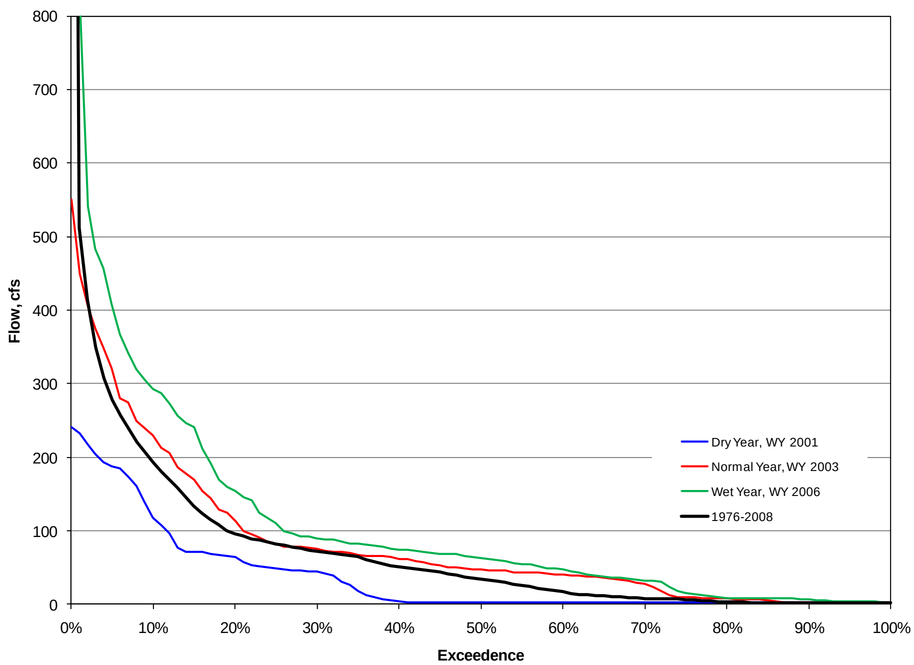


**Figure 6.1.1-41. Modeled flow duration curves for Canyon Creek below Sawmill Lake Dam in the representative dry (2001), normal (2003), and wet (2006) water years and for the period of record under Licensee's No-Action Alternative Operations Model run.**

#### 6.1.1.7 Bowman Lake

Bowman Lake's normal-maximum and normal-minimum operating elevations are 5,562.0 feet and 5,400.0 feet, respectively. The reservoir's gross storage capacity of 68,363 acre-feet is the volume of water between elevation 5,562.0 feet, 1.6 feet below the top of the gates, and the bottom of the reservoir, approximately equal to elevation 5,400.0 feet (also the invert of the low-level outlet tunnel). The reservoir's usable storage capacity is equal to its gross storage capacity. The low-level outlet intake serves as the intake for both the low-level flow releases and the Bowman Powerhouse penstock.

The area-capacity curve showing the gross and usable storage capacities of Bowman Lake is provided in Figure 6.1.1-42. A bathymetric survey was performed in June 2009 to determine if sedimentation has significantly altered the area-capacity curve since the Project was constructed. Results of the survey indicate that the storage capacity has increased by 1,213 acre-feet, or 1.8 percent, from the as-built survey at the normal-maximum operating elevation. The surface area at the normal-maximum operating elevation is 827 acres.

Modeled daily storage for Bowman Lake for each water year is graphically presented in Figure 6.1.1-43. As indicated on the figure, the reservoir storage and elevation can fluctuate significantly from year to year although the median and mean curves represent the general reservoir operation.

Operation of Bowman Lake in terms of storage for the representative dry (2001), normal (2003), and wet (2006) water years is shown in Figure 6.1.1-44. The range of reservoir elevations in the representative dry (2001), normal (2003), and wet (2006) water years and annual elevation fluctuation in Bowman Lake are summarized in Table 6.1.1-6.

**Table 6.1.1-6. Modeled minimum and maximum elevations in Bowman Lake in the representative dry (2001), normal (2003), and wet (2006) water years.**

| Water Year | Minimum Daily Elevation (feet) | Average Daily Elevation (feet) | Maximum Daily Elevation (feet) | Annual Elevation Fluctuation (feet) |
|---|---|---|---|---|
| 2001 (Dry Year) | 5,502 | 5,524 | 5,553 | 52 |
| 2003 (Normal Year) | 5,517 | 5,534 | 5,564 | 47 |
| 2006 (Wet Year) | 5,518 | 5,547 | 5,564 | 46 |

Rule curve elevations for Licensee's No-Action Alternative Operations Model run are shown in Figure 6.1.1-45 to demonstrate how the reservoir was operated. The maximum and minimum reservoir elevations are also shown on Figure 6.1.1-45. Rule curve elevations were developed to contain proposed license reservoir operation requirements, available storage, and contracts or agreements with other parties regarding reservoir storage or elevation. Additionally, median daily reservoir operation was used for establishing rule curve elevations if no operational requirements are specified or for periods where no requirements are in effect. Details regarding the regulatory and contractual operating constraints are discussed in Section 5.

The spillway rating curve for Bowman Lake South Dam is presented in Figure 6.1.1-46. The elevation of the ungated spillway crest for the dam is 5,563.6 feet; the elevation of the gated spillway crest for the dam is 5,557.2 feet.

Drainage area into Bowman Lake is about 28.5 square miles. Inflows are highly regulated by multiple upstream reservoirs and local accretion. The reservoir is operated to capture and store the spring runoff, and to divert water to Bowman Powerhouse. Flow duration curves for Canyon Creek below Bowman Dam and for the Bowman-Spaulding Conduit are provided in Figures 6.1.1-47 and 6.1.1-48, respectively. Both sets of flow duration curves are based on Licensee's No-Action Alternative Operations Model run. Figures 6.1.1-49 and 6.1.1-50 show flow duration curves during the representative dry (2001), normal (2003), and wet (2006) water years for Canyon Creek below Bowman Dam and for the Bowman-Spaulding Conduit, respectively.

Flow releases from the dam are regulated through a 62-inch ID steel pipe, which bifurcates into two pipes just past the downstream toe of the dam. One pipe is the 62-inch ID powerhouse penstock. The other pipe is a 70-inch ID pipe going to an outlet valve control house. Just prior to the control house, the 70-inch pipe bifurcates into two pipes. Both pipes are reduced down to 42-inches ID and have control valves. One control valve is a 24-inch butterfly valve and the second valve is a 30-inch butterfly valve.

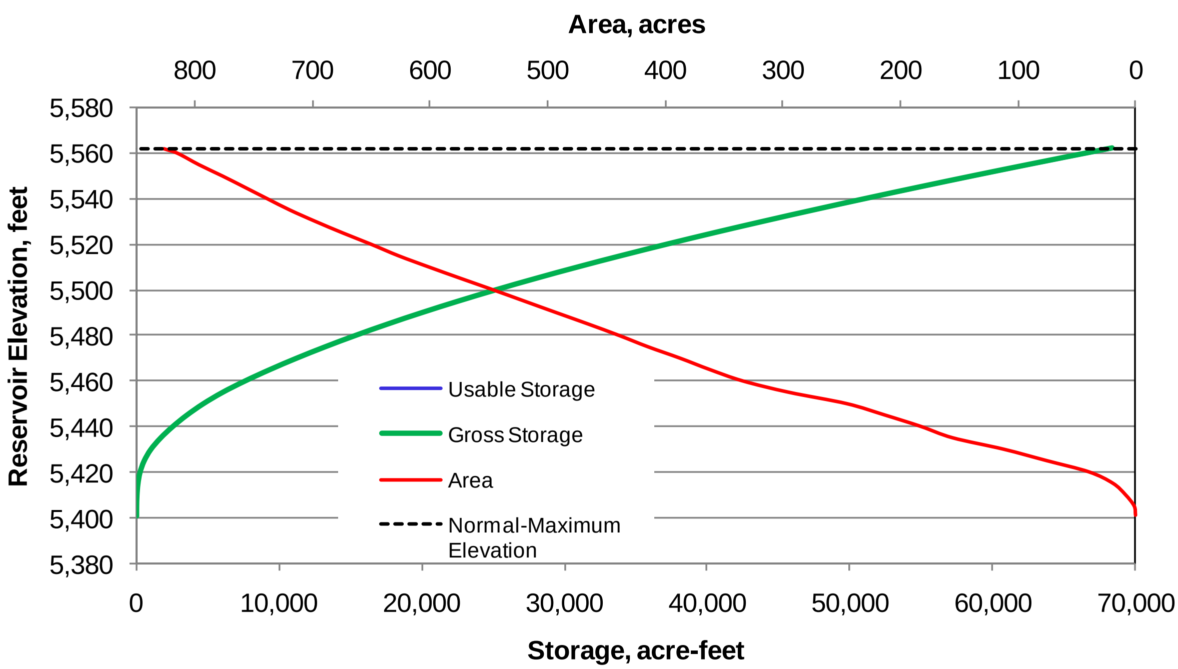


**Figure 6.1.1-42. Bowman Lake area-capacity curve.**

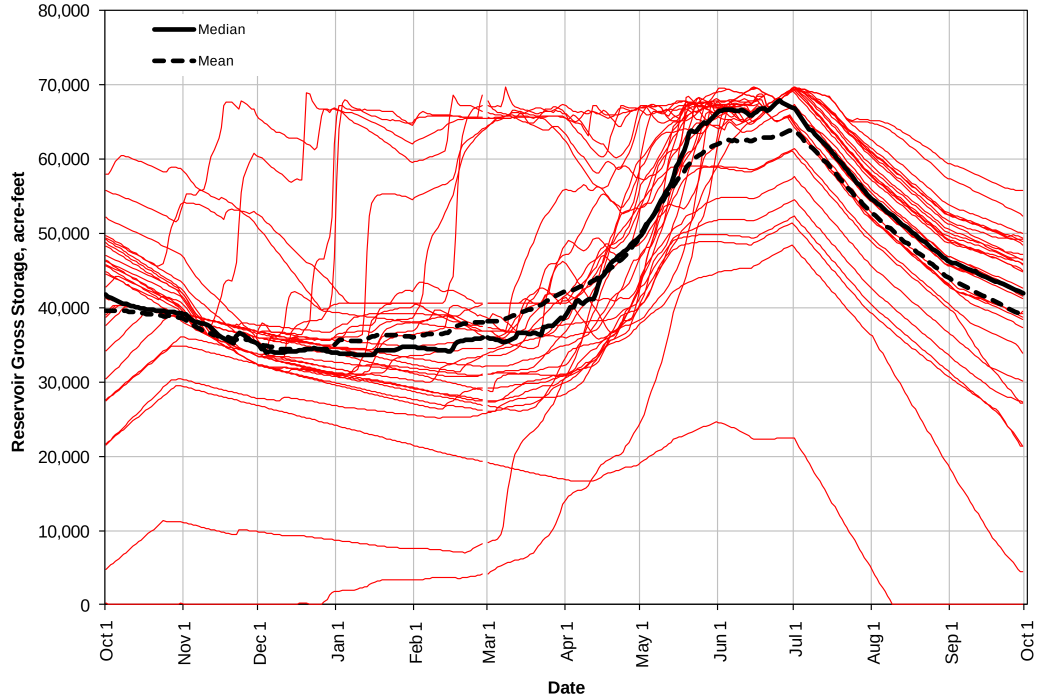


**Figure 6.1.1-43. Bowman Lake daily modeled median and mean storage for water years 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

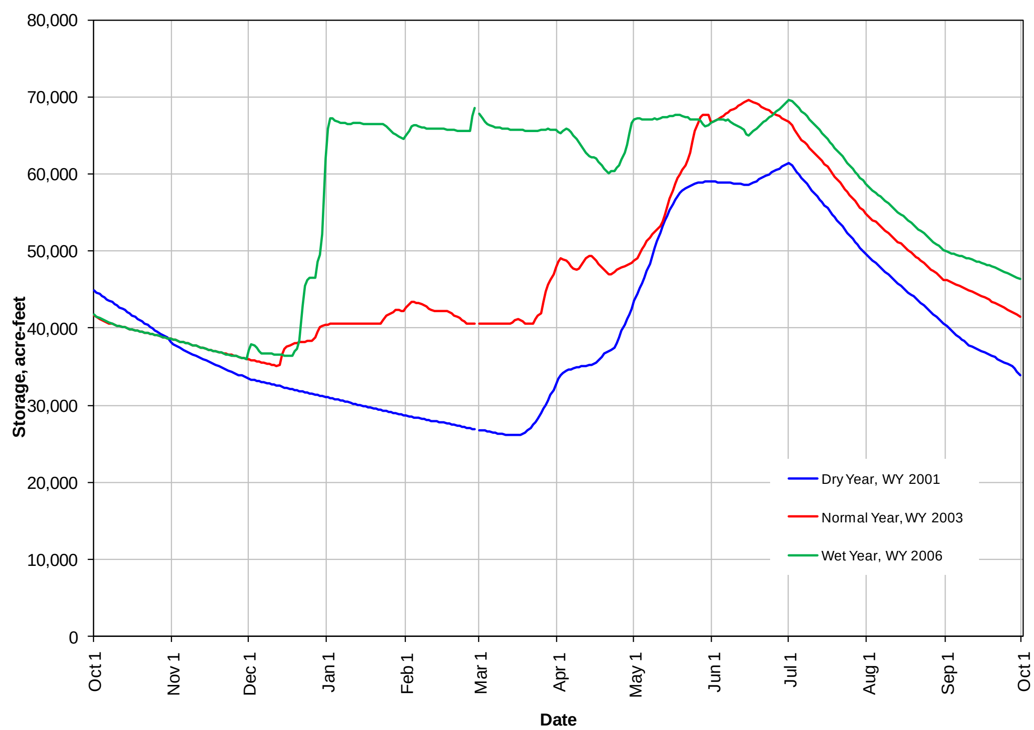


**Figure 6.1.1-44. Modeled daily storage in Bowman Lake in the representative dry (2001), normal (2003), and wet (2006) water years under Licensee's No-Action Alternative Operations Model run.**

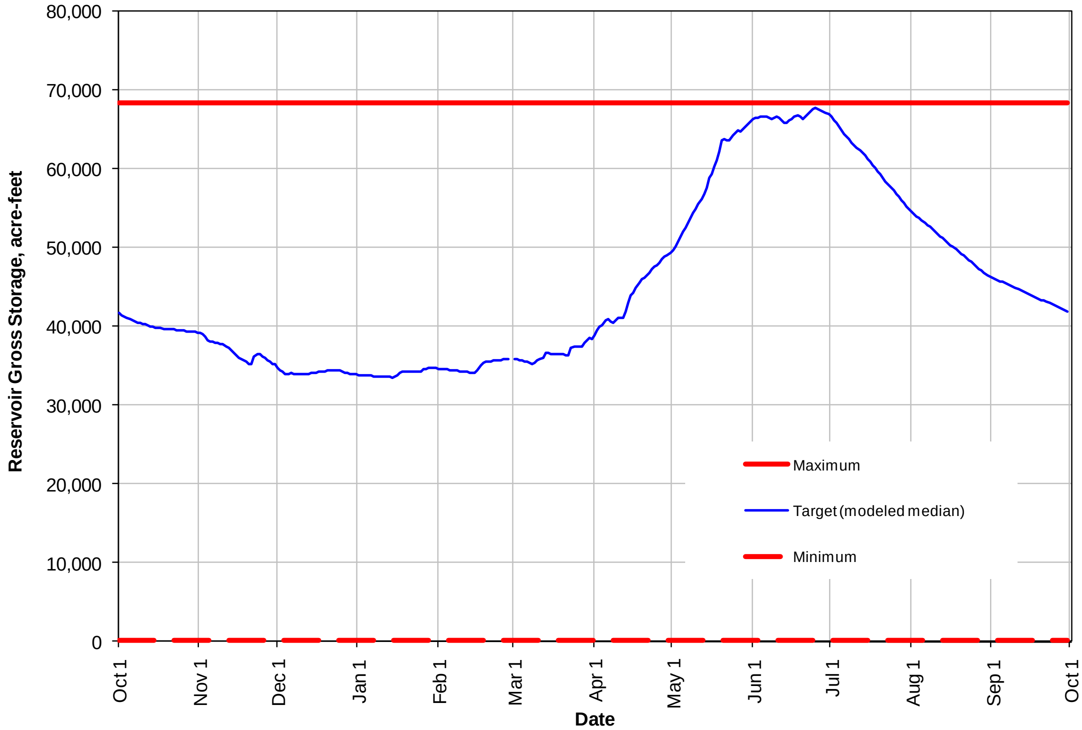


**Figure 6.1.1-45. Bowman Lake rule curve under Licensee's No-Action Alternative Operations Model run.**

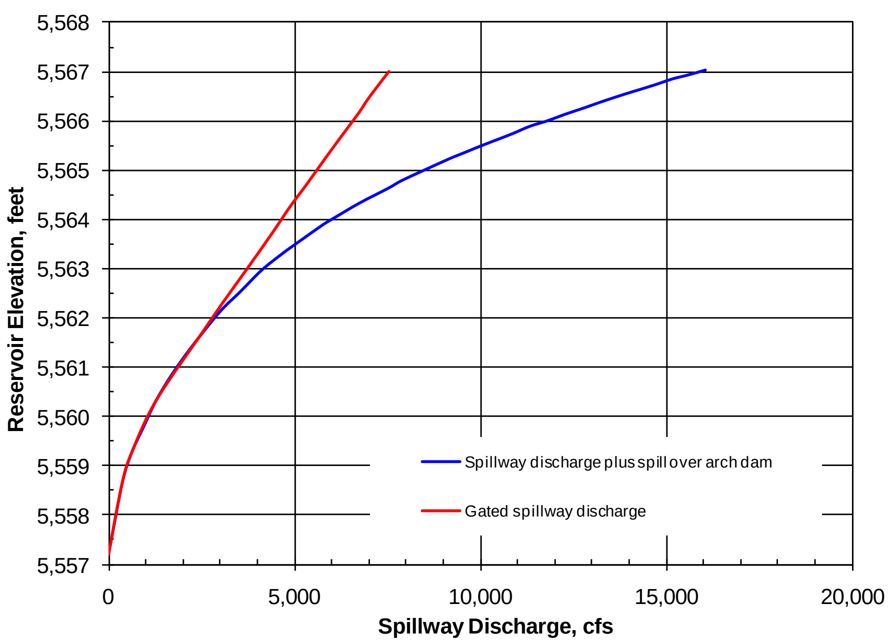


**Figure 6.1.1-46. Bowman Lake South Dam spillway rating curve.**

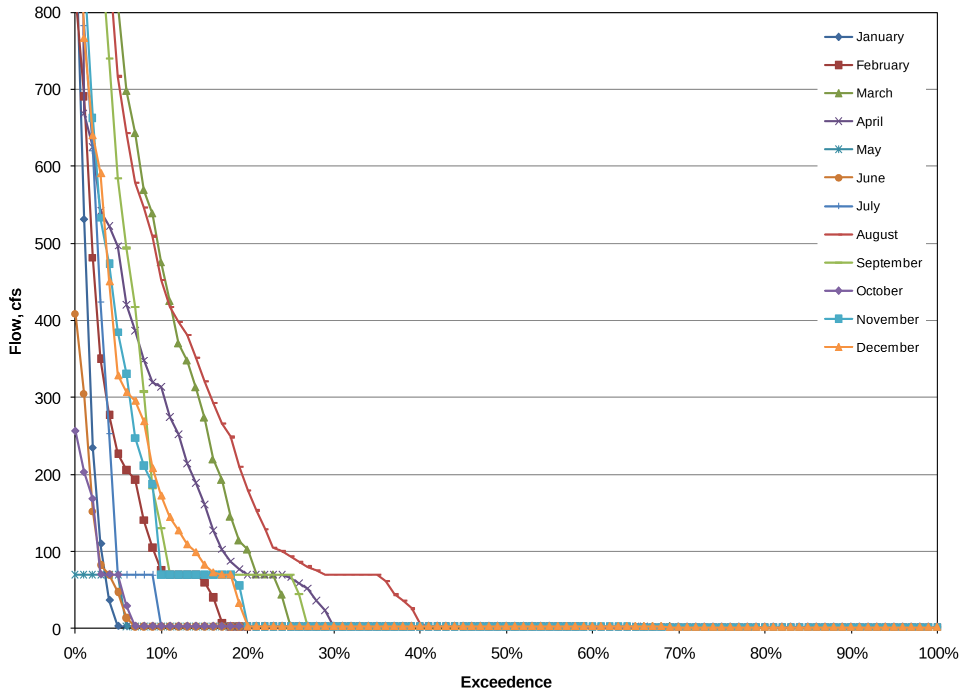


**Figure 6.1.1-47. Modeled monthly flow duration curves for Canyon Creek below Bowman Lake for the 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

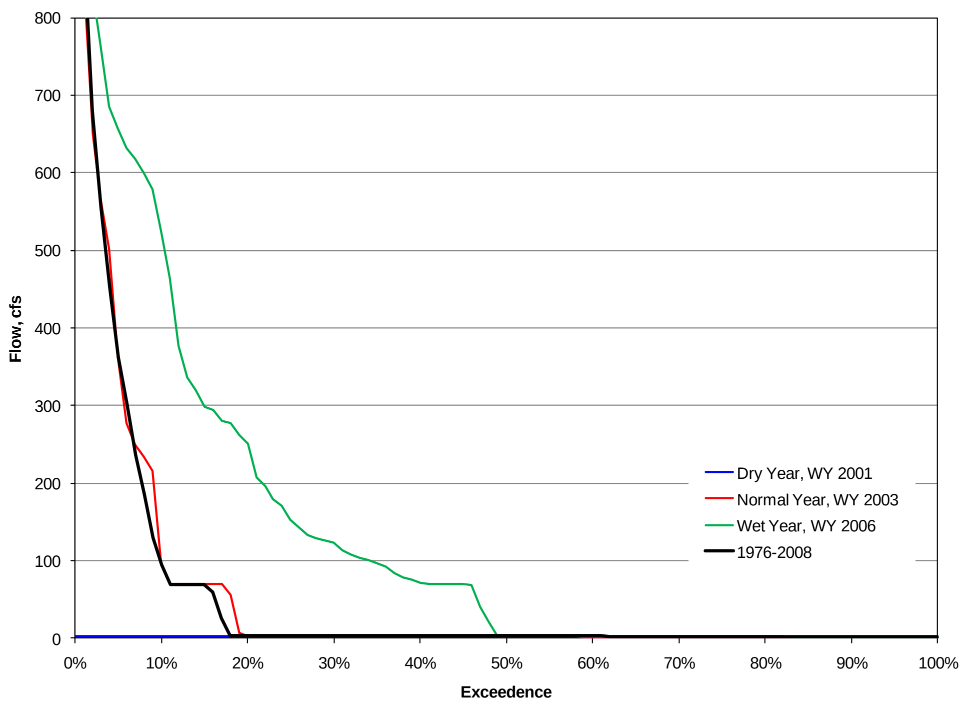


**Figure 6.1.1-48. Modeled flow duration curves for Canyon Creek below Bowman Lake Dam in the representative dry (2001), normal (2003), and wet (2006) water years and for the period of record under Licensee's No-Action Alternative Operations Model run.**

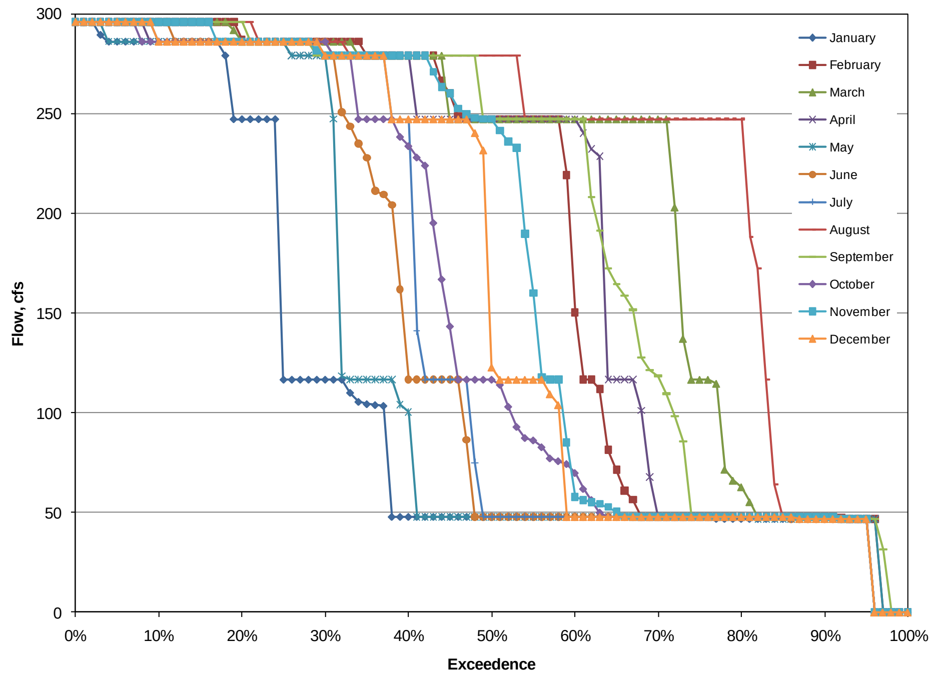


**Figure 6.1.1-49. Modeled monthly flow duration curves for Bowman-Spaulding Conduit below Bowman-Spaulding Conduit Diversion Dam for 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

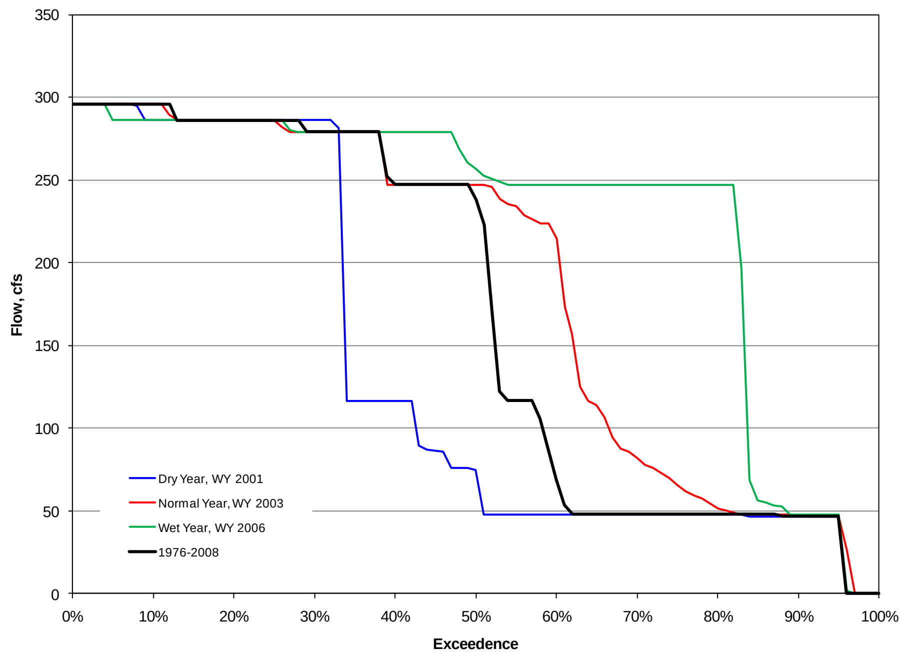


**Figure 6.1.1-50. Modeled flow duration curves for Bowman-Spaulding Conduit below Bowman-Spaulding Conduit Diversion Dam in the representative dry (2001), normal (2003), and wet (2006) water years and for the period of record under Licensee's No-Action Alternative Operations Model run.**

### 6.1.2 Bowman Powerhouse Operation

Bowman Powerhouse (installation completed in 1986) is a manual plant operated as a base-loaded facility supplying water to the Bowman-Spaulding Conduit. Operation during adverse, mean, and high water years for reservoirs supplying this powerhouse are provided above in Section 4.1.

#### 6.1.2.1 Modeled Minimum, Maximum, and Mean Flows at Powerhouse

The minimum, mean, and maximum modeled flows through the powerhouse are 0, 179.5, and 350 cfs, respectively. Powerhouse flows are diverted into the Bowman-Spaulding Conduit.

#### 6.1.2.2 Powerhouse Hydraulic Capacity

Bowman Powerhouse consists of one unit with a total nameplate hydraulic capacity of 313 cfs. The minimum hydraulic capacity of the powerhouse is estimated to be approximately 45 cfs.

#### 6.1.2.3 Powerhouse Flow Duration Curves

Annual and monthly flow duration curves for Bowman Powerhouse, based on Licensee's No-Action Alternative Operations Model run from 1976 to 2008 is provided in Figure 6.1.1-51.

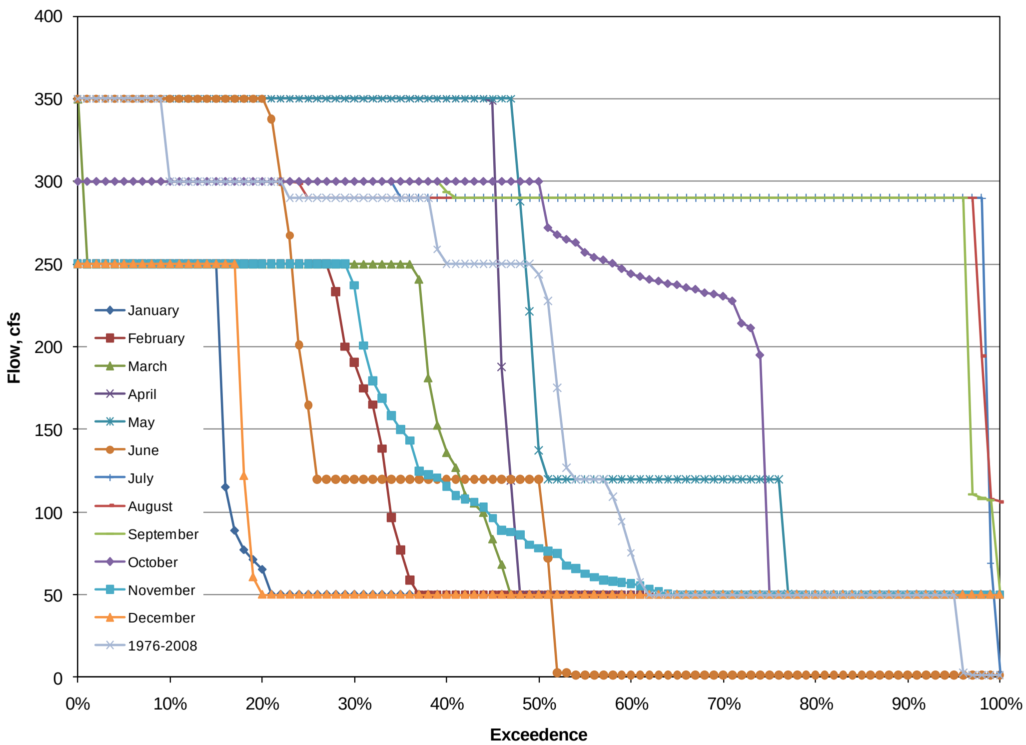


**Figure 6.1.1-51. Bowman Powerhouse modeled annual and monthly flow duration curves.**

### 6.1.2.4. Powerhouse Capability versus Head

Powerhouse capability versus net head is shown in Figure 6.1.1-52. Minimum, normal, and maximum heads for Bowman Powerhouse are 70 ft, 160 ft, and 170 ft, respectively.

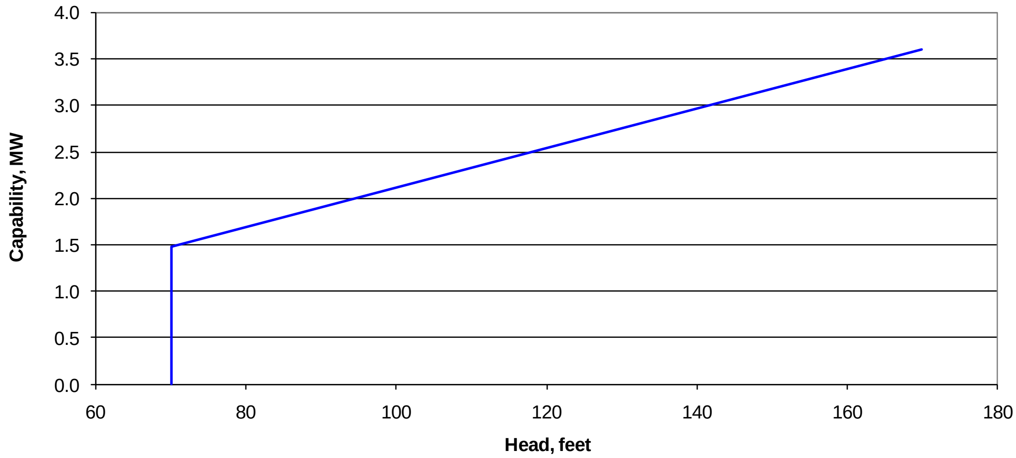


**Figure 6.1.1-52. Bowman Powerhouse capability curve.**

### 6.1.2.5 Tailwater Rating Curve

The normal tailwater elevation of Bowman Powerhouse is 5,400 feet. Bowman Powerhouse does not have a tailrace weir; therefore, the water discharges from the powerhouse at a constant elevation, as seen in Figure 6.1.1-53.

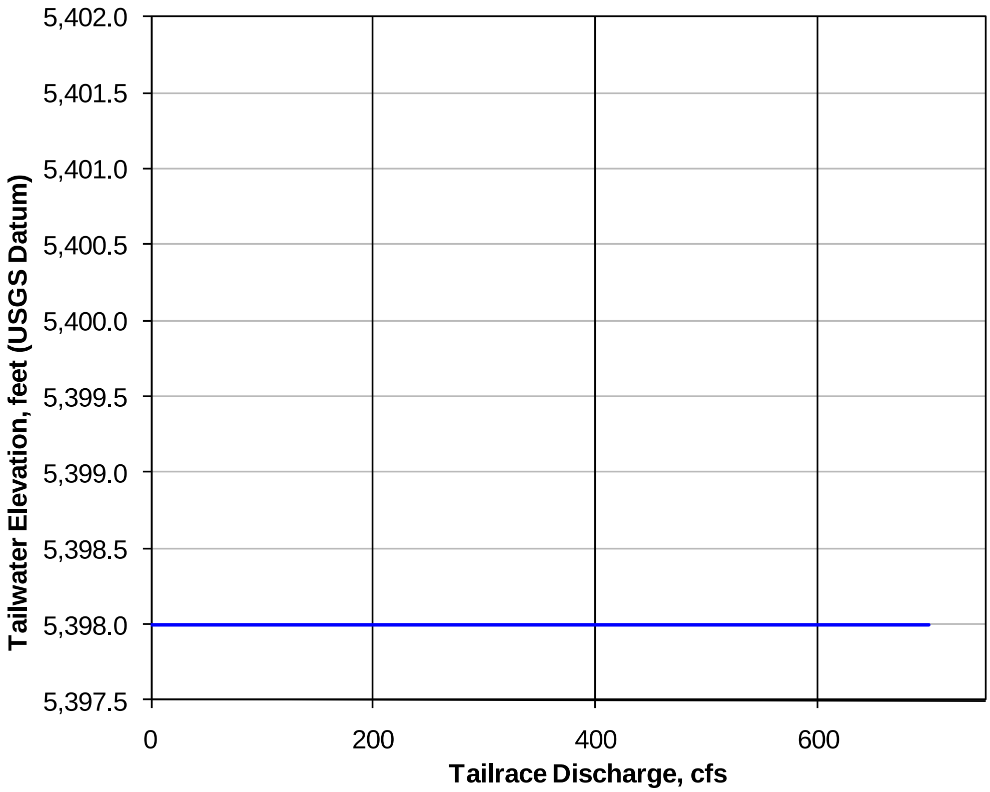


**Figure 6.1.1-53. Bowman Powerhouse tailwater rating curve.**

### 6.1.2.6 Load Curves

Because the Bowman Powerhouse is a base-loaded plant without peaking capability, there is no diurnal or weekly load curve. There is no appreciable station service power usage.

### 6.1.2.7 Average Annual Energy Production

Bowman Powerhouse would have generated an average of 12,405 MWh from 1976 to 2008 under Licensee's No-Action Alternative Operations Model run. The average annual plant factor for Bowman Powerhouse for this time period is 0.39 percent (1.4 average MW, or aMW) based on the annual generation divided by the plant generating capability (3.6 MW) times the number of hours per year. Annual gross generation and plant factors for the powerhouse are provided in Table 6.1.1-7.

**Table 6.1.1-7. Modeled generation and plant factors for Bowman Powerhouse.**

| Water Year | Annual Generation, MWh | Annual Generation, aMW | Plant Capacity, MW | Plant Factor |
|---|---|---|---|---|
| 1976 | 10,479 | 1.2 | 3.6 | 0.33 |
| 1977 | 1,539 | 0.2 | 3.6 | 0.05 |
| 1978 | 7,740 | 0.9 | 3.6 | 0.25 |
| 1979 | 9,756 | 1.1 | 3.6 | 0.31 |
| 1980 | 18,725 | 2.1 | 3.6 | 0.59 |

**Table 6.1.1-7. (continued)**

| Water Year | Annual Generation, MWh | Annual Generation, aMW | Plant Capacity, MW | Plant Factor |
|---|---|---|---|---|
| 1981 | 8,805 | 1.0 | 3.6 | 0.28 |
| 1982 | 21,103 | 2.4 | 3.6 | 0.67 |
| 1983 | 17,856 | 2.0 | 3.6 | 0.57 |
| 1984 | 23,176 | 2.6 | 3.6 | 0.73 |
| 1985 | 9,423 | 1.1 | 3.6 | 0.30 |
| 1986 | 16,329 | 1.9 | 3.6 | 0.52 |
| 1987 | 7,632 | 0.9 | 3.6 | 0.24 |
| 1988 | 4,612 | 0.5 | 3.6 | 0.15 |
| 1989 | 10,986 | 1.3 | 3.6 | 0.35 |
| 1990 | 9,090 | 1.0 | 3.6 | 0.29 |
| 1991 | 7,490 | 0.9 | 3.6 | 0.24 |
| 1992 | 7,078 | 0.8 | 3.6 | 0.22 |
| 1993 | 12,828 | 1.5 | 3.6 | 0.41 |
| 1994 | 8,214 | 0.9 | 3.6 | 0.26 |
| 1995 | 15,270 | 1.7 | 3.6 | 0.48 |
| 1996 | 19,605 | 2.2 | 3.6 | 0.62 |
| 1997 | 21,865 | 2.5 | 3.6 | 0.69 |
| 1998 | 15,433 | 1.8 | 3.6 | 0.49 |
| 1999 | 16,233 | 1.9 | 3.6 | 0.51 |
| 2000 | 15,923 | 1.8 | 3.6 | 0.50 |
| 2001 | 7,861 | 0.9 | 3.6 | 0.25 |
| 2002 | 10,064 | 1.1 | 3.6 | 0.32 |
| 2003 | 13,750 | 1.6 | 3.6 | 0.44 |
| 2004 | 12,887 | 1.5 | 3.6 | 0.41 |
| 2005 | 11,235 | 1.3 | 3.6 | 0.36 |
| 2006 | 20,233 | 2.3 | 3.6 | 0.64 |
| 2007 | 8,691 | 1.0 | 3.6 | 0.28 |
| 2008 | 7,448 | 0.8 | 3.6 | 0.24 |
| **Total** | **409,360** | ---- | ---- | ---- |
| **Minimum** | **1,539** | **0.2** | ---- | **0.05** |
| **Average** | **12,405** | **1.4** | ---- | **0.39** |
| **Median** | **10,986** | **1.3** | ---- | **0.35** |
| **Maximum** | **23,176** | **2.6** | ---- | **0.73** |

## 6.2 Dutch Flat Development

The Dutch Flat Development includes the Bowman-Spaulding Conduit, several diversion dams and flumes, Dutch Flat No. 2 Forebay, and Dutch Flat No. 2 Powerhouse. The diversion dams are operated as run-of-river reservoirs on the Bear River. Downstream of the Bowman-Spaulding Conduit, the water passes through several of PG&E’s Drum-Spaulding Project facilities including Spaulding No. 3 Powerhouse, Lake Spaulding, Spaulding No. 1 Powerhouse, Drum Canal, Drum No. 1 and No. 2 powerhouses, and Drum Afterbay. Licensee’s Dutch Flat No. 2 Flume, Forebay, and Powerhouse receive water diverted from PG&E’s Drum Afterbay. Dutch Flat No. 2 Forebay is operated as a run-of-river reservoir.

Dutch Flat No. 2 Powerhouse is an outdoor powerhouse with automatic SCADA controls, operated from PG&E’s Drum Switching Center located in Drum No. 1 Powerhouse. Dutch Flat No. 2 Powerhouse generates power in an intermediate peaking mode to meet daily water supply demands and discretionary hydropower generation. Dutch Flat No. 2 Powerhouse has a licensed installed capacity of 24.57 MW, a normal operating capacity of 26.0 MW, with one synchronous generator and one vertical Francis turbine with a rated nameplate hydraulic capacity of 600 cfs. Historically, Dutch Flat No. 2 Powerhouse generated an average of 108,740 MWh from 1972 to 2007 and has a dependable capacity of 7.9 MW based on daily power generation data as estimated in the Licensees' No-Action Alternative Operations Model run over the period of July-August 1977, which represents a period of adverse water conditions coupled with high demand for electricity.

### 6.2.1 Dutch Flat No. 2 Forebay

Dutch Flat No. 2 Forebay's normal-maximum and normal-minimum operating elevations are 3,330.0 feet and 3,323.0 feet, respectively. The reservoir's gross storage of 177.9 acre-feet is the volume of water between the normal maximum water surface elevation and the bottom of the reservoir, approximately equal to elevation 3,313.0 feet. The reservoir's usable storage is 159.8 acre-feet based on the volume of water between the normal-maximum operating elevation and the invert of the low-level outlet (operated by sluice gate toward the south end of the dam), at elevation 3,295 ft. The Dutch Flat No. 2 penstock intake is separate from the low-level outlet tunnel, and is situated toward the north end of the dam, with an invert elevation of 3,300.0 ft.

Dutch Flat No. 2 Forebay has a surface area at the normal-maximum water-surface elevation of 8 acres. A complete area rating curve is unavailable. Due to the small size of this forebay, area-capacity and spillway rating figures are not provided.

Inflows to Dutch Flat No.2 Forebay are highly regulated by the upstream dams and reservoirs. Drum Forebay is operated as a run-of-river reservoir, regulating flow into Dutch Flat No. 2 Powerhouse Penstock. There are no rule curve requirements for Dutch Flat No.2 Forebay or minimum streamflow requirements below Dutch Flat No. 2 Forebay Dam under the existing Project. Due to the operation scheme of Dutch Flat No.2 Forebay and the static nature of the forebay's reservoir elevation, storage graphs are not presented in this document.

### 6.2.2 Dutch Flat No. 2 Powerhouse Operation

Dutch Flat No. 2 Powerhouse is an automatic plant operated as a run-of-river facility. The plant is operated for intermediate demand and some daily peaking power demands. Operation during adverse, mean, and high water years for reservoirs supplying this powerhouse are provided above in Section 4.1.

#### 6.2.2.1 Historical Minimum, Maximum, and Mean Flows at Powerhouse

The minimum, mean, and maximum modeled flows through the powerhouse are 0, 197.5, and 610 cfs, respectively. Powerhouse flows are discharged into Dutch Flat Afterbay.

#### 6.2.2.2 Powerhouse Hydraulic Capacity

Dutch Flat No. 2 Powerhouse consists of one unit with a nameplate hydraulic capacity of 600 cfs. The minimum hydraulic capacity of the powerhouse is estimated to be 80 cfs.

### 6.2.2.3 Powerhouse Flow Duration Curves

Annual and monthly flow duration curves for Dutch Flat No. 2 Powerhouse, based on Licensee's No-Action Alternative Operations Model run from 1976 to 2008 is provided in Figure 6.2.2-1.

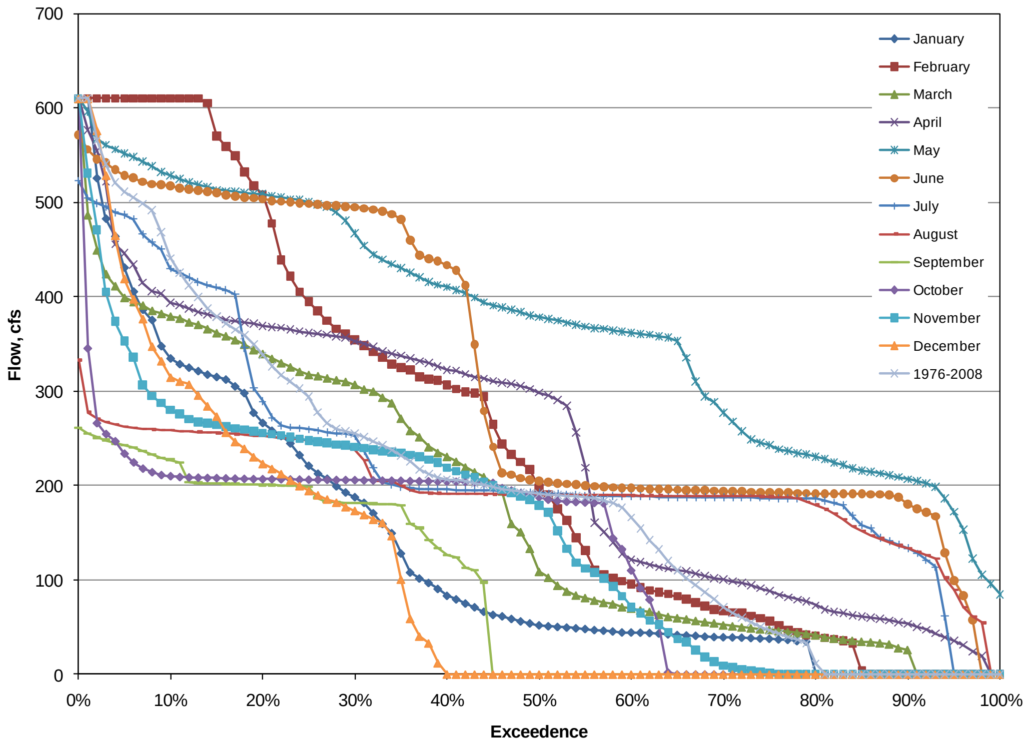


**Figure 6.2.2-1. Dutch Flat No. 2 Powerhouse modeled annual and monthly flow duration curves.**

### 6.2.2.4 Powerhouse Capability versus Head

Powerhouse capability versus net head is shown in Figure 6.2.2-2. Minimum, normal, and maximum heads for Dutch Flat No. 2 Powerhouse are 590 ft, 593 ft, and 596 ft, respectively.

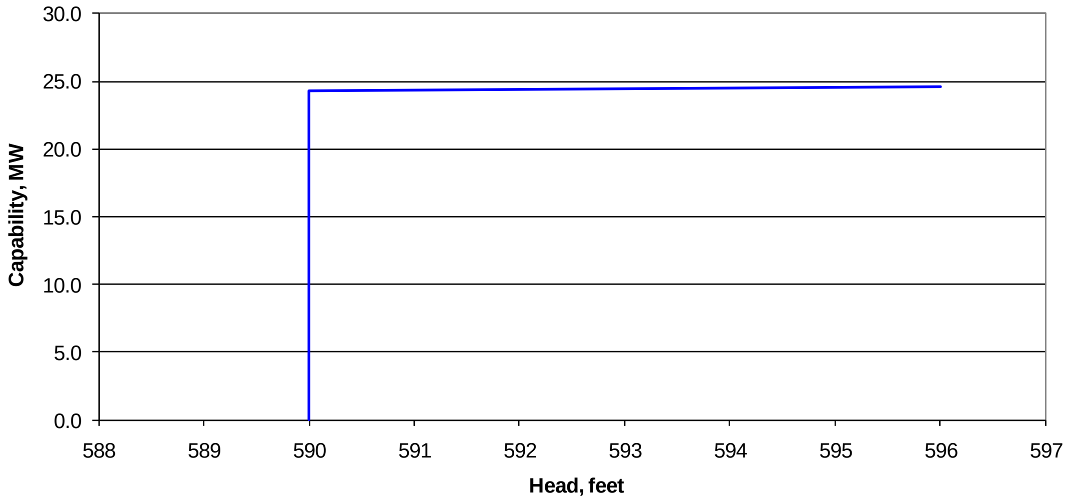


**Figure 6.2.2-2. Dutch Flat No. 2 Powerhouse capability curve.**

### 6.2.2.5 Tailwater Rating Curve

The normal tailwater elevation of Dutch Flat No. 2 Powerhouse is 2,740.0 feet. The tailwater rating curve for Dutch Flat No. 2 Powerhouse can be seen in Figure 6.2.2-3.

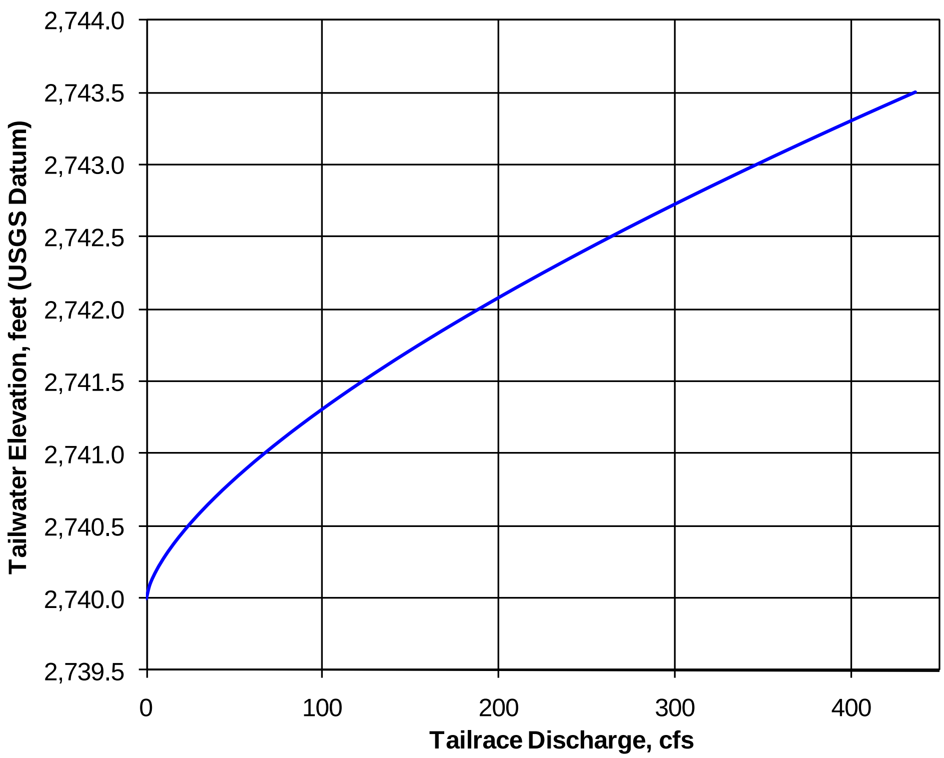


**Figure 6.2.2-3. Dutch Flat No. 2 Powerhouse tailwater rating curve.**

#### 6.2.2.6 Load Curves

Dutch Flat No. 2 Powerhouse is used as an intermediate peaking plant. There is no appreciable station service power usage.

#### 6.2.2.7 Average Annual Energy Production

Dutch Flat No. 2 Powerhouse would have generated an average of 63,765 MWh from 1976 to 2008 under Licensee's No-Action Alternative Operations Model run. The average annual plant factor for Dutch Flat No. 2 Powerhouse for this time period is 0.30 percent (7.3 aMW) based on the annual generation divided by the plant generating capability (24.6 MW) times the number of hours per year. Annual gross generation and plant factors for the powerhouse are provided in Table 6.2.2-1.

**Table 6.2.2-1. Modeled generation and plant factors for Dutch Flat No. 2 Powerhouse.**

| Water Year | Annual Generation, MWh | Annual Generation, aMW | Plant Capacity, MW | Plant Factor |
|---|---|---|---|---|
| 1976 | 21,477 | 2.4 | 24.6 | 0.10 |
| 1977 | 5,444 | 0.6 | 24.6 | 0.03 |
| 1978 | 66,668 | 7.6 | 24.6 | 0.31 |
| 1979 | 47,701 | 5.4 | 24.6 | 0.22 |
| 1980 | 90,516 | 10.3 | 24.6 | 0.42 |
| 1981 | 38,493 | 4.4 | 24.6 | 0.18 |
| 1982 | 108,758 | 12.4 | 24.6 | 0.50 |
| 1983 | 114,439 | 13.1 | 24.6 | 0.53 |
| 1984 | 107,376 | 12.2 | 24.6 | 0.50 |
| 1985 | 50,457 | 5.8 | 24.6 | 0.23 |
| 1986 | 75,509 | 8.6 | 24.6 | 0.35 |
| 1987 | 39,435 | 4.5 | 24.6 | 0.18 |
| 1988 | 22,055 | 2.5 | 24.6 | 0.10 |
| 1989 | 52,890 | 6.0 | 24.6 | 0.25 |
| 1990 | 46,296 | 5.3 | 24.6 | 0.21 |
| 1991 | 33,276 | 3.8 | 24.6 | 0.15 |
| 1992 | 30,492 | 3.5 | 24.6 | 0.14 |
| 1993 | 71,439 | 8.2 | 24.6 | 0.33 |
| 1994 | 34,301 | 3.9 | 24.6 | 0.16 |
| 1995 | 94,321 | 10.8 | 24.6 | 0.44 |
| 1996 | 101,864 | 11.6 | 24.6 | 0.47 |
| 1997 | 98,987 | 11.3 | 24.6 | 0.46 |
| 1998 | 93,641 | 10.7 | 24.6 | 0.43 |
| 1999 | 94,122 | 10.7 | 24.6 | 0.44 |
| 2000 | 76,002 | 8.7 | 24.6 | 0.35 |
| 2001 | 39,555 | 4.5 | 24.6 | 0.18 |
| 2002 | 54,508 | 6.2 | 24.6 | 0.25 |
| 2003 | 83,002 | 9.5 | 24.6 | 0.39 |
| 2004 | 60,893 | 6.9 | 24.6 | 0.28 |
| 2005 | 60,876 | 6.9 | 24.6 | 0.28 |
| 2006 | 104,281 | 11.9 | 24.6 | 0.48 |
| 2007 | 51,112 | 5.8 | 24.6 | 0.24 |
| 2008 | 34,052 | 3.9 | 24.6 | 0.16 |

**Table 6.2.2-1. (continued)**

| Water Year | Annual Generation, MWh | Annual Generation, aMW | Plant Capacity, MW | Plant Factor |
|---|---|---|---|---|
| **Total** | **2,104,249** | **----** | **----** | **----** |
| **Minimum** | **5,444** | **0.6** | **----** | **0.03** |
| **Average** | **63,765** | **7.3** | **----** | **0.30** |
| **Median** | **60,876** | **6.9** | **----** | **0.28** |
| **Maximum** | **114,439** | **13.1** | **----** | **0.53** |

## 6.3 Chicago Park Development

Chicago Park Development includes Dutch Flat Afterbay, the Chicago Park Flume/Conduit, Chicago Park Forebay, and Chicago Park Powerhouse located off-stream of the Bear River. Dutch Flat Afterbay is operated as a re-regulating reservoir discharging flows from PG&E's Dutch Flat No. 1 Powerhouse and NID's Dutch Flat No. 2 Powerhouse into the Bear River. The flume/conduit diverts water from Dutch Flat Afterbay to Chicago Park Forebay, which is operated as a run-of-river reservoir. Flows from the forebay are directed to the Chicago Park Powerhouse, which then discharges into the Bear River upstream of Rollins Reservoir.

Chicago Park Powerhouse is an indoor powerhouse with automatic SCADA control from PG&E's Drum Switching Center located in the Drum No. 1 Powerhouse. Chicago Park Powerhouse generates power for intermediate loads with some peaking loads. Chicago Park Powerhouse has a nameplate installed capacity of 39.0 MW, with a normal operating capacity of 41.5 MW. It operates one synchronous generator and one Francis turbine with a rated nameplate hydraulic capacity of 1,100 cfs. Historically, Chicago Park Powerhouse generated an annual average of 161,918 MWh from 1972 to 2007 and has a dependable capacity of 35.2 MW based on average daily power generation data as estimated in the Licensees' No-Action Alternative Operations Model run over the period of July-August 1977, which represents a period of adverse water conditions coupled with high demand for electricity.

### 6.3.1 Dutch Flat Afterbay

Dutch Flat Afterbay's normal-maximum and normal-minimum operating elevations are 2,741.0 feet and 2,729.0 feet, respectively. The reservoir's gross storage capacity of 1,359.2 acre-feet is the volume of water between the normal-maximum water surface elevation and the bottom of the reservoir and the invert of the low-level outlet, approximately equal to elevation 2,640.0 feet. The reservoir's usable storage capacity is the same as the gross storage capacity. The Chicago Park Conduit, to which water is diverted from Dutch Flat Afterbay, has an intake separate from the low-level outlet, with an invert elevation of 2,720 feet.

The area-capacity curve showing the gross and usable storage capacity of Dutch Flat Afterbay is provided in Figure 6.3.1-1. A bathymetric survey was performed in April 2007 to determine if sedimentation has significantly altered the area-capacity curve since the Project was constructed. Results of the survey indicate that the storage capacity has been reduced by 640 acre-feet, or 31.4 percent, from the as-built survey at the spillway crest elevation. The surface area at the spillway crest elevation of 2,741 ft is 38 acres.

 

Because the Operations Model operates on a daily timestep, the reservoir storage operations for Dutch Flat Afterbay within the model are simplified. Under actual operations, the afterbay would fluctuate from its normal minimum elevation to its normal maximum elevation (or higher during periods of uncontrolled spill) over the course of the year. Graphs of the annual mean and median storage values, typical storage values for the representative dry (2001), normal (2003), and wet (2006) water years, and rule curve are, therefore, not presented in this document.

The spillway rating curve for Dutch Flat Afterbay Dam is presented in Figure 6.3.1-2. The elevation of the spillway crest for the dam is 2,741.0 feet.

The drainage area into Dutch Flat Afterbay is about 21.2 sq mi. Dutch Flat Afterbay is operated as a re-regulating reservoir, regulating inflows from Bear River, Dutch Flat No. 1 Powerhouse, and Dutch Flat No. 2 Powerhouse into Chicago Park Flume. Discharge below Dutch Flat Afterbay Dam into the Bear River is regulated, as indicated in the flow duration curves shown in Figure 6.3.1-3, based on Licensee's No-Action Alternative Operations Model run for 1976 through 2008. Figure 6.3.1-4 shows flow duration curves during the representative dry (2001), normal (2003), and wet (2006) water years. Actual daily flow measurements will continue to be recorded at the compliance point flow USGS Gage 11421790 (Bear River below Dutch Flat Afterbay near Dutch Flat, CA) located at the mouth of the Dutch Flat Afterbay low level discharge tunnel.

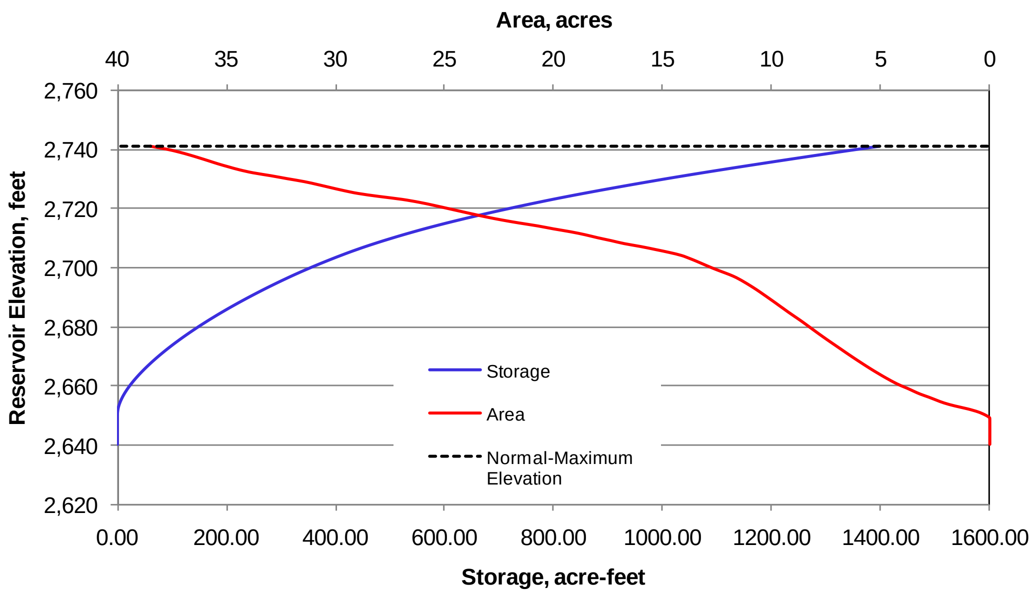


**Figure 6.3.1-1. Dutch Flat Afterbay area-capacity curve. Usable and gross storage capacities are equal.**

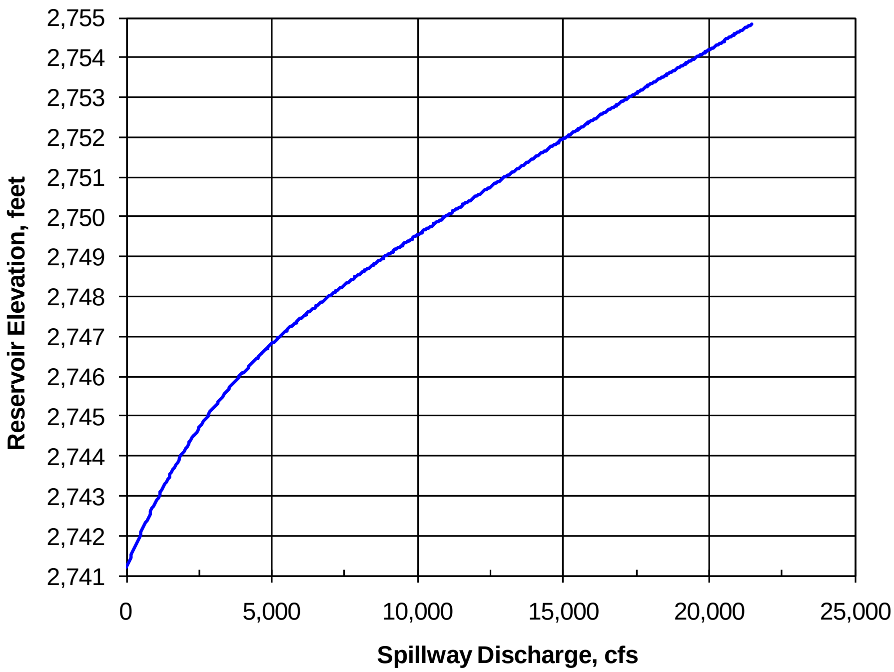


**Figure 6.3.1-2. Dutch Flat Afterbay spillway rating curve.**

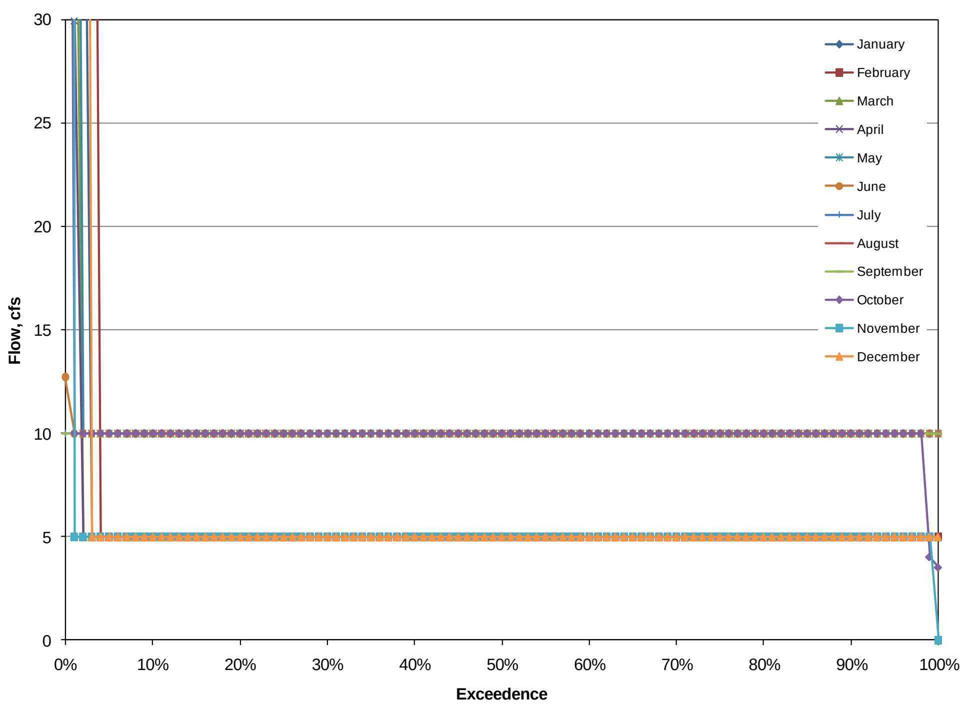


**Figure 6.3.1-3. Modeled monthly flow duration curves for Bear River below Dutch Flat Afterbay for 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**


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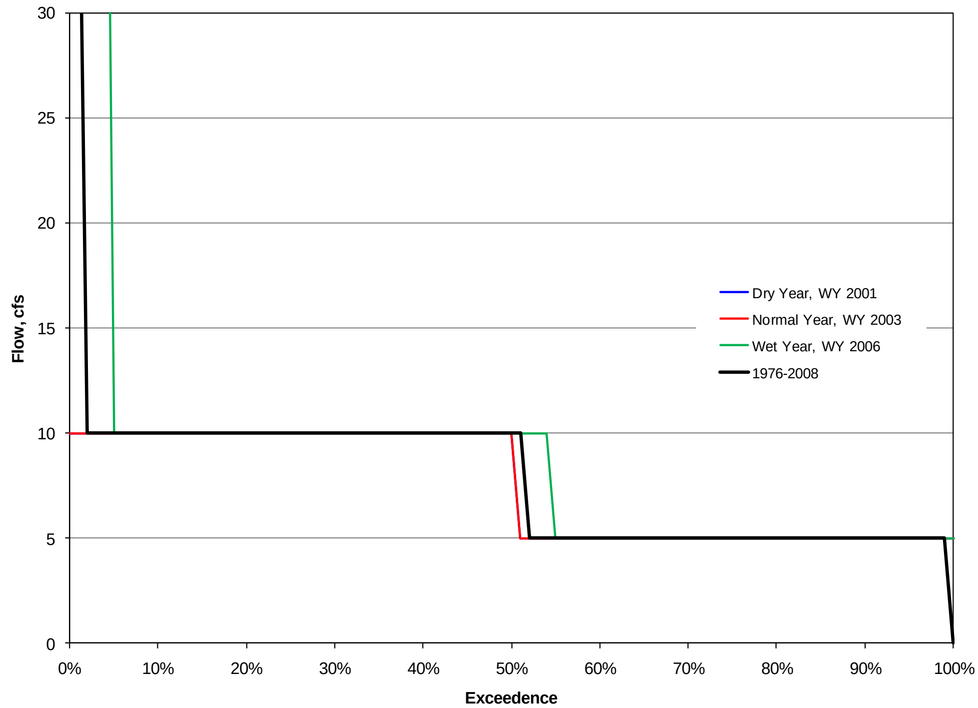


**Figure 6.3.1-4. Modeled flow duration curves for Bear River below Dutch Flat Afterbay in the representative dry (2001), normal (2003), and wet (2006) water years and for the period of record under Licensee's No-Action Alternative Operations Model run.**

### 6.3.2 Chicago Park Forebay

Chicago Park Forebay's normal-maximum and normal-minimum operating elevations are 2,716.0 feet and 2,710.0 feet, respectively. The reservoir's gross storage capacity of 103 acre-feet is the volume of water between the normal-maximum operating elevation and the bottom of the reservoir (and the invert elevation of the low-level outlet), approximately equal to elevation 2,689.0 feet. The reservoir's usable storage capacity is the same as the gross storage capacity and is based on the volume of water between the normal-maximum operating elevation and the penstock intake invert elevation, 2,690.0 feet. There is negligible storage between the penstock intake invert elevation and the bottom of the reservoir.

The surface area at the normal-maximum water-surface elevation is 7 acres. A complete area rating curve is unavailable. Due to the small size of this forebay, storage-capacity and spillway rating figures are not provided.

Inflows to Chicago Park Forebay are highly regulated by the upstream dams and reservoirs. Chicago Park Forebay is operated as a run-of-river reservoir, regulating flow into Chicago Park Powerhouse Penstock. There are no rule curve requirements for Chicago Park Forebay or minimum streamflow requirements below Chicago Park Forebay Dam under the existing Project. Due to the operation scheme of Chicago Park Forebay and the static nature of the forebay's reservoir elevation, storage graphs are not presented in this document.

### 6.3.3 Chicago Park Powerhouse Operation

Chicago Park Powerhouse is operated as a run-of-river plant, generating power for intermediate demand with some peaking power demands. Operation during adverse, mean, and high water years for reservoirs supplying this powerhouse are provided above in Section 4.1.

#### 6.3.3.1 Modeled Minimum, Maximum, and Mean Flows at Powerhouse

Daily minimum, mean, and maximum modeled flows through Chicago Park Powerhouse are 0, 498.7, and 1,100 cfs, respectively. There are no minimum instream flow requirements under the existing license.

#### 6.3.3.2 Powerhouse Hydraulic Capacity

Chicago Park Powerhouse consists of one unit with a rated hydraulic capacity of 1,100 cfs. The minimum hydraulic capacity of the powerhouse is estimated to be 125 cfs.

#### 6.3.3.3 Powerhouse Flow Duration Curves

Annual and monthly flow duration curves for Chicago Park Powerhouse, based on Licensee's No-Action Alternative Operations Model run from 1976 to 2008, is provided in Figure 6.3.3-1.

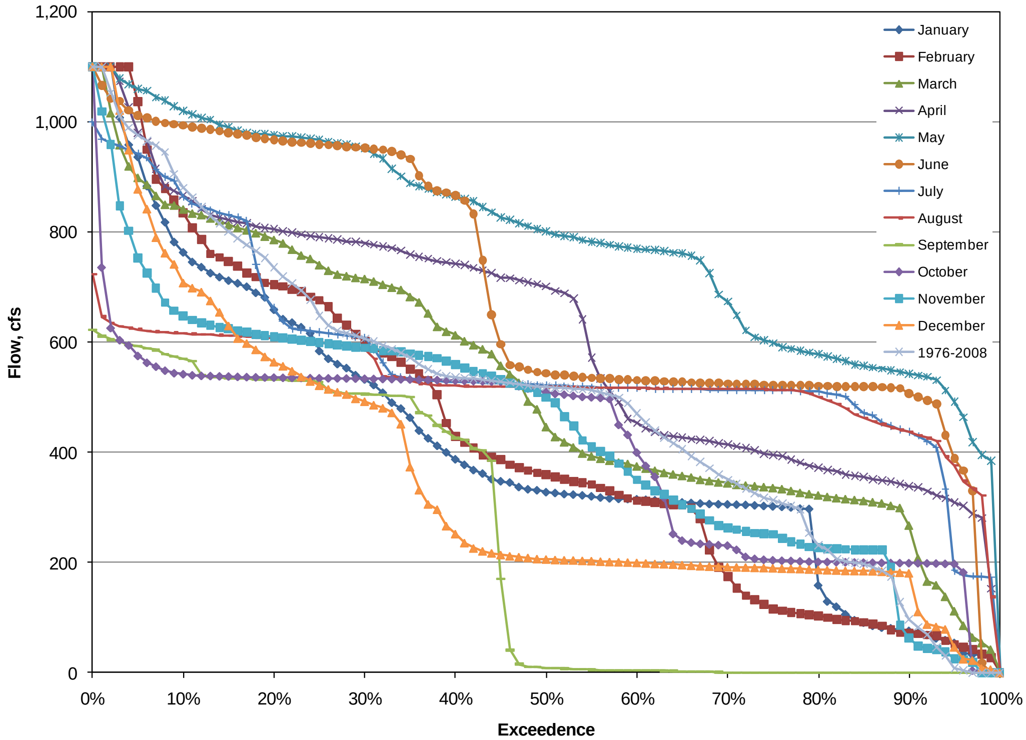


**Figure 6.3.3-1. Chicago Park Powerhouse modeled annual and monthly flow duration curves.**

### 6.3.3.4 Powerhouse Capability versus Head

Powerhouse capability versus net head is shown in Figure 6.3.3-2. Minimum, normal, and maximum heads for Chicago Park Powerhouse are 471 ft, 474 ft, and 477 ft, respectively.

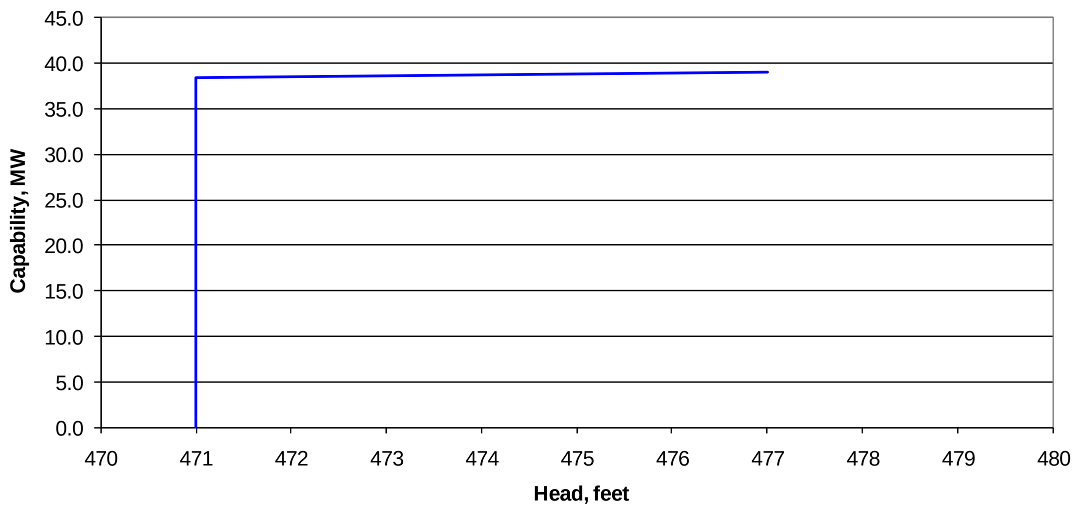


**Figure 6.3.3-2. Chicago Park Powerhouse capability curve.**

### 6.3.3.5 Tailwater Rating Curve

The normal tailwater elevation of Chicago Park Powerhouse is 2,235.0 feet. The tailwater rating curve for Chicago Park Powerhouse can be seen in Figure 6.3.3-3.

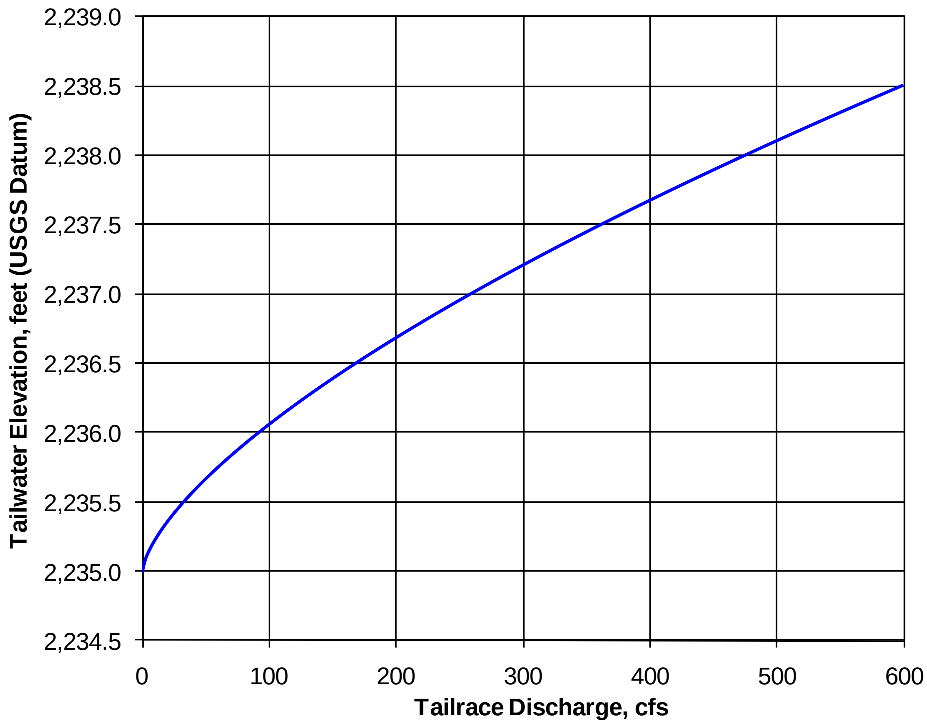


**Figure 6.3.3-3. Chicago Park Powerhouse tailwater rating curve.**

### 6.3.3.6 Load Curves

Chicago Park Powerhouse is used as an intermediate peaking plant. There is no appreciable station service power usage.

### 6.3.3.7 Average Annual Energy Production

Chicago Park Powerhouse would have generated an average of 132,493 MWh from 1976 to 2008 under Licensee's No-Action Alternative Operations Model run. The average annual plant factor for Chicago Park Powerhouse for this time period is 0.39 percent (15.1 aMW) based on the annual generation divided by the plant generating capability (39 MW) times the number of hours per year. Annual gross generation and plant factors for the powerhouse are provided in Table 6.3.3-1.

**Table 6.3.3-1. Modeled generation and plant factors for Chicago Park Powerhouse.**

| Water Year | Annual Generation, MWh | Annual Generation, aMW | Plant Capacity, MW | Plant Factor |
|---|---|---|---|---|
| 1976 | 74,780 | 8.5 | 39 | 0.22 |
| 1977 | 32,011 | 3.7 | 39 | 0.09 |
| 1978 | 127,969 | 14.6 | 39 | 0.37 |
| 1979 | 112,781 | 12.9 | 39 | 0.33 |
| 1980 | 168,654 | 19.2 | 39 | 0.49 |
| 1981 | 100,168 | 11.4 | 39 | 0.29 |
| 1982 | 195,679 | 22.3 | 39 | 0.57 |

**Table 6.3.3-1. (continued)**

| Water Year | Annual Generation, MWh | Annual Generation, aMW | Plant Capacity, MW | Plant Factor |
|---|---|---|---|---|
| 1983 | 204,541 | 23.3 | 39 | 0.60 |
| 1984 | 192,541 | 21.9 | 39 | 0.56 |
| 1985 | 118,736 | 13.6 | 39 | 0.35 |
| 1986 | 151,325 | 17.3 | 39 | 0.44 |
| 1987 | 100,405 | 11.5 | 39 | 0.29 |
| 1988 | 75,624 | 8.6 | 39 | 0.22 |
| 1989 | 115,004 | 13.1 | 39 | 0.34 |
| 1990 | 112,491 | 12.8 | 39 | 0.33 |
| 1991 | 90,594 | 10.3 | 39 | 0.27 |
| 1992 | 88,806 | 10.1 | 39 | 0.26 |
| 1993 | 140,461 | 16.0 | 39 | 0.41 |
| 1994 | 94,690 | 10.8 | 39 | 0.28 |
| 1995 | 167,506 | 19.1 | 39 | 0.49 |
| 1996 | 189,215 | 21.5 | 39 | 0.55 |
| 1997 | 179,364 | 20.5 | 39 | 0.53 |
| 1998 | 171,243 | 19.5 | 39 | 0.50 |
| 1999 | 174,622 | 19.9 | 39 | 0.51 |
| 2000 | 153,191 | 17.4 | 39 | 0.45 |
| 2001 | 101,330 | 11.6 | 39 | 0.30 |
| 2002 | 120,162 | 13.7 | 39 | 0.35 |
| 2003 | 159,438 | 18.2 | 39 | 0.47 |
| 2004 | 130,835 | 14.9 | 39 | 0.38 |
| 2005 | 130,106 | 14.9 | 39 | 0.38 |
| 2006 | 188,782 | 21.6 | 39 | 0.55 |
| 2007 | 117,669 | 13.4 | 39 | 0.34 |
| 2008 | 91,543 | 10.4 | 39 | 0.27 |
| **Total** | **4,372,264** | ---- | ---- | ---- |
| **Minimum** | **32,011** | **3.7** | ---- | **0.09** |
| **Average** | **132,493** | **15.1** | ---- | **0.39** |
| **Median** | **127,969** | **14.6** | ---- | **0.37** |
| **Maximum** | **204,541** | **23.3** | ---- | **0.60** |

## 6.4 Rollins Development

Rollins Development includes Rollins Reservoir and Rollins Powerhouse located on the Bear River. Rollins Reservoir is generally operated as a storage reservoir for irrigation, recreation, and power demands. Rollins Powerhouse is located directly below Rollins Dam and discharges flow into the Bear River upstream of the Bear River Canal and above Lake Combie, a non-project reservoir owned and operated by NID.

Rollins Powerhouse is an outdoor powerhouse with semi-automatic SCADA controls (manual start-up and automatic shut down), operated from PG&E's Drum Switching Center located in the Drum No. 1 Powerhouse. Rollins Powerhouse is operated as a base-loaded plant, generating power according to irrigation water demand and water conditions. Rollins Powerhouse has a licensed installed capacity of 12.15 MW, with a normal operating capacity of 12.8 MW, with one synchronous generator and one Francis turbine with a rated nameplate hydraulic capacity of 840 cfs. Historically, Rollins Powerhouse generated an annual average of 70,563 MWh from 1981 to 2007 and has a dependable capacity of 2 MW based on average daily power generation data as estimated in the Licensees' No-Action Alternative Operations Model run over the period of July-

August 1977, which represents a period of adverse water conditions coupled with high demand for electricity.

### 6.4.1 Rollins Reservoir

Rollins Reservoir's normal-maximum and normal-minimum operating elevations are 2,171.0 feet and 2,030.0 feet, respectively. (An additional restriction on the operating pool of Rollins Reservoir is included in the Davis-Grunsky requirements from the SWRCB, which require a minimum water surface elevation of 2,150 feet.) The reservoir's gross storage capacity of 58,682 acre-feet is the volume of water between the spillway crest, at elevation 2,171.0 feet, and the bottom of the reservoir, approximately equal to elevation 1,962.0 feet. The reservoir's usable storage capacity for power generation is 54,453 acre-feet based on the volume of water between the normal-maximum operating elevation and the top of the intake tower, 2,030.0 feet. The invert of the intake tower is at elevation 2,022 feet; the single intake tower supplies water to a common intake tunnel, which then bifurcates into the Rollins Powerhouse penstock and the low-level outlet tunnel, operated with a Howell-Bunger valve.

The area-capacity curve showing the gross and usable storage capacities of Rollins Reservoir is provided in Figure 6.4.1-1. A bathymetric survey was performed in April 2007 to determine if sedimentation has significantly altered the area-capacity curve since the Project was constructed. Results of the survey indicate that the storage capacity has been reduced by 7,306 acre-feet, or 11.1 percent, from the as-built survey at the spillway crest elevation. The surface area at the spillway crest elevation is 788 acres.

Modeled daily storage for Rollins Reservoir for each water year is graphically presented in Figure 6.4.1-2. As indicated on the figure, the reservoir storage and elevation can fluctuate significantly from year to year, although the modeled median and mean curves represent the general reservoir operation.

Operation of Rollins Reservoir in terms of storage for the representative dry (2001), normal (2003), and wet (2006) water years is shown in Figure 6.4.1-3. The range of reservoir elevations in the representative dry (2001), normal (2003), and wet (2006) water years and annual elevation fluctuation in Rollins Reservoir are summarized in Table 6.4.1-1.

**Table 6.4.1-1. Modeled minimum and maximum elevations in Rollins Reservoir in the representative dry (2001), normal (2003), and wet (2006) water years.**

| Water Year | Minimum Daily Elevation (feet) | Average Daily Elevation (feet) | Maximum Daily Elevation (feet) | Annual Elevation Fluctuation (feet) |
|---|---|---|---|---|
| 2001 (Dry Year) | 2,131 | 2,163 | 2,171 | 40 |
| 2003 (Normal Year) | 2,130 | 2,165 | 2,172 | 42 |
| 2006 (Wet Year) | 2,131 | 2,166 | 2,177 | 46 |

Rule curve elevations for Licensee's No-Action Alternative Operations Model run are shown in Figure 6.4.1-4 to demonstrate how the reservoir was operated. Normal-maximum and normal-minimum operating elevations are also shown on Figure 6.4.1-4. Rule curve elevations were developed to contain proposed license reservoir operation requirements, available storage, and contracts or agreements with other parties regarding reservoir storage or elevation. Additionally, median daily modeled reservoir operation was used for establishing rule curve elevations if no operational requirements are specified or for periods where no requirements are in effect. Details regarding the regulatory and contractual operating constraints are discussed in Section 5.

The spillway rating curve for Rollins Dam is presented in Figure 6.4.1-5. The elevation of the spillway crest for the dam is 2,171.0 feet.

The drainage area into Rollins Reservoir is about 104 sq mi. Rollins Reservoir is operated as a storage reservoir for irrigation, recreation, and power demands. Discharge below Rollins Reservoir Dam into the Bear River is regulated, as indicated in the flow duration curves shown in Figure 6.4.1-6, based on Licensee's No-Action Alternative Operations Model run for 1976 through 2008. Figure 6.4.1-7 shows flow duration curves during the representative dry (2001), normal (2003), and wet (2006) water years. Actual daily flow measurements will continue to be recorded at the compliance point flow USGS Gage 11422500 (Bear River below Rollins Dam near Colfax, CA) located approximately 0.5 miles downstream of Rollins Reservoir.

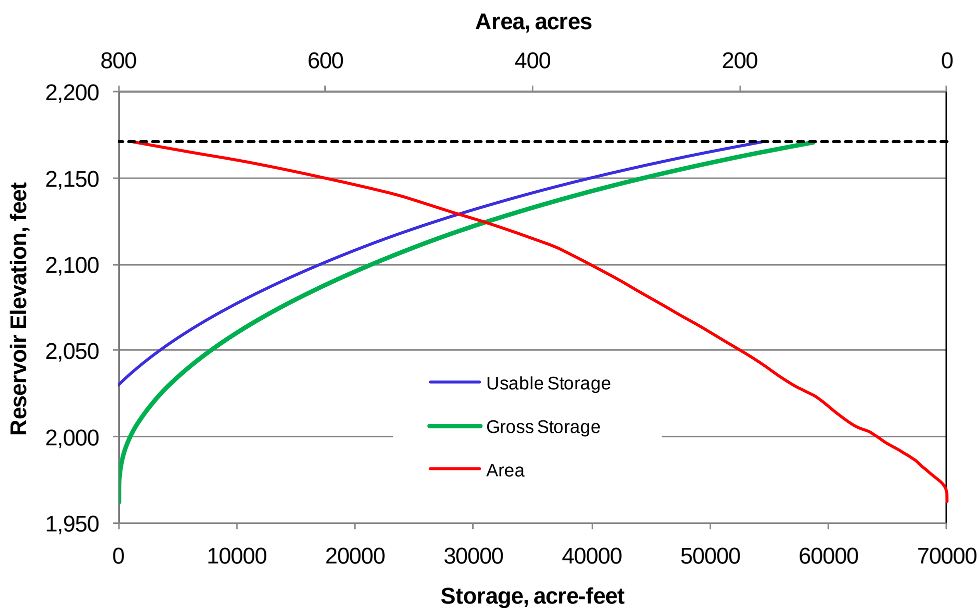


**Figure 6.4.1-1. Rollins Reservoir area-capacity curve.**

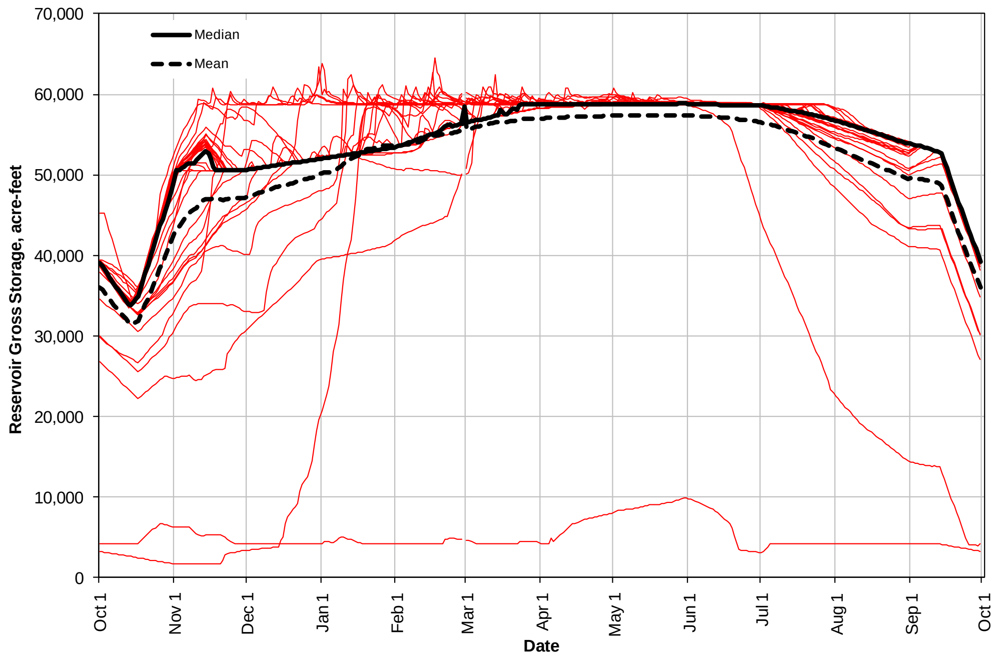


**Figure 6.4.1-2. Rollins Reservoir daily modeled median and mean storage for water years 1976 through 2008 under Licensee's No-Action Alternative Operations Model run. Values greater than normal maximum storage are modeling artifacts and should generally not be considered as accurate.**

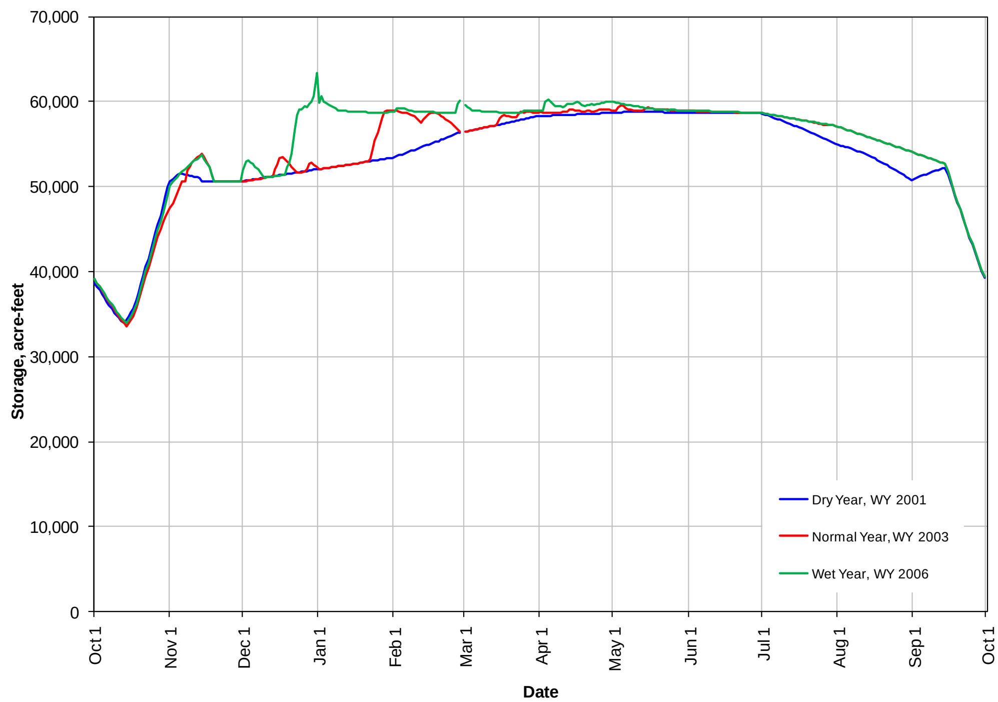


**Figure 6.4.1-3. Modeled daily storage in Rollins Reservoir in the representative dry (2001), normal (2003), and wet (2006) water years under Licensee's No-Action Alternative Operations Model run. Values greater than normal maximum storage are modeling artifacts and should generally not be considered as accurate.**

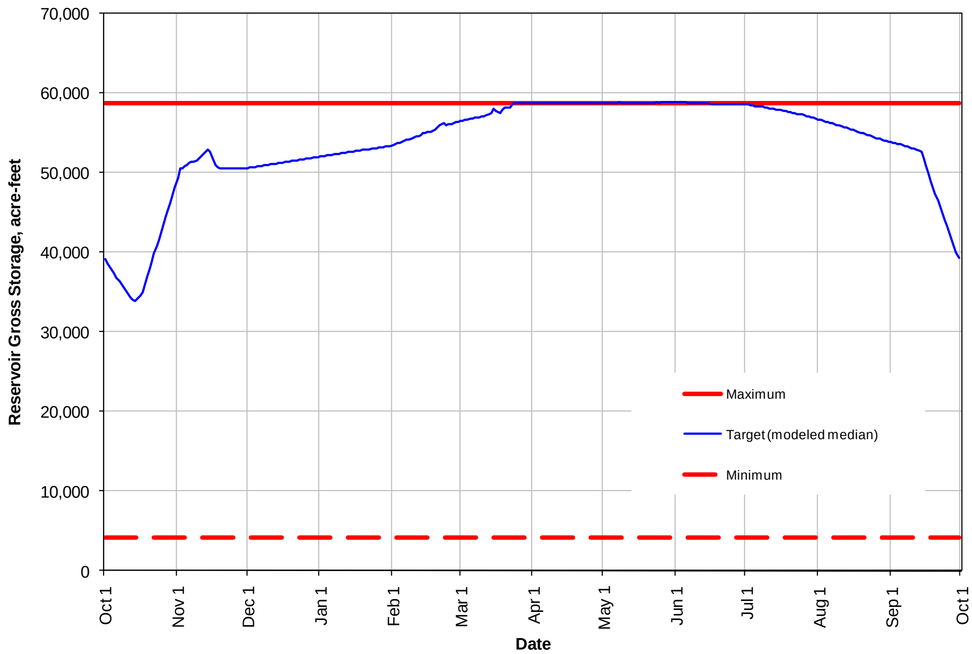


**Figure 6.4.1-4. Rollins Reservoir rule curve under Licensee's No-Action Alternative Operations Model run.**

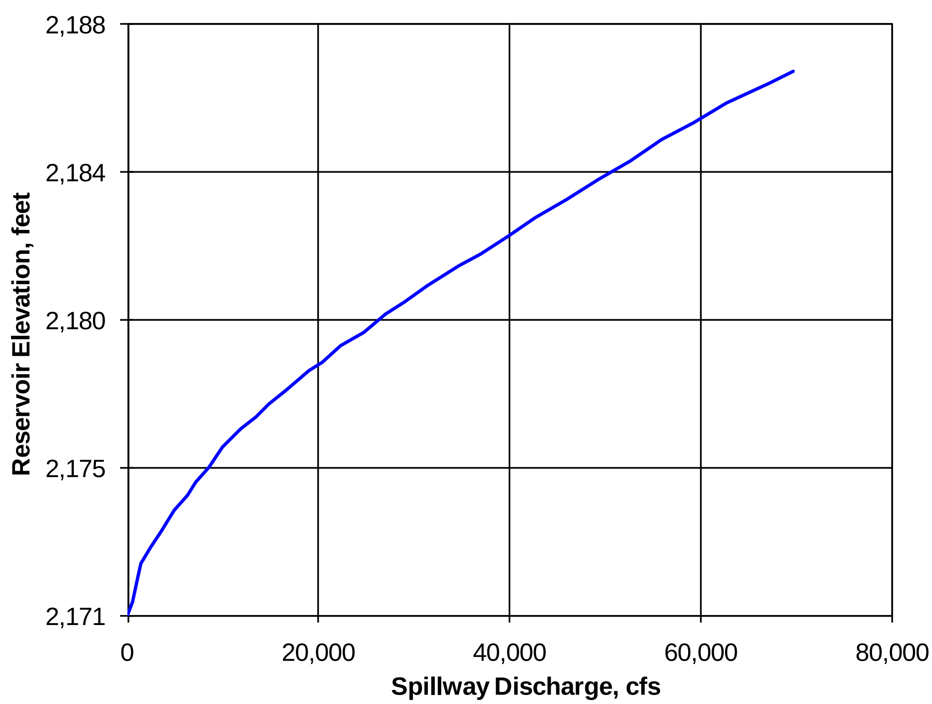


**Figure 6.4.1-5. Rollins Dam spillway rating curve.**

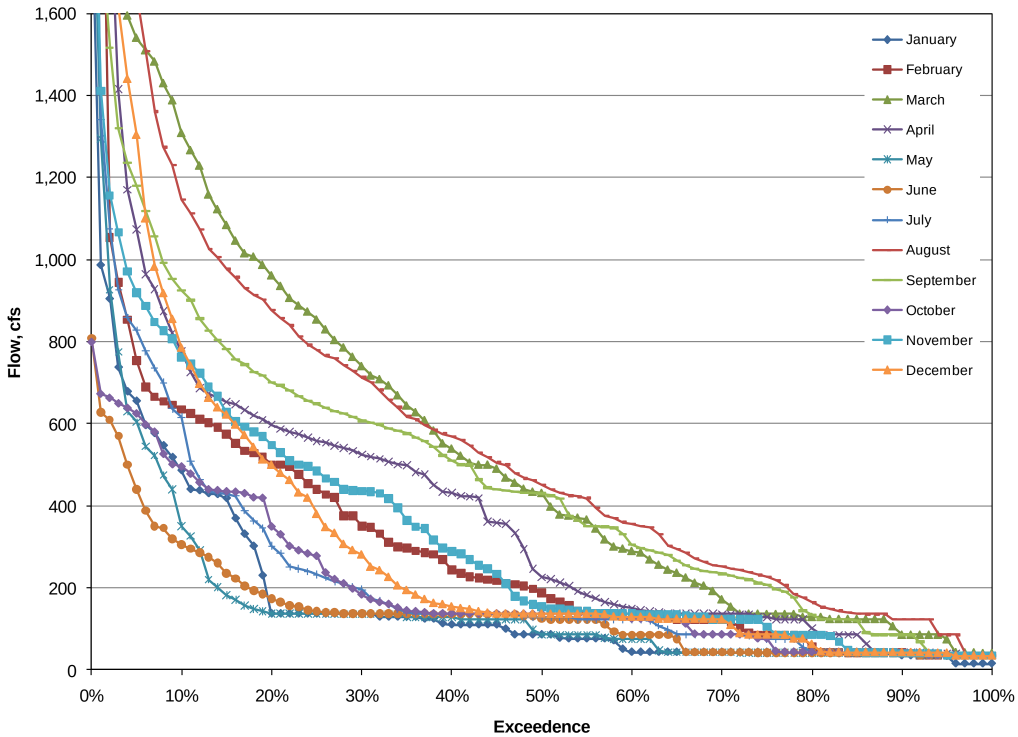


**Figure 6.4.1-6. Modeled monthly flow duration curves for Bear River below Rollins Reservoir for 1976 through 2008 under Licensee's No-Action Alternative Operations Model run.**

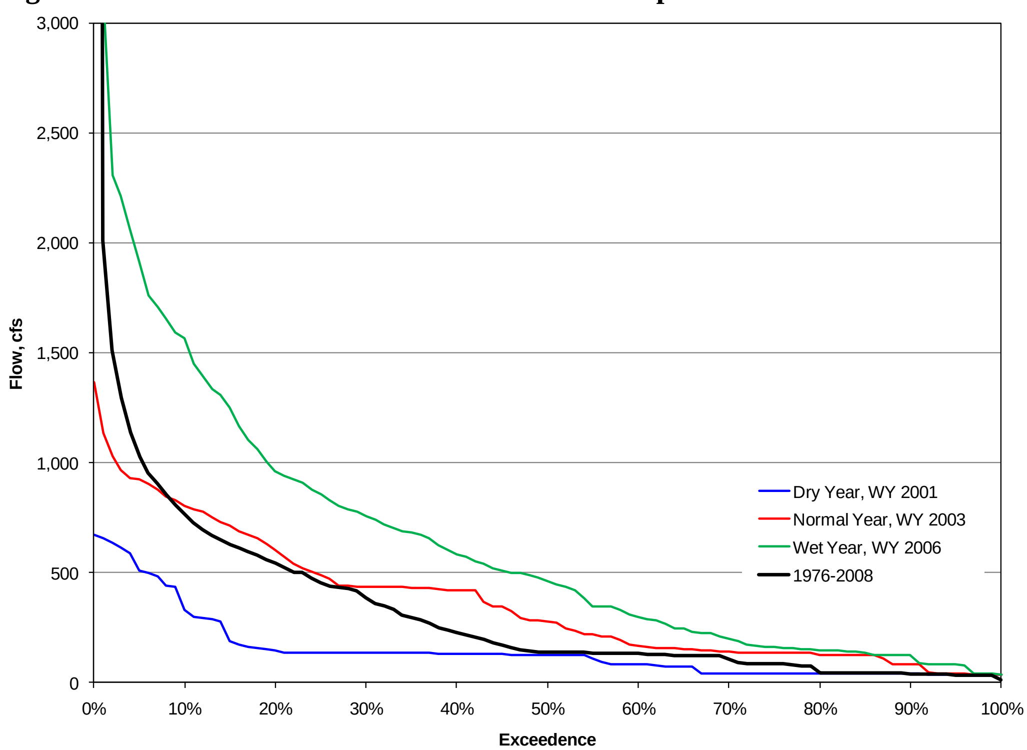


**Figure 6.4.1-7. Modeled flow duration curves for Bear River below Rollins Reservoir in the representative dry (2001), normal (2003), and wet (2006) water years and for the period of record under Licensee's No-Action Alternative Operations Model run.**

## 6.4.2 Rollins Powerhouse Operation

Rollins Powerhouse is operated as a base-loaded plant, generating power according to irrigation water demand and water conditions. Operation during adverse, mean, and high water years for reservoirs supplying this powerhouse are provided above in Section 4.1.

### 6.4.2.1 Modeled Minimum, Maximum, and Mean Flows at Powerhouse

Daily minimum, mean, and maximum modeled flows through Rollins Powerhouse are 0, 545, and 837.9 cfs, respectively. The minimum flow release requirement under the existing License is 75 cfs from May 1 through October 31 and 20 cfs from November 1 through April 30, under normal water conditions.

### 6.4.2.2 Powerhouse Hydraulic Capacity

Rollins Powerhouse consists of one unit with a rated nameplate hydraulic capacity of 840 cfs. The minimum hydraulic capacity of the powerhouse is estimated to be 142 cfs.

### 6.4.2.3 Powerhouse Flow Duration Curves

Annual and monthly flow duration curves for Rollins Powerhouse, based on Licensee's No-Action Alternative Operations Model run from 1976 to 2008 is provided in Figure 6.4.2-1.

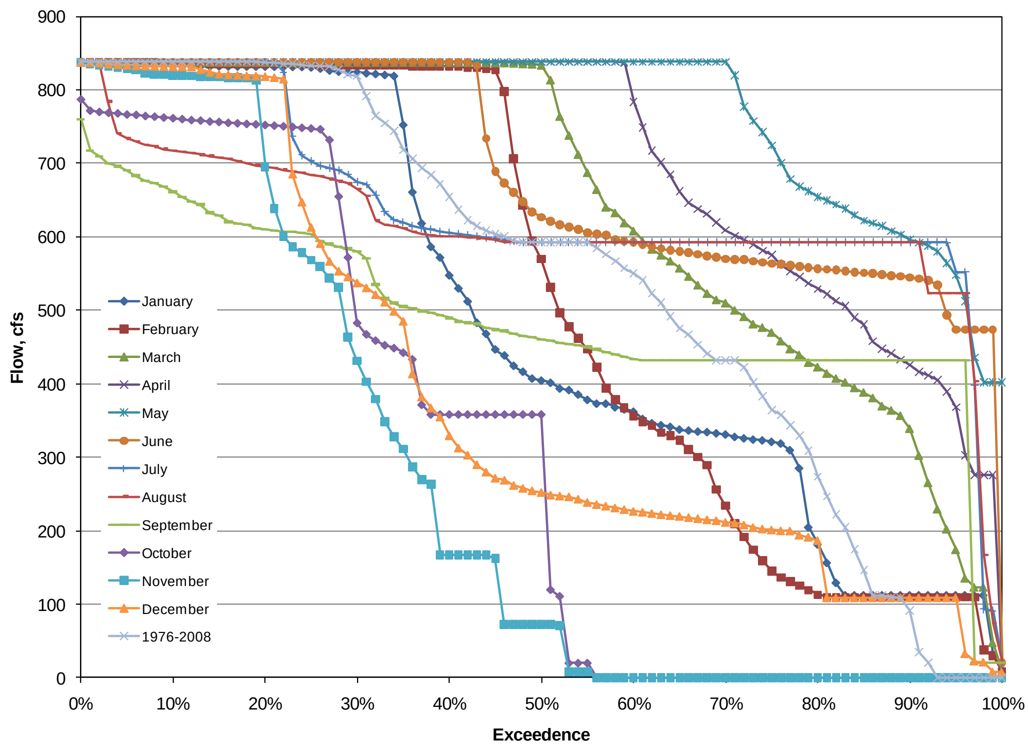


**Figure 6.4.2-1. Rollins Powerhouse modeled annual and monthly flow duration curves.**

### 6.4.2.4 Powerhouse Capability versus Head

Powerhouse capability versus net head is shown in Figure 6.4.2-2. Minimum, normal, and maximum heads for Rollins Powerhouse are 114 ft, 205 ft, and 225 ft, respectively.

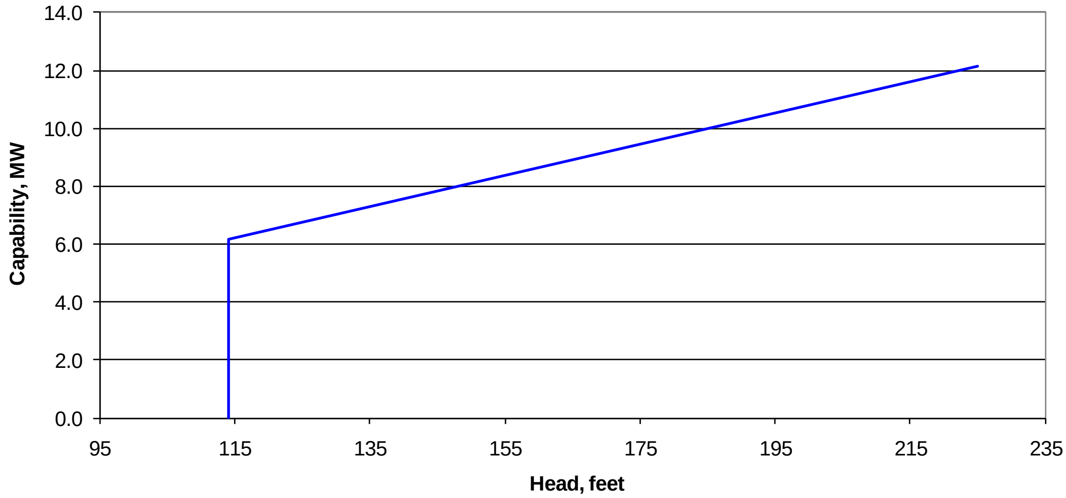


**Figure 6.4.2-2. Rollins Powerhouse capability curve.**

### 6.4.2.5 Tailwater Rating Curve

The normal tailwater elevation of Rollins Powerhouse is 1,958.4 feet. The tailwater rating curve for Rollins Powerhouse can be seen in Figure 6.4.2-3.

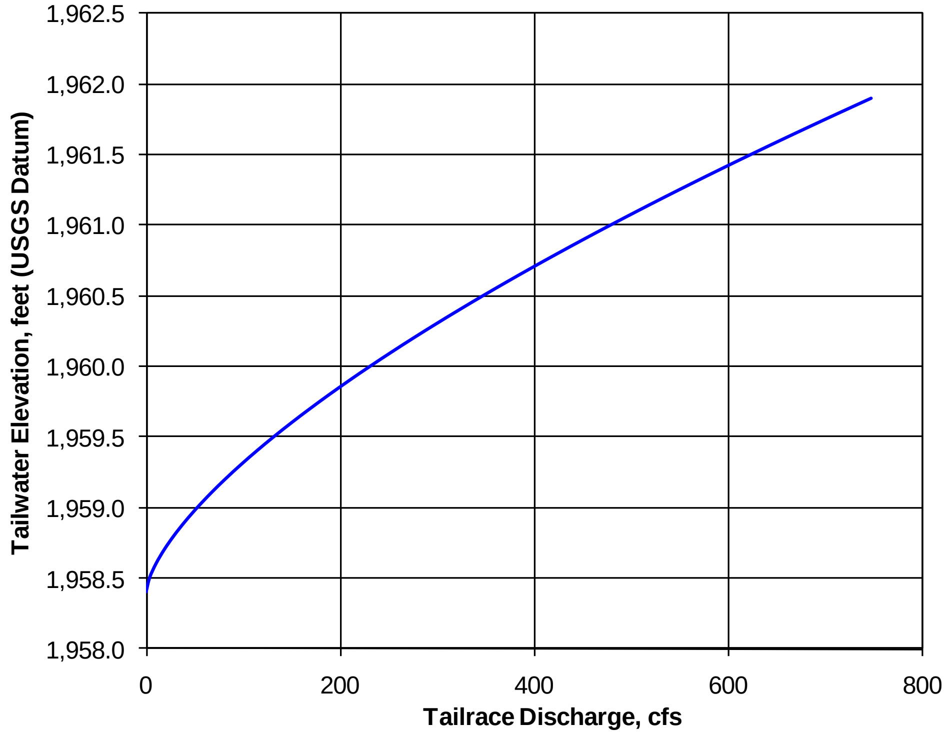


**Figure 6.4.2-3. Rollins Powerhouse tailwater rating curve.**

### 6.4.2.6 Load Curves

Because Rollins Powerhouse is a base-loaded plant without peaking capability, there is no diurnal or weekly load curve. There is no appreciable station service power usage.

### 6.4.2.7 Average Annual Energy Production

Rollins Powerhouse would have generated an average of 66,395 MWh from 1976 to 2008 under Licensee's No-Action Alternative Operations Model run. The average annual plant factor for the powerhouse for this time period is 0.62 (7.6 aMW) based on the annual generation divided by the plant generating capability (12.15 MW) times the number of hours per year. Annual gross generation and plant factors for the powerhouse are provided in Table 6.4.2-1.

**Table 6.4.2-1. Modeled generation and plant factors for Rollins Powerhouse.**

| Water Year | Annual Generation, MWh | Annual Generation, aMW | Plant Capacity, MW | Plant Factor |
|---|---|---|---|---|
| 1976 | 42,815 | 4.9 | 12.15 | 0.40 |
| 1977 | 5,697 | 0.7 | 12.15 | 0.05 |
| 1978 | 67,112 | 7.7 | 12.15 | 0.63 |
| 1979 | 61,611 | 7.0 | 12.15 | 0.58 |
| 1980 | 81,103 | 9.2 | 12.15 | 0.76 |
| 1981 | 56,478 | 6.4 | 12.15 | 0.53 |
| 1982 | 88,181 | 10.1 | 12.15 | 0.83 |
| 1983 | 92,874 | 10.6 | 12.15 | 0.87 |

**Table 6.4.2-1. (continued)**

| Water Year | Annual Generation, MWh | Annual Generation, aMW | Plant Capacity, MW | Plant Factor |
|---|---|---|---|---|
| 1984 | 88,942 | 10.1 | 12.15 | 0.83 |
| 1985 | 64,171 | 7.3 | 12.15 | 0.60 |
| 1986 | 76,150 | 8.7 | 12.15 | 0.72 |
| 1987 | 53,291 | 6.1 | 12.15 | 0.50 |
| 1988 | 43,185 | 4.9 | 12.15 | 0.40 |
| 1989 | 54,572 | 6.2 | 12.15 | 0.51 |
| 1990 | 60,233 | 6.9 | 12.15 | 0.57 |
| 1991 | 50,749 | 5.8 | 12.15 | 0.48 |
| 1992 | 51,385 | 5.8 | 12.15 | 0.48 |
| 1993 | 71,578 | 8.2 | 12.15 | 0.67 |
| 1994 | 50,835 | 5.8 | 12.15 | 0.48 |
| 1995 | 75,980 | 8.7 | 12.15 | 0.71 |
| 1996 | 87,696 | 10.0 | 12.15 | 0.82 |
| 1997 | 85,840 | 9.8 | 12.15 | 0.81 |
| 1998 | 81,439 | 9.3 | 12.15 | 0.77 |
| 1999 | 86,742 | 9.9 | 12.15 | 0.81 |
| 2000 | 78,175 | 8.9 | 12.15 | 0.73 |
| 2001 | 51,574 | 5.9 | 12.15 | 0.48 |
| 2002 | 64,066 | 7.3 | 12.15 | 0.60 |
| 2003 | 79,083 | 9.0 | 12.15 | 0.74 |
| 2004 | 67,997 | 7.7 | 12.15 | 0.64 |
| 2005 | 72,588 | 8.3 | 12.15 | 0.68 |
| 2006 | 85,010 | 9.7 | 12.15 | 0.80 |
| 2007 | 63,655 | 7.3 | 12.15 | 0.60 |
| 2008 | 50,239 | 5.7 | 12.15 | 0.47 |
| **Total** | **2,191,045** | **----** | ---- | **----** |
| **Minimum** | **5,697** | **0.7** | ---- | **0.05** |
| **Average** | **66,395** | **7.6** | ---- | **0.62** |
| **Median** | **67,112** | **7.7** | ---- | **0.63** |
| **Maximum** | **92,874** | **10.6** | ---- | **0.87** |

# 7.0 Future Development

## 7.1 Rollins No. 2 Powerhouse

NID proposes to include one new generating facility in the new license: Rollins No. 2 Powerhouse. The new facility would more effectively capture the combined releases from Rollins Reservoir. The existing powerhouse consists of one vertical axis, Francis turbine with a rated capacity of 12.15 MW at a head of 208 feet and maximum flow of 840 cfs. At this time, NID anticipates that the new powerhouse would be constructed entirely on privately-owned land adjacent to the existing powerhouse location in a laydown area just below the existing parking lot on the right bank of the river. The existing powerhouse would be unaltered and remain in full operation.

The current design concept for the new powerhouse includes a 58-feet-by-40-feet concrete building that would house a single Francis turbine with a maximum flow of 600 cfs and synchronous generator combination yielding a maximum capacity of 11.4 MW. The average annual plant factor for the powerhouse, based on a model of plant operations from water year

 

1995 through 2008, is expected to be approximately 0.55 (dependable capacity of 6.27 aMW). The plant is expected to generate approximately 18.4 GWh per year and to operate at 64 percent of capacity during dry years, at 83 percent of capacity during normal years, and at 96 percent of capacity during wet years. This new facility would be an automatic, remotely operable, unmanned installation. The upgrade would require modifications to the existing penstock to allow for a new bifurcation to route flow to the new generation facility, and would include replacing the Rollins Powerhouse Switchyard with a new switchyard that will service both the existing and proposed powerhouses. The upgrade would occur entirely within the existing FERC Project Boundary and affect less than 1 acre of NID-owned land.

See Exhibit A of this DLA for a photograph and anticipated layout drawing of the proposed Rollins No. 2 Powerhouse.

# 8.0 Literature Cited

FERC Exhibit Drawings, FERC Project No. 2266 (latest revisions).

de Rubertis. 2002. 2001 Review of Safety, Bowman North Dam, FERC No. 2266, Yuba-Bear Hydroelectric Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Bowman South Dam, FERC No. 2266, Yuba-Bear Hydroelectric Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Dutch Flat Afterbay Dam, FERC No. 2266, Yuba-Bear Hydroelectric Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Dutch Flat Forebay Dam, FERC No. 2266, Yuba-Bear Hydroelectric Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Faucherie Dam, FERC No. 2266, Yuba-Bear Hydroelectric Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, French Lake Dam, FERC No. 2266, Yuba-Bear Hydroelectric Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Jackson Lake Dam, FERC No. 2266, Yuba-Bear Hydroelectric Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Jackson Meadows Dam, FERC No. 2266, Yuba-Bear Hydroelectric Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Rollins Dam, FERC No. 2266, Yuba-Bear Hydroelectric Project, Nevada Irrigation District, Colfax, California.

_____. 2002. 2001 Review of Safety, Sawmill Dam, FERC No. 2266, Yuba-Bear Hydroelectric Project, Nevada Irrigation District, Colfax, California.

Henwood Energy Services, Inc. 2002. Emergency Action Plan, Yuba-Bear River Project, FERC Project No. 2266 – CA, Vols 1 and 2.

Nevada Irrigation District (NID) website. 2007. Available online: <http://www.nid.dst.ca.us/>. Accessed February 2, 2007.

United States Federal Power Commission. 1963. Project No. 2266, Order Issuing License (Major).

United States Geological Survey (USGS). 2002. Water Resources Data, California Water Year 2002, Vol 4. Northern Central Valley Basins and the Great Basin from Honey Lake Basin to the Oregon State Line.

_____. Website Information for California. Available online: <http://waterdata.usgs.gov/ca/nwis/si>. Accessed October 25, 2009.

# Application for a New License Major Project – Existing Dam

# Exhibit C
# Construction History and Proposed Construction Schedule

Yuba-Bear Hydroelectric Project

FERC Project No. 2266-096


Prepared by:
Nevada Irrigation District
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Grass Valley, CA 95945
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April 2011

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**EXHIBIT C**

# Construction History and Proposed Construction Schedule

## 1.0 Introduction

The Nevada Irrigation District (NID or Licensee) has prepared this Exhibit C, Report on Construction History and Proposed Construction Schedule, as part of its Application for License for a Major Project – Existing Dam - (Application) from the Federal Energy Regulatory Commission (FERC) for the Yuba-Bear Hydroelectric Project (Project), FERC Project No. 2266. This exhibit is prepared in conformance with Title 18 of the Code of Federal Regulations (CFR), Subchapter B (Regulations under the Federal Power Act), Part 5 (Integrated Licensing Process). In particular, this report conforms to the regulations in 18 CFR § 5.18(a)(5)(iii), which requires in part that the application include an Exhibit C in conformance with 18 CFR § 4.51(d). As a reference, 18 CFR § 4.51(d) states:

> Exhibit C is a construction history and proposed construction schedule for the project. The construction history and schedules must contain:
>
> (1) If the application is for an initial license, a tabulated chronology of construction for the existing projects structures and facilities described under paragraph (b) of this section (Exhibit A), specifying for each structure or facility, to the extent possible, the actual or approximate dates (approximate dates must be identified as such) of:
> (i) Commencement and completion of construction or installation;
> (ii) Commencement of commercial operation, and
> (iii) Any additions or modifications other than routine maintenance; and
>
> (2) If any new development is proposed, a proposed schedule describing the necessary work and specifying the intervals following issuance of a license when the work would be commenced and completed.

Besides this introductory material, this exhibit includes three sections. Section 2.0 provides a history of Project construction. Section 3.0 describes NID's proposed construction schedule for any proposed improvements to the Project under the new license. Section 4.0 provides a bibliography of the references consulted to develop this exhibit.

See Exhibit A for a description of Project facilities and features, Exhibit B for a description of Project operations, Exhibit D for costs and financing information, and Exhibit E for a discussion of potential environmental effects and NID's proposed resource management measures. Project design drawings and maps are included in Exhibits F and G, respectively. Exhibit H contains a detailed description of the need for the electricity provided by the Project, the availability of electrical energy alternatives, and other miscellaneous information.

# 2.0 Construction History of Existing Structures and Facilities

NID applies to FERC for a new license, not an initial license, for the Project. Therefore, the requirement of 18 CFR § 4.51(d)(1) regarding a tabulated chronology of construction of existing structures and facilities does not apply. Refer to Exhibit H, Section 15.0, History of the Project, for a description of the construction history of the structures and facilities that comprise the current Project.

# 3.0 Construction Schedule for Proposed New Facilities

## 3.1 Rollins Powerhouse Upgrade

As currently conceived, construction will proceed in four phases, which collectively will take about 1 year. Access would occur over existing roads, and likely not require any modification to the roads. NID anticipates that the size of the construction crew on-site will average about 10-15 people, but could be about 30-40 during periods of heaviest construction. Each construction phase is briefly described below, although details may change as final design and selection of a contractor occurs.

In the first phase, site preparation would occur including ground disturbing activities to create a construction lay down area, expose the existing pipe for addition of the bifurcation, and prepare the area for addition of the new building. Excavated material would be piled on site for backfilling purposes in Phase 3.

NID anticipates that in the second phase, a temporary bulkhead or cofferdam would be constructed from the existing tailrace wall to the north bank of the river. The cofferdam or bulkhead would isolate the construction work in the bed from the stream. The area enclosed by the cofferdam or bulkhead would be minor. Then, standing water enclosed by the cofferdam or bulkhead would be allowed to settle, and pumped into the tailrace. The area of the new powerhouse and tailrace would be excavated down to the foundation level. The concrete foundation would then be placed, followed by the new walls of the tailrace and powerhouse. The last portion of this phase would be installation of the turbine and generator. During this phase, the bifurcation and new penstock would be installed as well.

In the third phase, the area would be backfilled around the new powerhouse walls using material that was excavated from the area in Phase 1, and stoplogs or a tailrace gate would be placed in the tailrace to stop water from entering the draft tube. The cofferdam would then be removed. Backfilling around the new bifurcation and penstock would also occur during this phase.

In the fourth phase the remainder of the powerhouse equipment would be installed and the roof of the powerhouse completed. Equipment testing would occur during this phase. In this phase, site clean-up and remediation would occur including stabilizing all slopes and finalizing drainage and paving of the road and access areas. Any excess clean material (e.g., excavated dirt) or construction material would be properly disposed of off-site. Final as-built drawings would be prepared and filed with FERC.

Prior to any ground disturbing activities, NID and/or its contractor would obtain all necessary approvals/permits for construction.

NID has included in its FLA conceptual-level design drawings for the upgrade. If approved, detailed drawings would be provided to the Commission as appropriate for FERC approval.

### 3.2 Non-Generating Facilities

In conformance to 18 CFR § 5.18(b)(5)(ii)(C) and (6), Appendix E5 of Exhibit E, Environmental Report, of this Application includes a description of any structure or facility necessary for implementation of NID's proposed resource management measures including: 1) functional design drawings; 2) a description of operation and maintenance procedures; 3) construction methods; 4) construction schedule; and 5) a map depicting the location of any such structures or facilities.

## 4.0 References Cited

None.

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# Application for a New License
# Major Project – Existing Dam

## Exhibit D
## Statement of Project Costs
## and Financing

Yuba-Bear Hydroelectric Project

FERC Project No. 2266-096

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**EXHIBIT D**

# Statement of Project Costs and Financing

## 1.0 Introduction

The Nevada Irrigation District (NID or Licensee) has prepared this Exhibit D, Statement of Costs and Financing, as part of its Application for a License for a Major Project – Existing Dam (Application) from the Federal Energy Regulatory Commission (FERC) for the Yuba-Bear Hydroelectric Project (Project), FERC Project No. 2266. This exhibit is prepared in conformance with Title 18 of the Code of Federal Regulations (CFR), Subchapter B (Regulations under the Federal Power Act), Part 4 (Licenses, Permits, Exemptions, and Determination of Project Costs), Subpart F (Application for License for Major Project – Existing Dam). In particular, this Exhibit D conforms to the regulations in 18 CFR § 4.41(e), and provides information regarding Project costs and financing, as well as other information NID believes would be useful when FERC evaluates Project economics. As a reference, 18 CFR § 4.51(e) states:

The [Exhibit D] statement must contain:

(1) If the application is for an initial license, a tabulated statement providing the actual or approximate original cost (approximate costs must be identified as such) of:
   - (i) Any land or water right necessary to the existing project; and
   - (ii) Each existing structure and facility described under paragraph (b) of this section (Exhibit A).

(2) If the applicant is a licensee applying for a new license, and is not a municipality or a state, an estimate of the amount which would be payable if the project were to be taken over pursuant to section 14 of the Federal Power Act upon expiration of the license in effect [see 16 U.S.C. 807], including:
   - (i) Fair value;
   - (ii) Net investment; and
   - (iii) Severance damages.

(3) If the application includes proposals for any new development, a statement of estimated costs, including:
   - (i) The cost of any land or water rights necessary to the new development; and
   - (ii) The cost of the new development work with a specification of:
     - (A) Total cost of each major item;
     - (B) Indirect construction costs such as costs of construction equipment, camps, and commissaries;
     - (C) Interest during construction; and
     - (D) Overhead, construction, legal expenses, taxes, administrative and general expenses, and contingencies.

(4) A statement of the estimated average annual cost of the total project as proposed, specifying any projected changes in the costs (life-cycle costs) over the estimated financing or licensing period if the applicant takes such changes into account, including:
   - (i) Cost of capital (equity and debt);
   - (ii) Local, state, and Federal taxes;
   - (iii) Depreciation or amortization;
   - (iv) Operation and maintenance expenses, including interim replacements, insurance, administrative and general expenses, and contingencies; and
   - (v) The estimated capital cost and estimated annual operation and maintenance expense of each proposed environmental measure.

(5) A statement of the estimated annual value of project power, based on a showing of the contract price for sale of power or the estimated average annual cost of obtaining an equivalent amount of power (capacity and energy) from the lowest cost alternative source, specifying any projected changes in the cost of power from that source over the estimated financing or licensing period if the applicant takes such changes into account.

(6) A statement specifying the source and extent of financing and annual revenues available to the applicant to meet the costs identified in paragraphs (e)(3) and (4) of this section.

(7) An estimate of the cost to develop the license application.

(8) The on-peak and off-peak values of project power, and the basis for estimating the values, for projects which are proposed to operate in a mode other than run-of-river.

(9) The estimated average annual increase or decrease in project generation, and the estimated average annual increase or decrease of the value of project power due to a change in project operations (i.e., minimum bypass flows, limits on reservoir fluctuations).

Besides this introductory material, this Exhibit D includes seven sections. Sections 2.0, 3.0, and 4.0 address the requirements of Exhibit D regarding the estimated cost of the original Project; estimated cost related to takeover of the existing Project by another party, and estimated cost related to any new generation facilities proposed by NID, respectively.

Section 5.0 describes NID's annual costs to operate and maintain the Project as proposed in this Application. Section 5.0 includes cost of capital, taxes and fees, depreciation, routine operations and maintenance (O&M) costs, and costs associated with environmental/recreational resource management measures for the proposed Project.

Section 6.0 describes NID's estimate of the amount of electricity the Project as proposed by NID in this Application would generate. The information is provided by Project powerhouse and by water year type. Generation in peak and off-peak periods as well as total generation is provided.

Section 7.0 compares the amount of power and value of power under the Project as proposed by Licensee in this Application and under the No Action Alternative.

Section 8.0 in this Exhibit D describes the consequences should FERC not issue a new license to NID.

See Exhibit A for a description of Project facilities and features, Exhibit B for a description of Project operations, Exhibit C for a construction history and a construction schedule, and Exhibit E for a discussion of potential environmental effects and Licensee's proposed resource management measures. Project design drawings and Project maps are included in Exhibits F and G, respectively. Exhibit H contains a detailed description of the need for the electricity provided by the Project, the availability of electrical energy alternatives, and other miscellaneous information.

Under FERC's approach to evaluating the economics of hydropower projects as articulated in Mead Corporation, Publishing Paper Division (72 FERC ¶ 61,072, July 13, 1995), FERC employs a "current cost approach" in that all costs are presented in current dollars (e.g., no consideration for potential future power costs, inflation, escalation, or deflation beyond the license issuance date; and costs to be expended over the license term are summed and normalized as current dollars). FERC's current cost economic analysis provides a general estimate of the potential power benefits and costs of the proposed Project. NID has prepared this Exhibit D using FERC's current cost method. Unless otherwise specified below, all costs are provided in 2010 United States (U.S.) dollars and are predicated on a new license with a 30-year license term.

## 2.0 Cost of Original Project

The initial license for the Project, issued by the Federal Power Commission (FERC's predecessor) to NID on June 24, 1963, was effective on May 1, 1963, for a term ending April 30, 2013. Because this is not an application for an initial license, a tabulated statement of the actual original cost of Project land, water rights, structures and facilities is not required to be included in Licensee's application for a new license.

## 3.0 Amount Payable in the Event of Project Takeover

NID is a municipality, established under the laws of the State of California, within the meaning of Section (§) 3(7) of the Federal Power Act. Because NID is a State subdivision, the existing Project is not subject to the takeover provisions of § 14 of the Federal Power Act (16 U.S.C. § 807). Accordingly, an estimate of the amount which would be payable if the Project was taken over pursuant to § 14 is not required to be included in NID's application for a new license.

## 4.0 Cost of Proposed New Generating Facilities

As part of this Application, NID proposes to construct the Rollins No. 2 Powerhouse, to be located adjacent to the existing Rollins Powerhouse below Rollins Dam on the Bear River. Based on a preliminary design and feasibility study, NID estimates that construction of the Rollins No. 2 Powerhouse would cost roughly $22 million (2010 dollars). A breakdown of the construction costs are presented in Table 4.0-1. Annual operations and maintenance costs are projected to be about $200,000 per year. This results in an annualized cost of about $954,000 per year, assuming a 30-year license term.

**Table 4.0-1. Nevada Irrigation District's estimated costs in 2010 US dollars for construction of Rollins No. 2 Powerhouse.**

| Description | Cost (2010 US Dollars) |
|---|---|
| Land Acquisition | $0 |
| Structures and Improvements | -- |
| Job Overhead and Supervision | $1,712,064 |
| Pre-Construction Activities | $311,182 |
| Site Work | $1,209,346 |
| Cofferdams & Dewatering | $91,144 |
| Powerhouse | $1,211,538 |
| **Subtotal** | **$4,535,273** |

**Table 4.0-1. (continued)**

| Description | Cost (2010 US Dollars) |
|---|---|
| Reservoirs, Dams, & Waterways | -- |
| Powerhouse Intake & Pipe | $1,228,826 |
| Downstream Structures | $145,260 |
| **Subtotal** | **$1,374,086** |
| Turbine / Generator Units | $4,261,702 |
| Accessory Electrical Equipment | -- |
| ISO Metering | $16,147 |
| Generator Control | $98,346 |
| Transformer & Line Protection Panel | $80,616 |
| Switchgear | $495,000 |
| MV Cable Units #1 and #2 | $158,400 |
| Grounding Grid | $66,000 |
| DC System | $39,138 |
| Station Service | $176,195 |
| **Subtotal** | **$1,129,842** |
| Miscellaneous Power Plant Equipment | -- |
| Draft Tube | $76,771 |
| Conveying Systems | $8,683 |
| Powerhouse Security Systems | $0 |
| **Subtotal** | **$85,453** |
| Contingency for Roads and Recreation Facilities | $50,000 |
| Transmission & Substation | $862,127 |
| PH Telemetry & Communications Equipment | $171,951 |
| **Overall Subtotal** | **$12,470,435** |
| Contractor's Profit & General Overhead (10%) | $1,247,044 |
| Bonds & Insurance (2%) | $274,350 |
| **Construction Cost without Contingency of Inflation** | **$13,991,828** |
| Escalation to Mid-Point of Construction (2 years @ 4% per year) | $1,141,733 |
| Project Contingency (25%) | $3,497,957 |
| **Total Construction Costs** | **$18,631,518** |
| Engineering & Construction Management (15%) | $2,794,728 |
| Miscellaneous Owner Costs (3%) | $558,946 |
| **Total** | **$21,986,000** |

NID does not propose to add to the Project any previously constructed, unlicensed water power structures or facilities.

Costs related to NID's proposed environmental/recreational facilities are discussed in Section 5.6 below.

# 5.0 Annual Project Costs

Estimated annual costs for the proposed Project are provided below in Table 5.0-1.

**Table 5.0-1. Nevada Irrigation District's estimated average annual costs in 2010 US dollars for continued operation of the Yuba-Bear Hydroelectric Project.**

| Item | Annual Cost (2010 US Dollars) |
|---|---|
| Capital Cost including Cost of Capital[1] | $1,000,000 |
| Local, State and Federal Taxes and Fees[2] | $500,000 |
| Annual Depreciation Expense[3] | $2,500,000 |
| Operation and Maintenance Expenses[4] | $2,487,000 |
| Transmission Costs[5] | $300,000 |

 

**Table 5.0-1. (continued)**

| Item | Annual Cost (2010 US Dollars) |
|---|---|
| Operating Reserve[6] | $600,000 |
| Power Purchase Contract Management[7] | $40,000 |
| Cost to Prepare Application for a New License[8] | $367,000 |
| **Subtotal – No-Action Alternative Project Cost** | **$7,794,000** |
| Capital and Annual Operation and Maintenance Costs Associated with Licensee's Proposed Project[9] | $1,648,000 |
| **Total – Licensee's Proposed Project Cost** | **$9,442,000** |

1 As described in Section 5.1.
2 As described in Section 5.2.
3 As described in Section 5.3.
4 As described in Section 5.4.
5 For continued Project O&M and delivery of Project power, Licensee must obtain transmission access. The special facilities charge for transmission line access and capacity is assumed to be a monthly tariff set at 1.14% of transmission line capital investment, including transmission line licensing costs. This is assumed to be $300,000 annually based on access over existing PG&E transmission lines.
6 In the first 5 years of the term of the new licensee, Licensee plans to build an operating reserve of $15,000,000. As expended, the reserve would be re-established. Assuming the reserve is depleted once during the new license term, the annualized cost of creating and replenishing the reserve once over the 30-year term of the new license, the reserve equals $600,000 annually.
7 Over the term of the new license, License plans to seek out and enter into power purchase contracts for the sale of Project power. Besides the costs of entering into the contracts, Licensee must also manage the new contracts. Cost for this task is assumed to be $40,000 annually.
8 As described in Section 5.5.
9 As described in Section 5.6, and including $954,000 annualized costs associated with the construction and operation of the proposed Rollins No. 2 Powerhouse.

## 5.1 Capital Expenses

Based on the past five years of existing Project operation, NID estimates Project capital expenses over the term of the new license will average approximately $1,000,000 annually. These capital expenses do not include expenses related to environmental/recreational measures, which are discussed in Section 5.6 below. These non-environmental/recreational expenses are expected to vary from year to year based on the scheduling of capital work, which include life cycle costs such as runner replacements, generator rewinds, and oil circuit breakers replacements and routine replacement of vehicles and tools. The costs do not include contingency for unexpected repair work that are covered under the Operating Reserve. NID will most likely finance these capital expenses through revenues generated by operation of the Yuba-Bear Hydroelectric Project.

## 5.2 Local, State and Federal Taxes and Fees

As a public agency, NID is generally exempt from public taxation. However, NID does pay various fees, which NID anticipates will be about $500,000 per year in 2010 U.S. dollars. This includes fees to federal agencies for FERC administrative costs, use of U.S.-owned lands, stream gaging and special use permits costs; fees to State of California agencies for dam safety and water rights, and fees to county agencies for public water systems at recreational facilities.

## 5.3 Depreciation Expense

The original Yuba-Bear Hydroelectric Project facilities were constructed with funds from the issuance of $62,000,000 in bonds with a maturity date of July 1, 2010 and an interest rate of 4.25

to 6.0 percent. The annual debt service for principal and interest was $3,128,000. The Bowman Powerhouse and related facilities were constructed with bonds originally totaling $16,000,000, also with a maturity date of July 1, 2010.

NID has depreciated Project plant and equipment using the straight-line method over the estimated useful lives of the following facilities: 50 years for dams; 50 years for buildings and turbines; 5-20 years for accessory equipment and features; and 5-20 years for equipment.

As of December 31, 2008, the total cost of existing plant and equipment of the Yuba-Bear Hydroelectric Project was $87,257,979 including construction in progress. The accumulated depreciation as of December 31, 2008 was $61,844,549.

Over the past five years, NID's annual depreciation expense has ranged from $1,978,175 to $2,898,224 and has averaged $2,500,000, which average is used in this Exhibit D analysis.

## 5.4 Operation and Maintenance Expenses

NID anticipates that Project operation and maintenance (O&M) expenses under the new license will be similar to current O&M costs over the past five years, but would also include recreation facilities improvements scheduled over the next license term which would have occurred under the No-Action Alternative. These costs have averaged $2,487,000, and are used in this Exhibit D analysis. The O&M costs include interim replacement costs, insurance, and administration and general expenses.

## 5.5 Cost to Prepare License Application

To date, NID has expended about $9,000,000 to prepare this Application. These costs include NID's internal administrative costs, costs spent on outside consultants including the cost to complete the relicensing studies, and the cost for the pre-filing consultation process with the resource agencies and other Relicensing Participants through April 2011. NID's cost to complete the relicensing process may be as high as an additional $2,000,000 if, as provided under the Energy Policy Act, evidentiary trial-type hearings occur and parties choose to offer alternative measures. Assuming these costs are recovered over a 30-year term, average annual costs would be $367,000.

## 5.6 Costs of Proposed Protection, Mitigation and Enhancement Measures

NID's proposed Project includes 30 Project-specific environmental/recreational resource management measures. Seventeen of these measures will require significant capital expenditure. Twenty-three of the measures will require significant annual O&M expenditures. NID's estimate costs, including assumptions related to the costs for each of these measures is provided by measure in Table 5.6-1.

 

**Table 5.6-1. Summary of annualized costs in 2010 US dollars for environmental and recreation measures included in the proposed Yuba-Bear Hydroelectric Project with the Rollins Powerhouse Upgrade.**

| Measure No. | Measure | Capital, One-Time, or Repeating Cost ($1,000s or $1,000 per year) | Annual Expense ($1,000 per year) | Average Annual Costs ($1,000 per year) |
|---|---|---|---|---|
| **GENERAL** | | | | |
| YB-GEN1 | Annual Consultation with Forest Service and BLM | -- | $15/year | $15/year |
| YB-GEN2 | Employee Training | -- | $20/year | $20/year |
| YB-GEN3 | Annual Review of Special-Status Species Lists and Assessment of New Species on Federal Land | -- | $16/year | $16/year |
| YB-GEN4 | Consultation Regarding New Ground Disturbing Activities on Federal Land | -- | $5/year | $5/year |
| YB-GEN5 | Consultation Regarding New Facilities on Federal Land | -- | $3/year | $3/year |
| YB-GEN6 | Development and Implementation of Coordinated Operations Plan for Yuba-Bear Hydroelectric Project and Drum-Spaulding Project | $60 | -- | $2/year |
| **GEOLOGY AND SOILS** | | | | |
| YB-G&S1 | Development and Implementation of Rollins Upgrade Construction Erosion Control and Restoration Plan | $30 | -- | $1/year |
| YB-G&S2 | Development and Implementation of Recreation Facilities Construction Erosion Control and Restoration Plan | $90 | -- | $3/year |
| YB-G&S3 | Implement Clear and Trap Creeks Stabilization Plan | $3,000 | $25/year | $125/year |
| **WATER RESOURCES** | | | | |
| YB-WR1 | Development and Implementation of Rollins Upgrade Construction Hazardous Material Spill Prevention, Control and Countermeasures Plan | $30 | -- | $1/year |
| YB-WR2 | Development and Implementation of Recreation Facilities Construction Hazardous Material Spill Prevention, Control and Countermeasures Plan | $30 | -- | $1/year |
| **AQUATIC RESOURCES** | | | | |
| YB-AQR1 | Streamflows | $150 | $40/year | $44/year |
| YB-AQR2 | Fish Stocking in Bowman Lake | -- | $75/year | $75/year |
| YB-AQR3 | Jackson Meadows Reservoir Minimum Pool | -- | -- | -- |
| YB-AQR4 | Milton Diversion Impoundment Normal Pool | $40 | -- | $1/year |
| YB-AQR5 | Rollins Reservoir Minimum Pool | -- | -- | -- |
| YB-AQR6 | Faucherie Lake Minimum Pool | -- | -- | -- |
| YB-AQR7 | Fish Stocking in Rollins Reservoir | -- | $40/year | $40/year |
| **TERRESTRIAL RESOURCES** | | | | |
| YB-TR1 | Implement Invasive Weeds Management Plan on Federal Land | $125 | $30/year | $43/year |
| YB-TR2 | Implement Vegetation Management Plan on Federal Land | $125 | $30/year | $43/year |
| YB-TR3 | Pesticide and Herbicide Use Restrictions on Federal Land | -- | -- | -- |
| YB-TR4 | Consult When Replacing Canal Wildlife Escape Facilities | -- | $1/year | $1/year |
| YB-TR5 | Monitor Animal Losses in Project Canals | -- | $3/year | $3/year |
| YB-TR6 | Bat Management | -- | $3/year | $3/year |

## Table 5.6-1. (continued)

| Measure No. | Measure | Capital, One-Time, or Repeating Cost ($1,000s or $1,000 per year) | Annual Expense ($1,000 per year) | Average Annual Costs ($1,000 per year) |
|---|---|---|---|---|
| **RECREATIONAL RESOURCES** | | | | |
| YB-RR1 | Implement Recreation Facilities Plan | -- | -- | -- |
| | *Jackson Meadows Reservoir* | -- | -- | -- |
| | Aspen Group Campground | $27 | $0/year | $1/year |
| | Aspen Picnic Area | $2 | $0/year | $0/year |
| | East Meadow Campground | $72 | $0/year | $3/year |
| | Pass Creek Campground | $92 | $0/year | $3/year |
| | Pass Creek Overflow Campground | $0 | $0/year | $0/year |
| | Pass Creek Boat Launch | $191 | $0/year | $7/year |
| | Jackson Meadows Vista | $0 | $0/year | $0/year |
| | Findley Campground | $67 | $0/year | $3/year |
| | Fir Top Campground | $65 | $0/year | $3/year |
| | Woodcamp Campground | $69 | $0/year | $3/year |
| | Woodcamp Picnic Area | $11 | $0/year | $1/year |
| | Woodcamp Boat Launch | $210 | $0/year | $7/year |
| | Silvertip Group Campground | $16 | $0/year | $1/year |
| | Jackson Point Boat-In Campground | $86 | $0/year | $3/year |
| | *Milton Diversion Impoundment* | -- | -- | -- |
| | Shoreline Facilities (proposed) | $35 | $0/year | $1/year |
| | *Bowman Lake* | -- | -- | -- |
| | Bowman Lake Campground | $24 | $1/year | $1/year |
| | Designated Primitive Campsites (proposed) | $46 | $1/year | $2/year |
| | Shoreline Parking Areas (proposed) | $56 | $1/year | $3/year |
| | *Sawmill Lake* | -- | -- | -- |
| | Sawmill Walk-In Campground (proposed) | $238 | $0/year | $8/year |
| | *Canyon Creek (non-reservoir)* | -- | -- | -- |
| | Canyon Creek Campground | $0 | $0/year | $0/year |
| | *Faucherie Lake* | -- | -- | -- |
| | Faucherie Lake Group Campground | $0 | $0/year | $0/year |
| | Faucherie Lake Day Use and Boat Launch | $0 | $0/year | $0/year |
| | Faucherie Lake Dam Parking Area | $10 | $0/year | $0/year |
| | *Dutch Flat No. 2 Forebay* | -- | -- | -- |
| | Information Kiosk (proposed) | $2 | $0/year | $0/year |
| | *Dutch Flat Afterbay* | -- | -- | -- |
| | Day Use Area (proposed) | $113 | $0/year | $4/year |
| **RECREATIONAL RESOURCES (continued)** | | | | |
| YB-RR1 (continued) | *Rollins Reservoir* | -- | -- | -- |
| | Orchard Springs Recreation Complex | $0 | $1/year | $1/year |
| | Greenhorn Recreation Complex | $0 | $1/year | $1/year |
| | Peninsula Recreation Complex | $0 | $1/year | $1/year |
| | Long Ravine Recreation Complex | $0 | $1/year | $1/year |
| YB-RR2 | Provide Recreation Flow Information | -- | $4/year | $4/year |
| YB-RR3 | Provide Supplemental Flows in Canyon Creek Below French Dam for Whitewater Boating | -- | $5/year | $5/year |
| **LAND USE** | | | | |
| YB-LU1 | Implement Transportation Management Plan | $835 | $90/year | $118/year |
| YB-LU2 | Implement Fire Prevention and Response Plan on Federal Land | $30 | $2/year | $3/year |

 

**Table 5.6-1. (continued)**

| Measure No. | Measure | Capital, One-Time, or Repeating Cost ($1,000s or $1,000 per year) | Annual Expense ($1,000 per year) | Average Annual Costs ($1,000 per year) |
|---|---|---|---|---|
| **CULTURAL RESOURCES** | | | | |
| YB-CR1 | Implement Historic Properties Management Plan | $1,650 | $14/year | $69/year |
| **AESTHETIC RESOURCES** | | | | |
| YB-AER1 | Implement Visual Resource Management Plan on Federal Land | -- | $5/year | $5/year |
| | **Total** | **$7,625** | **$440/year** | **$694/year** |

NID considers the total cost of $694,000 per year to be a conservatively low estimate because implementation of some of the measures could result in significant additional costs because the full scope of the measure is unknown at this time so can not be estimated. In addition, this estimate does not include costs related to implementation of the Forest Service's "standard" 4e conditions or the State Water Resources Control Board's Section 401 Water Quality Certificate measures since these have not been provided to NID yet. Implementation of these additional measures will likely result in significant increases to NID's estimate of capital and annual O&M costs related to environmental/recreational measures.

# 6.0 Value of Project Power

## 6.1 Hydroelectric Power Generation

### 6.1.1 Yuba-Bear Hydroelectric Project/Drum-Spaulding Project Operations Model

To estimate generation under NID's proposed Project as described in this FLA, as well as under the No-Action Alternative, NID developed a computerized Operations Model of the combined NID's Yuba-Bear Hydroelectric Project and Pacific Gas and Electric Company's (PG&E) Drum-Spaulding Project; see Section 6.2 (Water Resources) of Exhibit E of this FLA for additional details on the Operations Model.

### 6.1.2 Annual Peak and Off-Peak Energy Generation

Based on the Yuba-Bear Hydroelectric Project/Drum-Spaulding Project Operations Model run, NID estimates that under its Proposed Project as described in this FLA, average annual generation would be 287 GWh, composed of 185 GWh (64 percent of total energy generation) of peak energy and 102 GWh (36 percent of total energy generation) of off-peak energy. These estimates include an additional 18 GWh of annual generation anticipated from the proposed Rollins No. 2 Powerhouse.

## 6.2 Unit Values of Power Used in Analysis

The CPUC periodically publishes market price referents (MPRs) which is an estimation of the long-term market price of electricity that are used in evaluating bid products received during Renewable Portfolio Standard (RPS) eligible power solicitations. The MPRs represent "*the levelized price at which the proxy power plant revenues exactly equal the expected proxy power plant costs on a net-present value basis*." As a reference, the CPUC's estimated 25-year levelized 2013 MPR is 10.9 cents per kWh. As a proxy for the FERC current-cost economic methodology, the CPUC-published average monthly short run avoided costs of 4.46 cents/kWh is used for the value of non-RPS-eligible power and the CPUC-adopted MPR of 10.9 cents/kWh is used for RPS-eligible power.

NID's Bowman, Dutch Flat No. 2 and Rollins powerhouses qualify as RPS-eligible generating units (nameplate capability of less than 30 MW), while NID's Chicago Park Powerhouse does not qualify for RPS due to its nameplate capability of 39 MW.

See Section 6.2.1 of this Exhibit D for a discussion of peak and off-peak power values, and see Exhibit H of this FLA for more information regarding power value. Figure 6.2-1 shows the historical average monthly values of short run avoided costs (SRAC) for 2009.

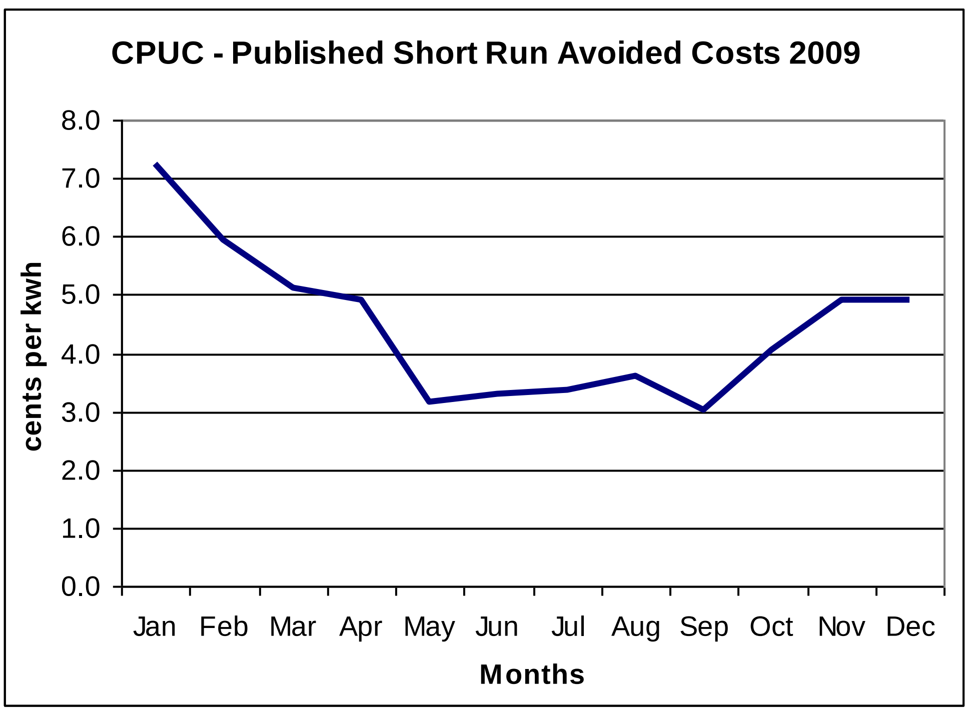


**Figure 6.2-1. Historical CPUC-published SRACs.**

The 12-month average SRAC for January through December 2009 was 4.46 cents per kWh.

 

### 6.2.1 Peak and Off-Peak Value of Project Power

The CPUC publishes SRACs by time of use and month. These time-of-use SRACs are reasonable proxies for the value of Project power. Table 6.2-1 lists the monthly peak, partial-peak, off-peak, and super off-peak values of SRAC for 2009. Table D6.2-2 describes the time of use definitions used in Table 6.2-1. For the purposes of this value analysis, assumed peak and off-peak prices of 4.66 cents per kWh and 4.35 cents per kWh, respectively, were used for non-RPS-eligible generating units, and assumed peak and off-peak prices of 11.39 cents per kWh and 10.63 cents per kWh, respectively, were used for RPS-eligible generating units.[1]

**Table 6.2-1. Calendar Year 2009 CPUC-published SRACs, cents per kWh. Shaded values represent those used to calculate peak and off-peak price averages for 2009.**

| Effective Period | Seasonal Period | Peak | Partial-Peak | Off-Peak | Super Off-Peak | Seasonal Average |
|---|---|---|---|---|---|---|
| January 1 - 31, 2009 | B | --- | 7.486 | 7.201 | 6.891 | 7.254 |
| February 1 - 28, 2009 | B | --- | 6.125 | 5.892 | 5.639 | 5.935 |
| March 1 - 31, 2009 | B | --- | 5.298 | 5.087 | 4.877 | 5.133 |
| April 1 - 30, 2009 | B | --- | 5.079 | 4.872 | 4.675 | 4.921 |
| May 1 - 31, 2009 | A | 3.381 | 3.244 | 3.138 | 3.003 | 3.175 |
| June 1 - 30, 2009 | A | 3.503 | 3.361 | 3.231 | 3.111 | 3.289 |
| July 1 - 31, 2009 | A | 3.569 | 3.425 | 3.291 | 3.171 | 3.352 |
| August 1 - 31, 2009 | A | 3.8222 | 3.6679 | 3.5401 | 3.3952 | 3.5890 |
| September 1 - 30, 2009 | A | 3.2235 | 3.0934 | 2.9810 | 2.8634 | 3.0268 |
| October 1 - 31, 2009 | A | 4.3086 | 4.1347 | 3.9818 | 3.8272 | 4.0457 |
| November 1 - 30, 2009 | B | --- | 5.0718 | 4.8887 | 4.6688 | 4.9146 |
| December 1 - 31, 2009 | B | | 5.0634 | 4.8630 | 4.6611 | 4.9064 |
| Calendar Year 2009 Average | --- | 4.66[1] | | 4.35[2] | | |

[1] Calculated as average of Peak prices during May-October, and Partial Peak prices in the remaining months.
[2] Calculated as weighted average of Off-Peak (7/11 weighting fraction) and Super Off-Peak (4/11 weighting fraction) monthly prices.

**Table 6.2-2. Time of use definitions used in Table 6.2-1.**

| Time of Use Periods | Period A—Summer (May 1–October 31) | Period B—Winter (November 1–April 30) | Days Applicable |
|---|---|---|---|
| Peak | Noon–6:00 p.m. | NA | Weekdays except holidays |
| Partial-Peak | 8:30 a.m.–Noon<br>6:00 p.m.–9:30 p.m. | 8:30 a.m.–9:30 p.m. | Weekdays except holidays<br>Weekdays except holidays |
| Off-Peak | 9:30 p.m.–1:00 a.m.<br>5:00 a.m.–8:30 a.m.<br>5:00 a.m.–1:00 a.m. | 9:30 p.m.–1:00 a.m.<br>5:00 a.m.–8:30 a.m.<br>5:00 a.m.–1:00 a.m. | Weekdays except holidays<br>Weekdays except holidays<br>Weekends and holidays |
| Super Off-Peak | 1:00 a.m.–5:00 a.m. | 1:00 a.m.–5:00 a.m. | All days |

### 6.2.2 Value of Project Power

Table 6.2.2-1 shows the total generation, including off-peak and on-peak, and value of power that would occur compared to the No Action Alternative if FERC issued a new license for NID's proposed Project as described in this Application.

[1] Peak/off-peak pricing for RPS-eligible generating units based on spread of peak/off-peak pricing for non-RPS-eligible generating units, prorated by the spread between RPS-eligible and non-RPS-eligible average pricing.

**Table 6.2.2-1. Comparison of annual costs and benefits of the proposed Project using FERC's current cost method.**

| | No Action Alternative | Licensee Proposed Project |
|---|---|---|
| Dependable Capacity (MW) | 44.2 | 44.2 |
| Total Annual Generation (GWh) | 275 | 287 |
| Total Annual RPS Generation (GWh) | 141 | 158 |
| On-Peak | 86 | 96 |
| Off-Peak | 55 | 62 |
| Total Annual Non-RPS Generation (GWh) | 133 | 129 |
| On-Peak | 90 | 89 |
| Off-Peak | 43 | 40 |
| Total Annual Power Value | $21,706,400 | $23,412,400 |
| On-Peak | $13,989,400 | $15,081,800 |
| Off-Peak | $7,717,000 | $8,330,600 |
| $1,000s per year | $21,706 | $23,412 |
| mills/kWh | 79 | 82 |
| Annual Cost: | --- | --- |
| $1,000s per year | $7,794 | $9,442 |
| mills/kWh | 28 | 33 |
| Current net annual benefits: | | |
| $1,000s per year | $13,912 | $13,970 |
| mills/kWh | 51 | 49 |

[1] Dependable capacity values derived from Base Case and Licensee's Proposed Project scenarios of Licensee's Operations Model.

# 7.0 Changes in Project Power and Power Value

Table 6.2.2.-1 shows the change in peak, off-peak and total generation that would occur to the No Action Alternative if FERC issued a new license for NID's proposed Project. NID proposes increasing minimum instream flows below numerous dams and diversions to enhance aquatic resources. It is estimated that these measures will decrease average annual generation by 6 GWh at a cost of about $400,000 per year. It is estimated that on-peak generation will decrease by 3.5 GWh per year at a cost of $250,000 per year, and that off-peak generation will decrease by 2.5 GWh per year at a cost of $150,000 per year.

It is estimated that the proposed Rollins No. 2 Powerhouse will increase average annual generation at the Project by 18 GWh, resulting in additional generation revenue of about $2,100,000. This results in a net increase in Project generation of 12 GWh per year and a net increase in Project generation value of about $1,700,000 per year.

# 8.0 Consequences of Denial of New License

If NID was denied a new license for the Project, NID would retain most existing Project facilities since the facilities are used to provide consumptive water to NID's service territory and since NID holds the consumptive water rights associated with the existing Project facilities. In addition, NID would not receive the energy revenue from the proposed Project, which would result in higher costs to its customers for consumptive water. Lastly, the environmental and recreational benefits described above would not be realized. Consequences related to the denial of the license are described in more detail in Exhibit H.

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