REVIEW OF APPLICATION FOR CERTIFICATION OF THE BUFFALO RIVER HYDROELECTRIC PROJECT

This report provides review findings and recommendations related to the application submitted to the Low Impact Hydropower Institute (LIHI) by the Fall River Rural Electric Cooperative, Inc. (Applicant or FRREC) for Low Impact Hydropower Certification of the Buffalo River Hydroelectric Project (the Project). The application was filed on November 28, 2016 and is subject to review under the April 2014 LIHI Handbook. The Project had been certified by LIHI in 2006 under Certificate No. 21; that certification expired August 11, 2011.

I. PROJECT'S GEOGRAPHIC LOCATION

The Buffalo River Hydroelectric Project is located on the Buffalo River at the river's confluence with the Henrys Fork of the Snake River and about 39 miles north of Ashton, in Fremont County, Idaho. The Project is located within the Targhee National Forest. The Project dam is the only dam located on the Buffalo River. The Island Park Dam and Reservoir, a major U.S. Bureau of Reclamation (USBR) development, is located on Henrys Fork just upstream of the confluence.

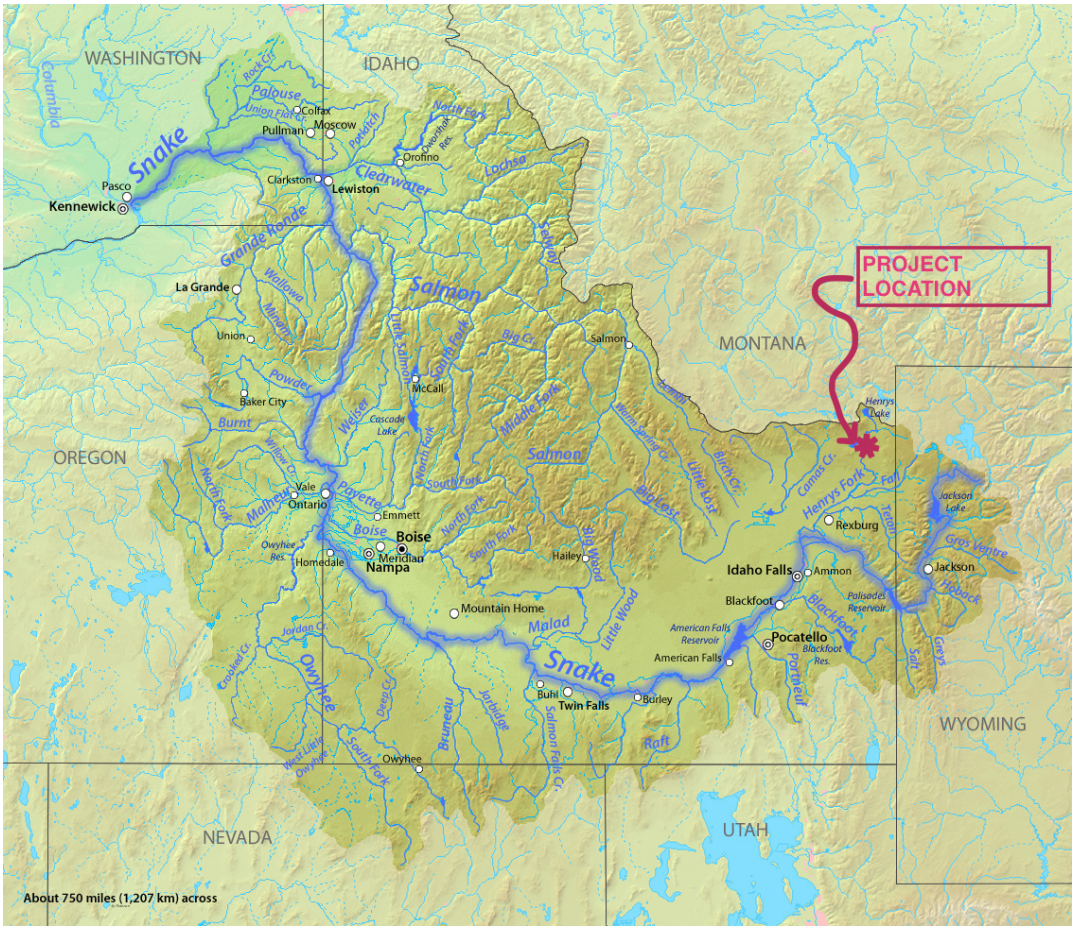

Figure 1. Project location in the headwaters of the Snake River in eastern Idaho.

Figure 2. Buffalo River Dam.

II. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

The Buffalo River dam was built in 1936 to generate hydroelectric power for the construction of USBR's Island Park Dam and Reservoir, part of the Minidoka Project, which provides water to irrigate farmland in Idaho's Snake River Plain. The facility was subsequently acquired by Ponds Lodge, a resort lodge located upstream on the Buffalo River in Island Park. It provided power for the lodge until the powerhouse was struck by lightning and burned in 1986. Buffalo Hydro, Inc. acquired a new license for the project in 1989 and rebuilt the powerhouse, resuming hydroelectric operation in 1994. In 1997, Buffalo Hydro, Inc. sold their operation to FRREC.

The Buffalo River Project consists of a 142-foot-long by 12-foot-high timber-faced rockfilled diversion dam; a 40-foot-long by 3-foot-high concrete slab spillway with stop logs and a small auxiliary spillway; a 270-foot-long fish passage structure; a concrete intake with a 5-foot steel slide gate; a trashrack; a 52-foot-long by 5-foot diameter concrete encased steel penstock; a 34-foot by 22-foot masonry block powerhouse; a 250 kW Bouvier Kaplan inclined shaft turbine; an 1,800-foot-long underground transmission line; and appurtenant facilities.

The dam creates an impoundment of about 4.6 acres extending about 1,400 feet upstream (as judged from the Google Earth aerial view).

The average annual generation is 1,647 MWh (2013-14).

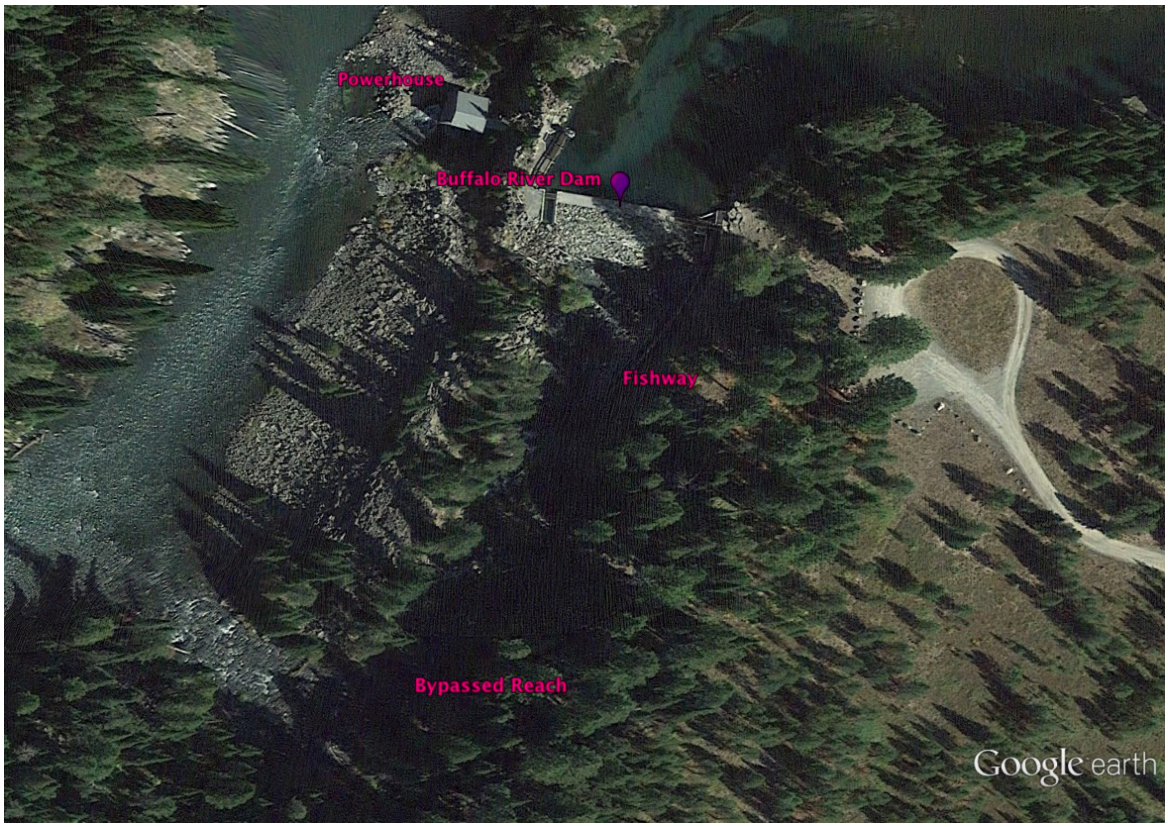

Figure 3. View of Project layout.

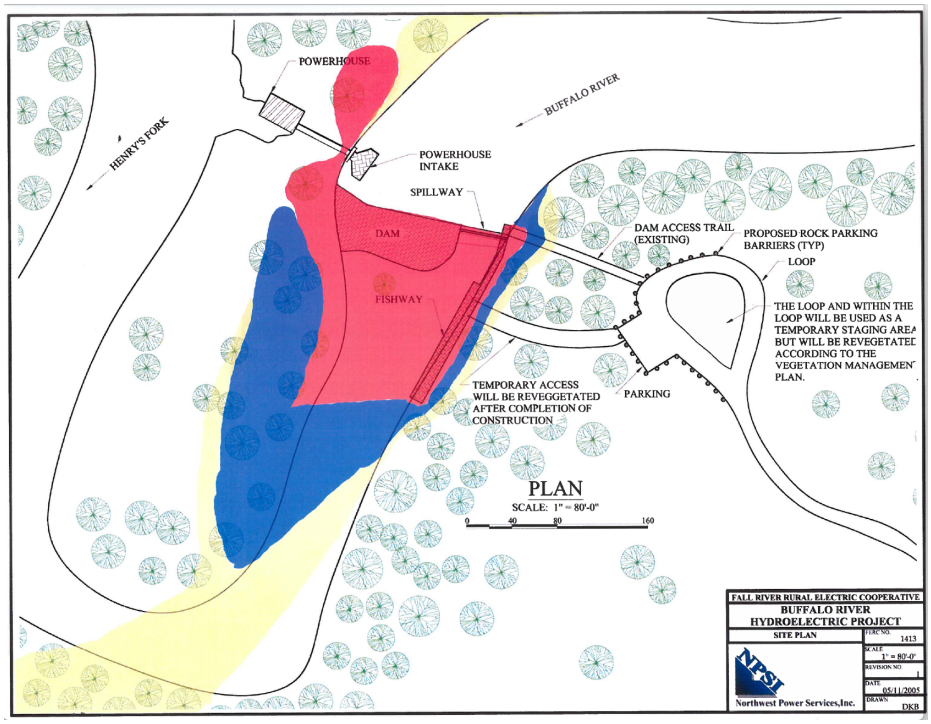

Figure 4. Project plan.

Figure 5. View looking upstream at spillway with fishway in foreground along east (left) bank of river.

Figure 6. View looking downstream with intake on right bank, automated trashrack rake visible.

III. REGULATORY AND COMPLIANCE STATUS

The Federal Energy Regulatory Commission (FERC) granted the Project a license as Project No. 1413 on November 5, 2004. The FERC license was issued for a period of 40 years with an expiration date of October 31, 2044. The federal land manager for the Targhee National Forest is the U.S. Forest Service (USFS). The license, therefore, incorporates terms recommended by the USFS by letter dated January 4, 2004 pursuant to the Federal Power Act, Section 4(e). The Project also operates under a USFS Special Use Permit issued July 21, 2005 and is reviewed annually for compliance with both that permit and the USFS terms and conditions contained in the license.

The license application was filed on October 30, 2002. Motions to intervene in the proceeding were filed by the State of Idaho, the Henry's Fork Foundation, Idaho Rivers United, and the USFS after the application was placed on notice January 16, 2003, none in opposition.

Several mitigation and enhancement measures are included in the license as articles or USFS terms and are relevant to the LIHI criteria:

1. *Article 401 (Commission Approval and Reporting).* Sets forth the schedule for filing of plans mandated by the USFS with FERC and requires consultation with several other agencies and a NGO in addition to the USFS: the U.S. Fish and Wildlife Service (USFWS), the Idaho Department of Fish and Game (IDFG), IDEQ, the Idaho Department of Park and Recreation (IDPR), and the Henry's Fork Foundation (HFF), non-profit fisheries conservation organization.

2. *Article 402 (Project Operation).* To protect fish and aquatic resources in the Buffalo River and Henrys Fork, FRREC is required to operate in a run-of-river mode and minimize fluctuations in the impoundment level.

3. *Article 403 (Operational Compliance Monitoring Plan).* The article requires the development of a plan for gaging, data records, and reporting to agencies as related to Article 402.

4. *Article 404 and USFS 6 (Hazardous Substances Plan).* Development of a plan to control spills.

5. *Article 405 (Upstream Fishway).* Development of a plan for design and implementation of a proposed fishway.

6. *Article 406 and USFS 14 (Intake Screen).* Development of a plan for design and implementation of an intake screen to prevent fish entrainment.

7. *Article 407 (Fishway and Fish Screen Effectiveness Monitoring, Evaluation, and*

Maintenance). Development of a plan for a plan for conducting post-construction monitoring and evaluation of the fishway and the fish screen required by articles 405 and 406 for a period of 3 years and every third year thereafter for the term of the license.

8. *Article 408 (Upstream Fishway Construction Scheduling)*. Provision of a construction/installation plan and schedule with fishway construction/installation activities only during the months of August through October in order avoid disturbance to rainbow trout spawning movements and rearing of newly hatched rainbow trout fry and displacement of wintering trumpeter swans.

9. *Article 409 (Reservation of Authority – Fishways)*. Reservation of authority should the U.S. Department of Interior prescribe fishways in the future.

10. *Article 410 and USFS 15 (Diversion Operation Plan).* Development of a Diversion Operation Plan to maintain the Buffalo River channel in the project area and pass large woody debris past the project for its habitat benefit downstream.

11. *USFS 3 (Consultation)*. Consultation with the Forest Service 60 days preceding the anniversary of the license with regard to measures needed to ensure protection and utilization of the Nation Forest System lands and resources affected by the project.

12. *USFS 4 (Surrender of License or Transfer of Ownership).* Prior to any surrender or transfer of this license, restoration of National Forest System lands to a condition satisfactory to the Forest Service.

13. *USFS 10 (Recreation Plan).* Development of a recreation plan within one year of license issuance.

14. *USFS 11 (Interpretive Display).* Development of an Interpretive Display Plan for the hydropower facility.

15. *USFS 12 (Heritage Resource Protection)*. Development of a Heritage Resource Protection Plan related to ground-disturbing activities.

16. *USFS 13 (Scenery Management)*. Development of a Scenery Management Plan with mitigation and implementation schedules necessary to bring project facilities into compliance with Targhee National Forest Land and Resource Management Plan direction and provide protection of scenic value, one of the outstanding and remarkable values (ORV's) of the eligible Wild Henrys Fork and Buffalo River.

17. *USFS 16 (Erosion Control Measures Plan).* Development of erosion prevention and sediment control plans for any ground-disturbing activities.

18. *USFS 17 (Vegetation Management Plan)*. Development of a vegetation management plans for ground-disturbing activities, including revegetation measures and control of noxious weeds.

19. *USFS 18 (Protection of Threatened and Endangered Species Plan).* Development of a Threatened, Endangered, and Proposed for Listing Species Plan to protect federally listed or proposed species and their critical habitat.

20. *USFS 19 (Forest Service Sensitive Species Biological Evaluation).* Development of a Biological Evaluation for sensitive species.

Although a water quality certification application was filed with the Idaho Department of Environmental Quality (IDEQ) on November 26, 2002, IDEQ did not act on the application until November 28, 2003, outside of the maximum one year allotted under federal Clean Water Act Section 401 for final action on an application. Consequently, FERC deemed the certification waived. Since the certification that was issued contained no conditions, the waiver had no material effect.

No fishway prescriptions were filed under section 18 of the FPA. The dam, however, was already fitted with a fishway when the license application was filed, and the licensing proposal included construction and operation of a new, more functional fishway.

I reviewed documentation in FERC eLibrary going back two years to determine whether any compliance issues have arisen during that period. No incidences of non-compliance were in that record. The USFS compliance inspection reports for the years 2012-16 indicate no violations of the special use permit and USFS license terms and conditions. Further, the Applicant states in the LIHI application (p. 1-4), "The Project has not experienced any out of compliance or licensing issues since its most recent relicensing." The Applicant provided a copy of FERC compliance report from its inspection done July 27, 2010; the report shows no significant violations.

IV. PUBLIC COMMENTS RECEIVED BY LIHI

The LIHI application was publicly noticed on November 28, 2016. No comments were received during the notice period, which ended on January 29, 2017.

V. LIHI CRITERIA REVIEW

Under each of the issue sections that follow, I include a table that contains the related LIHI questionnaire sections and my analysis and conclusions.

General Conclusions and Recommendations. I recommend that LIHI certify the Project for the standard term of five years, subject to one special flow-related condition, as I believe that it meets all of the standards of the 1st edition Handbook. I further note that the Applicant appears to have an excellent record with respect to compliance and cooperation with the resource agencies and HFF.

The Project meets the Ecological Flow Regime standard as it operates true run-of-river and the flow regime in the 660-foot bypassed reach remains above IDFG's target flow of 50 cfs at all times, although that conservation flow is not a regulatory requirement. However, I did note that

FRREC's compliance flow data log (a Microsoft Excel spreadsheet) appears to overstate inflows to the Project in several cases when compared to field flow measurements taken by the USGS.

Operations are not known to adversely impact water quality, and IDEQ has not listed the river segment as impaired.

Regarding fish passage, the Project is in the headwaters of the Snake River, a major tributary of the Columbia, and well upstream of natural and artificial barriers that prevent diadromous fish access. Riverine fish are accommodated by a fishway that was reconstructed under the 2004 license. Effectiveness studies are ongoing, and no problems are identified in the record. An intake screen was also installed to prevent entrainment, and it has been assessed to assure that fish impingement is not significant.

Regarding recreation, the Project is on federal lands and there are no restrictions to access and use, except where warranted for protection of the facilities or public. The Applicant has constructed certain recreational improvements under an approved recreation plan.

Regarding other LIHI criteria, there are no known conflicts with respect to listed T&E species at the site. Historic resources are protected under a Heritage Resource Protection Plan. The watershed protection criteria are generally not applicable; the shorelands are managed by USFS, and there is no watershed enhancement fund that would qualify the facility for extension of the certification term by three years. And there is no record of a resource agency requesting dam removal.

Issue 1. License Article 403 requires gaging of inflows to the Project as part of the approved *Operational Compliance Monitoring Plan*, but the recorded flows are inaccurate as they have not been adjusted in accordance with the most current rating curves.
Recommended Condition No. 1. The Licensee shall consult the USGS and HFF on how best to adjust flow records on an ongoing basis in order to assure their accuracy. Within 90 days of receipt of the LIHI certification, the Licensee shall provide proof of the consultation and a description of the steps that have been taken to correct the problem.

A. Flows

The Buffalo River, 10.5 miles in length, drains an area of 36.7 square miles[1]. River flows are predominantly derived from springs that originate in the headwaters. The springs provide a stable year-round base flow at the project of about 200 cfs according to the application. The station diverts a fixed flow of 100 cfs[2] from the Buffalo River year-round, directing the flow via a short penstock to the project powerhouse on the east bank of the Henrys Fork about 330 feet upstream of the Buffalo River confluence. The diversion creates a 660-foot-long bypassed reach in the

[1] This value was contained in the application. The drainage area is probably a bit larger than 36.7 square miles as that is the number the USGS uses for the upstream gaging site, which is located about one mile upstream.
[2] The record does not indicate the source or accuracy of this number.

Buffalo River extending from the project dam to the river mouth. Base flows in the bypassed reach average about 100 cfs from June through March and exceed 200 cfs in April and May.

The Buffalo River Project is licensed as a run-of-river facility (Article 402).[3] Inflows exceeding the 100 cfs station capacity are discharged downstream via the fish ladder and the dam spillway (see Figure 5).

Commenting on the license application, IDFG recommended that, if future changes occur to the hydrology of the Buffalo River, then FRREC should provide a minimum flow of at least 50 cfs to the bypassed reach. FERC decided to include such a requirement in the license, concluding that inclusion of a requirement for a minimum flow based on an uncertain future event would be premature and noting that the license would include, in standard Article 11, the Commission's reservation of authority to reopen the license to modify project structures and operations for the conservation and development of fish and wildlife resources in response to future events. The license has not been reopened to address bypass conservation flows. Neither the scientific basis for the 50 cfs flow recommendation nor FERC staff's rationale for not addressing bypass conservation flows in the 2004 are explained in the FERC final environmental assessment (July 2004).

The Applicant, in consultation with the agencies and the U.S. Geological Survey (USGS), developed the *Article 403 Operational Compliance Monitoring Plan*, which FERC approved by order dated March 2, 2007. Project inflows are monitored daily using a staff gage located at State Route 20 near Ponds Lodge in Island Park.[4] The gage rating curve (the stage/discharge relationship) was initially updated under a contract with the USGS. Stage data has been collected by FRREC since January 2006, and FRREC agreed to contract with the USGS to periodically measure the streamflow at the site so that the rating could be kept current.

Henrys Fork and the Buffalo River support important rainbow trout fisheries. The fishery, including the effectiveness of the new fishway, have been extensively studied since issuance of the license. FRREC filed the report, *Buffalo River Fish Ladder 2006-2016 Comprehensive Report* (HFF, August 2016) with FERC on August 8, 2016. The report includes an inflow hydrograph plots for 1936-41 (Figure 7) and for 2006-2016 (Figure 8).

[3] FERC amended Article 402 by order dated August 10, 2005 at FRREC's request, allowing deviations from run-of-river to occur when the station is taken off line and there is a lag before full flows are restored downstream. IDEQ and HFF commented and had no objections to the change.

[4] The USGS operated a surface water gage at this location (Gage #13043000. Buffalo River at Island Park ID) from May 1, 1935 through January 2, 1941.

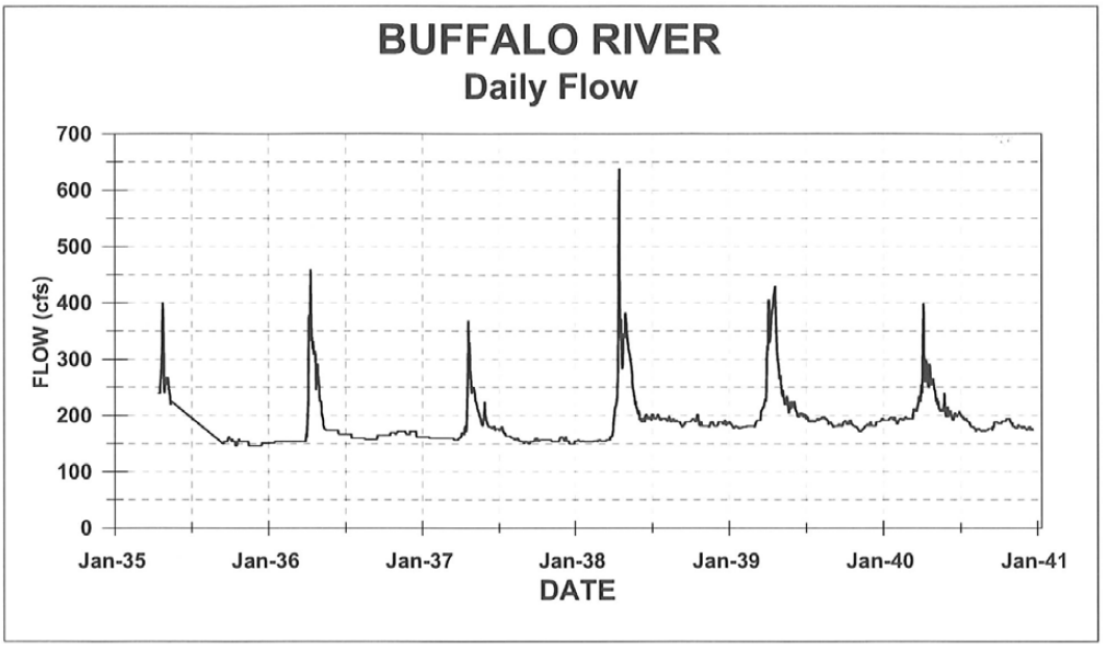

Figure 7. Historical flows at USGS Station No 13043000, 1936-1941. Source: *Buffalo River Fish Ladder 2006-2016 Comprehensive Report* (HFF, August 2016)

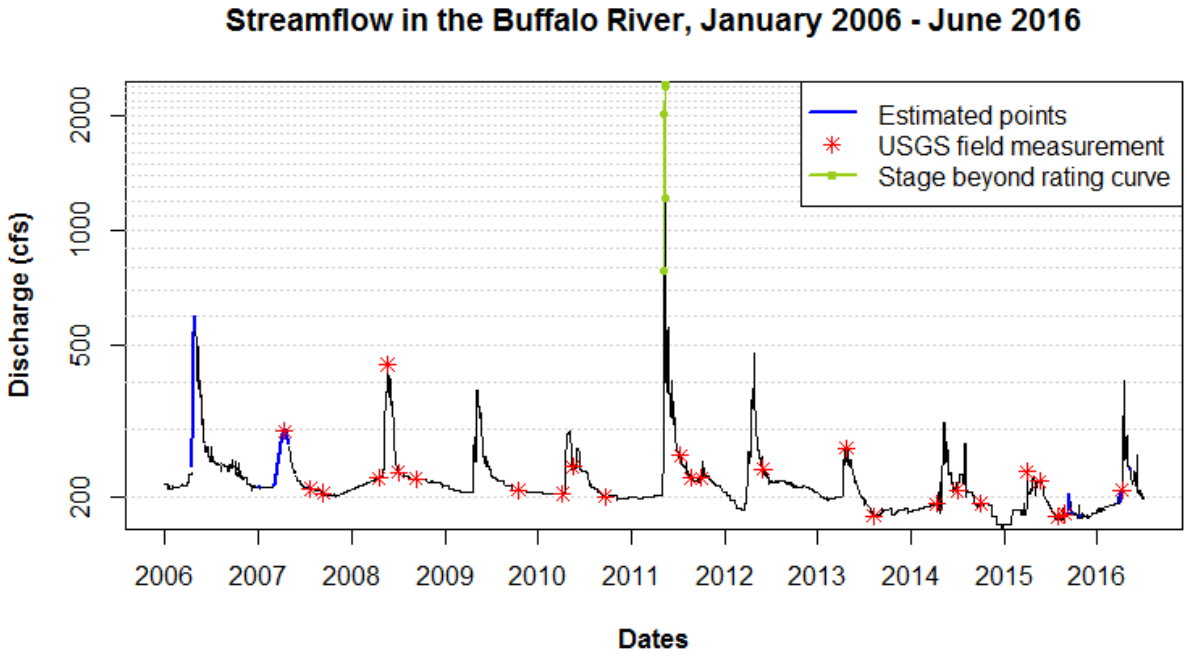

Figure 8. Project inflow data collected by FRREC at the former USGS gage site and adjusted by HFF using the USGS gage rating. Source: *Buffalo River Fish Ladder 2006-2016 Comprehensive Report* (HFF, August 2016)

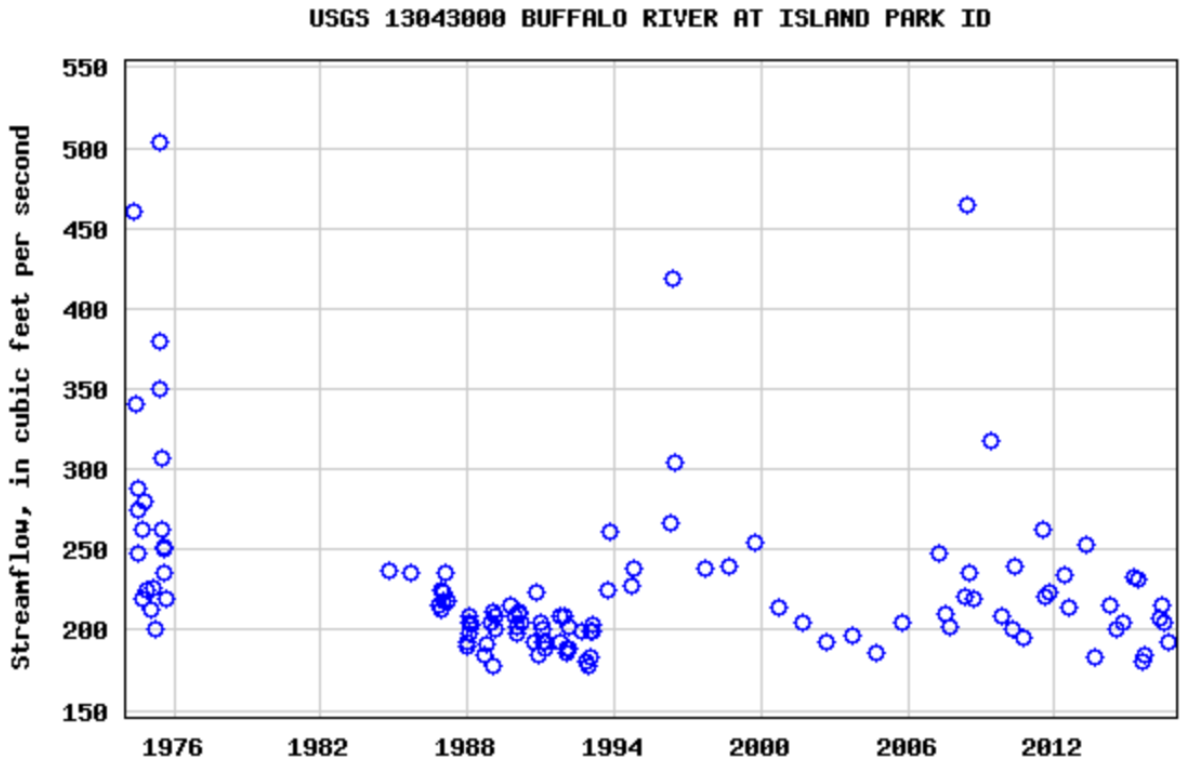

Figure 9. Random measurements by the USGS at the gage site since 1974. Source: USGS website.

In order to understand low baseflow conditions at the site and net flows experienced in the bypassed reach, I requested, and the Applicant provided (email from Mark Chandler, February 15, 2017), its daily flow data from 2012-16. I initially compared these record to the plot in Figure 8 above and noticed that the flow data provided by FRREC does not match the Figure 8 hydrograph. I then compared the some of FRREC's flow data to the concurrent USGS rating measurements and found that quite a number of the recorded flows were on the order of 10% to 50% higher.

On February 22, 2017, I spoke with Rob Van Kirk, Senior Scientist with HFF. He explained the basis for the discrepancy (see appended email). FRREC has not been adjusting the rating curve consistent with normal rating curve recalibrations that account for shifts in the natural control section. HFF provided me with corrected data.

The annual low flows for 2012-2016 were 185 cfs, 178 cfs, 165 cfs, 170 cfs, and 183 cfs, respectively. Adjusted for the 100 cfs, flows in the bypass remained well above IDFG's target flow of 50 cfs at all times during the period. One may also note that the base flows for the historical gaging period (Figure 7) were on the order of 150 cfs; operating under those historical

flow conditions would have left about 50 cfs in the channel. Further, the random measurements taken by the USGS at the gage site, shown in Figure 9, are all at or above 178 cfs.[5]

Donald Tennant's Montana Method is an alternate way of assessing flow sufficiency for aquatic biota and can be used in LIHI's A.2 standard. The method is hydrology based, and a flow of 30% of average daily flow is characterized as good habitat conditions. Other percentages can be used for seasonal flow needs, such as spawning periods. The average daily flow for 2012-16 (HFF data) is 202 cfs. "Good" habitat conditions would be provided by a flow of 30% x 202 cfs = 61 cfs, a bit higher than IDFG's 50 cfs, but bypass flows still exceeded this value in all of those five years.

Since the station capacity of 100 cfs is less than inflows at all times, impoundment drawdowns do not occur. There can, however, be a lag time following station shutdowns. FRREC requested that Article 402 be amended to clarify that such lag times would not be considered a violation of run-of-river operation, noting that the absence of automated gates precluded the ability to maintain outflows equal to inflows at all times. HFF stated that the impact on flows and habitat is not significant, and FERC staff concurred. The article was amended by order dated August 10, 2005.

Based on available flow data, the stated hydraulic capacity of the station, and the run-of-river mode of operation, I conclude that the operation is "appropriately protective of habitat and aquatic life" in the bypassed reach of the Buffalo River and in Henrys Fork below the station tailrace. A further consideration is that the record, including the recently completed fishway evaluation report, does not indicate any issues having been raised with respect to flow sufficiency in the bypassed reach. While I reach this conclusion based on best available information, FRREC may need to provide better substantiation if recertification is requested under the 2nd edition Handbook. The new Handbook would require either that 1) the flow regime at the Facility was developed in accord with a site-specific, science-based agency recommendation, or 2) the flow regime at the Facility was developed on a site-specific basis, using a well-documented habitat evaluation technique or a science-based flow-ecology model. Either approach may require verification of the actual flows passed at the spillway/fishway (e.g., checking the actual turbine capacity); flow/habitat modeling; and defining the minimum flow necessary to provide a zone of passage for fish movement between Henrys Fork and the fishway entrance.

The Article 403 compliance plan states, on p. 7:

> The Licensee has consulted with the USGS pertaining to updating the current gauge. An agreement (attached in appendix A) was entered into with the USGS December 14, 2006 to update the gauge rating curve. To update the rating curve the USGS will need to make at least three visits to the site during different flow conditions to take measurements. Once the rating curve has been updated the USGS will need to return to the site approximately twice annually to take measurements and adjust the rating curve as needed. The Licensee has agreed to reimburse the USGS for this work. The Licensee will take stage measurements of the water

[5] https://waterdata.usgs.gov/nwis/measurements/?site_no=13043000

elevation with the current measuring gauge. This stage measurement together with an updated rating curve will result in a volumetric flow rate.

Since compliance with the plan envisions maintaining an accurate record of flows based on a current rating curve, I am recommending that certification be conditioned on consultation with the USGS and HFF to develop a protocol for adjusting the rating curve on an ongoing basis as field measurements are done by the USGS and adjusting the daily records accordingly.

LIHI Questionnaire: Flows	
A.1	**Is the Facility in *Compliance* with *Resource Agency Recommendations* issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypassed reaches?**
	Reviewer Analysis/Conclusions: The station operates true run-of-river mode. With respect to the bypassed reach, only IDFG had made a flow recommendation (50 cfs). Although it was not formally adopted by FERC, the natural flows in the Buffalo River, based on available data, are sufficient to both support generation and maintain 50 cfs in the bypassed reach. **YES = PASS**

B. Water Quality

FRREC applied for a water quality certification for the project on November 26, 2002. IDEQ, the certifying agency for Idaho, received the request on the same date. On November 28, 2003, IDEQ issued the certification subject to no special conditions; however, because IDEQ failed to act within one year of FRREC's request, the certification was deemed waived.

Idaho's designated uses for the Buffalo River from Elk Creek to the mouth (Assessment Unit ID17040202SK016_03, 2.33 miles) are Aquatic Life: Cold Water Communities – Salmonid Spawning; Primary Contact Recreation; and Domestic Water Supply. A salmonid spawning designation invokes more stringent temperature and dissolved oxygen criteria compared to other aquatic life designations. (Idaho Administrative Code, IDEQ, IDAPA 58.01.02, Water Quality Standards, p. 115)

In an email of July 6, 2016 to the Applicant's consultant, IDEQ stated, "DEQ can't confirm compliance with numeric standards due to the lack of data; however, DEQ is confident the Project is not adding common pollutants such as sediment solar load (temperature) by the current operations." Although this statement is not conclusive as to compliance with water quality standards, it seems reasonable to conclude that IDEQ is confident that the facility does not cause, or contribute to, violations of water quality standards. IDEQ previously certified the Project, as proposed for licensing, as meeting water quality standards without imposing any special conditions.

The lower segment of the Buffalo River below Elk Creek is not listed as impaired on Idaho's federal Clean Water Act Section 303d list. The segment is a Category 3, Unassessed Water (*Idaho's Integrated Report 2014, Final*, IDEQ, February 2017, p. 39). Category 3 Waters are defined as those waters with insufficient data and information to determine if beneficial uses are being attained. The next segment upstream (Chick Creek to Elk Creek, Assessment Unit ID17040202SK018_03, 7.28 miles) is listed as Category 4a sedimentation/siltation impaired with an EPA-approved TMDL (Total Maximum Daily Load). The impaired uses are coldwater aquatic life and salmonid spawning. IDEQ attributes the impairment to streambank erosion caused by historical recreational access (*Upper and Lower Henry's Fork Total Maximum Daily Loads: Addendum to the Upper Henry's Fork Subbasin Assessment and TMDLs*, IDEQ, June 2010).

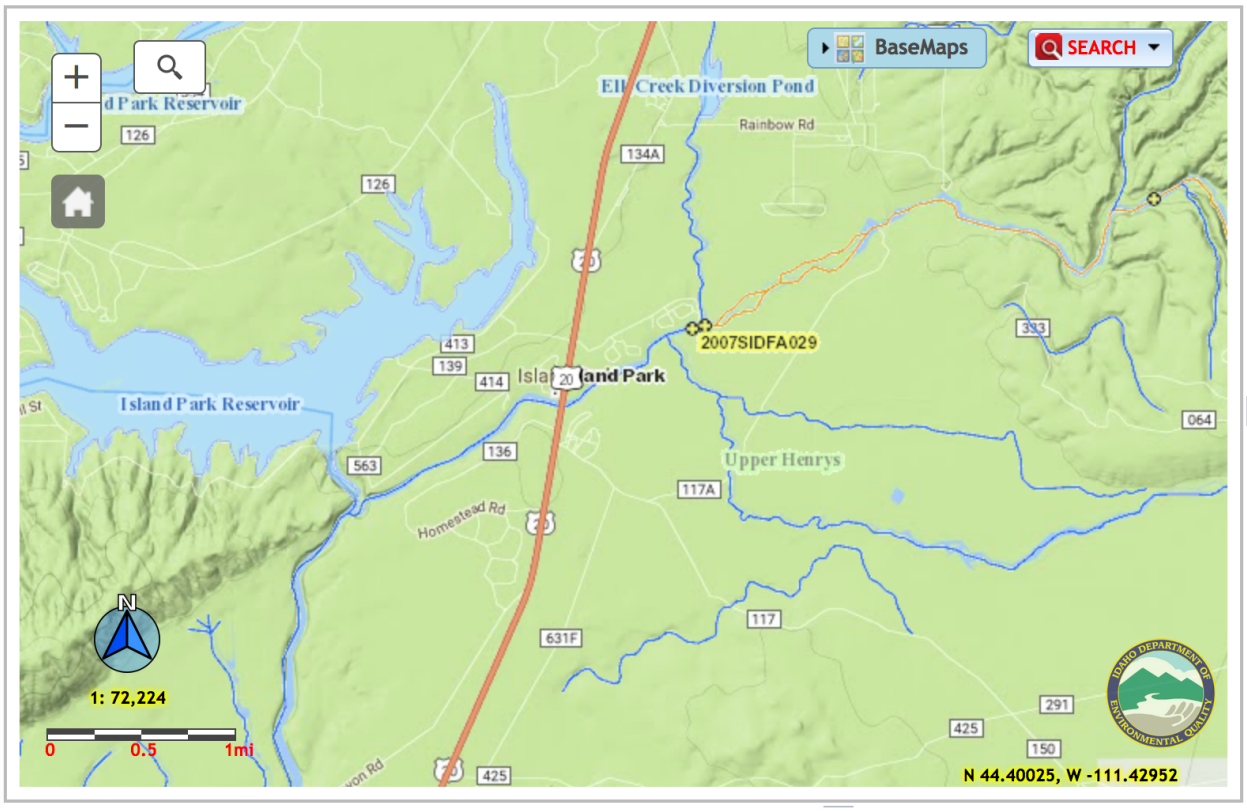

Figure 10. 2014 Status of waters. Blue = Not assessed. Red = Not supporting uses. (2014 Section 305(b) Integrated Report, IDEQ)

LIHI Questionnaire: Water Quality	
B.1	**Is the Facility either:** **a) In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986? Or** **b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?**
	Reviewer Analysis/Conclusions: In 2003, IDEQ certified that the Project as proposed for licensing would meet water quality standards without any special conditions imposed. From a regulatory perspective, the certification was waived, but none-the-less it indicates that IDEQ was reasonably assured standards would be met. **YES to (b)**
B.2	**Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?**
	Reviewer Analysis/Conclusions: The Buffalo River is not 303(d) listed (2014 list). **NO = PASS**

C. Fish Passage and Protection

Henrys Fork and Buffalo River support rainbow trout, brook trout, mountain whitefish, as well as several non-game species. In the 1930s, construction of the Buffalo River Dam blocked upstream fish passage to the Buffalo River, the only large tributary to the Henrys Fork between Island Park Dam (River Mile 91.7) and Mesa Falls (River Mile 65.0), two barriers that isolate this reach of Henry Fork. In 1996, a working group of the Henry's Fork Watershed Council realized the goal of restoring fish migration from the Henrys Fork into the Buffalo River with the completion of a fish ladder at the Buffalo River dam, replacing one built in the 1930s. The fish ladder was improved in 2006 to allow juvenile trout access to winter habitat and to increase the number of spawning trout migrating upstream in hopes of increasing recruitment to the Henrys Fork fishery.

Since the Project is in the Snake River headwaters with natural barriers downstream, diadromous fish did not use the Project area historically.

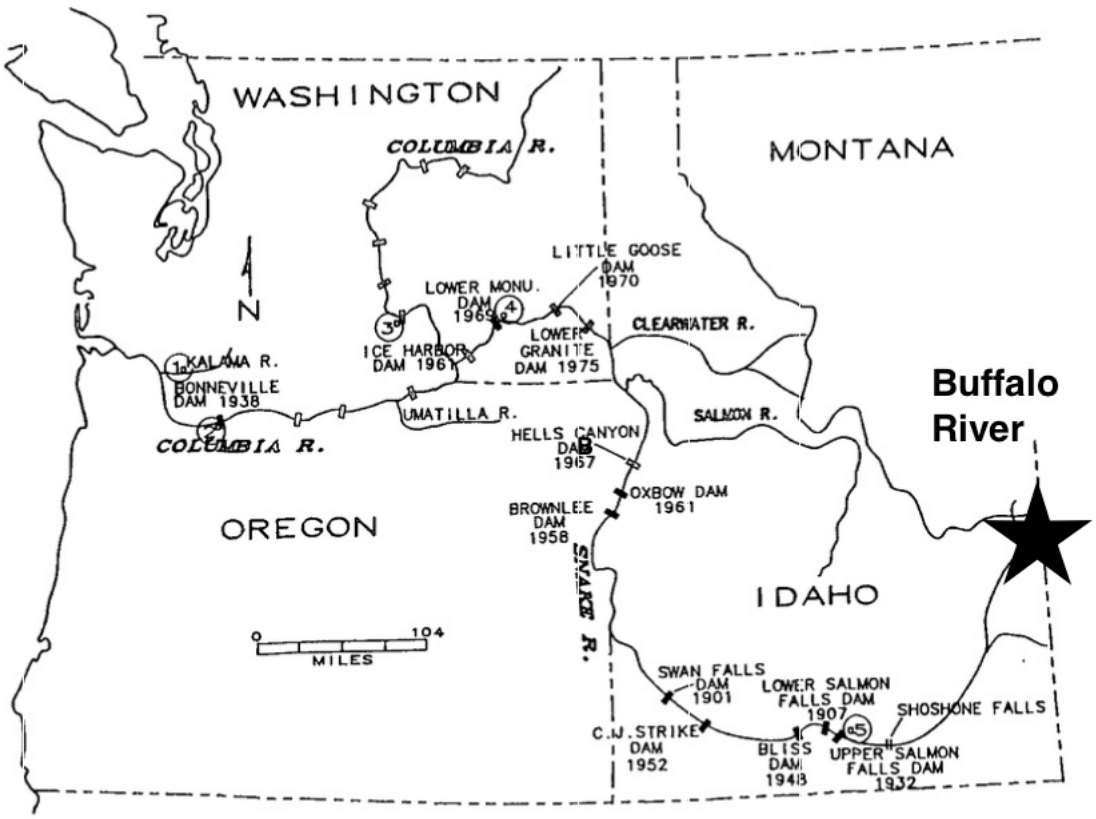

Figure 11. Map showing locations of Columbia River basin dams with year of first operation. (Source: NOAA-NMFS. *Status Review of Snake River Fall Chinook Salmon*.

Fishway evaluation under Article 407is ongoing. HFF recently completed report, *Buffalo River Fish Ladder 2006-2016 Comprehensive Report* (August 2016) indicates that the Buffalo River is particularly important for spring spawning by Henrys Fork rainbow trout and less important than

originally thought for juvenile trout overwintering.

The fishway reconstruction was proposed by FRREC as part of the license application. There are no formal passage prescriptions, although there is a reservation of authority should the USFWS elect in the future to prescribe passage.

The license under Article 406 also provided for intake screening to prevent fish entrainment. The screen meets USFS design standards for spacing and maximum approach velocity. FRREC provides frequent removal of debris and trash from the installed screen to maintain proper approach velocities. Article 407 requires impingement monitoring for the first three years after installation and every third year thereafter. The USFS confirmed compliance by email to the Applicant's consultant on May 12, 2016.

On February 21, 2017, I spoke with Thomas Bassista, IDFG Staff Biologist and Lee Maybe, USFS Henrys Fork Zone Fisheries Biologist, both of whom stated that the resource agencies had a good working relationship with FRREC. Mr. Maybe noted that some improvement in overall maintenance of fishway is needed, specifically with regard to cleaning the intakes to the fishway. The issue is mentioned in a January 22, 2017 letter from the USFS to FERC, appended. The fishway is supposed to be maintained and operated year-round.

Figure 12. Upper Mesa Falls, Targhee National Forest, on Henrys Fork 26 miles downstream of the Project. (Brian W. Schaller)

LIHI Questionnaire: Fish Passage and Protection	
C.1	**Are anadromous and/or catadromous fish present in the Facility area or are they know to have been present historically?**
	Reviewer Analysis/Conclusions: No. **NO= Go to C.6**
C.6	**Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of *Riverine* fish?**
	Reviewer Analysis/Conclusions: There are no prescriptions for riverine fish. **N/A = Go to C.7**
C.7	**Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?**
	Reviewer Analysis/Conclusions: Entrainment protection is required under the license, Article 406, and impingement mortality monitoring under Article 407. **YES = PASS**

D. Watershed Protection

The lands at the Project site and the contributing watershed are primarily in federal ownership or control, including the impoundment, as part of the Targhee National Forest. The Applicant does not have any control or land management obligations with respect to the reservoir shoreline, nor is there an Applicant administered shoreland management plan. The Applicant has not created a watershed enhancement fund, nor has the Applicant conserved lands in the basin for mitigation purposes.

FRREC developed, and FERC approved by order dated August 2, 2005, a vegetation management plan in accordance with USFS Condition No. 17. The Vegetation Management Plan is prescribed to prevent the movement of invasive weeds into the project area during construction activities, prevent the spread of weeds within disturbed areas, and re-establish native plant species in potentially disturbed areas to prevent soil erosion.

LIHI Questionnaire: Watershed Protection	
D.1	**Is there a buffer zone dedicated for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low-impact recreation) extending 200 feet from the highwater mark in an average water year around 50 - 100% of the impoundment, and for all of the undeveloped shoreline?**
	Reviewer Analysis/Conclusions: The shorelands are managed by USFS. **NO = Go to D.2**
D.2	**Has the facility owner/operator established an approved watershed enhancement fund that: 1) could achieve within the project's watershed the ecological and recreational equivalent of land protection in D.1 and 2) has the agreement of appropriate stakeholders and state and federal resource agencies?**
	Reviewer Analysis/Conclusions: There is no watershed enhancement fund. **NO = Go to D.3**
D.3	**Has the facility owner/operator established through a settlement agreement with appropriate stakeholders and that has state and federal resource agencies agreement an appropriate shoreland buffer or equivalent watershed land protection plan for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low impact recreation).**
	Reviewer Analysis/Conclusions: There is no settlement agreement. **NO = Go to D.4**
D.4	**Is the facility in compliance with both state and federal resource agencies recommendations in a license approved shoreland management plan regarding protection, mitigation or enhancement of shorelands surrounding the project?**
	Reviewer Analysis/Conclusions: There is no license-approved shoreland management plan. **N/A = PASS**

E. Threatened and Endangered Species Protection

Several listed species have been identified as present in Fremont County. In its application, FRREC provided current information on federal and state listings based on a September 22, 2016, USFWS IPAC Project Planning Report, a Sept 22, 2016, USFWS Species by County Report, and a July 7, 2016, email from IDFG. Listed species include grizzly bear, Canada lynx, and Ute ladies' tresses orchid; all were listed at the time of licensing as well.[6]

A Grizzly Bear Recovery Plan was originally approved in 1982 and was updated in 1993. An interim strategy document was developed for the Canada Lynx, and a recovery plan is expected to be finalized in 2018. A draft recovery plan for the Ute ladies' tresses orchid was developed in 1995 but was never finalized; the plant was found on Henrys Fork 25 miles from the Project site.

FRREC developed, and FERC approved by order dated July 13, 2005, both an endangered species protection plan and a sensitive species biological evaluation in accordance with USFS Conditions No. 18 and 19, respectively. The plan only identified concerns with respect to construction activities, and not ongoing operation of the facility.

The application includes a statement from IDFG dated September 16, 2015 that Project operation is not negatively affecting state or federally listed species.

LIHI Questionnaire: Threatened and Endangered Species Protection	
E.1	**Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?**
	Reviewer Analysis/Conclusions: Several listed species may be found in the Project area or downstream. **YES = Go to E.2**
E.2	**If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?**
	Reviewer Analysis/Conclusions: A recovery plan is in place for grizzly bear. Operation of this run-of-river facility does not conflict with this plan. **YES = Go to E.3**
E.3	**If the Facility has received authority to incidentally Take a listed species through: (i) Having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental Take statement; (ii) Obtaining an incidental Take permit pursuant to**

[6] The USFWS concurred with FERC's request of July 16, 2004 that its draft environmental assessment serve as a Biological Assessment for the purposes of consultation under Section 7 of the Endangered Species Act. The USFWS concurred with FERC's determination that the new license and associated project activities may affect, but are not likely to adversely affect, bald eagle, Canada lynx, and grizzly bear. The USFWS also acknowledged FERC staff's conclusion that the project will not affect the Utah valvata snail and Ute ladies' tresses.

	ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authority pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authority?
	Reviewer Analysis/Conclusions: **N/A = Go to E.5**
E.5	**If E.2 and E.3 are not applicable, has the Applicant demonstrated that the Facility and Facility operations do not negatively affect listed species?**
	Reviewer Analysis/Conclusions: No impacts from ongoing operations of the facility have been identified as potentially conflicting with protection of listed species. Any future construction activities would be subject to a biological evaluation and consultation/approval process under USFS Condition No. 19. **YES = PASS**

F. Cultural Resource Protection

USGS Condition No. 12 addresses cultural resource protection, mitigation or enhancement for planned ground-disturbing activities or incidences related to Project operation. The condition applies to "items of potential cultural, historical, archeological, or paleontological value are reported or discovered, or a known deposit of such items is disturbed on National Forest System lands." FRREC developed a Heritage Resource Protection Plan and filed it with FERC on May 13, 2005. The plan indicates that all work activities will cease if such items are discovered pending a consultation process with the USFS and FERC and written approval to proceed from the USFS. FERC approved the plan by order dated June 8, 2005. The USFS indicated by email dated May 12, 2016 that the Applicant is in compliance with the plan.

LIHI Questionnaire: Cultural Resource Protection	
F.1	**If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?**
	Reviewer Analysis/Conclusions: The USFS has indicated that the Applicant is currently in compliance with the FERC-approved Heritage Resource Protection Plan. **YES = PASS**

G. Recreation

USFS Condition Nos. 10 and 11 requires development of a Recreation Management Plan and an Interpretive Display Plan, respectively. The plans, which were approved by FERC by order dated February 28, 2006, provide for construction and operation of certain recreation facilities and sites on National Forest System lands, accommodations for the Americans with Disabilities Act in the existing parking area and turn around, and planning for future development or rehabilitation of recreation facilities or sites. FRREC is responsible for providing recreational access sites within the Project vicinity while the USFS is responsible for maintaining the recreation sites.

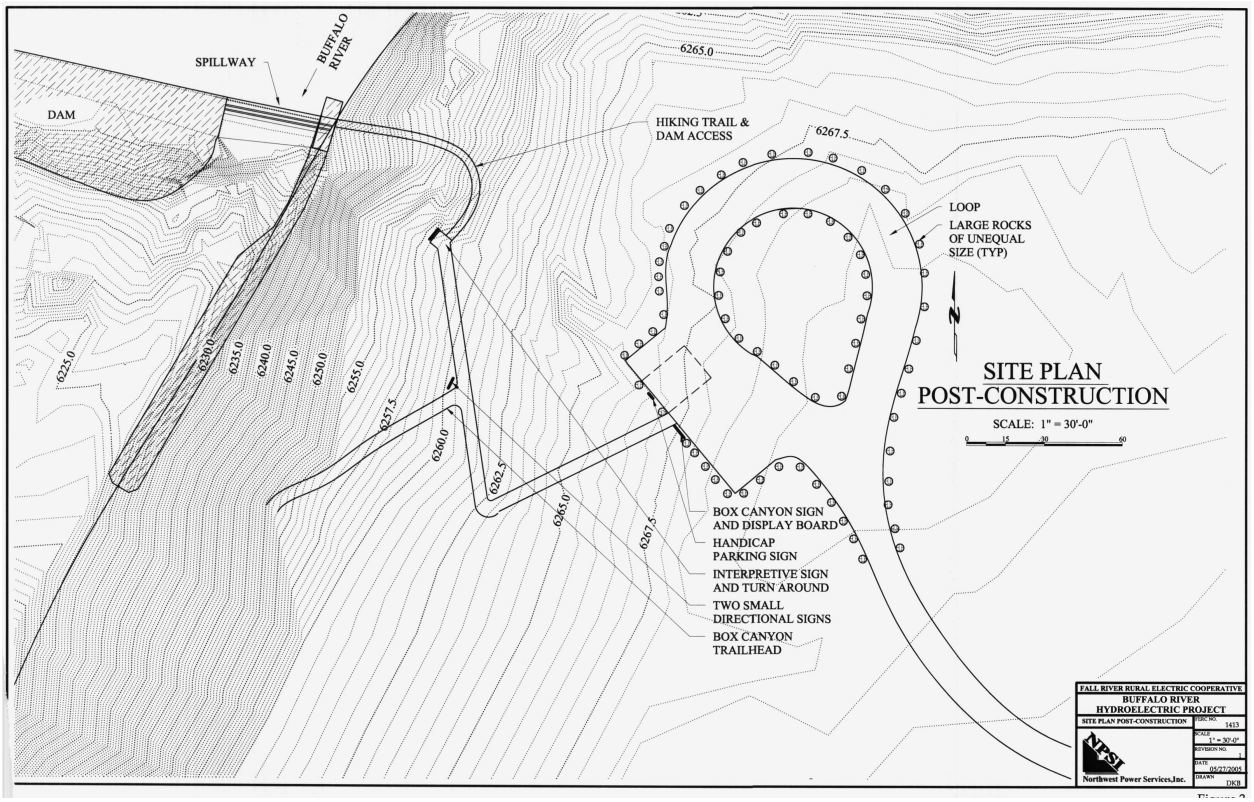

Figure 13. Project recreational amenities.

In 2005-2006, FRREC upgraded the public parking area and turnaround area and improved the short trail connecting the parking/turnaround area to Box Canyon Trailhead. FRREC also installed an interpretative project description sign, a trail to the interpretative sign, and a 4-foot by 6-foot sign board for the Box Canyon Trailhead.

FRREC provides free public access to the impoundment and downstream reaches through a public parking facility and connecting trail leading to the dam spillway area.

LIHI Questionnaire: Recreation	
G.1	**If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?**
	Reviewer Analysis/Conclusions: The Applicant is in compliance with the FERC-approved recreation plan. The USFS annually inspects the Project for compliance with its special use permit and the terms incorporated in the FERC license. **YES = Go to G.3**
G.3	**Does the Facility allow access to the reservoir and downstream reaches without fees or charges?**
	Reviewer Analysis/Conclusions: Access is available on the federal lands, which include the Project. **YES = PASS**

H. Facilities Recommended for Removal

There is no record of a dam removal request during the licensing process.

LIHI Questionnaire: Facilities Recommended for Removal	
H.1	**Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?**
	Reviewer Analysis/Conclusions: There is no record that dam removal has been recommended at any time by a resource agency. **NO = PASS**

APPENDIX

Rob Van Kirk
To: Jeffrey Cueto, Mark Chandler

10:34 AM
Details

RV

New contact info found in this email: Rob Van Kirk rob@henrysfork.org add...

Jeffrey and Mark,

I will try to follow up with a phone call to Jeffrey and explain the full details of how we take the stage measurements Mark gives us an convert them into flow. In a nutshell:

1. FRREC manually records raw river stage every day (or at least every day when the gage is accessible)
2. USGS visits the site 3-4 time per year, makes a manual measurement, and records the measured stage, shift, and discharge in the online database at https://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=13043000
3. FRREC provides HFF with the raw stage measurements. We generally enter them exactly as recorded except where it appears obvious that some sort of recording, gage or transcription error occurred.
4. We then obtain the latest rating shift from the USGS site, use linear interpolation to estimate shift between field measurements (this is the standard USGS method), apply the interpolated shift to the raw data, and then use the stage-discharge curve USGS provided directly to us to calculate discharge. This is exactly the same method USGS uses at all gages it maintains. The only difference here is that we do the shift interpolation and calculation.
5. Values calculated since the most recent field visit will change slightly after recalculated following the next field visit. This is also standard procedure at all USGS sites, since the stage shift interpolation changes each time a new record is added.
6. For days with missing data, we use cubic-spline interpolation to fill in the missing values.

Attached is the latest full record of the data. The last column has data flags in it: M = field measurement, ADJ= manual stage record adjusted prior to entry in the database, E = no stage record; flow estimated from cubic-spline interpolation; OB = stage record beyond rating curve (these were extremely high flow values; values may not be accurate, but comparison with real-time gages nearby confirmed this high-flow event); PH=end of last period of continuous stage records provided to us.

Rob

Rob Van Kirk, Ph.D.
Senior Scientist
Henry's Fork Foundation
P.O. Box 550
Ashton, ID 83420
208-652-3567
208-652-3568 FAX

rob@henrysfork.org
www.henrysfork.org

See More from Jeffrey Cueto

Found in Sent - AOL Mailbox

☆ **Jeffrey Cueto**
To: Mark Chandler Cc: Rob Van Kirk

Yesterday at 9:59 PM
Details

Mark — I had looked at that data last week. As I understood it, the USGS was going to update and maintain the rating curve for the gage under your FERC-approved compliance plan. The data on the USGS site are the field measurements that are used to adjust the rating to account for any shifts that occur over time (e.g., typically deposition or scour at the control section for the gage). I had compared the data to the values in your spreadsheet, and a fair number of the rating measurements are on the order of 10% lower than the values in your spreadsheet. So it does seem that some work needs to be done here.

I was going to talk to HFF tomorrow, and I'll ask about their graph and how they got the numbers they input since they don't match yours. (I'm copying them on this message to give them a heads up.)

Overall I think this project is pretty benign from what I can tell. Artificial flow manipulation is limited by the fact that the station capacity of 100 cfs is lower than the lowest base flows of the river. That said, accurate gaging is important, and it sheds some light on what the flow regime is in the bypassed reach. I may recommend to LIHI that certification be conditioned on resolving the gaging issue. It seems like it should be simple if the USGS is already being contracted to do the measurements and provide the rating. Then it's just a matter of making sure the log entries are adjusted starting with the last field measurement if there is a rating change. Please let me know if you think that is reasonable.

Jeff

See More from Mark Chandler

Mark Chandler
To: Jeffrey Cueto

Yesterday at 10:39 AM
Details

MC

Hi Jeffrey,

This link is the only USGS data on Buffalo we can find. If you found better data would love to see it. Not sure if we figure stream flow adjustments correctly. The plant operator takes readings off a staff gauge when weather permits.

Mark Chandler

From: Dave Peterson
Sent: Tuesday, February 21, 2017 8:32 AM
To: Mark Chandler <Mark.Chandler@fallriverelectric.com>
Subject:

https://waterdata.usgs.gov/nwis/measurements/?site_no=13043000

Dave Peterson
Manager of Engineering
Fall River Electric Cooperative
(208) 652-7050 Direct Office
(208) 709-4870 Cell

FALL RIVER
RURAL ELECTRIC COOPERATIVE

"Where Service Matters"

United States Department of Agriculture **Forest Service** **Caribou-Targhee National Forest HQ**
1405 Hollipark Drive
Idaho Falls, ID 83401
208-529-1020
Fax: 208-557-5827

File Code: 2770
Date: January 22, 2017

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

Re: FERC Project No. 1413-038
Order Amending Fishway and Fish Screen Monitoring Plan
Pursuant to Article 407, and Need for Regular Maintenance of Fishway by Licensee

Dear Secretary Bose:

On October 11, 2016 FERC issued an order amending the Fishway and Fish Screen Monitoring Plan. This was done in response to a request from Fall River Rural Electric Cooperative, Inc.'s. The Forest Service along with Henry's Fork Foundation (HFF) and Idaho Fish and Game had reviewed the data that had been gathered to date. The Forest Service approves the changes made to the timeframes now required for monitoring but seeks to clarify the rationale for these changes as they were incorrectly stated in the order.

In section 3. of the order it is stated that: "*Based on the monitoring data collected under the plan, . . . the licensee does not believe that year-round monitoring is necessary at this time. The licensee has not observed any impediments to upstream migration, but the numbers of fish out-migrating in the spring has remained consistently low. As such, the license requests that fishway and fish screen monitoring be reduced to February through June only, to capture the spring out-migration.*"

The Forest would clarify that the fishway monitoring conducted from February through June is to monitor upstream migration of trout during the spawning period not out migration.

Monitoring of upstream movement of young fish in the fall has observed a median number of 1792 (n=9 years) individual fish migrating into the Buffalo from the Henry's Fork each fall (HFF 2016 report). Monitoring of out-migrants was never part of the monitoring plan but has been conducted by HFF in cooperation with all partners to better understand the contribution of all the parts to the whole.

In section 5. of the order it is stated that: "*The licensee's request, to reduce year-round monitoring to February through June annually, appears to be reasonable. The licensee has collected data, as described in the plan, with acceptable operational results; however, the number of spring out-migrants is not as high as anticipated. As such, the licensee intends to continue monitoring during the spring months. The Forest Service concurs that July through January monitoring is no longer necessary, and the data demonstrates that the fishway is functioning as intended for upstream migrating fish. As such, the licensee's request should be approved.*"

The studies summarized by HFF have concluded that survival rates of the up-migrating young are no better in the Buffalo than in the Henrys Fork. It has also found that the majority of out-migrating young in the spring are offspring of either resident rainbow trout in the Buffalo River or are offspring of the spawning run of rainbows from the Henrys Fork that use the fishway. The study concluded that the fall up-migrants composed 0.18% and 1.42% of the following spring out migrants. The rest being composed of rainbow trout spawned in the Buffalo River itself. Studies are still being conducted to decipher the contribution of resident vs. migratory spawning to the out-migrants.

The primary purpose of the spring monitoring of the fishway is to verify the numbers of migrating adults that may be spawning in the Buffalo.

The reasoning for allowing the changes to the monitoring plan are the number of spawners and up-migrating young has been relatively constant. Little movement has been detected during late December thru January. And up-migrating young are not as numerous as offspring of trout spawned in the Buffalo River. By monitoring spawning movements and in conjunction with learning from the past studies major changes will still be detected.

Also at times we have noticed lapses in cleaning the intakes to the fishway that are causing the fishway to be unusable. Though the fishway is not being monitored year round for passage it still needs to be checked and kept clean on a daily basis or at least as often as the screen to the penstock is cleaned so the fishway is operable.

The Henry's Fork Foundation who has completed most of the fish monitoring can assist with cleaning as they monitor the fish trap February- June but ultimately it is the responsibility of the Licensee to ensure the fish way remains operational year round. There are two intake sites that need cleaning the intake for the attractant flow and the trash rack in front of the fishway intake along with the finer screen behind it. During the year when the trap is not being operated there may be some operational options to make cleaning easier and more accessible.

On December 9, 2016 Lee Mabey of our office discussed the need to regularly clean the entrance to the fishway and the associated intake for the attractant flow with Dave Peterson, Manager of Engineering for Fall River Rural Electric. He was assured this issue would be resolved and regular cleaning of the fishway would occur.

If there are questions regarding this letter the fishway or its operation please contact Lee Mabey at 208-557-5784 or lmabey@fs.fed.us.

Sincerely,

GARTH SMELSER
Forest Supervisor

cc: Fall River Rural Electric, Henry's Fork Foundation, Idaho Fish and Game