REVIEW OF APPLICATION FOR CERTIFICATION OF THE ISLAND PARK 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 Island Park Hydroelectric Project (the Project). The application was filed on December 23, 2016 and is subject to review under the April 2014 LIHI Handbook. The Project had been certified by LIHI in 2001 under Certificate No. 2; that certification expired June 7, 2003. The certification was extended in 2003 when LIHI extended certification terms from two years to five years in duration. It was certified again for a five-year term from June 24, 2006 to June 24, 2011. FFREC chose not to apply for recertification at that time.

I. PROJECT'S GEOGRAPHIC LOCATION

The Island Park Hydroelectric Project is located at the U.S. Bureau of Reclamation (USBR) Island Park Dam on the Henrys Fork, or North Fork, of the Snake River just upstream of the confluence with the Buffalo River, which enters from the east. It is in Fremont County, Idaho about 39 miles north of Ashton. The Project is located within the Targhee National Forest.

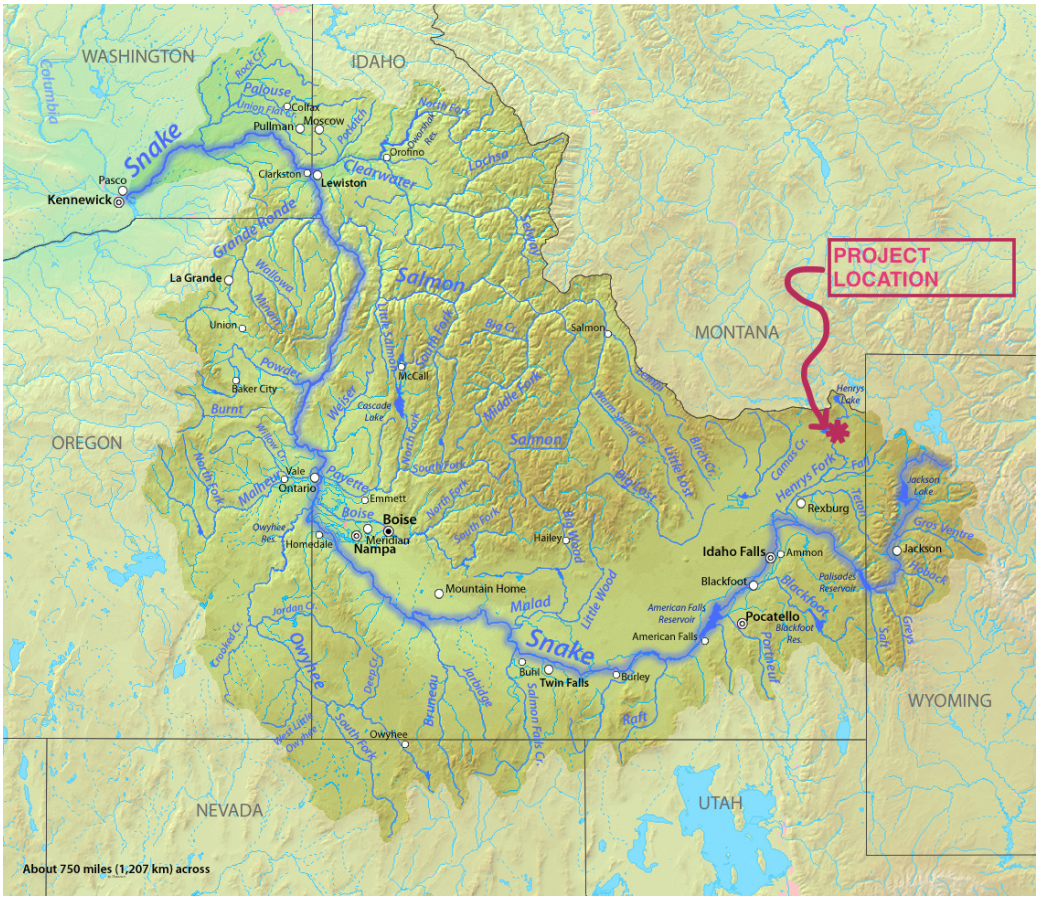

Figure 1. Project location in the headwaters of the Snake River in southeastern Idaho.

Figure 2. Island Park Dam.

II. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

USBR completed the Island Park dam in 1939 as part of the Minidoka Project, which provides water to irrigate farmland in Idaho's Snake River Plain. The dam is located at River Mile 91 and about 0.4 mile upstream of the Buffalo River confluence as shown in Figure 2. FRREC also owns a hydroelectric facility at the Buffalo River Dam; that facility was built in 1936 to generate hydroelectric power in support of the construction of Island Park Dam and Reservoir, and is also currently under review for LIHI certification. The headwaters of the Henrys Fork begin 31 miles upstream of the dam, at Henrys Lake.

Island Park dam is a 9,448-foot-long earthfill structure with a maximum height of 91 feet, and a concrete spillway at crest elevation 6,309 feet m.s.l. that joins the outlet tunnel at the bottom of the dam. The dam outlet structure is at 6,230 feet m.s.l. inside the reservoir and is composed of: (1) an intake structure with trashracks and screens; (2) a 12-foot-diameter, concrete, circular intake tunnel 238 feet long; (3) a gate chamber, 75 feet long, at the confluence of the spillway; and (4) a 13-foot-diameter, concrete, circular tunnel, 500 feet long, with a 3,400 cfs capacity, discharging into the river southwest of the dam and opposite the powerhouse location (see figures 4 and 5).

The hydroelectric facility is a non-federal power plant that was constructed between September 1992 and July 1994. It consists of the screened intake structure with 3/8 inch openings, approximately 720 feet of a 10-foot diameter penstock, a concrete masonry powerhouse with two vertical Francis turbines/generators and associated controls, one 500 hp. centrifugal blower, one 250 hp. positive displacement blower, one 200 hp. variable speed blower with associated

controls, a 60’ x 100’ aeration basin, and a concrete masonry valvehouse located on top of the dam. The aeration basin, powerhouse, and a small section of the buried penstock are located at the base of the dam. The Project utilizes waters diverted from the Island Park Reservoir under the direction of the Fremont-Madison Irrigation District and the USBR.

Figure 3. View of Project layout.

Figure 4. Downstream view of powerhouse and angler access walkway.

The Island Park Reservoir covers an area of about 7,794 acres.

With an installed capacity of 4.8 MW, the Project generates an average of 19,437 MWh of electricity annually (2009-14).

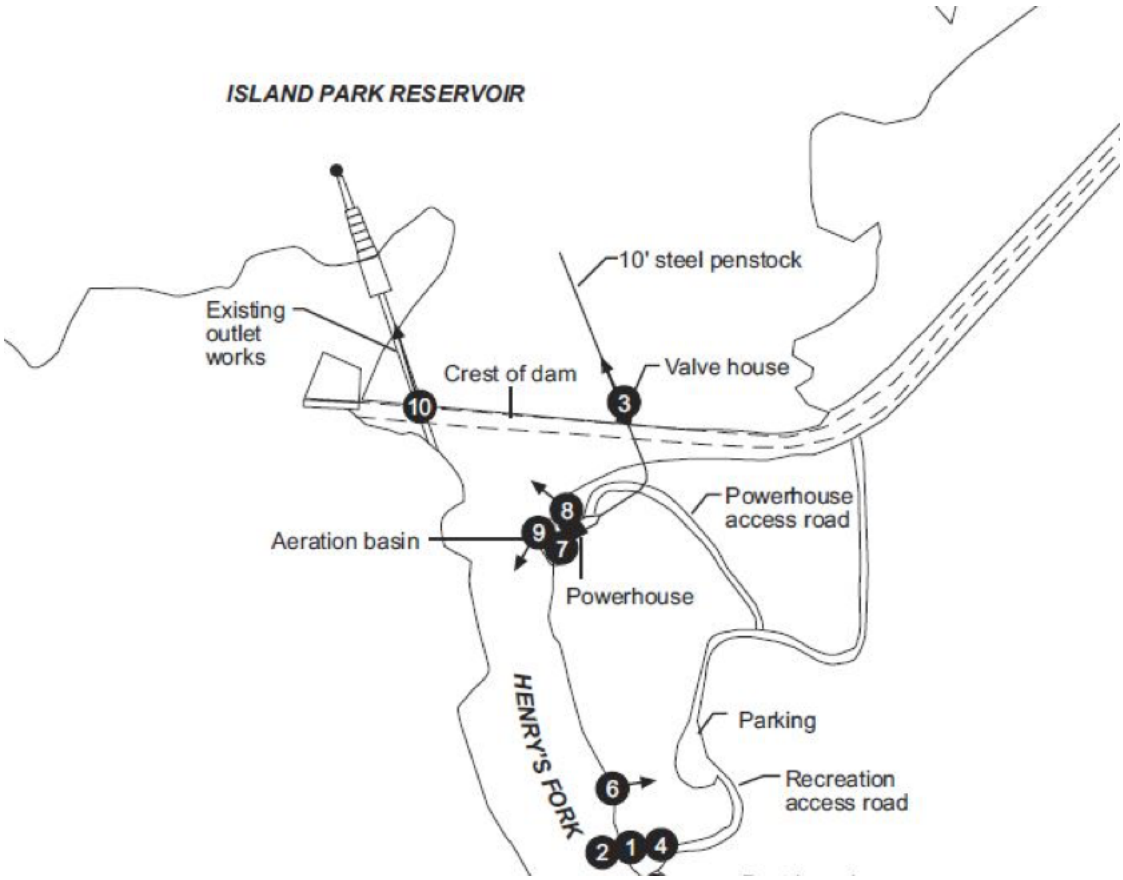

Figure 5. Site plan.

III. REGULATORY AND COMPLIANCE STATUS

The Federal Energy Regulatory Commission (FERC) granted the Project a license as Project No. 2973 on October 19, 1988. The FERC license was issued for a period of 50 years with an expiration date of September 30, 2038. The federal land manager for the Targhee National Forest is the U.S. Forest Service (USFS). The land occupied by project facilities (1.2 acres) is under the jurisdiction of the USFS; the hydroelectric project operates under a special use permit that the USFS issued to FRREC on April 23, 1992. The license incorporates articles prescribed by the USFS by letter dated February 23, 1988 pursuant to the Federal Power Act, Section 4(e) (articles 101-104). The USFS review the Project annually for compliance with both the Special Use Permit and the USFS articles contained in the license. The license also contains articles

prescribed under Section 4(e) by USBR through letters dated December 30, 1985 and September 25, 1986 (articles 115-133).

The license application was filed on July 1, 1985. Motions to intervene in the proceeding were filed by the Department of Interior, the Idaho Department of Water Resources, the Idaho Water Resources Board, the Idaho Department of Fish and Game (IDFG), the Fremont-Madison Irrigation District, the Henry's Fork Foundation, Inc. (HFF), and the Greater Yellowstone Coalition. Concerns that were raised by the intervenors included adverse impacts to area fish and wildlife resources, negative effects on water temperatures and dissolved oxygen levels downstream, sedimentation from construction activities, assurance of consistency with state water law and the Idaho State Water Plan, potential damage to the dam, and restriction of irrigation water use.

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

USFS

1. *Article 104 (Annual USFS Consultation).* Annual consultation of the USFS during the 60-day period preceding the license anniversary date as regards measures needed to ensure protection and development of the natural resource values of the project area.

2. *Article 105 (Recreation Plan).* USFS-approved recreation plan within one year of license issuance.

3. *Article 106 (Water Quality Study).* Study of pre-project water quality after consultation with USFS, U.S. Fish and Wildlife Service (USFWS), IDFG, and the Idaho Department of Health and Welfare, including dissolved oxygen, temperature, total gas pressure, and turbidity. Baseline data for use in Article 107 compliance.

4. *Article 107 (Long-term Water Quality Monitoring Plan).* Development of a water quality monitoring and mitigation procedures plan within one year of licensee issuance and in consultation with the same agencies as Article 106. Target water quality for project releases to meet or exceed water quality of USBR release. Project to cease or modify operations to comply in event of non-compliance.

5. *Article 109 (Solid Waste and Wastewater Disposal Plan).* Development of a plan for disposal of solid waste and wastewater disposal plan to address disposal during construction and operation.

6. *Article 110 (Oil and Hazardous Materials Storage and Spill Prevention and Cleanup Plan).*

7. *Article 112 (Facility Design to Preserve/Enhance Aesthetics).* Within one year of license issuance, filing of a USFS-approved plan for project design in a manner to preserve/enhance site aesthetics.

USBR

8. *Article 117 (Protection of USBR Federal Reservation).* Specifies that the Project construction, operation, and maintenance is not to damage the dam structural integrity or interfere with the operation of the federal reservation. "Operation of the powerplant shall be secondary to the operation and maintenance of the federal reservation. No water will be released solely for hydroelectric generation."

9. *Article 118 (Operation and Maintenance Agreement).* Development of an O&M agreement with USBR at least 60 days before start of operation.

10. *Article 125 (Reservoir Water Levels).* Licensee to attempt to maintain water level at elevation 6289 feet. (May apply only to construction.)

11. *Article 126 (Subordination).* Operation not to interfere with use, storage, or release of water from the reservoir and shall be subordinate to USBR operating standards.

12. *Article 127 (Releases for Trumpeter Swans).* Licensee to cooperate on special releases for trumpeter swans for feeding downstream.

13. *Article 128 (Intake and Fish Screen Design).* Consultation with USFWS and IDFG on final design for the intake and fish screen.

14. *Article 129 (Aeration System Design).* Consultation with USFWS and IDFG on final design for the aeration system.

15. *Article 130 (Water Quality Monitoring).* See articles 106 and 107. Article 130 requires installation of monitoring equipment within 6 months of license issuance and continuous monitoring thereafter, with annual summary reports. Adds EPA in consultation process. Includes implementation of changes in operation or structures should a problem be identified.

16. *Article 133 (Recreation Plan).* See Article 105. Consultation with the National Park Service, USFS, USBR, and the Idaho Department of Parks and Recreation and filing of a revised Report on Recreational Resources within 18 months of license issuance. Report to include improved access to project lands and waters and parking and toilet facilities.

FERC

17. *Article 401 (Water Quality – Dissolved Oxygen).* Sets a standard of 7 mg/l or the concentration at the dam outlet structure, whichever is higher. [Note: This standard is actually higher than the present requirement below reservoirs in Idaho water quality standards. See appended email from IDEQ, March 16, 2017.]

18. *Article 402 (Water Quality – Temperature).* Sets specific standards for water temperature seasonally and year around for the purpose of meeting state water quality standards and aquatic resources.

19. *Article 403 (Ramping Rates).* Limits changes in flow to 50 cfs every half hour, with downramping only during the hours of 7 p.m. to 5 a.m., and requires the development of a ramping rate monitoring plan, to include a continuous gage and reporting to agencies and FERC.

20. *Article 404 (Reservation of Authority).* Reserves FERC authority to require alterations to structures or operations to take into account the regional fish and wildlife program developed and amended under the Pacific Northwest Electric Power Conservation Act.

21. *Article 405 (Cultural Resources).* Requires consultation and development of a cultural resources management plan for any land clearing or earth disturbance, and USFS or USBR approval.

FRREC applied for a water quality certification application from the Idaho Department of Health and Welfare on June 3, 1985. Certification was granted without conditions.

No fishway prescriptions were filed under section 18 of the FPA.

I reviewed documentation in FERC eLibrary going back two years to determine whether any compliance issues have arisen during that period. The Project has had a history of compliance problems related to flow management and water quality data collection, report filing, and exceedances; that said, FRREC has been making progress bring the Project into compliance. The USFS compliance inspection reports for the years 2015-16 (appended) indicate that it found no violations of the special use permit and USFS license terms and conditions. The application includes a copy of a 2006 FERC inspection report that did not disclose any issues at that time.

IV. PUBLIC COMMENTS RECEIVED BY LIHI

The LIHI application was publicly noticed on December 30, 2016. No comments were received during the notice period, which ended on March 4, 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 not certify the Project under the 1st edition Handbook. In accordance with LIHI policy, both the USBR operation and the subordinate FRREC operation must meet all standards. Island Park Dam is operated in a manner that does not meet the Ecological Flow Regime standard. The only flow restriction is a ramping rate restriction on the hydroelectric operation. Outside of that the dam is operated, as detailed below, under a Drought Management Plan that recognizes the primary use of storage

manipulation for irrigation purposes, while making good faith efforts to improve conditions for the downstream fishery and the hydroelectric operation. A review of hydrologic data collected directly downstream shows a lack of conformance with the Montana-Tennant method, as well as exceedances of the maximum ramping rate. Further, water quality data collected by FRREC and HFF indicates that the limitations set in the license are not being met. Additionally, FRREC failed to produce annual water quality reports from 2010-14 in accordance with the license.

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. There is no fish passage requirement at this dam. An intake screen has been installed to prevent entrainment of reservoir fish.

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, if present, are protected by a consultation requirement in the license. The watershed protection criteria are generally not applicable; the shorelands are federally owned and managed, 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.

A. Flows

Henrys Fork drains an area of 481 square miles according to the application.[1] The primary purpose of regulation of outflows from Island Park dam is to utilize storage for irrigation. Since USBR has primacy in that regard, the FERC licensing process did not address the adequacy of the downstream flow regime to support aquatic habitat. The only exception is restrictions that were placed on ramping rates for the hydroelectric facility in Article 403.[2] Flows in the upper

[1] The U.S. Geological Survey gaging station (No. 13042500) information indicates 501 square miles at the dam outlet where the gage is located. https://nwis.waterdata.usgs.gov/nwis/inventory/?site_no=13042500&agency_cd=USGS

[2] The LIHI application details problems the Project had coming into full compliance with Article 403 (Ramping Rates). Plant controls were modified in 2016 to bring the facility into compliance, and FRREC expects that it will be able to verify its ability to fully comply after it comes back online in spring 2017. FRREC will be amending and refiling its ramping rate plan by July 1, 2017 as regards use of the USGS gage for compliance monitoring. According to FRREC's application, the last ramping deviations that FERC considered to be license violations were in 2014. Subsequent exceedances have occurred but FERC has not considered them to be license violations. FRREC filed its 2016 ramping report with FERC on January 27, 2017, and indicated that exceedances persisted through that year similar to 2015. The ramping limitation was a recommendation of IDFG according to the FERC Environmental Assessment (September 29, 1988).

watershed have been highly regulated since the North Fork Reservoir Company completed construction of a dam at the outlet of Henrys Lake in 1923.

Henrys Fork is known for its important wild rainbow trout fishery with catch-and-release regulations. Protection of streamflow during the winter period is considered particularly critical to reduce overwintering mortality. Adequate releases during the spring is also necessary for spawning. Storage during the winter/spring period to replenish water lost during the prior irrigation season can create a conflict with biota flow needs.

Water allocation and releases during drought conditions are planned for and addressed through the *Henry's Fork Drought Management Plan*, a collaborative plan developed in 2005 by representatives from the Fremont-Madison Irrigation District, HFF, the North Fork Reservoir Company, Trout Unlimited, The Nature Conservancy, and USBR. The mission of the plan is "…to maintain or enhance watershed health and ecology, even in years of below-average precipitation, in balance with agricultural needs through flexible and adaptive water management within the context of Idaho water law." The plan recognizes the high value of the recreational fishery. Drought conditions, during which the irrigation district's water allocation is not met, occur in one out of three years. Much of the water stored in Island Park Reservoir is passed to the lower Snake River watershed to satisfy senior water rights. The plan is essentially an adaptive management plan to meet the irrigation water allocation while improving water management for hydropower and the downstream fishery. The plan envisions four or five meetings annually, assessment of water management measures, and periodic plan revisions, with the Fremont-Madison Irrigation District having the lead. Currently, under the plan, storage of water has been increased in the fall to reduce the amount of storage necessary during the winter months.

As FRREC notes in its LIHI application, it "utilizes the determined flow [the flow releases determined by other parties under the Drought Management Plan] as it passes through the powerplant and may only manage ramping rates below the Project." The station has a capacity of 185 cfs to 960 cfs, although the actual capacity can vary with reservoir levels. When it is offline, USBR releases flows via its separate outlet works.

In its Environmental Assessment (September 29, 1988)(EA), FERC staff noted that it would be beneficial to have a minimum flow below Island Park Dam. FERC staff met with USBR on August 15, 1988 to explore that possibility given the lack of FERC authority, but USBR declined to consider such a change in operation. The EA states that the lack of a continuous minimum flow results in the following adverse impacts downstream: "(1) reductions in fish and wildlife habitat and aquatic vegetation; (2) increased ice formation; (3) losses of all life stages of trout; (4) losses of recreation opportunities; and (5) reductions in fish growth and reductions in fish year classes…" IDFG initially requested a minimum flow of 300 cfs but later withdrew the request. The EA summarizes the findings of several habitat studies done in the 1980s, including an Instream Flow Incremental Methodology study. Recommendations for minimum flows ranged from 300 to 500 cfs.

When the Project was previously reviewed for certification by LIHI in 2001, the central issue was whether the LIHI's flow criteria would be met. The Board determined that, for the Project to be found as compliant with LIHI standards, including the flow standard, the USBR operation

would have to be found to meet the standards as well. Since there were no resource agency flow recommendations made after 1986, LIHI turned to the alternate criterion of flow releases meeting "good" habitat flow standards calculated using the Montana-Tennant method (Criterion A.2). Based on available flow data, the Application Reviewer calculated that the conservation flow standards are 146 cfs from October – March and 292 cfs from April – September based on the Montana-Tennant method. The Reviewer further determined that those flows had been met by USBR on all but one day in the historical flow record. On that basis, LIHI concluded that the A.2 criterion would be met.

LIHI suspended the Project certification on December 19, 2001 (effective September 17, 2001) based on a self-reported flow violation during drought conditions, later reinstating the certification on March 15, 2005. USBR had reduced outflows to 150 cfs after September 17, then 80 cfs after October 23, to assure refill of the reservoir by April 1, 2002. The station had ceased operation in August.

Under its A.2 response in the LIHI application, FRREC states, "Per email dated December 22, 2016 (Appendix D), the IDEQ has reviewed the Montana-Tennant Method in partnership with local stakeholder groups. Although it appears the 2000 analysis is not an accurate estimation of flows, IDEQ determined that 'the actual hydropower use of the Island Park Dam does not, by generating electricity, impact streamflow.'" By email dated February 22, 2017, HFF provided me with a copy, appended, of its Montana-Tennant method analysis (December 4, 2016), which had been done for IDEQ and which reviews the analysis done for the original LIHI certification. In addition to expanding the gage dataset to include flow data collected since 2000, HFF's analysis eliminates the adjustment that had been made for irrigation water use[3] upstream of Island Park Reservoir.

I revised the estimates of the average daily flow (ADF) used in the Montana-Tennant method by using the full data set through Water Year 2016 and assumed an average diversion of 10 cfs. The measured ADF at the gage is 612 cfs. Adjusted for the diversion, the ADF is 622 cfs, with the recalculated conservation flows being:

October – March (20% ADF)	124 cfs
April – September (40% ADF)	249 cfs

I then analyzed the frequency that the reservoir release daily flows were reduced below those standards from 2001 through 2016. Since the mode of operation changed around 2006, I am only providing the output from the period 2006-16 in the following table.

[3] The original analysis assumed an annual volume of irrigation water use equal to a continuous diversion of 100 cfs. The analysis further assumed that none of the irrigation water returns to the river upstream of the gage. HFF's reason for eliminating the irrigation adjustment is explained on p. 4 of the HFF analysis.

Table 1. Days with average reservoir outflow falling below Montana method standard.

Water Year	Days: Oct.-March	Days: April-Sept.	Water Year	Days: Oct.–March	Days: April-Sept.
2006	0	0	2012	0	0
2007	0	0	2013	0	
2008	77	43	2014	47	28
2009	0	0	2015	0	7
2010	0	0	2016	115	17
2011	39	0			

The following graph provides information from WY2017, some of which is provisional at this point. It shows outflows as low as 72 cfs in October 2016.

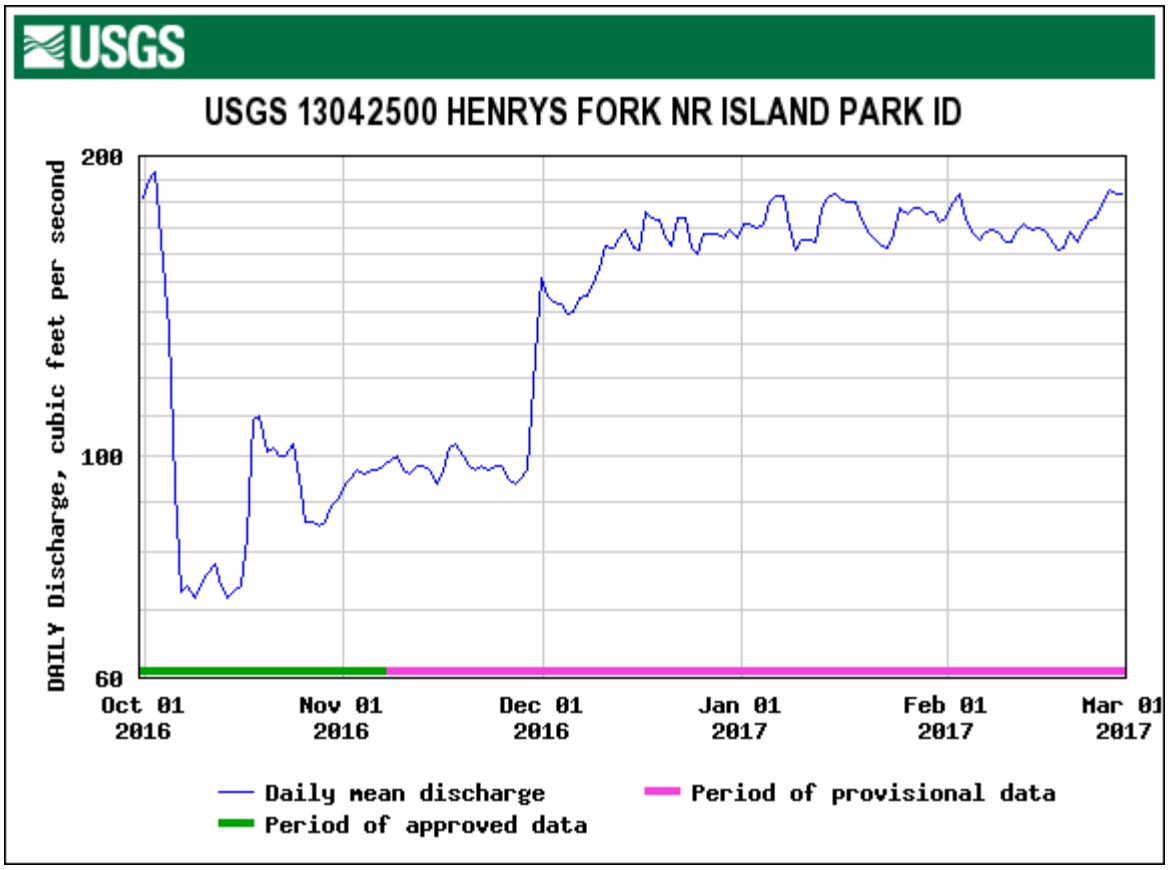

Figure 6. Hydrograph of recent reservoir outflow.

Based on this analysis, outflows from the reservoir as managed by USBR under the Drought Management Plan do not consistently provide good habitat conditions.

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 federal license only specifies ramping rates. This only addresses one aspect of the flow issue, however, and USBR is not subject to the ramping limitation. **N/A = Go to A.2**
A.2	**If there is no flow condition recommended by any Resource Agency for the Facility, or if the recommendation was issued prior to January 1, 1987, is the Facility in Compliance with a flow release schedule, both below the tailrace and in all bypassed reaches, that at a minimum meets Aquatic Base Flow standards or "good" habitat flow standards calculated using the Montana-Tennant method?**
	Reviewer Analysis/Conclusions: Based on an analysis using the Montana-Tennant method, releases as managed by USBR do not consistently provide good habitat conditions for downstream aquatic biota. Releases are commonly reduced below Montana-Tennant conservation flow values to replenish storage in drought years. **No = Go to A.3**
A.3	**If the Facility is unable to meet the flow standards in A.2., has the Applicant demonstrated, and obtained a letter from the relevant Resource Agency confirming that demonstration, that the flow conditions at the Facility are appropriately protective of fish, wildlife, and water quality?**
	Reviewer Analysis/Conclusions: The Applicant has not demonstrated that the flows as managed by USBR are appropriately protective. **No = FAIL**

B. Water Quality

Idaho's designated uses for Henrys Fork from the reservoir downstream to Thurman Creek (Assessment Unit ID17040202SK015_05, 1.88 miles) are Aquatic Life: Cold Water Communities – Salmonid Spawning; Primary Contact Recreation; and Domestic Water Supply. A salmonid spawning designation generally 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)

The reservoir and the river segment downstream are Category 3, Unassessed Waters (*Idaho's Integrated Report 2014, Final*, IDEQ, February 2017). Category 3 Waters are defined as those waters with insufficient data and information to determine if beneficial uses are being attained. The waters are not Section 303(d) listed as impaired.

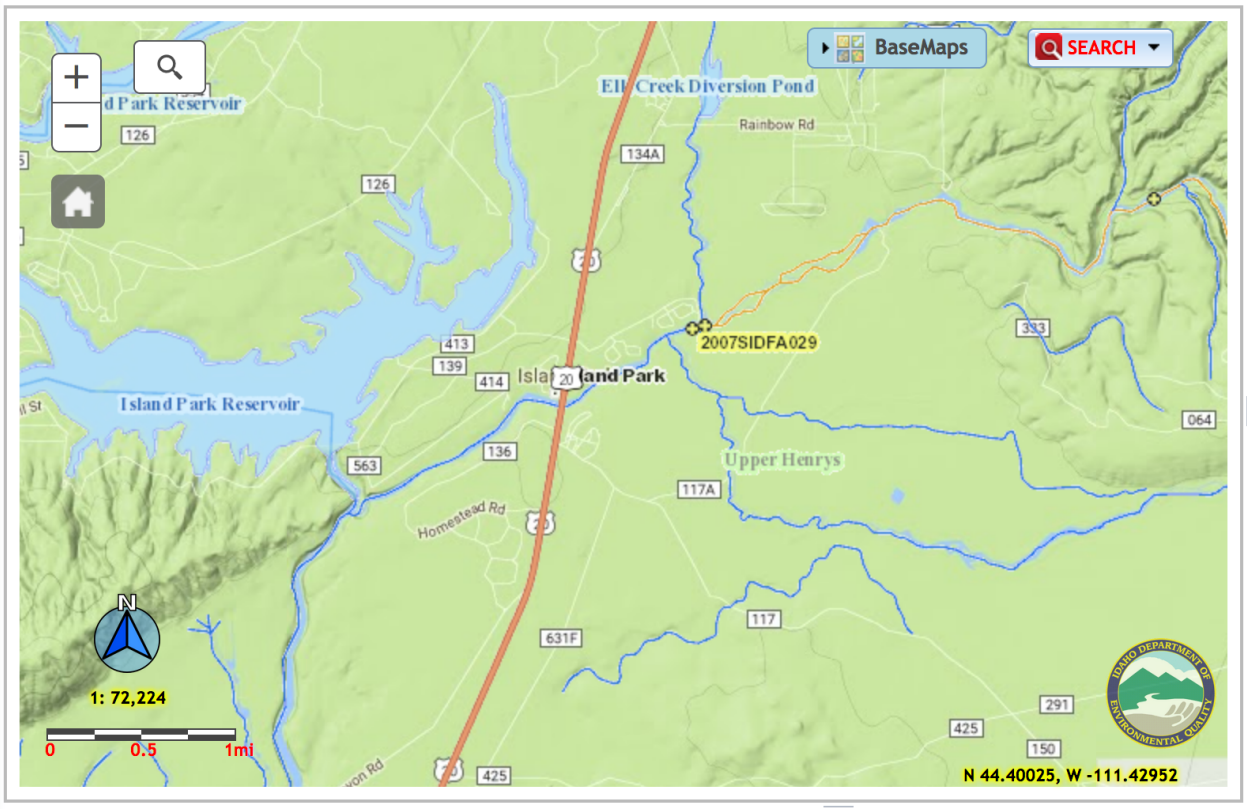

Figure 7. 2014 Status of waters. Blue = Not assessed. Red = Not supporting uses. (2014 Section 305(b) Integrated Report, IDEQ)

Several license articles address ongoing compliance with water quality criteria. Affected waters are to be closely monitored to ensure that they meet state standards. The Project additionally provides an aeration facility as required under Article 129 to ensure dissolved oxygen concentrations are enhanced. The aeration facility retains discharged water for two minutes at peak flows and adds 25,000 pounds of oxygen per day into the water.

In 1995, FRREC built an adjustable rubber dam on the spillway of the Island Park dam. This rubber dam, while not part of the FERC-licensed Project, was built for the purposes of maximizing power generation at the Project. Additionally, the rubber dam allows for mixing of water released from the bottom of the reservoir with water from the surface of the reservoir. This allows overall releases from the reservoir to be mixed in an effort to optimize water temperatures for downstream fish habitat requirements.

FERC notified FRREC by letter dated June 3, 2016, that it was in violation of 1) Article 130 as it had failed to file its annual water quality reports for years 2010-2014, and 2) Article 107 due to data quality problems that resulted in missing data for 2015.[4] The 2015 annual water quality report compared dissolved oxygen data collected by FRREC with data collected by HFF at essentially the same river location (Figure 9 below); on the basis of the comparison, FRREC concluded that its equipment was unreliable. New water quality sondes and temperature gages were installed at the Project to assure data reliability for 2016. FRREC also invested in a $125,000 system upgrade for the tailrace aeration system. An appended email of March 10, 2017 to me from FRREC further explains the changes.

In its application, FRREC stated it would provide LIHI with letters from the agencies confirming compliance after completion of the 2016 water quality report. I checked FERC e-Library. The report was filed with FERC on February 27, 2017. In the introduction, the report states, "Analysis of 2016 water quality data showed that water temperature, total gas pressure and dissolved oxygen compliance requirements were consistently met during the year. In order to meet dissolved oxygen requirements, it was necessary for Fall River Electric to curtail power production beginning in late July." Although the language suggests compliance throughout 2016, the report does show problems meeting with the dissolved oxygen and temperature standards set forth in the license, primarily when the station was off line. A recommendation is made in the report to further upgrade the reaeration structure to allow the station to operate at higher water temperatures when the dissolved oxygen saturation values are lower and reaeration less efficient. The dissolved oxygen data does show non-compliance for several days after the station was initially brought online on April 11.

I solicited comments from IDEQ as to whether it is reasonably assured based on available data that standards are being met under both USBR and FFREC operation, or is reasonably assured but would want verification through additional sampling. By email dated March 8, 2017 (appended), Troy Saffle, IDEQ, responded that neither option applies but that, "DEQ is aware of a study being conducted by a graduate student affiliated with the Henry's Fork Foundation and we will able to answer the certification questions after its conclusion and summary, likely before September 2017."

[4] HFF responded to FERC by letter dated June 15, 2016 to clarify the impacts potentially caused by non-compliance with the water quality and flow requirements of the license. The letter can be found at https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14277081

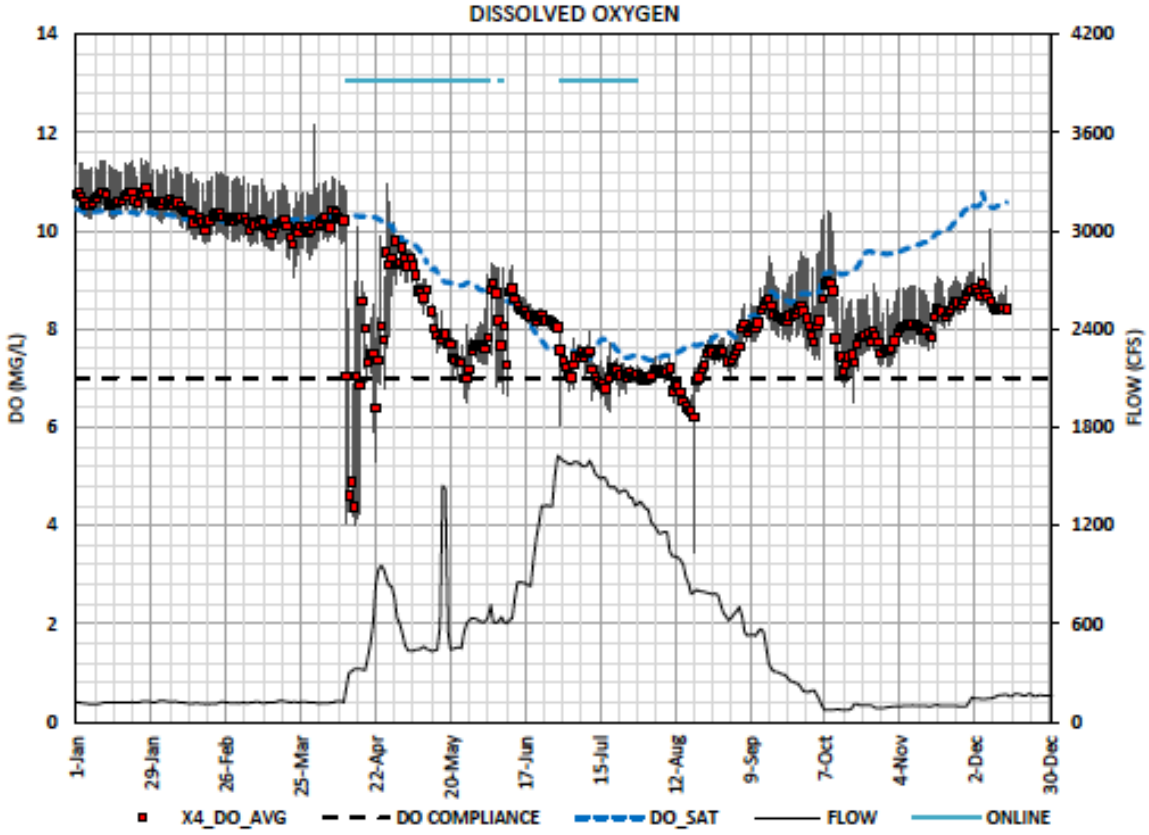

Figure 8. Dissolved oxygen concentrations at Station X4 (at the USGS gage 600 feet downstream). (*Island Park Hydroelectric Project - FERC Project No. 2973, 2016 Water Quality Report* (February 2017)

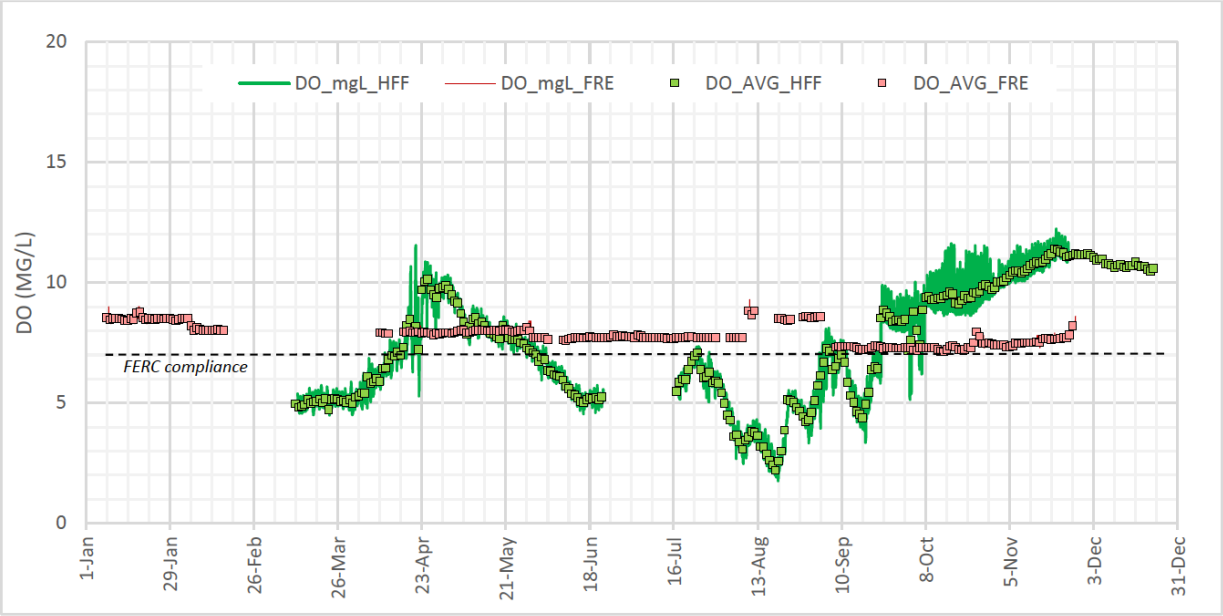

Figure 9. Plot comparing dissolved oxygen concentrations as measured separately by FRREC and HFF in tailrace reach, confirming FRREC equipment malfunction. (*Island Park Hydroelectric Project - FERC Project No. 2973, 2015 Water Quality Report,* Figure 6 (March 2016)

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: a) The Project water quality certification was issued before 1987. b) Without additional data, IDEQ is unable to indicate that it is reasonably assured that water quality standards are being met downstream. **NO to (b) = FAIL**

C. Fish Passage and Protection

Henrys Fork supports 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 Henrys Fork. A fish ladder has existed at the Buffalo River dam since the 1930s; the current 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. While there is access to this tributary, Henrys Fork is also considered important for spawning and overwintering of trout.

Since the Project is in the Snake River headwaters with natural barriers downstream, diadromous fish did not use the Project area historically and there is no program to introduce them.

There are no formal passage prescriptions for riverine fish at Island Park Dam.

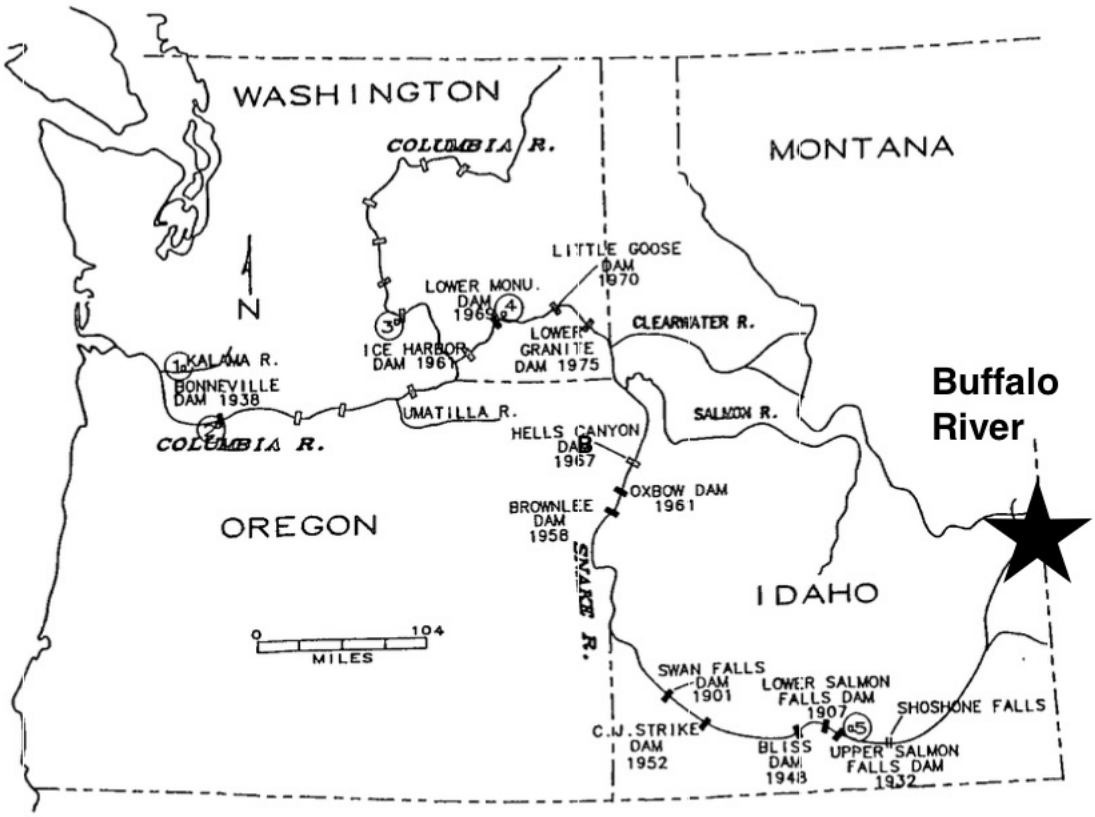

Figure 10. Map showing locations of Columbia River basin dams with year of first operation. (Source: NOAA-NMFS. *Status Review of Snake River Fall Chinook Salmon*.

On September 23, 1992, FERC approved functional design drawings for the intake structure and fish screens under Article 128. The screening limits the export of reservoir fish into the downstream coldwater fishery reach. FFREC provided an email (appended) dated January 6, 2017 from IDFG confirming compliance with Article 128.

Figure 11. 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 128, and no compliance issues were in the record. **YES = PASS**

D. Watershed Protection

The lands at the Project site are in federal ownership, either USFS or USBR, including the reservoir, and are 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.

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 the federal government. **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 March 6, 2015, USFWS Species by County Report, and a July 7, 2016, email[5] from IDFG. Listed species include grizzly bear, Canada lynx, and Ute ladies' tresses orchid; all were listed at the time of licensing as well. By email dated January 6, 2017 (appended), IDFG confirmed their possible presence at the site.

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.

The application includes a statement from IDFG dated September 16, 2015 that Project operation is not negatively affecting state or federally listed species. It also includes a voicemail message from the USFWS finding similarly.

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 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 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**

[5] Appendix H actually contains an email pertaining to the Chester Diversion Dam (FERC Project No. 11879). FRREC had intended to include the email that pertained to the nearby Buffalo River Project. The email can be found in that application.

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. **YES = PASS**

F. Cultural Resource Protection

Article 405 requires consultation and development of a cultural resources management plan for any land clearing or earth disturbance, and USFS or USBR approval. The State Historic Preservation Office provided FRREC with a statement for the application that it had provided a no-effect finding on December 9, 1985 for the licensing process.

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 annual compliance reports do not indicate any conflicts. It is reasonable expect that the powerhouse site was already highly disturbed during construction of the dam. **YES = PASS**

G. Recreation

Article 133 requires the licensee, after consultation with various resource agencies, to prepare, and file for Commission approval, a revised report on recreational resources. The order approving the report was issued September 18, 1992. The report indicated that FRREC would make improvements and additions to the Project's Box Canyon boat launch site. Specifically, FRREC proposed to reconstruct the existing parking area, improve the existing access road and boat launch, and install restroom facilities, a fishing platform, informative/interpretive signs, and a trail at the site. As-built drawings were approved by order dated November 3, 1994.

For the purposes of the LIHI application, USFS commented by email dated November 18, 2016 that the Project was inspected on September 26, 2016 and found to be in compliance with articles 105 (Report on Recreational Resources) and 133 (Recreation Plan). A supporting email dated December 20, 2016 from the National Park Service was also provided.

Figure 12. View of the handicapped-accessible angling platform from the parking 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**

A. 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

USDA **United States Department of Agriculture** **Forest Service** **Ashton/Island Park Ranger District**

46 South Highway 20
P.O. Box 858
Ashton, ID 83420
208-652-7442
FAX: 208-652-7863

File Code: 2720
Date: September 27, 2016

Mr. Nicholas E. Josten
GeoSense LLC
2742 St. Charles Avenue
Idaho Falls, ID 83404

Dear Nick:

The Island Park hydroelectric facilities at Island Park Dam and Buffalo River Dam were inspected for compliance on September 26, 2016.

The facilities were found to be in compliance with the terms and conditions of special use permit and the 4(e) condition required by the Forest Service and the FERC license.

This constitutes our annual review of the facilities and their operation as specified in the Forest Service Manual, section 2770 and Article 104 of the FERC project license.

Sincerely,

ELIZABETH DAVY
District Ranger

cc: Fall River Electric, 1150 N 3400 E, Ashton, ID 83420

United States Department of Agriculture **Forest Service** **Ashton/Island Park Ranger District**

46 South Highway 20
P.O. Box 858
Ashton, ID 83420
208-652-7442
FAX: 208-652-7863

File Code: 2720
Date: October 27, 2015

Nicholas E. Josten
Geo Sense
2742 St. Charles Ave
Idaho Falls, ID 83404

Dear Nick,

The Island Park Hydroelectric facilities at Island Park Dam and Buffalo River Dam were inspected for compliance on September 25, 2015.

The facilities were found to be in compliance with the terms and conditions of the Special Use Permit and the 4(e) condition required by the Forest Service and the FERC License.

This constitutes our annual review of the facility and its operation as specified in the Forest Service manual Section 2770 and Article 104 of the FERC project license.

Sincerely,

ELIZABETH DAVY
District Ranger

cc: Fall River Electric 1150 North 3400 East, Ashton, ID 83420

Review of Stillwater Sciences Application of Tenant Method to Streamflow in the Henry's Fork at Island Park

Rob Van Kirk, Ph.D.
Senior Scientist
Henry's Fork Foundation
December 4, 2016

Background

On September 25, 2015, Kleinschmidt Associates submitted the required intake questionnaire for Low Impact Hydropower Institute (LIHI) certification for the Island Park Hydroelectric Project (FERC No. 2973).

The question and answer regarding flow standards and the application of the Tenant method is repeated here, verbatim from the submitted document.

> *2) If there is no flow condition recommended by any Resource Agency for the Facility, or if the recommendation was issued prior to January 1, 1987, is the Facility in Compliance with a flow release schedule, both below the tailrace and in all bypassed reaches, that a minimum meets Aquatic Base Flow standards or "good" habitat flow standards calculated using the Montana-Tennant method?*
>
> **YES.** The flows released from the USBR dam are not part of the FERC-licensed Island Park Project; because of this, there have been no agency-recommended minimum flows for the USBR dam. A Montana-Tennant method analysis of flows below the Island Park Dam was conducted in 2000 as part of the Project's original LIHI application. The study determined that flows released from the Project met "good" habitat standards overall and "excellent" habitat standards in the area between the Island Park Dam and the Buffalo River (Appendix D).

Because the Henry's Fork Foundation has great interest in streamflow at Island Park Dam and has conducted substantial scientific research on interactions among streamflow, water quality, and the trout fishery downstream of the dam, I was asked by agency personnel to review the application of the Tenant method to streamflow at Island Park Dam.

Summary of Hydrology and Management at Island Park Dam

A large body of literature has documented natural and regulated hydrology of the Henry's Fork at Island Park Dam and effects on fish and wildlife. To make this review as concise as possible, I will list only the most relevant observations and citations here, in itemized format.

1. Natural hydrology of the upper Henry's Fork is dominated by groundwater inputs from springs at the base of the Yellowstone Plateau. As a result, the river's natural hydrology has much lower peak flows and higher baseflows than are typical of most streams in the Northern Rocky Mountains (Benjamin and Van Kirk 1999; Benjamin 2000; Gardner et al. 2010).

2. The stream channel of the Henry's Fork in the 3 river miles immediately downstream of the dam is highly confined in a narrow canyon. Substrate consists of bedrock, large boulders, and cobbles (Mitro and Zale 2002, Mitro et al. 2003), which are not mobile at any natural or regulated flows that have been experienced in the modern climatic regime (HabiTech Inc. 1994). As a result, the channel has not adjusted to the regulated hydrologic regime imposed by construction of Island Park Dam in 1939.
3. Recruitment of fish into the popular wild rainbow trout fishery downstream of the dam is limited by survival of fish during their first winter, which is directly related to winter flow release at the dam (Smith and Griffith 1994; Gregory 2000; Mitro and Zale 2002; Mitro et al. 2003; Schoby et al. 2014). See Figure 1.
4. Negative ecological effects from flow alteration at Island Park Dam are greatest during the winter and result from low flows during the time period over which the reservoir is filled (Benjamin and Van Kirk 1999; Van Kirk et al. 2011).
5. Prior to the early 1970s, the reservoir was filled by reducing outflow to near 0 on November 15. Outflow was typically increased for a short period during the holidays for additional hydroelectric generation at facilities far downstream of Island Park Dam and then increased again in the spring once the reservoir neared capacity (Van Kirk and Griffin 1997; Benjamin and Van Kirk 1999).
6. Beginning in the early 1970s, reservoir fill commenced earlier in the fall in order to maintain a higher and relatively constant flow throughout the fall and winter (Van Kirk and Griffin 1997; Benjamin and Van Kirk 1999, Van Kirk and Gamblin 2000).
7. In 2005, the Henry's Fork Drought Management Plan (DMP) was developed and signed by multiple stakeholders, as required by federal legislation that transferred some irrigation facilities in the Henry's Fork watershed from the U.S. Bureau of Reclamation to Fremont-Madison Irrigation District (Joint Committee 2005). The signatories to the DMP are U.S. Bureau of Reclamation, Fremont-Madison Irrigation District, North Fork Reservoir Company, Henry's Fork Foundation, The Nature Conservancy and Trout Unlimited. The DMP is implemented by a committee that consists of these signatories, plus other stakeholders such as Idaho Department of Fish and Game and Fall River Rural Electric Cooperative. Beginning in water year 2006, the DMP committee has implemented a strategy of storing as much water as possible in Island Park Reservoir as during September, October, and November, so that mid-winter flow critical to trout survival is maximized, under the constraint of filling the reservoir by the beginning of irrigation season. The three distinct periods of winter-flow management described in items 5, 6, and 7 are illustrated in Figure 2.
8. The Island Park Hydroelectric plant is operated as a "run-of-river" facility. Although power-plant constraints are considered in DMP decisions, the plant has little influence on streamflow, which is determined primarily by irrigation storage and delivery needs, with attention given to winter-flow needs for the fishery and to power-plant constraints and capacity, when possible.

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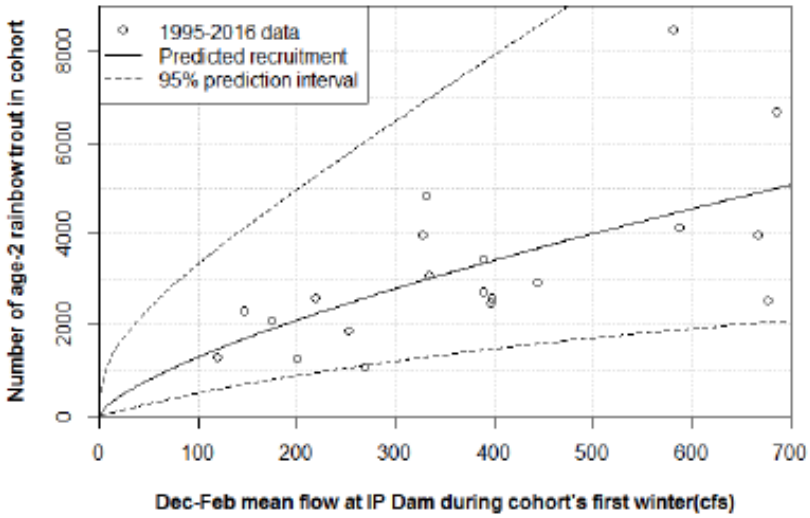

Figure 1. Recruitment of rainbow trout in the Henry's Fork downstream of Island Park Dam as a function of mean December-February flow during the cohort's first winter in the river.

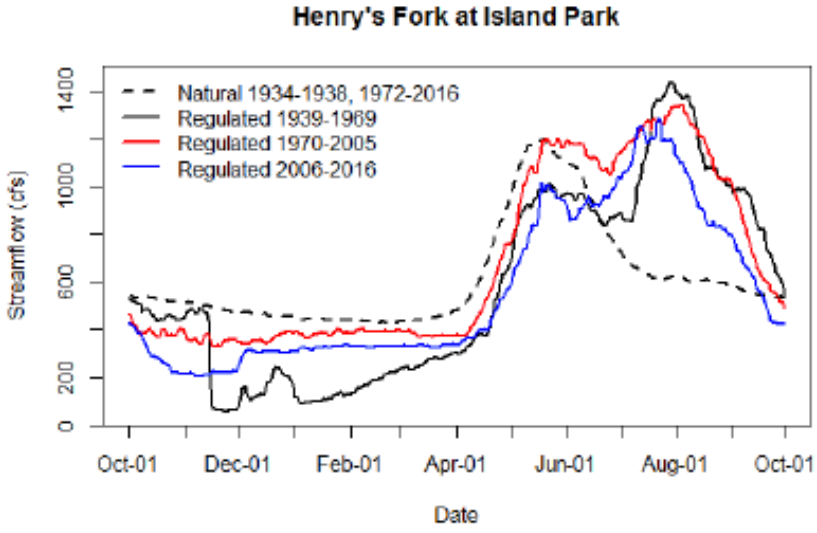

Figure 2. Comparison of flow regimes in the Henry's Fork at Island Park Dam. Natural flow was observed in water years 1934-1938, prior to construction of the dam, and reconstructed for water years 1972-2016. The Island Park hydroelectric plant first operated in 1994.

Application of Tenant Method

Stillwater Sciences applied the Tenant Method (Tenant 1976) to flow at Island Park Dam in 2001, using data for water years 1995-2000, which were the only full water years over which the Island Park hydroelectric project had operated at the time of the analysis. Given that the primary negative ecological effect of flow alteration at Island Park Dam occurs during the winter, I will focus only on the October-March time period for the remainder of this review.

Calculation of annual mean as basis of Tenant method

Stillwater Sciences used 731 cfs as the annual mean in its analysis, arriving at this value by calculating the mean annual discharge at Island Park Dam as 631 cfs and then adding an estimated 100 cfs to account for diversions between Henry's Lake and Island Park Reservoir. The 100 cfs addition to account for diversions greatly overestimates the effect of these diversions on mean annual flow for several reasons. First, although diversions can equal as much as 100 cfs during periods of high water availability, no diversion occurs outside of the legal irrigation season (May – October 31 in this basin). Furthermore, diversions are limited by administrative and physical natural flow availability so that by late summer of most years, total diversion is reduced to only a fraction of the maximum possible under the applicable water rights. Third, the vast majority of water diverted between Henry's Lake and Island Park Dam is delivered via unlined earthen canals and applied to pasture or hay meadows using flood irrigation methods. It is well known that consumptive use of water under such conditions is very low—as little as 20% of the total amount withdrawn (Thompson 1988; Venn et al. 2004; Zaladis et al. 1997). Even in the lower elevations of the Henry's Fork watershed, where the growing season is longer, evapotranspiration is much higher, water is applied to high water-use crops such as potatoes, and most irrigation water is applied via sprinklers, consumptive use is 25% of total withdrawal (Van Kirk et al. 2012, USBR 2012). Thus consumptive use of water between Henry's Lake and Island Park Dam is less than 25 cfs for half of the year, resulting in a reduction in mean annual flow of less than 12.5 cfs. This is smaller than typical stream gage errors at Island Park and thus can be ignored in estimates of mean annual flow in the Henry's Fork at Island Park.

Daily flow data for the Henry's Fork at Island Park are available starting March 1, 1933. There are daily data for five full water years (1934-1938) prior to completion and initial storage of water in Island Park Reservoir. Beginning in water year 1972, sufficient data are available to account for reservoir storage, delivery and evaporation in Henry's Lake and Island Park Reservoirs. I have estimated natural streamflow in the Henry's Fork for water years 1972-2016 using a model that accounts for storage, delivery, direct precipitation, and evaporation in both Henry's Lake and Island Park Reservoir. When appended to the 1934-1938 data, this provides a record of 50 full water years of estimate natural discharge in the Henry's Fork at Island Park (excepting the small consumptive use of water mentioned above for pasture irrigation between Henry's Lake and Island Park). The mean daily flow over this 50-year record is 613 cfs. This is also equal to the mean annual regulated discharge at Island Park since Island Park Dam was completed in 1939. Because Henry's Lake and Island Park Reservoir are generally refilled each year, the total regulated discharge at Island Park is equal to total natural discharge when averaged over long time periods.

According to the Tenant method, "good" habitat conditions over the October-March period are achieved at a flow of 20% of mean annual, which would be 123 cfs in this case. The number of

days per year on which daily flow at Island Park is less than 123 cfs during the October-March period decreased dramatically when fill operations were changed in 1970 (Figure 2 above, and Tables 1 and 2 below). Very little change has occurred since the modern DMP process was initiated in 2005; only the timing of low-flows days has changed somewhat—from mid-winter to autumn, when negative effects on the fishery are lower.

Table 1. Mean number of days per water year that flow at Island Park Dam was lower than 123 cfs during the October-March time period.

Water years	Reservoir fill strategy	Mean days/year flow < 123 cfs
1939-1969	Zero outflow on November 15	78.6 days
1970-2005	Uniform fill rate from autumn through winter	22.4 days
1995-2016	Both 1970s and modern strategy; this is the time period over which the power plant has operated	24.5 days
2006-2016	Fill as much as possible in autumn; maximize Dec.-Feb. outflow	24.7 days

Table 2. Total number of days in each water year that flow at Island Park Dam was lower than 123 cfs during the October-March time period. Table shows all years that Island Park hydroelectric project has operated.

Water year	No. days flow < 123 cfs, October-March	Water year	No. days flow < 123 cfs, October-March
1995	0	2006	0
1996	0	2007	0
1997	0	2008	77
1998	0	2009	0
1999	0	2010	0
2000	0	2011	39
2001	0	2012	0
2002	91	2013	0
2003	112	2014	44
2004	65	2015	0
2005	0	2016	112

Discussion

Applicability of the Tenant method

The Tenant method was developed on alluvial-floodplain rivers with snowmelt-dominated hydrologic regimes. In such rivers, a diversity of habitat types is created and maintained both laterally and longitudinally in the stream channel and temporally through the water year by a combination of mobile alluvial substrate and large seasonal differences in streamflow. My experience is that the Tenant method tends to work well in alluvial rivers with large maximum-minimum flow ratios. Natural baseflow in such streams is about 10% of the natural peak flow and averages around 30-40% of mean annual flow. Thus, a 20% threshold to maintain "good" habitat conditions is consistent with the river's natural hydrologic regime. For example, mean

annual natural flow in the Snake River at Heise is around 6,900 cfs, depending on the exact period of record over which it is calculated. The minimum natural flow recorded over water years 1978-2008 in that river reach was 2,010 cfs, 29% of the long-term mean. Thus, even under unregulated conditions, low flows would fall into the range of 20-30% of mean annual flow. In the Henry's Fork at Island, typical low flows under the natural hydrologic regime are about half of the river's natural peak flow. The minimum daily natural flow recorded at Island Park during the October-March period was 261 cfs, 43% of the mean annual flow and well above that required for "outstanding" habitat conditions under the Tenant method. Thus, the 20% threshold in the Henry's Fork is less than half of the daily minimum natural flow recorded over a 50-year record. Furthermore, because the stream channel downstream of Island Park Dam is immobile, habitat conditions cannot adjust to alterations in streamflow—either across or within water years. The amount of habitat available at any given time is nearly completely determined by streamflow. As an example, mid-winter outflow at Tenant's 20% value (123 cfs) in the Henry's Fork produces less than half of the trout recruitment that would occur at the river's natural mid-winter flow of 460 cfs (Figure 1).

Stillwater's conclusions in the 2001 report

As noted in Stillwater's analysis, the water years used in its 2001 analysis (1995-2000) were much wetter than average years. One long-term depiction of annual water supply at Island Park Dam is given in Figure 3, which shows natural watershed inflow between Henry's Lake Dam and Island Park Dam. Data prior to dam completion in the fall of 1938 are observed; the remaining data are reconstructed by accounting for storage and delivery from Island Park Reservoir and direct precipitation on and evaporation from the reservoir surface. Figure 3 clearly shows that the late 1990s were among the wettest on record, whereas the years since 2000 have been among the driest on record. Stillwater's analysis reported that monthly means over the October-March period ranged from 218 cfs to 862 cfs, meriting a conclusion of "good" habitat conditions. However, if the period of record is extended to 2016, mean monthly flow for November, to provide a specific example, ranged from 3 cfs in 2003 to 862 in 1997, and was lower than 123 cfs in 2003, 2010, and 2013. Furthermore, Table 2 shows that in the 22 years the power plant has operated, daily flow during the October-March period was lower than 123 cfs for periods of 39-112 days in seven of those years. Thus, even if one believes that the 20% Tenant threshold for "good" habitat conditions applies to the Henry's Fork at Island Park, October-March flow at Island Park falls below this threshold frequently and for long periods of time. If Stillwater's inflated value of 146 cfs were used as the 20% threshold, habitat conditions would fall below "good" even more frequently and for longer time periods. On the other hand, as Stillwater's report correctly points out, the Buffalo River adds an average of 200 cfs of unregulated flow to the Henry's Fork less than one-half mile downstream of Island Park Dam, so the negative effects of low flows at Island Park Dam are somewhat lower downstream of the Buffalo River confluence. Unfortunately, there is no long-term gage record for the Buffalo River.

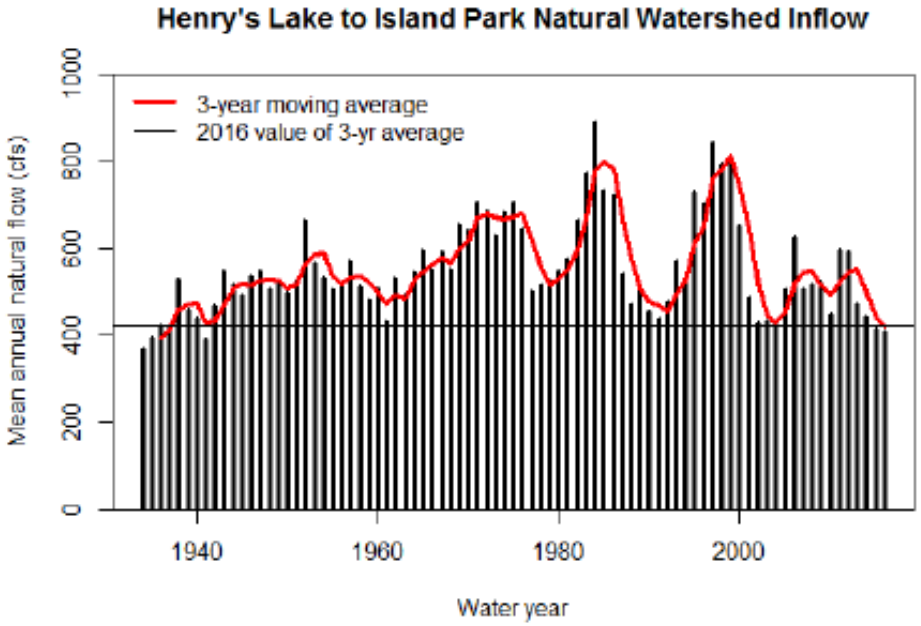

Figure 3. Annual natural watershed yield between Henry's Lake Dam and Island Park Dam, water years 1934-2016.

One final observation on Stillwater's 2001 report is that in the second bullet item in the Conclusions, the report states:

> According to the "Island Park Operations Manual" (page 5/21), the flow releases from the Dam have never (i.e. since 1939) been below 170 cfs;…

This statement is not true. Flow releases at the dam were routinely less than 170 cfs and generally as low as 2-3 cfs for extended periods during the winter prior to 1970. Even the *mean* flow over the 31 water years from 1939 to 1969 was lower than 170 cfs during late November (Figure 2). Since Stillwater's 2001 report was issued, flow releases at Island Park Dam have been less than 170 cfs for extended periods of time in numerous water years.

Conclusions

1. Mid-winter outflow from Island Park Dam is the single biggest factor limiting recruitment of rainbow trout into the Henry's Fork population.
2. Stillwater's estimate of annual natural flow at Island Park is about 100 cfs too large; a more realistic number is 613 cfs.
3. The Tenant method is not appropriate for application to the Henry's Fork downstream of Island Park Dam, where hydrologic regime is dominated by groundwater and the stream

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channel is confined in a bedrock canyon. By the Tenant method, the minimum flow to maintain "good" habitat conditions during October-March is 123 cfs. By comparison, the lowest daily flow recorded in a 50-year record of natural flow in the Henry's Fork at Island Park is 261 cfs, and mean October-March flow under natural conditions is 483 cfs.

4. At the Tenant threshold of 123 cfs during the critical December-February period, expected rainbow trout recruitment is less than half of its expected value under the natural flow regime.
5. Even if one believes that the 20% Tenant threshold for "good" habitat conditions applies to the Henry's Fork at Island Park, October-March flow at Island Park falls below this threshold frequently and for long periods of time—between 39 and 112 days in each of 7 of 22 years since the power plant was built.
6. Although outflow from Island Park Dam is not determined by operation of the Island Park Hydroelectric power plant, observations 4 and 5 suggest that winter outflows at Island Park do not merit a "good" habitat ranking, regardless of whether the Tenant method is considered applicable.

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RECORD OF TELEPHONE COMMUNICATION

Participants: Jeffrey Cueto, Reviewer and Rob Van Kirk, Henry's Fork Foundation
Date: March 16, 2017
Subject: Ecological Flows and Water Quality Sampling

Rob returned my call. We first discussed the flow regime, specifically conservation flows (the Montana method analysis) and the ramping rates. I explained my understanding of the issues and the current status of the USBR and FRREC operations. He stated that my understanding is correct. He said that FRREC has had a bumpy road with respect to addressing the ramping restriction but that it has made a good effort and that the automated system now in place should work well going forward. HFF had reported some of the original compliance problems to FERC. One problem is the transition between the two dam operators, for example when the hydrostation has an unplanned shutdown.

Regarding conservation flows, there have been improvements in fish density downstream (about 9%) since the fishway was upgraded at the Buffalo River dam and the Drought Management Plan for Island Park has been instituted. The Plan, while significantly improving the critical overwintering flows, has reduced habitat value in the September/October months, although aquatic vegetation during that period offsets some of the degradation by providing cover for the fish. HFF has turned to working with irrigators to reduce water consumption in order to in turn reduce the reservoir storage deficit.

I asked Rob about the WQ sampling. He said that they have been collection extensive data above, below, and in the reservoir, specifically nutrients, sediment, and temperature data. We discussed FFREC's sampling equipment problems which had resulted in use of the reaeration system having been discontinued for several years due to spurious data. HFF brought the problem to FFREC's attention, but all of the blowers could not be brought back in service unfortunately. FFREC had to discontinue operation temporarily in order to comply.

Mark Chandler
To: Jeffrey Cueto

5:06 PM
Details

MC

Hi Jeffrey,

A quick update on Island Park Hydro water quality standards. When it was discovered monitoring equipment for D O below the plant had failed the plant was taken off line. Extensive work was done to the tailrace aeration basin for improved air flow. All the blowers that put air into the tailrace basin were pulled and shipped off for rebuild. New D O sondes were purchased and are using handheld D O meters as well. Thanks and may your weekend be grand.

Mark Chandler.vcf

From: <Troy.Saffle@deq.idaho.gov>
Subject: RE: Island Park Reservoir dam
Date: March 16, 2017 at 11:43:14 AM GMT-4
To: <ompompanoo@aol.com>

Hi Jeff.. yes, there is no reason I can see why these standards don't apply at IP. I suppose they were not on the books when FERC issued the license the last time. I'm pretty sure their license pre-dates the 1993 promulgation date of the rule. I'll check and confirm.

Troy Saffle
Regional Manager
Idaho Dept. of Environmental Quality
900 N Skyline, Suite B
Idaho Falls, Idaho 83402

208.528.2650
208.521.5913 (c)
troy.saffle@deq.idaho.gov

From: Jeffrey Cueto [mailto:ompompanoo@aol.com] **Sent:** Wednesday, March 15, 2017 2:53 PM **To:** Troy Saffle **Subject:** Re: Island Park Reservoir dam

Troy — Just out of curiosity, is this the standard that applies below Island Park? Looks a lot different than the standard FERC applied in the license. If I recall correctly, that was 7 mg/l.

02. Dissolved Oxygen Concentrations Below Existing Facilities. As of the effective date of these regulations, and except as noted in Subsections 276.03 and 276.04, waters below dams, reservoirs, and hydroelectric facilities shall contain the following dissolved oxygen concentrations during the time period indicated:

	mg/l Dissolved Oxygen		
Time Period (annually)	**30-day Mean**	**7-Day Mean Minimum**	**Instantaneous Minimum**
June 15 - Oct 15	6.0	4.7	3.5

(7-1-93)

From: <Troy.Saffle@deq.idaho.gov>
Subject: RE: Island Park Reservoir dam
Date: March 14, 2017 at 3:10:53 PM GMT-4
To: <ompompanoo@aol.com>
Cc: <Mark.Chandler@fallriverelectric.com>

Jeff…DEQ isn't able to confirm either of the two option proposed below are accurate at this present time. However, DEQ is aware of a study being conducted by a graduate student affiliated with the Henry's Fork Foundation and we will able to answer the certification questions after its conclusion and summary, likely before September 2017.

There is not any need to commission any new studies for the season.

Please feel free to contact me any time, but we will be able to specifically address your questions in September.

Troy Saffle
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troy.saffle@deq.idaho.gov

From: Jeffrey Cueto [mailto:ompompanoo@aol.com]
Sent: Wednesday, March 8, 2017 1:55 PM
To: Troy Saffle
Cc: Mark Chandler
Subject: Island Park Reservoir dam

Hi, Troy. I am the Application Reviewer for the Low Impact Hydropower Institute review of FRREC's hydroelectric station at Island Park Dam. I understand that you are familiar with this application and the hydroelectric operation. As part of the review, I need to determine whether the facility is in compliance with your state's quantitative water quality standards. In this case, it would be helpful to know whether both the U.S. Bureau of Reclamation operation and FRREC's operation are compliant. I took a quick look at the annual water quality report that FRREC recently filed with FERC and note that there are times that the target dissolved oxygen concentrations and water temperature standards set forth in the license are not being met, but, looking at your water quality standards, it appears that those targets are not necessarily the same as the state WQS criteria. I also note that 2016 may be the first year that FRREC has been able to collect reliable data.

For circumstances like this (no recent water quality certification), there are two options for meeting LIHI's water quality standard, both involving some form of determination by your office:

Option 1. In the application, there must be: (1) information demonstrating Compliance, which should include information on the characteristics of the river on which the facility is located (e.g., permitted wasteloads, hydrology), the Facility's operating parameters that are relevant to potential impacts to water quality (e.g., spillage, hydraulic operating range), and water quality monitoring data that accurately reflects current conditions, and (2) a letter from an appropriate state water quality official stating that the Facility is in Compliance.

Option 2. If the Facility does not possess data demonstrating current Compliance with the state's quantitative water quality standards and written correspondence from an appropriate state water quality official agreeing that the Facility is in Compliance, then the application must contain:
(1) a letter from an appropriate state water quality official stating that there is reasonable assurance that the waters in the Facility area and in the downstream reach are in compliance with the state's quantitative water quality standards based on available data, river characteristics, permitted wasteloads, project operating constraints (e.g., spillage, hydraulic operating range) and other relevant data, and
(2) if the official further believes that additional data should be gathered to confirm the official's conclusion of reasonable assurance of compliance, then the application must include a sampling and analysis plan for the next field season sufficient to allow the official to make a final determination that the Facility is in Compliance, and a statement from the state agency official confirming the acceptability of the sampling plan. [This letter would be mandatory.]

I would appreciate it if you would let me know whether either of those options work for both the USBR and FRREC operations.

Thank you for your assistance in this matter. I can be reached at 802/223-5175 if you have any questions.

Jeffrey Cueto, P.E.

From: Bassista,Tom [mailto:thomas.bassista@idfg.idaho.gov]
Sent: Friday, January 06, 2017 1:31 PM
To: Katie Sellers <Katie.Sellers@KleinschmidtGroup.com>
Cc: Laura Cowan <Laura.Cowan@KleinschmidtGroup.com>
Subject: RE: Review of Island Park Hydro Information for Low Impact Hydropower Institute

Dear Katie:

The Idaho Department of Fish and Game (IDFG) has reviewed your request for input concerning the Island Park Hydroelectric Project. We understand that Fall River Rural Electric Cooperative has applied for a Low Impact Hydropower Institute Certification.

IDFG confirms that the Island Park Hydroelectric Project is in compliance with their fish screen protections as included within License Article 128.
IDFG confirms that grizzly bear, Canada lynx and Ute Ladie's Tresses may have the potential to occur within the project area.

Thank you for your inquiry and please let IDFG know how we can be of further assistance in this process.

Sincerely,

Tom Bassista
Environmental Staff Biologist
Idaho Department of Fish and Game
Upper Snake Region
4279 Commerce Circle
Idaho Falls, ID 83401
208.525.7290

From: Katie Sellers
Sent: Thursday, November 17, 2016 4:45 PM
To: 'thomas.bassista@idfg.idaho.gov' <thomas.bassista@idfg.idaho.gov>
Cc: 'dan.garren@idfg.idaho.gov' <dan.garren@idfg.idaho.gov>; Laura Cowan <Laura.Cowan@KleinschmidtGroup.com>
Subject: Review of Island Park Hydro Information for Low Impact Hydropower Institute

Hi Tom,
As I have mentioned in earlier emails, Kleinschmidt is helping Fall River Rural Electric Cooperative with applying for a Low Impact Hydropower Institute (LIHI) Certification for the Island Park Hydroelectric Project (FERC No. 2973). Since our last email exchanges LIHI has reviewed the draft Island Park application and requests the following follow-up input from Fish and Game prior to the submission of the final LIHI certification application:

[if !supportLists]1) [endif]Confirm the Project is in compliance with fish screen protections as included within License Article 128.
[if !supportLists]2) [endif]Confirm/or update the following list of threatened species that may have the potential to occur within the Project area:
-Grizzly Bear (Threatened)
-Canada Lynx (Threatened)
-Ute Ladie's Tresses (Threatened)

If you could please provide feedback on the above topics at your earlier convenience, it would be much appreciated.

Thank you!
Katie

Katie Sellers
Regulatory Coordinator
Kleinschmidt
Office: 207-416-1218
www.KleinschmidtGroup.com