

**REVIEW OF APPLICATION
OF THE JORDANELLE HYDROPOWER PROJECT
LIHI # 29 FOR RECERTIFICATION
BY THE LOW IMPACT HYDROPOWER INSTITUTE**

Prepared by Diane Barr, Camas LLC

November 22, 2023

I. INTRODUCTION

The 13-MW Jordanelle Hydroelectric Project (“the Project”), LIHI #29, is owned and operated by the Central Utah Water Conservancy District (CUWCD or the “Applicant”). The Project is located on the Provo River near Heber City in Wasatch County, Utah. The Project is not licensed by the Federal Energy Regulatory Commission (FERC) but is authorized through a lease of power privilege from the U.S. Department of the Interior (USDOI), U.S. Bureau of Reclamation’s (USBOR) Central Utah Project.

The Project was first granted LIHI certification in 2007 and was recertified in 2015. The 2015 Certification expired on June 10, 2023, and was extended to December 31, 2023. The Applicant submitted their initial recertification materials in June 2023.

On January 4, 2023, LIHI notified the Applicant of the upcoming expiration of the Low Impact Hydropower Institute certification for the Project. The notification included an explanation of procedures to apply for an additional term of certification under the 2nd Edition LIHI Handbook, including the new two-phase process starting with a limited review of a completed LIHI application, focused on three questions:

- (1) Is there any missing information from the application?
 - (2) Has there been a material change in the operation of the certified facility since the previous certificate term?
 - (3) Has there been a change in LIHI criteria since the Certificate was issued?

If the answer to any question is “Yes,” the application must proceed through a second Stage which consists of a more thorough review of the application using the LIHI criteria in effect at the time of the recertification application. The Low Impact Hydropower Institute letter stated the Project had not yet been recertified under the LIHI 2nd Edition Handbook and is therefore not eligible for the 5-year extension of the current LIHI term that became effective on January 1, 2022. The new Handbook involves revised standards and a new process, and all projects scheduled to renew in 2017 and beyond will be an automatic ‘YES’ to question #3 above.

The 2015 LIHI Certificate included one condition shown below. The Applicant has demonstrated compliance with Condition 1 with their annual status report findings.

Condition No. 1.

The facility owner shall continue to work proactively with the USFWS on the June Sucker Recovery Program. As part of its annual compliance letter to LIHI, the owner shall provide a statement confirming that it has released the committed flows identified in its June Sucker Recovery Implementation Program (JSRIP) from the Jordanelle Project for the recovery of the June sucker during the prior year, within the limits of the owners Lease of Power Privilege agreement with the Bureau of Reclamation. Also, verification shall be provided annually that the owner has discussed and reached agreement with the USFWS pertaining to these releases as part of the JSRIP.

II. PROJECT'S GEOGRAPHIC LOCATION

The Jordanelle Dam is located at River Mile 49 on the Provo River in Wasatch County, approximately four miles north of Heber City, Utah and 45 minutes east of Salt Lake City.

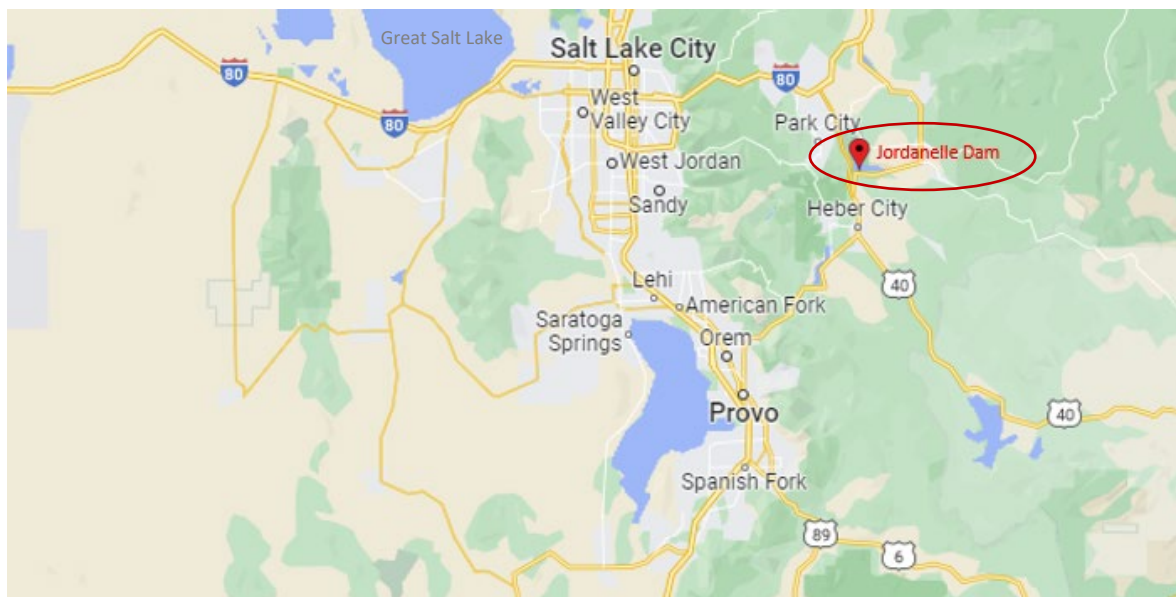


Figure 1-Project Location

III. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

Jordanelle Dam, constructed in 1993, was primarily built for the delivery of water downstream for municipal, industrial, irrigation, and water quality purposes in Salt Lake City and northern Utah County. Other uses include flood control, recreation, and fish and wildlife enhancement. Power generation was installed in 2008. The Project powerhouse is situated at the base of Jordanelle Dam (latitude of 40.59845° N, longitude of -111.42411° W) below Jordanelle Reservoir and drains an area of 252 square miles. An area called “Upper Lakes” comprised of Lost Lake, Washington Lake and Trial Lake are upstream of the Project, and downstream are Deer Creek Reservoir and Utah Lake receiving water releases from Jordanelle. See Figure 2, Watershed Features.



Figure 2-Watershed Features

Jordanelle Dam is a rolled earthfill structure with an emergency spillway and outlet works. The embankment section has a structural height of 300 feet and a crest length of 3,820 feet. The emergency spillway is located near the left abutment and consists of an unlined inlet channel, a concrete lined trapezoidal channel, an earthen plug section, a concrete chute, and a 9.5-foot by 10-foot concrete double box conduit (Figure 3).



Figure 3-Dam and Powerhouse Features

The powerhouse is a reinforced concrete structure located partially within the rock berm at the toe of the dam, west of the existing outlet works. The penstock is constructed from the 72-inch-diameter connection in the outlet conduit and then routed to the powerhouse where it bifurcates into two 66-inch-diameter pipes feeding the turbines. The powerhouse contains two horizontal Francis turbines. The turbines drive synchronous generators with output ratings of approximately 6.5 megawatts (MW) each. The Project generated 39,000 MWh annually for the 2015 LIHI certification, and the 2023 application indicates an increase to 43,000 MWh annually.

The powerhouse discharges into two separate gated discharge channels consisting of regulating gates and radial gates, as shown in Figure 4, Discharge Features.



Figure 4-Powerhouse discharge features

The LIHI recertification application characterizes the Project as operating in a run of river mode. In accordance with the LIHI criteria (2nd Edition, 2.05, 2022, pg. 47) the Project operates in a “run of release” mode, not run of river. The run of release operation is established as the USBOR controls the dam releases, which vary from inflows, for uses other than hydro power.

IV. ZONES OF EFFECT

The Project consists of two Zones of Effect, 1-Impoundment and 2- Tailrace/Downstream. The Figure 5 illustrates the Zones of Effect (ZoEs).

Table 1, LIHI Standards Selections by Criterion exhibits the Alternative Standards selected by the Applicant for each ZoE. The reviewer agrees with the Applicant's Standard selections for each Zone and Criteria.



Figure 5-Zones of Effect

Table 1-LIHI Standards Selections by Criterion

Criterion		Zone of Effect	Alternative Standards				
			1	2	3	4	Plus
A	Ecological Flow Regimes	1	X				
		2		X			
B	Water Quality	1			X	n/a	
		2			X	n/a	
C	Upstream Fish Passage	1	X				
		2	X				
D	Downstream Fish Passage and Protection	1				X	
		2				X	
E	Watershed and Shoreline Protection	1	X			n/a	
		2	X			n/a	
F	Threatened and Endangered Species Protection	1		X			
		2			X		
G	Cultural and Historic Resources Protection	1	X		n/a	n/a	
		2	X		n/a	n/a	
H	Recreational Resources	1		X		n/a	
		2		X		n/a	

V. REGULATORY AND COMPLIANCE STATUS

The Jordanelle river releases are dictated by the Bonneville Unit of the Central Utah Project (CUP). Its primary purpose is to store surplus flows of the Provo River and water from Strawberry Reservoir exchanged through Utah Lake for municipal and industrial use in Salt Lake, Wasatch, Summit, and northern Utah Counties. Releases to support the CUP are made through the powerhouse, allowing for hydroelectric generation. The application references releases made in accordance with a Water Quality Management Plan for dissolved oxygen, and the plant operates only at reservoir elevations that fall within the turbine limits and where Water Quality Management Plan requirements are met. Reservoir releases vary from a minimum flow requirement of 125 cfs from October through March up to as much as 2,400 cfs from April to September. Tail water elevations are controlled by the Timpanogos Canal diversion dam on the Provo River several hundred feet downstream of Jordanelle Dam.

The Applicant provided information about a 1984 Watershed Management Plan currently implemented by the Provo River Watershed Council (PRWC) which is coalition of state, local, and federal government agencies; water districts including CUWCD; and private organizations. The Applicant stated that the resulting data from the Watershed Council implementation is analyzed and presented in annual reports although no weblink to those reports was available. The Applicant explained in an email to LIHI staff (Attachment A) that their collected data is summarized along with data from the rest of the watershed

on PRWC's web-based story map¹, and the data sent to the Utah Department of Environmental Quality for use in the state's water quality database. The Applicant also provided a weblink² to the Utah Department of Environmental Quality 2022 Integrated Report on Water Quality in which Jordanelle Reservoir is characterized as not meeting pH standards and requiring a 303(d) TMDL with a low priority for the department to complete. The record of LIHI annual compliance reporting during the term of the current certification includes annual attestation of meeting the US Fish and Wildlife Service (USFWS) minimum flow requirements for the June sucker.

VI. PUBLIC COMMENTS RECEIVED OR SOLICITED BY LIHI

A 60-day public notice was provided to stakeholders and the state and federal agencies on September 14, 2023. The public comment period concluded on November 13, 2023 and no comments were received. No additional outreach was made to regulatory agencies or stakeholders as the application presented sufficient evidence in meeting the LIHI recertification standards without additional verification. However, LIHI staff reached out to the Applicant for additional information regarding water quality monitoring (Attachment A).

VII. DETAILED CRITERIA REVIEW

A. Ecological Flow Regimes

Goal: The flow regimes in riverine reaches that are affected by the facility support habitat and other conditions suitable for healthy fish and wildlife resources

The Applicant accurately selected Standard A-1, Not Applicable/De Minimis Effect for ZoE-1-Impoundment. Typically, impoundment zones can use this standard which is focused on riverine reaches. The Applicant accurately selected Standard A-2, Agency Recommendation for ZoE-2-Tailrace and Downstream, and has met the minimum flow requirements based on providing LIHI annual statements of compliance with these flows. Minimum flows are based on pre-dam base flows and flow/habitat studies³ conducted for the 2004 Utah Lake System, Final Environmental Impact Statement. The hydro plant operates only at reservoir elevations that fall within the turbine limits and where Watershed Management Plan requirements are met. The hydro project utilizes all flow released from the reservoir up to 600 cfs during periods when the reservoir is at elevation 6037 feet msl or higher. Whenever reservoir elevation and/or release flow falls outside the plant's operating range and subject to the downstream water quality criteria, releases are made via the existing outlet works valves to increase dissolved oxygen by aerating the water. Reservoir releases vary from a minimum flow requirement of 125 cfs from October through March up to as much as 2,400 cfs from April to September.

Flows are monitored at the upstream [USGS Gage #10155000, Provo River near Hailstone UT](#) and the downstream USGS [Gage #10155200, Provo River below Jordanelle Dam near Heber, UT](#), and are reviewed daily within the CUWCD Water Accounting processes, and discussed in bi-weekly meetings with the Provo River Commissioner.

¹ <https://swcagis.maps.arcgis.com/apps/MapSeries/index.html?appid=950ffb8e6b2d495e98523e0011f1835f>

² <https://documents.deq.utah.gov/water-quality/monitoring-reporting/integrated-report/DWQ-2022-002386.pdf>

³ https://www.mitigationcommission.gov/watershed/provoriver/pdf/provo_flow_study_2004.pdf

Based on the review of the application, supporting documentation, and other publicly available information the Project continues to satisfy the Ecological Flow Regimes criterion.

B. Water Quality

Goal: Water quality is protected in waterbodies directly affected by the facility, including downstream reaches, bypassed reaches, and impoundments above dams and diversions.

The Applicant accurately selected Standard B-3, Site-Specific Studies for both ZoE's. The impoundment (state assessment Unit ID: UT-L-16020203-003 00) and downstream reach (assessment Unit ID: UT16020203-004 00) are both listed as impaired for pH with a TMDL required but not developed yet. The Applicant stated, and the reviewer agrees, that the hydro operation does not impact pH levels in the river since waterbodies throughout the watershed including upstream of Jordanelle Reservoir are also impaired for pH.⁴

The Jordanelle Reservoir Water Quality Technical Advisory Committee (JTAC) was formed in 1981 with the purpose of developing a reservoir management plan for Deer Creek and Jordanelle Reservoirs. Water temperature can be adjusted from the selective level inlet structure to provide water quality and fish and wildlife benefits. Water is released from the dam through a selective level (SLOW) and/or low level (LLOW) inlet structure through piping and tunnels to the outlet works. The outlet works consist of two 72-inch fixed cone valves and a bypass jet flow valve. Water is mixed from different reservoir depths to control and meet water quality standards for phosphorus, temperature, and dissolved oxygen levels in water discharged to the Provo River downstream of Jordanelle Dam. Water releases can be modified through various gates to provide cooler water temperatures. Most, if not all, of these water quality flow decisions are not predicated on the hydropower units or power delivery contracts.

The Applicant monitors numerous water quality parameters on a monthly basis for ten months each year. Samples are collected from several sites above and below Jordanelle Reservoir including from the reservoir's water surface, at each gate depth of the SLOW tower, and from the bottom of the reservoir. In addition, at each of these locations, a multiparameter sonde is used to collect water quality data (temperature, dissolved oxygen, pH, specific conductivity, and turbidity) in one-meter increments, beginning with the surface and going all the way to the bottom.

Water releases are typically adjusted from the middle of June to November to maintain water quality. During this time all releases are made through the SLOW. Water quality testing has shown that the highest water quality occurs when the water temperature of the releases can be maintained between 49 F and 52 F, within which range, water meets the water quality standards. The six gates on the SLOW are adjusted to maintain this temperature range in the river.

⁴ <https://www.google.com/url?client=internal-element-cse&cx=015474105693784682582:dyxlxumg5eo&q=https://documents.deq.utah.gov/water-quality/watershed-protection/watershed-plans/DWQ-2023-007160.pdf&sa=U&ved=2ahUKEwjCh5eR-fWCAxXyFFkFHTS-BgY4ChAWegQICRAC&usg=AOvVaw0sb9XdMQgyYSDpPJki54ks>

The Applicant provided documentation of recent water quality monitoring data as well as a link to the PRWC's story map of water quality monitoring conducted in the basin including in Jordanelle Reservoir and downstream.⁵

Based on the review of the application, supporting documentation, Applicant responses to LIHI staff questions, and other publicly available information the Project continues to satisfy the Water Quality criterion.

C. Upstream Fish Passage

Goal: The facility allows for the safe, timely, and effective upstream passage of migratory fish. This criterion is intended to ensure that migratory species can successfully complete their life cycles and maintain healthy populations in areas affected by the facility.

The Applicant selected Standard C-1, Not Applicable/De Minimis Effect for both ZoE's, which is appropriate based primarily on the fact that the powerhouse and all related facility features are not affiliated with the Jordanelle dam. If upstream fish passage were required, the USBOR would be the responsible entity for such passage. There are no migratory fish in the area. The river drains to Utah Lake which then drains to the Jordan River and ultimately to the Great Salt Lake which has no outlet to the ocean. Any resident fish that may have historically moved from Utah Lake up the river are blocked by multiple diversion structures downstream that serve as fish passage barriers. Deer Creek Reservoir, just downstream of the Project was constructed in 1941, prior to Jordanelle dam construction in 1993 and would have blocked any migratory species, if present, from reaching Jordanelle Dam.

Based on the review of the application, supporting documentation, input from agencies/stakeholders as applicable, and other publicly available information the Project continues to satisfy the Upstream Passage criterion.

D. Downstream Fish Passage

Goal: The facility allows for the safe, timely, and effective downstream passage of migratory fish. For riverine (resident) fish, the facility minimizes loss of fish from reservoirs and upstream river reaches affected by facility operations. Migratory species can successfully complete their life cycles and maintain healthy populations in the areas affected by the facility.

Standard D-4, Acceptable Mitigation was selected by the Applicant for both ZoE's, as prior to construction of the hydro project, resident fish were unable to swim past the fixed cone valves at the dam. Fish found in the impoundment are Brown Trout, Kokanee Salmon, Rainbow Trout, Smallmouth Bass, Utah Chub, Wiper, Yellow Perch, Black Crappie, Cutthroat Trout/Bonneville, Largemouth Bass, Splake, Tiger Muskie, and Utah Sucker.

After power plant construction, fish are generally still unable to swim past the turbines and dam. The 2005 environmental assessment for the Jordanelle Dam Hydroelectric Project was reviewed by federal, state, and local wildlife agencies. No comments were received from any of these agencies concerning fish passage.

⁵ <https://swcagis.maps.arcgis.com/apps/MapSeries/index.html?appid=950ffb8e6b2d495e98523e0011f1835f>

As acceptable mitigation, the Provo River Restoration Project⁶ mitigates past impacts of the Central Utah Project and other federal Reclamation projects by improving fish and riparian habitats in the 10-mile reach of the Provo River downstream. The restoration project is under the direction of the Utah Reclamation Mitigation and Conservation Commission and was planned, designed, and constructed to restore and create a functional riparian ecosystem. The volume, timing, and pattern of water discharges from the dam provide scouring and deposit of fine sediments from the stream onto adjacent floodplain and near-bank surfaces to support germination and growth of seedling plants, aquatic invertebrates, and plant and fish communities.

Based on the review of the application, supporting documentation, input from agencies/stakeholders as applicable, and other publicly available information the Project continues to satisfy the Downstream Passage criterion.

E. Shoreline and Watershed Protection

Goal: The facility has demonstrated that sufficient action has been taken to protect, mitigate or enhance the condition of soils, vegetation and ecosystem functions on shoreline and watershed lands associated with the facility.

The Applicant selected Standard E-1, Not Applicable/De Minimis Effect for both ZoE's and demonstrated appropriate adherence to this Standard. The Applicant does not directly manage the shoreline or watershed areas in their operation of the hydroelectric facility. The impoundment shoreline is controlled and maintained by Jordanelle State Park under a reservoir management plan developed by USBOR. The shorelines of the downstream reach are controlled and maintained by Wasatch County. The reach is bounded on the east and west by major roads with little development. The Provo River Basin Drinking Water Source Protection Plan discusses watershed protection in detail. The Provo River Restoration Project maintains, monitors, and improves the shorelines and habitats in this reach.

Based on the review of the application, supporting documentation, and other publicly available information the Project continues to satisfy the Shoreline and Watershed Protection criterion.

F. Threatened and Endangered Species Protection

Goal: The facility does not negatively impact federal or state listed species.

The Applicant selected Standard F-2, Finding of No Negative Effect for ZoE-1-Impoundment and Standard F-3, Recovery Planning and Action for ZoE-2-Tailrace and Downstream.

Zone 1-Impoundment: The Applicant provided the USFWS IPaC report in Attachment 2 of the LIHI application which listed the federal threatened Canada lynx, yellow-billed cuckoo, and Ute ladies' tresses, along with the candidate monarch butterfly. Federally protected migratory birds that may be present periodically include bald and golden eagles and several other migratory bird species. The Applicant also discussed the state listed species list derived from the Utah State mapping tool. The Applicant based the finding of No Negative Effect from the 2005 Environmental Assessment which established no impact on species in the impoundment area due to the small project footprint associated with the hydro operation and lack of appropriate habitat. The Environmental Assessment is nearly 19

⁶ <https://www.mitigationcommission.gov/prrp/prrp.html>

years old but included Canada lynx, yellow-billed cuckoo, and black-footed ferret. These species were noted as not being present in the Project area with only a single observation of Canada lynx about 16 miles away from the Project. The EA also included bald eagle, but not Ute ladies' tresses. The Reviewer relied on the listing of IPaC species as representing likely species to be impacted by Project operations. This is further supported by the Applicant's lack of direct management for the impoundment operations. The ZoE-1 Impoundment Standard F-2 has been adequately demonstrated the No Negative Effect standard.

ZoE-2 Tailrace/Downstream also includes the federally endangered June sucker. The USFWS has developed a June sucker Recovery Implementation Program⁷ Initiated in 2002 to support species recovery. The June sucker is found in Utah Lake and lower tributaries well downstream of the Project. The Recovery Program has two main goals:

1. Recover the June sucker to the extent that it no longer requires protection under the Endangered Species Act; and
2. Allow for the continued operation of existing water facilities and future water development of water resources for human use.

The Recovery Program is built on an adaptive management framework with data gathered, reviewed, and incorporated into the Recovery Program on a continual basis.

The Applicant also demonstrated compliance with Condition 1 of the 2015 LIHI Certification, which requires CUWCD to work proactively with the USFWS on the June Sucker Recovery Program. And to provide in the annual compliance submittal to LIHI, a statement confirming that it has released the committed flows identified in its June Sucker Recovery Implementation Program (JSRIP). Therefore, the ZoE-2 Tailrace/Downstream Reach Standard F-3 Standard-Recovery Planning and Action has been adequately demonstrated.

Based on the review of the application, supporting documentation, and other publicly available information the Project continues to satisfy the Threatened and Endangered Species criterion.

G. Cultural and Historic Resource Protection

Goal: The facility does not unnecessarily impact cultural or historic resources that are associated with the facility's lands and waters, including resources important to local indigenous populations, such as Native Americans.

The Applicant selected Standard G-1, Not Applicable/De Minimis Effect for both ZoE's. The Applicant provided documentation of a 2004 letter report prepared by Sagebrush Archaeological Consultants which determined that studies during dam construction did not find any cultural or historic resources in the area to be occupied by the hydro project. Tribal consultation was also conducted during this period resulting in no tribal trust resources identified. The Utah State Historic Preservation Office concurred with the no impact determination. The Applicant provided sufficient documentation to meeting this standard with no new information since the 2015 LIHI Certification indicating a cultural or historic resource impact through hydroelectric operations.

⁷ <https://www.junesuckerrecovery.org/about-us>

Based on the review of the application, supporting documentation, input from agencies/stakeholders as applicable, and other publicly available information the Project continues to satisfy the Cultural and Historic Resources criterion.

H. Recreational Resources

Goal: The facility accommodates recreation activities on lands and waters controlled by the facility and provides recreational access to its associated lands and waters without fee or charge.

The Applicant selected Standard H-1, Not Applicable/De Minimis Effect. The Project has no recreational opportunities within the 4.66-acre Project footprint. The area is not conducive to safe public access. Jordanelle State Park at the reservoir provides numerous activities including boating, fishing, picnicking, camping, and water activities at three distinct recreational areas – Hailstone, Rock Cliff, and Ross Creek.

Fishing access downstream is allowed within approximately ¼ mile of the project. The Provo River is a destination for fishing both upstream and downstream of the hydro plant. Brown, rainbow, and cutthroat trout are the primary species on this stretch of the river. Access is available at several locations below Jordanelle Dam. The river and reservoir are both classified as blue-ribbon fisheries as determined by the Utah Division of Wildlife Resources.

The Applicant has provided sufficient information to support the H-1 Standard.

Based on the review of the application, supporting documentation, and other publicly available information the Project continues to satisfy the Recreation Resources criterion.

VIII. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION

Based on this review, the Jordanelle Hydroelectric Project continues to meet the LIHI criteria for recertification as a Low Impact Hydropower facility and a new 10-year term with no conditions. The reviewer recommends not continuing the 2015 Certificate Condition 1 as the Applicant has consistently demonstrated compliance and the flow releases supporting the June sucker recovery program are mandatory.

ATTACHMENT A – APPLICANT COMMUNICATIONS

From: [Joe Crawford](#)
To: mfischer@lowimpacthydro.org; [Rex Mathis](#); [Will Garner](#); [Eli Johnson](#)
Subject: Re: a question on the Jordanelle project
Date: Monday, November 27, 2023 1:28:48 PM
Attachments: [image001.png](#)

Maryalice,

This is all non-compliance data. However, we do submit all of our data to the Division of Water Quality. They input all of it into their AWQMS database.

If you are interested in looking into more of our past data, the Provo River Watershed Council has a story map that houses all of our past data as well as other water quality information that we collect within the upper and middle Provo River Watershed.

Here is a link to the story map: <https://swcagis.maps.arcgis.com/apps/MapSeries/index.html?appid=950ffb8e6b2d495e98523e0011f1835f>

Please let me know if you have any other questions.

Thanks,

Joe

From: mfischer@lowimpacthydro.org <mfischer@lowimpacthydro.org>
Sent: Monday, November 27, 2023 8:15 AM
To: Joe Crawford <Joe@cuwcd.gov>; Rex Mathis <REX@cuwcd.gov>; Will Garner <Will@cuwcd.gov>; Eli Johnson <eli@cuwcd.gov>
Subject: RE: a question on the Jordanelle project

Good morning, happy Monday! I apologize for one more question. Do you develop annual reports of the water quality data and/or report results to any agency to confirm compliance with water quality standards?

Thank you,
Maryalice

From: mfischer@lowimpacthydro.org <mfischer@lowimpacthydro.org>
Sent: Wednesday, November 22, 2023 9:24 AM
To: 'Joe Crawford' <Joe@cuwcd.gov>; 'Rex Mathis' <REX@cuwcd.gov>; 'Will Garner' <Will@cuwcd.gov>; 'Eli Johnson' <eli@cuwcd.gov>
Subject: RE: a question on the Jordanelle project

Perfect, thank you all!
Maryalice

From: Joe Crawford <Joe@cuwcd.gov>

Sent: Tuesday, November 21, 2023 5:39 PM

To: mfischer@lowimpacthydro.org; Rex Mathis <REX@cuwcd.gov>; Will Garner <Will@cuwcd.gov>; Eli Johnson <eli@cuwcd.gov>

Subject: Re: a question on the Jordanelle project

Maryalice,

I collect samples from Jordanelle Reservoir on a monthly basis during the months of April - October. I also collect monthly samples from several sites on the Provo River, including above and below Jordanelle Reservoir.

When collecting samples from Jordanelle Reservoir, I collect water samples above the dam from the water surface, at each gate depth of the Select Level Outlet Works tower, and from the bottom of the reservoir. I also collect samples from the top and bottom of the reservoir near the North End as well as from an area near Hailstone (the area where the Provo River enters Jordanelle). When I am finished collecting the samples, most of them are dropped off at Chemtech-Ford and analyzed for several analytes (e.g., phosphorus, nitrogen). At each of these locations, we also use a sonde to collect water quality data (i.e., temperature, dissolved oxygen, pH, specific conductivity, and turbidity) in one-meter increments, beginning with the surface and going all the way to the bottom.

The river samples are collected monthly, ten months out of the year. Samples are collected from the thalweg at each site and dropped off at Chemtech-Ford (we analyze the bacteria samples in-house). I also collect sonde samples from each river site as well.

I have attached the sample data from our August sample run. It is the raw data and has not been quality checked.

If you have any questions or need more information, please let me know.

Thanks,

Joe Crawford
Watershed Programs Manager
Central Utah Water Conservancy District
435-760-8334

From: mfischer@lowimpacthydro.org <mfischer@lowimpacthydro.org>

Sent: Tuesday, November 21, 2023 11:44 AM

To: Rex Mathis <REX@cuwcd.gov>; Will Garner <Will@cuwcd.gov>; Eli Johnson <eli@cuwcd.gov>

Cc: Joe Crawford <Joe@cuwcd.gov>

Subject: RE: a question on the Jordanelle project

Thank you, Rex – this is very helpful. Yes, if Joe can elaborate on how data is collected that

would be great. And, if not too onerous, maybe provide some recent data or summary.
Maryalice

From: Rex Mathis <REX@cuwcd.gov>
Sent: Tuesday, November 21, 2023 10:47 AM
To: mfischer@lowimpacthydro.org; Will Garner <Will@cuwcd.gov>; Eli Johnson <eli@cuwcd.gov>
Cc: Joe Crawford <Joe@cuwcd.gov>
Subject: RE: a question on the Jordanelle project

Hi Maryalice

Releases are adjusted from about the middle of June to about November for water quality. During this time all the releases are made through the Selective Level Outlet Works (SLOW). Water quality testing has showed that the highest water quality is when the water temperature of the releases can be maintained between 49 F and 52 F. Monitoring has shown that when we do this the water meets the water quality standards. This is also the best water temperature for the fish. We adjust the six gates on the SLOW to maintain this temperature in the river. During the winter and spring months the lake overturns and mixes and with the temperatures becoming similar at all the intakes. We have been able to adjust the discharges to maintain water quality since the reservoir has been filled. The lowest slide gate on the SLOW is at elevation 6130 ft and the lowest reservoir elevation since first filling has been 6102 ft. If the reservoir level ever dropped below the 6160 level during the summer and fall months it could be a challenge to maintain the water quality as we would not have the span of gates on the SLOW to make adjustments. Joe Crawford the Watershed Program Manager with the district does monthly water quality sampling on both the reservoir and river below Jordanelle when conditions allow. There is also a hydro lab that is installed in the river downstream of the dam that is collecting data. I am Cc Joe on this email so he can respond on how he collects the data and also provide that data to you if you need it.

Thanks,

Rex Mathis

Facility O&M Lead – CUP M&I
CENTRAL UTAH WATER CONSERVANCY DISTRICT
(801) 319-6857 cell rex@cuwcd.gov
1426 E. 740 N. Suite 400 | Orem, UT 84097



From: mfischer@lowimpacthydro.org <mfischer@lowimpacthydro.org>
Sent: Tuesday, November 21, 2023 7:08 AM
To: Rex Mathis <REX@cuwcd.gov>; will@cuwcd.com; Eli Johnson <eli@cuwcd.gov>
Subject: a question on the Jordanelle project

Good morning – we are trying to clarify one aspect of the LIHI recertification application and I hope you can shed some light on this.

To maintain water quality in the river, you adjust discharges from the selective/low level inlet

structures. Do you monitor temperature, phosphorus and dissolved oxygen in order to make the adjustments? If so, can you describe your monitoring in more detail? How often do you monitor, how is the data collected, what happens if you can't adjust discharges enough to maintain water quality standards?

Thank you!

Maryalice Fischer
Certification Program Director
(603) 664-5097
mfischer@lowimpacthydro.org