



United States Department of the Interior
FISH AND WILDLIFE SERVICE

UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

In Reply Refer To

FWS/R6
ES/UT
05-0736

June 1, 2005

Terry J. Hickman, Environmental Programs Manager
Central Utah Water Conservancy District
355 West University Parkway
Orem, Utah 84058-7303

RE: Jordanelle Dam Hydroelectric Draft Environmental Assessment

Dear Mr. Hickman:

The U.S. Fish and Wildlife Service (Service) has received your letter of April 20, 2005 requesting review and comment on the Draft Environmental Assessment (EA) for the Jordanelle Dam Hydroelectric Project (Project). We are providing the following comments for consideration in your EA.

7-1 The draft EA states that the Department of the Interior (DOI) has proposed to enter into a Lease of Power Privilege contract, to provide for construction, operation, and maintenance of a non-federal hydroelectric generation facility on Jordanelle Dam. Central Utah Water Conservancy District and Heber Light and Power were selected by DOI as the potential joint lessees for development of the Project. The Preferred Alternative includes construction of a powerhouse facility at the toe of the dam west of the existing outlet works. Hydropower generation will be incidental to the delivery of water for authorized Central Utah Project purposes including municipal and industrial water supply, irrigation supply, flood control, and fish and wildlife.

The power plant would house two horizontal Francis turbines, each rated at approximately 300 cubic-feet-per-second with output ratings of about 6 megawatts (MW). Generated electrical power would be transmitted to the site of interconnection with the utility's facilities via an overhead 3-phase power line. Design for all new power lines both temporary and permanent, will conform to designs shown in the Avian Power Line Interaction Committee's 1994 and 1996 publications.

- 7-1 The District emphasizes that operations will comply with the intent of the last sentence of Paragraph 2 of comments by USFWS, “Hydropower generation will be incidental to the delivery of water for authorized CUP purposes, including Municipal and Industrial Water supply, irrigation, flood control, and fish & wildlife.”

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General Comments:

- 7-2 As stated in the EA, the Provo River Restoration Project is currently being implemented to restore a more natural channel dimension, pattern, and profile as well as ecological function to the reach of the Provo River between Jordanelle Reservoir and Deer Creek Reservoir. As you know, this restoration work represents a substantial investment in terms of land acquisition, construction activities, and coordination of local, state, and federal agencies. As such, modification to reservoir operations should in no way impact ecological processes in the middle Provo River.
- 7-3 The EA states that the proposed power plant would be operated during periods when the following two conditions are met: when reservoir elevation is high enough to permit effective turbine operation, and when such reservoir releases can meet the requirements of the Water Quality Management Plan (Plan). The effects of the Project's operations on dissolved oxygen will be of primary importance and continual regulation of water temperature and phosphorus levels will be important as well. Although the Plan is referred to several times in the document it is unclear what the specific Plan criteria are for dissolved oxygen and phosphorus. A more thorough description of the Plan should be provided in the EA that specifies specific water quality criteria, how these criteria have been met during past operation of the reservoir, and by what methods these criteria will be met with future reservoir and hydropower operations.
- 7-4 Additionally, the document states that a monitoring station is located downstream of the dam outlet and Timpanogos Canal diversion; however, more information should be provided specifying monitoring parameters, frequency, and adaptive management methods for adjusting water intake and water release if standards are not met.
- 7-5 Because of the important fishery resources in Jordanelle Reservoir, we recommend that the EA include an analysis of the potential for fish entrainment into the hydropower generation system. If appropriate, the Project's design should include fish screens at the intake structure for the turbines or other features to reduce or eliminate entrainment.
- 7-6 Below hydroelectric facilities, nitrogen supersaturation has the potential to negatively affect fish by causing gas-bubble disease. From the information contained in the EA it is unclear if the Project would have any negative effect on nitrogen levels in waters of the Provo River fishery. We recommend that the EA include an analysis of the potential for Project induced nitrogen supersaturation and gas-bubble disease.
- 7-7 Outdoor lighting should be designed to minimize indirect impacts to migratory birds, bats, and other nocturnal wildlife by reducing scatter and light trespass. We recommend directional, downward-facing lighting (e.g. no floodlighting or lighting on tall poles (recommend not exceed 25 feet tall)).

- 7-2 The Joint Lead Agencies concur. The Jordanelle Dam Hydroelectric Project is in conformance with approved NEPA documents that may be associated with the proposed project area.
- 7-3 The Joint Lead Agencies commit to maintain dissolved oxygen concentrations above the State and EPA standards. The District presently has a water quality monitoring station located at an established gauging location approximately 1,500 feet downstream of the outlet of the dam. The District will operate the facilities to maintain the standard and post water quality information on the District website for a reasonable period of time. This station (Provo River below Jordanelle) has real time (hourly) data for temperature, dissolved oxygen, pH, and conductivity and is transmitted into the District's SCADA system. Data from this site have been used to ensure temperature releases downstream and will continue to be used after hydroelectric facilities are in place. In addition, dissolved oxygen monitoring will be initiated in the tailrace of the hydropower plant and incorporated into the SCADA system.

Also, as stated in section 2.9, first paragraph, "Operations that mix and blend Jordanelle Reservoir water to meet requirements of the Water Quality Management plan (the Plan) for Deer Creek and Jordanelle Reservoirs would be unchanged under the proposed project (Psomas, 1999)." The Plan criteria for dissolved oxygen and phosphorus will be met regardless of the presence of the hydropower plant; therefore, the Plan criteria for dissolved oxygen and phosphorus are not relevant to this planning process.

- 7-4 See response to Comment 7-3. Data from both stations will be used to make adjustments to water intake and releases as described in the EA, Section 3.8.4, to ensure meeting state water quality standards.
- 7-5 Movement of fish through the outlet works of Jordanelle Dam is infrequent. The discharge of all or part of the release from Jordanelle Reservoir through hydroelectric turbines will not affect the potential or frequency of fish entrainment, nor is it expected to increase fish passage mortality. Under existing conditions of operation, or the No Action Alternative, any entrained fish enter the outlet works conduit at the reservoir intake structures. They would be discharged through the outlet works control valves, passing through the valve mechanism into the stilling basin at velocities often exceeding 100 feet per second. Mortality in entrained fish would be extremely high.
- 7-6 The presence of nitrogen supersaturation and the associated gas bubble disease (GBD) can negatively affect fish. Nitrogen supersaturation below hydraulic structures is typically associated with spillways where highly aerated flows are plunged deep into stilling basins, followed by deep, slow-moving downstream flow conditions. Part of the entrained air is driven into solution before it has risen to the surface and escaped into the atmosphere. The slow-moving, deep downstream flow conditions allow the condition to persist.

Generally, hydroelectric turbines have not been associated with this problem. However, in some cases, where low water levels and vortex-prone intake conditions are present, some elevation of gas saturation can occur.

The potential for the proposed facilities to create nitrogen supersaturation problems is very small. The design of the existing reservoir intakes are not prone to vortex formation and gates are operated to reduce intake velocities. Therefore, the potential for air entrainment is very limited. The proposed powerhouse tailbay configuration results in turbine draft tube exits that are only 14 to 16 feet below the tailwater surface elevation. The geometry of the tailbays and tailrace will produce consistent levels of turbulence and mixing. At the tailrace outlet, the depth of flow is reduced to only 3 to 4 feet. Shallow depth of flow and turbulence in the stilling basin pool and downstream channel are likewise conducive to the elimination of supersaturation.

Text has been added to Section 2.9 to reflect this information.

- 7-7 Powerhouse and area lighting will be provided for security, safety, and maintenance purposes. Offsite lighting will be minimized through use of cut-off luminaires. Directional lighting will be taken into account wherever possible.

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Specific Comments

7-8

Page 3-19, second full paragraph. The first sentence is unclear. If the reader is to assume that the text should read "...historical monitoring has not found the LLOW level dissolved oxygen levels to be extremely low.", what is the criteria for making this assessment? Please explain.

7-9

Page 3-20, first paragraph. The EA states that use of the LLOW "may be" necessary to keep temperatures below 56 degrees F mid-July through September and that these operations may result in higher concentrations of phosphorus being released. It is unclear what criteria have been used to evaluate phosphorus concentrations in Jordanelle Reservoir and the Provo River. Also, no information has been provided to explain how releases have been managed for these water conditions. Please expand this discussion to include this information.

7-10

Page 3-21, fifth paragraph. This paragraph states that dissolved oxygen would be monitored "...at a nearby downstream location...". Please provide the location for this monitoring as well as method and frequency for monitoring protocol.

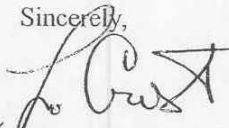
7-11

Page 3-21 last full paragraph. We do not believe enough information or analysis has been provided to determine whether Project operations will have an effect on Provo River natural resources. The Affected Environment water quality section of the document stated that current dissolved oxygen levels are approximately 8-9 mg/L as calculated for a monthly mean. The Impact Analysis water quality section does not provide a standard for dissolved oxygen. If the reader is to assume that the State of Utah or Environmental Protection Agency (EPA) standard will be used, this should be stated in the document and analysis should be provided that explains the effects of reduced dissolved oxygen levels on Provo River natural resources.

Page 3-22, 3.8.5 Cumulative Impacts. Please see comments in previous paragraph.

We appreciate the opportunity to provide these comments. If you need further assistance, please contact Paul Abate, Ecologist, at the letterhead address or (801) 975-3330 ext. 130.

Sincerely,


Henry R. Maddux
Utah Field Supervisor

cc: URMCC (Attn: Mark Holden)
UDWR - Springville (Attn: Ashley Green)
UDWR - SLC (Attn: Rick Larson)
DOI - CUP Completion Act Office (Attn: Reed Murray)

7-8 The text has been revised as suggested. The Jordanelle outlet works have not been operated with the reservoir as low as elevation 6070 feet since the reservoir has been filled and historical monitoring has not found the LLOW level dissolved oxygen levels to be extremely low.

Temperature, dissolved oxygen, pH, and conductivity profiles have been taken approximately monthly on Jordanelle Reservoir since 1994 and will continue as stated in Section 3.8.4. Those data show that dissolved oxygen has never been less than 1.3 mg/L at the bottom, and only one time in over 70 data points at that concentration. Other reservoirs typically have dissolved oxygen concentrations at or near zero mg/L for several weeks when the reservoir is stratified.

7-9 Operations for managing temperature and/or phosphorus levels are not changed by the presence of the power plant. Therefore, it is not warranted to try to address the detailed operations of the LLOW nor the SLOW. Also, see response to Comment 7-3 and Comment 4-3.

7-10 See the response to Comment 7-3 and 7-4.

7-11 The Joint Leads can only commit to maintain dissolved oxygen above the State and EPA standards. It is the Joint Leads understanding that fish do not appear to be negatively impacted by these standards. In addition, see the response to Comment 7-3 and 7-4.