# Arrowrock Dam Hydroelectric Facility Application to Low Impact Hydroelectric Institute

**Submitted by:**

**Clatskanie People's Utility District**
**495 East Columbia River Hwy**
**Clatskanie, OR 97016**
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# 1 Background and Facility Description

The Arrowrock Hydroelectric Project (FERC No. 4656) is located on the Boise River in southwest Idaho about 22 miles upstream of the City of Boise in Elmore and Ada Counties. It is part of the Columbia River network of dams. Arrowrock Dam was constructed in 1915 and is owned and operated by the US Bureau of Reclamation (USBR), one of four federal dam developments within the upper Boise River watershed. Upstream is the Anderson Ranch Dam and hydro project constructed in 1950 and located on the South Fork Boise River. About 11 miles downstream of Arrowrock is the Lucky Peak dam constructed in 1955 owned and operated by the US Army Corps of Engineers (USACE). The Lucky Peak impoundment backwaters to the base of Arrowrock dam. Farther downstream is the Boise River Diversion Dam and hydro project constructed in 1909 and owned and operated by USBR. This dam diverts irrigation water to the New York Canal about 14.2 miles downstream of Arrowrock.

Arrowrock is part of the USBR "Boise Project" which includes five storage dams, two diversion dams, three power plants, 721 miles of canals, seven pumping plants, 1,323 miles of laterals, and 649 miles of drains. The Boise Project furnishes irrigation water to about 390,000 acres in southwestern Idaho and eastern Oregon.

The Arrowrock hydro project was first certified by LIHI in 2011 for a 5-year term that expired on April 30, 2016. At the time of recertification in 2016, a recertification application was submitted but the owners ultimately decided to let the certification lapse, being unable to monetize the value of LIHI recertification. Now though, economic conditions have changed such that seeking LIHI certification is more worthwhile.

The Boise River drains an area of 4,100 square miles (Figure 1). The mainstem is formed by the convergence of the North and Middle forks of the Boise River to the northeast of Arrowrock reservoir. The headwaters originate in the Sawtooth Mountains at elevations exceeding 10,000 feet. The river's forks generally flow in a southwesterly direction before emptying 102 miles later into the Snake River near Parma, Idaho. The South Fork of the Boise River also feeds Arrowrock reservoir as shown in Figure 1. Below the South Fork confluence, the river flows westerly and is fed also by Mores Creek a major tributary that enters Lucky Peak reservoir. Arrowrock reservoir's contributing watershed area is 2,210 square miles, and all inflows are appropriated for irrigation use and flood control (Figure 2).

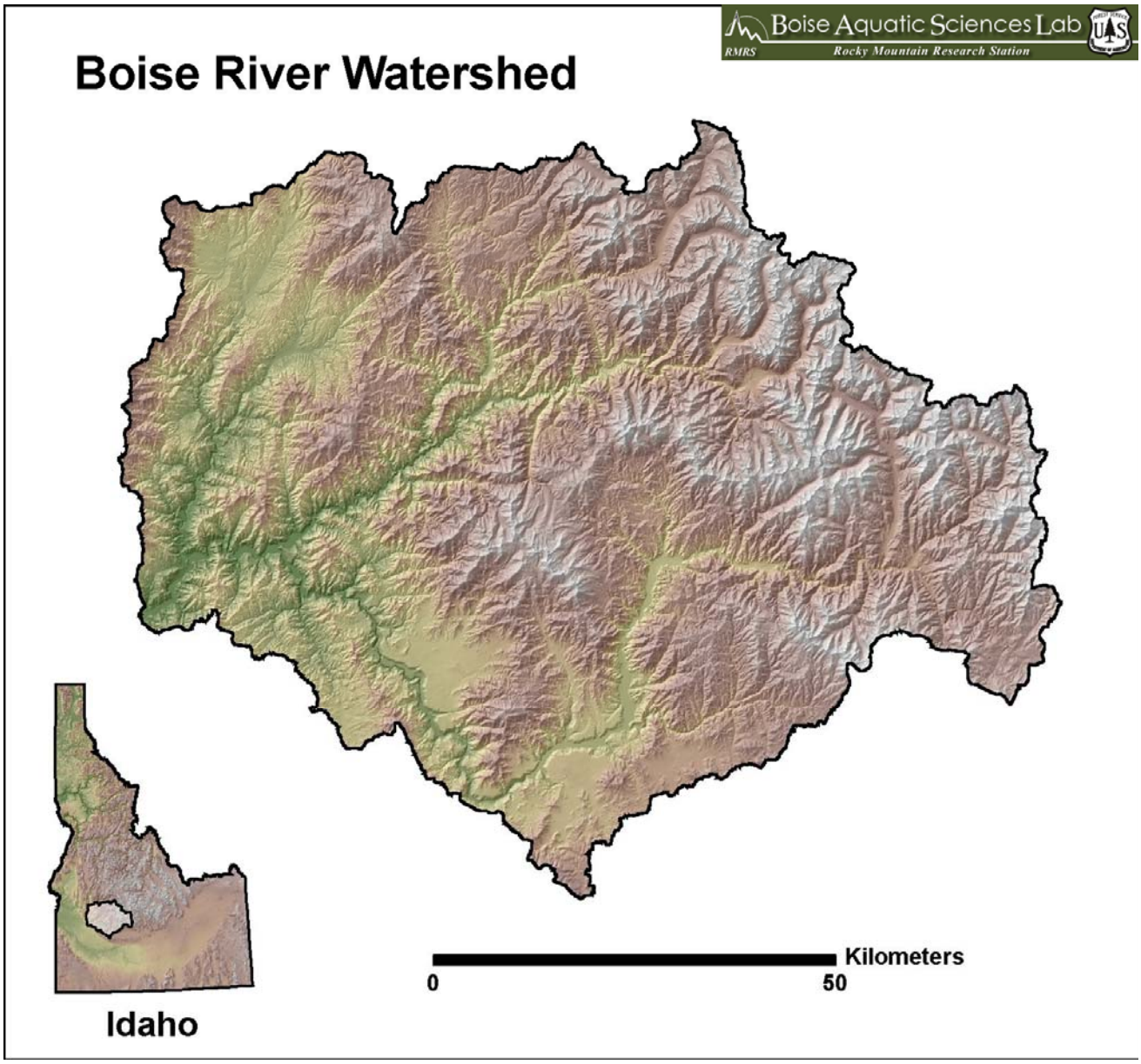


**Figure 1. Boise River Watershed**

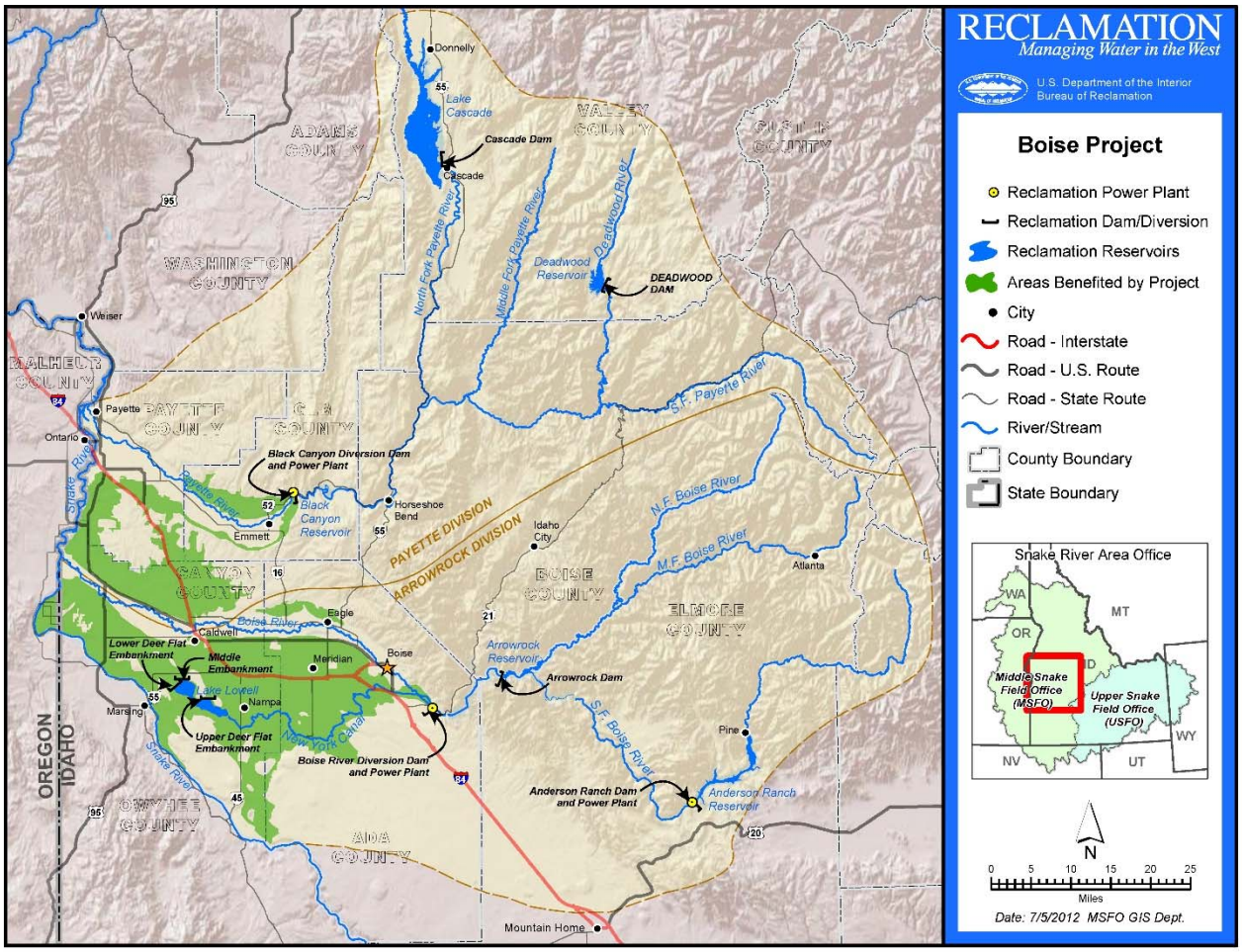


**Figure 2. Project Locus**

Arrowrock Dam was constructed in 1915 and was the tallest dam in the world at that time at 350 feet. It has a spillway length of 1,150 feet with an upstream depth of 257 feet. The crest elevation is 3216.0 feet msl. When full, the reservoir has a surface area of 3,100 acres and a length of 12.8 miles along the mainstem. Two series of ten outlet conduits extend through Arrowrock Dam to provide irrigation releases at centerline elevations of 3018 feet msl and 3105 feet msl; the project penstocks are tied into two conduits in the lower of the two tiers. Clamshell gates installed on the downstream end of each conduit are used to control water releases through the dam. There is also an overflow side-channel spillway on the dam which is used occasionally to release water for flood control using six drum gates that are six feet high with an invert elevation of 3210.0 feet msl.

The hydro project was proposed in the 1980s by a group of local irrigation districts that included the Boise-Kuna Irrigation District, Nampa & Meridian Irrigation District, New York Irrigation District, Wilder Irrigation District, and Big Bend Irrigation District (the licensees). A FERC license was issued on March 27, 1989 which was proposed as a 60-MW facility. Construction was not initiated, and FERC issued several license extensions between 1991 and 2004 and a Notice of Probable License Termination in May 2005. In December 2006, Congress enacted Public Law 109-393 which required FERC to extend the deadline to begin construction for another three years.

On August 1, 2007, the licensees filed a license amendment application including substantial changes to project design and operations which reduced the project to 15 MW and reconfigured the water supply intake structures. In August 2008, FERC issued the amended license which again extended the construction deadline to 2009. The project began operation in 2010.

The hydro facility is located on the south side of the river directly below the dam (Figures 3 and 4). The powerhouse is sited entirely on USBR lands, although Arrowrock Reservoir and the upper end of Lucky Peak Reservoir are located within the Boise National Forest (U.S. Forest Service). The facility includes two 58-inch diameter, 120-foot-long steel penstocks, a 50-foot-wide by 80-foot-long by 70-foot-high powerhouse, two 7.5-MW Francis turbine generating units, a 55-foot-wide, 125-foot-long tailrace discharging into Lucky Peak Lake, a control weir located at the downstream end of the tailrace to ensure draft tube submergence when Lucky Peak Reservoir is drawn, and electrical transmission infrastructure.

The two penstocks divert flows at bifurcations located at the downstream end of two of the ten dam outlet conduits (No. 1 and No.2 conduits). The remaining eight outlet conduits continue to discharge directly into Lucky Peak Reservoir when daily releases beyond those that pass through the hydroelectric project are necessary. The station's hydraulic capacity ranges from 350 to 810 cfs per turbine (Figure 5), with a hydraulic head range of 70-180 feet. Butterfly shutoff valves with flow-through design are installed on the turbine inlets.


**Figure 3. Project layout**

**Figure 4. Dam, Powerhouse and Weir**

**Figure 5. Powerhouse Interior**

**Table 1. Facility Information Table**

| *Item* | *Information Requested* | *Response (include references to further details)* |
|---|---|---|
| ***Name of the Facility*** | Facility name (use FERC project name or other legal name) | Arrowrock Hydroelectric Project |
| ***Reason for applying for LIHI Certification*** | 1. To participate in state RPS program<br>2. and specify the state and the total MW/MWh associated with that participation (value and % of facility total Mw/MWh).<br>3. To participate in voluntary REC market (e.g., Green-e)<br>4. To satisfy a direct energy buyer's purchasing requirement<br>5. To satisfy the facility's own corporate sustainability goals<br>6. For the facility's corporate marketing purposes<br>7. Other (describe) | To participate in voluntary REC market (Green-e) |
| | If applicable, amount of annual generation (MWh and % of total generation) for which RECs are currently received or are expected to be received upon LIHI Certification | 100% of generation |
| ***Location*** | River name (USGS proper name) | Boise River |
| | Watershed name - Select region, click on the area of interest until the 8-digit HUC number appears. Then identify watershed name and HUC-8 number from the map at: https://water.usgs.gov/wsc/map_index.html | Boise-Mores<br>Watershed ID- 17050112 |
| | Nearest town(s), county(ies), and state(s) to dam | Boise, Ada County, ID |
| | River mile of dam above mouth | Approximate river mile 75.7 |
| | Geographic latitude of dam | 43.595545 |
| | Geographic longitude of dam | 115.922658 |
| ***Facility Owner*** | Application contact names | Ian Bledsoe, Power Analyst<br>Clatskanie People's Utility District |

| *Item* | *Information Requested* | *Response (include references to further details)* |
|---|---|---|
| | Facility owner company and authorized owner representative name. | Boise Kuna Irrigation District, Nampa & Meridian Irrigation District, New York Irrigation District, Wilder Irrigation District and Big Bend Irrigation District.<br><br>Ian Bledsoe, Power Analyst Clatskanie People's Utility District |
| | FERC licensee company name (if different from owner) | |
| ***Regulatory Status*** | FERC Project Number (e.g., P-xxxxx), issuance and expiration dates, or date of exemption | P-4656 issued March 27, 1989. License expires February 28, 2039 |
| | FERC license type (major, minor, exemption) or special classification (e.g., "qualified conduit", "non-jurisdictional") | Major License |
| | Water Quality Certificate identifier, issuance date, and issuing agency name. Include information on amendments. | No identifier, State of Idaho Department of Environmental Quality issued February 1, 2008 https://elibrary.ferc.gov/eLibrary/filedownload?fileid=11587726<br><br>Boise Project Board of Control, Water Right No. 63-10240 for hydroelectric generation use of 1,680 cfs https://idwr.idaho.gov/apps/ExtSearch/RightReportAJ.asp?BasinNumber=63&SequenceNumber=10240&SplitSuffix=%20%20&TypeWaterRight=True |
| | Hyperlinks to key electronic records on FERC e-library website or other publicly accessible data repositories | 1989 FERC License and EA https://elibrary.ferc.gov/eLibrary/filedownload?fileid=12249238<br>2008 FERC Amendment https://elibrary.ferc.gov/eLibrary/filedownload?fileid=11765911<br>2008 FERC EA https://elibrary.ferc.gov/eLibrary/filedownload?fileid=11678243<br>2019 FERC Order correcting installed capacity https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15163195 |

| *Item* | *Information Requested* | *Response (include references to further details)* |
|---|---|---|
| ***Powerhouse*** | Date of initial operation (past or future for pre-operational applications) | 2010 |
| | Total installed capacity (MW) | 15 MW |
| | Average annual generation (MWh) and period of record used | 2010-2020 Avg. – 70,541 MWh |
| | Mode of operation (run-of-river, peaking, pulsing, seasonal storage, diversion, etc.) | Run of release with daily shaping |
| | Number, type, and size of turbine/generators, including maximum and minimum hydraulic capacity and maximum and minimum output of each turbine and generator unit | Two 7.5 MW vertical Francis turbines<br>Hydraulic range = 350 to 810 cfs each |
| | Trashrack clear spacing (inches) for each trashrack | 4 to 5 inches |
| | Approach water velocity (ft/s) at each intake if known | Unknown |
| | Dates and types of major equipment upgrades | None |
| | Dates, purpose, and type of any recent operational changes | Modification of Fish Injury and Mortality Plan<br>https://elibrary.ferc.gov/eLibrary/filedownload?fileid=01EDA570-66E2-5005-8110-C31FAFC91712 |
| | Plans, authorization, and regulatory activities for any facility upgrades or license or exemption amendments | None |
| ***Dam or Diversion*** | Date of original dam or diversion construction and description and dates of subsequent dam or diversion structure modifications | 1915, raised by 5 feet in 1935-1937 |
| | Dam or diversion structure length, height including separately the height of any flashboards, inflatable dams, etc. and describe seasonal operation of flashboards and the like | 350-foot-high concrete arch dam, spillway length = 1,150 ft<br>No flashboards or inflatable dams |
| | Spillway maximum hydraulic capacity | 16,000 CFS at 3216 ft<br>33,000 CFS at 3218.5 ft |
| | Length and type of each penstock and water conveyance structure between the impoundment and powerhouse | Two 58-inch diameter, 120-foot-long steel penstocks |

| *Item* | *Information Requested* | *Response (include references to further details)* |
|---|---|---|
| | Designated facility purposes (e.g., power, navigation, flood control, water supply, etc.) | Hydro installation is for power generation, but dam purpose is for irrigation water supply and flood control |
| ***Conduit Facilities Only*** | Date of conduit construction and primary purpose of conduit | n/a – not a conduit project |
| | Source water | n/a |
| | Receiving water and location of discharge | n/a |
| ***Impoundment and Watershed*** | Authorized maximum and minimum impoundment water surface elevations | n/a – hydro project does not control impoundment |
| | Normal operating elevations and normal fluctuation range | n/a – useable hydraulic head range = 70-180 feet |
| | Gross storage volume and surface area at full pool | 3,100 acres, 286,600 acre-ft |
| | Usable storage volume and surface area | Usable storage = 272,200 acre-ft |
| | Describe requirements related to impoundment inflow and outflow, elevation restrictions (e.g., fluctuation limits, seasonality) up/down ramping and refill rate restrictions. | See flows discussion |
| | Upstream dams by name, ownership and river mile. If FERC licensed or exempt, please provide FERC Project number of these dams. Indicate which upstream dams have downstream fish passage. | Anderson Ranch Dam (South Fork Boise River), Bureau of Reclamation – no fish passage |
| | Downstream dams by name, ownership, river mile and FERC number if FERC licensed or exempt. Indicate which downstream dams have upstream fish passage | Lucky Peak Dam, Army Corps of Engineers<br>Boise River Diversion Dam, Bureau of Reclamation – no fish passage |
| | Operating agreements with upstream or downstream facilities that affect water availability and facility operation | All dam operations are coordinated between Bureau of Reclamation and US Army Corps of Engineers. |
| | Area of land (acres) and area of water (acres) inside FERC project boundary or under facility control. Indicate locations and acres of flowage rights versus fee-owned property. | 5 acres of land for project facilities, 26 acres of transmission line on Reclamation land. |
| ***Hydrologic Setting*** | Average annual flow at the dam, and period of record used | 2000-2020: 2,154 CFS |

| *Item* | *Information Requested* | *Response (include references to further details)* |
|---|---|---|
| | Average monthly flows and period of record used | 2000-2020<br>Jan 221 CFS<br>Feb 859 CFS<br>Mar 1983 CFS<br>Apr 3922 CFS<br>May 5536 CFS<br>Jun 4672 CFS<br>Jul 3940 CFS<br>Aug 2829 CFS<br>Sep 728 CFS<br>Oct 405 CFS<br>Nov 304 CFS<br>Dec 226 CFS |
| | Location and name of closest stream gaging stations above and below the facility | LUC - Lucky Peak Lake near Boise, ID<br>BTSI - Boise River near Twin Springs, Idaho<br>ANDI - South Fork Boise River at Anderson Ranch Dam<br><br>https://www.usbr.gov/pn/hydromet/boipaytea.html |
| | Watershed area at the dam (in square miles). Identify if this value is prorated from gage locations and provide the basis for proration calculation. | 2,210 square miles |
| | Other facility specific hydrologic information | See flows discussion |
| ***Designated Zones of Effect*** | Number of zones of effect | 2 |
| | Type of waterbody (river, impoundment, bypassed reach, etc.) | Zone 1 – Impoundment – Intake area<br>Zone 2 – Tailrace/Downstream Reach |
| | Upstream and downstream locations by river miles | Zone 1 – impoundment extends 12.8 miles upstream from dam at RM 75.7 but zone of effect is ~ 0.6 RM upstream from the dam<br>Zone 2 – RM 75.7 to RM 75.4 |
| | Delimiting structures or features | Arrowrock dam delimits the two zones<br>The tailrace/downstream zone extends to first river bend downstream |

## 2 Standards Selection

In consultation with LIHI, two designated zones of effect have been identified for the Project (Figure 6). Zone 1 is the impoundment which extends 12.8 miles upstream from the dam, but the hydro operation does not impact the impoundment, so for purposes of defining Zone 1, it can be seen to extend at most about 0.6 miles upstream from the dam to the widening of the impoundment. Zone 2 is the tailrace/downstream reach extending about 0.3 miles downstream to the first bend in the river below the boater boom (shown in Figure 3). The Lucky Peak dam backwaters to the base of Arrowrock dam.


**Figure 6. Arrowrock Project designated zones of effect**

**Table 2. LIHI standards Selections**

**Zone of Effect 1: Impoundment**

| | | *Alternative Standards* | | | | |
|---|---|---|---|---|---|---|
| | Criterion | *1* | *2* | *3* | *4* | *Plus* |
| A | Ecological Flow Regimes | ✘ | | | | |
| B | Water Quality | | | ✘ | | |
| C | Upstream Fish Passage | ✘ | | | | |
| D | Downstream Fish Passage | | ✘ | | | |
| E | Watershed and Shoreline Protection | ✘ | | | | |
| F | Threatened and Endangered Species Protection | | | ✘ | | |
| G | Cultural and Historic Resources Protection | | ✘ | | | |
| H | Recreational Resources | | ✘ | | | |

**Zone of Effect 2: Tailrace/Downstream Reach**

| | | *Alternative Standards* | | | | |
|---|---|---|---|---|---|---|
| | Criterion | *1* | *2* | *3* | *4* | *Plus* |
| A | Ecological Flow Regimes | ✘ | | | | |
| B | Water Quality | | | ✘ | | |
| C | Upstream Fish Passage | ✘ | | | | |
| D | Downstream Fish Passage | ✘ | | | | |
| E | Watershed and Shoreline Protection | ✘ | | | | |
| F | Threatened and Endangered Species Protection | | | ✘ | | |
| G | Cultural and Historic Resources Protection | | ✘ | | | |
| H | Recreational Resources | | ✘ | | | |

# 3 Supporting Information

## 3.1 Ecological Flow Regimes

| *Criterion* | *Standard* | *Instructions* |
|---|---|---|
| A | 1 | <u>Not Applicable / De Minimis Effect:</u><br>• Confirm the location of the powerhouse relative to dam/diversion structures and demonstrate that there are no bypassed reaches at the facility.<br>• For run-of-river facilities, provide details on operations and describe how flows, water levels, and operations are monitored to ensure such an operational mode is maintained. In a conduit facility, identify the source waters, location of discharge points, and receiving waters for the conduit system within which the hydropower facility is located. This standard cannot be used for conduits that discharge to a natural waterbody.<br>• For impoundment zones only, explain water management (e.g., fluctuations, ramping, refill rates) and how fish and wildlife habitat within the zone is evaluated and managed. ***NOTE:*** this is required information, but it will not be used to determine whether the Ecological Flows criterion has been satisfied. All impoundment zones can apply Criterion A-1 to pass this criterion. |

Both Zones of Effect satisfy Standard A-1. The project operates in a run-of-release mode, using available inflow from Arrowrock Reservoir with no control over impoundment operations. There is no bypassed reach at the project.

Most of the runoff in the Boise River system during winter and early spring is held initially in Arrowrock reservoir which is also the first reservoir in the system to be drafted to meet irrigation demand. All inflows to the reservoir are appropriated for irrigation and flood control, and the upstream Anderson Ranch Dam creates highly regulated inflow conditions at Arrowrock. Spring high flows are used to refill the reservoir by late June and the available post-irrigation season storage capacity provides flood control during the spring refill period. The reservoir is drawn down during the irrigation months of July, August, and September with daily flow releases based on irrigation demands. The seasonal drawdown has averaged 68 feet from 2001 to 2020. Releases are diverted into irrigation canals downstream of Lucky Peak, including the New York Canal.

The volume of daily flow releases from the reservoir into the turbines is allocated by USBR; however, the hydro project is allowed to “shape” flow releases on a sub-daily basis (license article 402 as amended in 1990 and in 2008). This enables it to generate during daily peak power demand periods as long as the overall volume of water released each day remains within the daily allocation and meets USBR’s irrigation and flood control requirements. This is accomplished by controlling the turbine intake valves to hold back or release water into the turbines as needed. Because the project flows exceed turbine capacity between April and August of each year, daily shaping does not typically occur during that period. From November to March daily flow shaping occurs about half the time.

USBR operations do not include conservation flow requirements. The turbine discharges are too small relative to the size of Lucky Peak reservoir to have any impact beyond the immediate tailrace area since that reservoir backwaters to Arrowrock dam. Lucky Peak reservoir is maintained between elevations 3040 feet and 3055 feet msl for recreational purposes from May through August. During drought years when storage in Arrowrock is insufficient to meet demands, Lucky Peak can be drawn starting as early as the end of June. A portion of the storage in Lucky Peak reservoir has been allocated to streamflow maintenance downstream at a level of 240 cfs.

In addition, the hydro project operates in a strict run-of-river mode without release shaping for a 1-month period between May 1 and June 30, during the smallmouth bass incubation and spawning period (license article 402). Timing of this period was to be determined annually in consultation with the Idaho Department of Fish and Game (IDFG) under license article 403 which was later eliminated by FERC in the 2008 license amendment with IDFG's concurrence.

## 3.2 Water Quality

| ***Criterion*** | ***Standard*** | ***Instructions*** |
|---|---|---|
| B | 1 | <u>Not Applicable / De Minimis Effect:</u><br>• Explain the rationale for why the facility does not alter water quality characteristics below, around, and above the facility. |
| B | 3 | <u>Site-Specific Studies:</u><br>• Document consultation with appropriate water quality agency to determine what water quality parameters and sampling methods are required.<br>• Present recent water quality data from the facility or from other sources in the vicinity of the facility (e.g., data collected from the state, watershed associations, or others who collected data under generally accepted sampling protocols and quality assurance procedures) and explain and demonstrate how it satisfies current applicable water quality standards including designated uses, or provide a letter from the appropriate state or other regulatory agency accepting the data. |

Zone 1 satisfies Standard B-1 since the hydro project has no control over, and no effect on water quality in the impoundment. Arrowrock reservoir is listed on the Idaho 2018/2020 Integrated Assessment Report as fully supporting its designated uses of coldwater aquatic life, primary contact recreation, and salmonid spawning although other designated uses have not been assessed[1].

Lucky Peak reservoir also fully supports the same designated uses that have been assessed[2]. But Zone 2 more closely satisfies Standard B-3. A water quality certification was first issued by the State of Idaho on December 11, 1984 (not available) and was subsequently re-issued on February 1, 2008 when the project was modified under FERC's August 1, 2008 license amendment. The certification reiterates license articles 401, 105 and 108 related to erosion and sediment control, and disposal of construction spoils; and license article 404 related to developing a dissolved oxygen

[1] https://mapcase.deq.idaho.gov/wq2020/scripts/adb2020.aspx?WBIDSEGID=ID17050112SW002L_0L
[2] https://mapcase.deq.idaho.gov/wq2020/scripts/adb2020.aspx?WBIDSEGID=ID17050112SW001L_0L

(DO) contingency plan including water quality monitoring to ensure at least 6 mg/l of DO in the project discharge and requirements for modifying project operation if DO falls below that level.

A dissolved oxygen monitoring plan was submitted to FERC in 2009[3] and approved that same year[4]. Continuous DO monitoring and annual reporting have occurred ever since construction was completed.

### 3.3 Upstream Fish Passage

| *Criterion* | *Standard* | *Instructions* |
|---|---|---|
| C | 1 | Not Applicable / De Minimis Effect:<br>• Explain why the facility does not impose a barrier to upstream fish passage in the designated zone. Typically, impoundment zones will qualify for this standard since once above a dam and in an impoundment, there is no facility barrier to further upstream movement.<br>• Document available fish distribution data and the lack of migratory fish species in the vicinity.<br>• If migratory fish species have been extirpated from the area, explain why the facility is not or was not the cause of the extirpation. |

Both Zones of Effect satisfy Standard C-1. During historic times, the Boise River was home to some runs of anadromous fish, likely Chinook salmon. In the 1860s mining began on Mores Creek, a tributary to the Boise, and settlement of the lower Boise soon followed. The anadromous fish populations went into decline and disappeared from many parts of the Boise River system. By the late 1800s dams were in place on the Boise River below Arrowrock and anadromous fish had disappeared from the river. The Swan Falls dam on the Snake River downstream of the Boise River confluence was constructed in 1901. In addition, the 39-foot tall Boise River Diversion Dam was constructed in 1909 and it is unlikely that salmon could access the Arrowrock reach thereafter. Arrowrock itself was completed in 1915 so is not the cause of extirpation.

Since then, the Hells Canyon Complex was built in 1967 downstream on the Snake River and a series of dams were constructed on the lower Snake and Columbia Rivers. The Lucky Peak Dam was constructed by USCACE in 1955 as a flood control facility, immediately downstream of Arrowrock dam so that it backs water up onto the face of Arrowrock dam. It has no upstream fish passage facilities.

The NOAA Fisheries 2008 Biological Opinion for USBR's Upper Snake Project[5], which includes the Boise River and Arrowrock reservoir, stated that Chinook salmon had been extirpated in the Snake River and its tributaries above Hells Canyon. Thus, by the time the Arrowrock hydro facility was built in 2008-2010 no anadromous fish were present.

[3] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=12035042
[4] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=12205766
[5] https://www.salmonrecovery.gov/doc/default-source/FCRPS-BiOp/upper-snake-biop-2008.pdf?sfvrsn=2

### 3.4 Downstream Fish Passage and Protection

| *Criterion* | *Standard* | *Instructions* |
|---|---|---|
| D | 1 | Not Applicable / De Minimis Effect:<br>• Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement (e.g., entrainment into hydropower turbines). Typically, tailwater/downstream zones will qualify for this standard since below a dam and powerhouse there is no facility barrier to further downstream movement. Bypassed reach zones must demonstrate that flows in the reach are adequate to support safe, effective and timely downstream migration.<br>• For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the species populations or to their access to habitat necessary for successful completion of their life cycles.<br>• Document available fish distribution data and the lack of fish species requiring passage in the vicinity.<br>• If migratory fish species have been extirpated from the area, explain why the facility is not or was not the cause of the extirpation. |
| D | 2 | Agency Recommendation:<br>• Identify the proceeding and source, date, and specifics of the agency recommendation applied (NOTE: there may be more than one; identify and explain which is most environmentally protective).<br>• Explain the scientific or technical basis for the agency recommendation, including methods and data used. This is required regardless of whether the recommendation is part of a Settlement Agreement or not.<br>• Describe any provisions for fish passage monitoring or effectiveness determinations that are part of the agency recommendation, and how these are being implemented.<br>• Provide evidence that required passage facilities are being operated and maintained as mandated (e.g. meets season, coordination with agencies) |

Zone 1 satisfies Standard D-2, and Zone 2 satisfies Standard D-1 because once downstream of the hydro project there is no facility-related barrier to downstream migration.

Both Arrowrock Reservoir and Lucky Peak Reservoir provide habitat for coldwater and warmwater fishes, but space and habitat variability are limiting factors for fish populations as the reservoirs are subject to substantial seasonal drawdowns. These drawdowns also limit fish food production. The reservoirs have abundant wild fish populations, and the sport fisheries are supplemented by hatchery trout stocking on a put-and-take basis.

Arrowrock Reservoir supports a mixed fishery consisting of yellow perch, smallmouth bass, mountain whitefish, rainbow trout, and bull trout, among other species[6]. Wild redband trout, considered an interior native subspecies of rainbow trout, are also present, as well as kokanee that

[6] https://idfg.idaho.gov/ifwis/fishingplanner/water/1158589436018

drop down from Anderson Ranch Reservoir. Bull trout (*Salvelinus confluentus*) in Arrowrock Reservoir are part of a population that is federally listed and protected under the Endangered Species Act.

Lucky Peak Reservoir is more dependent on stocking due to the lack of accessible spawning habitat in tributaries. A warmwater inshore fishery is dominated by smallmouth bass and a coldwater mid-water fishery dominated by rainbow trout and kokanee. The rainbow and kokanee fisheries in the lake are supplemented by stocking and through fish that survive entrainment through Arrowrock Dam. Warmwater fish spawn successfully along the shoreline. There are also yellow perch and mountain whitefish in the lake, and several species of non-game fish.

Conduit releases from Arrowrock in the absence of the hydro project entrain fish and routing entrained fish through the turbines can increase injury and mortality. However, the turbines cannot operate at heads below 70 feet net head and thus cannot operate when the risk of entrainment of fish is the greatest at lower reservoir levels. The original license article 405 required funding and implementation of a fish stocking program in cooperation with IDFG. Subsequently, FERC determined that it could not require compensatory mitigation "where there is not substantial evidence that entrainment mortality has significant adverse effects on fishery populations" (2008 FERC EA p. 12)[7] and determined that entrainment and turbine passage "could only incrementally increase mortality rates of fish already entrained through Arrowrock Dam, and would not result in population-level effects to fishes" (2008 FERC EA p. 37). The license article was therefore deleted from the 2008 license amendment.

However, license article 406 (as revised in the 2008 amendment) required development of a plan to monitor turbine-induced fish injury and mortality for at least five years to assure that no population-level impacts occur[8]. The article provides for annual consultation meetings with IDFG and the U.S. Fish and Wildlife Service (USFWS) and annual fish monitoring and salvage activities along with annual reports to FERC. Under the article, incidences of entrainment of bull trout must be reported immediately. Salvage operation are required when the tailrace weir is not submerged, and when the project is shut down for more than 24 hours, as under these conditions it is possible for fish to become stranded in the tailrace pool. Since hydro operations began, no bull trout were ever detected in the tailrace, and salvage operations pursuant to this provision were only required once since the project started operating.[9] Annual reports have been submitted since construction was completed. On August 17, 2016, FERC accepted the licensee's plan to supply fresh water to the tailrace in the event the plant is not operational for more than 24 hours. This ensures that the tailrace isn't dewatered to the point that fish become stranded, as well as supplying dissolved oxygen and cooler water. The modification also changed requirements so that agencies would only be notified in case bull trout were detected in the tailrace, or the tailrace pool falls below 3004 ft, triggering the requirement for salvage operations to be conducted.

[7] Based on *City of New Martinsville v. Federal Energy Regulatory Commission*, 1996 https://caselaw.findlaw.com/us-dc-circuit/1277852.html

[8] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=12178110

[9] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=018B3E02-66E2-5005-8110-C31FAFC91712

The USFWS issued a Biological Opinion for this project in 2007[10] because of the presence of a listed threatened species, bull trout, in the Arrowrock reservoir. USBR had previously consulted with USFWS on the dam and reservoir operations and received their own Biological Opinion. The Biological Opinion for the hydroelectric Facility concluded "the potential for the project to result in entrainment beyond that anticipated under Reclamation's existing operations will not result in effects to bull trout in Arrowrock Reservoir that could be meaningfully measured, detected, or evaluated."

Prior to the Biological Opinion issued for the hydroelectric proposal, USFWS had completed one in March 2005[11] that included the Reclamation operation. The USFWS concluded that the greatest entrainment risk occurs when the reservoir level is below elevation 3,111 feet msl and the flow release exceeds 695 cfs. In 2007 the USFWS issued a Biological Opinion concluding that the Arrowrock operations shaping flows would increase the conditions when entrainment might occur by 37 days over an 11-year time period for an increase of 0.1 percent of the license term, primarily in September and October. (2007 BiOp). FERC staff concluded that there would be no population-level effects (see 2008 EA, p. 37).

### 3.5 Shoreline and Watershed Protection

| *Criterion* | *Standard* | *Instructions* |
|---|---|---|
| E | 1 | Not Applicable / De Minimis Effect:<br>• If there are no lands with significant ecological value associated with the facility, document and justify this (e.g., describe the land use and land cover within the FERC project or facility boundary, and absence of critical habitat for protected species).<br>• Document that there have been no Shoreline Management Plans or similar protection requirements for the facility. |

Both Zones of Effect satisfy Standard E-1. The hydro project facilities encompass 5 acres of land on a basalt bench located on the downstream east side of the dam (see Figures 2 and 3). This land is US Forest Service lands. The transmission line is owned by Reclamation and it is located on Forest Service land and paid for by annual FERC fees. The areas around both reservoirs are dominated by a shrub-steppe vegetation community. At high elevations around Arrowrock reservoir, it transitions to coniferous forest. Riparian communities are limited to the areas around the numerous tributaries that flow into both reservoirs. Land use around the reservoirs is primarily undeveloped due to steep hillsides and most lands are federally owned.

The hydro project does not control or impact the shoreline of Arrowrock Reservoir nor does it influence the downstream zone given that Lucky Peak reservoir backwaters to the toe of Arrowrock dam. No shoreline management plan or similar plan is required. However, license articles 123 and 407 required re-vegetation of areas disturbed by construction and article 103 required development of a fish and wildlife habitat mitigation plan to meet US Forest Service fish and

[10] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=11427799 p. 26
[11] https://www.fws.gov/idaho/documents/BOs/05_F_0532_BORUpperSnake.pdf

wildlife habitat objectives and standards. The plan was filed in 2008[12] and included mitigations covered under several license articles, mostly related to project construction with the exception of DO monitoring and fish monitoring and salvage discussed above.

The associated transmission line encompasses another 26 acres. License article 112 required a pesticide and herbicide use plan with annual reporting, and article 413 required raptor-safe design of the transmission line. The project works and transmission line do not require routine vegetation management and FERC approved the approach to develop a plan only if such use was required. To date, no pesticides or herbicides have been needed and annual statements to that effect have been submitted to FERC since project operation began.

### 3.6 Threatened and Endangered Species

| *Criterion* | *Standard* | *Instructions* |
|---|---|---|
| F | 3 | Recovery Planning and Action:<br>• If listed species are present, document that the facility is in compliance with relevant conditions in the species recovery plans, incidental take permits or statements, biological opinions, habitat conservation plans, or similar government documents.<br>• Document that any incidental take permits and/or biological opinions currently in effect were designed as long-term solutions for protection of listed species in the area. |

Both Zones of Effect satisfy Standard F-3. Based on a USFWS online IPaC data check (Attachment 1) The only federally listed species in the project area is the threatened bull trout for which there is a recovery plan in place[13]. Critical habitat for bull trout is designated throughout the species range, and the species is present in both Arrowrock and Lucky Peak reservoirs and upstream of Arrowrock. Bull trout use both the Arrowrock reservoir and the regulated stretch of the South Fork downstream of Anderson Ranch Dam for overwintering and foraging activities. Adults and subadults migrate into Arrowrock reservoir from upstream North Fork and Middle Fork tributaries. Upstream migrations out of the reservoir occur between late March and mid-June, although a small number of fish remain over the entire summer. Most bull trout migrate from Arrowrock reservoir to upstream tributaries from March through June where they presumably find summer refuge habitat and foraging areas prior to the spawning period in late summer.

The project area is included in the Upper Snake Recovery Unit which has a bull trout recovery unit implementation plan in place[14]. While the implementation plan suggests that fish passage barriers "should be evaluated and addressed to improve bull trout population connectivity", the hydro project is not associated with any potential passage measures and has no effect on recovery planning activities.

The 2005 Biological Opinion includes terms for mitigating USBR's operational impacts on bull trout,

[12] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=11790701
[13] https://species.idaho.gov/wp-content/uploads/sites/82/2016/05/Final_Bull_Trout_Recovery_Plan.pdf
[14] https://www.fws.gov/pacific/bulltrout/pdf/Final_Upper_Snake_RUIP_092915.pdf

including fish entrainment and drawdown impacts (reduction of reservoir primary productivity and, as a result, the prey base for bull trout). USBR is responsible for trapping, and hauling back into Arrowrock reservoir, bull trout that survive entrainment. USBR must also control the total extent and rate of summer drawdowns and reduce dam spillage. The 2005 Biological Opinion exempts incidental take of bull trout by entrainment due to USBR operations, including up to 2% of the population during the summer irrigation season and 2-7% from October through April.

During the hydro project license amendment process, FERC engaged in formal consultation with the USFWS under Section 7 of the Endangered Species Act regarding bull trout. In its November 9, 2007 final Biological Opinion, USFWS determined that implementation of the proposed project's construction and operation is not likely to jeopardize the continued existence of bull trout in the Columbia River distinct population segment and would therefore not jeopardize the listed coterminous population. Further, Article 406 compliance, as related to turbine entrainment, is expected to help ensure that the bull trout population is not jeopardized.

License article 114 required a survey and mitigation plan for threatened and endangered species approved by the US Forest Service which was filed in 2008 (privileged) and approved by FERC[15]. USFWS had been consulted and they concluded that the project with the design and construction mitigation measures in place would not adversely affect any listed species. The Forest Service confirmed that with the 2007 USFWS Biological Opinion, the project satisfied the provisions of article 114.

The fish monitoring and salvage plan approved under license article 406 described above under downstream fish passage, includes a provision for rescuing fish that become stranded in the tailrace when the hydro station is shut down for longer than 24 hours and the tailrace is not submerged by Lucky Peak reservoir. Recovered bull trout that survive entrainment are to be moved back to Arrowhead reservoir. Only one event occurred in the first year of operation. It was a planned station shutdown in September 2010, and no bull trout were found in the tailrace.
The USFWS IPaC report also lists migratory birds that are federally protected. Species that may be present in the project area include bald eagle, golden eagle, and Clark's grebe. Project operations do not affect these species separately from USBR operations including USBR's reservoir operations.

The State of Idaho does not maintain a separate list of threatened and endangered species. Rather, the State relies on federal agencies for determination of species status.

[15] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=11849396

## 3.7 Cultural and Historic Resources

| *Criterion* | *Standard* | *Instructions* |
|---|---|---|
| G | 2 | Approved Plan:<br>• Provide documentation of all approved state, federal, and recognized tribal plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility.<br>• Document that the facility is in compliance with all such plans. |

Both Zones of Effect satisfy Standard G-2. Article 109 of the original license for the larger originally proposed project required filing with FERC an archeological and cultural resources protection and mitigation plan approved by the U.S. Forest Service. The cultural resources assessment for FERC licensing focused on the impacts of building the powerhouse in an already highly disturbed area adjacent to the dam and the construction of the originally proposed transmission line. Cultural resources identified along the transmission line were not present in the revised transmission line authorized under the license amendment. Article 409 of the amended license contained more specific requirements including additional consultation for protection of newly discovered resources and development of a Historic American Engineering Record (HAER).

Powerhouse design compatibility with the dam, which is listed on the National Register of Historic Places, was also a concern. Plans to blend the new powerhouse facility with the existing dam were included in a visual quality management plan, submitted, and approved by FERC in 2008. The HAER documentation was completed by USBR as part of a separate project that involved replacement of the dam's lower set of 10 Ensign valves with clamshell gates between 2001 and 2004. USBR submitted the final confidential HAER to FERC on January 29th, 2015.

## 3.8 Recreational Resources

| *Criterion* | *Standard* | *Instructions* |
|---|---|---|
| H | 2 | Agency Recommendation:<br>• Document any comprehensive resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations.<br>• Document that the facility is in compliance with all such recommendations and plans. |

Both Zones of Effect satisfy Standard H-2. There is no safe recreational access within the small hydro project boundary; however, several license articles relate to recreational resources.

Recreational access to Arrowrock reservoir consists of a single boat ramp located about 1.5 miles above the dam which is maintained by the US Forest Service. The reservoir has limited access to 60 miles of shoreline from the unimproved Middle Fork Road, which traverses the entire North side of Arrowrock Reservoir. Boating, canoeing, windsurfing, and fishing are the major recreation activities. Arrowrock Boat Ramp, which has a restroom and parking area, provides the main access to the reservoir. Primitive camping is available on the reservoir at Irish Point Camp Area. Near the

reservoir are two established recreation areas (Cottonwood and Willow Creek) with primitive campgrounds and vault toilets. Since the reservoir is heavily drawn during the summer recreation season, Lucky Peak reservoir is much more popular for recreational use and is maintained at a stable elevation during the summer months for that purpose with many recreational amenities and facilities[16].

Article 104 required a plan for accommodation of project-induced recreation and funding to US Forest Service recreation enhancements at Arrowrock reservoir to accommodate increased recreation use resulting from road improvement to the dam and anticipated changes to the reservoir operating level (under the original 60-MW project with flow shaping). With the revised smaller project, impacts to recreation were eliminated. The road improvement had been completed by other entities much earlier and any recreation-related effects pre-dated the project. FERC declined to amend the license to eliminate the requirement citing US Forest Service Section 4(e) mandatory conditions. Consultation with the U.S. Forest Service concerning measures needed to ensure the protection and development of natural resource values of the project area (article 102), and for recreational use have taken place annually since the project began operations and are documented in submittals to FERC. To date, the Forest Service has not identified any adverse effects to recreation from operation of the project and no funding has occurred.

Article 410 as amended, required a road utilization plan to minimize recreational access concerns during construction. The plan was submitted to FERC and approved in 2008. All construction-related work and road impacts were completed with final project construction and demobilization.

Article 411 required development of a parking area for anglers near Arrowrock dam on the north shoreline and an overlook off the access road below the dam. FERC issued an order on January 19, 2010 approving a modified parking plan to be located on the north shore of the Boise River arm of Lucky Peak reservoir. The plan included installing a vault toilet, metal staircase, and electrical service, constructed and operated under an August 21, 2009, cost-share agreement with USACE. The 2008 FERC EA noted that the licensees questioned whether new security provisions at Arrowrock dam would render the overlook infeasible; however, FERC declined to remove the overlook from article 411. Despite this, FERC's January 19, 2010 order[17] denotes final action regarding article 411. The Applicant provided an email dated September 27, 2011[18] from USACE accepting the work, which also stated "we are exceedingly happy with the improvements as they are already proving beneficial to our stewardship of these areas and are fulfilling a cherished public need for improved shoreline access and Park Host presence at Lucky Peak Lake".

Article 412 of the license required a recreation monitoring plan and recreation survey. The plan was submitted to FERC in 2009 and approved in 2010[19]. The survey was conducted in 2010[20] and filed with and approved by FERC in 2011[21].

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[16] https://www.nww.usace.army.mil/Portals/28/docs/recreation/LuckyPeak/AdaCountyMap.pdf
[17] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=12247406
[18] Included in Appendix A of the 2011 LIHI review report
[19] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=12313142
[20] http://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=12604244
[21] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=12751685

# 4 Contacts Forms

**Applicant-related contacts**

| **Facility Owner:** | |
|---|---|
| Name and Title | Mike Kukla, Project Administrator |
| Company | Boise Kuna Irrigation District et al |
| Phone | 208-344-7022 |
| Email Address | mkukla@boiseproject.org |
| Mailing Address | 9731 East Highway 21, Boise, ID 83716 |
| **Facility Operator (if different from Owner):** | |
| Name and Title | |
| Company | |
| Phone | |
| Email Address | |
| Mailing Address | |
| **Consulting Firm / Agent for LIHI Program (if different from above):** | |
| Name and Title | Ian Bledsoe, Power Analyst |
| Company | Clatskanie People's Utility District |
| Phone | 503-308-4578 |
| Email Address | ibledsoe@clatskaniepud.com |
| Mailing Address | PO Box 216, Clatskanie, OR 97016 |
| **Compliance Contact (responsible for LIHI Program requirements):** | |
| Name and Title | Mike Kukla, Project Administrator |
| Company | Boise Kuna Irrigation District et al |
| Phone | 208-344-7022 |
| Email Address | mkukla@boiseproject.org |
| Mailing Address | 9731 East Highway 21, Boise, ID 83716 |
| **Party responsible for accounts payable:** | |
| Name and Title | Mike Kukla, Project Administrator |
| Company | Boise Kuna Irrigation District et al |
| Phone | 208-344-7022 |
| Email Address | mkukla@boiseproject.org |
| Mailing Address | 9731 East Highway 21, Boise, ID 83716 |

**Current and relevant state, federal, and tribal resource agency contacts with knowledge of the facility**

| ***Agency Contact*** | | ***Area of Responsibility*** |
|---|---|---|
| Agency Name | United States Bureau of Reclamation | _X_ Flows<br>___ Water Quality<br>___ Fish/Wildlife<br>___ Watershed<br>___ T&E Species<br>___ Cultural/Historic<br>___ Recreation |
| Name and Title | Lanie Paquin, Area Manager | |
| Phone | (208) 383-2246 | |
| Email address | MPaquin@usbr.gov | |
| Mailing Address | Snake River Area Office<br>230 Collins Road, Boise ID 83702 | |

| ***Agency Contact*** | | ***Area of Responsibility*** |
|---|---|---|
| Agency Name | United States Fish and Wildlife Service | ___ Flows<br>___ Water Quality<br>___ Fish/Wildlife<br>___ Watershed<br>_X_ T&E Species<br>___ Cultural/Historic<br>___ Recreation |
| Name and Title | Michael Morse | |
| Phone | (208) 378-5321 | |
| Email address | michael_morse@fws.gov | |
| Mailing Address | 1387 South Vinnell Way, Suite 343<br>Boise, ID 83709 | |

| ***Agency Contact*** | | ***Area of Responsibility*** |
|---|---|---|
| Agency Name | United States Forest Service | ___ Flows<br>___ Water Quality<br>___ Fish/Wildlife<br>_X_ Watershed<br>___ T&E Species<br>___ Cultural/Historic<br>___ Recreation |
| Name and Title | Stephaney Kerley, District Ranger | |
| Phone | (208) 587-7961 | |
| Email address | Stephaney.kerley@usda.gov | |
| Mailing Address | 3080 Industrial Way<br>Mountain Home, ID 83647 | |

| ***Agency Contact*** | | ***Area of Responsibility*** |
|---|---|---|
| Agency Name | Idaho Fish and Game | ___ Flows<br>___ Water Quality<br>_X_ Fish/Wildlife<br>___ Watershed<br>___ T&E Species<br>___ Cultural/Historic<br>___ Recreation |
| Name and Title | Tom Bassista | |
| Phone | (208) 334-3700 | |
| Email address | thomas.bassista@idfg.idaho.gov | |
| Mailing Address | 600 S. Walnut<br>Boise, ID 83712 | |

| *Agency Contact* | | *Area of Responsibility* |
|---|---|---|
| Agency Name | Idaho State Historic Preservation Office | ___ Flows<br>___ Water Quality<br>___ Fish/Wildlife<br>___ Watershed<br>___ T&E Species<br>_X_ Cultural/Historic<br>___ Recreation |
| Name and Title | | |
| Phone | (208) 334-3847 | |
| Email address | shpo@ishs.idaho.gov | |
| Mailing Address | 210 Main Street<br>Boise, ID 83702 | |

| *Agency Contact* | | *Area of Responsibility* |
|---|---|---|
| Agency Name | Idaho Department of Water Resources | ___ Flows<br>_X_ Water Quality<br>___ Fish/Wildlife<br>___ Watershed<br>___ T&E Species<br>___ Cultural/Historic<br>___ Recreation |
| Name and Title | Lance Holloway | |
| Phone | (208) 287-4800 | |
| Email address | Lance.holloway@deq.idaho.gov | |
| Mailing Address | The Idaho Water Center<br>322 East Front Street, PO Box 83720<br>Boise, Idaho 83702 | |

**Current stakeholder contacts that are actively engaged with the facility**

Not Applicable

## 5 Sworn Statement and Waiver Form

All applications for LIHI Certification must include the following sworn statement before they can be reviewed by LIHI:

**SWORN STATEMENT**

*As an Authorized Representative of Mike Kukla, the Undersigned attests that the material presented in the application is true and complete.*

*The Undersigned acknowledges that the primary goal of the Low Impact Hydropower Institute's certification program is public benefit, and that the LIHI Governing Board and its agents are not responsible for financial or other private consequences of its certification decisions.*

*The Undersigned further acknowledges that if LIHI Certification of the applying facility is granted, the LIHI Certification Mark License Agreement must be executed prior to marketing the electricity product as LIHI Certified®.*

*The Undersigned further agrees to hold the Low Impact Hydropower Institute, the Governing Board and its agents harmless for any decision rendered on this or other applications, from any consequences of disclosing or publishing any submitted certification application materials to the public, or on any other action pursuant to the Low Impact Hydropower Institute's certification program.*

**FOR PRE-OPERATIONAL CERTIFICATIONS:**

*The Undersigned acknowledges that LIHI may suspend or revoke the LIHI Certification should the impacts of the facility, once operational, fail to comply with the LIHI program requirements.*

Company Name: Arrowrock Hydroelectric Project

Authorized Representative:

Name: Mike Kukla

Title: Project Administrator

Authorized Signature: Mike Kukla

Date: 9/7/2021

**ATTACHMENT 1**

**IPaC** Information for Planning and Consultation **U.S. Fish & Wildlife Service**

# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.



## Location

Boise and Elmore counties, Idaho


## Local office

Idaho Fish And Wildlife Office

(208) 378-5243
(208) 378-5262

1387 South Vinnell Way, Suite 368
Boise, ID 83709-1657

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.



1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

# Fishes

| NAME | STATUS |
|---|---|
| Bull Trout Salvelinus confluentus<br>There is **final** critical habitat for this species. Your location overlaps the critical habitat.<br>https://ecos.fws.gov/ecp/species/8212 | Threatened |

# Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

| NAME | TYPE |
|---|---|
| Bull Trout Salvelinus confluentus<br>https://ecos.fws.gov/ecp/species/8212#crithab | Final |

# Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.



| NAME | BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.) |
|---|---|
| Bald Eagle Haliaeetus leucocephalus<br>This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.<br>https://ecos.fws.gov/ecp/species/1626 | Breeds Dec 1 to Aug 31 |
| Clark's Grebe Aechmophorus clarkii<br>This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Jan 1 to Dec 31 |

Golden Eagle Aquila chrysaetos Breeds Dec 1 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/1680

# Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

**Probability of Presence** (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

**Breeding Season** (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

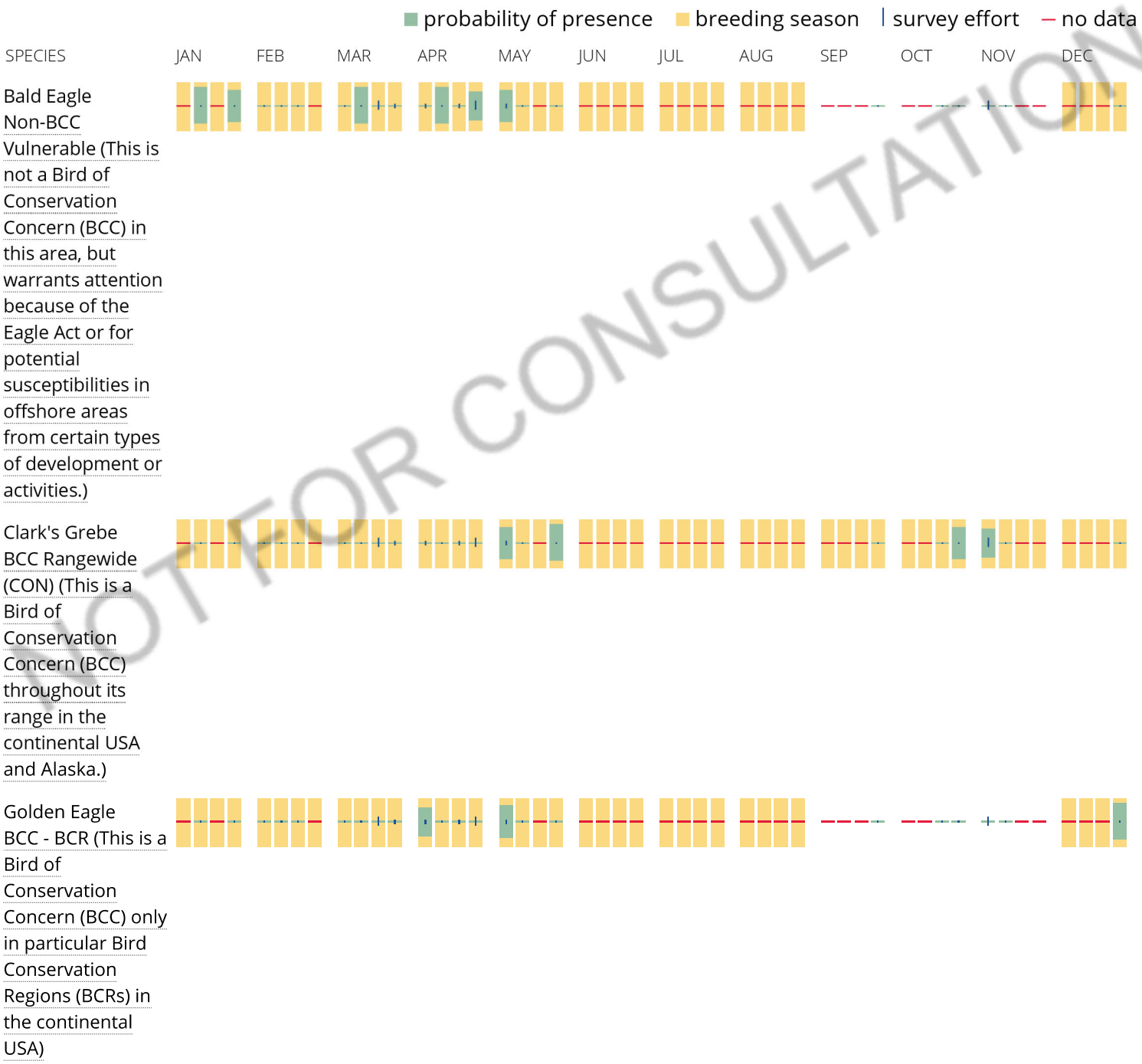
**Survey Effort** (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys

performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

**No Data (–)**
A week is marked as having no data if there were no survey events for that week.

**Survey Timeframe**
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

**What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

**How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

**What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

**Details about birds that are potentially affected by offshore projects**

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

**What if I have eagles on my list?**

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

**Proper Interpretation and Use of Your Migratory Bird Report**

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

# Facilities

## National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

## Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

# Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER POND

PUBF

LAKE

L

L1UBHh

RIVERINE

R5UBH

R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

### Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

### Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

### Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.