



MEMORANDUM

EUGENE WATER & ELECTRIC BOARD



TO: Commissioners McRae, Barofsky, Schlossberg, Brown, and Carlson

FROM: Lisa Krentz, Generation Manager; Patty Boyle, License Deployment Supervisor; and Mark Zinniker, Generation Engineering Supervisor

DATE: June 4, 2024

SUBJECT: Carmen-Smith License Deployment Program Update

OBJECTIVE: Information

Issue

On May 17, 2019, the Carmen-Smith Hydroelectric Project was issued a renewed 40-year operating license (License) by the Federal Energy Regulatory Commission (FERC). These materials provide an update on progress toward deployment of License requirements, investments to the power production facilities, and challenges, including dam safety, regulatory compliance, and financial considerations.

Background

The FERC originally issued a 50- year operating license on December 1, 1958. In anticipation of the 2008 expiration of the license, EWEB began Endangered Species Act consultation in 1999 to evaluate the effects of the continued operation of the project. A Final License Application was submitted in November 2006, initiating a series of discussions that culminated in a supplementary Offer of Settlement Agreement among EWEB and the Settlement Parties¹ (Parties) that was filed with the FERC in October 2008.

On July 27, 2015 EWEB requested that FERC delay issuance of the new license to allow EWEB to complete an updated economic analysis of the Carmen-Smith Project. This delay gave EWEB and the Parties the opportunity to address two significant issues by renegotiating select terms of the 2008 Settlement Agreement. First, EWEB's economic analysis concluded that the construction of volitional fish passage utilizing an upstream fish ladder and downstream floating fish screen was uneconomic. The subsequent revised Settlement Agreement included a trap and haul system to enable upstream

1 - National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Department of Agriculture Forest Service, Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, Oregon Parks and Recreation Department, Confederated Tribes of the Grand Ronde Community of Oregon, Confederated Tribes of the Siletz Indians of Oregon, Confederated Tribes of the Warm Springs Reservation of Oregon, McKenzie Flyfishers, Rocky Mountain Elk Foundation, Trout Unlimited

fish passage and modifications to the existing Trail Bridge Spillway and gate to provide downstream fish passage, including permanently shutting down the Trail Bridge Powerhouse for the purposes of generating power to serve load. A three-year deadline was established for these projects. Second, to address a jurisdictional issue at the Federal level, the Parties agreed that certain planned improvements located within the designated area of the McKenzie Wild and Scenic River would be subject to authorization of the USDA Forest Service. In November 2016 EWEB filed an Amended and Restated Settlement Agreement (Settlement Agreement) and, after this lengthy process, the current 40-year License was issued.

Combined, the License and Settlement Agreement establish EWEB's obligations, which are primarily articulated in License Articles and six Management Plans. Requirements under each plan include ongoing management of the project as well as requirements for new or refurbished features. In addition to the Management Plans, the license also required EWEB to develop plans to guide ongoing activities including a Fire Response Plan, Water Quality Management Plan, and Transmission Line Management Plan. In total, the License and Settlement Agreement includes hundreds of requirements, ranging from relatively small projects and monitoring efforts to large, multi-year, complex construction projects.

Shortly after license issuance, it became clear that an extension of time to complete permanent fish passage at Trail Bridge Dam would be necessary. EWEB understood during settlement negotiations in 2015 and 2016 that dam safety design review processes would be extremely challenging to fit within a three-year window and conveyed that reality to the Settlement Parties. In February 2017, the dam safety landscape shifted dramatically after the spillway failure at the Oroville Dam in California. The dam safety community's heightened awareness of the potential for spillway failures due to latent design and construction-era problems had an immediate and direct impact on the fish passage improvement design work that was planned or underway at all three of EWEB's Carmen-Smith dams: Trail Bridge, Smith, and Carmen Diversion. While the Oroville Dam spillway failure had the most immediate impacts on EWEB's spillway modification plans, the application of important lessons learned from this event resulted in generally amplified scrutiny of every design element that might increase dam safety risks at the Project.

Recognizing these new realities and the resulting schedule viability problems, EWEB prepared a draft Combined Plan and Schedule for fish passage at the Trail Bridge Dam and distributed it for review in April, 2020. Shortly after, the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and the State of Oregon, by and through the Oregon Department of Environmental Quality (ODEQ) and the Oregon Department of Fish and Wildlife (ODFW), filed notices to cure under the Settlement Agreement stating, among other things, their concern that EWEB would not comply with the three-year construction requirement for the fish passage project.

In June 2020 filings, NMFS, USFWS, and State of Oregon requested that the Commission reject EWEB's proposed plan and schedule and order the submission of a revised plan and schedule that would eliminate the delay of Trail Bridge fish passage construction. By August 6, 2020, NMFS, USFWS, and State of Oregon had each provided notice to initiate the dispute resolution process with EWEB

under the terms of the Settlement Agreement. The FERC issued an order on October 28, 2020, directing EWEB to “continue to work with the resource agencies” to develop a schedule that will allow for the earliest operation of the trap and haul facility.

In May 2021, a routine bathymetric survey of Trail Bridge Reservoir revealed two apparent sinkholes directly upstream of the dam and proposed trap and haul facility. This discovery created significant dam safety concerns, further complicating the design and construction process for fish passage facilities.

Discussion

Regulatory Update

Since October 2021, EWEB has been working with the state and federal fish agencies to develop an acceptable schedule for constructing permanent fish passage at Trail Bridge Dam with the goal of reaching a resolution that works for all parties. EWEB has proposed actions and funding to mitigate for delays in fish passage according to the following criteria:

- A. Proximity to the Carmen-Smith Project,
- B. Extent of the benefits to aquatic species, including temperature regulation, safe, timely and effective passage, and/or habitat enhancements,
- C. Sufficiency to mitigate for the impacts caused by the delay,
- D. Ability to fully fund the completion of an ongoing mitigation project, and
- E. Timeliness of mitigation project implementation and completion.

In January 2022, EWEB agreed in principle to all mitigation proposal requests to date by ODFW, ODEQ, and USFWS. Provided below is a description of the request and the current status.

Requested Action	Status
Provide \$445,000 to fund the completion of Deer Creek Phase 4 floodplain restoration.	The project was funded and completed in 2022, two years ahead of its original schedule.
Establish and deposit annually into a fish enhancement fund to be used for habitat restoration projects to benefit Chinook salmon and bull trout.	Agreed to in principle at \$200,000 per year until permanent fish passage is constructed.
Provide additional funding to ODFW to manually trap and haul Chinook salmon and bull trout around Trail Bridge Dam.	Funding was provided through the 2023 passage season and recently renewed for 2024 and 2025.
Incorporate Forest Service Stage 0 restoration principles into the design and implementation of enhancements in Smith Bypass Reach.	In progress, design is 60% complete.

In March and April 2022, USFWS and NMFS respectively provided the following additional terms to the draft mitigation proposal.

Requested Action	Status
Provide passage in 2022 using a collaboratively developed trap and haul system.	Eleven pairs of Chinook were moved from the Spawning Channel to Trail Bridge Reservoir using a manual netting and transportation protocol in 2022. A Temporary Trap and Haul Facility was constructed at the spawning channel in 2023 and will continue to operate until permanent fish passage is established.
Develop and obtain approval of a fully integrated schedule for completing construction that best represents all required permanent improvements to fish passage, instream flow and habitat affecting Chinook and bull trout.	EWEB’s Master Plan of all planned projects at Carmen-Smith is updated and provided to the FERC D2SI and the FWG annually in November. Additionally, staff provide the FWG an update to the schedule each spring. The schedule for several projects, including the trap and haul facility, has not been approved by the fish agencies.
Extend the spill provided for downstream passage and stop generation at Trail Bridge Powerhouse immediately.	For safety reasons, the Trail Bridge Powerhouse needs to be capable of passing river flows when the spillway is closed for construction of downstream passage in the coming years. EWEB is conducting low load testing in summer 2024 to determine the technical feasibility of increasing fish spill while maintaining plant reliability for future construction. Based on the results, EWEB plans to maximum spill to the extent technically feasible.
Move up the timeline for Smith Bypass by completing the Load Bank in 2024, Smith Bypass habitat enhancements in 2025, Smith Flow Release Structure and provide flows in 2026.	The current schedule for construction of the Load Bank and Smith Bypass habitat enhancements is 2026, and the Flow Release Structure and associated instream flows in 2029. The Load Bank equipment procurement and construction design is complete, and bidding is underway. Attempts to shorten the timeline for the Load Bank have been unsuccessful due to a lack of bids from equipment suppliers at early design phases. The Smith Flow Release Structure must be designed in conjunction with the Smith Auxiliary Spillway. The two-year construction period for both facilities is planned for 2028 and 2029.

On October 17, 2023, NMFS filed a letter with FERC concerning noncompliance with the License and, specifically, delays to construction of permanent fish passage at Trail Bridge Dam. The letter also alleged bad faith behavior on the part of EWEB throughout the implementation of the License. On October 26, 2023, USFWS filed a similar letter with FERC, expressing concerns over the ongoing impacts of the Project on bull trout and urging FERC to work with the settlement parties to require

EWEB to implement fish passage as soon as possible. On November 13, 2023, EWEB filed a comprehensive response denying allegations that EWEB intentionally delayed the construction of fish passage or falsified information.

On November 1, 2023, NMFS and USFWS formally notified EWEB that the dispute resolution process initiated under the terms of the Settlement Agreement in 2020 had failed and requested that the dispute be referred to the Policy Committee for final resolution, essentially triggering a procedural step to allow their withdrawal from the Settlement Agreement. The Policy Committee met on November 20, 2023.

On December 13, 2023, NMFS notified EWEB that they were exercising their right to withdraw from the Settlement Agreement and filed a letter with FERC informing them that the 2018 ESA consultation for Willamette spring Chinook salmon requires reinitiation. NMFS stated that EWEB has failed to conform to the action analyzed and they would like to work with FERC on a path forward, including implementing changes, presumably to the proposed action, and interim measures to reduce impacts to Chinook salmon resulting from delays in permanent fish passage at Trail Bridge Dam.

On January 26, 2024, USFWS filed similar letters, one notifying EWEB of their withdrawal from the Settlement Agreement and the other informing FERC that the 2018 ESA consultation for bull trout requires reinitiation.

On April 11, 2024, EWEB received an Order from the FERC Division of Hydropower and Compliance (FERC-DHAC), which included their approval of multiple Extension of Time (EOT) requests submitted by EWEB, rejection of three EOT requests, and a notice of non-compliance for several License Articles, including Smith Bypass Reach Habitat (Article 7) and Upstream and Downstream Fish Passage (Articles 29 and 33). The April 11 letter also noted that any alternative mitigation plan reached in agreement with the Fish Agencies as a result of fish passage delays does not constitute compliance with License Articles 29 and 33 and, because any alternative mitigation plan is beyond the requirements and scope of the project License, FERC will not approve or comment on any such filing. The FERC Order did not specifically address the NMFS and USFWS requests to reinitiate consultation under the ESA.

License Deployment Status

Several important efforts have been completed since the license was issued. Planning activities include the development of the Terrestrial Habitat Management Plan that guides specific actions to protect and enhance wildlife, the Transmission Line Management Plan that guides vegetation management near the Carmen Transmission Line, and the Water Quality Management Plan that establishes the timing and sampling methods to ensure project operations achieve all applicable water quality requirements under the new FERC License. Additionally, many important projects have been designed, approved, and constructed since the license was issued, including:

- Relocation of the Carmen Transmission Line from Deer Creek - completed 2021
- Installation of Bird Flight Diverters - completed 2021

- Phase I Improvements to the Spawning Channel - completed 2021
- Reconstruction of the Trail Bridge Campground - completed 2022
- Reconstruction of three undersized road culverts - completed 2023
- Construction of the Temporary Trap and Haul Facility - completed 2023
- Carmen Transmission Line Wildlife Standing Snag Creation - completed 2024

Projects planned for construction in 2024 include:

- Phase II Habitat Improvements in the Spawning Channel
- Installation of Aquatic Habitat at Trail Bridge and Smith Reservoirs
- Reconstruction of recreation facilities at Smith Reservoir and Lakes End Campground.
- Improvements to staff housing and equipment storage buildings at the Project Office Area.

In addition to construction projects, efforts to complete designs for future projects are ongoing.

Power Plant Improvements

In addition to the requirements of the License and Amended Settlement Agreement, staff have continued with efforts to refurbish the power plants and ancillary systems to replace end of life equipment, ensuring reliable power production at the Carmen Plant and facilitating the upcoming construction of fish passage improvements at Trail Bridge Dam. Power plant projects completed as part of license deployment efforts include:

- Rebuilding the existing Carmen Plant gantry crane - completed 2016
- Replacing the Carmen Plant turbine shut off valves - completed 2018
- Rebuilding the Carmen substation as well as upgrading the switchgear, protection systems, and controls – completed 2019
- Upgrading the Trail Bridge Plant switchgear, protection systems, and controls - completed 2023
- Rebuilding the Carmen Plant turbine-generator Unit 2 - completed 2024

Dam Safety

Dam safety considerations factor into nearly every improvement project that takes place at the Carmen-Smith Project and, in many cases, exert a major influence on design details as well as the implementation schedule. Some dam safety considerations were understood to be influential factors for the relicensing projects all along. These anticipated factors included updated understandings of the Probable Maximum Flood (PMF) and the updated seismic hazard potentials for the Carmen-Smith Project. Though these anticipated dam safety considerations were not insignificant, EWEB expected that incorporating them into the design of the relicensing improvements would be relatively straight forward. For example, our site-specific seismic hazard assessment (SHA) was approved by the FERC in 2019 and presumably only required minor adjustments to reflect small refinements to the most recent ground motion models. However, the reality has not been straight forward. Instead, there have been several emergent dam safety discoveries that have added complexities and challenges to advancing the design and implementation of license required work. The emergent dam safety considerations include the following important developments:

- Discovery of sinkholes in the bottom of Carmen Diversion Reservoir in 2018
- Discovery of an extension of the White Branch Fault Zone that approaches the Carmen-Smith Project in 2020
- Discovery of sinkholes in the bottom of Trail Bridge Reservoir in 2021

Each of these discoveries triggered the initiation of new investigations that hadn't been factored into project work plans and became critical path tasks that needed to be completed prior to advancing and finalizing major fish passage improvements at Carmen Diversion, Smith, and Trail Bridge Dams. The sinkhole investigations required the development of drilling program plans (DPPs) and subsequent documentation of the findings in investigation reports. The expanded fault zone discovery required thorough review of field investigation work to better develop slip rate estimates and fault orientation details in order to update the controlling seismic design criteria. Following are the investigations that have been completed after the emergent discoveries:

- Carmen Diversion Geotechnical Data Report for Reservoir Sinkhole Investigation – March 2020
- Updated Site-Specific Seismic Hazard Analyses – March 2024
- Trail Bridge Sinkhole Evaluation Report – May 2024

Each of these studies are currently under review by the FERC. Initial feedback on results from independent consultants as well as the FERC has triggered additional investigations. In the case of the Carmen Diversion Reservoir sinkholes, further studies are planned at the spillway to better understand the effects from historical settlement of that structure and determine if any sinkhole-related voids are present. Findings from that investigation, scheduled for Fall 2024, will allow EWEB to finalize the scope of spillway modifications required by the license to construct a permanent flow-release structure that will supply downstream fish habitat. In the case of the Trail Bridge Reservoir sinkholes, EWEB is working with the FERC and expert consultants to perform semi-quantitative and quantitative risk assessments of potential failure modes related to the sinkholes. Findings from the risk assessments, scheduled for November 2024, are needed to confirm the viability of constructing a trap and haul facility at the base of Trail Bridge dam and to identify risk reduction measures that should be incorporated into the fish passage facility design to limit the possibility of adverse dam safety impacts. In the case of the updated SHA, FERC approval of the recommended seismic design criteria is necessary to support the final design work for fish passage facilities at Carmen Diversion Dam (flow-release system), Smith Dam (flow-release system), and Trail Bridge Dam (trap and haul facility for upstream fish passage and downstream fish passage improvements to the spillway). After receiving comments from the FERC on the first draft of the updated SHA in 2023, EWEB is expecting to receive final approval on the revised version later this year.

Board of Consultants

In response to a FERC-D2SI letter dated July 1, 2021, EWEB has contracted with a Board of Consultants (BOC) with expertise in hydraulic engineering, hydrological engineering, and

geotechnical engineering to review the Probable Maximum Flood (PMF) routing and proposed modifications to accommodate the PMF, to review the impacts of proposed modifications related to the fish passage at Trail Bridge Dam on the ability to pass the PMF safely, and to review interim risk reduction measures to reduce the likelihood/consequences of any identified potential failure modes related to existing facilities at the Trail Bridge Development. The FERC established the BOC review requirements in response to their recognition of potential effects on dam safety associated with the proposed fish passage improvements and their desire to ensure that dam safety complexities had been thoroughly vetted with appropriate independent experts prior to submittal to the FERC for review and approval. This FERC recognition of dam safety complexities came even before the discovery of sinkholes at Trail Bridge and were heightened thereafter. As a result, EWEB included subject matter expertise on internal erosion potential failure modes to ensure that the sinkhole-related considerations were fully explored during the fish passage planning and design development processes.

EWEB has convened the BOC to review critical dam safety issues on four occasions, with the first meeting in January 2022 and the fifth scheduled for July 2024. The BOC has already played a critical role in confirming the adequacy of PMF flow routing analyses, determining the appropriate scope of sinkhole investigations at Trail Bridge Reservoir, and reviewing fish habitat structure designs that present a potential debris hazard during flood flow conditions. The first BOC-reviewed design package, fish habitat structures to be installed within Smith and Trail Bridge Reservoirs, was recently approved by the FERC in short order. This indicates that the BOC review process leading up to EWEB's official submittals for approval can be an effective tool for accomplishing timely FERC authorizations to implement the license-required improvements.

Remaining Improvements

Final design and implementation work remains outstanding for many license-required fish passage improvements that necessitate structural modifications to the dams and flow conveyance systems. The design and construction of these types of modifications trigger substantial dam safety scrutiny to ensure that dam safety considerations are properly addressed during both the construction phase and long-term ongoing operations. The recent discovery of sinkholes and seismic hazard changes have lengthened the duration of time necessary to thoroughly address dam safety issues. The following projects are currently delayed due to either the investigation of sinkholes, revision of seismic design criteria for FERC approval, or other pending FERC D2SI reviews and approvals.

- Permanent upstream fish passage at Trail Bridge Dam
- Permanent Downstream Fish Passage at Trail Bridge Dam
- Smith Dam Flow Release System and Auxiliary Spillway
- Carmen Diversion Flow Release System and Spillway Improvements

Economic Changes

Carmen-Smith is EWEB's largest owned resource and brings unique capacity and flexible generation to the portfolio. Regionally, regulatory requirements are driving the need to build more clean energy resources with capacity attributes similar to Carmen-Smith to meet anticipated electrification and general load growth. Regional load/resource balance is a critical concern in the Western Power Pool, which has led to the formation of the Western Resource Adequacy Program (WRAP). WRAP aims to support reliability and incentivize the development of dispatchable resources with peaking capacity.

While investing in Carmen-Smith to meet our power supply needs remains an effective long-term strategy to reduce EWEB's exposure to volatile market pricing, the cost to rebuild generation infrastructure and complete license required projects has exceeded the amounts projected in 2017. For example, design and construction cost estimates for fisheries improvements have increased by \$37M over the 2017 projection of \$35M. Inflation has played a major role in the increased costs, as well as incorporating changes associated with emergent dam safety issues, such as sinkholes and seismic updates. The Project will also incur additional costs related to more complex operating systems and dam safety surveillance requirements. Costs for mitigation actions related to the delay in permanent fish passage construction and Trail Bridge sinkhole remediation are not yet fully determined and are not included in current budget estimates.

An updated financial and value assessment of the Carmen-Smith Project will be provided this fall, incorporating information from EWEB's Annual IRP Update and 2025 Energy Resource Study Assumptions, currently scheduled for the September Board meeting.

Recommendation & Requested Board Action

These materials are for informational purposes only. There is no requested Board action at this time.