

**WILLAMETTE VALLEY SYSTEM
GREEN PETER DAM AND RESERVOIR**

**WATER QUALITY BEST MANAGEMENT PRACTICES
&
DOWNSTREAM COORDINATION**

APRIL 1, 2024

**U.S. ARMY CORPS OF ENGINEERS
PORTLAND DISTRICT
CENWP**

1.0 Introduction

Green Peter Dam and Reservoir (Green Peter) is located on the middle fork of the Santiam River, approximately 11 miles northeast of Sweet Home, Oregon. Green Peter is operated by the U.S. Army Corps of Engineers as part of a system of thirteen multi-purpose dams and reservoirs that make up the Willamette Valley System. These dams and reservoirs work together for the purposes of flood damage reduction, hydropower generation, irrigation, recreation, fish and wildlife enhancement and downstream water quality improvement within the Willamette River drainage system.

Green Peter Dam is a concrete structure with a gated spillway. The dam was completed in 1968 and is operated to meet multiple Congressionally authorized purposes. During flood season (typically November – January), the dam captures runoff to reduce the potential for downstream flooding. During drier hydrologic periods (typically June – September, in Oregon), water is slowly released from the dam to support ESA-listed fish habitat (water quality), hydropower generation, irrigation, municipal drinking water, pollution abatement, and other purposes.

On September 1, 2021, the U.S. District Court for the District of Oregon issued a final Interim Injunction Order that directs the Corps to implement specified operations intended to improve conditions for fish passage and water quality in the Willamette Valley Project (WVP) to avoid irreparable harm to Endangered Species Act (ESA) - listed salmonids. Among the measures adopted by the Court is a deep drawdown at Green Peter to facilitate juvenile passage through the facility. These measures must be carried out “to the greatest extent practicable under existing hydrologic conditions and necessary flood control operations” while making “every effort to comply with the various water quality standards governing WVP.”

During the first drawdown at Green Peter under the Interim Injunction in fall of 2023, changes in water flow and reservoir elevations caused turbidity above and below the dam to increase rapidly. While some increase in turbidity was expected, the full effects of complying with the court order were not known until they were experienced. This study contemplates Best Management Practices (BMPs) for managing water quality impacts during future drawdowns, along with plans for how the Corps of Engineers will coordinate with downstream state and local officials.

2.0 Constraints

The Corps of Engineers is constrained in its ability to manage water quality during deep drawdowns by the terms of the Interim Injunction, configuration of Green Peter Dam (i.e., elevation of the regulating outlets), hydrologic conditions and downstream spring Chinook spawning, dam safety and the flood control mission and Operations & Maintenance at Green Peter.

2.1 Injunction

The Interim Injunction contains clear guidelines for how the Corps of Engineers must implement the deep drawdown at Green Peter. Deep drawdowns must 1) be performed during peak juvenile salmonid migration periods; 2) prioritize volitional fish passage; 3) prioritize passage through Green Peter Dam’s regulating outlets; and 4) draw down the reservoir level to within 25’ or less of the regulating outlets. The target elevation is to be achieved during early to mid-November

and held at that level for a month. The Interim Injunction contemplates drawdown discharge rates between 3,000 and 4,000 cfs until September (unless flood risk management operations interfere) and between 1,500 and 3,000 cfs between September and mid-October to protect downstream spring Chinook spawning.

2.2 Hydrologic Conditions and Spring Chinook Spawning

Real-time and projected hydrologic conditions further constrain the deep drawdown. The actual date of initiating the drawdown is based on real-time conditions and hydrologic predictions and will vary depending on these factors. The rates and duration of the drawdown will thus depend on when the draw down begins in order to achieve the target elevation as defined in the Interim Injunction by the prescribed date.

Downstream spring Chinook spawning season further constrains the drawdown operation. The rate of the drawdown must decrease from 3,000-4,000 cfs prior to spawning season to 1,500-3,000 cfs during spawning, ideally. This is done so to protect downstream populations while benefiting upstream fish populations.

2.3 Dam Safety

There is a history of landslides in Green Peter, most notably near the left abutment of the dam. While mitigated during construction, all precautions were taken during the first drawdown at Green Peter in fall of 2023, including slowing the drawdown rate, deploying additional monitoring equipment and increasing visual inspections to monitor potential movement. These precautions were conservative measures implemented to ensure the safest operation possible. Refinements to the operation (i.e., rate of drawdown) may be possible in the future as the Corps of Engineers learns more.

2.4 Flood Control and O&M

The Interim Injunction recognizes that the Corps of Engineers' flood control mission is prioritized over all other actions at Green Peter. At no time will human health or safety be jeopardized during implementation of the deep drawdown.

O&M capabilities at Green Peter further constrain the drawdown. The implementation plan for the drawdown, as adopted by the Court, requires the fish passage operation to prioritize the south regulating outlets at Green Peter due to erosion concerns in the stilling basin and north regulating outlets. This may limit the amount of water that can be discharged at any given time from Green Peter. Draft rates are further limited by O&M capabilities as rotary screw traps cannot be operated when flows greater than 4,000 cfs are released from Green Peter.

3.0 Potential BMPs

The Corps of Engineers met with representatives of the Oregon Department of Environmental Quality (ODEQ) on February 14, 2024, to discuss potential BMPs that could be implemented at Green Peter prior or during future deep reservoir drawdowns. Importantly, any adjustment to deep drawdown operations to manage turbidity could have negative effects on other water quality standards such as temperature or TDG. Acknowledging these potential tradeoffs limits the potential range of BMPs, as do the constraints identified in Section 2. Short of halting the

Green Peter deep drawdown altogether, the group collectively identified adjusting the rate, timing and duration of the deep drawdown as potential future strategies for managing turbidity.

A longer drawdown conducted at a lower rate could manage turbidity by allowing water to flow through the regulating outlets while keeping sediment at lower levels; the decreased flow rate would result in less disturbance to the sediment in Green Peter and therefore less turbidity downstream. However, this operation could negatively impact fish passage survival (i.e., smaller flows would require smaller gate openings potentially leading to increased gate strike) and/or negatively impact downstream water temperatures.

A shorter drawdown conducted at a higher initial rate. This may reduce the duration of increased turbidity. Corps of Engineers staff are reviewing RM&E data and will recommend appropriate changes based on that information. Additionally, the Corps of Engineers is conducting modeling based on two potential scenarios:

DelayDrawdown1: Maintain pool above spillway and Penstock as long as possible by beginning rapid, deep draft on Oct 15, targeting low pool by Dec 1.

DelayDrawdown2: Maintain pool above spillway and Penstock as long as possible by beginning rapid, deep draft on Oct 15, targeting low pool by Dec 15.

Modeling results will have impacts on further necessary adjustments, which will likely result in other options being identified.

4.0 Implementing BMPs

Because the Green Peter deep drawdown is a nondiscretionary action imposed by the Court in the Interim Injunction, the Corps of Engineers does not have the ability to unilaterally implement BMPs if they conflict with the terms of the Injunction. Any modifications to the deep drawdown will require the approval of the Court and the other parties to the litigation that resulted in the Interim Injunction.

On March 15, 2024, the Plaintiffs filed comments on the Corps of Engineers' 5th Biannual Status Report in which they acknowledged concerns about warm water temperatures caused by the drawdown as well as the potential for high turbidity to occur during future drawdowns. The Plaintiffs stated their willingness to consider revising the operation to reduce these risks. This would require initiating discussions soon so that the parties can come to an agreement and bring it to the Court.

The Corps of Engineers plans to explore the potential of modifying the Interim Injunction to reduce risks of future impacts to water quality standards. Given the potential that the Court will modify the terms of the drawdown, adopting BMPs at this time is not feasible before further discussion with the parties. Potential modifications to drawdown operations, and future BMPs that guide their implementation, would be best developed with input from ODEQ. To that end, the Corps of Engineers welcomes cooperation from ODEQ in developing proposals for injunction operation modifications.

5.0 Downstream Coordination

The Corps of Engineers, among its many public service functions, also plays a role in protecting water quality. This is not only part of our mission but an important aspect of our organizational culture. As part of that mission, it is our duty to keep the public informed as to how our operations may affect its environment, including water quality. To that end, the Corps of Engineers continuously monitored water quality (by funding numerous USGS gaging stations), worked with local stakeholders and conducted public informational forums in advance of the 2023 deep drawdown. While we seriously engaged with the public ahead of the drawdown, we recognize the need for further coordination.

We are committed to increasing the level of public engagement ahead of this year's, and future, drawdowns. The Corps of Engineers' communications plan for ongoing Willamette Valley operations includes planned engagements with the public at several different levels of our organization. Communication with Oregon officials is included over the course of the water year for operations and projects with impacts as well. Beginning in August 2024, the Corps of Engineers has scheduled public informational forums in Albany, Sweet Home, Lebanon, and Lowell, along with virtual sessions.

Additionally, the Corps of Engineers conducts outreach through the Flow Management and Water Quality Team (FMWQT); this is a regular way that to update and coordinate with the public on upcoming operations in the Willamette Valley. ODEQ and other Oregon representatives are encouraged to attend these monthly sessions in order to better understand the Corps of Engineers' Willamette activities, including the deep drawdown at Green Peter Dam. It is the hope of the Corps of Engineers that this coordination will better educate the relevant state and local entities and allow for advance planning ahead of future drawdown operations.

6.0 Conclusion

The deep drawdown operation at Green Peter Dam and Reservoir is a mandatory action ordered by the District Court of Oregon in its Interim Injunction. The constraints placed on the drawdown operation by the language of the injunction, natural conditions, and the Corps of Engineers' flood control mission severely narrow the range of potential BMPs that could be implemented to manage turbidity and other water quality standards. Additionally, the terms of the injunction may be modified through agreement between the Corps of Engineers, Plaintiffs, and other parties. ODEQ and Corps of Engineers staff identified adjusting the rate, timing and duration of the deep drawdown as potential future strategies for managing turbidity. While the above constraints and the potential for injunction operation modification make selecting and implementing BMPs at this time infeasible, the Corps of Engineers welcomes continued coordination with ODEQ in proposing injunction modifications to better manage water quality during deep drawdowns and in implementing supporting BMPs. Additionally, the Corps of Engineers plans to continue and expand its public outreach and coordination efforts in advance of future drawdown operations.