



## Detroit Dam Drawdown – City Water Supply Implications

The City of Stayton continues to coordinate internally on water quality impacts related to the NOAA BiOp and the planned sediment release from Detroit Dam in the fall of 2025 by the U.S. Army Corps of Engineers (USACE). Our attorney has engaged with Salem’s legal team and will attend an upcoming meeting to discuss potential legal and mitigation strategies. Additionally, discussions with the Santiam Water Control District (SWCD) and the City of Salem will ensure ongoing collaboration on this issue. Given the risk of increased turbidity rendering Stayton’s Slow Sand Filters inoperable, the city is actively coordinating with other affected water purveyors, regional partners, monitoring legal challenges, and exploring alternative water sources, treatment modifications, and pre-treatment options. Stayton is also working with government agencies, lobbyists, and experts to develop and implement strategies before the drawdown, with the goal of ensuring an uninterrupted potable water supply. Eliminating, minimizing, or mitigating efforts would need to be completed prior to the end of summer 2025, which is highly unlikely (i.e. before the potential drawdown occurrence in fall of 2025). The City of Stayton has launched a formal monitoring and reporting program to enhance data collection, promote transparency, and support informed decision-making.

### Introduction

The City of Stayton’s primary source of water is the North Santiam River which flows from Mount Jefferson in the Cascade Mountains near the Santiam Pass to the mainstem of the Santiam River near the town of Jefferson, Oregon. The mainstem Santiam River is a tributary of the Willamette River joining the Willamette River at approximately milepost 108. The mainstem Santiam River is approximately 12-river-miles long. From its head water to the mainstem Santiam River the North Santiam River passes through Detroit Dam at milepost 49 and Big Cliff Dam at mile post 47. The North Santiam River’s length is approximately 92-river-miles.

The city’s water intake is part of the Santiam Water Control Districts (SWCD) hydro station water intake located near the intersection of 3<sup>rd</sup> and Water Street in Stayton at approximately milepost 18 on the North Santiam River.

The intake feeds the direct-on-line Slow Sand filter (SSF) water treatment plant (WTP) located on the south side of SWCD’s intake channel and north side of the North Santiam River adjacent to the intake. Stayton’s water demand varies seasonally from approximately 1.5 MGD in the winter to 4 MDG during peak summer demands.

Detroit Dam and Big Cliff Dam on the North Santiam River, Oregon, were constructed by the USACE. Detroit Dam was completed in 1953 and serves as the primary storage and flood control structure. Big Cliff Dam, a regulating dam located just downstream, was also completed in 1953 to manage water releases from Detroit Dam and smooth out flow fluctuations. Both dams play



crucial roles in flood control, hydroelectric power generation, and water supply management in the Willamette Valley.

Studies suggest that the construction and operation of Detroit and Big Cliff Dams have substantially altered the natural flow regime of the North Santiam River, particularly in relation to sediment transport, the formation of fish spawning habitats, and fish migration paths.

To mitigate the fish migration ability and comply with the Biological Opinion received from the National Marine Fisheries Service, it is proposed that beginning in the fall of 2025, the U.S. Army Corps of Engineers may implement an annual deep drawdown program. This process would involve the strategic opening of the dam allowing juvenile spring chinook to migrate downstream through the dam's upper regulating outlet. This drawdown will lower the pool 55 feet lower than the minimum conservation pool, and roughly 30 feet lower than it has been in recent years.

## U.S. Army Corps of Engineers, City of Salem, City of Stayton Information Transfer Meeting – Summary

Through coordination with Jason Pulley from the City of Salem, the City of Stayton participated in an information exchange meeting with the U.S. Army Corps of Engineers on January 31, 2025. Several key points were presented by the Corps regarding ongoing mitigation efforts and reservoir drawdown operations:

- The Corps did not act in a timely manner on a Biological Opinion (BiOp) issued to the Corp. by the National Marine Fisheries Service (NMFS) and was subsequently directed by the court to implement mitigation measures. These measures included the drawdown of three reservoirs (Green Peter, Foster, and Lookout dams), with Detroit Reservoir later added.
- Over the past two years, the Corps has conducted drawdown operations at Lookout Dam and Green Peter Dam, resulting in severe impacts on potable water supply systems in the South Santiam reach of the river. In 2024, the drawdown was halted due to the physical failure of part of the Sweet Home Treatment system.
- The drawdown planned for this year remains uncertain due to conflicting regulatory directives:
  - The NMFS BiOp mandates mitigation - reservoir drawdowns.
  - The National Environmental Policy Act (NEPA) requires further consultation.
  - Request for study re. continuation of use of the dams for hydro production remain unformalized.
- There are also potential conflicts with the Clean Water Act (CWA) water quality criteria imposing additional constraints, including preventing the release of contaminants at unsafe levels.



- The Corps' modeling suggests that the impact on the North Santiam River will be less severe than on the South Santiam River due to a shallower drawdown depth of 55 feet at Detroit Reservoir and a potentially shorter duration of only two weeks, compared with Green Peter drawdown to 142 ft and prolong 30-day operation. *(Key operational considerations not discussed include the depth of the drawdown outlet and the functional role of Big Cliff Dam during this process.)*
- Turbidity data from previous drawdowns in the South Santiam River indicate significant variation:
  - **Year 1 (2023):** Average turbidity levels ranged from 300 to 500 NTU, with peaks of 1,200 to 1,500 NTU. (reported by others to have peaked at 2,700 NTU)
  - **Year 2 (2024):** Average turbidity levels were lower, ranging from 150 to 200 NTU.
- The Corp. admits a significant breakdown in communication with those that were impacted on the South Santiam River system in year 1 activities. Year 2 closer communication and operational control were put in place, including but not limited to a red through green notification system enabling the water purveyors to notify and halt drawdown activities when treatment capacities were compromised. The USACE wishes to continue this positive communication with the North Santiam River work and requests for continued and expanded informal and formal meetings for the constructive exchange of information.

Further discussions and regulatory clarifications are necessary to determine the feasibility and environmental impact of the planned drawdown operations. The Corp. has agreed to provide all information requested by the potentially impacted parties.

## Problem statement

Slow Sand Filters (SSFs), such as those utilized in the City of Stayton, City of Gate, Lyons/Mahema Water District, and the City of Salem's water treatment process, operate most effectively when raw water turbidity levels remain below 10 Nephelometric Turbidity Units (NTU). Industry consensus indicates that SSFs become increasingly ineffective at turbidity levels exceeding 20–50 NTU, potentially compromising treatment performance and water quality.

Previous experience with the scouring of Green Peter and Foster Reservoirs on the South Santiam River over the past two years has demonstrated that initial dam scouring events consistently result in sustained turbidity levels exceeding 300 NTU, with some reported occurrences of turbidity more than 2,500 NTU. Under these raw water conditions, the City's SSF would cease to function in a very short period. That is the City of Stayton would not be able to produce water.

The City of Lebanon and the City of Sweet Home, both located on the South Santiam River, have reported that elevated turbidity levels resulting from the drawdown of Green Peter and Foster Dams persist for more than 5–6 weeks after drawdown operations cease. As a result, these communities experience prolonged periods of highly turbid raw water for more than two months.



The City of Lebanon employs membrane filtration systems and the City of Sweet Home employs Wes-Tech Trident Filters, both designed to manage elevated turbidity levels. However, these systems are generally not intended to treat raw water with turbidity exceeding 100–150 NTU for prolonged periods. During initial exposure to extreme turbidity events caused by the South Santiam raw water dam drawdowns, both treatment facilities experienced system failures and sustained significant damage to their treatment equipment. In both cases the fineness of the silts transported from the dam released to the filtration plants have clogged the fine pores of the processes, in one case compromising future operations in the other destroying a train of filters when back wash was initiated. Consequently, the Cities of Lebanon, and Sweet Home, have jointly filed a lawsuit against the U.S. Army Corps of Engineers seeking approximately \$37 million in damages, the Cities are currently waiting to see if they will get a hearing.

Slow Sand Filters (SSFs) are less adaptable than membrane filtration systems under these operating conditions. Elevated turbidity levels rapidly cause SSFs to become blinded or clogged, resulting in failure to produce water and necessitating frequent scraping to maintain functionality assuming the silts are captured in the surface layer. In a worst-case scenario, fine silts could penetrate the filter bed to a significant depth, clogging the filters, requiring re-sanding or even a full reconstruction of the SSF to restore operational capacity. For Stayton a re-sanding of each filter will cost approximately \$1.2M-\$1.5M, for the 3 filters the cost could be \$4.5M. A rebuild may cost as much as twice this, notwithstanding the possibility that the city may be out of water for several weeks if not months. That is, potentially, if the filters are clogged to any significant depth the city would only be able to produce very minimal water if any at all. (Interestingly, if any water were able to be produced it would likely be of high potable quality due to the fineness of the filtration, in a slow sand filter as the filter blinds the water quality improves until such time that no or very limited production is possible.)

It is also possible, though unconfirmed, that dam releases may contribute nutrients to the river system, that potentially exacerbate cyanotoxin formation later in the year.

## Current Status

The city is currently collecting data and evaluating the next steps. The City Council and senior staff have been apprised of the situation in a work session, Feb 07, 2025, and have directed staff to continue monitoring conditions, develop an emergency response plan, coordinate with affected neighboring Cities, and utilize available resources to eliminate, minimize, or mitigate potential impacts on the city. The city has engaged Buchanan and Associates to coordinate their efforts in this matter.

Stayton is in contact with:

- City of Lyons – Lyons/Mehama Water District (503) 859-2367, John Demarko (503) 551-8653 email [operations@lyonsmehamawater.com](mailto:operations@lyonsmehamawater.com) , Kelly Mametz email [office@lyonsmehamawater.com](mailto:office@lyonsmehamawater.com)



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- City of Salem – Jason Pulley (503) 932-1517 email [jpulley@cityofsalem.net](mailto:jpulley@cityofsalem.net) Brian Martin (503) 588-7272 email [bmartin@cityofsalem.net](mailto:bmartin@cityofsalem.net) Lacey Goeres-Priest (503) 361-2224 email [lgoeres@cityofsalem.net](mailto:lgoeres@cityofsalem.net) Allen Dannen (503) 569-9313 [adannen@cityofsalem.net](mailto:adannen@cityofsalem.net) Robert Chandler (503) 569-9313 [rhandler@cityofsalem.net](mailto:rhandler@cityofsalem.net) Keith Stahley (503) 588-6255 email [kstahley@cityofsalem.net](mailto:kstahley@cityofsalem.net) or [manager@cityofsalem.net](mailto:manager@cityofsalem.net)
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- City of Jefferson – Sarah Cook (541) 327-2768 email [scook@jeffersonoregon.org](mailto:scook@jeffersonoregon.org)
- City of Albany – Chris Bayley (541) 917-7500, Scott LaRoque (541) 917-7676 email [Scott.LaRoque@cityofalbany.net](mailto:Scott.LaRoque@cityofalbany.net)
- City of Detroit – City Recorder (503) 854-3496 email [detroit@wvi.com](mailto:detroit@wvi.com)
- Oregon Association of Water Utilities – Heath Cokeley (503) 599-6589 email [hcokeley@oawu.net](mailto:hcokeley@oawu.net)
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Lyons/Mahema Water district operates direct online Slow Sand Filters and are very concerned about future operations of their treatment facilities and their ability to service their customers. Service population 1800 +/-.

The City of Mill City operate wells and are not so concerned about the river conditions. Population 2000 +/-.

The City of Gates operates direct-online Slow Sand Filters and are very concerned about their filter operability. Population 500 +/- . Gates has engaged Keller and Associates as their technical advisors.

SWCD operates irrigation and hydro power facilities. The district is concerned with the impact of the water quality and their TMDL, specifically mercury concentrations.

The City of Salem operates direct-online Slow Sand filters and are very concerned about their filter operability. Salem is also in consultation about pursuing legal action to potentially stop the drawdowns with potentially 200,000 +/- people affected. Salem has engaged Carollo Engineering to



support their investigation work. Staff will present their finding to an executive session of Council Feb 10, 2025.

The City of Lebanon and Sweet Home have damaged filters and are pursuing compensation from the Corp.

The City of Sweet Home and Albany pursued legal action to stop the drawdown and were unsuccessful due to there being no emergency precedent to stop the activity.

A coalition of the city's mayors will convene on Monday, February 10, 2025, to further discuss this matter and determine the appropriate political course of action regarding future initiatives related to the Santiam River dam drawdowns.

## Root Cause

The drawdown and scouring of dams on the North Santiam River will result in significant increase turbidity levels to the point of Slow Sand Filter inoperability. This process is designed to enable trapped fish from behind the dams into the lower reaches of the river and to redistribute sediment into the lower reaches of the river, aiming to restore and enhance traditional fish spawning habitats.

## Potential Countermeasures

Solutions being investigated to address the issue include the following actions:

1. **Legal action:** have an injunction placed on the Corp. to stop operational drawdown of the dams.
2. **Political action:** Encouraging political involvement in decision-making to ensure that diverse voices are heard, leading to more representative and effective solutions to the dam drawdown enforcement action.
3. **Evaluate Alternate Raw Water Source:** The City may investigate the potential of utilizing alternative raw water sources including but not limited to:
  1. **Ranney Wells**
  2. **ASR Wells**
  3. **Connection to Private wells**
  4. **Connection to Neighboring Distribution Systems (buy water):**
    1. **City of Salem**
    2. **City of Sublimity**
    3. **City of Aumsville**
4. **Investigate Options for Existing Plant Modifications:**
  1. Ensure intake is at the highest possible level SWCD channel.
  2. For the duration of the turbidity episode (several weeks) slow operation to base flow demand and use all filters for as long as possible.
  3. Investigate sediment characteristics and ensure SSF operations are configured to optimize longevity of production and ability to clean





5. **Identify Potential Pre-treatment:** Investigate the potential for pre-treatment of the raw water prior to the slow sand filtration –
  1. **Roughing Filtration using one filter bed**
  2. **Constructed/Repurposed Existing Sedimentation Basins** (site to be found)
  3. **Sedimentation Package Plant**
    1. **Chemically Enhanced Clarifier: horizontal, up-flow, plates/tubes, DAF** (DAF may also be beneficial for the removal of non lysed algae cells with respect to cyanotoxin water contamination)
    2. **Horizontal Filtration Clarifier**
  4. **Membrane Filtration** (permanency to be determined given other water treatment requirements and anticipated drawdown reoccurrence)
  5. **Utilization of SWCD ditch as a settlement facility**

No specific remedy has been identified or is currently under detailed investigation or action. Many of the proposed ideas may not be feasible or effective in addressing the potential water contamination. Furthermore, it is unlikely that sufficient funding or time will be available to implement a solution before the anticipated drawdown action takes place in Fall 2025

All potential options are being gathered, collated, and will be evaluated based on their respective merits in due course.

## Next Steps/Implementation Plan

The City of Stayton proposes to:

- Participating in the local Majors coalition (Feb 10, 2025) initiated by the City of Detroit
- Combine forces with other North Santiam Water purveyors including pursuing action to resolve the potential elimination of the City's potable water supply. Potential partnering Cities include:
  - City of Salem
  - City of Gates
  - Lyons/Mehama Water District
  - City of Mill City
  - SWCD
  - City of Jefferson
  - City of Albany
- Meet with and discuss action with the Corp. (Next meeting with the Corp. Feb 21, 2025, hosted by the City of Salem), OHA, OWA
- Meet with and discuss action with lobbyists.
- Meet with and discuss action with state representatives.
- Pursue assistance and advice on technical action with consultants and water treatment experts to establish and implement a physical solution in advance of any drawdown taking place.



- Formulate an action group with North and South Santiam Water Purveyors, meeting being coordinated for later in the week of February 10, 2025. Adding to the above list (At this meeting it is anticipated that we will learn more of Lebanon and Sweet Homes trials and tribulations associated with the South Santiam drawdown):
  - City of Lebanon
  - City of Sweet Home

## Output/Outcome

These actions are taken with the intent of enabling the City of Stayton to continue to provide safe reliable uninterrupted potable water supplies to its customers.

## Follow Up Plan

It is anticipated that all counter measures associated with this issue will be completed prior to the end of summer 2025. It is recommended that a monitoring program be put in place and weekly updates on progress of the work be reported to all stakeholders including the public.

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