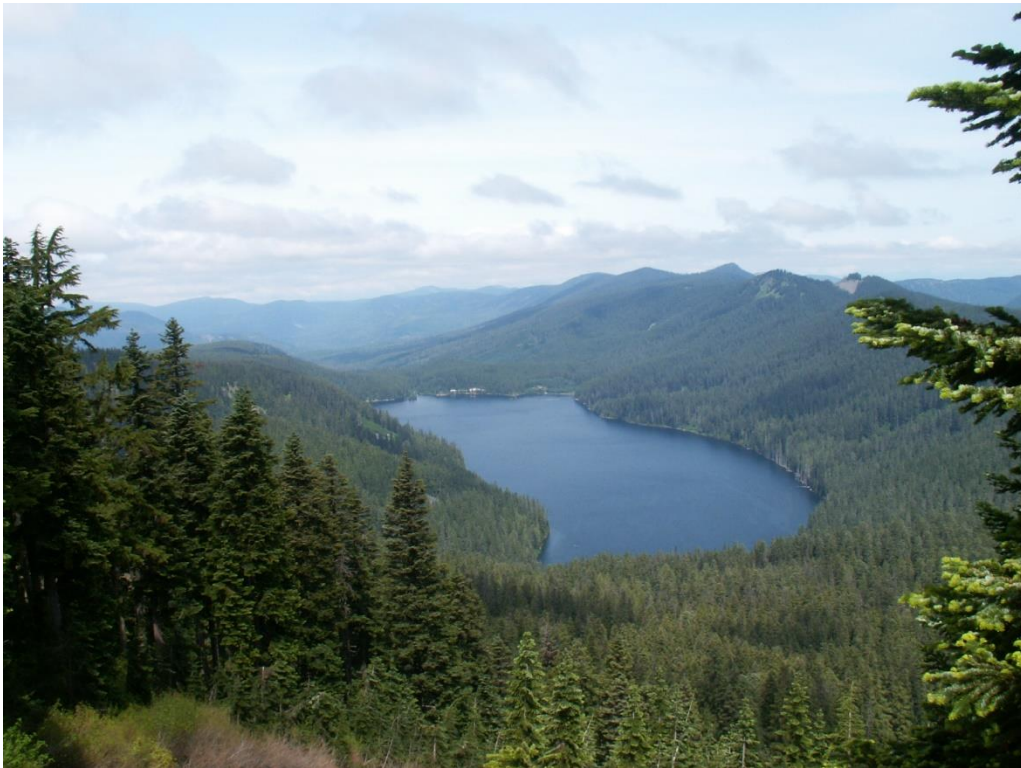


**Portland Water Bureau and United States Forest Service**

# **Bull Run Watershed Management Unit Annual Report**

**April 2023**



**Bull Run Watershed Semi-Annual Meeting**





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## **A. OVERVIEW**

This report fulfills the annual work plan reporting commitment described in the 2007 Bull Run Watershed Management Unit Agreement (“Agreement”) between the Portland Water Bureau (PWB) and the US Forest Service (USFS). As part of the Agreement, PWB and USFS agree to use a working group format and annual work plan to update each other on pertinent projects and monitoring occurring within the Bull Run Watershed Management Unit (BRWMU). Specific topics covered in the Agreement and included in this report include security and access management; emergency response planning; transportation system; fire planning and management; water quality and quantity monitoring; terrestrial and aquatic natural resources; conservation education; administrative use trails; and simplifying land ownership and occupancy arrangements. Other topics of interest to both agencies within the BRWMU can be added or removed depending on annual applicability.

## **B. SECURITY and ACCESS MANAGEMENT**

### **Bull Run Security Access Policies and Procedures**

PWB continues to implement the Bull Run Security Access Policies and Procedures Standard Operating Procedure (SOP), which include procedures for entering the Bull Run as an employee or contractor. Key components of the plan include reinforcing the requirement for PWB employees and contractors to notify PWB Security Dispatch when entering and exiting the watershed and for a vehicle permit designed to mark vehicles more clearly in the watershed, used by both PWB and the USFS. BRWMU gates are operated with a standard hard lock and key system. The main watershed gate also continues to be able to be opened by authorized electronic key-card holders.

PWB Watershed Rangers conduct frequent foot and vehicle patrols, monitor surveillance cameras at the main gate, Dam 1, and Dam 2, and monitor remote trail cameras at undisclosed locations. They check for evidence of trespass, domesticated animal incursion, and other illicit activity. Rangers also regularly check the condition and functionality of all gates and locks and confirm the condition of boundary signage. Security Dispatch personnel provide additional continuous monitoring of surveillance cameras in the Bull Run. USFS Law Enforcement Officers also occasionally conduct patrols of the BRWMU for illegal activity.

## **C. EMERGENCY PLANNING and RESPONSE**

USFS and PWB exchange updated emergency contact information for key personnel in the fall and spring of each year.

PWB is in the process of updating their emergency action plan for the BRWMU. The purpose of the plan is to define procedures for emergency preparedness, notification, and evacuation for PWB staff and contractors working in the watershed.

#### **D. TRANSPORTATION SYSTEM**

In the BRWMU Agreement (2007), PWB and USFS agreed that PWB should become primarily responsible for the BRWMU transportation system, including capital reinvestment and regular maintenance. At the time, it was recognized that a legal agreement and transportation system maintenance plan would be needed to formally recognize this arrangement. PWB and USFS finalized a road maintenance and use easement on November 9, 2022, which fulfills the legal agreement envisioned by the two parties in the BRWMU Agreement. The easement provides the legal mechanism for PWB to continue to use the roads and to accomplish routine road maintenance as well as capital road repair for the benefit of both PWB and USFS management purposes in the BRWMU. The BRWMU Road Management Plan, also finalized in 2022, accompanies the easement and serves as the Transportation System Maintenance Plan called for in the 2007 Agreement. The Plan provides a set of programmatic maintenance and design criteria that provide for protection of drinking water quality, safe and efficient access throughout the watershed in support of PWB and USFS operations, and protection of the natural environment.

##### **2020-2022 Project: Road 10 (“10E”: MP 6.2 to MP 8.2)**

Reconstruction of a 2.0-mile section of Road 10, from approximately MP 6.2 to the intersection with Road 1008 (MP 8.2) began in August 2020, continued during the summer of 2021, and was finished in the fall 2022. All of the road segment is on PWB land with the land exchange finalized in December 2022(see Land Exchange in Section K). Approximately 0.4 miles was located on USFS land during the construction. The road segment was reconstructed and repaved to improve pavement condition, create better ditch lines, improve drainage, and address slumping and slides. Several culverts were replaced and upsized to improve drainage and reduce risks to infrastructure, water quality and aquatic habitat.

##### **2022 Project: Hamilton Creek culvert replacement (MP 12.5)**

The Hamilton Creek Project was completed in 2022 for replacement of an undersized culvert on Hamilton Creek, a stream that feeds directly into Reservoir 1. The design was completed in early 2022; a contract was awarded in spring of 2022 and the construction occurred during the summer of 2022. The project is located on Road 10 at MP 12.5, just before the North Fork Bull Run River Bridge. A new 55-foot span bridge that meets USFS Aquatic Organism Passage (AOP) requirements replaced a 36-inch culvert. The culvert was significantly undersized and failing, increasing the risk for a catastrophic road failure that could deposit sediment directly into the drinking

water reservoir, damage the road, and damage fish habitat for cutthroat and rainbow trout. PWB staff assisted with the design in coordination with USFS Mt. Hood National Forest staff and USFS Regional AOP Design Assistance Team. The project is located on land brought into PWB-ownership when the land exchange with USFS was finalized in December 2022.

#### **2023 - 2024 Project: Road 10 (“10I & 10J”): MP 12.6 to MP 14.4)**

Project design was completed in late 2022 and a contractor was hired in spring of 2023 for a 1.8-mile segment of Road 10, from the North Fork Bull Run River Bridge at MP 12.6 to MP 14.4 near the intersection with Road 20. Most of the road segment is on USFS land with 0.76 miles of lands brought into PWB-ownership when the land exchange with USFS was finalized in December 2022. The road segment will be reconstructed and repaved to improve pavement condition, create better ditch lines, improve drainage, and address slumping and slides. Several culverts will be replaced and upsized to improve drainage and reduce risks to infrastructure, water quality and aquatic habitat. Construction is expected to take two construction seasons starting in summer 2023 and finishing by the fall of 2024.

#### **2025 – 2026 Project: Headworks Loop Road**

Early planning has started on repairs and improvements that will be made to the 1.6-mile Headworks Loop Road that provides access from two directions into water treatment and hydropower facilities. The road consists of primary access into the facilities from the east off of Road 10 and a secondary access from the west. Work will include repaving, guard rail improvements, minimal widening to improve safety where possible, replacing culverts, improving ditch lines, and increasing signage to address limited visibility. The project is entirely on PWB-owned land. Project construction is currently expected to be split into two phases and take two construction seasons to complete starting in summer 2025.

### **E. FIRE PLANNING, PREVENTION, DETECTION, and SUPPRESSION**

#### **Fire Season**

Fire season in Oregon was relatively quiet in 2022 despite it being a long, hot and dry season. As the summer progressed with dry and hot conditions, USFS instituted public use restrictions by prohibiting campfires on the Mt. Hood National Forest on August 10 which were in place through the end of the 2022 Fire Season.

No fires were reported within the Closure Area in 2022 and only two small fires are known to have occurred within three miles of the Closure Area boundary.

The two small fires known to have occurred within three miles of the Closure Area in 2022 are:

1. Snowdon Road fire

A small fire started underneath the BPA powerline near the intersection of Snowdon Road and E. Anglesley Road approximately two miles outside of the Closure Area on September 5, 2022. The fire was approximately 0.01 acres and was extinguished the same day by USFS, ODF, and Hoodland firefighting staff.

2. Marmot Road Brush fire

A slash burn escaped and started a 20-acre brush fire along Marmot Road on June 28, 2022, located about 0.8 miles south of the Closure Area. Firefighters from several agencies including Hoodland, Sandy, Estacada, Clackamas, and ODF responded to the fire and were able to quickly contain and extinguish it.

A red flag weather event in early September fortunately did not result in any fires in the Bull Run but provided an opportunity for advanced planning and coordination among fire response agencies. On September 6, the National Weather Service forecasted strong east winds and low humidity for September 9 and 10 that would have been favorable for rapid fire spread for the Bull Run and nearly the entire Pacific Northwest region. In response to the forecast, agencies convened and discussed increased measures for fire prevention and response that would have been implemented during the east wind event. USFS elevated the Industrial Fire Precaution Level (IFPL) of the entire Mt. Hood National Forest to a IV shutting down all operations, including the two road construction projects in the watershed. The PWB restricted access into the watershed to only essential staff required for dam and water supply operations. For the first time, in coordination with PWB, PGE enacted their Public Safety Power Shutoffs Program and depowered both the 13 kV and the 57 kV powerlines in the Bull Run during the event, which was fortunate since several trees were blown onto the powerlines in the Bull Run during the wind event. These preventive measures proved to be successful, as there were no fire starts on the Mt. Hood National Forest during the event.

In late winter of 2023, well before the typical start of fire season, a fire started on Saturday March 18 under the BPA powerlines on private property on the east end of Marmot road from sparks generated by someone discharging a firearm at a metal target. The sparks ignited the dried grass and then wind spread the fire into the blackberries and into the trees on BLM land just north of the powerline corridor west of the Sandy Ridge Trail System. Local fire agencies were first to respond and then an ODF crew worked through the weekend to contain the fire and by Monday March 21, the 19-acre fire was safely contained. The fire was located about 1 mile south of the Bull Run Watershed Management Unit boundary.

### **Building on Wildfire Preparation and Training**

PWB continues to work with USFS and Oregon Department of Forestry (ODF) as well as other agencies to continue to improve upon training and preparedness for a



large wildfire event in the Bull Run.

PWB continues to implement the Industrial Fire Precaution Level (IFPL) requirements and fire season guidance document that was developed in collaboration with USFS and ODF fire staff. The goal of the guidance document is to help enhance PWB staff and contractors' understanding of responsibilities, best practices, and legal requirements for conducting maintenance and construction activities in the Bull Run during fire season.

Under the Bull Run Fire Management Plan, developed by USFS with assistance from PWB and ODF, Sandy Fire Department is the entity primarily responsible for structural fire protection within the BRWMU. However, during a large fire such as the 2017 Eagle Creek fire, Sandy Fire Department resources can quickly become overwhelmed, triggering mutual aid assistance from other fire departments, including Portland Fire and Rescue (PF&R). Through an MOU, PWB funded PF&R to purchase fire equipment that will improve protection of PWB infrastructure in the BRWMU. The structural protection equipment was purchased and cached at five locations in the watershed in June 2021. Annually, PF&R, in collaboration with USFS, ODF, other fire agencies and PWB, sets up and tests the equipment at each site. This provides additional training for PF&R and other fire response staff while also improving familiarity with the Bull Run.

In July 2022, PWB and USFS coordinated a watershed familiarization tour for fire response agencies that included a drill to set up the structural fire protection equipment and a test of radio communications to develop a plan for use during a wildland fire incident.

In the fall of 2022, USFS brought in a Community Mitigation Assistance Team (CMAT) to address a wide range of wildfire concerns for the Highway 26 corridor with agencies, including PWB, partners, cooperators and homeowners. The end result of the CMAT effort was the founding of the Mt. Hood Corridor Wildfire Partnership. The purpose of the partnership is to foster long-term community cohesion through sustainable and resilient wildfire risk adaptation in the Mt. Hood Corridor areas through collaborated education, outreach, prevention, planning, and mitigation efforts.

### **Powerline Fire Prevention**

A small fire in the BRWMU in 2018 that resulted from a tree touching a powerline, as well as recent wildfire events in California and Oregon, has increased attention to the fire risk associated with powerlines. PWB has been implementing practices to reduce risks of fires associated with Portland Hydroelectric Project (PHP) 57kV transmission lines within the Bull Run. In 2019, PWB began conducting regular patrols of powerlines during periods of high fire danger. In addition, PWB has a contract with Portland General Distribution Service (PGDS), a branch of Portland General Electric,

for maintaining the PHP lines, to increase clearances of vegetation and hazard trees in and around the power transmission line right-of-way. This work is on-going and has been incorporated into existing annual powerline right-of-way vegetation maintenance practices. PGDS addressed additional hazard trees along the distribution powerline in fall and early winter. In 2023, PGE, in coordination with PWB, conducted a powerline condition assessment on the PHP 57 kV transmission lines to identify deficiencies that may pose a fire risk. PWB has also worked with PGE to prioritize the Bull Run Watershed in their Public Safety Power Shutoff areas during extreme fire weather. In December 2022, PWB collaborated with Clackamas County, PGE and other partners to update and resubmit a FEMA Building Resilient Infrastructure and Communities grant application that was not awarded funding in the previous year's grant cycle to underground the powerlines in the Bull Run to reduce fire risk. Award decisions for this funding are still pending.

Through a partnership with Portland General Electric, a Pano Artificial Intelligence camera is deployed on the Lookout Point Communication Tower located along the western boundary of the BRWMU. The high-definition 360-degree panoramic camera uses artificial intelligence to detect smoke and notify fire agencies through automated texts to aid in early detection of potential fire starts.

### **Hickman Butte Fire Lookout**

PWB and USFS operate under a five-year interagency agreement to staff and maintain the fire lookout tower at Hickman Butte during fire season. A renewal of the interagency agreement was completed in spring of 2022. The agreement covers a fire-year period from 2022 to 2026 and includes authorization for a small maintenance fund to cover the cost of minor maintenance work on the tower.

An updated maintenance plan for the tower was developed by USFS in 2015. Repairs were made after the 2020 Labor Day windstorm event and the lookout was operational in 2021. USFS arranged for a comprehensive condition assessment to assess the lookout for structural integrity and other repair needs in early summer 2021. The main repair needs are addressing deficiencies in the lightning protection system and weather proofing the shed, which holds all of the solar electronics.

USFS constructed a larger communications equipment shelter and taller radio tower at Hickman Butte to improve the integrity of radio communication for the east side of the Mt. Hood National Forest and Columbia Gorge National Scenic Area in 2022. The purpose of the project was to address interference issues with the existing antennas and replace the existing inadequately sized and deteriorating shelter. The new shelter and tower have the capacity to accommodate future PWB communication equipment needs.

## **F. WATER MONITORING (Quality and Quantity)**

PWB continues its cooperative agreement with the U.S. Geological Survey (USGS) to monitor stream flow, reservoir levels, and/or water quality at nine stations within the Bull Run drinking water drainage as well as four additional stations, two on the lower Bull Run below PWB's water intake, one on the Little Sandy and the other on the Sandy River below its confluence with the Bull Run River. PWB also continues to conduct water quality monitoring at the four tributary key stations as well as at Reservoir 1, Reservoir 2, and Bull Run Lake to meet regulatory and operational objectives.

PWB continues to contract with the Natural Resources Conservation Service (NRCS) to monitor snow depth, snow water equivalent, and meteorological conditions at three sites in the watershed.

PWB is currently operating under the interim measures of the 2017 Bilateral Compliance Agreement with Oregon Health Authority (OHA) until *Cryptosporidium* treatment facilities are operational, no later than September 30, 2027. PWB continues to conduct routine monitoring at the intake for *Cryptosporidium*. Watershed inspections and environmental sampling are also required as part of a state-approved Watershed Inspection and Monitoring Plan. Results of watershed inspections and environmental sampling for each water year (Oct 1 – Sep 30) are submitted to OHA in an annual [Watershed Report](#) each December. Additional information on *Cryptosporidium* and the Bilateral Compliance Agreement can be found on the PWB's *Cryptosporidium* website:

<https://www.portland.gov/water/water-quality/cryptosporidium>

USFS continues to implement stream temperature monitoring in the Little Sandy watershed. Water temperature is monitored during the summer at five locations in the Little Sandy River and at the outlet of Upper Goodfellow Lakes.

## **G. NATURAL RESOURCES - TERRESTRIAL**

### **Invasive Species - Plants**

PWB continues to implement the Invasive Plant Standard Operating Protocol (SOP). The SOP is consistent with USFS requirements for invasive plant management within the BRWMU. PWB continues to maintain a wheel wash station on Road 10, just inside the main gate, to clean City vehicles entering the BRWMU and minimize the risk of the spread of invasive non-native plant species.

In developing the Invasive Plant SOP, PWB identified high priority invasive plant species based on how the species could become established in the BRWMU and affect water-supply operations. PWB continues to monitor and control high priority invasive plant species inside the watershed along the primary roadways, trails,

reservoirs, and near infrastructure as well as sites of recent road projects. A database of high priority invasive species occurrences inside the BRWMU is maintained by PWB.

Based on monitoring conducted since 2010, PWB discontinued the practice of cutting and removing invasive reed canary grass along the north bank of the upper Reservoir 1 in 2019. This activity was included as Measure R-3 of the PWB's Bull Run Water Supply Habitat Conservation Plan. The practice was intended to benefit reproduction of western toads and red-legged frogs. Monitoring data, however, did not support the assumption that better habitat would be created by cutting the grass. PWB will continue annual toad monitoring to gain additional information.

### **Aerial Survey for Forest Health /Insects & Disease**

USFS flies aerial surveys in Oregon and Washington each year to survey for forest disturbances. After being cancelled for the first time in 74 years in 2020 due to COVID-19, aerial surveys started up again in 2021. The aerial surveys cover all forested lands and are flown on a 4-mile grid. The surveys in Oregon are conducted in cooperation with the Oregon Department of Forestry. The results of the survey flights from 2022 and previous years are posted on the [Aerial Detection Survey website](#). Portions of the Bull Run watershed area are mapped on the following quadrangle maps: Vancouver, Hood River, Oregon City, and Mt. Hood.

Aerial surveys have occurred across the Pacific Northwest for several decades, starting in the late 1940s. Online mapping and tracking became more accessible in the early 2000s. Observation of maps since the early 2000s has shown small pockets of forest damage and disease within the Bull Run that vary over time and space. These patterns are consistent with natural disease and damage conditions that would be expected for western Oregon forest systems. No large or unusual pockets of disease or damage are known to have occurred in the Bull Run over the past 20 years.

### **Bull Run Wildlife Monitoring**

PWB conducts ongoing wildlife monitoring within the Bull Run watershed to improve its knowledge of wildlife as a potential source of *Cryptosporidium*. Wildlife scat monitoring is conducted under terms of the 2017 Bilateral Compliance Agreement (see Water Monitoring section above). Activities and results of scat monitoring and other wildlife-related investigations are submitted to OHA in an annual [Watershed Report](#).

Work this past year included: (1) using live traps for collecting small mammal scat near the reservoirs and (2) deer surveys around Headworks and will continue into 2023-2024.

## **H. NATURAL RESOURCES - AQUATIC**

### **Invasive Species - Aquatic**

PWB staff continue to implement preventative measures outlined in the PWB's Aquatic Invasive and Nuisance Species Standard Operating Protocol for both contractors and in-house maintenance and operations work, including boat and equipment decontamination, for safe use in the reservoirs and Bull Run River. Minor updates related to video documentation of equipment decontamination were made to the Aquatic Invasives SOP in 2022.

### **Bull Run Lake**

PWB operates and maintains drinking-water supply facilities at Bull Run Lake under a 20-year easement with USFS. The easement expired June 30, 2017. USFS has issued extensions to PWB for the existing easement until the renewed easement is complete. PWB and USFS are continuing the process of renewing the easement under terms and conditions very similar to the existing agreement. USFS needs to conduct an appraisal to determine the new fee, but the appraisal has been delayed for several years. It is currently not known when the appraisal will be completed. Once the appraisal is complete and the fee is determined, PWB will seek Portland City Council authorization for the easement renewal.

PWB received a Clean Water Act 401 certification in 2020 from Oregon Department of Environmental Quality (DEQ). The 401 certification is required for renewal of the easement. Conditions of the DEQ 401 certification will take effect upon completion of the easement.

Due to an outlet pipe structural issue and lower water demand, no releases were made from Bull Run Lake in years 2001 through 2014. In 2015 and 2016, the outlet pipe was repaired. This was followed in 2016 by a month-long test release, and results from that test release are summarized in the 2017 BRWMU Annual Report. In 2018, PWB made a small release of water from Bull Run Lake as summarized in the 2018 BRWMU Annual Report. In 2022, PWB made a release of approximately 0.6 billion gallons from the lake for supply augmentation.

The operation of the pump in 2018 stressed the outlet pipe. With further testing and inspections, PWB determined that the pipe is damaged but remains operable; the pump is no longer functioning. PWB is assessing options to repair the pipe. Releases are currently limited to what is possible using gravity (lower limit of approximately 3,154-foot lake surface elevation).

PWB continues to implement mitigation and monitoring measures as required by the easement and as agreed by USFS. A Decision Memo for the new easement was signed by USFS on September 30, 2019. The decision memo updates the mitigation and

monitoring requirements somewhat from the current terms based on information gained in 20 years of monitoring.

PWB is currently operating under the 2021 Bull Run Lake Interim Mitigation and Monitoring Agreement (“Interim Agreement”), approved by USFS in 2021. The Interim Agreement amends the mitigation and monitoring conditions of the original easement. The Interim Agreement is based on terms and conditions described in the 2019 Decision Memo that will accompany the renewed easement. In 2022, USFS signed an addendum to the Interim Agreement to clarify specific time-bound mitigation and monitoring terms.

Various monitoring activities have been conducted at Bull Run Lake from 1998 through 2022; monitoring is expected to continue for the duration of the easement extension until the easement is renewed. The goal of the monitoring is to assess potential effects of lake water withdrawals on the fish population and provide information for mitigation. In 2022, activities included: fish spawning surveys, fish population estimates (hydroacoustic surveys), amphibian surveys, and limnological monitoring. The same activities are scheduled for 2023.

Spawning surveys are typically conducted in the tributaries of Bull Run Lake each spring and summer documenting adult abundance, spawning timing, and redd counts of coastal cutthroat trout. The annual spawning surveys, from 1998-2022, have been completed either by USFS personnel from the Zigzag Ranger District or, more recently (2004, 2009-2022), by contractors hired by PWB. PWB plans to use a contractor to conduct spawning surveys in 2023.

The annual spawning surveys have shown a relationship between lake water surface elevation and cutthroat trout spawning success. In addition, the hydroacoustic surveys conducted by PWB document fish population size. To date, these surveys show high variability but no statistically significant change (95% level of confidence) in the lake’s cutthroat trout population over time.

### **Salmon & Steelhead Monitoring and Spawning Gravel Placement in lower Bull Run River**

PWB continues to conduct salmon spawning and snorkel surveys in the lower Bull Run River in adherence to the terms of the PWB’s Incidental Take Permit and Habitat Conservation Plan (“HCP”). Spawning surveys for adult Chinook salmon are conducted annually, from August through December, to monitor adult salmon numbers. The spawning surveys began in 2006 and are expected to continue through 2029 (HCP Years 1–20).

Snorkel surveys are also conducted annually in the lower Bull Run River, from the mouth of the Bull Run River to the location of the former rock weir (below spillway of Dam 2). Snorkel surveys monitor juvenile salmon and steelhead populations and

support HCP fish management activities. Snorkel surveys have been performed annually since 2009. No snorkel survey was conducted in 2022, but one is planned for 2023 and are expected to continue indefinitely.

PWB also annually augments spawning gravel in the lower Bull Run River and monitors the effects of the gravel placements in accordance with the terms of PWB's Incidental Take Permit and HCP. Gravel was placed at three sites in the river each year prior to 2022, but one site was dropped in 2022 and into the future because of a landslide. The same amount of gravel will be placed at the remaining two sites. Gravel augmentation is intended to mitigate the effects of Dam 1 and Dam 2 on transport of natural spawning gravel to the lower Bull Run River, and is required by Measure H-1 of the Bull Run HCP. Gravel augmentation began in 2010 and is expected to continue annually through 2059 (HCP Years 1–50). Summaries of the gravel augmentation monitoring and Chinook spawning surveys are included in the 2022 Bull Run Water Supply Habitat Conservation Plan Annual Compliance Report (available in July 2023).

### **Salmon & Steelhead Monitoring in Little Sandy River**

PWB continues to conduct two activities in the Little Sandy River: (1) maintenance of a smolt trap just upstream of the former Little Sandy Dam site and (2) fish habitat surveys and snorkel surveys from the mouth of the river to the former dam site. These activities are done in accordance with terms of PWB's Incidental Take Permit and HCP. The smolt trap is operated from roughly mid-March through mid-June. Results of the fish trapping effort are summarized in the 2022 Bull Run Water Supply Habitat Conservation Plan Annual Compliance Report (available in July 2023).

Oregon Department of Fish and Wildlife (ODFW) continues to conduct spawning surveys for spring Chinook salmon, coho salmon, and winter steelhead above and below the former Little Sandy Dam site. All three species have been documented above the former dam site and appear to be re-colonizing their former habitat.

### **Aquatic Habitat and Fish Distribution Surveys**

PWB occasionally surveys small streams throughout the BRWMU, above and below potential fish barriers such as road crossings or waterfalls. These are done to determine the presence or absence of fish in streams potentially affected by PWB activities such as road maintenance and to inform planning for culverts and other stream-crossing structure replacements. No surveys were conducted in 2022; no surveys are currently planned for 2023.

USFS conducts watershed monitoring in the BRWMU as part of the Aquatic and Riparian Effectiveness Monitoring Program (AREMP). AREMP is used to evaluate effectiveness of the Northwest Forest Plan's aquatic conservation strategy in achieving the goals of maintaining and restoring the condition of watersheds. Physical habitat data, macroinvertebrates and water temperature are collected to



assess stream conditions. These surveys occur every five years in selected streams of the Blazed Alder, Middle Bull Run, and South Bull Run sub-watersheds.

As part of the AREMP monitoring, USFS conducted surveys for Pacific lamprey in the BRWMU in August and October 2020. Sampling included filtering water to analyze eDNA. Samples were collected in the Bull Run River immediately upstream of Reservoir 1, North Fork Bull Run River at the 10 Road, South Fork Bull Run River at the 1211 Road, and Little Sandy River just upstream of its mouth. eDNA samples were analyzed in February 2021 with Pacific lamprey only detected in the Little Sandy River. More information on the AREMP program and available reports can be found at [USFS Northwest Forest Plan Watershed Monitoring](#) program webpage.

ODFW also conducts fish habitat surveys on select short stream segments in the BRWMU. These surveys provide reference data to support on-going monitoring and research for salmon recovery and conservation. Sampling in the BRWMU began in 2015; ODFW usually surveys 2 to 3 segments per year. Data on habitat in the Bull Run is provided to PWB or USFS upon request.

## **I. CONSERVATION EDUCATION**

PWB offers educational field trips and tours of the Bull Run Watershed for students and the general public. All tours are planned and guided by a professional Water Resources Educator.

Participants on adult tours learn about the history of the watershed, its natural resources, the water supply infrastructure and operations, and the cooperative partnership between PWB and USFS. These tours generally occur June through September.

Tours for school groups are generally scheduled in May, June, September, and October. During PWB's tours for school groups, students are divided into small groups at Bull Run Dam 1 to tour the dam, to measure the temperature and turbidity of the reservoir water, and to learn about the role of forest protection in providing high-quality raw water.

Due to COVID-19, the 2020 and 2021 tour seasons were cancelled. PWB Education Team posted educational videos and resources to PWB website. Due to pandemic precautions, operational constraints such as road repairs, and staffing shortages, the typical pre-pandemic schedule of Bull Run tour program activities was on hold for spring/summer 2022. A small number of tours occurred in 2022, as conditions and staffing allowed. The Education Team hired two new educators in the spring of 2023. With COVID-19 restrictions lifting and vacancies filled, the tour program plans to resume tours in the summer of 2023.



## **J. ADMINISTRATIVE USE TRAILS**

Several trails in the BRWMU provide access to stream gauges operated by the USGS and water-quality monitoring stations maintained by PWB. PWB plans to do routine maintenance on several of these trails during the 2023 field season.

## **K. LAND OWNERSHIP and LAND OCCUPANCY ARRANGEMENTS**

### **Land Exchange**

The Land Exchange process between USFS and PWB is complete. The primary purpose of the exchange was to create a better alignment of land ownerships with the respective missions of PWB and USFS, including consolidating PWB ownership to lands where water system facilities are located and significantly reducing PWB-owned inholdings in upland forest areas surrounded by national forest. The land exchange involved approximately 5% of the BRWMU land area.

Portland City Council voted to authorize signing the Exchange Agreement on July 31, 2019. The agreement authorizes PWB and USFS to complete the exchange. Both agencies signed the agreement in September 2019. Completing the transaction involved a variety of process steps to prepare the deeds and complete the property transfer. The property transaction was completed on December 29, 2022.

## **L. OTHER ACTIVITIES**

### **Dam 1 Needle Valve Repair**

This project replaced three Larner-Johnson needle valves from the face of Dam 1 with three new fixed cone valves of modern equivalence. This replacement project improves operation, access, and worker safety, and is intended to reduce annual maintenance costs. The existing needle valves were over 90 years old, leaky, antiquated, required significant occasional maintenance, were difficult to operate, and were proven to be unsafe in certain operational conditions.

Construction began in fall 2020 and was substantially complete in 2021 except for the window replacements on the valve house and some concrete work, which were finished in June 2022.

### **Conduit 3 Ovality Replacement**

PWB will replace approximately 200 feet of Conduit 3 downstream of Headworks, located on PWB-owned land along Road 14, that was identified in a 2018 field inspection to be significantly out-of-round. The project will include open trench excavation and abandonment of the existing 58-inch lock bar pipe and installation of a new 74-inch diameter welded steel pipe. All construction activities are expected to be confined to areas that were previously disturbed from the original roadway and

pipe work. Project planning started in July 2021 and construction is anticipated to take place in 2024.

### **Spillway Gate and Hoist Equipment Replacement Project**

The three vertical slide gates and cable-hoist system used to raise and lower the gates on the Dam 1 will be replaced to address the results of a Federal Energy Regulatory Commission Dam Safety Inspection. The project is located on PWB-owned lands. Construction is planned for the fall of 2024 and will be completed by late winter of 2025.

### **Hydrographic Survey of Bull Run Reservoirs 1 and 2**

High resolution bottom elevation data, using multi-beam echosounder, was collected for Bull Run Reservoirs 1 and 2 from a survey vessel in accordance with the US Army Corps of Engineers Hydrographic Survey Manual. The survey results will be used for a variety of purposes including planning, hazard awareness, refining reservoir modeling, and long-term monitoring. A consultant conducted the survey in Spring 2022.

### **Upper Goodfellow Lake Core Sampling**

Core sampling was conducted during summer 2022 from Upper Goodfellow Lake by researchers from the Portland State University Geography Department. The goal of the sampling is to provide a longer environmental history of the area and integrate eDNA analysis surrounding peaks in charcoal indicating fire events. A combination of pollen and eDNA analysis is being used to understand changes in biota during the last few thousand years and since the last Ice Age.