

Portland Water Bureau and United States Forest Service

# Bull Run Watershed Management Unit Annual Report

April 2022



**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 (referred to as the “City” and “PWB” throughout report) and the US Forest Service (referred to as “USFS” and “Forest Service” throughout report). As part of the Agreement, the PWB and the 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. The SOP was updated in May 2021 to reflect current policy, procedure, and practices and is now called Bull Run Access Standard Operating Policies and Procedures. 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 Forest Service. 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. U.S. Forest Service Law Enforcement Officers also occasionally conduct patrols of the BRWMU for illegal activity.

Additional signage was added to the Lolo Pass area to address the increased trespassing documented during the 2020-2021 winter. Most trespass appears to be limited to just inside of the Lolo Pass boundary gate and along Road 18, and not within the water supply drainage area. Trespass in the 2021-2022 winter indicate a more normal amount of trespass consistent with years prior to the 2020-2021 winter. PWB Security staff continue to regularly attend the Bull Run Community Planning Organization meetings as part of on-going community outreach efforts.

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

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

### **D. TRANSPORTATION SYSTEM**

In the BRWMU Agreement (2007), the Water Bureau and the Forest Service agreed that the City 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 would be needed to formally recognize this arrangement. The Water Bureau and the Forest Service continue to work on completing an easement that fulfills the legal agreement envisioned by the two parties in the BRWMU Agreement. The easement provides the legal mechanism for the City to continue to use the roads and to accomplish routine road maintenance as well as capital road repair for the benefit of both City and USFS management purposes in the BRWMU. The easement is nearly complete, along with the accompanying BRWMU Road Management Plan.

#### **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 and continued during the summer of 2021. Although the goal was to finish in the fall 2021, there were project delays and additional work, mostly culvert replacements, remains and will start back up again during the summer 2022 construction season. Most of the road segment is on PWB land, but approximately 0.4 miles is located on USFS land. 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 water quality and aquatic habitat.

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

The Hamilton Creek Project design was completed and put out to bid during 2021-2022 for replacement of an undersized culvert on Hamilton Creek, a stream that feeds directly into Reservoir 1. The contract will be awarded in spring of 2022 with a notice

to proceed date anticipated for June 1. The culvert is located on Road 10 at MP 12.5, just before the North Fork Bull Run River Bridge. The culvert is 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 trout. A technical planning memo was completed in 2019 to assess alternative replacement options; the recommended option is to replace the existing 36-inch culvert with a precast, prestressed concrete bridge that meets the USFS Aquatic Organism Passage (AOP) requirements. The new bridge will provide a 50-foot clear span. PWB staff assisted with the design in coordination with USFS Mt Hood National Forest staff and the USFS Regional AOP Design Assistance Team. Construction is expected to occur during the in-water work window (July 15 to August 31) of 2022.

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

Project design has started 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. All of the road segment is currently on USFS land with 0.76 miles within the lands that will be exchanged between the City and USFS. 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 water quality and aquatic habitat. Project design should be complete by the end of 2022. Construction is currently planned for summer 2023.

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

**2021 Fire Season**

Fire season in Oregon started early in Water Year 2021 due to dry conditions. For example, the earliest red flag warning on record for one of the weather zones in the Bull Run was issued in April of 2021 followed by record-breaking temperatures in the Pacific Northwest during the heat dome in late June 2021. By the second week in July, the entire state was in at least a moderate drought, according to the National Integrated Drought Information System. Despite an active fire season regionally, no fires were reported within the Closure Area in 2021 and only three small fires are known to have occurred within three miles of the Closure Area boundary.

In response to the early season dry conditions in 2021, the Forest Service instituted a campfire-ban on the Mt. Hood National Forest in early July, which was not lifted until late September. Forest Service Staff responded to only a few escaped and abandoned small human-caused fires across the Mt. Hood National Forest. Nearly all fires were contained to small sizes (less than 0.25 acres) within the same day they were reported. None threatened the Closure Area. It is possible that some of those

fires may have been within three miles of the Closure Area boundary but data for all 2021 fire starts are not available.

The three small fires known to have occurred within three miles of the Closure Area in Water Year 2021 are:

1. Larch Mountain fire

A small fire started on Forest Service land at Mile Post 13 of Larch Mountain Road approximately 1.5 miles outside of the Closure Area on August 16, 2021. The fire was approximately 0.10 acres and was extinguished the same day by Forest Service staff.

2. Thomas Road south of Roslyn Lake area

Two small fires started on private land approximately one mile outside of the Closure Area on June 28, 2021. Both fires were located off Thomas Road, just south of the former Roslyn Lake area. One very small fire (100 sq. feet) was caused by a downed power line. The other small fire was the result of an old slash burn pile smoldering. Sandy Fire responded to both fires and they were resolved within the same day that they were reported.

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

Following up on lessons learned from the active fire seasons of 2017, 2018 and 2020, the PWB worked with the 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 in 2019 and updated in 2020. 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 the USFS with assistance from PWB and ODF, Sandy Fire 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 resources can quickly become overwhelmed, triggering mutual aid assistance from other fire departments, including Portland Fire and Rescue (PF&R). PWB signed a Memorandum of Understanding with PF&R in June 2020 to augment structural fire protection in the Bull Run. The new MOU provided additional resources for protecting PWB water supply infrastructure during a large wildfire event and increase wildfire emergency preparedness. The MOU allowed



PWB to fund PF&R to purchase fire equipment that will improve protection of PWB infrastructure in the BRWMU. PF&R purchased structural protection equipment and, in coordination with PWB, cached equipment at five locations in the watershed in June 2021. In collaboration with the USFS, ODF and PWB staff, the equipment was set up and tested at each site in October of 2021. PF&R plans to annually exercise the equipment. This will provide additional training for PF&R staff while also improving their familiarity with the Bull Run.

### **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, 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 worked with Portland General Distribution Service (PGDS is a branch of Portland General Electric), which is contractually responsible 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 2021. PWB has also worked with PGE to prioritize the Bull Run Watershed in their Public Safety Power Shutoff areas during extreme fire weather. PWB collaborated with Clackamas County, PGE and other partners on a grant application for 2022 FEMA Building Resilient Infrastructure and Communities funding to underground the powerlines in the Bull Run to reduce fire risk. Award decisions for this funding are still pending.

### **Hickman Butte Fire Lookout**

PWB and the Forest Service operate under a five-year interagency agreement to staff and maintain the fire lookout tower at Hickman Butte during fire season. The current agreement, covering the period from 2017 to 2021, expires in April 2022. A five-year renewal for fire seasons 2022 to 2026 is in progress. The agreement 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 the Forest Service in 2015. Repairs were made after the 2020 Labor Day windstorm event and the lookout was operational in 2021. The Forest Service 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.

The Forest Service will be constructing 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 is to address interference issues with the existing antennas and replace the existing inadequately sized and deteriorating shelter. The existing communications tower and associated shelter will be decommissioned and removed from the site. The shelter and tower will also accommodate future City communication equipment needs.

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

The Water Bureau continues its cooperative agreement with the U.S. Geological Survey (USGS) to monitor stream flow, reservoir levels, and/or water quality at eleven stations within the Bull Run drinking water drainage as well as two additional stations, 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>

The Forest Service 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**

The PWB continues to implement the Invasive Plant Standard Operating Protocol (SOP). The SOP is consistent with Forest Service requirements for invasive plant management within the BRWMU. The 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, the 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 the 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 City'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. The City will continue annual toad monitoring to gain additional information.

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

The Forest Service 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 2021 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. The only unusual observation from the 2021 survey was a small amount (77 acres) of tree scorch from

the late June 2021 heat dome event. The long-term effect of this damage on forest health is unknown at this time.

### **Bull Run Wildlife Monitoring**

The Water Bureau 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 2022-2023.

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

### **Invasive Species - Aquatic**

PWB staff continue to implement preventative measures outlined in the City'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. Updates to the process for how contractors should document equipment decontamination are planned for the SOP in 2022.

### **Bull Run Lake**

PWB operates and maintains drinking-water supply facilities at Bull Run Lake under a 20-year easement with the Mt. Hood National Forest. The easement expired June 30, 2017. The USFS has issued extensions to the PWB for the existing easement until the renewed easement is complete. The PWB and the Forest Service are continuing the process of renewing the easement under terms and conditions very similar to the existing agreement. An appraisal to determine the new fee and fee structure is needed, 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, the PWB will seek 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, the PWB made a small release of water from Bull Run Lake as summarized in the 2018 BRWMU Annual Report.

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).

In early August 2021, during the annual maintenance test release at Bull Run Lake, there was a small leak of hydraulic fluid from a tear in the hydraulic line into Bull Run Lake. Approximately 0.5 liters of fluid is estimated to have leaked; no additional leakage was observed after the initial leak. The PWB reported the leak to the Oregon Emergency Response System and DEQ, per state spill reporting requirements; no additional follow-up was required. In the 12-week period between the initial leak incident and hydraulic line repair, the lake was monitored nine times for signs of new leakage or impacts to fish, but none were detected.

The PWB continues to implement mitigation and monitoring measures as required by the easement and as agreed by the Forest Service. A Decision Memo for the new easement was signed by the Forest Service 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.

The PWB is currently operating under the 2021 Bull Run Lake Interim Mitigation and Monitoring Agreement (“Interim Agreement”), approved by the 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, the 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 2021; 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 2021, activities included: fish spawning surveys, fish population estimates (hydroacoustic surveys), amphibian surveys, and limnological monitoring. The same activities are scheduled for 2022.

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 1998-2021, have been completed either by Forest Service personnel from the Zigzag Ranger District or, more recently (2004, 2009-2021), by contractors hired by PWB. PWB plans to use a contractor to conduct spawning surveys in 2021.

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 City'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 and are expected to continue indefinitely.

The City 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 the City's Incidental Take Permit and HCP. Gravel is placed at three sites in the river each year. 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. The project constitutes 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 2021 Bull Run Water Supply Habitat Conservation Plan Annual Compliance Report (available in July 2022).

## **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 the City'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 2021 Bull Run Water Supply Habitat Conservation Plan Annual Compliance Report (available in July 2022).

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 2021; no surveys are currently planned for 2022.

The Forest Service 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, the Forest Service 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.

There were no full AREMP surveys conducted in 2021 and none are planned for 2022. More information on the AREMP program and available reports can be found at the [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 the PWB or USFS upon request.

## **I. CONSERVATION EDUCATION**

The Portland Water Bureau 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 the Mt. Hood National Forest. 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. The PWB Education Team posted educational videos and resources to the Water Bureau website. Due to pandemic precautions and operational constraints such as road repairs, the typical pre-pandemic schedule of Bull Run tour program activities will continue to be on hold for spring/summer 2022. A small number of smaller scale tours might occur in 2022 as conditions allow.

## **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 completed a reroute of a small section (approximately 300 feet) of the Key Station 18 trail to accommodate a cableway that was relocated in 2018.

PWB plans to do routine maintenance on several of these trails during the 2022 field season.

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

### **Land Exchange**

The Land Exchange process between the Forest Service and the City of Portland is nearing final completion. The primary purpose of the exchange is to create a better alignment of land ownerships with the respective missions of the City and the Forest Service, including consolidating City ownership to lands where water system facilities



are located and significantly reducing City-owned inholdings in upland forest areas surrounded by national forest. The land exchange involves approximately 5% of the BRWMU land area.

City Council voted to authorize signing the Exchange Agreement on July 31, 2019. The agreement authorizes the City and USDA Forest Service to complete the exchange. Both agencies signed the agreement in September 2019. Completing the transaction involves a variety of process steps to prepare the deeds and complete the property transfer. The property transaction is currently expected to be completed by the end of 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 is essentially complete except for the window replacements on the valve house and some concrete work, which are expected to be finished by June 2022.

### **Bull Run Cabin Chimney Repair**

In 2019, PWB began a small project to repair a damaged chimney for the historic south cabin at Bull Run Lake. The project was completed in 2020. All three cabins at Bull Run Lake are eligible for listing on the National Register of Historic Places (NRHP). The project removed an existing safety hazard of falling stones and ensured the long-term protection of this recently restored cabin by eliminating the water and snow entry that threatened to damage the structure. The repair project included demolition of the existing chimney, salvage of suitable stones, and reconstruction of the chimney with a design similar to the original 1917 chimney. A temporary access ramp to the site was constructed in Fall of 2019 to facilitate movement of materials. The ramp was removed in summer 2021.

### **Conduit 3 Ovality Replacement**

The PWB will replace approximately 200 feet of Conduit 3 downstream of Headworks, located on City-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 2023 or 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. 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, will be 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 has been hired to conduct the survey over the course of two to five days per reservoir in Spring 2022.