

Portland Water Bureau and United States Forest Service

Bull Run Watershed Management Unit Annual Report

May 2021



Bull Run Watershed Semi-Annual Meeting



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COVID-19 UPDATE

The Portland Water Bureau and U.S. Forest Service are continuing to monitor the COVID-19 pandemic situation and adhere to associated federal, state, local, and agency requirements and guidelines to reduce transmission of this virus. Health and safety of employees and the public continue to be paramount in all decisions regarding activities within the Bull Run Watershed Management Unit. All future activities described in this report will be conducted in accordance with these COVID-19 related policies, procedures, and guidelines which are being updated frequently; thus, all future activities and related timelines described herein are subject to change.

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. Over the past year, updates to reflect current policy, procedure, and practices have been made to the SOP and a revised SOP should be finalized by mid-2021. 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.

Two full-time 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 is being pursued for the Lolo Pass area due to 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.

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 Bull Run road management plan; it is the intent of both agencies to finalize the easement and road management plan as soon as possible following completion of the Bull Run Land Exchange (see page 17).

2020 Project: Road 10 (“10R”: MP 28.8 to 31.8)

A 3.1-mile section (“10R”) of road between MP 28.8 and 31.8 along the Road 10 in the upper Bull Run watershed was reconstructed in 2019. This area extends from approximately the intersection with Road 1000524 to the intersection with Road 1027 and is entirely located on USFS land. The project was needed to improve pavement

condition, create better ditch lines, improve drainage, and address significant slumping and slides in the area. Several culverts were also replaced; many were significantly upsized to increase drainage capacity for current and future stream flows, improve aquatic habitat, and improve resilience of road infrastructure. Repaving of the entire road segment was postponed in 2019 due to the onset of winter conditions and was completed in summer 2020. The project ensures continuous, reliable, and safe access throughout the watershed for fire protection, monitoring, security, and other water supply operational and regulatory needs.

2020-2021 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 will start up again in June 2021 with the goal of finishing in the fall 2021. 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.

Due to COVID-related culvert material shortages and regional wildfires, less work was possible than anticipated, and all of the culvert replacements are now scheduled for 2021. Some wall construction was completed to address slumping and slides and most of the material for the project is now staged in the watershed in preparation for work that will begin in June 2021.

2022 Project: Hamilton Creek culvert replacement (MP 12.5)

Due to COVID-related challenges, the Hamilton Creek Project design that was slated to begin in July 2020 for replacement of an undersized culvert on Hamilton Creek, a stream that feeds directly into Reservoir 1, was delayed. 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 is expected to provide a 50-foot clear span. PWB staff are assisting with the preliminary design in coordination with USFS Mt Hood National Forest staff and the USFS Regional AOP Design Assistance Team. Design and permitting are expected to be completed in late 2021 and 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. Due to detour logistics, construction cannot occur during the same year as the nearby Hamilton Creek culvert replacement project, so construction is currently planned for summer 2023.

E. FIRE PLANNING, PREVENTION, DETECTION, and SUPPRESSION

2020 Fire Season

Fire season was mild through much of 2020 but became one of the worst fire seasons on record in Oregon following the extreme east wind event that began on Labor Day (September 7, 2020). No fires were reported within the Closure Area in 2020 and only three small fires are known to have occurred within three miles of the Closure Area boundary.

Forest Service fire staff reported extinguishing several small human-caused fires across the Mt. Hood National Forest during the summer of 2020, likely related to increased recreation resulting from the COVID-19 pandemic. 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 2020 fire starts are not available.

The three small fires known to have occurred within three miles of the Closure Area in Water Year 2020 are:

1. Hiyu fire

A small fire started on Forest Service land approximately 0.25 miles outside of the Closure Area on July 28, 2020. It was located off of Lolo Pass Road (FR-18), just past the Lolo Pass gate to the Closure Area. It was started from an ATV driving off the road, sparking and igniting grass beneath the BPA powerline. The fire was approximately 0.25 acres and was contained the same day by Forest Service and Hoodland Fire Department staff.

2. Camp Howard Road fire

A small fire started on private land approximately 0.25 miles outside of the Closure Area on September 9, 2020. It was located off of the Camp Howard

Road, just outside the Camp Howard gate to the Closure Area. It was started by a tree leaning on a powerline that had been deactivated during the Labor Day wind event but reactivated prior to the tree being cleared. Local fire departments quickly responded, and the fire was contained and extinguished within a couple hours.

3. Walker Prairie fire

A small fire was reported on private land approximately 0.1 miles outside of the Closure Area on September 9, 2020. It was located on private timberland approximately one mile north of the Walker Prairie Boundary gate to the Closure Area. The start date of the fire is unknown; it was suspected to be caused by a smoldering lightning strike on a stump from an early season storm. Corbett Fire and ODF fire crews responded. The fire was approximately 0.25 acres and was contained by September 10, 2020.

Riverside Fire

The Riverside Fire started on September 8, 2020, in the Clackamas River Ranger District of the Mt. Hood National Forest. At that time, the fire was over 20 miles from the Closure Area perimeter. The fire grew quickly and by Wednesday, September 9, 2020, it was over 100,000 acres and within 13 miles of the Closure Area boundary. Clackamas County placed the entire county under an evacuation alert on September 9, 2020. The southern portion of the Closure Area, including all PWB facilities at Headworks, were included within the County's Level 1 ("get ready") alert. The evacuation alert prompted PWB to begin contingency planning in case the fire caused an evacuation of PWB Headworks facilities and a shutdown of the Bull Run supply. The PWB initiated a partial Emergency Operation Center (EOC) activation on September 12 to facilitate internal coordination, communication, and preparation efforts. Fire conditions began moderating the week of September 14, and the Riverside Fire never got closer than 12 miles from the Closure Area border. The EOC was deactivated on Monday, September 21, 2020.

Building on Wildfire Preparation and Training

Following up on lessons learned from the active fire seasons of 2017 and 2018, 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.

In 2020, PWB updated 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. 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 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 will provide additional resources for protecting PWB water supply infrastructure during a large wildfire event and increase wildfire emergency preparedness. The MOU allows PWB to fund PF&R to purchase fire equipment that will improve protection of PWB infrastructure in the BRWMU. In turn, PF&R will purchase, assemble, and regularly exercise the equipment. This will provide additional training for PF&R staff while also improving their familiarity with the Bull Run. As of spring 2021, the equipment has been purchased and storage options are being evaluated for each of the five sites. Deployment is planned for late spring and early summer 2021

Also, PF&R updated the 2006 Bull Run structure protection plan in 2020.

Powerline Fire Prevention

In response to a small fire in the BRWMU in 2018 that resulted from a tree touching a powerline as well as recent wildfire events in California, PWB has been implementing practices to further 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 been working 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 ongoing and expected to be incorporated into existing annual powerline right-of-way vegetation maintenance practices. In response to a January 2021 windstorm that resulted in extensive tree damage and associated power line damage, PGDS cleaned up the storm damage and addressed additional hazard trees along the distribution powerline in winter 2021.

Hickman Butte Fire Lookout

PWB and the Forest Service operate under a five-year interagency agreement to staff and maintain the fire lookout at Hickman Butte during fire season. The current agreement covers the period from 2017 to 2021 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 the Forest Service in

2015. Lumber and paint were purchased in 2019 and were used in 2020 for general tower and cabin repair and upkeep. Other maintenance activities in 2020 included filling propane tanks, replacing wooden panels at the base of the cabin, and replacing solar panels. The outriggers that hold the shutters were torn off from the lookout cabin during the 2020 Labor Day windstorm. Due to the damage documented from that storm and unknown impacts from the January 2021 windstorm, the Forest Service is arranging for a comprehensive condition assessment to assess the lookout for structural integrity and other repair needs in early summer 2021. The goal is to address any identified repair needs in 2021.

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 starting in summer 2021. 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.

PWB also coordinates with the Oregon Department of Agriculture on the control of A-listed Noxious Weeds and on the release of bio-controls for scotch broom.

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. Annual toad monitoring will be continued by the City 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. However, the surveys planned for 2020 were cancelled due to COVID-19. This was the first time in 74 years aerial surveys were not conducted. Instead, 2020 imagery from the National Agriculture Imagery Program was examined in areas that were higher priority for the detection of insect and disease damage, all outside of the Bull Run. Several trips were made to collect insect and disease information from the ground using the same Digital Mobile Sketch Mapping tablets that are used in the plane. Additionally, some attempts were made to use remotely sensed data to assess for insect and disease changes in the forest but did not provide

the expected detailed results.

Currently, planning is underway for aerial surveys 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 2019 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

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](#).

Planned work for 2021 includes: (1) using live traps for collecting small mammal scat near the diversion pool and reservoirs and (2) deer surveys around Headworks.

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.

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 an extension 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 was expected to be completed by the USFS in 2020; however, the appraisal was delayed and is now expected to be complete in 2021. Once 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 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).

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.

Various monitoring activities have been conducted at Bull Run Lake from 1998 through 2020; 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 2020, activities included: bird surveys, fish spawning surveys, fish population estimates (hydroacoustic surveys), and limnological monitoring. The same activities as well as amphibian surveys are scheduled for 2021.

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 1998-2020, have been completed either by Forest Service personnel from the Zigzag Ranger District or, more recently (2004, 2009-2020), 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 2020 Bull Run Water Supply Habitat Conservation Plan Annual Compliance Report (available in June 2021).

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 2020 Bull Run Water Supply Habitat Conservation Plan Annual Compliance Report (available in June 2021).

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 2020; no surveys are currently planned for 2021.

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. AREMP surveys were completed in the South Fork Bull Run sub-watershed in 2020. There are no full AREMP surveys planned in 2021; there are plans to collect eDNA data in the South Fork Bull Run sub-watershed since these data were not collected last season. 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 segment 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 tour season was cancelled. The PWB Education Team posted educational videos and resources to the Water Bureau website. As of spring 2021, tours continue to be cancelled due to COVID-19.

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 continues to work on completing 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 2021 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 2021.

L. OTHER ACTIVITIES

Dam 1 Needle Valve Repair

This project will replace three Larner-Johnson needle valves from the face of Dam 1 with three new valves of modern equivalence. This replacement project will improve operation, access, and worker safety, and is intended to reduce annual maintenance costs. The existing needle valves are over 90 years old, leak, are antiquated, require significant occasional maintenance, are difficult to operate, and have been proven to be unsafe in certain operational conditions.

Construction began in fall 2020 and is nearing completion; the project, except for the window replacements on the valve house, is expected to be finished in June 2021. The windows are expected to be replaced by the end of 2021.

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 started in 2019 but was curtailed in November 2019 due to the onset of winter conditions; it 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 will be removed in summer 2021.