

City of Portland Sponsored Bull Run Watershed Projects and On-going Activities



PROJECTS

No.	Project Name & Description	Location	Schedule/Status	Purpose
1	<p>Headworks Facilities Plan</p> <p>The Headworks Facilities Plan is a study of all of the existing facilities in the Headworks area analyzing present and future needs. The scope of the study includes all Headworks area facilities.</p> <p>Any recommended improvements will be ranked by need and by financial business case evaluation for future consideration in the Water Bureau’s capital improvement plan.</p>	Headworks	The Draft Facilities Plan is under staff review.	The Headworks systems,-- which are critical to the delivery of safe drinking water from the Bull Run watershed-- are aging facilities. The screenhouse is over 60 years old. The chlorination system is over 40 years old and it has become difficult to find replacement and maintenance parts. The Headworks Facilities Plan will provide analysis of improvement and replacement options f to address the aging infrastructure.
2	<p>Bull Run Dam 2 Tower Improvement</p> <p>Construction on the Dam 2 Tower improvement project, which modifies the north tower so that water from the reservoir can be accessed at three different depths to access raw water of varied temperatures, began in the spring of 2012. The tower previously had intakes (openings for water withdrawal) only at the bottom of the reservoir. Modification to the tower addresses the depletion of the coldest reservoir water which typically occurs in the late summer and fall, when water is released for fish habitat. This project also includes piping improvements in the Headworks area to allow the colder water for habitat protection to bypass the existing treatment facility and be directly discharged into the Bull Run River below Dam 2.</p>	Dam 2 Reservoir	This project was completed in FY13-14.	To comply with the terms of the City’s Incidental Take Permit and meet water temperature standards for the lower Bull Run River as established in Oregon Department of Environmental Quality’s (ODEQ) Sandy River Basin TMDL and the ODEQ-approved Temperature Management Plan. The project is a component of Measure T-2 of the Bull Run Water Supply Habitat Conservation Plan (HCP).

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3	<p>Headworks Flow Meters</p> <p>Six flow meters will be installed on the conduits; one on each of those leaving the Primary Intake Structure and one on each of those leaving Screenhouse 3. Three new control valves will be installed on the conduits from Screenhouse 3 to automate flow control.</p>	Bull Run Headworks	Construction contract issued September 2013; completion of project scheduled for July 2014.	To provide for accurate flow measurement on the conduits. The new flow meters replace existing meters installed in the 1920's through 1950's. The project improves the bureau's ability to perform chlorine contact time calculation for regulatory compliance and prepares facility for chlorine dose control based on flow. The new control valves will allow for automation and chlorine dose control and provide full pipe conditions for the flow meters.
4	<p>Helicopter Landing Site Evaluation</p> <p>Water Bureau and US Forest Service are evaluating several potential sites for emergency medical evacuation landing zones in the watershed.</p>	Entire watershed	Life Flight will evaluate the sites from the air in the fall of 2014.	To provide locations for helicopter evacuations during medical emergencies.
5	<p>Bull Run Land Exchange</p> <p>The project is exploring a land exchange to convey 2,830 acres of federal Forest Service land to the City of Portland in exchange for a roughly equal amount of City owned lands within the Bull Run Watershed Management Unit. City Council approved the Agreement to Initiate (ATI) for the land exchange in February, 2010.</p>	Selected parcels within the Management Unit	The Forest Service continued work on a transportation analysis of roads affected by the land exchange. Forest Service and Portland Water Bureau personnel continued to work on refining information for the NEPA analysis and the land appraisal. NEPA field work for hydrology and botany is anticipated during summer 2014.	To create a better alignment of land ownership responsibilities with the respective missions of the City and the Forest Service.
6	<p>Key Station Improvements</p> <p>Key station buildings and sampling equipment are being replaced and upgraded.</p>	<p>Four locations:</p> <ul style="list-style-type: none"> • North Fork Bull Run River • South Fork Bull Run River • Main stem Bull Run River • Fir Creek 	<p>Key Stations at the North and South forks of the Bull Run River and Fir Creek were completed in 2013.</p> <p>The Main stem Bull Run River Key Station was completed in June 2014.</p>	<p>New sampling equipment is required to ensure accurate water quality monitoring for compliance with the Inspection and Monitoring Program associated with the Bull Run Treatment Variance. New structures are needed to protect water sampling and monitoring equipment and protect personnel visiting the sites.</p>

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7	<p>Road 1008 Paving</p> <p>The entire length of the road will be repaved.</p>	<p>Entire length of 1008 Road in Bull Run watershed, intersection of 1010 Road at Walker Creek to the intersection with Road 10.</p>	<p>Project design completed FY13/14; construction anticipated during FY 14/15.</p>	<p>To ensure continuous, reliable, and safe access to all facilities, as well as maintenance of other city-owned infrastructure within the watershed. Road 1008 is preferred secondary access route to Headworks in the event Road 10 is unavailable.</p>
8	<p>Road 10 Paving</p> <p>A section of Road 10 will be reconstructed and repaved to improve pavement condition, create better ditch lines, improve drainage, and address slumping, slides and jersey barriers.</p>	<p>Road 10 in the Bull Run watershed, from approximately the intersection with Soapstone Road to the intersection with Larson's Intertie</p>	<p>Project design completed FY 13/14; construction anticipated during FY 14/15.</p>	<p>To ensure continuous, reliable, and safe access to all facilities, as well as maintenance of other city-owned infrastructure within the watershed. Road 10 is the primary route for access to Headworks.</p>
9	<p>Little Bear Creek House</p> <p>The smaller of two historic houses at Dam 1 has fallen into disrepair. Basic interior and exterior repairs are needed to maintain the structure.</p>	<p>Next to Bear Creek House, overlooking Dam 1.</p>	<p>This project was completed in FY13-14.</p>	<p>To preserve the historic water system building.</p>
10	<p>Reservoir 1 Log Boom</p> <p>This proposed project will replace the existing wooden log boom at Reservoir 1 with a new metal log boom and new anchor point on the south side of the reservoir. The new boom will consist of a UV resistant resin and closed-cell foam exterior with a steel channel forming the boom-to-boom connection. PWB will also replace the south anchor.</p>	<p>Reservoir 1</p>	<p>Installation of the new log boom and anchor is expected to occur in 2014.</p>	<p>Log booms located at the inlets of Reservoirs 1 and 2 capture debris that is dislodged from the forested areas in order to protect water supply infrastructure from damage. The existing log boom is rotting and the anchor points are nearing the end of their design life and need to be replaced.</p>

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	<p>Bull Run Lake Outlet Pipe Repair</p> <p>This proposed project will repair the outlet piping from Bull Run Lake.</p>	Bull Run Lake	<p>The repair to the outlet piping is planned for summer of 2014. Procurement work is underway.</p>	<p>The outlet piping from the lake has a broken flange preventing the pipe from working properly. Although water withdrawals at Bull Run Lake have not occurred since 2000, the pipe is part of the system that allows the PWB to draw water from Bull Run Lake when needed.</p>

ON-GOING ACTIVITIES

No.	Activity & Description	Location	Frequency	Purpose
1	<p>Water Treatment Operations</p> <p>Apply chlorine and monitor for finished water quality residuals. Monitor and control river flow below Dam 2 to meet fish flow requirements. Control conduit flows to meet customer demand.</p>	Headworks	Year-round	To disinfect water to protect public health and meet all state and federal water quality standards for unfiltered water system; create beneficial habitat conditions in lower Bull Run River; supply potable water to Portland metro area.
2	<p>Security</p> <p>A full-time Watershed Ranger conducts vehicle and foot patrols for trespass; implements a private-vehicle identification system; and coordinates emergency access in an emergency event. Security staff conduct fire patrols during the summer months and conduct security site surveys of all water system facilities and infrastructure sites during the months of May and June.</p>	Entire watershed	Year-round	To enforce the public closure of the Bull Run Watershed Management Unit (BRWMU) and maintain effective security program for the Unit.
3	<p>Road Maintenance</p> <p>Brushing (cutting roadside brush), mowing, tree-fall removal, slide removal, ditch maintenance, culvert cleaning and repair, sub-grade repair, snow plowing, chip-seal, and bridge inspections.</p>	Entire watershed	Year-round	To ensure continuous, reliable, and safe access to all facilities, as well as maintenance of other city-owned infrastructure within the watershed.
4	<p>Trail Maintenance</p> <p>Brushing, debris removal and safety-related maintenance on trails that provide access to water monitoring stations.</p>	Trails associated with USGS gauging stations located through watershed	Year-round	To provide access to facilities and natural resources.
5	<p>Conduit Maintenance</p> <p>Brushing, mowing, and tree-fall removal on conduit right-of-ways, leak repair, blow-off and air valve maintenance, bridge inspection, and intertie operations.</p>	Conduit right-of-ways between Headworks and main gate	Year-round, as required	To provide access on right-of-way as required to maintain operation of conduits.

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6	Facilities Maintenance Mowing at Headworks and Bear Creek house, monitor for storm damage, storm clean-up and repair.	Facilities located throughout watershed	Year-round, as required	To maintain structural integrity, upkeep and access to facilities.
7	Waterway Debris Removal & Disposal Removal of logs and debris captured by upper log boom in Reservoir 1. Inspection and repair of log booms in Reservoirs 1 & 2 and Bull Run Lake.	Reservoir 1, Reservoir 2 and Bull Run Lake	Late spring and summer, and as required	To protect dams and dikes, and other water system infrastructure.
8	Danger/Hazard Tree Removal Removal of danger and hazard trees that pose a risk to life, property, and infrastructure, as required by federal and state laws. Identification of danger and hazard trees is performed by a certified danger tree specialist.	Selected locations throughout the watershed	Year-round, as required	To keep workers and visitors safe while traveling and working in the watershed; to protect water system property and infrastructure.
9	Winter-Season Facility Maintenance Surveys Use of snow cat to conduct snow survey measurements at Bull Run Lake; assess condition of outlet structures at Bull Run and Boody lakes, assess condition of gauging flumes at Upper and Lower Springs; and provide access to Hiyu Mtn. telecommunications tower for ComNet staff. ComNet provides microwave communication service to the city.	Selected locations throughout watershed	Winter months (generally November – May)	To maintain seasonal access to facilities; monitor condition of resources; repair failed infrastructure.
10	Dam Maintenance Weekly piezometer readings in Dams 1 & 2; operation and maintenance of gates; perform Federal Energy Regulatory Compliance (FERC) requirements such as annual flushing of piezometers, face drains and foundation drains; brushing on dam abutments.	Dam 1 and Dam 2	Year-round	To maintain operational and structural integrity of dams and satisfy FERC requirements.
11	Road Inclinometer Monitoring	Road 10 between main gate and	Readings are made twice a year (spring and fall)	To determine presence of ground movements that could affect conduits.

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	Measure angles of slope, elevation or inclination. Inclinometer locations are all in close proximity to the conduits.	Headworks		The locations are either in areas of historic slides or in areas that were determined to have a potential to slide.
12	Road Piezometer Monitoring Use piezometer to measure water levels in porous surfaces and near potential slide areas.	Road 10 between main gate and Headworks	Readings are made twice a year (spring and fall)	To determine risk potential to protect critical water system infrastructure from slope failure.
13	Stream Flow & Temperature Gauging and Reservoir Level Monitoring Cooperative program with the U.S. Geological Survey (USGS) to monitor flow and water quality measurements at selected stream stations. Measure water levels at Bull Run Lake and Bull Run reservoirs.	Selected locations throughout watershed	Continuous automated monitoring. Validation by on-site inspection performed on as-needed basis	To monitor volume of water entering the reservoirs for summer supply planning and flow management in lower Bull Run River.
14	Snow Gauging Cooperative program with the federal Natural Resource Conservation Service (NRCS) to monitor snow depth, snow water equivalent, precipitation, and temperature at three monitoring stations.	Selected locations throughout watershed	Continuous automated monitoring. Validation by on-site inspection performed on quarterly basis	To monitor snow levels and hydrologic conditions.
15	Stream Key-Station Monitoring Collect water quality data at the mouths of the four main tributaries that flow into the reservoirs.	North Fork, South Fork, Main Stem and Fir Creek key stations	Scheduled: monthly Storm events: 6-8 times per year	To monitor water quality at the four main tributaries.
16	Reservoir Monitoring Collect water quality data and temperature profiles from the reservoirs.	Reservoirs 1 and 2	Bi-weekly	To monitor conditions, physical processes and water quality in source water reservoirs. At Reservoir 2, includes compliance with CWA § 401 certification conditions for the new multi-level intake.
17	Invasive Plant Surveys Ongoing monitoring, removal and control of invasive species. Surveys for invasive plant species occur along the primary roadways, trails, reservoirs,	Selected locations throughout watershed	Annually	To protect native vegetation and retain ecological function.

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	and near infrastructure, as well as sites of recent road projects. Aquatic surveys of the Bull Run reservoirs and rare plant surveys of two prairies are also conducted to monitor potential impacts of invasive plant species on these habitats and populations.			
18	Water Resources Education Program Supervised Bull Run tours are administered by the Water Bureau's education staff.	Selected locations throughout watershed	As of June 30, 25 tours have been conducted in 2014.	To educate participants about the Bull Run watershed and Portland's water system. Topics include history, ecology, source water protection, water quality, system operations, and stewardship
19	Spawning Surveys -- Lower Bull Run River Collect adult Chinook salmon information for the lower Bull Run River.	Lower Bull Run River	HCP Years 1–20 (2010-2030) Takes place annually from August through December.	To monitor adult salmon numbers and comply with terms of the City's Incidental Take Permit.
20	Spawning Gravel Placement The City augments spawning gravel in the lower Bull Run River and monitors the effects of the gravel placements. Project constitutes Measure H-1 of the Bull Run HCP.	Lower Bull Run River	HCP Years 1–50 (2010-2060) Gravel at three sites is placed in the river each year.	To mitigate the effects of Dam 1 and Dam 2 on transport of natural spawning gravel to the lower Bull Run River and comply with the terms of the City's Incidental Take Permit.
21	Salmon Monitoring -- Little Sandy River PWB continues to do two activities in the Little Sandy River: 1) maintenance of a smolt trap and 2) fish habitat surveys and snorkel surveys	Little Sandy River <i>Smolt trap:</i> just upstream of the former Little Sandy Dam site <i>Fish habitat and snorkel surveys:</i> from the mouth of the river to the former dam site	The smolt trap is operated from roughly late March through mid-June annually (2009 – 2050) Habitat surveys are conducted 5 times over a 20-year period (2007-2027). Snorkel surveys have been performed annually since 2009 and are expected to continue indefinitely.	The purpose of the smolt trap is to monitor juvenile salmon and steelhead production. Habitat surveys monitor the effectiveness of fish habitat restoration measures. Habitat and smolt surveys comply with terms of the Bull Run HCP. Snorkel surveys monitor juvenile salmon and steelhead populations; these surveys support HCP fish management activities.
22	Reed Canarygrass Removal The City continues to remove reed canary grass,	Reservoir 1	HCP Years 1–50 (2010-2060) Performed annually	To remove reed canarygrass, which inhibits egg incubation for western toads and red-legged frogs and

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	which inhibits egg incubation for western toads and red-legged frogs, along the north bank of the upper end of Reservoir 1. Removal includes cutting and raking. The City accesses the site by boat from the reservoir and by trail. Project constitutes Measure R-3 of the Bull Run HCP.			comply with the terms of the City's Incidental Take Permit.
23	<p>Dam Safety Inspections of PHP Facilities</p> <p>Bureau of Hydropower staff periodically visit and inspect the Portland Hydroelectric Project's (PHP) two Bull Run Dams and powerhouses.</p>	Dam 1 and Dam 2	Monthly	To ensure the stability and safety of the hydroelectric facilities and that any changing conditions at the dams and powerhouses can be monitored and addressed.
24	<p>FERC Annual Operations Inspections</p> <p>Hydropower staff accompanies representatives from the Federal Energy Regulatory Commission (FERC) and the Oregon Water Resources Department on periodic inspections of Bull Run Dams Nos. 1 & 2.</p>	Dam 1 and Dam 2	Annually	To inspect and assess the physical condition of the two Bull Run dams and comply with Federal Energy Regulatory Commission (FERC) regulations.
25	<p>PGE's Normal Ongoing PHP Operations</p> <p>As contract operators for the City, Portland General Electric (PGE) routinely starts and stops the two Portland Hydroelectric Project's (PHP) powerhouses remotely from their control room near Estacada. PGE's operating staff also visits both PHP powerhouses every day.</p>	Dam 1 and Dam 2	Once or twice per day	To verify the proper functioning of powerhouse equipment; and perform regular operation and maintenance functions. Monitor crests of both BR Dams to verify the actual reservoir water levels against what is being recorded in the PHP SCADA monitoring system.
26	<p>Annual Overhauls of the two PHP Powerhouses</p> <p>Portland General Electric schedules annual individual two-week long power generation outages at each of the Portland Hydroelectric Project's (PHP) powerhouses, during which time they have a variety of its maintenance and repair crews visit and do work at both of the powerhouses.</p>	Dam 1 and Dam 2	Annually – for usually two weeks at each powerhouse - in the summer / fall period.	To accomplish a range of testing, measuring, repair and maintenance work that cannot be accomplished while the units are in operation.

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27	<p>Deliveries to and Removals from the PHP Powerhouses</p> <p>On an “as-needed” basis, diesel fuel and supplies are delivered to both of the Portland Hydroelectric Project’s (PHP) powerhouses.</p>	Dam 1 and Dam 2	As needed - infrequent	To ensure adequate fuel for emergency backup generators and other supplies as needed. Both PHP powerhouses have diesel generators that provide emergency power during electricity outages.
28	<p>PHP Power Transmission Line Assessment & Maintenance</p> <p>Portland General Electric’s designated forester periodically conducts site visits to assess the condition of the Portland Hydroelectric Project’s (PHP) power transmission line corridor. In consultation with the City and Forest Service (if on federal land) recommendations and decisions are made on proposed brushing and hazard tree removal.</p>	Power line Right of Way between Dam 1 and main gate	<p>Assessment: annually</p> <p>Maintenance: on average, once every three years.</p>	To protect the safety and integrity of the transmission line.
29	<p>PHP Power Line Repairs</p> <p>Portland General Electric’s power line repair crews periodically visit the Portland Hydroelectric Project’s (PHP) transmission line corridor to repair any storm caused damage that may have occurred.</p>	Power line Right of Way between Dam 1 and main gate	As needed following events causing damage to the PHP transmission lines.	To ensure continued operation of powerhouses and minimize the duration of power outages.
30	<p>Powerhouse 2 Remediation Monitoring</p> <p>A Diesel Release Remediation Monitoring program will be conducted over the course of a three year period (2013-2015) to monitor the effectiveness of the Powerhouse 2 Diesel Release Remediation activities conducted in November 2012.</p>	Base of Dam 2	Three monitoring wells have been installed and site monitoring will continue for the next 18 months.	To monitor effectiveness of diesel spill remediation.

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31	<p>Bull Run Lake Special Use Authorization Monitoring Activities</p> <p>PWB is required to conduct various wildlife and fish monitoring activities on an annual basis to maintain its special use authorization with the Forest Service for Bull Run Lake. Activities for 2014 include: bald eagle, osprey, and loon surveys, fish spawning surveys, and fish population estimates.</p>	Bull Run Lake	Ongoing during field season (late spring through late fall)	To comply with mitigation and monitoring requirements of the Bull Run Lake Special Use Authorization.
32	<p>LT2 Treatment Variance Compliance Monitoring and Inspections</p> <p>As of April 1, 2012 PWB is conducting observation monitoring for <i>Cryptosporidium</i> to meet the intake monitoring conditions of PWB's Bull Run Treatment Variance. As of October 1, 2012, watershed inspection and environmental sampling is also required under the Variance as part of PWB's Watershed Inspection and Monitoring Plan. Results of watershed inspection and environmental sampling for each water year (Oct 1 – Sep 30) must be submitted to the Oregon Health Authority (OHA) in an annual Bull Run Treatment Variance Watershed Report.</p>	<p>Water sampling at Headworks and Key Stations. Inspections and scat collection throughout the watershed.</p> <p>Inspection categories include: security, diversion pool, wildlife areas, soil erosion areas and sanitary facilities.</p>	<p>Intake monitoring consists of sampling at least 100 liters over at least two days each week, with additional daily samples collected when turbidity is greater than 2.0 NTU. As of May 31, 2014, no <i>Cryptosporidium</i> has been detected at the intake since the variance went into effect.</p> <p>Tributary sampling occurs once every four weeks and during selected high-flow events. Wildlife scat sampling occurs approximately two to four times per month. The frequency of watershed inspections varies by category; ranges from daily to twice per water year.</p> <p>The Bull Run Treatment Variance Watershed Report for Water Year 2013 (Oct 2012 – Sep 2013) was submitted to OHA on December 19, 2013. No major concerns were identified, and no tributary water samples or scat samples tested positive for <i>Cryptosporidium</i>.</p>	<p>As of April 1, 2012, PWB is operating under the conditions of its Bull Run Treatment Variance. The water quality monitoring, inspections and reporting activities of the variance program are conditions required by OHA. Maintenance of the variance enables the city to comply with the treatment requirements of the federal Long Term 2 Enhanced Surface Water Treatment Rule (LT2) without treating Bull Run water for <i>Cryptosporidium</i> as would otherwise be required.</p>

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33	<p>Bull Run Treatment Variance Wildlife Monitoring</p> <p>The Water Bureau is conducting ongoing wildlife monitoring and studies within the Bull Run watershed to improve its knowledge of wildlife as a potential source of <i>Cryptosporidium</i>.</p> <p>Planned studies for the 2014 field season include</p> <ol style="list-style-type: none"> 1) testing small mammals for <i>Cryptosporidium</i> and 2) utilizing cameras to acquire information on wildlife activity near the reservoirs. 	<p>2014 studies will occur throughout the watershed.</p>	<p>Year round, depending on wildlife species being monitored</p>	<p>To support PWB's Bull Run LT2 Treatment Variance</p>