

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



PROJECTS

No.	Project Name & Description	Location	Schedule/Status	Purpose
1	<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	The Water Bureau is working with Life Flight and the local fire department to designate several sites throughout the Bull Run Watershed. This is expected to be completed by 2017.	To provide locations for helicopter evacuations during medical emergencies.
2	<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 awarded a contract for the property appraisal in the fall of 2016. The contract appraiser completed a draft appraisal in February, 2017. After review of the appraisal and equalization of the properties offered for the exchange, the appraisal is expected to be final by June 2017. Work on the draft environmental assessment continues.	To create a better alignment of land ownership responsibilities with the respective missions of the City and the Forest Service.

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3	<p>Road 10 Improvement (1)</p> <p>A 1.6 mile section of Road 10 will be reconstructed and repaved to improve pavement condition, create better ditch lines, improve drainage, and address slumping and slides.</p>	<p>Road 10 in the Bull Run watershed, from approximately the intersection with Road 14 to the intersection with Dam #2 access road</p>	<p>Project was mostly completed in 2016. Striping of pavement will occur in 2017.</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. Also provides reliable access for monitoring and fire protection in the watershed.</p>
4	<p>Road 10 Improvement (2)</p> <p>A 1.6 mile section of Road 10 will be reconstructed and repaved to improve pavement condition, create better ditch lines, improve drainage, and address slumping and slides.</p>	<p>Road 10 in the Bull Run watershed, from approximately the intersection with Dam #2 access road to milepost 6.2</p>	<p>Project was mostly completed in 2016. Striping of pavement will occur in 2017.</p>	<p>To ensure continuous, reliable, and safe access to all facilities, as well as maintenance of other city-owned infrastructure within the watershed. Also provides reliable access for monitoring and fire protection in the watershed.</p>
5	<p>Road 10 Improvement (3)</p> <p>A 1.6 mile section of Road 10 will be reconstructed and repaved to improve pavement condition, create better ditch lines, improve drainage, and address slumping and slides.</p>	<p>Road 10 in the Bull Run watershed, from approximately the Cougar Creek to the North Fork Bridge</p>	<p>Project design is scheduled for FY 2016 -17; construction anticipated during FY 2018-2019.</p>	<p>To ensure continuous, reliable, and safe access to all facilities, as well as maintenance of other city-owned infrastructure within the watershed. Also provides reliable access for monitoring and fire protection in the watershed.</p>
6	<p>Road 10 Improvement (4)</p> <p>A 3.1 mile section of Road 10 will be reconstructed and repaved to improve pavement condition, create better ditch lines, improve drainage, and address slumping and slides.</p>	<p>Road 10 in the Bull Run watershed, from approximately the intersection with Road 1000524 to the intersection with Road 1027</p>	<p>Project design is scheduled for FY 16 -17 & 17-18; construction anticipated during FY 2019-2020.</p>	<p>To ensure continuous, reliable, and safe access to all facilities, as well as maintenance of other city-owned infrastructure within the watershed. Also provides reliable access for monitoring and fire protection in the watershed.</p>

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7	<p>Diversion Pool Fencing</p> <p>Modify the existing fence to better exclude terrestrial mammals.</p>	Headworks Diversion Pool	Design began in April 2015 and construction is expected to be completed in the 2017.	Improve protection of diversion pool and further reduce risks to water quality
8	<p>Repairs of North Tower at Dam 2</p> <p>The project will remove failed stilling wells and equipment from the interior of the wet wells and outlet works as well as replacement of the interior cathodic protection system and replacement of various sensors.</p>	Dam 2	Failed stilling wells and equipment were removed from wet wells in the Fall of 2016. Replacement of interior cathodic protection system and level sensing instrumentation is currently scheduled for late Summer 2017.	To repair monitoring equipment on the North Tower.
9	<p>Headworks Generator Improvements</p> <p>Install a new emergency generator, fuel storage tank and associated site electrical components.</p>	Headworks; at the corner of Rock Cut Road and Powerhouse Road	Design is underway and construction is expected to start in 2018	Improve Headworks' emergency power supply system as recommended by the Headworks Facilities Plan.

ON-GOING ACTIVITIES

No.	Project Name & Description	Location	Schedule/Status	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>Two full-time Watershed Rangers conduct vehicle and foot patrols for trespass; monitor a private-vehicle identification system; deploy and maintain a camera system for remote area monitoring; and coordinate 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 throughout the year.</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.

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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>	<p>Conduit right-of-ways between Headworks and main gate</p>	<p>Year-round, as required</p>	<p>To provide access on right-of-way as required to maintain operation of conduits.</p>
6	<p>Facilities Maintenance</p> <p>Mowing at Headworks and Bear Creek house, monitor for storm damage, storm clean-up and repair.</p>	<p>Facilities located throughout watershed</p>	<p>Year-round, as required</p>	<p>To maintain structural integrity, upkeep and access to facilities.</p>
7	<p>Waterway Debris Removal & Disposal</p> <p>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.</p>	<p>Reservoir 1, Reservoir 2 and Bull Run Lake</p>	<p>Late spring and summer, and as required</p>	<p>To protect dams and dikes, and other water system infrastructure.</p>
8	<p>Danger/Hazard Tree Removal</p> <p>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.</p>	<p>Selected locations throughout the watershed</p>	<p>Year-round, as required</p>	<p>To keep workers and visitors safe while traveling and working in the watershed; to protect water system property and infrastructure</p>
9	<p>Winter-Season Facility Maintenance Surveys</p> <p>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.</p>	<p>Selected locations throughout watershed</p>	<p>Winter months (generally November – May)</p>	<p>To maintain seasonal access to facilities; monitor condition of resources; repair failed infrastructure.</p>

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10	<p>Dam Maintenance</p> <p>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.</p>	Dam 1 and Dam 2	Year-round	To maintain operational and structural integrity of dams and satisfy FERC requirements.
11	<p>Road Inclinometer Monitoring</p> <p>Measure angles of slope, elevation or inclination. Inclinometer locations are all in close proximity to the conduits.</p>	Road 10 between main gate and Headworks	Readings are made twice a year (spring and fall)	To determine presence of ground movements that could affect conduits. The locations are either in areas of historic slides or in areas that were determined to have a potential to slide.
12	<p>Road Piezometer Monitoring</p> <p>Use piezometer to measure water levels in porous surfaces and near potential slide areas.</p>	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	<p>Stream Flow & Temperature Gauging and Reservoir Level Monitoring</p> <p>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.</p>	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 and temperature management in lower Bull Run River.
14	<p>Snow Gauging</p> <p>Cooperative program with the federal Natural Resource Conservation Service (NRCS) to monitor snow depth, snow water equivalent, precipitation, and temperature at three monitoring stations.</p>	Selected locations throughout watershed	Continuous automated monitoring. Validation by on-site inspection performed annually or as needed	To monitor snow levels and hydrologic conditions.
15	<p>Stream Key-Station Monitoring</p> <p>Collect water quality data at the mouths of the four main tributaries that flow into the reservoirs.</p>	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.

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16	<p>Reservoir Monitoring</p> <p>Collect water quality data and temperature profiles from the reservoirs.</p>	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	<p>Invasive Plant Surveys</p> <p>Ongoing monitoring, removal and control of invasive species. Surveys for invasive plant species occur along the primary roadways, trails, reservoirs, 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.</p>	Selected locations throughout watershed	Annually	To protect native vegetation and retain ecological function.
18	<p>Water Resources Education Program</p> <p>Supervised Bull Run tours are administered by the Water Bureau's education staff.</p>	Selected locations throughout watershed	One tour was completed from January 1 – March 31, 2017.	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	<p>Spawning Surveys -- Lower Bull Run River</p> <p>Collect adult Chinook salmon information for the lower Bull Run River.</p>	Lower Bull Run River	HCP Years 1–20 (2010-2029) Takes place annually from August through December.	To monitor adult salmon numbers and comply with terms of the City's Incidental Take Permit.
20	<p>Spawning Gravel Placement and Monitoring</p> <p>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.</p>	Lower Bull Run River	HCP Years 1–50 (2010-2059) Gravel at three sites is placed in the river each year. Surface area of spawning gravel patches in the lower Bull Run River is estimated annually (2007-2019).	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.

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21	<p>Salmon Monitoring -- Little Sandy River and lower Bull Run River</p> <p>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. Snorkel surveys are also conducted in the lower Bull Run River.</p>	<p><i>Smolt trap:</i> just upstream of the former Little Sandy Dam site</p> <p><i>Little Sandy fish habitat and snorkel surveys:</i> from the mouth of the river to the former dam site</p> <p><i>Lower Bull Run River snorkel surveys:</i> from the mouth of the Bull Run River to the site of the former rock weir (just below Dam 2 spillway)</p>	<p>The smolt trap is operated from roughly mid-March through mid-June annually (2009 – 2059).</p> <p>Habitat surveys are conducted 7 times over a 20-year period (2007-2027).</p> <p>Snorkel surveys have been performed annually since 2009 and are expected to continue indefinitely.</p>	<p>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.</p>
22	<p>Reed Canary Grass Removal</p> <p>The City continues to remove reed canary grass, 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.</p>	Reservoir 1	<p>HCP Years 1–50 (2010-2059)</p> <p>Performed annually</p>	<p>To remove reed canary grass, which inhibits egg incubation for western toads and red-legged frogs and comply with the terms of the City's Incidental Take Permit.</p>
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	<p>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.</p>

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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.
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.

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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>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 to be conducted in 2017 include: bird surveys, 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.

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31	<p>LT2 Treatment Variance Compliance Monitoring and Inspections</p> <p>PWB is conducting observation monitoring for <i>Cryptosporidium</i> to meet the intake monitoring conditions of PWB's Bull Run Treatment Variance. Demonstration monitoring was triggered on January 8, 2017 after <i>Cryptosporidium</i> was detected at the intake for the first time since the variance went into effect in 2012. Between April 2012 through December 2016, no detections of <i>Cryptosporidium</i> occurred at the Bull Run water supply intake. In early January 2017, low amounts of <i>Cryptosporidium</i> began being detected in some raw water samples collected from the Bull Run water supply intake.</p> <p>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>Demonstration monitoring at the intake currently consists of sampling at least 250 liters over at least four days each week, with additional daily samples collected when turbidity is greater than 2.0 NTU.</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, and varies seasonally.</p> <p>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 2016 contains all monitoring and inspection results for Water Year 2016 (Oct 2015 – Sep 2016). The report was submitted to OHA on December 16, 2016.</p>	<p>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> <p>At this time, PWB does not believe it can meet the requirements for the concentration of <i>Cryptosporidium</i> outlined in the variance and is awaiting guidance from OHA. In the interim, PWB is continuing to maintain all conditions specified by the variance, including watershed protection, intake, tributary and wildlife scat monitoring, inspections, and reporting activities.</p> <p>Additional information on <i>Cryptosporidium</i> detections and the Bull Run Treatment Variance can be found at PWB's Treatment Variance for Cryptosporidium website.</p>

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32	<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 activities for 2017 include: (1) camera monitoring for wildlife activity and (2) using live traps for collecting small mammal scat.</p>	Studies occur throughout the watershed.	Year round, depending on wildlife species being monitored	To support PWB's Bull Run LT2 Treatment Variance