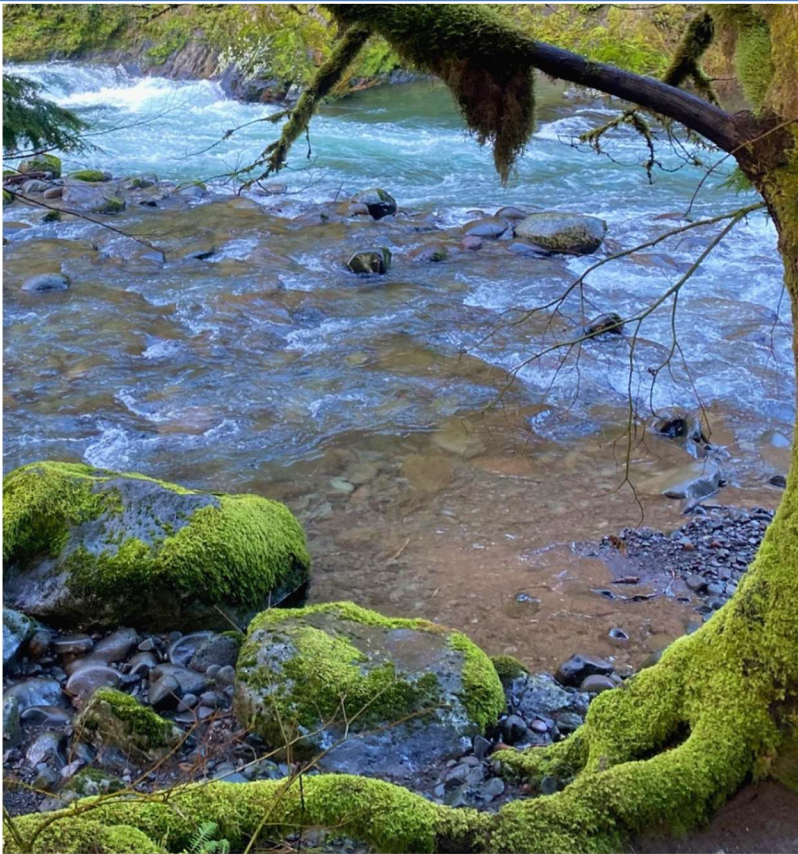




2023

State of the McKenzie Watershed Report

Eugene Water & Electric Board



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February 2024

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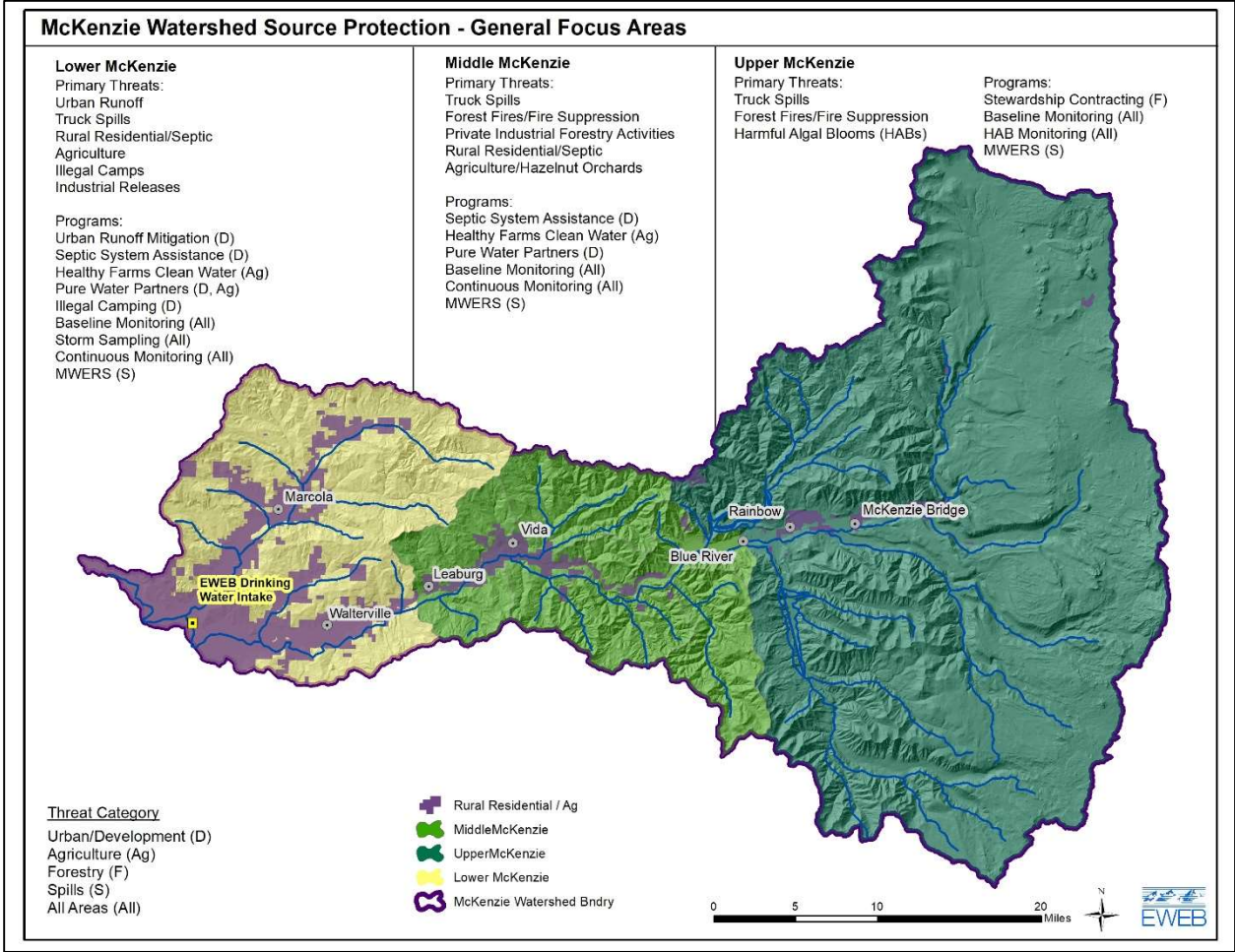
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1.0 Executive Summary

The purpose of the State of the McKenzie Watershed Report (SMWR) is to highlight water quality trends, activities that threaten water quality, significant watershed events, and programs designed to mitigate or reduce impacts to water quality. This report is produced annually to show progress being made or challenges encountered as EWEB implements the Drinking Water Source Protection (DWSP) Program 10-year strategic plan throughout the McKenzie Watershed (see Figure 1-1). To keep the report brief, background information and programs details are contained in the Strategic Plan Technical Report and the previous SMWR. Both can be found at: <http://www.eweb.org/community-and-environment/mckenzie-watershed-protection/drinking-water-source-protection-plan>.

Figure 1-1: Map of DWSP Program



The report layout is designed to address goals and objectives, highlight major events in the watershed that had significant positive or negative impact and provide a summary of the health of the McKenzie Watershed (Section 1), followed by brief discussions of water quantity and quality trends and highlights (Section 2-3) and updates on the priority threats to water quality and how EWEB programs are

responding to these threats (Sections 4-10). The final section focuses on operationalizing source protection as well as looking at efforts under development and future opportunities (Section 11).

1.1 Source Protection Goals & Objectives

The overarching goal of EWEB's Drinking Water Source Protection (DWSP) program is to measure the balance between watershed health and human use over time and implement actions that maximize the benefits EWEB receives through its investments in the McKenzie River Watershed. The primary objectives to accomplish this goal include:

1. Plan and implement actions that maintain source water quality in a way that balances risks with benefits in partnership with others;
2. Prioritize source protection efforts that provide the greatest benefit to water treatment and electric generation in the McKenzie Watershed; and,
3. Promote public awareness and stewardship of a healthy watershed through targeted actions and programs.

1.2 Watershed Highlights

Post-Fire Restoration Efforts Continue to be Critical for Landowners

In year 3 after the Holiday Farm Fire, the Pure Water Partners (PWP) Program, of which EWEB is a participating member, continues to work with a significant number of watershed landowners on restoration efforts. The PWP conducts property assessments to evaluate needs and opportunities for replanting in riparian areas, invasive species control, fire fuels reduction, erosion control, and naturescaping. Landowners who participate in PWP sign 7-year Watershed Stewardship Agreements which allow work to be completed on their properties and maintained over time (see Section 7).

In addition, EWEB has brought in 10.7 million dollars to date of funding for fuels reduction, replanting, large floodplain restoration projects, etc. EWEB is also partnering with Lane County, Business Oregon, the Department of Environmental Quality, and others to distribute up to \$3 million in septic system assistance grant funds from the American Rescue Plan Act (see Section 8).

Large-Scale Restoration Projects

EWEB continues to work with the McKenzie Watershed Council (MWC), the McKenzie River Trust (MRT), and the U.S. Forest Service (USFS) to implement large-scale restoration projects. In 2023, partners completed the Finn Rock Phase II project (see Figure 1-2) and continued project design for Quartz Creek. These types of restoration projects have numerous benefits including: mitigating floods, turbidity, and organic carbon by spreading out and attenuating flows, dropping out sediment, increasing the uptake of nutrients and organic carbon coming from upstream severely burned landscapes, storing water, increasing habitat for fish and wildlife, increasing resiliency to wildfire, and increasing cold water refugia.

Figure 1-2: Opening the McKenzie River to the Finn Rock Restoration Project August 4, 2023



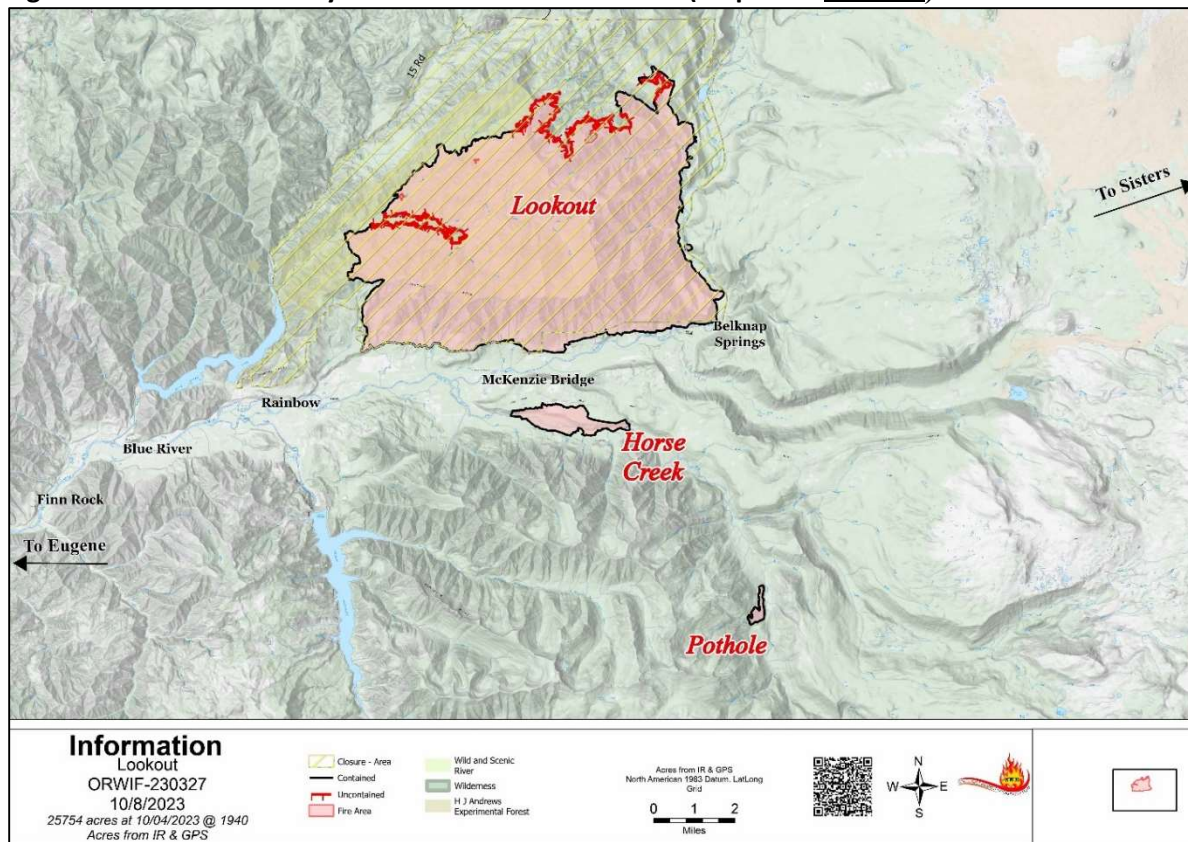
Willamette Valley System Draft Environmental Impact Statement

The public comment period closed on February 23, 2023, for the Draft Environmental Impact Statement (EIS) released by the U.S. Army Corps of Engineers (Corps) on November 25th, 2022. The Draft EIS proposes several alternatives to balance operations and maintenance of the Willamette Valley System with Endangered Species Act (ESA) requirements. Several of the proposed alternatives could significantly alter the way Cougar Reservoir is managed long-term and potentially impact water quality during the initial years of implementation. Staff are monitoring the progress of the Final EIS. However, the Corps is under a court-mandated injunction that directs them to implement specific operations to improve conditions for ESA-listed salmonids while the Final EIS is pending. One of the outcomes of the injunction is to conduct delayed refill (spring) and deep drawdown (fall) activities at specific reservoirs in order to lower lake levels and allow juvenile fish migration through the regulating outlet of dams. Cougar Reservoir, which is currently managed under this new operational plan, will likely not reach full pool during most years, and may experience periods of elevated turbidity during storm events under low draw-down conditions. Similar operations were conducted in Green Peter Reservoir this past fall, although at much lower fall draw-down levels as compared with Cougar Reservoir, resulting in significant turbidity and prolonged water treatment issues for downstream drinking water providers (Sweet Home and Lebanon).

Lookout, Horse Creek and Pothole Fires

In the summer of 2023, the Lookout, Horse Creek, and Pothole Fires together burned over 26,000 acres in the upper McKenzie Watershed, including a sizeable area in the HJ Andrews Experimental Forest and through the Deer Creek floodplain restoration project (Figure 1-3). Fortunately, no major structures were lost, but the fires created significant smoke and even major road closures for an extended period. The Deer Creek project handled the Lookout Fire very well, with less than 5% of the project wood burned. The increased wetted valley along with the cleared power lines led to a lower severity mosaic fire along the entire project and acted as a fire break in the lower section. Source Protection staff began monitoring potential downstream water quality impacts from the recent wildfires during storm events this past fall.

Figure 1-3: Wildfire Activity in the McKenzie Watershed (map from InciWeb)



1.3 Statement of Overall Health

In the 2019 State of the McKenzie Watershed Report staff indicated “it is anticipated that climate change impacts in the McKenzie will show up as extreme weather events (including flooding, drought, and loss of snowpack), resulting in increased wildfires, harmful algal blooms, and property damage in riparian and floodplain areas”. The 2020 Holiday Farm Fire (HFF) was an example of such an extreme event that continues to have a significant impact on the McKenzie Watershed. Last year brought another round of wildfires to the Upper McKenzie, adding to the already sizeable portion of total acres burned throughout the watershed over the past 7 years. Since the HFF, EWEB has been hard at work to

mitigate the water quality threats from the HFF and other fires by working closely with our federal, state, and local partners in a well-coordinated response and restoration effort.

Our water quality monitoring staff continued to conduct baseline and storm event monitoring with a focus on tributaries both within the Holiday Farm Fire and other burn areas and in the urban interface. EWEB staff installed a real-time water quality monitoring station in Keizer Slough, which is downstream of two urban stormwater outfalls. The station provides another early warning opportunity to assess rapidly changing conditions due to potential spills and will give Hayden Bridge staff time to make treatment adjustments if necessary. Routine harmful algal bloom (HAB) monitoring was carried out as planned from spring until fall, confirming a relatively uneventful and welcomed HAB year across the watershed. Although the McKenzie River has faced some major challenges over the past several years, overall water quality remained excellent in 2023 (see Section 3).

Wastewater releases and hazardous material spills remain high priority threats to water quality. Several spills, mostly minor, were recorded in the watershed in 2023, including one that involved a semi-truck crash near Finn Rock. Fortunately, the driver was okay, and although the truck landed in a wetland, it avoided going directly into the McKenzie River so emergency crews had time to respond and clean the area (see Figure 1-4). The McKenzie Watershed Emergency Response System (MWERS) and years of interagency drills continue to provide a platform for effective spill communication and coordination.

Figure 1-4: Semi-truck Crash near Finn Rock (April 2023)



Image Credit: David Donahue

Urban runoff continues to be a source of pollutants to the river in the lower watershed, as indicated by both baseline and storm event monitoring (see Section 3). The multi-partner Urban Waters & Wildlife Program continues to work together to design and implement green infrastructure in partnership with

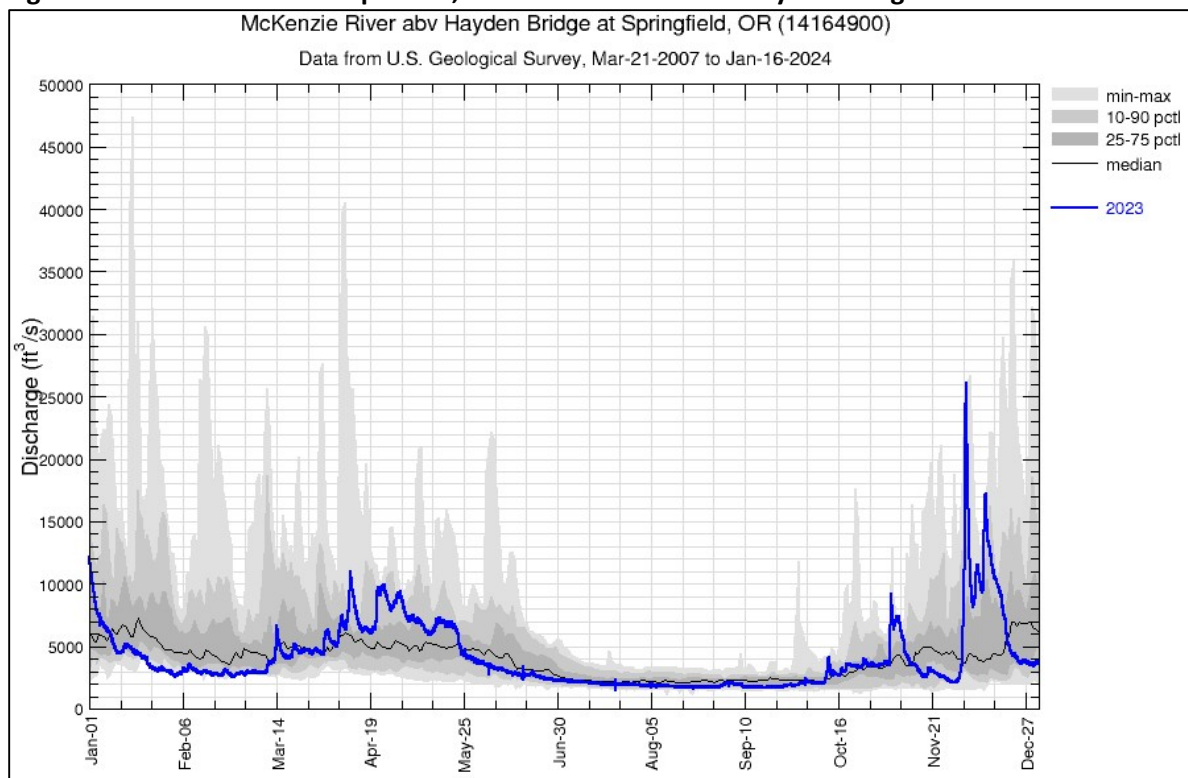
local businesses to treat stormwater runoff. This partnership has received significant funding from the U.S. Environmental Protection Agency (EPA) to scale these efforts up in Eugene/Springfield and surrounding areas (see Section 5.2).

2.0 Water Year

Total precipitation amounts in the upper McKenzie Watershed for the 2022/2023 water year (10/1/2022 thru 9/30/2023) were below median values when compared to a 30-year period from 1991 to 2020, according to figures from the USDA/NRCS [National Water and Climate Center](#). The McKenzie SNOTEL site received 72.6 inches of precipitation for the 2022/2023 water year, or 75% of the median value. The Roaring River SNOTEL site, which is in the southeast corner of the South Fork McKenzie River watershed, received 61.2 inches of precipitation for the 2022/2023 water year, or 89% of the median value. Fortunately, a series of large precipitation events moved through the area in March and April of 2023 that coincided with lower temperatures in the higher elevations, resulting in considerable snowfall that boosted snow water equivalent levels (or snowpack) well above median values.

Current water year precipitation through December 2023 at both sites remained slightly below respective median values, while snowpack remained well below median values at the close of the year. Most of Lane County remained in the abnormally dry to moderate drought categories in 2023 according to the [National Drought Monitor](#).

Figure 2-1: Historic Flow Comparison, McKenzie River above Hayden Bridge



Flow in the McKenzie River at Hayden Bridge during the 2023 calendar year generally stayed close or slightly below median values (see Figure 2-1). Notable exceptions include a period of lower flow during a relatively dry stretch in January and February, followed by higher-than-normal flows in March and April due to several large, spring storm events. Similar to last year, Cougar Reservoir was also bypassing higher flows in May, which contributed to higher mainstem McKenzie flows in late spring. A particularly large rain-on-snow event occurred in early December generating significant flows throughout the watershed. The event resulted in the highest observed flow (provisional USGS data) at Hayden Bridge during 2023, which peaked on December 4th at 26,100 cubic feet per second (cfs).

3.0 Water Quality and Watershed Health

EWEB's Source Water Protection Program utilizes multiple long-term monitoring efforts year-round to assess water quality conditions throughout the watershed. Water quality conditions are tracked through a combination of extensive continuous monitoring stations and discrete sampling. The results are used by staff to better understand overall watershed health, contaminant sources and emerging drinking water threats. In addition to long-term monitoring projects, continued emphasis in 2023 targeted post-fire impacts from the 2020 Holiday Farm Fire and the 2023 Lookout and Horse Creek Fires.

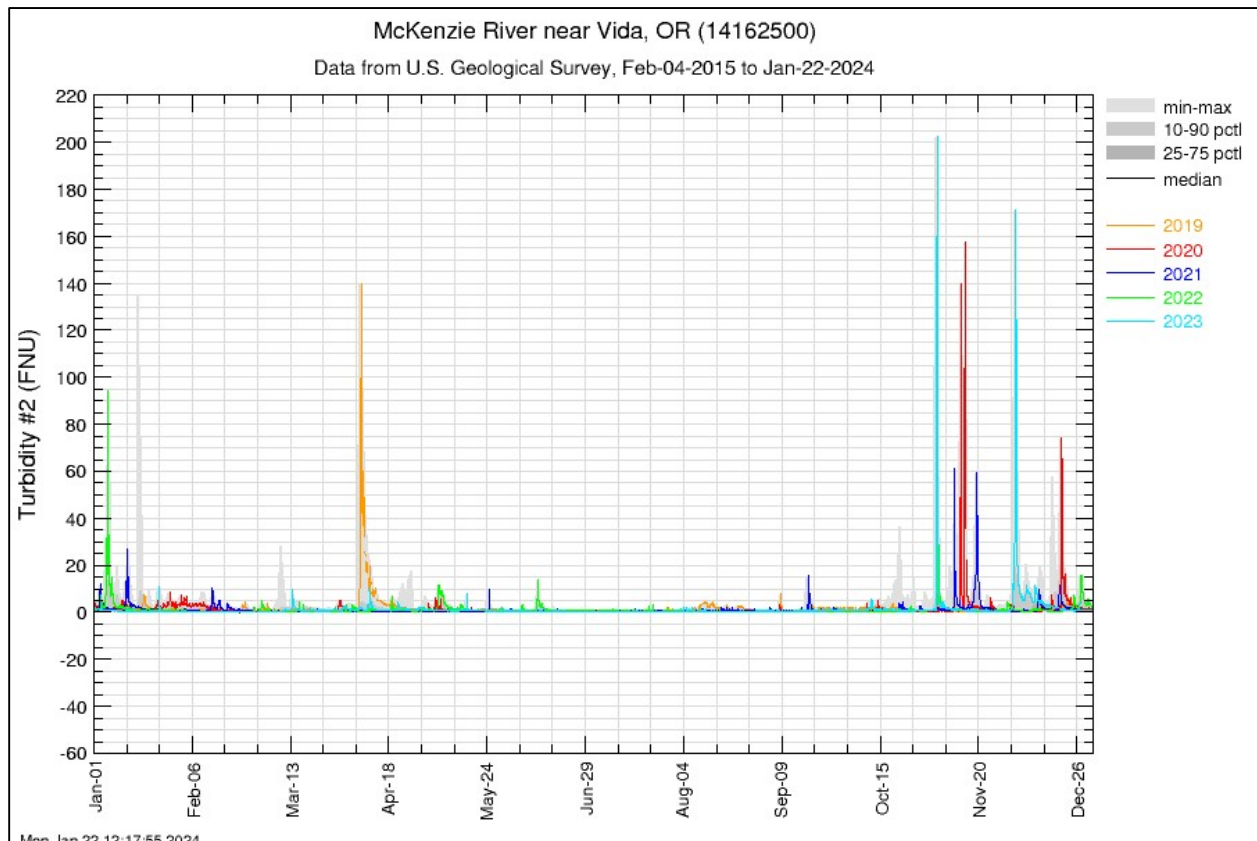
3.1 Continuous Monitoring Network

Continuous monitoring stations, whether managed by EWEB or the USGS, use multi-parameter water quality sondes to monitor conditions. Two key parameters, turbidity, or the cloudiness of the water, and fluorescent dissolved organic matter (fDOM), provide meaningful information to staff about rapidly changing conditions. Both parameters can also be viewed as surrogates for additional contaminants potentially entering local waterways. By monitoring these parameters, staff can react accordingly with additional sampling or treatment process adjustments if necessary.

EWEB's continuous water quality monitoring network was expanded in 2023 to include Keizer Slough. The Keizer Slough station includes telemetry (data transmission) and a housing unit to protect equipment. The operation of the Quartz Creek water quality and discharge monitoring station was temporarily suspended by the USGS during the second half of 2023 to accommodate construction of a new bridge. A temporary (non-telemetered) sonde was deployed in Quartz Creek during bridge construction and will remain in place until a new monitoring station is installed in early 2024. The lower- and mid-portions of the Quartz Creek watershed were extensively burned during the 2020 Holiday Farm Fire and large scale floodplain restoration is planned in the next couple of years (see Section 7).

As illustrated in Figure 3-1 below by the light blue line, turbidity levels (measured in FNU) in the McKenzie River near Vida peaked in 2023 during storm events on November 4th (202 FNU) and again on December 3rd (171 FNU). Turbidity levels in the McKenzie River near Vida are typically less than 2 FNU during most of the year. One interesting note is that from 2015 to 2019 there were only two events that exceeded 50 FNU over a 5-year period. Since the Holiday Farm Fire, there have been 8 events (2 per year) exceeding 50 FNU over the past four years from 2020 through 2023.

Figure 3-1: Major Turbidity Event Comparison, McKenzie River near Vida, 2019-2023



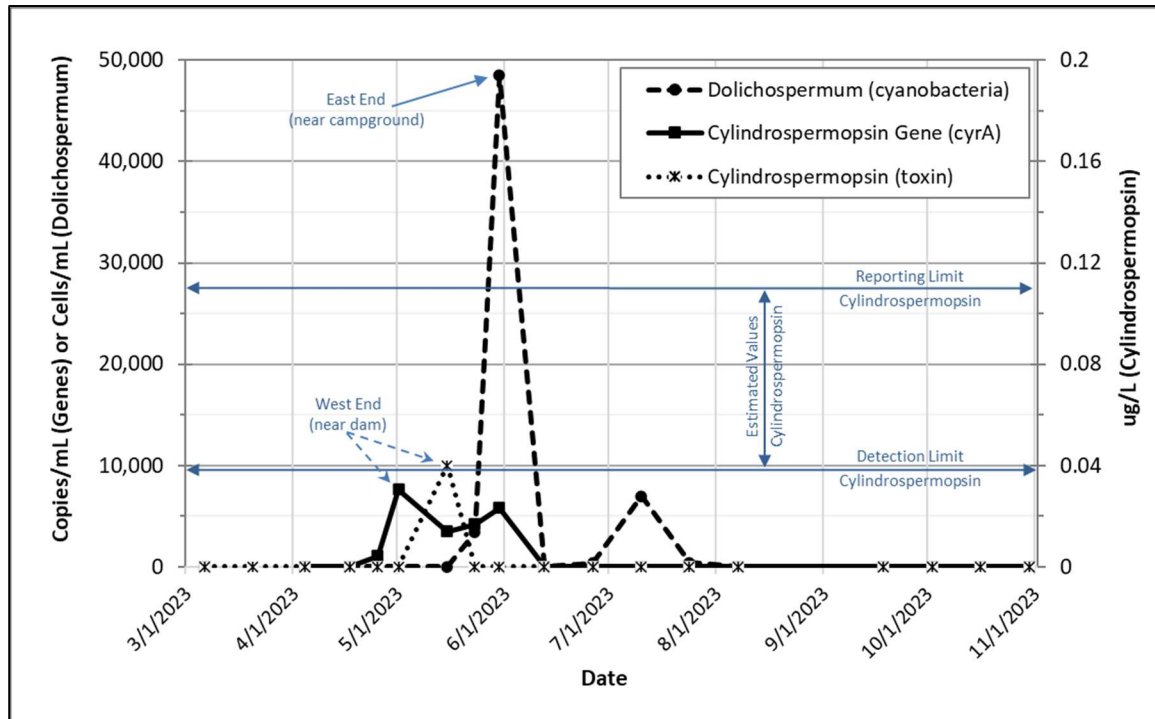
3.2 Harmful Algal Bloom (HAB) Monitoring

Cyanobacteria are photosynthetic bacteria found naturally in lakes, streams, ponds, and marine environments, and play an important role globally as a primary producer (organisms that convert sunlight energy and non-living materials into food). However, under certain conditions, like warm, slow-moving water, cyanobacterial harmful algal blooms (HABs) can form that impair water quality and potentially generate toxins that are harmful to humans and pets. Increased nutrients, such as nitrogen and phosphorus, can further exacerbate the formation of HABs. The Oregon Health Authority (OHA) has adopted drinking water and recreational use advisory levels for some of the toxins produced by HABs. Additional information on cyanotoxins can be found on OHA’s [Cyanotoxin Resources for Drinking Water and Cyanobacteria Bloom](#) pages.

Staff conducted 19 separate HAB monitoring events in 2023. Although subdued, 2023 cyanobacteria numbers in both Blue River Reservoir (BRR) and Cougar Reservoir (CR) followed typical seasonal patterns observed during previous years. *Dolichospermum*, a key cyanobacteria genus capable of producing toxins, was first observed in CR beginning in early March, and then in BRR around mid-May. *Dolichospermum* concentrations peaked on the east end of BRR (48,500 cells/mL) in late May (see Figure 3-2) and in CR around mid-July (8,700 cells/mL). *Dolichospermum* numbers declined significantly by August, until the start of the Lookout and Horse Creek Fires, at which point access was no longer

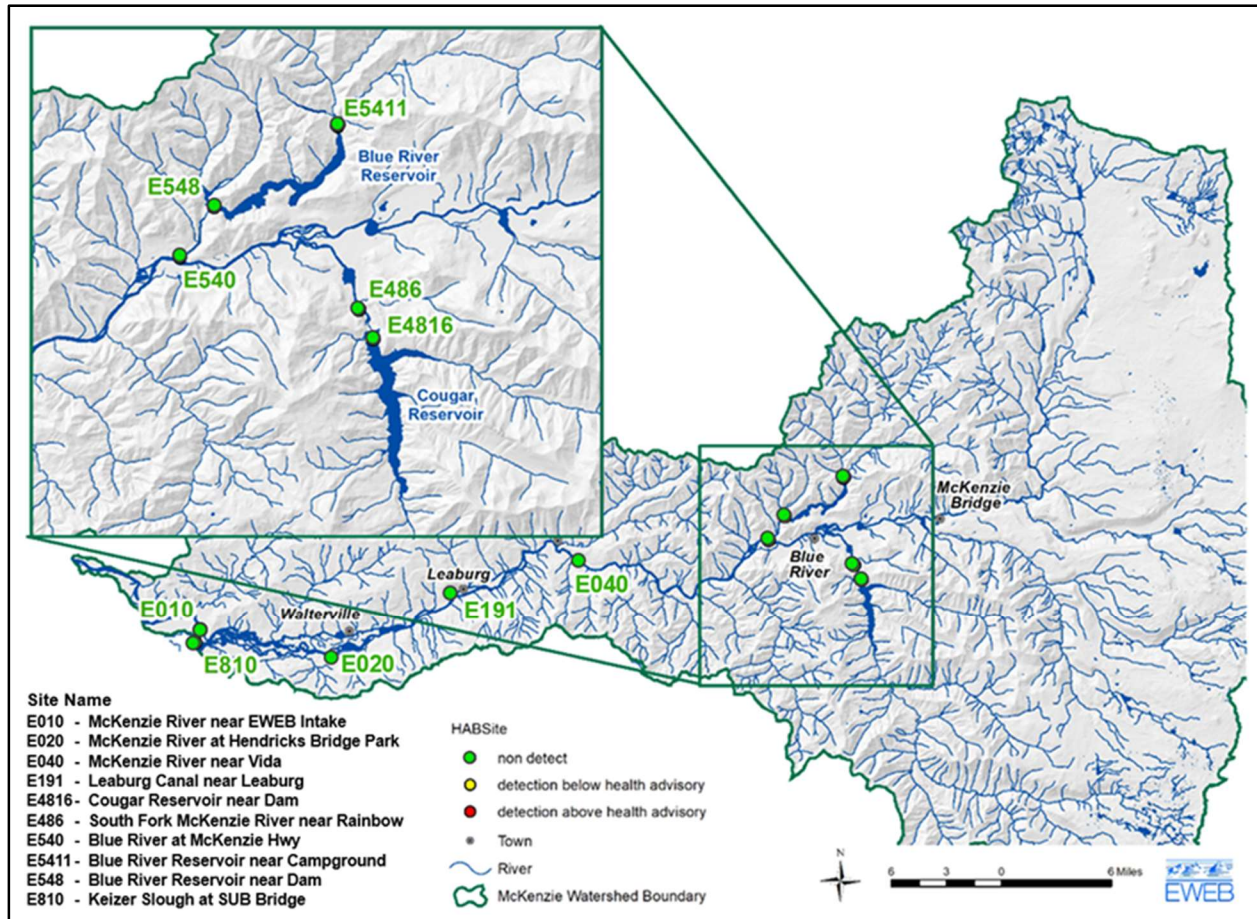
available to collect samples in either reservoir. However, the continuous water quality profiler deployed in BRR by the USGS and Corps, was active during the 2023 fires and did not indicate any major bloom production during the closure period. Access was restored by mid-September, and although *Dolichospermum* numbers were nearly non-detect, a late season bloom of *Cyanodictyon* (likely non-toxicogenic) was observed in BRR around mid-September (12,100 cells/mL).

Figure 3-2: 2023 Peak HAB Results for Blue River Reservoir (across all sites)



Certain species of cyanobacteria, including those within the *Dolichospermum* genus, are capable of producing cyanotoxins. In some cases, the genes responsible for producing specific toxins can be identified in samples using quantitative polymerase chain reaction (qPCR) methods. In 2023, toxigenic genes responsible for producing cylindrospermopsin were detected at low levels in Blue River Reservoir during consecutive sampling events from late April through late May. However, only a single (very low level) cylindrospermopsin gene detection was reported for Cougar Reservoir in 2023, occurring in early June. While the presence of toxigenic genes does not always result in measurable toxin concentrations, it is not surprising that cylindrospermopsin was not detected above the method reporting limit (.11 ug/L) throughout the McKenzie Watershed in 2023 (see Figure 3-3) given the infrequent, low-level gene detections. Only a single estimated result (value fell below the reporting limit of .11 ug/L) for cylindrospermopsin was observed in 2023 at .04 ug/L, which occurred in Blue River Reservoir near the dam on May 15. The estimated concentration barely exceeded the detection limit (.038 ug/L). For reference, the OHA drinking water threshold for cylindrospermopsin for vulnerable people is .7 ug/L, and 3 ug/L for all other people. OHA also established a health advisory recreational use value for cylindrospermopsin, which currently stands at 15 ug/L. No other toxigenic genes or cyanotoxins were detected in the McKenzie Watershed above applicable reporting limits.

Figure 3-3: 2023 Cyanotoxin Occurrences in the McKenzie Watershed (non-estimated values only)



3.3 Baseline & Storm Data Analysis (including Holiday Farm Fire impacts)

All routine baseline sampling events were completed as scheduled in 2023. Storm sampling events targeting peak flow conditions in urban stormwater outfalls or Holiday Farm Fire (HFF) and other wildfire-impacted sites were conducted in spring, fall and winter. For the discussion below, a selection of baseline and storm data were compiled into the following five groups: Metals, Nutrients, Solids, Bacteria, and Organic Compounds. Similar to the past three years, most peak values observed in 2023 were associated with prolonged rain events in urban areas around East Springfield or within burn areas.

Metals

Metals originate from a variety of natural and anthropogenic sources throughout the watershed. Consuming high levels of some metal species, particularly heavy metals, such as cadmium and lead, can increase the risk for a variety of short- and long-term health effects. In general, detectable (above the reporting limit) heavy metal concentrations in the mainstem McKenzie River are uncommon.

Reported concentrations for 19 metal species (includes two metalloids) assessed in 2023 during quarterly baseline events were comparable to results from previous years across most sites. Maximum total metal concentrations observed across all sites in 2023 were mainly associated with large

rainfall/runoff events during November and December in burned areas (see Figure 3-4). Marten Creek, which lies entirely within the HFF footprint, registered the highest total metal concentrations for 15 of the 19 metal species evaluated. Gate Creek reported the highest total mercury concentration at .0562 ug/L. The three exceptions were antimony, copper and zinc, with maximum total concentrations tied to two stormwater channels during an August runoff event.

Figure 3-4: Lookout Creek (left) and Simmonds Creek (right) during Fall Runoff Events.



Image Credit: David Donahue

For dissolved metals, the 42nd and 69th Street stormwater channels (42nd and 69th respectively) produced most of the observed peak concentrations in 2023 during the August runoff event. A handful of dissolved metal peak values were associated with other stormwater channels during a November storm event. Similar to previous years, elevated dissolved metal concentrations were concentrated in the middle to lower watershed, although dissolved vanadium levels remain highest in the upper watershed, likely due to the close proximity of young volcanic rock.

Nutrients

High nutrient levels can cause HABs, impact ecosystem function, and are a concern for drinking water treatment (e.g. nitrate and nitrite). Nutrient samples were collected frequently at several mainstem and tributary locations every two weeks from April through October during routine HAB events, quarterly across all baseline sites, and at select sites during large storm events. Overall, nutrient levels in 2023 across mainstem McKenzie River locations were similar to previous years during baseline conditions, with many sites reporting values below or just above the reporting limit for several nutrients. The main departure from normal for most mainstem locations, as well as other locations, occurred during a major runoff event in early December that yielded the highest number of elevated nutrient levels observed throughout the watershed in 2023. Many of the peak values observed were some of the highest values reported since the HFF. The other exception occurred in a pair of urban stormwater channels during an unusual late August rain event.

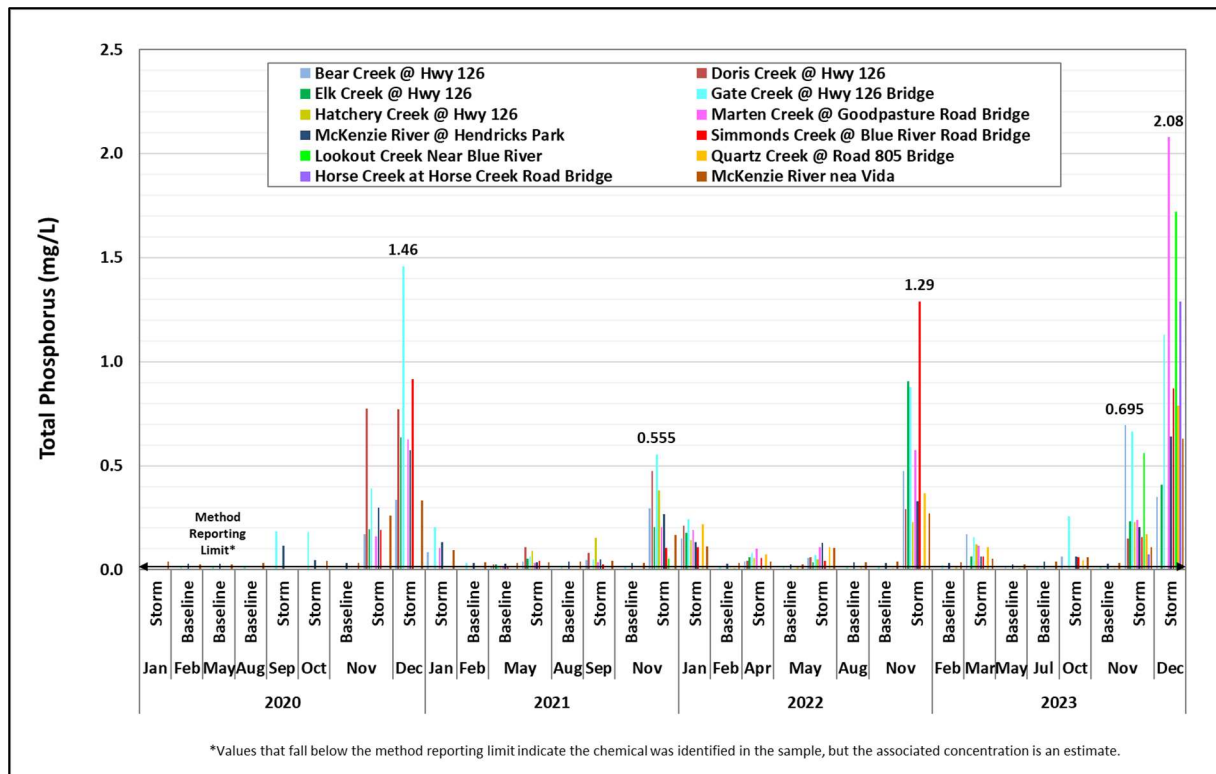
Most nitrate levels reported during quarterly baseline events did not exceed the method reporting limit (RL) of 0.1 mg/L, which applies to all mainstem McKenzie River monitoring locations. For baseline values that did exceed the RL, all sites remained at or below 1 mg/L, except for the 52nd stormwater channel, which peaked at 1.8 mg/L. During 2023 storm monitoring events, nitrate values across all HFF sites and urban-related sites stayed at or below 1.2 mg/L. Marten Creek reported the highest storm-related nitrate value at 1.2 mg/L during a November event. For comparison, the MCL for nitrate in drinking water is 10 mg/L. Nitrite was not detected in the McKenzie Watershed above the RL of 0.1 mg/L.

Total Kjeldahl nitrogen (TKN) is the combined measurement of total organic nitrogen and total ammonia. TKN measurements are widely used in the wastewater industry to determine treatment effectiveness, and in surface waters to determine potential upstream nitrogen sources. TKN baseline monitoring values ranged from non-detect (below .07 mg/L) up to 1.26 mg/L in Gate Creek, although most values fell below 0.5 mg/L. A handful of HFF sites did exceed 2 mg/L during storm events, with Lookout Creek producing the highest TKN value (4.92 mg/L) in November followed by Marten Creek in December (3.64 mg/L). However, these values fall well short of two incredibly high TKN values reported after a small rain event that hit East Springfield in August and triggered a limited first-flush sampling response. The 42nd stormwater channel reported a TKN value of 40.6 mg/L, while the 69th stormwater channel reported a maximum 2023 value of 82.4 mg/L. These values aren't typical for freshwater surface bodies and substantially exceed previous maximum values for the entire McKenzie Watershed (all below 9 mg/L). TKN values during a subsequent November storm event dropped dramatically for both 42nd (0.52 mg/L) and 69th (1.68 mg/L). Ammonia results were also elevated for both sites during the August runoff event, with 42nd at 1.7 mg/L and 69th at 1.1 mg/L. The only other site reporting an ammonia detection was Keizer Slough (0.12 mg/L), otherwise, ammonia results across all other sites throughout the year fell below the RL (0.1 mg/L). Although pet waste entering local waterways is the likely culprit for the elevated TKN, ammonia and E. coli (discussed below) values observed in urban stormwater channels, additional monitoring is planned for both 42nd and 69th in 2024, including genetic source tracking to determine upstream fecal sources.

Quarterly baseline results for both total and dissolved organic carbon (TOC and DOC respectively) were largely typical in 2023 across most sites, although noticeable upticks in both TOC and DOC were apparent at several lower watershed sites during the November baseline event. This was likely due to elevated rainfall prior to the November baseline event. Most baseline results fell at or below 1 mg/L. Storm-related DOC results across fire-impacted sites were elevated in the fall, particularly in October and November, with numerous sites exceeding 3 mg/L. DOC in Bear, Hatchery and Horse Creeks climbed above 5 mg/L during the last quarter of 2023. The most dramatic TOC values related to burn areas were observed during the major December run-off event. Peak TOC values occurred in Horse Creek (16 mg/L), Marten Creek (12 mg/L) and in Lookout Creek (8.8 mg/L), with remaining results mostly falling below 6 mg/L. Similar with many other parameters, the highest TOC/DOC values observed in 2023 were associated with the August urban runoff event. DOC in the 42nd stormwater channel was measured at 68 mg/L and in the 69th stormwater channel at 110 mg/L. For TOC, the results were 69 mg/L and 110 mg/L respectively, meaning most of the carbon moving through both systems at the time of collection was in the dissolved form. Although stormwater channels represent only a tiny portion of overall flow in the McKenzie River, the 69th TOC/DOC results from August represent the highest values ever observed by Source Protection staff throughout the McKenzie Watershed since 2002.

Elevated total phosphorus and orthophosphate concentrations were observed across numerous wildfire-impacted sites during the December 2023 storm event (see Figure 3-5). Marten Creek reported the highest total phosphorus and orthophosphate concentrations in 2023 (2.089 and 1.15 mg/L respectively), followed by Lookout Creek (1.72 and 0.92 mg/L), Horse Creek (1.29 and 0.8 mg/L) and Gate Creek (1.13 mg/L and 0.5 mg/L). All other storm-related total phosphorus and orthophosphate concentrations fell below 1 mg/L, with every baseline event concentration falling below 0.1 mg/L.

Figure 3-5: Phosphorus Results at Sites Impacted by Recent Wildfire Activity

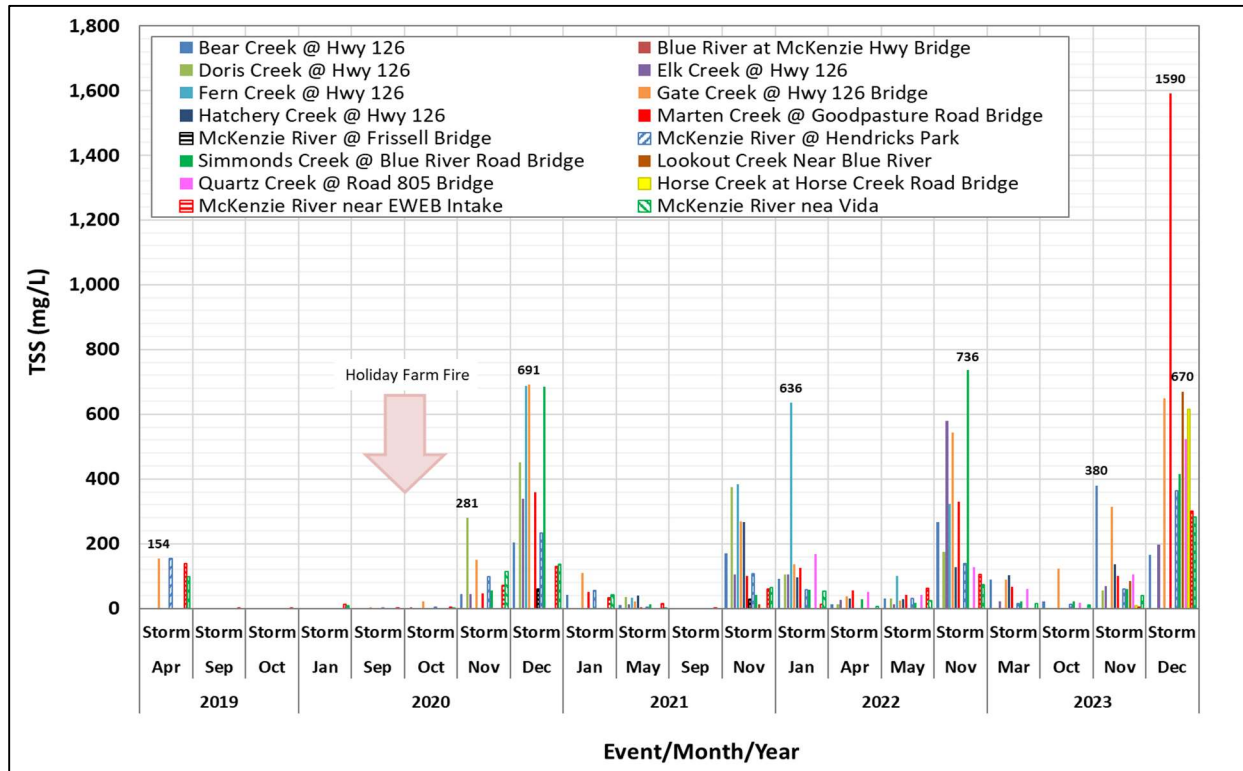


Solids

Solids can carry contaminants and pathogens through the watershed impacting ecosystem function as well as being a concern for drinking water treatment, particularly around filtration processes. Results for total suspended solids (TSS) and total dissolved solids (TDS) in 2023 were typical across most sites during baseline conditions. Similar to previous years post-HFF, 2023 witnessed another round of very high TSS values observed across multiple sites impacted by recent wildfires, particularly during large, late season storms (see Figure 3-6). The highest TSS value observed across all sites in 2023 occurred in HFF-impacted Marten Creek (1,590 mg/L) during a major December storm event that also saw turbidity climb above 900 FNU. This unusually high TSS value is more than double that of any previous storm-related value from all other HFF sites (previous high was 736 mg/L from Simmonds Creek in 2022) and is only eclipsed in the last 15 years by the 2021 Blue River Reservoir drawdown event that resulted in significant lakebed scouring and high downstream TSS values (1,740 mg/L observed in Blue River). The Marten Creek event was likely influenced by upstream slope failure(s) and major channel/bank erosion during high flows. Additional HFF sites that experienced high TSS values during the December event

included Gate Creek (650 mg/L), Quartz Creek (524 mg/L) and Simmonds Creek (416 mg/L). McKenzie River mainstem sites also experienced unusually high TSS values during the December storm event after mainstem flows exceeded 25,000 cfs. Several 2023 mainstem McKenzie TSS values are the highest observed over the past 15 years. The McKenzie River near Vida recorded a TSS value of 282 mg/L (previous high was 136 mg/L in 2020), while further downstream the McKenzie at Hendricks Bridge reported 364 mg/L (previous high was 233 mg/L during 2020), before finally reaching the McKenzie near EWEB’s intake, which climbed to 300 mg/L (previous high was 138 mg/L in 2019).

Figure 3-6: Total Suspended Solids (TSS) Across Multiple Holiday Farm Fire Sites, 2019-2023.



Additional monitoring in 2023 targeted downstream conditions below the recent Lookout and Horse Creek Wildfires. Samples collected in December during peak flow conditions yielded high TSS values, including 670 mg/L in Lookout Creek and 616 mg/L in Horse Creek. The highest TSS value reported in 2023 across all lower tributary and urban stormwater sites, at 413 mg/L, occurred in the 69th stormwater channel during a November storm event. For perspective, across all 15 routine baseline sites measured quarterly for TSS, no sites exceeded 5 mg/L, with the average concentration for most sites falling below 3 mg/L. These results clearly demonstrate the impact large wildfires can have on mobilizing suspended sediment and the value of restoration efforts geared towards stabilizing upslope areas and dropping sediment out in restored floodplain areas, particularly during large storm events involving high rainfall intensities.

Contrary to maximum TSS values being related to post-wildfire runoff, total dissolved solids (TDS) continue to remain highest in urban stormwater systems. In 2023, the 69th stormwater channel reached 310 mg/L during a late August storm event, which is one of the highest surface water TDS values ever observed in the watershed by Source Protection staff. The 42nd stormwater channel

exceeded 150 mg/L during the same event, while the 52nd stormwater channel twice exceeded 100 mg/L during May and July baseline events. One additional noteworthy TDS value came from the McKenzie River near the Cougar Dam Rd crossing. TDS reached 77 mg/L at this site during a November baseline event (highest mainstem McKenzie value reported in 2023), while further upstream in the McKenzie near Frissell Bridge, TDS was only 42 mg/L. The elevated TDS value was likely related to runoff from the Lookout and Horse Creek Fires just upstream from Cougar Dam Rd.

Bacteria

Ambient bacteria levels were typical in 2023 across most baseline sites when compared to previous years. The notable mainstem exception from 2022 (1,236 MPN/100mL), observed in the McKenzie River at Hendricks Bridge (E020), was not replicated in 2023. Quarterly baseline results for site E020 ranged from 20 to less than 10 MPN/100mL. During a large storm event in early November, *E. coli* did reach 410 MPN/100mL at site E020, but elevated *E. coli* levels were observed across several sites during a series of rain events beginning in late August. The highest storm-related *E. coli* values reported for HFF sites occurred in Gate Creek during an October event (850 MPN/100mL), followed by Hatchery Creek in early November (613 MPN/100mL). The early December storm event resulted in the largest flows observed in 2023, but *E. coli* levels across all HFF sites were unremarkable, likely due to previous storms having already flushed most bacteria sources downstream.

The most dramatic *E. coli* values in 2023 were observed in lower watershed tributaries and stormwater channels during the second half of 2023. The 42nd and 69th stormwater channels, which again, only contribute a small amount of flow to the mainstem McKenzie, both reached an upper enumeration limit of 24,196 MPN/100mL for *E. coli* during an unexpected late August rain event. This means the actual *E. coli* values were higher but unknown (the upper enumeration limit is controlled by the requested dilution factor). The highest reported *E. coli* value across all sites in 2023 was 27,550 MPN/100mL at 69th during a November storm event. The same event resulted in elevated *E. coli* values across a host of other sites, including the 72nd stormwater channel (15,650 MPN/100mL), 42nd (14,210 MPN/100mL), 52nd stormwater channel (5,760 MPN/100mL), Camp Creek (5,475 MPN/100mL), 64th stormwater channel and Kiezer Slough (both at 2,950 MPN/100mL), and lastly, Cedar Creek (1,134 MPN/100mL). Although the sampling for the December storm event mainly targeted HFF sites, Camp Creek was sampled and reported an *E. Coli* value of 1,935 MPN/100mL. For perspective, the highest reported *E. coli* value in 2022 was 9,208 MPN/100mL at 69th, while Oregon's freshwater recreational contact maximum guideline value is 406 *E. coli* organisms per 100 mL (MPN/100mL equivalent).

Organic Compounds

Over 400 compounds were analyzed at select sites during storm events in 2023, when contaminants are expected to be flushed into local waterways during heavy rainfall events. To accommodate the large amount of available data, only analytes with at least 1 non-estimated result in 2023 above applicable method reporting limits will be included in the discussion below.

Organic compound monitoring in 2023 mostly targeted urban stormwater outfalls located in East Springfield and their associated downstream receiving waters. Gate Creek and Marten Creek, as well as mainstem McKenzie locations, were also sampled during select storm events to assess potential post-

fire restoration and other impacts. As indicated in Figure 3-7, the 52nd stormwater channel registered the highest number of detections (14 total) for any one single event during a major storm in November.

Figure 3-7: Organic Compounds Detected Above Method Reporting Limits by Site, 2023.

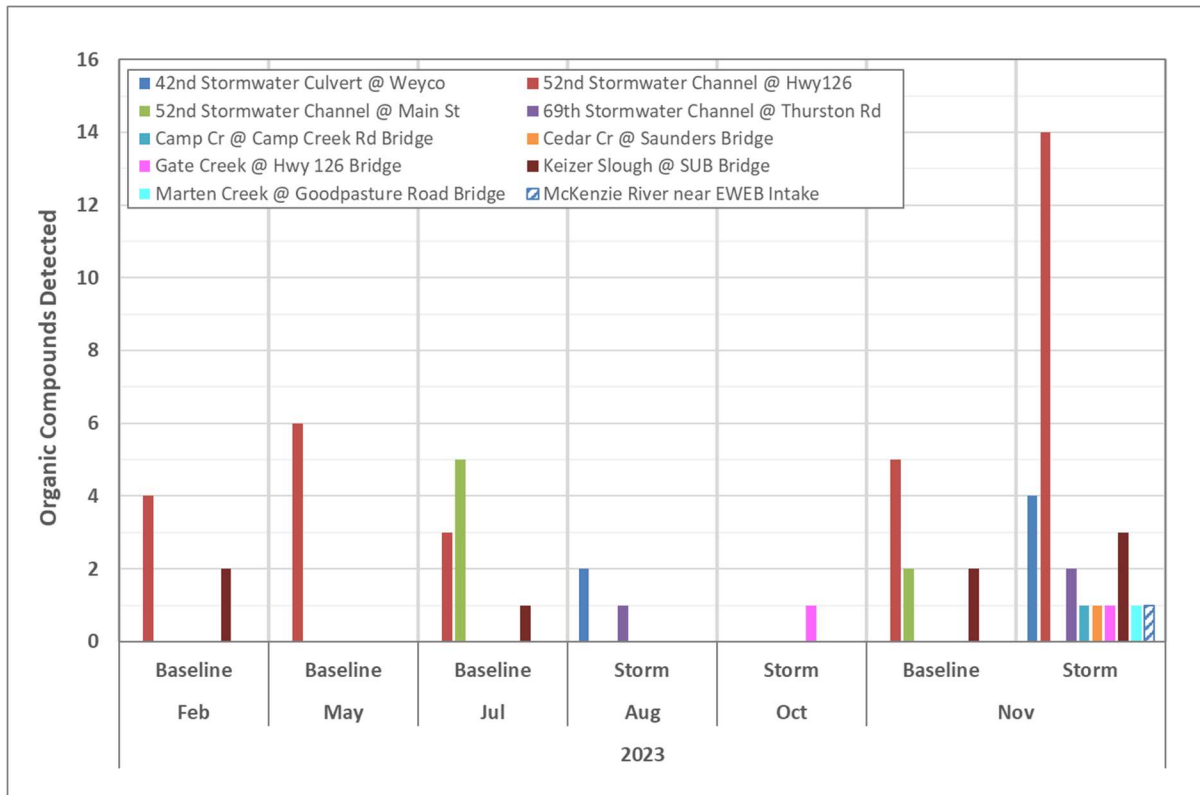


Table 3-1 summarizes 2023 totals for multiple organic compound groups across all sites. Totals include the number of analytes (or compounds) tested for, the total number of analyses conducted (sum of all analytes by site and date), as well as detections for both baseline and storm events (non-estimated values above applicable reporting limits). Several key findings for 2023 related to organic contaminant monitoring are presented below.

1. Most organic compound detections are considered low level, often less than 1 ug/L. Of the approximately 59 organic compound detections observed in 2023, 15.3% were above 1 ug/L and 49.2% were below 0.01 ug/L.
2. Multiple per- and polyfluoroalkyl substances (PFAS) were detected in several stormwater outfalls in Eastern Springfield. A focus of PFAS sampling in 2023 was the 52nd (or 48th) stormwater channel, which included additional monitoring, an expanded analyte list (68 compounds) and one additional upstream monitoring location at Main Street. There were 29 PFAS detections (out of 33 total detections) associated with the 52nd stormwater channel, representing 7 different compounds. The maximum value observed across the 7 PFAS compounds at the 52nd site was 0.03 ug/L for 6:2 FTS (1H,1H,2H,2H-Perfluorooctane sulfonic acid). Perfluoro octanesulfonic acid was detected 10 times across all sites, including twice in Keizer Slough (max value 0.0033 ug/L) and once in the 69th stormwater channel (0.026 ug/L),

while perfluoro-1-butanefluoronic acid was detected 8 times, including once at 42nd (0.02 ug/L). No PFAS compounds were detected in mainstem McKenzie River locations or major tributaries.

3. The only pharmaceutical and personal care product (PPCP) detection was acetaminophen at 0.022 ug/L, which occurred in the 52nd stormwater channel during a November storm event.
4. TCEP (or tris(2-carboxyethyl)phosphine hydrochloride) is a reducing agent and was detected once in the 42nd stormwater channel at a concentration of 0.12 ug/L (no associated EPA MCL).
5. A total of five pesticides were detected at concentrations generally regarded as low level (<1 ug/L). In November, the herbicide 2,4-D was detected twice in the 52nd stormwater channel (max value was 0.29 ug/L) and once in the 69th stormwater channel (0.32 ug/L). Similar to last year, although at lower concentrations, imazapyr (herbicide) was detected twice in Gate Creek (0.82 ug/L in October and 0.38 ug/L in November) and once in Marten Creek (0.36 ug/L in November). Both sites are within the HFF perimeter. Rounding out the herbicides, quinclorac was detected once in the 52nd stormwater channel (0.054 ug/L) and tebuthiuron was detected in the 42nd stormwater channel (0.48 ug/L), both in November. Finally, the common active ingredient in insect repellents, DEET (N,N-diethyl-meta-toluamide), was found in both the 52nd (0.024 ug/L) and 42nd (0.011 ug/L) stormwater channels, again in November.
6. Two other semi-volatile compounds (SVOCs) were detected in 2023. Low-level pentachlorophenol was detected in both Camp Creek (.1 ug/L) and in the 42nd stormwater channel (.11 ug/L) during an early November storm event, although the 42nd value is considered an estimated value due to potential matrix interference. The EPA MCL for pentachlorophenol is (1 ug/L). DEHP (or bis(2-ethylhexyl)phthalate) is a plasticizer and was detected once in the 42nd stormwater channel in August at 1.8 ug/L. The EPA MCL for DEHP is 6 ug/L.
7. Several low level volatile organic compounds (VOCs) were detected at urban-influenced sites. Chloroform was detected on multiple occasions in Keizer Slough, with the peak 2023 value reported at 3.2 ug/L, which is well below the 80 ug/L drinking water MCL for Total Trihalomethanes (includes chloroform). The 52nd stormwater channel also had a single chloroform detection at 0.76 ug/L. The chloroform source is unknown at this time. In addition to chloroform, elevated methyl ethyl ketone values were reported across multiple sites during two separate sampling events in November. Staff are suspect of the values and plan additional sampling and follow up with the external lab to confirm values. Lastly, a single detection of toluene (0.65 ug/L) was reported for the 52nd stormwater channel (EPA MCL is 1,000 ug/L).

Table 3-1: Total Detections (Detects) at or Above Method Reporting Limits for all Sites, 2023

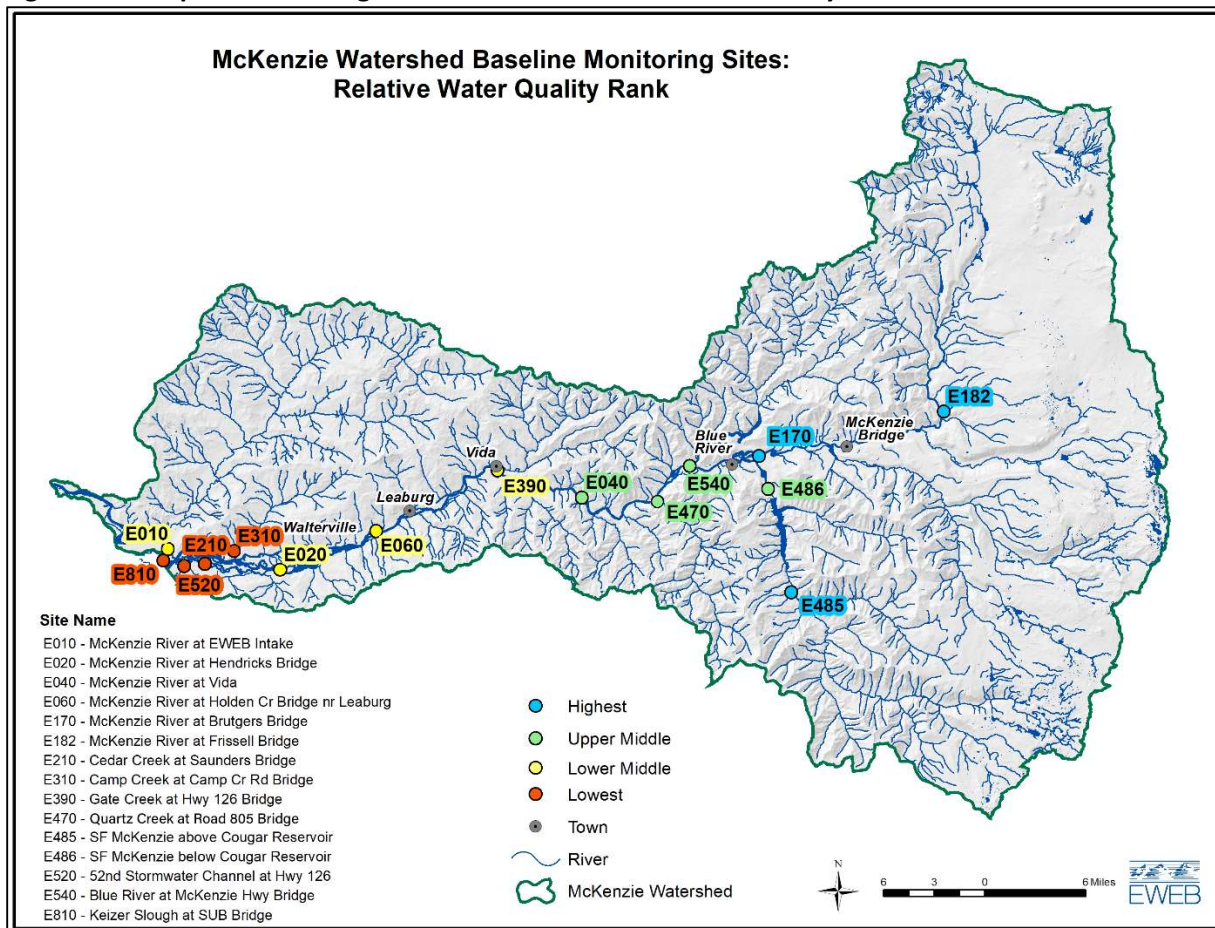
Analyte Group	Analytes	Analyses	Baseline Detects	Storm Detects
General Organic Compounds, Other	2	6	0	1
General Organic Compounds, Pesticides	27	297	0	0
Per- & Poly-fluorinated Substances (PFAS)	68	783	23	10
PPCPs, Pharmaceutical/Hormone	43	277	0	1
SVOCs, Other	55	1,182	0	3
SVOCs, Pesticides	206	4,803	1	9
VOCs	69	1,010	6	6
Totals:	470	8,358	30	29

3.4 Baseline Data Summary

Overall, water quality remains excellent in the McKenzie River. Water quality conditions tracked throughout the McKenzie Watershed during 2023 were largely unremarkable, apart from the August urban rain event and the large November/December storm events, which resulted in elevated turbidity, sediment and other concentrations throughout the watershed. This was partly due to a prolonged dry period beginning in early May that allowed sediment to build up before late summer rains arrived. A series of smaller storms throughout March and April, along with colder mountain temperatures, brought much-needed precipitation to the area following a relatively dry late winter. The additional snowpack supported McKenzie River flows closer to median values, which can help improve instream temperatures and overall water quality. Primary nutrient levels (nitrate, total phosphorus, orthophosphate) across all mainstem McKenzie River monitoring sites (6 in all) stayed at or below 60 ug/L during all quarterly baseline sampling events. Baseline mainstem metal concentrations also stayed well below all applicable drinking water MCLs.

Figure 3-8 illustrates the relative water quality rank of baseline monitoring sites across a variety of water quality parameters, including metals, nutrients, bacteria, and solids. Ranked values for numerous analytes were aggregated and assessed to determine how baseline sites compare to one another.

Figure 3-8: Map of Monitoring Locations with Relative Water Quality Rank



The first group, colored blue, represents sites with the highest or best water quality conditions compared to other sites, and generally reflects the exceptional water quality conditions of the High Cascades. The second group, or the upper middle group highlighted in green, consists of sites with generally great water quality conditions throughout most of the year, but with slightly higher metal and nutrient values when compared to the first group. The third group, highlighted in yellow and designated the lower middle, consists of sites with very good water quality, but noticeable increases in most analytical concentrations when compared to upstream sites. The fourth group, or lowest ranked group, is highlighted in red. Water quality conditions at sites within the lowest ranked group are generally the poorest and yield the highest analytical concentrations when compared to all other baseline sites within the watershed. However, even these higher analytical concentrations would generally still meet most drinking water standards before standard treatment.

4.0 Hazardous Material Spills or Releases

Hazardous material spills remain a substantial threat in the McKenzie Watershed due to the presence of a major highway (126) running along the length of EWEB's sole source of drinking water. In addition, spills and releases from urban areas reaching stormwater outfalls that discharge directly to the McKenzie River above EWEB's intake remain a significant concern.

4.1 Summary of Spills in the McKenzie Watershed

There were seven reported incidents in the McKenzie Watershed in 2023 that EWEB Source Protection staff tracked for potential water quality contamination in the McKenzie River (see Table 4-1). Two of the incidents involved single vehicle crashes into or near local waterways. However, hydrocarbon sheens were not observed by on-scene emergency crews or EWEB staff following either accident. Both vehicles were recovered by towing companies. A third incident involved the attempted theft of gasoline from a vehicle using a drill, which resulted in the loss of fuel to a parking lot and into a nearby catch basin. Absorbents were used to collect released product. A fourth incident involved a report from a concerned citizen about an RV leaking fluids. City of Springfield staff inspected the property and spoke to the owner of the RV. Another incident involved a small boat that submerged in Trail Bridge Reservoir while tied to the shore resulting in a localized light sheen from the motor. One incident involved a blocked sewer line at a gas station resulting in the release of sewage to nearby catch basins and to the street. Roto Rooter cleaned the area and eventually unclogged the line.

The most significant event in 2023 involved a semi-truck carrying woodchips that crashed into a wetland area near Finn Rock with limited surface water connectivity to the McKenzie River. The truck's engine and fuel tanks were compromised resulting in the loss of diesel fuel and other vehicular fluids. Complicated and extensive extraction and cleanup efforts involved large towing rigs, absorbent booms and pads, Vac trucks, soil removal and follow-up testing.

Table 4-1: Incidents/Spills/Releases Reported in 2023

Date	Responsible Party	Material Released	Quantity	Details	Response
1/10/2023	Private	Gasoline	15 Gallons	Fuel release to Springfield parking lot due to theft.	City of Springfield
4/11/2023	Private	Vehicle fluids	Minor	RV leaking fluids near Springfield stormwater system	City of Springfield, EWEB
4/19/2023	Gas Station	Sewage	Unknown	Blocked sewer line/release to Springfield stormwater system	City of Springfield, Roto Rooter, EWEB
4/20/2023	Trucking Company	Diesel/other vehicle fluids	Approx. 100 gallons	Semi-truck crash into wetland near McKenzie River/Finn Rock	ODOT, Towing, NW Hazmat, EWEB, DEQ
6/14/2023	EWEB Contractor	Motor oil	1 quart	Boat capsized in Trail Bridge Reservoir	Contractor, EWEB
9/26/2023	Private	Vehicle fluids	Unknown	Vehicle crashed into Waltherville Canal	MF&R, EWEB, Towing
11/2/2023	Private	Vehicle fluids	Minor	Vehicle crash along bank of McKenzie River	MF&R, Towing

4.2 Annual Spill Drill

EWEB worked with multiple partners to coordinate a multi-agency spill response drill on the McKenzie River this past fall (see Figure 4-1). Equipment from the McKenzie Watershed Emergency Response System (MWERS) was used to deploy boom across a segment of the McKenzie River adjacent to Hendricks Bridge County Park. The drill gives first responders an opportunity to familiarize themselves with equipment and to test out new response strategies.

Several drills have occurred at Hendricks Bridge County Park over the past 20 years, which is considered one of the best river access points for deploying spill-related equipment in close proximity to EWEB’s intake. The 2023 spill drill involved over 40 participants, representing 10 different agencies or organizations, including staff from the cities of Medford and Salem who are looking to develop similar programs in their respective watersheds.

EWEB staff also conducted two MWERS training webinars prior to the drill to demonstrate how the online system works, how to enter new spills, update organizational information and calculate times of travel. It is important to give refresher training periodically since most people do not use the system on a routine basis. Consultants have helped EWEB validate and add additional time of travel models to MWERS to give responders more information about potential spills and how long it may take for spills to reach EWEB’s intake or other critical resources.

Figure 4-1: Boom Deployment Drill, McKenzie River at Hendricks Bridge County Park, 2023



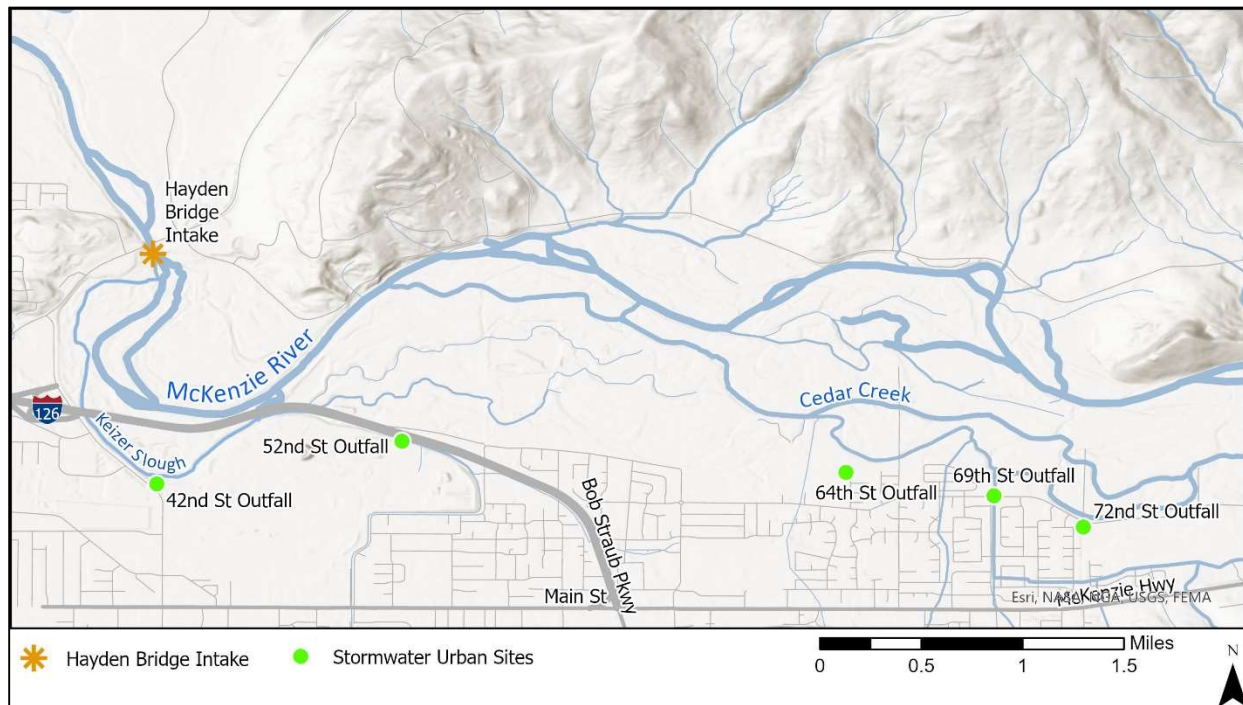
Image Credit: Adam Spencer

5.0 Urban Runoff Mitigation

Urban runoff from developed areas (construction, roads, parking lots, roofs, and other impervious surfaces) can be a significant source of pollution during rainfall events. Stormwater runoff often contains a variety of metals, such as arsenic, cadmium, chromium, copper, iron, manganese, nickel, lead and zinc, petroleum products including poly aromatic hydrocarbons, nutrients from fertilizers, *E. coli* bacteria from pet waste, pesticides, and other chemicals. These pollutants present a significant threat to aquatic organisms for short duration and long-term exposures. In addition, they can also pose a risk to human health.

Urban runoff is a concern especially in the lower part of the McKenzie Watershed which includes parts of East Springfield. Several stormwater outfalls (i.e., 42nd St., 52nd St., 64th St., 69th St., and 72nd St.) discharge into Cedar Creek and Keizer Slough, and then into the McKenzie River just upstream from EWEB's intake (see Figure 5-1). This area also contains a number of Springfield Utility Board (SUB) and Rainbow Water municipal well fields.

Figure 5-1: Stormwater Outfalls in East Springfield



5.1 Continuous Monitoring Network Expansion

EWEB staff expanded their continuous water quality monitoring network to include a new monitoring station in Keizer Slough in 2023. The station has full telemetry with an oversized housing unit that can accommodate additional monitoring equipment, including a full-sized autosampler. This site is considered a key monitoring location, being downstream of two stormwater outfalls and just above EWEB’s intake. The December 3rd major rainfall/runoff event resulted in damage to two continuous monitoring stations in the Holiday Farm Fire area. Significant bank erosion and a log jam compromised the sondes/sonde tubes at both locations, although remaining infrastructure (data logger, telemetry, solar panels, batteries, etc.) was not impacted. EWEB staff plan to evaluate both sites in early 2024 and reinstall pipes where appropriate. Although not in the McKenzie Watershed, EWEB staff also installed a non-telemetered water quality sonde in the Willamette River to collect preliminary time-series data prior to the development of EWEB’s second drinking water source. The sonde is measuring a variety of parameters similar to sondes in the McKenzie River.

5.2 Green Infrastructure/Urban Waters & Wildlife Program

The Urban Waters & Wildlife program (UWWP) is a regional expansion of the Long Tom Watershed Council’s (LTWC) successful Trout Friendly Landscape (TFL) Program to engage businesses to install voluntary green stormwater infrastructure retrofits within the Upper Willamette Metropolitan area (Eugene, Springfield, Glenwood) and develop a monitoring framework to identify trends and effectiveness of treatment. The overall goals include a focus on improving water quality and wildlife habitat through the Eugene-Springfield area. Partners include EWEB, SUB, Willamalane, the cities of

Eugene and Springfield, Lane County, the Upper Willamette Soil & Water Conservation District and several local watershed councils.

This year the LTWC did some focused design work on the Riverview Center for Growth (formerly The Child Center) property, located adjacent to and upstream from the Hayden Bridge intake, and the partnership received a \$50,000 Drinking Water Provider Partnership Grant to begin implementation work on stormwater infrastructure. However, the UWWP is holding on to these funds in the hopes of securing additional funding to cover complete installation. The Riverview Center for Growth has signed an agreement to participate in the Pure Water Partners program to help revegetate areas of the riparian bank above the drinking water intake when funding is available.

The partnership also received a third EPA grant (\$5.5 million) that will support its mission to improve and protect water quality and wildlife habitat in our urban waterways and aquifers for healthy, livable communities. Funding will support the Partnership's primary efforts to design and install priority green stormwater retrofit projects in the Eugene and Springfield areas, as well as expand educational opportunities, coordinate outreach efforts, carry out a pilot monitoring study, address barriers to green stormwater infrastructure maintenance, and expand the UWWP model to rural communities in the Upper Willamette.

5.3 Pentachlorophenol (PCP) Plume

International Paper (IP) was granted approval by the Oregon Department of Environmental Quality (DEQ) in 2021 to change their progress reporting from semiannual reporting to annual reporting. The annual report will be available in March for the preceding year. The following status update is based on findings in Progress Report Number 94 and the 2022 Annual Report for the Remedial Design and Remedial Action (RD/RA) Project at the Springfield Mill, submitted to DEQ on March 13th, 2023 by PES Environmental (an NV5 company) on behalf of IP, along with monthly email communications to EWEB staff regarding Springfield Utility Board/Rainbow Water District (SUB/RWD) well sampling results collected during operational periods (generally June through October). PES Environmental is the 3rd party environmental consulting firm responsible for collecting samples and reporting results. Accordingly, 2023 monitoring well results will not be available until March 15th, 2024, and will be presented in the 2024 State of the McKenzie Watershed Report.

According to direct email communications from PES Environmental, chlorinated phenolic compounds and volatile organic compounds were not detected in SUB/RWD wells during the 2023 operational period, which lasted from June 26th until September 29th. These wells are located downgradient of the PCP plume. Analytical results for downgradient groundwater monitoring wells sampled in 2022 (January and July) show continued decreasing PCP concentrations at most intermediate and deep well depths. Two exceptions are well MW-18d (deep well), where PCP concentrations (6.7 and 7.2 ug/L respectively) are somewhat variable but show a gradually increasing trend since 2011 (1.6 ug/L), and well MW-19d (deep well), where recent PCP concentrations (8.7 and 10 ug/L respectively) show some variability, although still decreasing from peak concentrations in 2012/2013 (32 ug/L). The long-term goal of monitoring efforts is to see groundwater PCP concentrations naturally attenuate below .5 ug/L across all sites, which is expected before 2040.

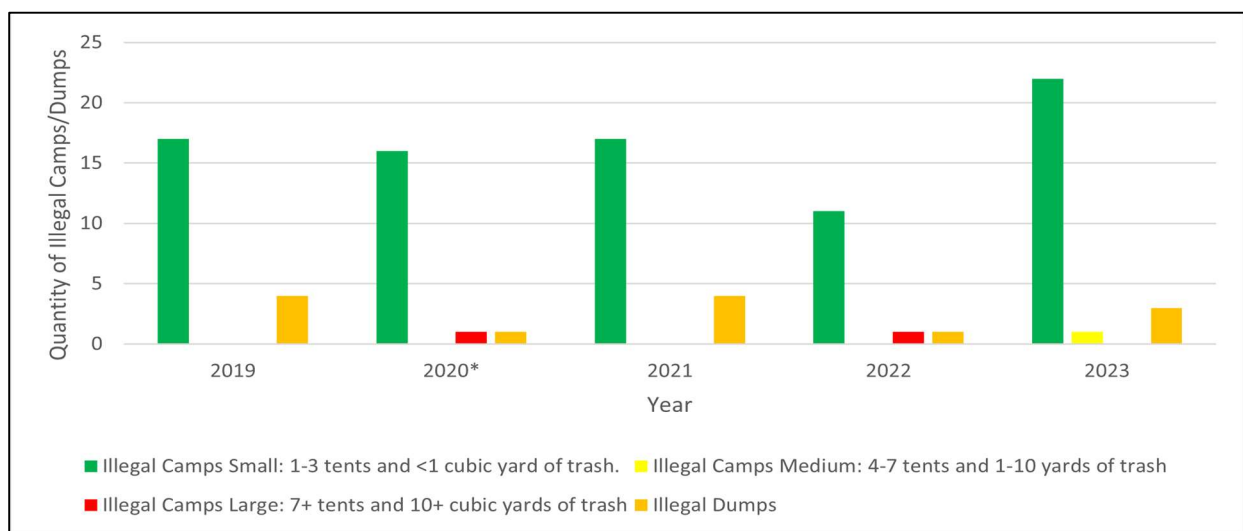
6.0 Illegal Camping

EWEB’s Source Protection staff continue to partner with Willamalane Parks, City of Springfield, and Lane County to reduce the impacts of illegal camping and dumping in riparian areas along the McKenzie River immediately above EWEB’s intake. Figure 6-1 shows the locations of illegal camps that were cleaned up in 2023. Figure 6-2 illustrates the downward trend of large, well established illegal camps due to the coordinated efforts of these agencies and use of the illegal camping application that identifies camps early and notifies agencies of a camp’s existence.

Figure 6-1: Map of Illegal Camps and Dumps, 2023



Figure 6-2: Illegal Camping/Dumping Activity Above EWEB’s Intake to Keizer Slough, 2019-2023.



7.0 Pure Water Partners (PWP)

The Pure Water Partners (PWP) Program was originally designed to reward McKenzie landowners for protecting high quality forest land along the river and assist landowners in restoring degraded areas in order to help EWEB protect water quality and avoid increases in future water treatment costs (see 2018-2019 State of the Watershed report for more information).

Following the 2020 Holiday Farm Fire, the Pure Water Partners program shifted its focus to carrying out restoration activities on properties impacted by the 2020 Holiday Farm Fire (HFF). This included erosion control, replanting in riparian areas, invasive vegetation removal, fire fuels reduction and naturescaping. In 2023, PWP planted approximately another 237,000 native trees and shrubs on 130 properties in the watershed (see Figure 7-1) In addition, contractors removed invasive species on 82 properties (see Figure 7-2). Currently, over 200 landowners have signed 7-year watershed stewardship agreements under the PWP program. This winter PWP will do its last 'large-scale' post HFF planting. Subsequent work will focus on managing invasives and maintaining plantings so that the native trees and shrubs reach their 'free-to-grow' status and are successful over the long term.

Figure 7-1: Planting in 2023



The PWP hired a new Community Engagement Coordinator, who is currently housed at the McKenzie Watershed Council but works on behalf of PWP. The Community Engagement Coordinator works to engage McKenzie landowners, provide information about the PWP and other assistance programs and facilitate signing up with the PWP program if appropriate. This position has helped to re-engage

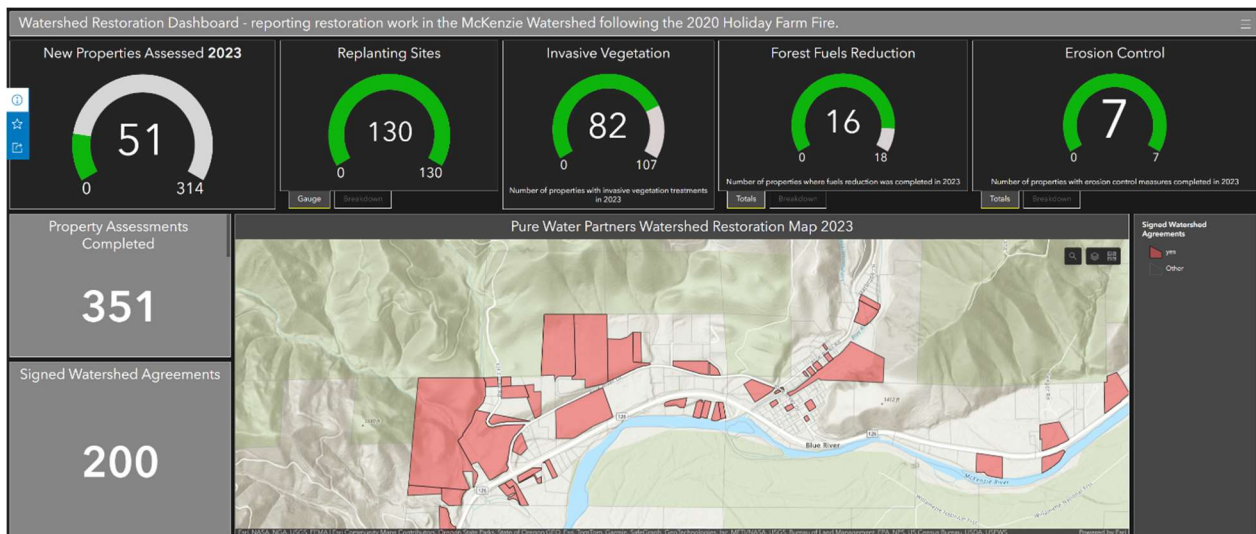
landowners outside of the Holiday Farm Fire perimeter who were previously interested in the program, as well as working on other related initiatives, such as the MWMC Shade Credit program.

In addition, a Tribal Liaison was hired in July 2023, and is a position shared by EWEB and the Upper Willamette Stewardship Network. This position was created to help build relationships with Tribal staff from The Confederated Tribe of Grande Ronde and the Confederated Tribe of Siletz Indians as well as local Tribal community members. The goal is to incorporate Tribal priorities into the work that we do, as appropriate, and to increase opportunities for Tribal members to access land and associated resources for subsistence, ceremonial, and cultural use.

Figure 7-2: Snapshot of PWP Activities Conducted in 2023

Across the top: New Properties Assessed, Replanting Sites, Invasive Vegetation, Forest Fuels Reduction, Erosion Control

Left Side: Property Assessments Completed, Signed Watershed Agreements (both of these metrics are cumulative since the Holiday Farm Fire)



*Note: Past Property Assessments metric is being recalculated, but is well over 300

**Note: Signed watershed agreements is a cumulative metric since the Holiday Farm Fire.

During 2023, the PWP program utilized several different grants to help fund the restoration efforts (see Figure 7-3). These grants included funding for invasive species removal, site preparation and replanting, large-scale floodplain restoration, and fuels reduction work. See Appendix A for more details on the various funding sources and the work supported by these funds.

The PWP program is currently undergoing a strategic planning process which is expected to be completed in spring 2024. The program is at a turning point, where it is past the ‘emergency’ post-fire phase of recovery and restoration assistance, and landowner enrollment has slowed. In addition, most of our remaining watershed restoration funding has been committed to floodplain restoration projects,

land acquisitions, and ensuring that PWP can maintain the properties that were replanted until the trees and shrubs are 'free-to-grow' at the end of the 7-year agreements. At this point, the partners are planning to return in large part to the pre-fire PWP program where PWP works with landowners throughout the watershed and provides assessments and recommendations for their properties, but then needs to work as a group to seek out funding for restoration work. PWP also hopes to enroll properties in the Protection pathway in the coming year under longer-term agreements, where landowners can receive a financial incentive for agreeing to protect their healthy riparian areas from development and vegetation removal.

Figure 7-3: Summary of Funding Sources for Watershed Restoration Activities

2023 Watershed Recovery Funding	
Revenue	
Watershed Restoration Fee:	\$2,317,784
OWEB Reimbursement HFF Recovery:	\$875,963
Finn Rock Reach Phase II Reimbursements:	\$605,000
Misc. Reimbursements from partners:	\$120,890
ODF Fuels Grant:	\$38,492
Large Wood Project Grant:	\$659,324
Total Revenue:	\$4,617,453
Net:	\$156,261
Expenses	
Restoration Activities:*	\$2,755,718
Finn Rock Phase 2 Implementation:	\$605,000
Fuels Reduction:	\$38,492
Large Wood Project:	\$1,061,982
Total Expenses:	\$4,461,192

*Restoration activities include water quality monitoring, landowner outreach, erosion control/stabilization, revegetation, invasives species control, fuels reduction, land acquisition and carbon sequestration work

Revenues exceeded expenses this year in Figure 7-3 for a variety of reasons. Grant revenue reimbursements started to come back into the program in 2023, and our partners were able to secure additional funding sources to help reimburse expenses. Additionally, we were able to secure additional funding from BLM and ODF to help with the 2023 project expenditures. We worked diligently on cost containment in 2023 by billing expenses for contracted work from grant funding to alleviate the Watershed Rate Fee that has carried much of the program to this point. Efficiencies were created by the establishment of best management practices and monitoring contractor/contract performance.

In 2023, EWEB spent approximately \$2.3 million of the watershed restoration fee on post-fire restoration activities (\$12 million is anticipated over the 5-year life of the restoration fee). Funds went to:

- ② **Risk-based activities:** on non-federal properties (invasive control, replanting, erosion control, fuels reduction and naturescaping) as described above.
- ② **Resiliency projects:** including design, permitting, environmental assessment, sourcing large wood, and implementation of floodplain restoration and large wood projects on Finn Rock Reach, Gate Creek and Quartz Creek in the middle McKenzie section of the watershed.

*Note: No land acquisitions occurred in 2023, though work continues exploring potential properties that could be acquired in 2024 or 2025.

In early 2021, the Board was provided an overview of the watershed restoration plan that justified and led to approval of a 5-year watershed restoration fee. Table 7-1 compares what was budgeted as part of the plan versus what was actually spent as part of recovery efforts through 2023.

Table 7-1: Comparison of Watershed Restoration Plan Budget with Actual Expenses (2023)

Activity	2023 Plan	2023 Actual
Risk-Based	\$3,500,000	\$2,327,180
Floodplain Restoration	\$2,850,000	\$1,666,982
Land Acquisition	\$1,500,000	\$401,030
Strategic/Carbon	\$150,000	\$66,000
Expense Subtotal	\$8,000,000	\$4,461,192
Grant Revenue	\$3,000,000	\$4,617,453
Total Watershed Fee Revenue Spent	\$5,000,000	\$(156,261)

In the summer of 2023, the McKenzie River Trust in partnership with the Willamette National Forest, EWEB, and the McKenzie Watershed Council, successfully completed Phase II of their latest 150-acre project at Finn Rock Reach of the McKenzie River. The restored floodplain at Finn Rock Reach is now a braided maze of logjams and water flowing at different velocities. By restoring the natural functions of floodplains, the watershed will become healthier, able to self-regulate with less human intervention, and will be more resilient to natural disasters (wildfire, floods, drought) and stressors of a changing climate (see Figures 7-4 and 7-5).

Figure 7-4: Finn Rock Reach Phase II Looking Downstream



Image Credit: MRT

These types of restoration have numerous benefits including, mitigating floods, turbidity, and organic carbon by spreading out and attenuating flows, dropping out sediment, increasing the uptake of nutrients and organic carbon coming from upstream severely burned landscapes, water storage, increasing habitat for fish and wildlife, protection from fire, and increasing cold water refugia. To date, the core project team of McKenzie River Trust, USFS, McKenzie Watershed Council and EWEB have restored more than 400 acres within Finn Rock Reach. For the Finn Rock reach pre-project, there were about 5-10 Spring Chinook spawning redds a year. After phase 1 in 2021, there were 9 redds, and in 2022 there were 26. In 2023, field crews counted 65 redds, which is an amazing increase just 2 months after the project was completed. See the McKenzie River Trust website for more detailed information: <https://mckenzie-river.org/restoring-finn-rock-reach/>.

Figure 7-5: Finn Rock Reach Phase II Looking Upstream

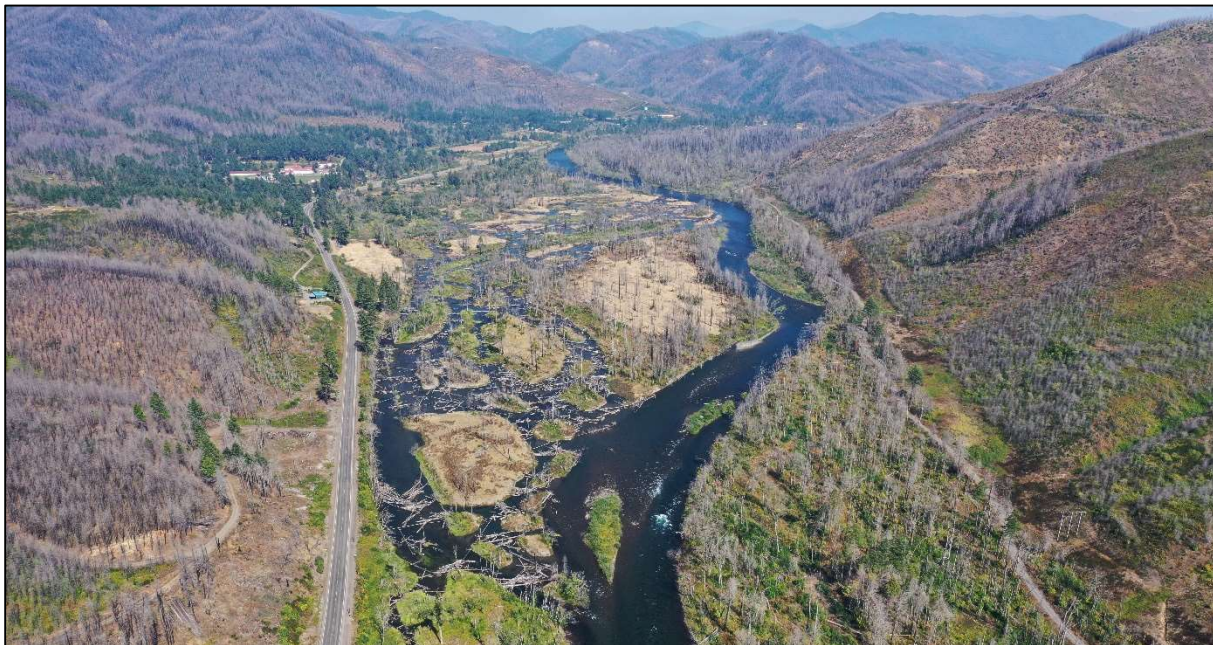


Image Credit: MRT

The Quartz Creek floodplain restoration project is a 1.75 mile floodplain restoration project located at the lower end of Quartz Creek, a degraded tributary that has a water quality impact on the McKenzie River. EWEB secured an 82-acre long-term easement on Campbell Global property for this project. In 2023, MWC was awarded a \$7.5 million grant from National Oceanic and Atmospheric Administration (NOAA) that will fund project implementation. This NOAA funding also was used to replace a bridge to widen the area available for floodplain restoration, and the bridge work was completed in the fall of 2023. EWEB source water protection and the USFS are working together and have sourced areas of public lands for timber removal to include root wads conducive for floodplain restoration. The Quartz Creek project requires over 8,000 trees. In 2023, EWEB and its partners secured 4,276 trees that are decked in a log yard leased by EWEB. The design plan for Quartz Creek is 90% complete and the implementation is on schedule for 2025.

EWEB continues to support the University of Oregon (UO) Soil-Plant-Atmosphere Laboratory under a 5-year IGA to conduct research at EWEB’s 140-acre High Banks Road property. In 2023, approximately 29 acres were planted with a variety of trees and shrubs in the third phase of planting at High Banks to promote long-term carbon sequestration and enhancement of biodiversity, habitat, and other ecological values. In 2023, EWEB and UO added Quartz Creek to the portfolio of carbon sequestration research, where UO will research these dynamics in large-scale floodplain restoration projects. Baseline data collection for this effort began in 2023, and post project data collection will begin in 2025 once the project implementation is complete.

For more information on sources of funding flowing into and out of EWEB and PWP for watershed restoration work projected over the new few years, see Appendix A.

8.0 Septic System Assistance

Since EWEB began its Septic System Assistance Program in 2008, over 1,100 septic systems have been inspected and pumped out (see Table 8-1). A number of systems were also repaired as needed. EWEB’s ongoing septic system assistance program currently consists of two components:

- 1) **Rebate program:** This program provides homeowners who are in close proximity to the McKenzie River with a \$300 rebate to have their septic systems inspected and pumped out, if needed. This amount was increased from \$250 to address increases in septic system inspection costs over the past several years. There were 57 homeowners who took advantage of this incentive in 2023.
- 2) **Zero-interest loan program:** This program allows homeowners who need to make major repairs or replace their septic tank or drainfield to apply for a zero-interest loan of up to \$20,000 from EWEB. Forty-one zero-interest loans have been issued to McKenzie homeowners since the beginning of the program, with 27 of those loans going to homeowners affected by the fire. Seven zero-interest loans were issued this year.

Feedback around this program has always been extremely positive. The septic system assistance program is now run by the Customer Solutions Department, though Source Protection staff does much of the outreach and collects data on septic system inspections/results by address in a database and in GIS. In 2023, 57 septic systems were inspected and pumped out (see Table 8-1).

Table 8-1: Septic System Participation 2008-2023

Septic Systems Inspected	
Average Inspections/Year	56*
2023 Inspections	57
Cumulative Inspections	1,167

*Average from beginning of septic assistance program in 2011. 2008-2009 inspections were funded through a grant.

Federal funding issued through the American Rescue Plan Act (ARPA) is now available to help McKenzie River homeowners repair or replace septic systems damaged in the Holiday Farm Fire. To leverage this funding, EWEB has partnered with the Oregon Department of Environmental Quality, Lane County, and other agencies to implement this grant program. In total, about \$3 million is available in grant funds via two different pathways:

1. \$1.5 million is coming through Biz Oregon and Lane County, and EWEB will facilitate the distribution of these funds on the ground. The amount of grant funding depends on the 150% of the average median income for Lane County. Homeowners at or below this threshold (which takes into account household size) will receive the full amount of grant funding. This is \$15,000 for a traditional septic system and \$35,000 for an alternative treatment system. Those homeowners with household incomes that are above this threshold will be eligible for half of the full amount. These funds are applicable to homeowners who owned the property before the fire (or have transferred the property to a family member). Non-profits and local businesses are also eligible to participate in this program.
2. \$1,592,410 was awarded to EWEB directly by DEQ to distribute to low- and moderate-income homeowners, based on 300% of federal poverty guidelines. DEQ approves local businesses or community centers on a case-by-case basis.

These grant funds are critical to many homeowners in the watershed who were underinsured and who are facing challenges in rebuilding or repairing their homes. Funds from both sources are retroactive to March 3, 2021, so homeowners who have already started the process are still eligible. Homeowners affected by the fire who already have zero-interest septic loans with EWEB may be eligible to have these loans paid off with grant funds.

Note: At the end of 2023, DEQ amended the contract such that the septic system grant funds are now also available to anyone in the McKenzie Watershed upstream of EWEB's drinking water intake, regardless of whether or not they were impacted by the Holiday Farm Fire. However, recipients are still subject to the 300% of federal poverty guideline income threshold described above.

Since the inception of this program in January 2023, 85 septic grants have been awarded: 28 through DEQ funds, 55 through Lane County, and 2 through the rate fee for a combined total of \$951,329. Currently, about 20 additional grant projects have been preliminarily approved.

EWEB staff are also tracking the community wastewater efforts led by Lane County in Blue River and are hoping to be able to provide grant funding to assist local residents if this project proceeds before the grant program has to expend its funds.

For more information about any of the above septic system assistance programs, please visit: www.eweb.org/septic.

9.0 Healthy Farms Clean Water

EWEB's Healthy Farms Clean Water Program is designed to support growers, helping to keep farmland as farmland (and not be sold off for development) and protect water quality. EWEB continues to offer

free soil and leaf sampling to growers in the watershed, which helps inform growers of current nutrients levels and allows them to avoid over-applying fertilizers. In addition, EWEB is working with the Upper Willamette Soil & Water Conservation District and local Natural Resources Conservation Service (NRCS) to offer growers cost-share assistance for projects which have a water quality benefit, such as fencing and off-stream watering, composting and nutrient management. We did not have any of these projects in 2023.

9.1 Hazelnut Pesticide Reduction Project

EWEB has been working with McKenzie hazelnut growers for years on monitoring for filbert worm to alleviate impacts to their crops while reducing the quantity of pesticides used. EWEB pays a contractor during the summer months to set up moth traps, monitor them throughout the growing season, and share this information with growers so that they can determine the best time to spray for filbert worm, if needed, and minimize the number of sprays during the summer. Monitoring alone has helped to reduce pesticide use on hazelnut crops by up to 50% in some orchards. In the summer of 2023, four hazelnut growers participated in this program, representing approximately 200 acres of hazelnut orchards. We anticipate that additional growers may participate in future, as new hazelnut orchards are being planted and replanted with blight-resistant trees. OSU is providing technical advice and is currently looking into the feasibility of installing camera traps to reduce labor to conduct the monitoring. EWEB is evaluating the potential to transfer this program to the Upper Willamette Soil & Water Conservation District in 2024 as it may have broader application across the Upper Willamette watersheds.

10.0 Healthy Forests Clean Water

10.1 Forestry

The McKenzie Watershed is comprised of 88% forested land, with a mixture of private, state, and federally owned lands. Forested watersheds, like the McKenzie, produce better water quality than any other surface water source. However, forest management activities that may adversely impact downstream water quality include: the use of chemical applications for industrial forest stand treatment; road building; and various timber harvest techniques. These activities may adversely impact water quality due to increased runoff that carries pesticide residues and higher sediment loads that can increase turbidity levels, making it harder and more expensive to treat the water, as well as increasing the likelihood of producing disinfection by-products (DBPs).

Forest Spray and Harvest Tracking

Lane Council of Governments has been tracking forestry planned timber harvests and spray activities for EWEB since 2003. The data is collected by sub-watershed on industrial timberlands over time. The data reported by Oregon Department of Forestry provides only planned activities by timberland owners, but this at least provides an estimate of where harvest and spray activities are occurring over time. As a result of the Holiday Farm Fire, salvage logging in the McKenzie went up significantly in 2020 and 2021.

particularly in Gate Creek, Marten Creek, Deer Creek and Quartz Creek. Salvage logging has gone down dramatically since the Holiday Farm Fire, with the exception of the upper McKenzie above McKenzie Bridge, likely due to this summer's Lookout Fire. Herbicide spray has increased in a number of the subwatersheds in the middle McKenzie. EWEB continues to monitor for pesticides and other contaminants during storm sampling events generally in the fall and spring. For more information see section 3.3 and to explore an interactive map, see: [FERNs Dashboard: Forestry Activities in the McKenzie Watershed](#).

Stewardship Contracting

EWEB, the US Forest Service and a number of local partners have been participating in the McKenzie Watershed Stewardship Group (MWSG) for the past 9 years. Stewardship contracting is a mechanism where timber receipts from harvests designed to increase forest health and reduce wildfire risk remain in the watershed to fund restoration on public and private lands. Retained receipts may be used on either public or private lands for restoration work. This collaborative group traditionally met bi-monthly to discuss upcoming harvests and provide recommendations to the Forest Service around potential stewardship sales and how to spend retained receipts that result from these projects.

The pace of projects has slowed due to Covid, Holiday Farm Fire, and Lookout Fire, as well as some continued turnover with facilitation. The stewardship contracting sales that were expected have been delayed, although road preparation and harvest work is expected to start up again this year for sales that were not substantially impacted by recent fires. The MWSG convened this past fall for a round of updates from the US Forest Service and partners and plans to meet again before the summer to keep abreast of updates and needs related to stewardship contracting or other opportunities for input into USFS activities.

11.0 Operationalizing Source Protection

11.1 Hayden Bridge and Generation Integration Projects

Aquarius was acquired in 2022 by Source Protection staff through a competitive bidding process to manage various types of time-series data collected for parameters like temperature, turbidity, dissolved oxygen, total algae, and FDOM throughout the McKenzie Watershed. Staff continued to build out capabilities and integrate additional data resources into the Aquarius platform during 2023. The data platform will provide both internal and external stakeholders better access to time-series data collected by Source Protection staff with a rollout expected for Q1, 2024 (see Figure 11-1).

Source Protection staff recently completed installation of a new water quality monitoring station in Keizer Slough, which empties into the McKenzie River just above EWEB's intake (see Figure 11-2). Real-time data from the station is currently available to staff through Aquarius and will also be added to the McKenzie River Information System (MRIS) by the end of March, which provides Hayden Bridge operators quick access to important water quality conditions upriver.

Figure 11-1: Aquarius Time-Series Data Access Platform

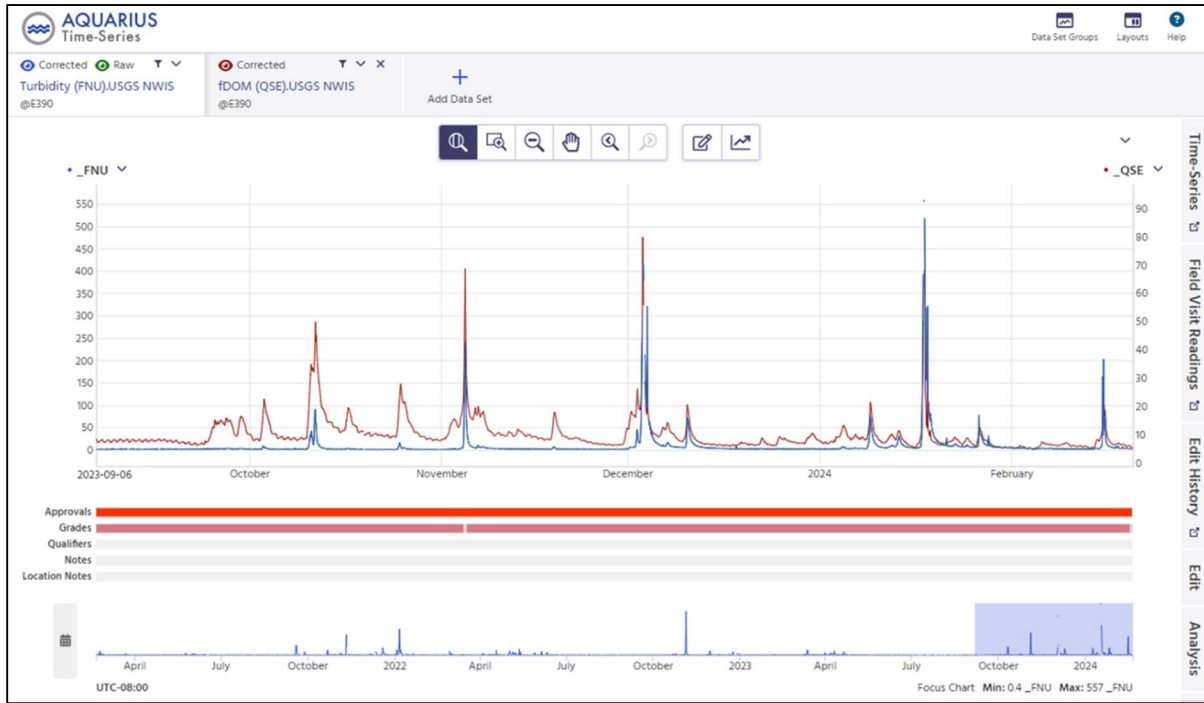


Figure 11-2: Keizer Slough Water Quality Station



Image Credit: David Donahue

Appendix A - Watershed Restoration Funding

Figure A-1: Risk-Based Actions

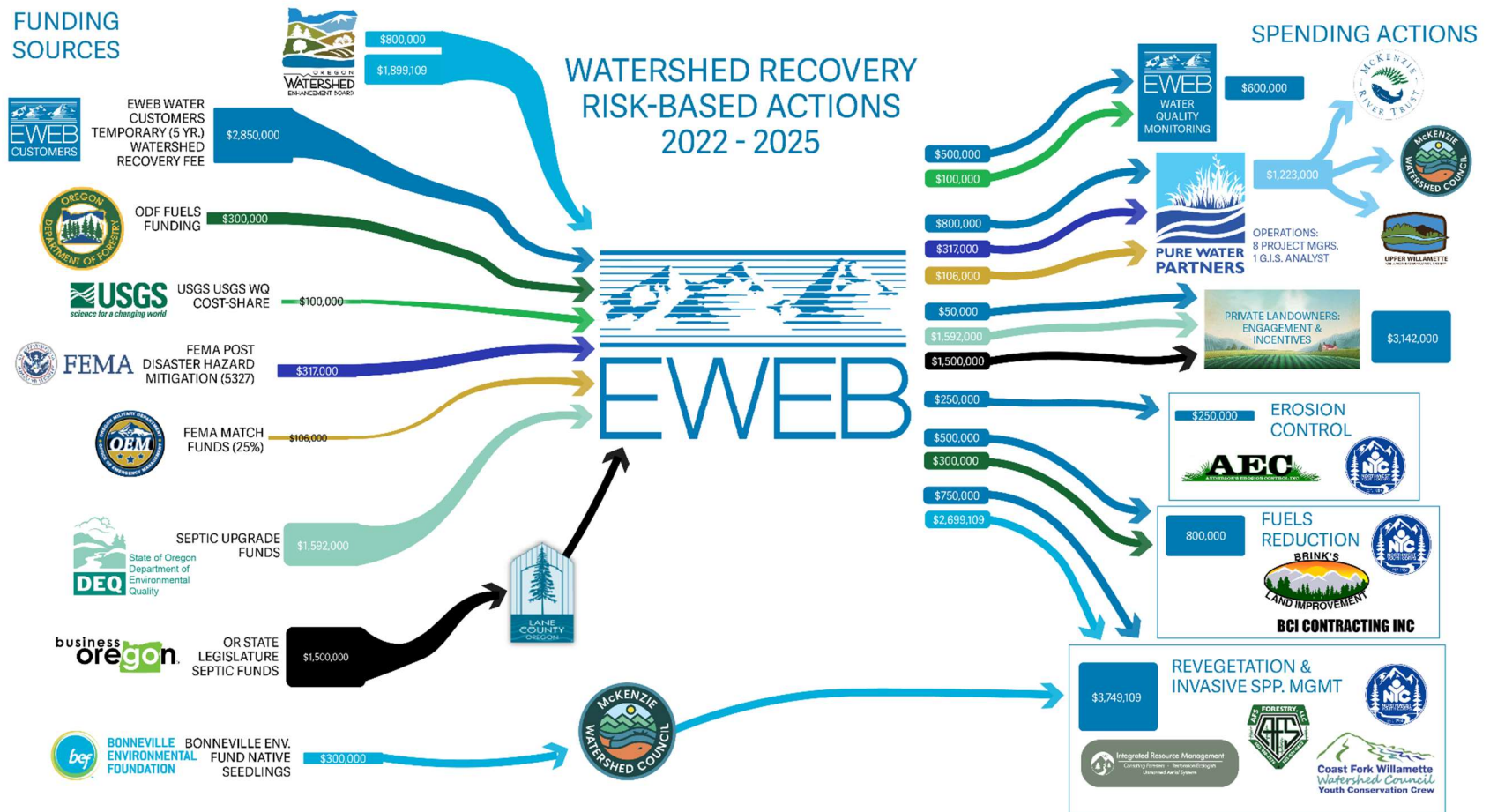


Figure A-2: Holiday Farm Fire Budget, 2021-2024

Activity	2021 ANNUAL BUDGET			2022 ANNUAL BUDGET			2023 ANNUAL BUDGET			2024
	PLAN	ACTUAL	% OF BUDGET	PLAN	ACTUAL	% OF BUDGET	PLAN	ACTUAL	% OF BUDGET	PLAN
Risk-Based	\$ 2,250,000	\$ 1,925,000	86%	\$ 2,150,000	\$ 4,050,000	188%	\$ 3,500,000	\$ 2,327,180	66%	\$ 1,700,000
Floodplain Restoration	\$ 50,000	\$ 170,000	340%	\$ 150,000	\$ 1,020,000	680%	\$ 2,850,000	\$ 1,666,982	58%	\$ 1,400,000
Land Acquisition	\$ 1,500,000	\$ 440,000	29%	\$ 1,500,000	\$ 240,000	16%	\$ 1,500,000	\$ 401,030	27%	\$ 617,000
Strategic/Carbon	\$ 150,000	\$ 15,000	10%	\$ 150,000	\$ 101,000	67%	\$ 150,000	\$ 66,000	44%	\$ 67,000
Subtotal	\$ 3,950,000	\$ 2,550,000	65%	\$ 3,950,000	\$ 5,411,000	137%	\$ 8,000,000	\$ 4,461,192	56%	\$ 3,784,000
Revenue	\$ -	\$ (25,000)		\$ -	\$ (1,190,000)		\$ 3,000,000	\$ 4,617,453	154%	\$ 1,855,049
Total Watershed Fee Expense	\$ 3,950,000	\$ 2,525,000	64%	\$ 3,950,000	\$ 4,221,000	107%	\$ 5,000,000	\$ (156,261)	-3%	\$ 1,928,951

Figure A-3: Summary of Funding Sources for Watershed Restoration Activities for 2023

