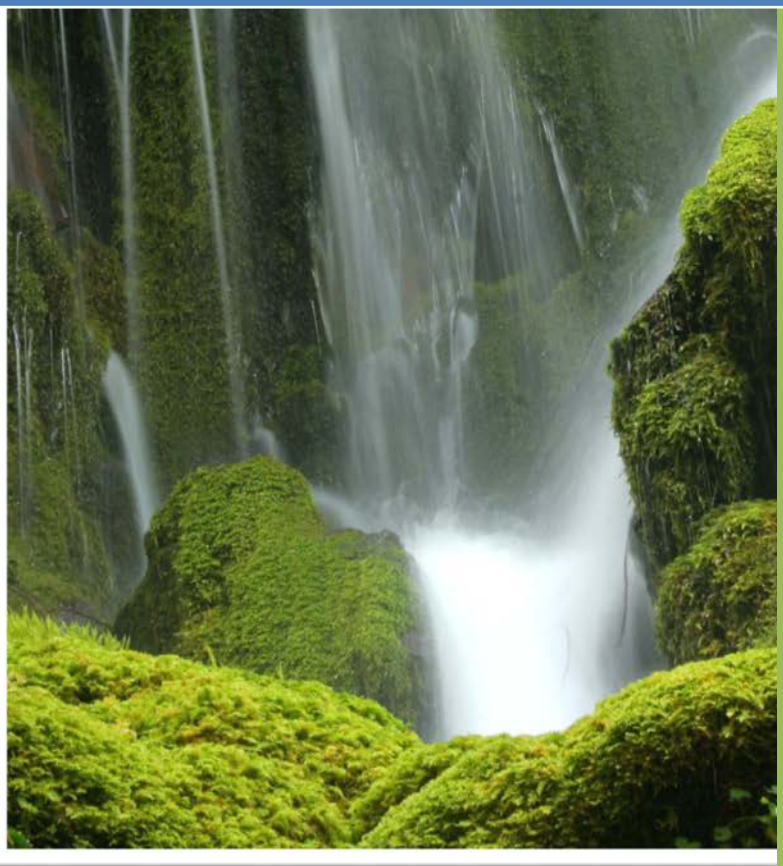
2018-2019

State of the McKenzie Watershed Report

Eugene Water & Electric Board



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1.0 Introduction

1.1 Purpose of the report

The purpose of the State of the McKenzie Watershed Report 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 in a meaningful way. The report will be produced annually to show progress being made or challenges encountered as EWEB implements the Drinking Water Source Protection (DWSP) Program 10-year strategic plan. (Since this is the first report, it encompasses both 2018 and 2019.) To keep the report as brief as possible, background information and details about programs are contained in the Strategic Plan Technical Report that can be found at: http://www.eweb.org/community-and-environment/mckenzie-watershed-protection/drinking-water-source-protection-plan.

The report layout is designed to provide a summary of the health of the McKenzie Watershed and highlights of major events in the watershed that had significant impact in a positive or negative way (Section 2), followed by brief discussions of water quality trends and highlights (Section 3) and updates on the priority threats to water quality and how EWEB' programs are responding to these threats (Sections 4-7). The final section provides an outlook of efforts under development and/or things we should be paying attention to in the next few years (Section 8).

1.2 Overview of 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.

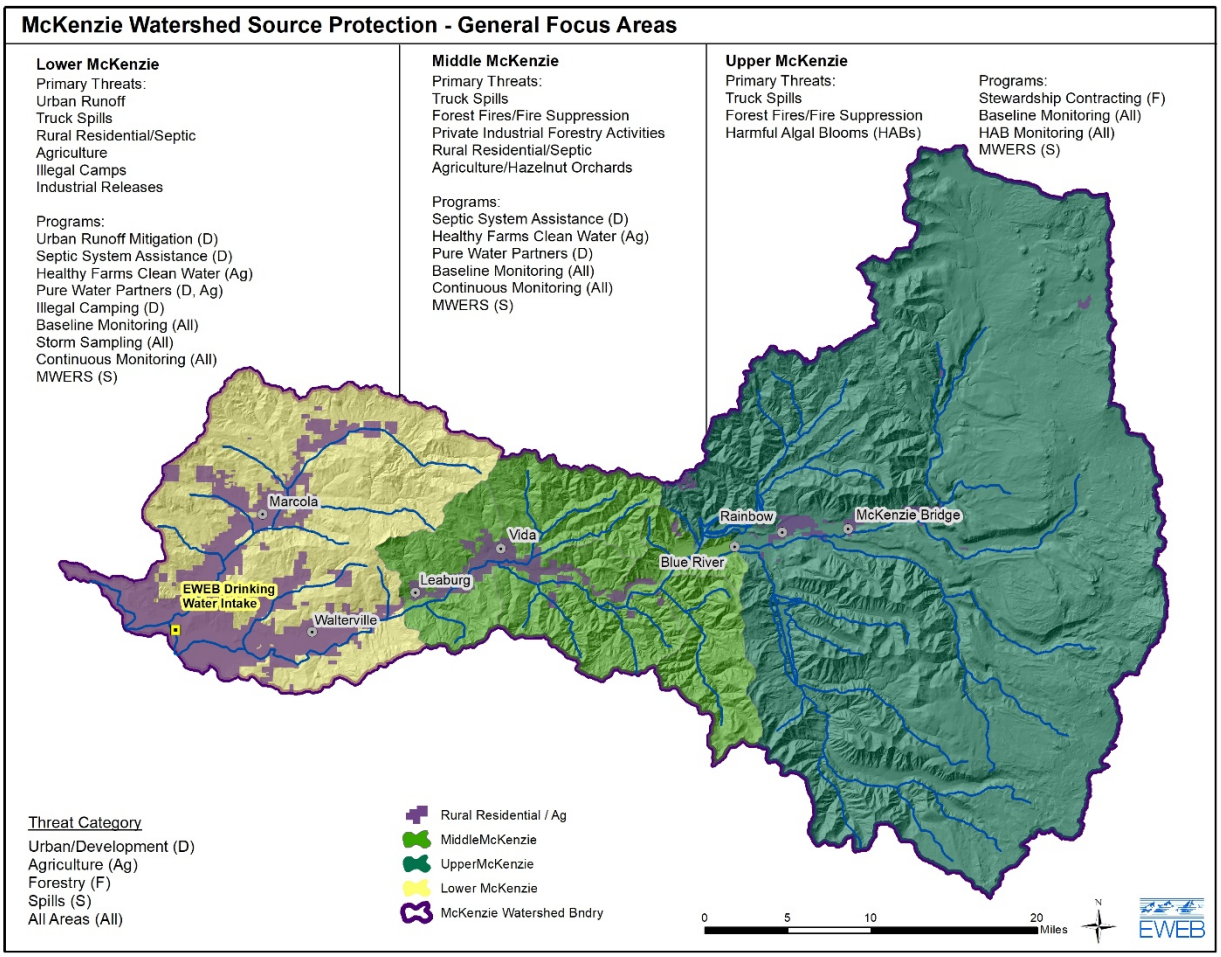
Based on these goals and objectives, our long-term strategic approach is to operationalize source protection efforts in a way that aligns priorities, leverages resources, and integrates with partner actions and leadership through long-term agreements.

1.3 Summary of strategic planning effort

In February 2018, staff presented the proposed 10-year strategic plan to the EWEB Board. The DWSP Strategic Plan was revised to incorporate Board feedback and adopted as the road map for future source

protection work and investments. Figure 1-1 summarizes the main programmatic elements of EWEB's approach to protecting the McKenzie Watershed, provides a geographic prioritization of EWEB investments, and shows the main threats addressed by each program.

Figure 1-1: Map of DWSP Program



1.4 Operationalizing Source Protection

EWEB's source protection staff are an integral part of Hayden Bridge operations. A water quality dashboard was developed that uses real-time monitoring stations to provide early warning for harmful algal blooms, as well as high turbidity and/or dissolved organic matter events. This system will be enhanced in 2020 to add additional water quality stations and notifications via text and email when events are happening that exceed water quality thresholds.

Figure 1-2: Water Quality Dashboard using Data from Real-time Monitoring Stations

The other key area of integration is using EWEB's Water Quality Laboratory to support source protection work. The WQ Lab increased its workload to analyze watershed samples for nutrients, total and suspended solids, bacteria, and other parameters that would have went to a commercial lab. This saved EWEB approximately $40,000 in 2019. The EWEB WQ Lab also developed new analytical capabilities for detecting cyanotoxins, which will replace use of commercial labs in 2020 after EWEB's lab becomes accredited by Oregon Environmental Laboratory Accreditation Program (ORELAP) for these analysis.

2.0 State of the Watershed Summary and Highlights

Overall, the health of the McKenzie Watershed is good (See Table 2-1). The McKenzie continues to deliver excellent water quality to Hayden Bridge despite unusually low flows in 2019. Comprehensive water quality monitoring that includes baseline, storm event, harmful algal bloom, and real-time monitoring continues to be a large focus for EWEB's source protection program as an early warning to potential problems, assessing trends over time, and to stay ahead of emerging contaminants like Polyfluoroalkyl and perfluoroalkyl substances (PFAS) and perfluorooctane sulfonate (PFOS) compounds.

It is anticipated that climate change impacts in the McKenzie will show up as extreme weather events (including flooding, drought, and loss of snow pack), resulting in increased wildfires, harmful algal blooms, and property damage in riparian and floodplain areas. All of these impacts have been observed in the watershed and will continue to be tracked over time.

There has been significant progress made in working with landowners to protect and restore riparian and floodplain forests through the launch of the Pure Water Partners (PWP) program. In addition, the McKenzie Watershed Council and US Forest Service (USFS) worked together to implement two large scale floodplain restoration projects in Deer Creek and the South Fork McKenzie. Both of these initiatives were designed to help mitigate the effects of climate change and increase resiliency to floods

and droughts for downstream local communities. However, there continue to be setbacks in development impacts along the river with a 26-home subdivision going in at the former McKenzie Golf Course and at least five properties being impacted with significant bank erosion in the lower watershed, immediately threatening one home. All five of these threatened properties have enrolled in PWP in search of natural solutions instead of pursuing revetment and bank hardening.

Table 2-1: Summary of Watershed Trends

Watershed Health Attribute	Maintain or Improve	Slight Decline	Significant Decline	Notes
Water Quality				Section 3.0
Climate Change Impacts:				Seeing impacts in flows, fires and algal blooms
Snow Pack/Flows				Section 2.1
Wildfire				Section 2.2
Algal Blooms				Section 3.2
Urban Runoff Impacts				Section 4.0
Hazmat Spills				Section 5.0
Development Impacts				Section 6.0
Illegal Camping				Section 7.1
Forestry				Section 7.2
Agriculture				Section 7.3
Conservation				Section 6.0
Watershed Investments				Appendix 2
Partnerships				Appendix 1

Urban runoff and hazardous material spills remain high priority threats to water quality. Over the last 2-3 years, there has been a significant increase in hazardous material spills from tanker truck accidents, the International Paper oil spill, cars driving into the river, and a number of more minor spills. The McKenzie Watershed Emergency Response System (MWERS) was tested on a number of occasions and years of interagency drills paid off in facilitating effective communication and coordination in response to these incidents. Urban runoff continues to deliver the highest levels of pollutants to the river in the lower watershed. Efforts to mitigate these pollutants through establishment of wetlands and other green infrastructure for treatment of pollutants and to buffer impacts to the river have been challenging to implement, but have gained traction toward the end of 2019.

The addition of an Environmental Technician to EWEB's source protection staff provided more bandwidth for increasing illegal camp surveys, quicker analysis of analytical data, and being more proactive rather than reactive to watershed events. Development of solid partnerships with City of Springfield, Willamalane Parks, and Lane County to conduct weekly/biweekly coordinated surveys in the lower watershed has had the desired effect of finding camps early, notifying campers to leave, and cleaning them up before they grow into much larger problems.

Pesticide reduction on agricultural lands, especially hazelnut orchards, continues to increase and scale up as partnerships with growers, Upper Willamette SWCD, Oregon Department of Agriculture, and the

Natural Resource Conservation Service (NRCS) mature and outside investments increase. Camp Creek has become a designated focus area for these investments that address water quality issues and the hazelnut partnership is now scaling up across the entire Willamette Basin in an effort to attract large NRCS investments for pesticide reduction and other water quality benefits.

The Pure Water Partners program has attracted hundreds of thousands of dollars from outside funders and developed two new funding streams for restoration work on PWP landowner properties that include the Metropolitan Wastewater Management Commission and USFS through Stewardship Contracting (see Table 2-2). Efforts are underway to develop additional long-term sustainable funding sources that will flow through PWP. These efforts have solidified existing partnerships and helped to develop new partnerships such as the Upper Willamette Urban Waters Program, which scales up green infrastructure solutions to treat urban runoff at the source. Acres of land under conservation have significantly increased over the last few years with the McKenzie River Trust's purchase of the Finn Rock reach (with EWEB support) and opportunities arising out of PWP engagement with landowners.

The remainder of this report provides details of these and other efforts to protect the McKenzie Watershed as the lifeblood of EWEB, our customers, and the region to maintain or improve the excellent water quality we enjoy for future generations. See Appendix 1 for a complete list of all the partners EWEB actively works with to implement these source protection programs and Appendix 2 for list of current grants and other funding sources that EWEB leverages with its investment in watershed protection.

Table 2-2: Summary of Funding by Source Protection Program (2018-2019)

Source Protection Program	EWEB Funds*	Outside Funds**	Total Funding	Notes
Water Quality	$504,000	$370,200	$874,200	Section 3.0
Urban Runoff Impacts	$109,500	$57,000	$166,500	Section 4.0
Hazmat Spills	$67,100	$37,100	$104,200	Section 5.0
Development Impacts	$447,300	$389,000	$836,300	Section 6.0
Illegal Camping	$16,000	--	$16,000	Section 7.1
Forestry	$13,000	$27,000	$40,000	Section 7.2
Agriculture	$15,000	$120,100	$135,100	Section 7.3

*- O & M funds, does not include labor.

**- See Appendix 2 for detailed list of outside funding sources (pending grants not included).

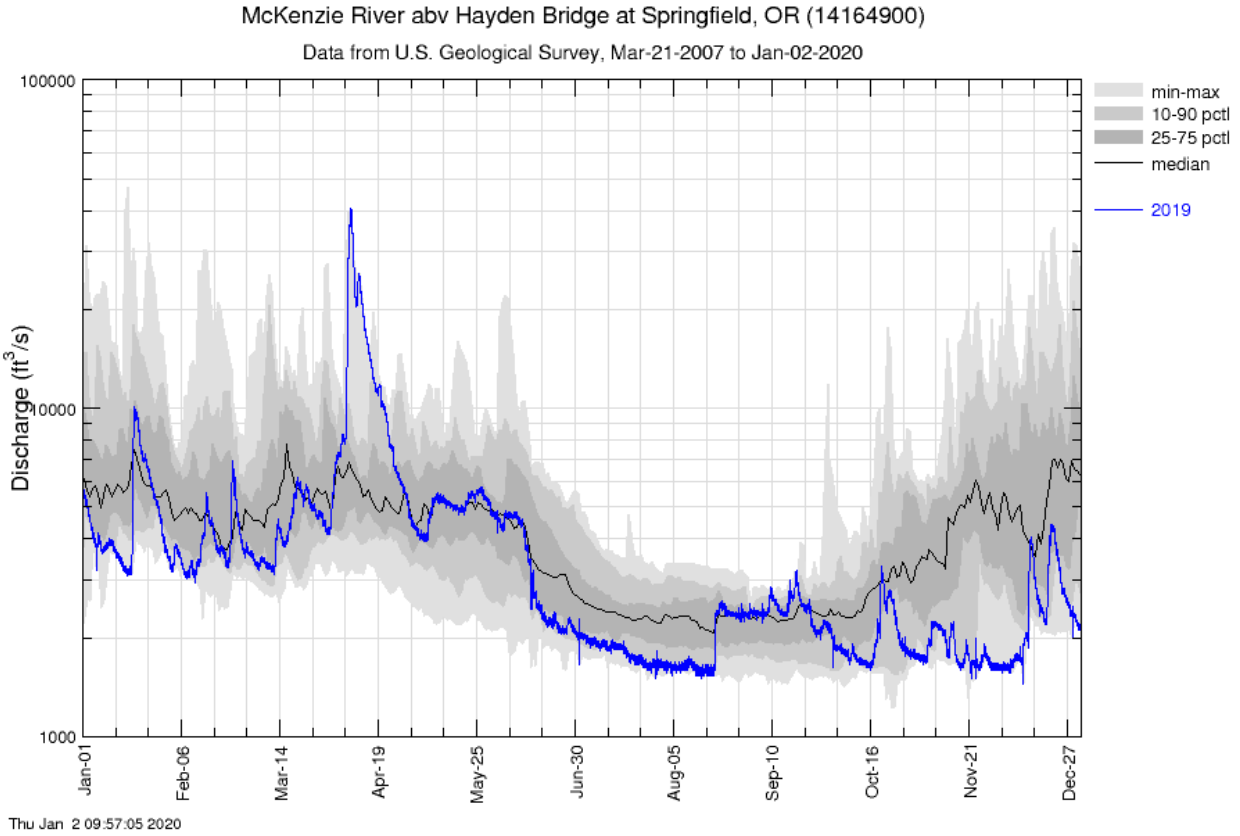
2.1 Water year (flows/snowpack)

Overall, drier conditions were observed across much of the McKenzie Watershed during the past 2 years. The snowpack for 2018 and 2019, measured as snow water equivalent (SWE), was approximately 10-20% below normal SWE when compared to median values from 1981 to 2010.

McKenzie River flow at Hayden Bridge during the 2019 calendar year was generally lower than normal when compared to USGS data collected at the site since 2007 (see Figure 2-1). During this time period

the peak daily flow fell below the historical daily median flow on 237 days, or 65% of the time. Also since 2007, the minimum daily flow observed during 2019 was equal to or less than the previous historical minimum flow on 64 days, or 17.5% of the year. However, 2019 also recorded one of the largest flows over the past 20 years, when discharge went from 8,000 cubic feet per second (cfs) on April 7th, to over 40,000 cfs on April 9th. This event was largely due to a warm, heavy precipitation event with a significant snowmelt component.

Figure 2-1: Graph of historic low river flows

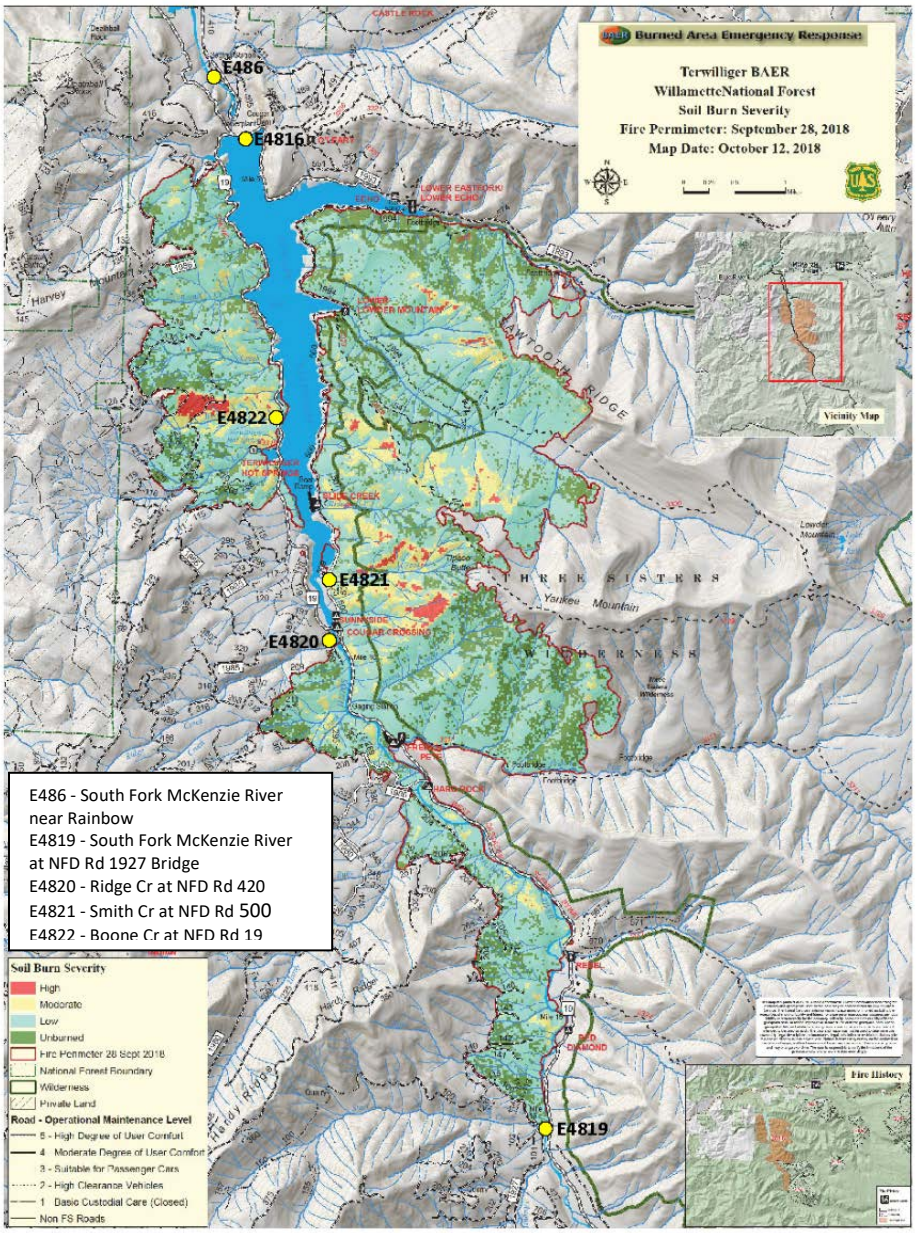


2.2 Major events of significance

Terwilliger fire

In 2018, from August to October, the Terwilliger wildfire burned approximately 11,500 acres around Cougar Reservoir in the South Fork McKenzie Watershed (Figure 2-3). The fire originated on the west side of the reservoir in the vicinity of Terwilliger hot springs, before embers made their way across the reservoir, spreading wildfire to the east and south. The Terwilliger Fire came on the heels of a very active 2017 fire season in the McKenzie Watershed. Fires within the South Fork McKenzie and Horse Creek Watersheds covered approximately 42,000 acres in 2017.

Figure 2-3: Map of fire severity/area burned



Photos Courtesy of USFS

Forest fires can be beneficial to overall forest health. However, severe forest fires can have significant effects on downstream water quality conditions. Fire-related inputs such as organic carbon, nutrients, metals and sediment may easily be mobilized post-fire during significant rainfall events. Increased nutrients can impact downstream biological processes, such as increased algal growth. EWEB is currently engaged in a multi-year study with Oregon State University (OSU) Department of Forest Ecohydrology and Watershed Science to assess if these effects are occurring in Cougar Reservoir as a result of the Terwilliger and Rebel fires. Results of this study will become available in 2020-2021.

International Paper Release

On March 12, 2018, IP experienced an equipment failure that resulted in approximately 1,000 gallons of hydraulic oil being released from their system. Approximately one third of the oil went to an onsite wastewater treatment system. The other two-thirds bypassed the treatment system and entered IP's effluent discharge pipe. Although most of the oil was eventually removed from the discharge pipe, IP estimated approximately 95 gallons of oil reached the McKenzie River. The effluent pipe discharges treated wastewater to the McKenzie River downstream of EWEB's intake. Multiple agencies responded to the release and were able to provide spill response resources and staff time.

Lower South Fork Floodplain Restoration

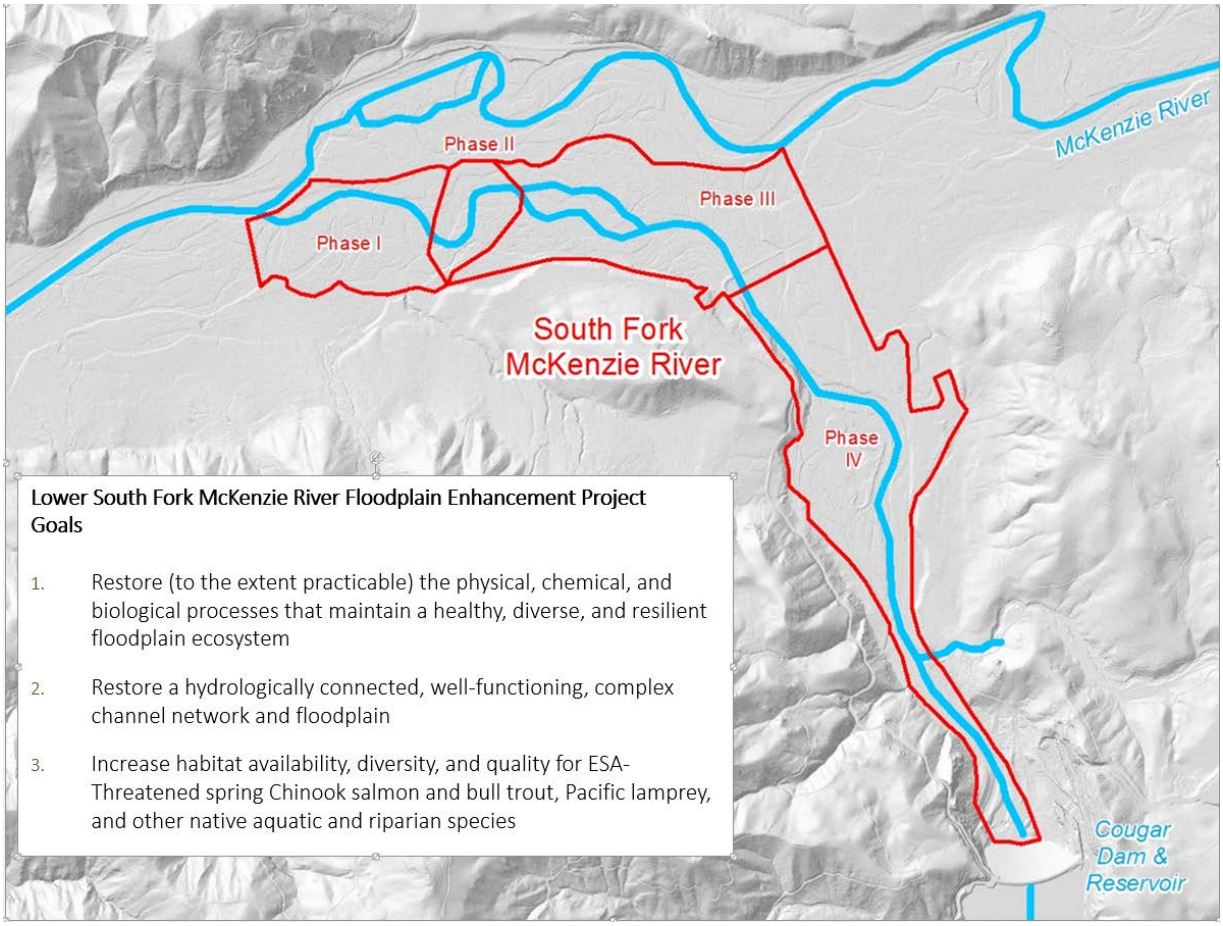
For the second summer in a row (2019), the McKenzie Watershed Council and the USFS McKenzie District collaborated on the second phase of a major floodplain restoration project designed to improve habitat for spring Chinook salmon and bull trout and restore to the extent possible, the physical, chemical and biological processes that are impaired by Cougar Dam. This work involved removing artificial features, such as berms and revetment, filling incised channel, and adding significant amounts of large wood throughout the valley bottom. This enables stream power to be distributed laterally across a wider portion of the valley instead of being concentrated in a single channel with fast-moving waters, which helps mitigate floods and by storing more water longer on the landscape reduces drought impacts.

In order to accomplish the work in phase II and build a temporary diversion dam and channel, the Army Corps increased flows coming out of Cougar Reservoir prior to the commencement of work. In the summer of 2018, this augmented flow from Cougar caused an increase in cyanotoxins in the mainstem McKenzie River that resulted from an algal bloom in the reservoir. As a result, low level of cyanotoxins were detected in the raw water at EWEB's intake that were mitigated through the use of activated carbon at the Hayden Bridge filtration plant. Fortunately, there was no toxic algal bloom in 2019 prior to

the start of the restoration work commencing when the Army Corps conducted another early release from Cougar.

Phase II of the project was completed by late August and enhanced habitat conditions within a 0.6 mile section of the South Fork McKenzie River immediately upstream of the Phase I area, restoring connection to over 20 acres of floodplain (Phase I resulted in reconnecting over 150 acres of floodplain). There will be a break in the project during 2020 while project partners work on design of the last two phases and seek additional funding (see Figure 2-5).

Figure 2-4: Lower South Fork McKenzie River Floodplain Enhancement Project



3.0 Water Quality and Watershed Health

EWEB's Source Protection Program has implemented a number of different monitoring projects to assess water quality conditions throughout the watershed. Samples are routinely collected and analyzed to better understand overall watershed health, contaminant sources, effectiveness of water

quality improvement projects, and emerging drinking water threats. Table 3-1 lists routine monitoring efforts conducted by EWEB staff in 2019.

This level of monitoring provides a comprehensive view of water quality in the McKenzie Watershed and allows EWEB to be proactive if degradation of water quality is observed. Water quality in the McKenzie River at Hayden Bridge continues to be excellent with occasional observations of low levels of pollutants usually associated with storm events and/or urban runoff.

Table 3-1: Summary of 2019 Water Quality Monitoring Events

Monitoring Project	Sites	Target Parameters	Annual Events	Purpose of Monitoring
Continuous Monitoring Network	7	General WQ parameters and Blue-Green Algae*	365 days	Early warning and trending analysis
Harmful Algal Bloom (HAB) Monitoring	8	Algae, Bacteria, Nutrients, Toxins	16	WQ acute impacts (cyanotoxins), trending analysis, climate change
Baseline Monitoring	14	Bacteria, Metals, Nutrients, Organics**	4	Early warning to WQ degradation, pollution source ID, trending analysis
Storm Runoff – Urban Contaminants	11	Bacteria, Metals, Nutrients, Organics**	2	WQ acute impacts, pollution source ID, trending analysis
Forestry - Fire Impact Study/Nutrients	10	Bacteria, Metals, Nutrients	3	Climate change impacts, predictive analysis
Forestry - Stewardship Contract Support	4	Bacteria, Metals, Nutrients	2	Understanding unintended consequences, garner support

***** - General WQ parameters measured using WQ sensors or sondes include: pH, temperature, dissolved oxygen, conductivity, turbidity, fluorescence dissolved organic carbon, phycocyanin, and chlorophyll

****** - Organics include pesticides, semi-volatile organics, volatile organics, pharmaceuticals and personal care products, and petroleum products.

3.1 Continuous Monitoring Network

EWEB's continuous monitoring network is designed to collect water quality measurements over extended time periods to support a variety of monitoring objectives (see Table 3-1). Data can be collected *remotely*, meaning equipment is deployed continuously, but water quality data is only available to download during site visits. Continuous monitoring stations can also be set up to access data in *real-time*, meaning current data is available instantly. EWEB staff may also deploy continuous monitoring equipment on an *occasional* basis, such as during storm events. Table 3-2 lists continuous monitoring stations operated in 2019 by EWEB staff and/or by USGS staff on behalf of EWEB.

Table 3-2: Continuous Monitoring Locations

Monitoring Location	Site ID	Water Quality	Stage (level)	Discharge (flow)
McKenzie River at Hayden Bridge	E010	Real-time	Yes	Yes
52nd Stormwater Channel	E520	Real-time	Yes	No
Cedar Creek at Springfield	E210	Occasional	Yes	No
Camp Creek at Camp Cr Rd Bridge	E310	Remote	Yes	No
McKenzie River Near Vida	E040	Real-time	Yes	Yes
Blue River at McKenzie Hwy Bridge	E540	Real-time	Yes	Yes
South Fork McKenzie near Rainbow	E486	Real-time	Yes	Yes

Continuous data can be used as an early warning system to changing watershed conditions that may impact water quality, to assess water quality threats, understand short and long-term trends, support contaminant monitoring efforts, and to evaluate hydrologic processes throughout the watershed. The real-time water quality and flow data feeds a dashboard (see Figure 1-2) that highlights where exceedances of pre-set thresholds are occurring that can inform source protection staff and Hayden Bridge operators of changing conditions that may warrant a response (such as increased monitoring or preparing for influx of high organic carbon at the treatment plant). Flow thresholds focus on Blue River and Cougar dam operations that can alert staff and operators when the Army Corps is increasing dam releases during times of harmful algal blooms and/or cyanotoxin events.

3.2 Harmful Algal Bloom (HAB) Monitoring

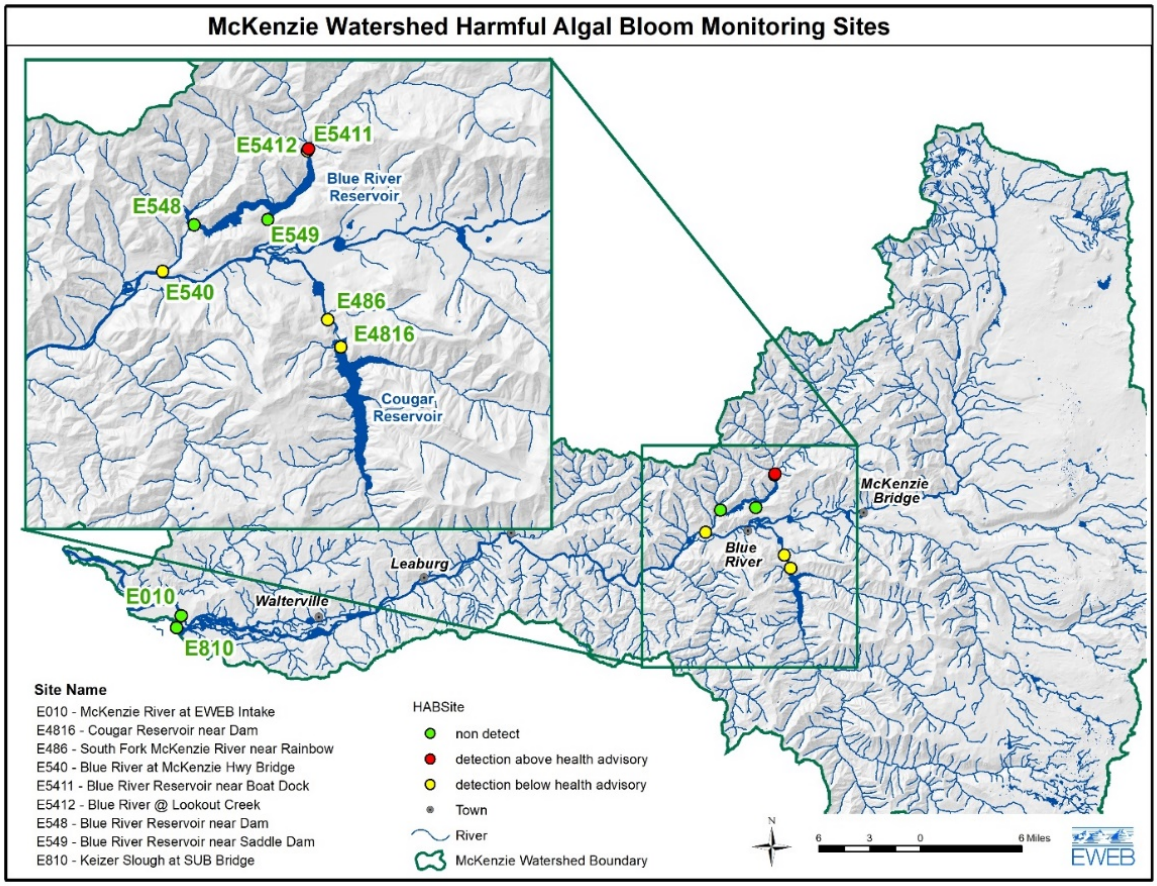
Cyanobacteria and other types of phytoplankton, including green algae and diatoms, are found naturally in aquatic environments. However, certain species of cyanobacteria are capable of producing toxins, commonly referred to as cyanotoxins, which can be harmful to human health. EWEB staff monitor the McKenzie Watershed for HAB conditions from March through November. Biweekly monitoring targets nutrient levels, algal concentrations and toxin levels. Nutrient and toxin samples are analyzed in-house by EWEB Laboratory staff.

In addition to biweekly sampling, EWEB has partnered with the USGS to install continuous monitoring stations below both Blue River and Cougar Reservoirs and on the McKenzie River at Vida that can detect blue-green algae using phycocyanin and chlorophyll sensors (see Table 3-2). This data is fed to a water quality dashboard to provide an early warning system for source protection staff and treatment plant operators (see Figure 1-1). In addition, a new water quality profiling system will be deployed in Cougar Reservoir to assess algal conditions at various depths throughout the year. The profiling system is a joint partnership between the USGS, USACE and EWEB.

Monitoring results from 2019 indicated the presence of cyanotoxins in Blue River and Cougar Reservoirs and downstream of the reservoirs in Blue River and South Fork McKenzie, but were not detected in the McKenzie River at Hayden Bridge (see Figure 3-1).

Harmful algal bloom containing Cylindrospermopsin in Blue River Reservoir

Figure 3-1: Harmful Algal Bloom Monitoring Results – Cyanotoxins, 2019



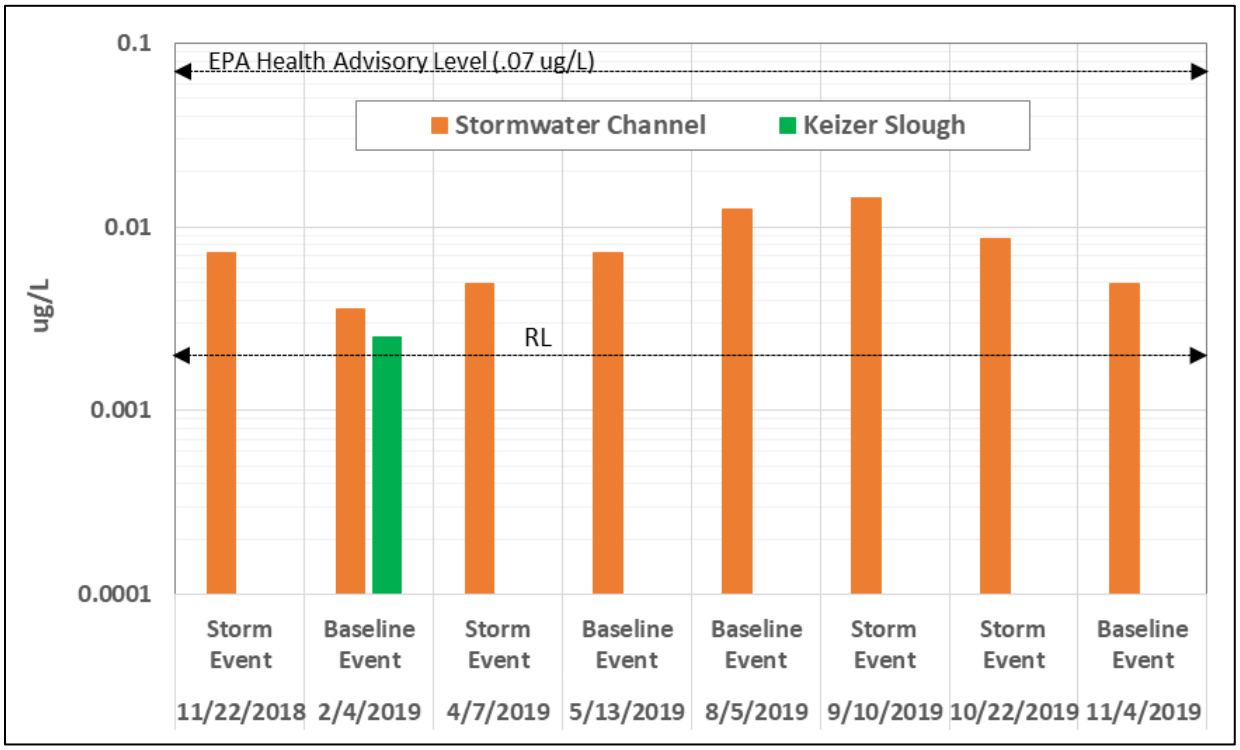
3.3 Organic Contaminant Monitoring

EWEB staff periodically monitor for organic contaminants in the mid to lower McKenzie Watershed during both ambient conditions and storm events. For purposes of this report, "organic contaminant" refers to any carbon-based compound typically not found naturally in surface waters. Examples of organic contaminants may include pesticides, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), pharmaceuticals and personal care products (PPCP), and polyfluoroalkyl and perfluoroalkyl substances (PFAS). Organic contaminant monitoring efforts during 2018 and 2019 focused on urban stormwater sources and the EWEB intake at Hayden Bridge. Several urban stormwater outfalls in east Springfield were targeted during fall and spring storm events, including E520 (52nd/48th Street outfall), E690 (69th Street outfall) and E720 (72nd Street outfall). Analytical results discussed below only include compounds with at least one reportable value above the applicable analytical reporting limit (RL). If a compound had at least one reportable value during the 2018-2019 time period, then estimated values were included in the detection total summaries below. Estimated values are typically concentrations that fall between the detection limit and reporting limit, resulting in less certainty of the actual concentration. If a compound was only detected at estimated concentrations, or concentrations below the RL, then it was not included in the table summaries below.

Polyfluoroalkyl and Perfluoroalkyl Substances (PFAS)

Polyfluoroalkyl and perfluoroalkyl substances (PFAS) are persistent synthetic compounds used in a variety of industrial and consumer product applications. PFAS compounds bioaccumulate in the food chain and have been found in water samples across the nation. In the McKenzie Watershed, two PFAS compounds, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), have been detected at sites associated with urban stormwater runoff upstream of EWEB's intake. The sites include stormwater outfalls at 69th Street, 52nd Street and 42nd Street (see Figure 4-1). Figure 3-2 represents the maximum combined concentration of PFOA and PFOS observed at a single site during a particular monitoring event. Please note that detected concentrations are currently well below the health advisory level of .07 ug/L for combined PFOA and PFOS values. PFAS compounds have not been detected above the analytical reporting limit (RL) outside of urban areas.

Figure 3-2: Maximum Combined PFOA/PFOS Concentrations at Urban Monitoring Sites



Note: RL = Laboratory reporting limit. Concentrations plotted in log scale.

Pesticides

Over the past 20 years, EWEB staff have assessed hundreds of pesticide compounds, including herbicides, insecticides, bactericides and fungicides, across sites throughout the watershed. Table 3-3

Table 3-3: Pesticide Detections at Urban Sites, 2018-2019

Pesticide	Analyzed 2018-2019	Detected 2018-2019	Max Value 2000-2017	Max Value 2018-2019	Max Site 2018-2019
2,4-D	21	8	1.649	0.55	E420
Bromacil	32	1	Not Detected	0.02	E420
Deisopropylatrazine	21	1	0.013	0.0076	E520
Diuron	13	3	6.065	0.026	E810
Fipronil	17	4	0.041	0.004	E690
Malathion	19	1	0.040	0.1	E690
Deet	13	13	0.29	0.03	E520
Pentachlorophenol	16	4	0.8	0.12	E420
cis-Permethrin	25	1	Not Detected	0.016	E690
trans-Permethrin	25	1	Not Sampled	0.02	E690
Permethrin	28	1	Not Detected	0.036	E690
Picloram	23	5	5.5	0.13	E520

Note: red font = a compound detected at a higher concentration than previously observed at similar sites.

lists pesticides detected at urban-related sites from 2018 to 2019. The commonly used herbicide 2,4-D was the most frequently detected pesticide at urban sites above the RL.

Volatile Organic and Semi-Volatile Organic Compounds (VOCs/SVOCs)

VOCs and SVOCs represent a broad class of organic compounds that are routinely monitored at several urban sites during both baseline and storm conditions. Results from 2018 and 2019 monitoring efforts are presented in Table 3-4. Of notable interest is the prevalence of chlorinated compounds in the vicinity of Keizer Slough and the 42nd stormwater channel. The chloroform detection of 10 ug/L from Keizer Slough (E810) originated from a sample collected by EWEB staff on 11/22/2018 during a baseline event.

River levels were fairly low at the time of sample collection, although some precipitation was reported for that day. Although this value is well below the drinking water MCL for TTHM, at 80 ug/L respectively,

Table 3-4: VOC/SVOC Detections at Urban Sites, 2018-2019

VOC/SVOC	Analyzed 2018-2019	Detected 2018-2019	Max Value 2000-2017	Max Value 2018-2019	Max Site 2018-2019
Benzo[a]pyrene	19	1	0.04	0.04	E420
Bromodichloromethane	35	9	2.1	1.3	E810
Carbon disulfide	20	4	Not Detected	1.4	E010
Chloroform*	35	13	8.8	10	E810
DEHP	39	6	22.8	1.3	E420
Dibromochloromethane	18	5	0.9	0.73	E810
Pyrene	19	1	0.14	0.061	E420
Trihalomethanes, Total*	28	10	6	11	E810

*Chloroform is a subset of Total Trihalomethanes.

the presence of chlorinated compounds in the vicinity of Keizer Slough warrants further evaluation of potential sources, including the adjacent pentachlorophenol plume, which is discussed below.

Pentachlorophenol (PCP) Plume

Located approximately 1 mile upstream of EWEB's intake, a pentachlorophenol (PCP) plume is being monitored by EWEB staff. The plume is a result of wood treatment practices conducted by Weyerhaeuser Company until 1986. Soil contamination was discovered in 1991 at the mill complex. The site is currently owned and managed by International Paper Company (IP). Ongoing groundwater monitoring of the PCP plume is conducted by PES Environmental, Inc. (PES) on behalf of IP. For the past 2 decades, the Oregon Department of Environmental Quality (DEQ) has been working with relevant parties to address monitoring and reporting objectives related to plume progression. EWEB staff receive plume updates and progress reports from PES on behalf of IP.

According to Progress Report Number 89, submitted by PES on behalf of IP to the DEQ on October 15th, 2019, along with a sampling update email received by EWEB staff on November 14, 2019, results for all samples collected in 2019 from Springfield Utility Board/Rainbow Water District (SUB/RWD) wells were non-detect for chlorinated phenolic and volatile organic compounds. Analytical results for groundwater monitoring wells sampled in 2019 largely showed decreasing PCP concentrations at both intermediate

and deep well depths. One exception was well MW-18D, which appears to be relatively constant, if not slightly increasing, over the past 10 years.

Pharmaceuticals and Personal Care Products (PPCPs)

The growing list of PPCPs that could potentially impact drinking water is a challenge for water quality monitoring efforts. Table 3-5 provides a list of PPCP compounds, including medications and artificial sweeteners that were detected at urban sites in 2018 and 2019. Although values are generally very low, of note is the number of new compounds detected in local waterways.

Table 3-5: PPCP Detections at Urban Sites, 2018-2019

PPCP	Analyzed 2018-2019	Detections 2018-2019	Max Value 2000-2017	Max Value 2018-2019	Max Site 2018-2019
Acesulfame-K	13	2	0.036	0.16	E520
Acetaminophen	13	3	Not Detected	0.07	E520
Caffeine	41	15	11.3757	0.76	E420
Cotinine	13	3	0.059	0.028	E420
Gemfibrozil	13	1	Not Detected	0.0057	E520
Lidocaine	13	2	Not Detected	0.0066	E420
Naproxen	13	2	Not Detected	0.02	E520
Sucralose	13	3	0.26	0.34	E520
Sulfamethoxazole	13	1	Not Detected	0.012	E520
Theophylline	13	2	Not Detected	0.039	E520
Triclocarban	13	1	Not Detected	0.037	E810

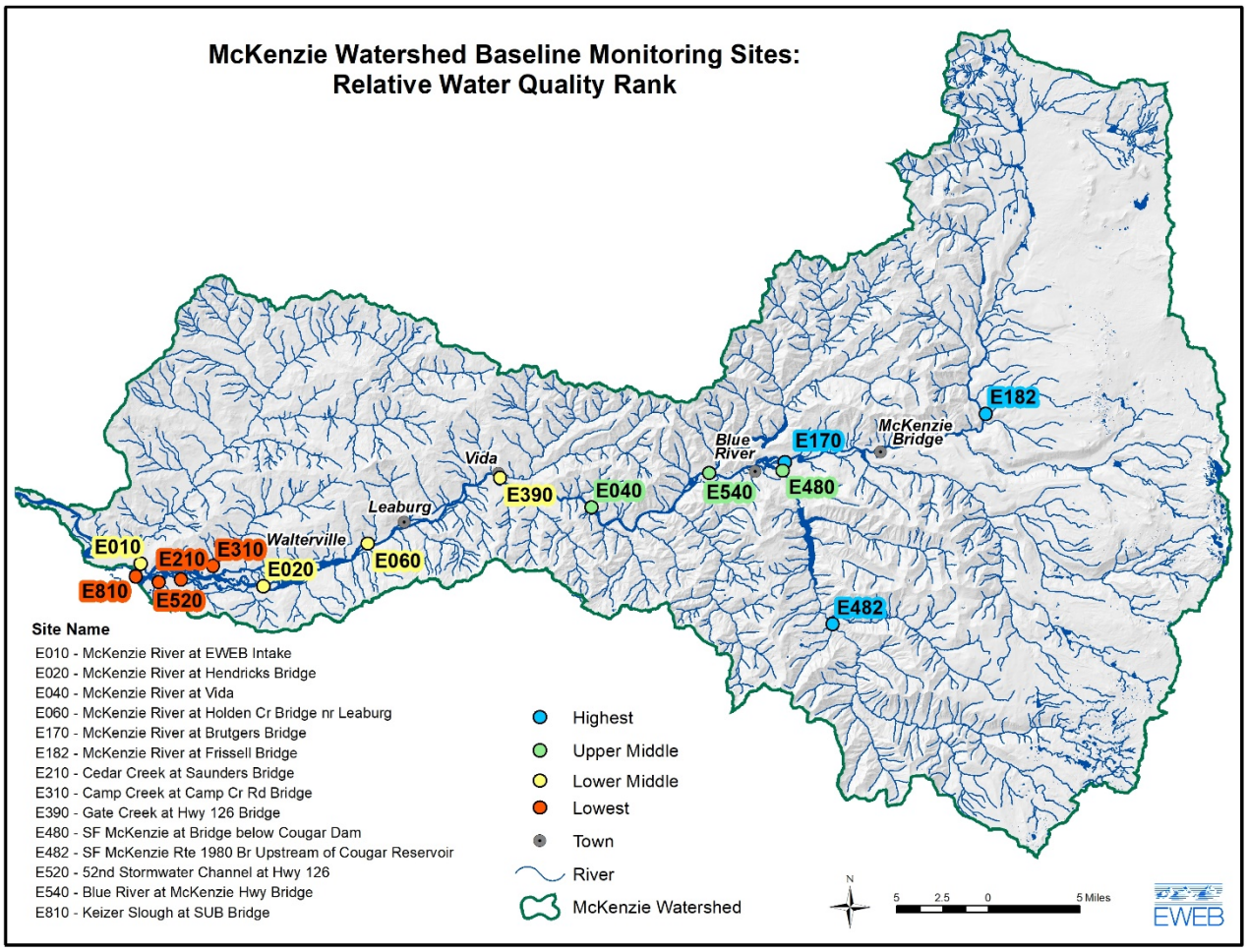
Note: red font = a compound detected at a higher concentration than previously observed at similar sites.

3.4 Baseline Data Summary/Trends

EWEB's baseline monitoring program is a long-term effort to assess ambient water quality conditions in source waters over time. Samples are collected quarterly at 14 sites throughout the watershed ranging from urban stormwater channels to pristine, spring-fed rivers. Samples are analyzed for metals, bacteria, organics, nutrients and other general chemistry parameters. Baseline information is used to better understand the overall health of the watershed and to identify long-term trends in water quality conditions.

Figure 3-3 is a map illustrating the relative water quality rank of baseline monitoring sites across a variety of water quality parameters, including metals, nutrients and general chemistry. Ranked values for numerous analytes were aggregated and assessed to determine how baseline sites compare to one another. Three sites with the best or highest water quality conditions compared to other sites are colored blue, and generally reflect the excellent 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, but with slightly higher metal and nutrient values when compared to the

Figure 3-3: Map of Monitoring Locations



highest group. The third group, highlighted in yellow and designated the lower middle, consists of sites with good water quality, but with 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.

Analytical results presented in the tables below reflect both median and maximum concentrations reported for sites throughout the watershed over two different time periods (2000-2017 and 2018-2019). Median values for each analyte were calculated from all applicable site data. Median values listed as non-detect (ND) for a specific analyte indicate the median value was below the applicable analytical detection limit and/or reporting limit. Baseline data tables include only results from the 14 baseline sites presented in Figure 3-3. In addition to baseline data tables, which are more reflective of typical conditions in the watershed, the tables also include storm event results for comparison. While baseline conditions may include a storm event, since baseline sampling is random and dates are set far in advance, storm event monitoring specifically targets peak rainfall events and maximum flow conditions. During such conditions, it is expected that additional contaminants will be mobilized and

flushed into local waterways. Storm event monitoring results are compared with baseline results to better understand how typical conditions compare with less frequent, worst case scenarios. Please note that storm event results presented below include data from additional monitoring sites that are not part of the normal baseline group. The additional monitoring sites include several stormwater channels in east Springfield that discharge to the McKenzie River above EWEB's intake. These sites include the 42nd stormwater channel (E420), the 64th stormwater channel (E640), the 69th stormwater channel (E690) and the 72nd stormwater channel (E720).

Metals

Metal concentrations in surface water can originate from a variety of both anthropogenic (or human caused) and natural sources. Metal concentrations generally increase moving downstream as anthropogenic sources increase, especially in the lower watershed near urban environments. Table 3-6 presents median and maximum total metal concentrations reported for sites throughout the watershed over two different time periods (2000-2017 and 2018-2019).

Table 3-6: Total Metals – Baseline and Storm Monitoring Events, All Sites

Total Metals (ug/L)		Analyzed 2018-2019	Detected 2018-2019	Median 2000-2017	Median 2018-2019	Max 2000-2017	Max 2018-2019	Max Site 2018-2019
Aluminum	Baseline	113	113	43.5	29.7	2,100	815	E310
	Storm	49	49	667	424	6,400	4,810	E010
Arsenic	Baseline	113	108	ND	0.25	11.2	0.52	E170
	Storm	49	47	0.2	0.39	1.66	1.02	E010
Barium	Baseline	113	113	1.92	1.87	22.7	10.1	E310/E520
	Storm	49	49	9.32	5.41	56	33.3	E390
Cadmium	Baseline	113	15	ND	ND	0.19	0.085	E020
	Storm	49	19	ND	ND	1.4	0.077	E420
Chromium	Baseline	113	110	ND	0.25	5.09	2.1	E310
	Storm	49	49	0.53	0.5	9.57	4.95	E310
Copper	Baseline	113	113	ND	0.23	102	25.9	E010
	Storm	49	49	4.7	2.97	30	15.2	E010
Iron	Baseline	113	113	70	43.1	3,780	860	E310
	Storm	49	49	1,100	609	8,400	3,560	E010
Lead	Baseline	112	96	ND	0.021	9.1	0.29	E182
	Storm	49	47	0.12	0.16	13	10.4	E420
Manganese	Baseline	113	113	3.92	3.51	529	297	E520
	Storm	49	49	45.1	27.1	490	372	E520
Mercury	Baseline	94	86	ND	0.00046	0.17	0.00305	E210
	Storm	49	49	ND	0.00177	0.15	0.0186	E390
Nickel	Baseline	113	78	ND	0.07	30.5	0.81	E310
	Storm	49	44	ND	0.46	7	3.73	E420
Zinc	Baseline	113	72	ND	0.6	154	93.8	E520
	Storm	49	42	27.2	3.3	789	984	E420

Note: ND (non-detect) indicates the median value for a specific analyte was below the applicable detection limit.
Red font = a compound detected at a higher concentration than previously observed at similar sites.

Generally, most maximum total metal concentrations over the 2018-2019 time period, for both baseline and storm conditions, occurred in either stormwater sites or in Camp Creek. The notable exceptions include several maximum concentrations observed in the McKenzie River at EWEB's intake (E010). This was largely due to a significant storm event that was sampled on April 8th, 2019, which resulted in extremely high river flows and sediment loads (see Figure 2-1). Also note that increased median values for many metals in 2018-2019, as compared to ND values for similar metals during 2000-2017, are the result of improved analytical capabilities and lower reporting limits, resulting in fewer ND values.

Nutrients and General Chemistry

Nutrients play an important role in natural ecosystems. However, elevated nutrient sources can impact water quality and may indicate potential pollution sources. Natural nutrient sources can include soils, bedrock, leaf fall and nitrogen-fixing organisms. Anthropogenic sources may include fertilizer runoff, animal waste, septic tanks and industrial discharges. Table 3-7 summarizes median and maximum concentrations of several key nutrient parameters throughout the watershed over two different time periods (2000-2017 and 2018-2019).

Table 3-7: Nutrients – Baseline and Storm Monitoring Events, All Sites

Nutrients (mg/L)		Analyzed 2018-2019	Detected 2018-2019	Median 2000-2017	Median 2018-2019	Max 2000-2017	Max 2018-2019	Max Site 2018-2019
Ammonia	Baseline	203	95	ND	ND	1.2	0.096	E540
	Storm	49	35	ND	0.015	0.401	0.098	E420
Nitrate	Baseline	209	50	ND	ND	4.35	2.3	E520
	Storm	49	40	0.22	0.07	1.61	0.8	E520
Orthophosphate	Baseline	203	169	0.014	0.026	0.25	0.102	E520
	Storm	49	49	0.0271	0.056	0.15	0.19	E010
Phosphorus	Baseline	203	185	0.0249	0.031	0.81	0.12	E520
	Storm	49	49	0.0681	0.088	0.405	0.278	E010
Total Kjeldahl Nitrogen	Baseline	54	38	ND	0.165	8.12	3.38	E810
	Storm	19	19	ND	0.75	2.92	1.15	E010

Note: ND (non-detect) indicates the median value for a specific analyte was below the applicable detection limit.
Red font = a compound detected at a higher concentration than previously observed at similar sites.

Apart from the storm-related orthophosphate concentration, all other nutrient concentrations observed during 2018-2019 were below corresponding maximum values reported during the previous 18 years. Similar to total metal results, maximum concentrations were typically found in stormwater outfalls, with the exception of several maximum storm values observed at EWEB's intake during the April, 2019, storm event.

General chemistry includes a variety of parameters, such as solids and organic carbon, which can complicate drinking water production when levels are elevated. Sources for many of the parameters listed below include forestry practices, agricultural and urban runoff, algal blooms, leaf fall and forest

fire runoff. Table 3-8 presents median and maximum general chemistry concentrations reported for both time periods (2000-2017 and 2018-2019).

For most general chemistry parameters highlighted in Table 3-8, 2018-2019 peak concentrations fell below 2000-2017 peak concentrations, and were almost exclusively associated with stormwater outfalls. Total dissolved solids was the exception for both storm and baseline events. The highest total dissolved solids concentration for both event types were observed in the 2018-2019 time period, and both occurred in the 52nd stormwater channel (E520). E520 also saw higher peak concentrations during 2018-2019 baseline events for both dissolved organic carbon and total solids. The peak total solids concentration of 182 mg/L for EWEB's intake (E010) was associated with the April 2019 storm event.

Table 3-8: General Chemistry – Baseline and Storm Monitoring Events, All Sites

General Chemistry (mg/L)		Analyzed 2018-2019	Detected 2018-2019	Median 2000-2017	Median 2018-2019	Max 2000-2017	Max 2018-2019	Max Site 2018-2019
Chemical Oxygen Demand	Baseline	65	36	ND	1.7	46	13.7	E520
	Storm	22	22	22.4	16.5	195	39	E020
Dissolved Organic Carbon	Baseline	180	145	0.73	0.765	3.1	5	E520
	Storm	49	45	1.8	2.1	16	5	E420
Hardness (as CaCO3)	Baseline	113	113	16.4	17.6	100	95.2	E520
	Storm	49	49	18	18.8	53	68	E520
Total Dissolved Solids	Baseline	75	75	39	47	51.3	160	E520
	Storm	49	49	46.5	53	72	130	E520
Total Organic Carbon	Baseline	199	171	0.69	0.76	5.93	4.9	E520
	Storm	49	47	2.325	2.33	51.9	6.1	E520
Total Solids	Baseline	75	75	45.5	50	100	168	E520
	Storm	49	49	63	63	478	182	E010
Total Suspended Solids	Baseline	110	59	ND	1	82.7	7	E540
	Storm	49	43	9	8	428	154	E390/E020

Note: ND (non-detect) indicates the median value for a specific analyte was below the applicable detection limit.
Red font = a compound detected at a higher concentration than previously observed at similar sites.

Bacteria

Escherichia coli (*E. coli*) and total coliform are two common bacterial indicators used to assess water quality conditions. *E. coli*, which are a subgroup of total coliform bacteria, are specific to the intestinal tract of warm-blooded animals. Total coliform encompasses a large group of different bacteria species, many of which are completely harmless. Bacteria sources can include septic systems, domestic and wild animal fecal material, stormwater and urban runoff, and human fecal material from encampments along waterways. Table 3-9 reflects both median and maximum *E. coli* and total coliform values observed during baseline and storm monitoring events over two different time periods.

Table 3-9: Bacteria – Baseline and Storm Monitoring Events, All Sites

Bacteria (MPN/mL)		Analyzed 2018-2019	Detected 2018-2019	Median 2000-2017	Median 2018-2019	Max 2000-2017	Max 2018-2019	Max Site 2018-2019
E. coli	Baseline	909	842	12	10	5,794	2,489	E520
	Storm	49	45	687	41	34,480	17,329	E690
Total Coliform	Baseline	909	906	461	659	198,630	15,531	E520
	Storm	49	49	13,085	2,420	241,960	241,960	E690

Note: See Figure 3-4 for monitoring site locations

Red font = a compound detected at a higher concentration than previously observed at similar sites.

The highest maximum values reported during the 2018-2019 time period for both *E. coli* and total coliform were associated with the 52nd Street and the 69th Street stormwater channels (E520 and E690 respectively). The maximum *E. coli* values observed in both stormwater channels easily surpass Oregon's maximum water quality standard for *E. coli*, which stands at 406 *E. coli* organisms per 100 mL. The median value for *E. coli* during both time periods is relatively low during baseline events, with some upper watershed sites even reporting non-detect values. However, median values are significantly higher during storm events, although less so from 2018 to 2019.

4.0 Urban Runoff

As mentioned in Section 3.0, EWEB monitored urban runoff from several storm events in 2018 and 2019 and analytical results indicated these areas had the highest concentrations of pesticides and other pollutants found in the watershed. Currently these pollutants are being diluted to levels below laboratory detection limits by the time they reach EWEB's intake. EWEB's strategy to address urban runoff as a high priority threat to water quality is to:

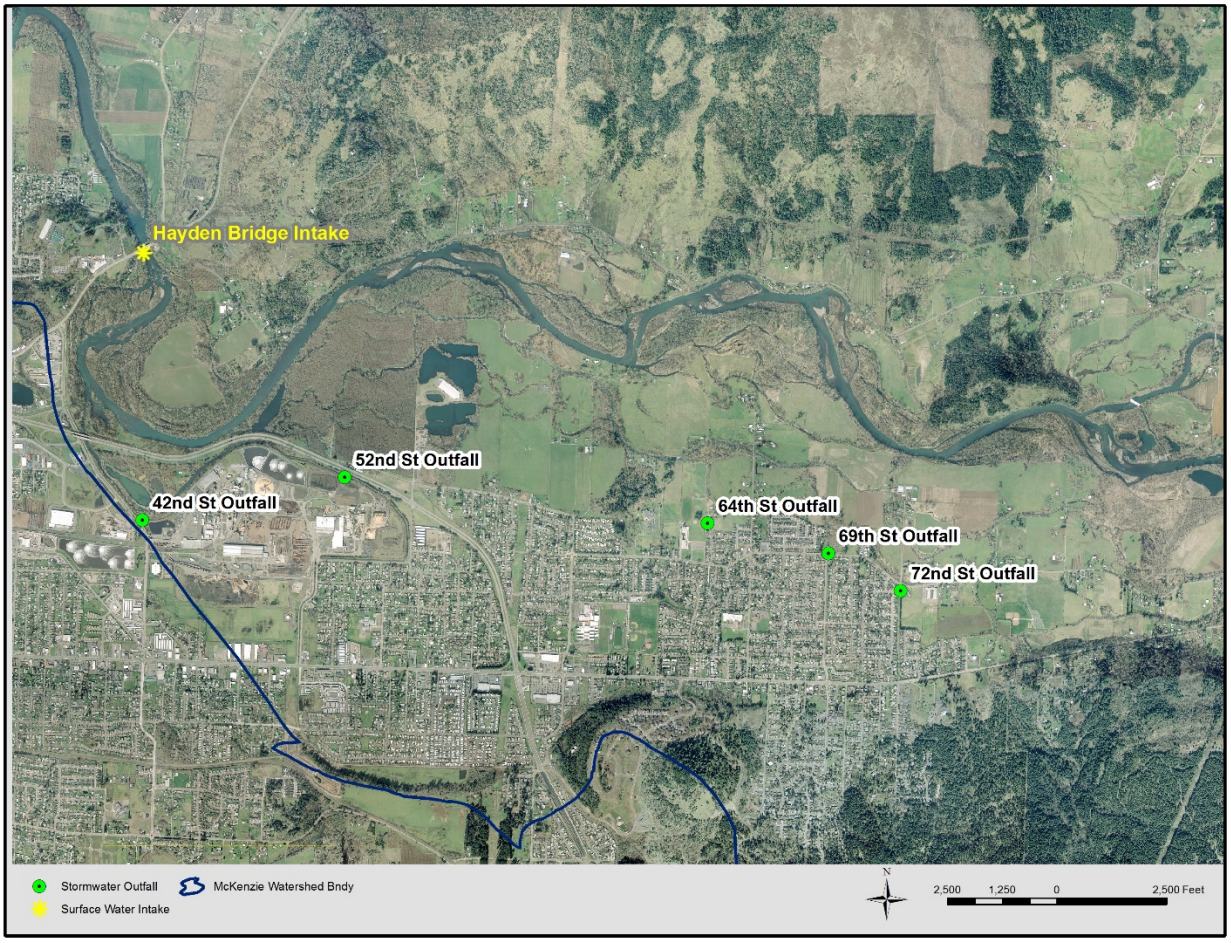
- Continue baseline and storm event monitoring;
- Add more real-time monitoring stations that are connected to the water quality dashboard for early warning of potential pollution events;
- Install wetland treatment downstream of outfalls: and,
- Scale up installation of green infrastructure to treat stormwater at the source.

4.1 Summary of Threat

Urban runoff from developed areas (construction, roads, parking lots, roofs, and other impervious surfaces) can be a significant source of pollution during rainfall events that quickly and efficiently deliver runoff containing numerous contaminants into a nearby stream or river. 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 4-1). This area also contains a number of Springfield Utility Board (SUB) and Rainbow Water municipal well fields.

Figure 4-1: Stormwater Outfalls in East Springfield



The 42nd and 52nd Street stormwater outfalls drain a large area of Springfield, approximately 2000 acres, that contains a concentration of industrial and commercial activities, while the other three outfalls drain areas of eastern Springfield containing mostly residential neighborhoods and some commercial uses.

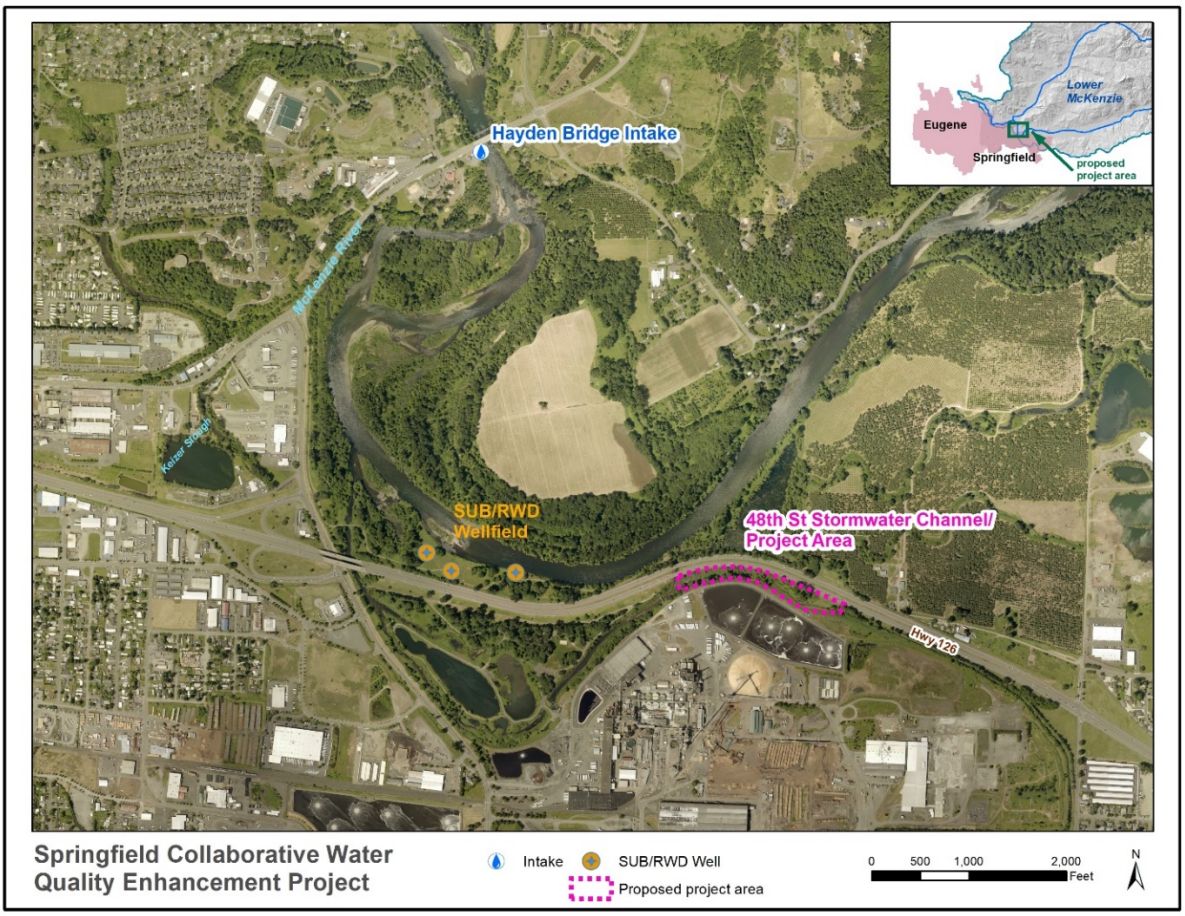
4.2 48th Street Channel Wetland Project Summary

(Note: EWEB's 52nd St stormwater outfall is technically located in what Springfield refers to as the 48th Street stormwater channel.)

For the past 5 years, EWEB had been working with City of Springfield, Springfield Utility Board, Rainbow Water District, Oregon Department of Transportation, International Paper, and Oregon Department of Fish and Wildlife to enhance the wetland area in the 48th St stormwater channel and increase its ability

to treat stormwater. This stormwater channel is located just upstream from the confluence of Keizer Slough and the McKenzie River (see Figure 4-2). EWEB received two $30K grants from the Oregon Health

Figure 4-2: Wetland Enhancement Project Location



Authority to do some survey work and invasives removal in the channel, as well as design work around enhancing the water treatment capacity of this channel. The concept was to design a simple weir structure and do some regrading and replanting work to effectively slow down the normally flashy stormwater flow, treat pollutants via infiltration and vegetative uptake, and act more like a functional wetland (see Figure 4-3).

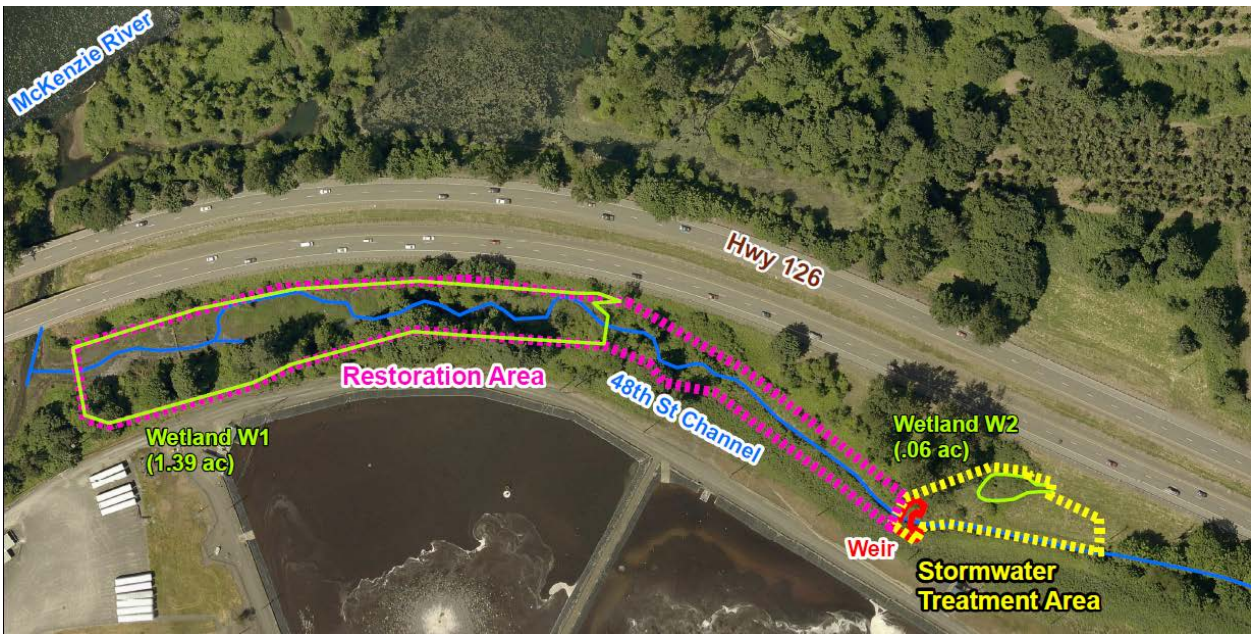
After years of design work with OBEC and working with the Corps of Engineers, Oregon Department of Environmental Quality, and Oregon Department of State Lands on permitting, ODFW ultimately did not allow the project to move forward without fish passage in the stormwater channel unless significant expensive mitigation work was done as part of a fish passage waiver. This made the project prohibitively expensive to build and maintain in this area, so this part of the project had to be abandoned.

EWEB has decided to move forward with invasive removal in the channel downstream of where the weir was originally going to be constructed and intensive native plantings to improve the function of the existing degraded wetland. However, without the weir to slow down flow and the constructed wetland

behind the weir to perform initial treatment of pollutants, the overall treatment capacity of the project will be reduced (see Figure 4-3). The weir was also designed to also act as a hazardous material spill recovery point in the event of upstream spills from industrial facilities.

Invasive treatment work has already begun in the downstream part of the project area to restore wetland W1 (see Figure 4-3). The initial phase of planting native forbs, sedges, shrubs and trees is planned for winter 2020. There is opportunity to extend the size of wetland W1 into the Keizer Slough area as it silts in over time since International Paper stopped dredging it approximately 4 years ago.

Figure 4-3: 48th Street Wetland Enhancement Project Components



4.3 Green Infrastructure/Urban Waters Program

The Upper Willamette Urban Waters program (UWUWP) is a regional expansion of the Long Tom Watershed Council's 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 monitor efficacy. The retrofits are designed to reduce or eliminate pollution and runoff from the property, improve water quality and protect habitat while promoting citizen engagement and knowledge (see example in Figure 4-4).

Partners include: City of Eugene, City of Springfield, EWEB, Springfield Utility Board, Long Tom Watershed Council, McKenzie Watershed Council, Willamalane, Middle Fork Watershed Council, Coast Fork Watershed Council, and MWMC, with Cascade Pacific Resource Conservation & Development acting as the fiscal manager. Partners have been meeting monthly and recently submitted a couple of grants for funding the development of a framework for engaging businesses and a programmatic process for accomplishing the work, as well as planning for a couple of on-the-ground projects. EWEB is

particularly interested in engaging businesses in the immediate area of our intake and in the east Springfield area near the five outfalls that empty into the McKenzie upstream of the intake.

Figure 4-4: Example of Green Infrastructure to Treat Urban Runoff

Photo by Long Tom Watershed Council

5.0 Hazardous Material Spills or Releases

As mentioned in Section 2.0, there has been an increase in larger spills from tanker and semi-truck accidents, the IP oil release along with smaller spills from auto accidents, cars going into the river, EWEB Generation facilities and others (see Table 5-1). Fortunately, the amount of spilled material that reached the McKenzie River from these larger events was minimal compared to the volume actually spilled. EWEB's strategy to address hazardous material spills as a high priority threat to water quality is to:

- Maintain, update, and enhance the GIS-based web application formerly known as the McKenzie Watershed Emergency Response System (MWERS), but renamed the Oregon Watershed Emergency Response System (OWERS) to match a public-private partnership to sell this product to utilities across Oregon;
- Maintain the four fully equipped interagency spill response trailers staged throughout the watershed in partnership with the Region II Hazmat Team and McKenzie Fire & Rescue;
- Conduct 1-2 live drills annually with 12-15 agency partners using OWERS and the interagency response trailers to test pre-determined response strategies under an Incident Command System; and,
- Actively respond, as necessary, and document every incident (no matter how small) using the OWERS system, which provides real-time notifications to people via text and email in order to test and maintain familiarity with the system.

5.1 (Threats) Summary of spills in watershed/response/corrective actions

Spills are a substantial threat in the McKenzie Watershed due to the presence of Highway 126, which runs right next to the river for the majority of its length. Furthermore, due to EWEB's reliance on the McKenzie as its sole source of drinking water, a major hazardous spill could have significant and long lasting impacts to Eugene's drinking water. In addition, chemicals used in industrial and commercial facilities may also be accidently spilled during transport to the facility, during off-loading once at facility, as a result of use, and/or as part of a waste stream. Table 5-1 summarizes the number of spills experienced over the last three years, which mostly included petroleum products being released.

Table 5-1: Reportable Spills/Releases in the McKenzie Watershed from 2017 to 2019

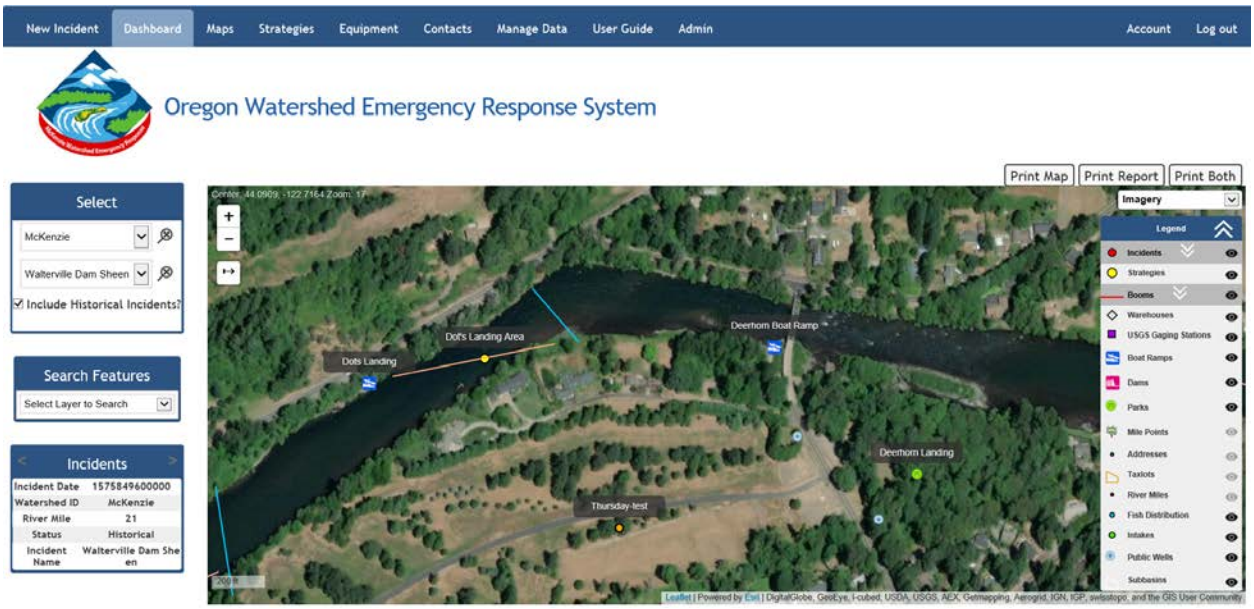
Date	Responsible Party	Material Released	Quantity (gallons)	Details	Response
12/09/19	EWEB	Hydraulic Oil	Est <5 gal	Vandalism and old equipment resulted in release to Walterville Canal.	Multiple agencies and contractors involved in clean-up over weeks.
10/09/19	EWEB	Gasoline	Est <.1 gal	Contractor boat capsized in Smith Reservoir causing sheen.	Boom deployed by contractor.
08/08/19	EWEB	Oil	Est <.1 gal	Small sheen observed after work on Carmen sump.	Boom already in place. Contractor performed clean-up.
04/16/19	Ike's Pizza	Cooking Oil	Est <5 gal	Cooking oil bins outside overfilled. Parking area puddles have oil sheen.	Parking area is 60 ft from McKenzie River.
04/06/19	Unknown	Auto Fluids	Unknown	Stolen SUV dumped in McKenzie River at RM5	Lane Co. SAR recovered vehicle.
01/4/2019	Army Corps Contractor	Hydraulic Oil	Est <.1 gal	Small observable sheen in reservoir; likely residual oil from contractor's drilling rig.	Absorbent boom deployed.
09/12/2018	Unknown	Auto Fluids	Unknown	Vehicle went off road at MP 33; partially in river.	McKenzie Fire responded.
05/25/2018	Unknown	Auto Fluids	Unknown	Truck went into river on 5/22/18 near Greenwood Drive.	Vehicle removed on 5/25/2018 by towing company.
04/17/2018	Army Corps	Oil	Est .5 gal	Oil released from pump at fish ladder into river.	Boom was placed in river.
03/12/18	International Paper	Hydraulic Oil	Est. 1,000 gal	Est. 95 gal released to McKenzie River below EWEB intake.	Est 95 gal released to McKenzie River below EWEB intake.
6/13/2017	Trucking Company	Diesel	Est. 10,000 gal	Tanker truck accident near Leaburg Dam, MP 22.5.	Contractor eventually had to excavate a large amount of soil.

5.2 Overview of OWERS/Changes/Enhancements

Source Protection staff continue to work with a consultant, Mason Bruce & Girard (MB&G), on fixes and enhancements to the Oregon Watershed Emergency Response System (OWERS), a GIS-based online application designed to enter spill incidents, obtain travel time estimates to downstream critical resources, send email and text notifications to partners, provide access to information on threats, critical resources, spill response strategies, equipment availability and other information needed to effectively respond to a spill. EWEB held a couple of OWERS trainings in the late spring/early summer, which were attended by partners from McKenzie Fire & Rescue, Eugene Springfield Fire, Region 2 Hazmat, US Forest Service, City of Springfield, and International Paper.

Clackamas River Water Providers (five water utilities) and Rogue Valley water utilities (Medford, Grants Pass, etc.) are exploring contracting with MB&G to purchase and install OWERS for their watersheds, which if successful would provide EWEB with royalty payments. EWEB has been in conversations with Oregon DEQ and EPA about using OWERS across the Willamette Basin to provide consistency in responses, working with local agency partners, and accessing local resources.

Figure 5-1: OWERS Website Application Dashboard



5.3 Spill Drill

On an annual basis, EWEB organizes 1 to 2 on-the-ground drills that use interagency response trailers to familiarize partners with equipment, resources and procedures around spill response and implementing pre-determined booming strategies along a river under an Incident Command System (ICS). This is an opportunity for new people to learn about OWERS and for people already familiar to increase their

response skills. These drills also test the pre-determined response strategies, which are then updated based on lessons learned from the drill.

Figure 5-2: Boom deployment during 2018 and 2019 drills

6.0 Development

As mentioned in Section 2.0, new development continues to happen along the river and in the floodway and floodplain despite efforts to appeal development approval decisions and engage Lane County. The largest development approved a few years ago was a 26-home subdivision in the floodway and entirely within the 100-year floodplain at the former McKenzie Golf Course at Deerhorn. In the lower watershed, the McKenzie continues to move within its floodplain, impacting properties and threatening at least one home. EWEB's strategy to address development along the river and in the floodplain as a high priority threat to water quality involves septic assistance programs and riparian and floodplain forest protection via partnerships with Pure Water Partners and working with Lane County Land Management to engage developers and landowners early in the development process.

6.1 Summary of threat (Development Trends/Canopy Cover Analysis)

The McKenzie River has excellent water quality overall, and we are fortunate to have such a clean source for our drinking water. However, one of the high priority threats to the watershed is from development pressure in the riparian area. Currently over 4,000 homes exist in the watershed upstream of EWEB's intake with over 200 homes in the floodway and over 1200 homes in the 100-year floodplain. Based on Lane County permit data, 237 and 143 new addresses were created in the McKenzie Watershed in 2018 and 2019, respectively. The majority of new addresses (approximately 70%) include single family residents and mobile homes, while others include everything from apartments to office

buildings. Increasingly development along the river brings with it additional septic systems, increased impervious surfaces, loss of riparian vegetation, and potentially increased pesticide/fertilizer use. The cumulative impact of homes and structures along the river from all of these factors can lead to degradation of water quality.

We are currently working with LCOG to develop a process for tracking development permits so that we can see where development is occurring in the watershed and how that is changing over time (see : http://purewaterpartners.org/173/Building-Permits).

6.2 Septic Assistance Program

Since EWEB began its Septic System Assistance Program (SSAP) in 2008, over 900 septic systems have been inspected, pumped, and repaired as needed (see Table 6-1). EWEB's program currently consists of two components:

1) ***Cost-share program:*** This program provides a 50% cost-share for McKenzie homeowners to have their septic systems inspected and pumped out, if needed. The cost-share also includes performing minor repairs to the system. Feedback around this program has been extremely positive.

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 $10,000 from EWEB.

The septic system assistance program is now run by the Customer Solutions Department; though Source Protection staff collects data on septic system inspections/results by address in a database and in GIS. See www.eweb.org/septic for more information about the program. For the period of this report (2018-2019) 197 septic systems have been inspected , while over 900 were inspected overall (see Table 6-1).

Table 6-1: Septic System Program Statistics

Septic System Program Statistics	
Septic systems Inspected since 2009	904
Septic systems inspected in 2018-2019	197
Septic systems needing repairs	163
Septic systems repaired	59
Zero interest loans issued	12

Table 6-2 Septic System Participation over Time

Year	Participants	Cumulative
2008/2009*	439	439
2011	48	487
2012	38	525
2013	43	568
2014	33	601
2015	17	618
2016	17	635
2017	69	704
2018	151	855
2019	46	901

*The 2008-2009 period was a grant-funded, when we hired a contractor to do free inspections and pump-outs for participating landowners. 2011 was the beginning of our cost-share program.

6.3 Riparian and Floodplain Forest Protection

The McKenzie Watershed has experienced loss of riparian habitat and degradation of riparian function over the past couple of decades. Increased development along the river has led to increased chemical use, increased use of revetment to protect vulnerable structures and a higher density of septic systems. These changes pose a threat to the water quality of the McKenzie River, which is both the sole source of drinking water for the City of Eugene and a stronghold for native Upper Willamette River Spring Chinook and Columbia River Bull Trout. Baseline water quality monitoring over time has indicated increasing trends of E. coli bacteria and nitrates associated with areas of higher development.

The Pure Water Partners (PWP) Program is a relatively new initiative (launched in 2018) designed to reward McKenzie landowners who protect high quality land along the river and/or restore degraded areas, assisting EWEB in protecting water quality and helping to avoid future water treatment costs. The ultimate goal is to encourage landowners to consider placing conservation easements on their property, to ensure protection in perpetuity. In the meantime, signed long-term 15-20-year agreements are an effective first step. The program provides annual payments, technical assistance and/or other incentives to participating landowners. It also helps to connect landowners who wish to engage in restoration projects on their land with technical and financial assistance.

To date, we have enrolled 66 McKenzie landowners in the PWP program 'pipeline' (see Figure 6-1). As of Dec 2019, we have 8 landowners who have signed long-term protection or restoration agreements and 13 landowners who have signed more informal naturescaping agreements (see Table 6-2 and Figure 6-1).

PWP program partners include: EWEB, CPRCD, McKenzie Watershed Council, McKenzie River Trust, Metropolitan Wastewater Management Commission, The Freshwater Trust, Upper Willamette Soil & Water Conservation District, University of Oregon and the US Forest Service (see Appendix 1).

Governance/MOA

EWEB and other project partners having been meeting for over 5 years to design, develop, and roll out this program. Most recently, through a grant obtained from the US Endowment for Forestry and Communities, the group has develop a governance structure and a Memorandum of Agreement (MOA) that all partners will sign which outlines how each organization fits into the PWP program structure and their responsibilities (see Figure 6-2). The MOA is currently going through legal review by the various partners in hopes of having it executed in 2020. Partners have also developed a PWP Program Handbook which provides more detail about how the program operates and is funded. Finally, part of the grant involved the development of the McKenzie Watershed Conservation Fund, which is administered by Cascade Pacific Resource Conservation & Development (CPRCD) and manages multiple sources of funding for riparian/floodplain restoration and protection projects on private landowner properties that are under long-term PWP agreements.

Table 6-3: PWP Landowners

Landowners in PWP Program	Current Totals	2019 Goal
Initial PWP Intake Phase	9	--
PWP Riparian Assessment Phase	10	--
PWP Management Plan Phase	11	--
Signed PWP Agreements	8	20
PWP Naturescaping Landowners	28	--
Total Landowners in PWP	66	40
Total Acres in PWP Program	652	--
Total Acres Under PWP Agreements	71	200

Figure 6-1: Map of Landowner participation in Lower Watershed

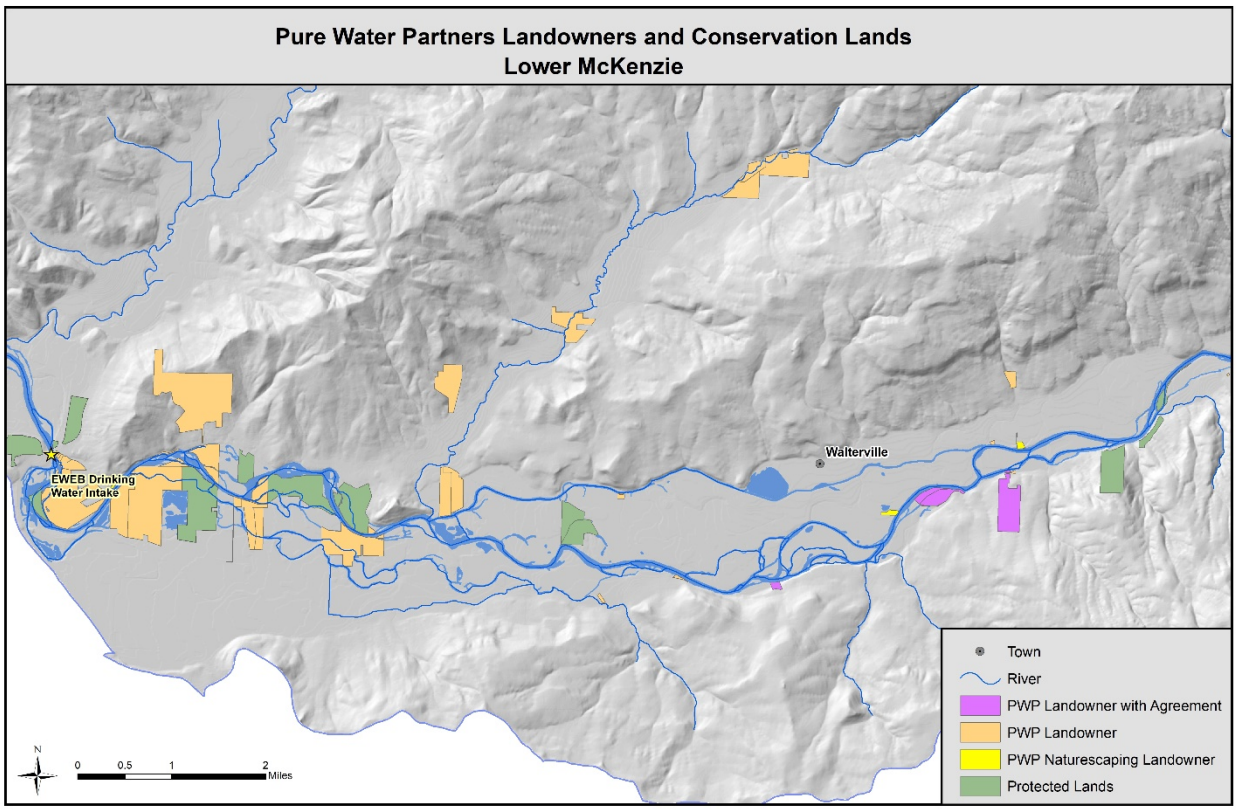
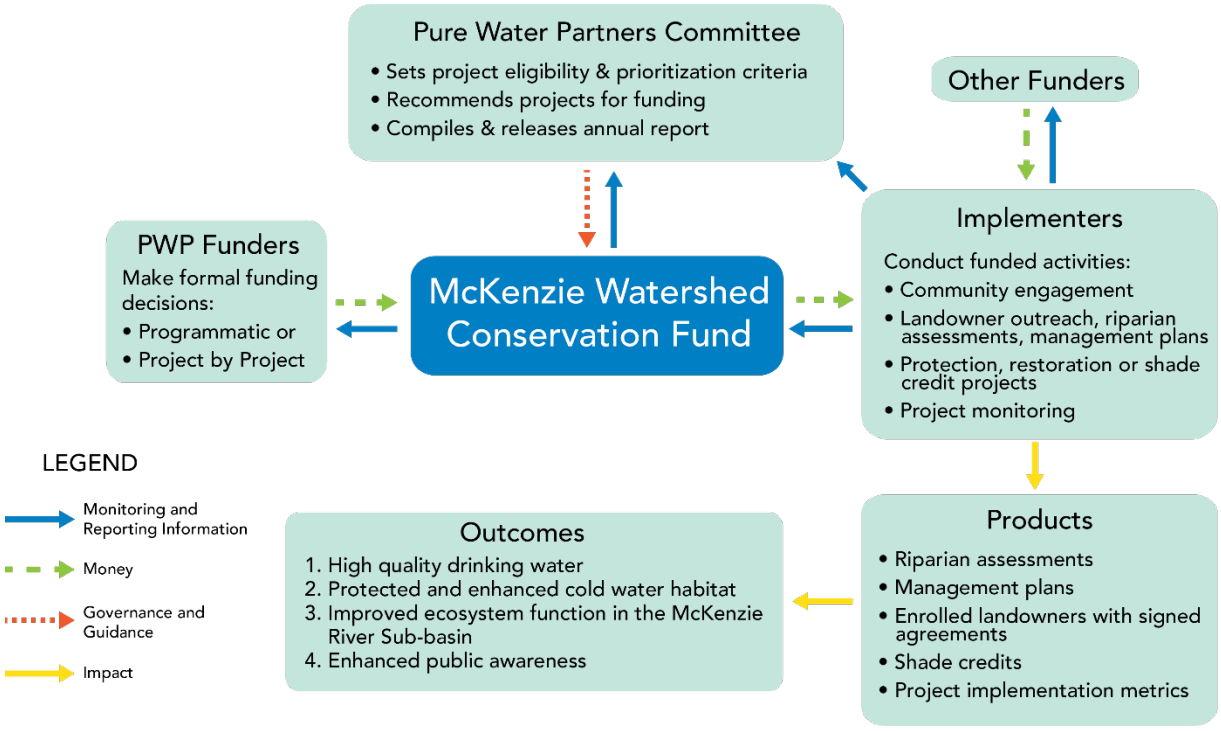


Figure 6-2: PWP Governance Structure

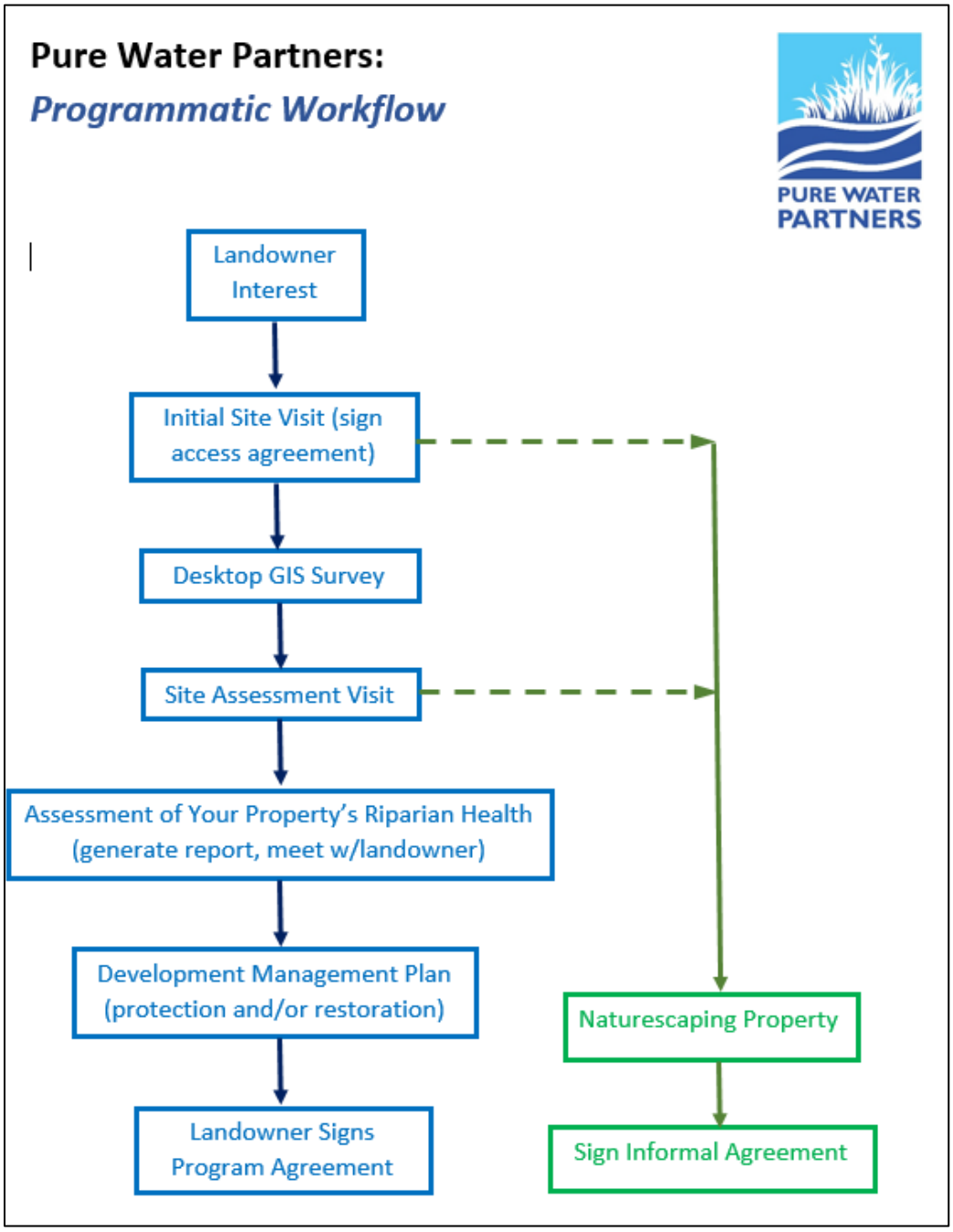


Note: See Appendix 1 for list of Pure Water Partners Committee members.

Programmatic Process

Figure 6-3 outlines the PWP programmatic process, or the steps that a PWP landowner goes through from initial contract to a signed agreement. The establishment of this programmatic infrastructure has been instrumental in scaling up landowner engagement and allowing partners to more effectively work together and support each other. We are working to export this programmatic approach to urban green infrastructure and future carbon sequestration programs (see Section 8.0).

Figure 6-3: PWP Programmatic Process



7.0 Other Threats

7.1 Illegal Camping

Figure 7-1: Map of Illegal Camps and Dumps 2018 & 2019 LCOG Site

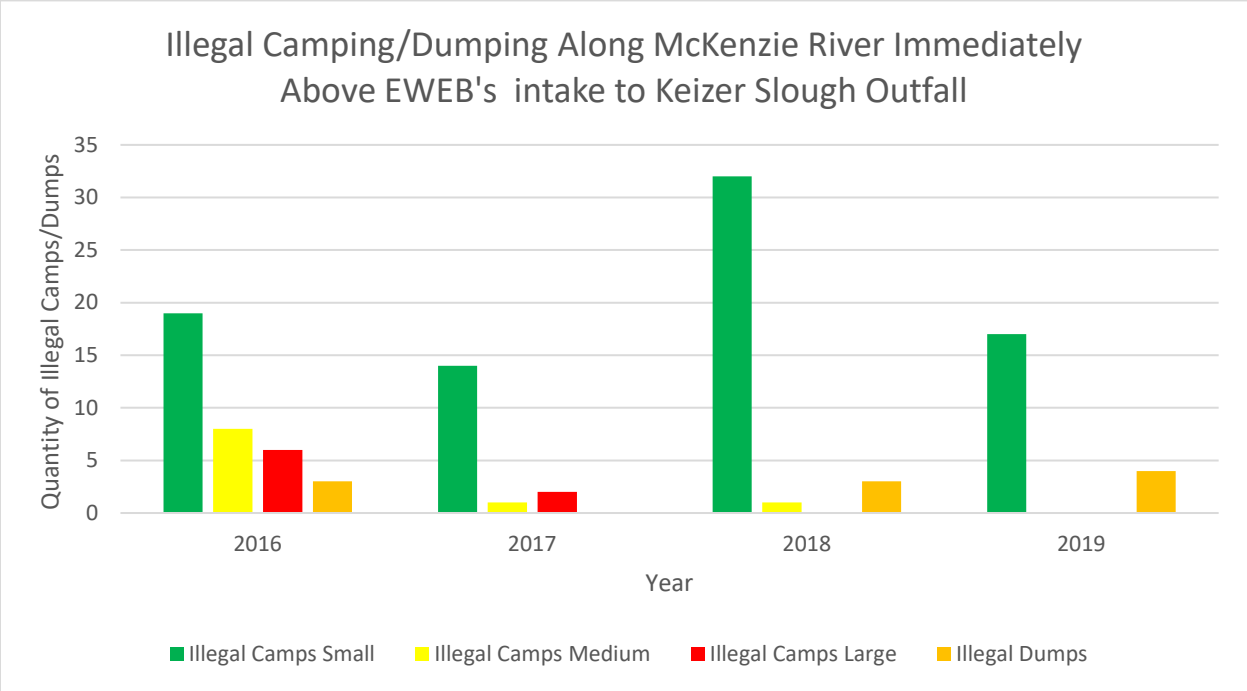
EWEB's Source Protection Staff's partnership with Willamalane Parks, City of Springfield, and Lane County was a critical step to reduce the amount of illegal camping and dumping in the riparian areas along the McKenzie River immediately above EWEB's intake to the Keizer Slough Outfall. The following are proactive management steps that have led to the reduction of illegal camping and dumping:

- The use of the LCOG web application to track illegal camping activity and problem areas. Figure 7-1 shows the LCOG map of camps found in 2018 and 2019.
- Willamalane and City of Springfield cleared out brush and trees to make problem areas more visible.
- In 2018 EWEB began to conduct boat surveys to access and patrol islands in the summer months.
- Patrol area more frequently. EWEB partners with Willamalane to conduct surveys of the area biweekly in the spring, summer and fall and monthly in the winter. Monitoring is increased if the amount of illegal camps/dumps increases. This partnership also addresses safety concerns associated with patrolling alone.

These proactive management steps have led to an overall decrease in illegal camps, camp size and trash in close proximity of EWEB's intake (see Figure 7-2). Increased monitoring and tracking using the LCOG app began in 2016. This led to a decrease in well-established larger camps. The continuous practice of

frequent monitoring and tracking, boat surveys of islands, and making problem areas more visible has led to less illegal camping.

Figure 7-2: Illegal Camping/Dumping Activity 2016-2019 Data from LCOG Site



7.2 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).

LCOG 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 way the data is reported, we can only see planned activities as reported by the industrial timber companies, but this at least gives us a sense of where harvest is occurring over the years. LCOG has experimented with developing an interactive map to view this data and is working on updating it to include more recent data (see http://purewaterpartners.org/249/Forestry).

The tables below show the planned harvest and spray data for the past 5 years, which indicate harvest activities are comparable to previous years while planned herbicide spray acres has tended to increase over the five years with 2019 having the most acres sprayed at nearly 25,000.

Table 7-1: Planned Harvest Acres, 2015-2019

Harvest Acres				
2019	**2018**	**2017**	**2016**	**2015**
4,537	5,455	4,044	6,530	1,638

Table 7-2: Planned Spray Acres, 2015-2019

Spray Acres				
2019	**2018**	**2017**	**2016**	**2015**
24,687	20,483	22,247	18,911	16,818

Stewardship Contracting

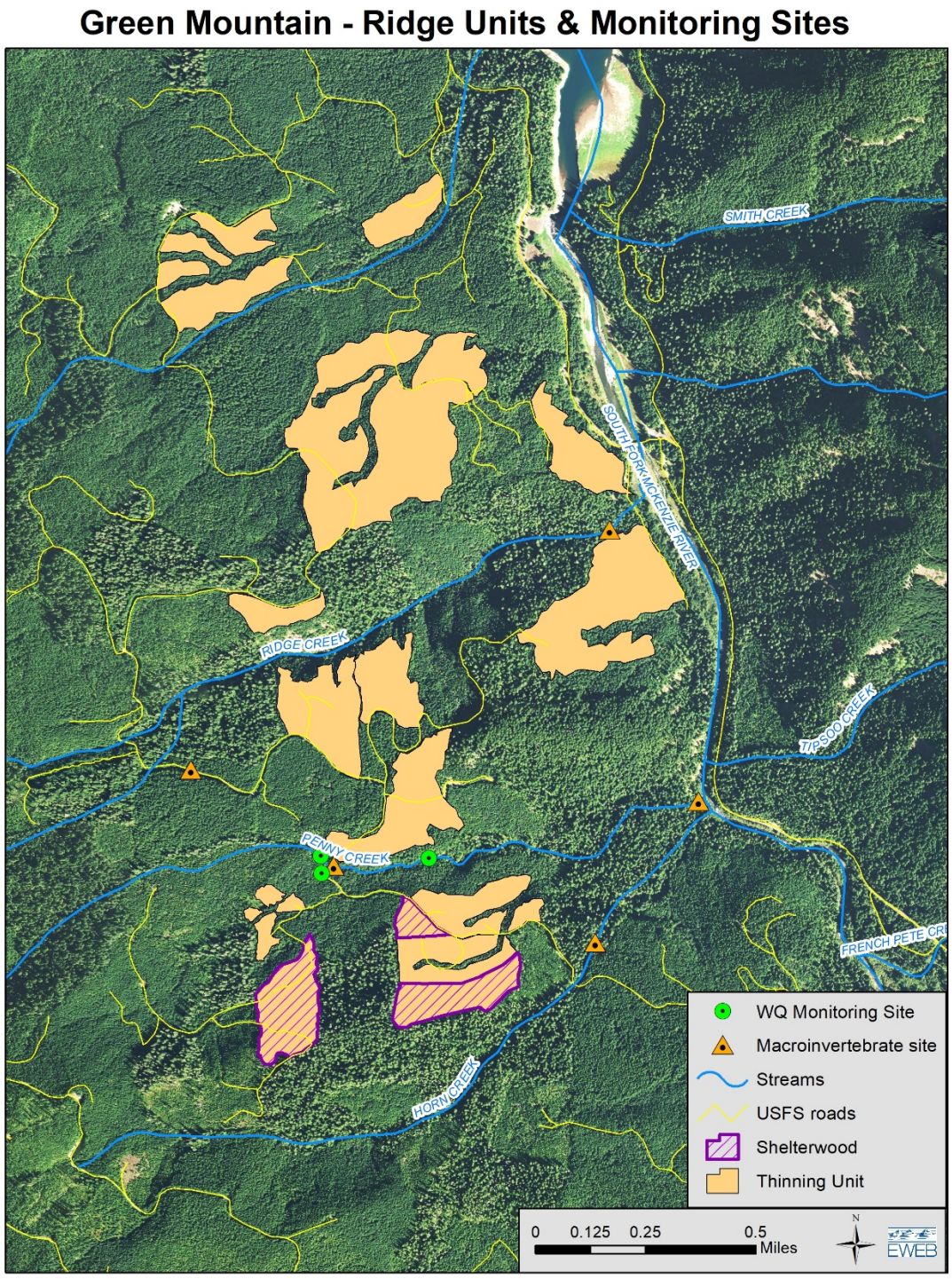
EWEB, the US Forest Service and a number of local partners (see Appendix 1), have been participating in the McKenzie Watershed Stewardship Group for the last 5 years. Stewardship contracting is a mechanism where timber receipts from harvests designed to increase forest health and reduce wildfire risk remain in the watershed to fund restoration on public and private lands. Retained receipts are one of the multiple funding sources for PWP. This collaborative group meets monthly and works 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. One stewardship sale (7 Thin) was completed generating approximately $130,000 in retained receipts and another one is currently in progress (Green Mountain Ridge Sale, see Figure 7-3) that is expected to generate over $1.0 million. The group has been working together to prioritize watershed restoration projects on both public and private lands and recommend where retained receipts could be spent. Receipts from 7-Thin were spent partly on USFS land and partially on private land (PWP landowners).

7.3 Agriculture

In the McKenzie watershed most agricultural land is located along the valley floor in close proximity to the river. Numerous studies have been conducted in the Willamette River Basin that looked at impacts of agricultural activities on streams, rivers and drinking water supplies and show that pesticides and nutrients occurred more frequently and at higher concentrations at monitoring sites located in agricultural areas.

The water quality data from samples collected downstream of agricultural land uses indicates various pesticides being detected at low levels and elevated *E. coli* levels that often exceed Oregon's recreational maximum exposure limit of 406 *E. coli* organisms per 100 mL. EWEB is working with farmers in the McKenzie Watershed to reduce chemical use and increase riparian buffers while improving their economic health to keep farmland as a preferred floodplain land use to development. These efforts

Figure 7-3: Green Mountain Sales; Ridge Stewardship Units



have made significant progress in removing old legacy chemicals for proper disposal, reducing pesticide and fertilizer use in hazelnut orchards, pulling cattle back from streams, and protecting and restoring riparian forests to make agriculture less of a threat than it was in the 2000 risk assessment.

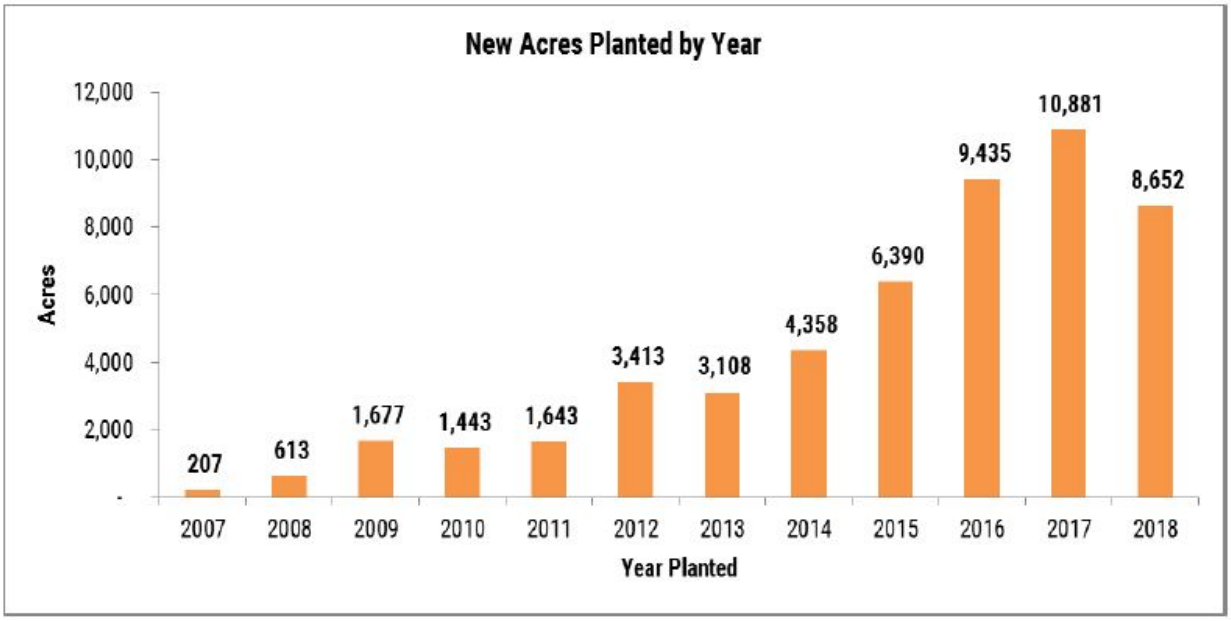
EWEB continues to support McKenzie growers in several ways. EWEB offers free soil and tissue sampling to growers to assess their current conditions, allowing fertilizer applications to be tailored to the actual need preventing over application and targeting use to address deficiencies. Finally, EWEB works with growers on a case-by-case basis to implement agricultural practices or projects that are protective of water quality.

Hazelnut Pesticide Reduction Project

EWEB has been working with McKenzie hazelnut growers for years on mating disruption and monitoring to alleviate impacts of the filbert worm (FBW) on their crops while reducing the amount of pesticides used. EWEB pays a contractor 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 FBW, if needed. Monitoring alone has helped to reduce pesticide use on hazelnut crops by 50%.

Over this past year, there has been momentum throughout the Willamette Valley around working with hazelnut growers on best practices to protect water quality and increase conservation work. Over the last three years, acreage in hazelnut orchards has increased by almost 30,000 acres in response to increasing domestic and world demand (see Figure 7-4), including new orchards in the McKenzie Watershed. A number of partners including EWEB, soil & water conservation districts, NRCS, other water utilities, OSU and OSU Extension have come together and started discussions around how best

Figure 7-4: New Acres of Hazelnut Production in the Willamette Basin



to support hazelnut growers while reducing water quality impacts by scaling up projects that have been working to a larger Willamette Basin scale. The Oregon Hazelnut Commission is also interested because they are currently working on an effort to develop a 3rd party stewardship certification for

growers that could include some of the same water quality beneficial practices that are working in the McKenzie and Yamhill areas.

Partners have applied for grant funding and so far have received word that this planning effort will be designated as a Governor's Oregon Solutions project. This means that staff from Oregon Solutions at Portland State University will help to facilitate a broad planning effort with partners to engage Willamette Basin hazelnut growers and other partners to develop a basin-wide program that can be rolled into a large NRCS Regional Conservation Partnership Program (RCPP) grant in fall 2020.

Camp Creek SIA

The Oregon Department of Agriculture designated the Camp Creek Watershed as a Strategic Implementation Area (SIA) in 2018. This means that this watershed receives focused outreach and education to address priority water quality concerns in the area. The Upper Willamette SWCD is the lead for conducting this outreach and working with landowners to make sure they comply with state water quality regulations; and offering technical assistance to implement voluntary measures to improve water quality.

National Water Quality Initiative: Source Water Protection Pilot

The NRCS recently expanded the scope of its National Water Quality Initiative (NWQI) to include a source water protection focus. The NWQI is a program of the USDA that "provides a way to accelerate voluntary, on-farm conservation investments and focused water quality monitoring and assessment resources where they can deliver the greatest benefits for clean water." The Upper Willamette SWCD partnered with EWEB to apply for this program and was successful in getting the McKenzie Watershed designated as one of the NWQI's source water protection pilot projects.

This means that NRCS, state water quality agencies and EPA will help local partners to expand source water protection plans and identify critical source areas needing conservation practices to help address water quality concerns. The NWQI Program allows NRCS to provide targeted funding for financial and technical assistance to project partners and farmers in needed areas. EWEB and the Upper Willamette SWCD anticipate funding might be available in the next couple of years to use for agricultural projects in the McKenzie.

8.0 Future Areas of Focus

8.1 Fires/HABs/Reservoir Management

EWEB is working with OSU and USGS to gain a better understanding of the impacts from wildfires as a source of nutrients that can fuel future harmful algal blooms. It is clear that one of the likely impacts of climate change is increased wildfires and more frequent algal blooms that have the ability to produce cyanotoxins. 2018 and 2019 saw a large investment of EWEB time and resources in understanding HABs, the types of algae associated with these blooms and if these specific types are able to produce

cyanotoxins. This effort will continue over time in order to build a library with algae types and determine which types produce cyanotoxins.

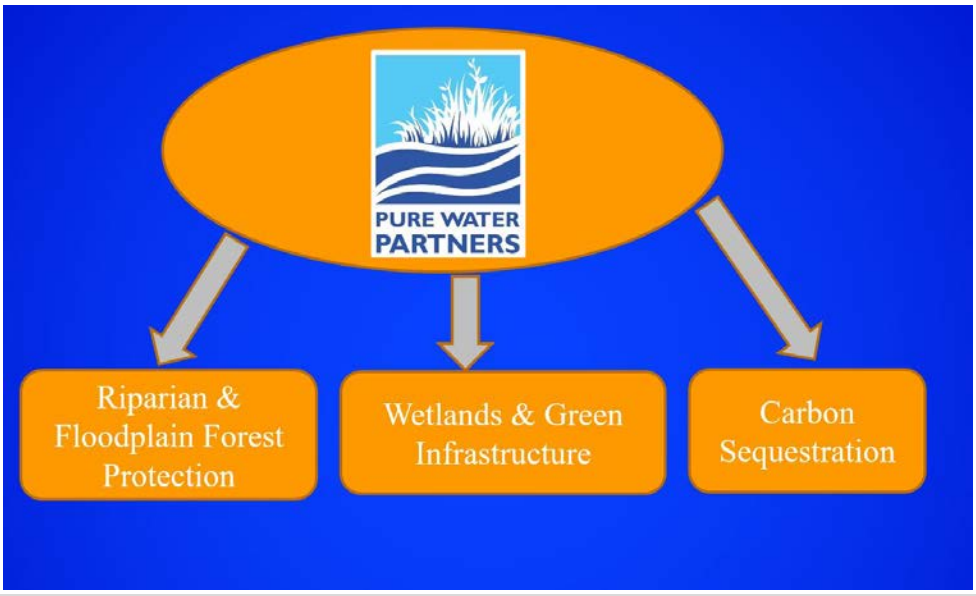
EWEB is also working closely with the Army COE and USGS to establish real-time monitoring stations that can provide an early warning of blooms. The Army COE and USGS will be installing a vertical profiling system in Cougar Reservoir that will provide real-time data on the depth that bloom activity is occurring. This can direct targeted monitoring and allow the Army COE respond to presence of cyanotoxins by releasing water from a different depth and changing reservoir operations to reduce discharge flows so adequate dilution of toxins is achieved when mixing with the McKenzie River. EWEB, Lane County Emergency Management, and the Army COE are planning to run a cyanotoxin incident exercise in April 2020 to test this system.

8.2 Carbon Sequestration/Offset Markets, Green Infrastructure and PWP

EWEB is exploring the creation of two new product lines for our customers to voluntarily contribute through monthly donations; carbon offsets and watershed stewardship. To support development of these products, source protection and customer solutions staff are working with the University of Oregon to establish long-term carbon research areas associated with forests, wetlands, and natural prairie/shrub ecosystems. This research will help inform design of a carbon offset program that invests in the McKenzie Watershed and provides water quality benefits as well as carbon sequestration. These carbon research areas can then be used to train a local work force to design, implement, and maintain McKenzie carbon projects that produce verifiable offset credits.

As mentioned in Section 4.3, EWEB and its partners are developing a program to scale up green infrastructure solutions for businesses that treat stormwater at its source. Given the success of developing a programmatic approach as part of the PWP that provides consistency in working with landowners to protect and restore riparian and floodplain forests, the vision is to have carbon offsets and green infrastructure added to this model (see Figure 8-1).

Figure 8-1: Future Expansion of Pure Water Partners Program



8.3 Willamette Basin Coordination

There are two efforts underway to scale up and more effectively coordinate watershed restoration and protection efforts across larger geographies in the Willamette Basin. One is development of the Upper Willamette Stewardship Network that now has a paid coordinator and is engaged in developing the green infrastructure program across the Eugene and Springfield. The other is developing a drinking water source protection plan for the entire Willamette Basin that involves the over 50 water utilities in the Basin.

In 2019, EWEB and Carpe Diem West completed development of the Willamette Basin source protection plan as part of the Willamette Future Project funded by Meyer Memorial Trust. The project is a collaboration among the Willamette River Initiative (Meyer Memorial Trust), Willamette water utilities, federal, state and local land use and emergency response agencies, and agriculture leaders. The goal of the Willamette Future Project is to advance successful work that has been tested on a smaller scale and is ready to be transferred and scaled up, and to pursue projects which have clear benefits to a number of water utilities across the Basin dealing with similar issues. Three areas of focus were recommended for initial investment and development by water utilities and associated partners:

1) Scaling up the pesticide reduction project for hazelnut growers and adding additional measures that benefit water quality (see Section 7.3);
2) Applying the Oregon Watershed Emergency Response System (OWERS) across the entire Basin to achieve a coordinated and consistent mechanism for spill response that integrates with DEQ and EPA response tools and more effectively leverages local resources (see Section 5.0); and,
3) Development of an on-line resource center for municipalities, water utilities, state agencies, Army COE, USGS, researchers, and the public to help understand and mitigate harmful algal blooms and cyanotoxins.

A core group of nearly a dozen of the largest water utilities in the Willamette Basin are working closely together with key partners to attract outside funding and develop collaborative networks that build off of existing systems and successes to move these three initiatives forward.

Appendix 1: Watershed Protection Active Partnerships

Partner	Water Quality Monitoring	Harmful Algal Blooms Monitoring	MWERS	Healthy Forests Clean Water	Urban Runoff Improvement Projects	Illegal Camp Monitoring	Septic System Assistance Program	Healthy Farms Clean Water	Pure Water Partners	Naturescaping
Cascade Pacific Resource Conservation & Development*				Fiscal Manager	Fiscal Manager			Fiscal Manager	Fiscal Manager	Fiscal Manager
City of Eugene					Partner, Funder	Partner				
City of Springfield	Partner		Partner		Partner, Funder	Partner				
Coast Fork Wilamette Watershed Council					Partner					
East Lane Forest Protection Association				Partner						
Eugene Springfield Fire			Implementer							
International Paper		Partner	Partner		Funder	Partner				
Lane Council of Governments	Technical Support		Technical Support	Technical Support		Technical Support			Technical Support	Technical Support
Lane County			Partner		Partner	Partner	Partner	Partner		
Local septic system companies							Education			
McKenzie Fire and Rescue			Implementer					Partner		
McKenzie Guides						Partner				
McKenzie River Trust*				Partner, Funder				Partner, Funder	Partner, Funder	
McKenzie Watershed Council*	Partner			Partner, Implementer	Implementer			Implementer	Implementer	Implementer
Metropolitan Wastewater Management Commission*					Partner, Funder				Partner, Funder	
Middle Fork Willamette Watershed Council					Partner					
Natural Resources Conservation Service								Partner, Funder		
Oregon Departmant of Environmental Quality	Partner	Partner	Partner				Funder	Funder		
Oregon Department of Fish and Wildlife						Partner				
Oregon Department of Forestry				Partner, Funder						
Oregon Department of Transportation			Partner		Partner					
Oregon Hazelnut Commission								Partner, Funder		
Oregon Health Authority		Partner			Funder					
Oregon State Parks						Partner				
Oregon State University	Partner, Funder	Partner, Funder						Partner		
Oregon State University Extension				Partner				Partner		
Oregon Watershed Enhancement Board				Funder					Funder	Funder

Oregon Wild				Partner						
Rainbow Water District			Partner		Partner					
Region 2 HazMat Team			Implementer					Partner		
City of Springfield			Partner		Partner, Funder					
Springfield Utility Board	Funder, Partner		Partner		Partner, Funder	Partner	Education	Partner		
The Freshwater Trust*									Implementer, Technical Support	Technical Support
U.S. Army Corps of Engineers	Partner, Funder	Partner, Funder	Partner							
U.S. Bureau of Land Management				Partner						
U.S. Environmental Protection Agency			Partner, Funder		Funder					
U.S. Forest Service*	Partner	Partner	Partner	Partner, Funder					Partner, Funder	
U.S. Geological Survey	Partner, Funder	Partner, Funder								
University of Oregon*				Partner, Funder					Research/Surveys	
Upper Willamette Soil & Water Conservation District*				Partner				Implementer	Implementer	Implementer
Whitewater Forests, LLC				Partner						
Willamalane Parks					Partner	Partner				
Willamette Partnership*									Facilitator	Facilitator
Willamette Riverkeepers						Partner				

* These partners are currently serve on the Pure Water Partners Committee.

APPENDIX 2

2018-2019 Grant Funding Summary Table

Grant (EWEB DWSP Program Supported)	Grant Amount	Purpose	Granting Organization	Grantee or Fiscal Manager
Landowner Outreach Grant (PWP)	$50,000	Inform, educate and recruit McKenzie landowners into PWP	Oregon Watershed Enhancement Board (OWEB)	Cascade Pacific Resource Conservation & Development (CPRCD)
Healthy Watershed Grant (PWP)	$143,000	Develop the McKenzie Watershed Conservation Fund; governance structure of the PWP; survey EWEB customers	U.S. Endowment for Forestry and Communities (with contributions from NRCS, EPA)	EWEB
Developmental Focused Investment Program (PWP)	$136,000	Develop annual work plan template, operating plan, and financial plan. Explore program transferability options.	OWEB	CPRCD
Programmatic Support Funding (PWP)	$30,000	Provide funding to support PWP programmatic infrastructure	Metropolitan Wastewater Management Commission (MWMC)	CPRCD
Riparian Restoration Funding (PWP)	$30,000	Provide funding for riparian restoration on PWP landowner properties	USFS WNF Stewardship Contracting Retained Receipts	CPRCD
Willamette Basin Drinking Water Protection (Healthy Farms Clean Water, OWERS, HABs/cyanotoxins)	$100,000	Facilitate development of a Willamette Basin drinking water source protection plan among 10-12 utilities to align investments and coordinate efforts	Meyer Memorial Trust (MMT)	Carpe Diem West
Spill Equipment and GIS Support (OWERS)	$3,100	Purchase spill response equipment	Springfield Utility Board (SUB)	EWEB

Grant (EWEB DWSP Program Supported)	Grant Amount	Purpose	Granting Organization	Grantee or Fiscal Manager
		for OWERS trailers and ArcGIS fees		
Scale-Up Hazelnut Pesticide Reduction Program (Healthy Farms Clean Water)	$25,000 (In-Kind Facilitation and Project Management Services)	Provide facilitation and project management to develop Willamette Basin wide proposal for NRCS RCPP funding	Portland State University – Governor's Oregon Solutions Program	EWEB
Scale-Up Hazelnut Pesticide Reduction Program (Healthy Farms Clean Water)	$25,000	Develop Willamette Basin wide proposal for NRCS RCPP funding	Meyer Memorial Trust (MMT)	CPRCD
Scale-Up Hazelnut Pesticide Reduction Program (Healthy Farms Clean Water)	$63,800 (Pending)	Develop Willamette Basin wide proposal for NRCS RCPP funding	OWEB	CPRCD
Community Capacity and Land Stewardship (Healthy Forests Clean Water)	$15,000	Build stewardship group capacity, facilitation, plan and develop stewardship contracts	National Forest Foundation	CPRCD
Stewardship Group Facilitation and Monitoring (Healthy Forests Clean Water)	$12,000	Fund stewardship group facilitation and conducting water quality monitoring on Ridge Harvest	Oregon Department of Forestry (ODF)	CPRCD
Support Water Quality Monitoring and Streamflow Gages (Water Quality Monitoring)	$187,000	Cost share real-time water quality monitoring stations and stream flow gages	USGS	USGS
Support Water Quality Monitoring and Streamflow Gages (Water Quality Monitoring)	$120,000	Fund installation of vertical profiling water quality monitoring station at Cougar Reservoir	Army COE	USGS
Support Water Quality Monitoring (Water Quality Monitoring)	$30,200	Provide funding for water quality monitoring and Cedar Creek gage	SUB	EWEB

Grant (EWEB DWSP Program Supported)	Grant Amount	Purpose	Granting Organization	Grantee or Fiscal Manager
Develop Urban Green Infrastructure Program (Urban Runoff)	$200,000 (Pending)	Develop coordinated green infrastructure program for Eugene and Springfield	US EPA	CPRCD
Develop Urban Green Infrastructure Program (Urban Runoff)	$50,000 (Pending)	Develop coordinated green infrastructure program for Eugene and Springfield	Oregon Health Authority (OHA)	EWEB and SUB
Wetland restoration at 52nd Street Stormwater (Urban Runoff)	$20,000	Remove invasive plants and replant with native wetland plants, shrubs and trees	International Paper	EWEB
Wetland design at 52nd Street Stormwater (Urban Runoff)	$30,000	Wetland design and invasive vegetation removal at 52nd Street stormwater channel	OHA	EWEB
Wetland trashrack design at 52nd Street Stormwater (Urban Runoff)	$7,000	Wetland design for upstream trash rack to remove garbage prior to wetland	City of Springfield	EWEB