2023-2025
Walla Walla Basin Pesticide Stewardship Partnership
Final Report

Final Report
ODA-4421-GR

Pesticide Stewardship Partnership Project
Walla Walla Basin Watershed Council

Cooperative project partners included:
Oregon Department of Agriculture
Oregon Department of Environmental Quality
Blue Mountain Horticultural Society
Oregon State University Extension
Salmon-Safe

Table of Contents

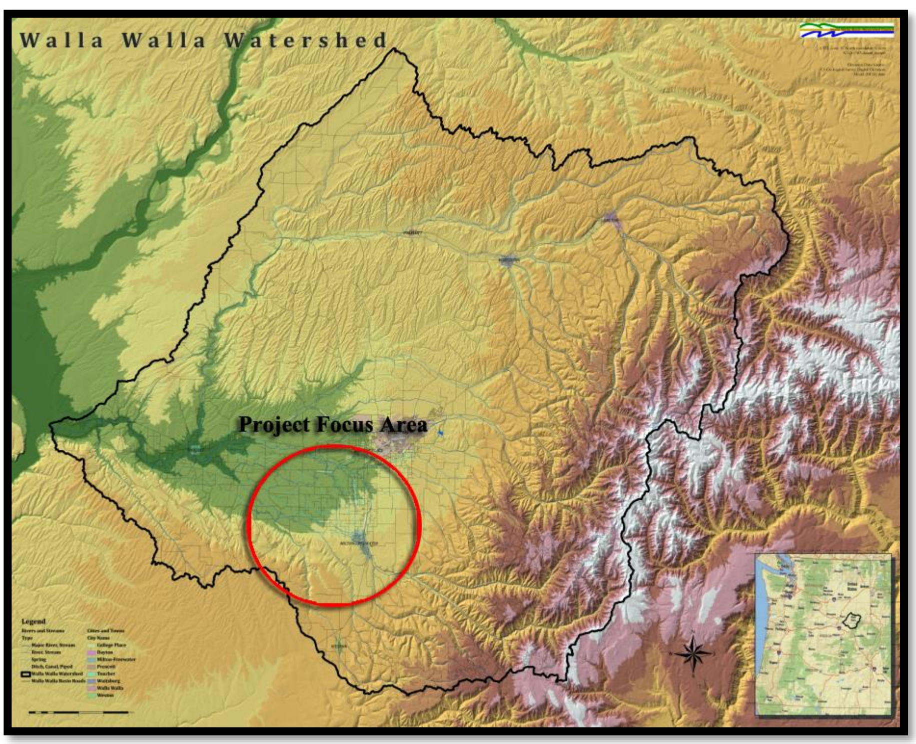
Appendices

Overview

This project supports the protection and improvement of water quality in the Walla Walla Basin, where agricultural practices for perennial systems like orchards or vineyards, and annual systems like cereal grains, seed crops, and legumes have a large influence on watershed conditions. The project used a collaborative, partnership-driven approach to conduct surface water monitoring, with a primary focus on current-use pesticides. A range of agricultural best practices were promoted, including integrated pest management, precision application timing, and the use of lower-toxicity pesticides to reduce impacts on aquatic life. Performance measures include in-stream effectiveness monitoring and tracking changes in management practices by acreage. This report focuses on the collection and processing of surface water grab samples conducted by the Walla Walla Basin Watershed Council (WWBWC) throughout the basin. During the grant period, the Walla WWBWC continued to follow its previously developed five-year strategic plan, which is included in Appendix C.

Background

The Walla Walla Basin near Milton-Freewater, Oregon (Map 1) is predominantly an agricultural region, with a significant portion of the landscape dedicated to tree fruit production, particularly apples and cherries. Other major crops in the area include wheat, oilseeds, legumes, and wine grapes. To control insect pests, organophosphate insecticides are commonly applied during the spring and summer. However, these insecticides are highly toxic to fish and other aquatic organisms. Their use in the basin coincides with critical life stages of ESA-listed mid-Columbia steelhead, including upstream migration, spawning, early development, and the downstream migration of smolts, raising concerns about potential impacts on this sensitive species.



Map 1: Project Focus Area in the Walla Walla Watershed in Oregon

Project History and Most Recent Data (2022-2024)

This project supports in-stream effectiveness monitoring to evaluate how agricultural Best Management Practices (BMPs) are reducing pesticide impacts on water quality. Key goals include lowering the concentration, total load, and toxicity of pesticides used in both perennial and annual cropping systems, especially those targeting insect pests in tree fruit and seed crops.

Since 2005, entities in the Walla Walla Basin have built a foundation of collaborative stewardship through the Pesticide Stewardship Partnership (PSP). Local partners include the Walla Walla Basin Watershed Council, Oregon State University Extension (Milton-Freewater), Washington State University, and the region's tree fruit growers, historically coordinated through the Blue Mountain Horticultural Society. While the Society is no longer meeting regularly, reestablishing consistent communication with growers remains a key priority, especially following recent staffing transitions.

Water sampling occurred during pesticide application windows to capture potential runoff and drift events. In 2009 and 2010, the scope of pesticide monitoring significantly expanded from 12 to over 100 compounds, including herbicides (e.g., 2,4-D, triclopyr, diuron), fungicides (e.g., chlorothalonil), and insecticides (e.g., carbaryl, imidacloprid). Many of these chemicals do not yet have formal aquatic life benchmarks established, though the Oregon Department of Environmental Quality (ODEQ) is working on developing guidance values for current-use pesticides (Masterson, 2009)[1]. While Total Maximum Daily Loads (TMDLs) are in place for legacy pollutants such as DDT, PCBs, and temperature in both Oregon and Washington portions of the basin, these TMDLs do not currently address pesticides in active use.

However, recent monitoring (2022–2024) detected insecticides in the Little Walla Walla River distributary system during agricultural spray periods. In 2024, imidacloprid was detected at 0.306 μg/L on the West Prong Walla Walla River south of Stateline Road, exceeding the EPA chronic aquatic life benchmark of 0.01 μg/L. Pyriproxyfen was detected in 2022 (first detected in 2020) at the West Branch/Crockett Road site, exceeding the EPA chronic aquatic life benchmark. These exceedances are notable, as imidacloprid had never been detected in prior years of PSP monitoring within the Walla Walla Basin. Their recent appearance suggests a shift in pesticide use patterns and highlights the importance of continued monitoring. Imidacloprid is currently classified as a pesticide of high concern and pyriproxyfen is a pesticide of moderate concern in the Walla Walla Basin. Glyphosate is also designated as a pesticide of moderate concern, not because of high toxicity to aquatic life, but due to its frequent detection in surface water samples.

Chlorpyrifos, once commonly detected, was found in 2019 samples at an average concentration of 0.11 μg/L, approximately 20 times higher than the benchmark of 0.0056 μg/L. Following implementation of stricter regulatory controls, chlorpyrifos was undetected in 2020 and in subsequent years. This decline may indicate a shift in pest management practices toward alternatives like imidacloprid and pyriproxyfen, now appearing in current monitoring results.

Carbaryl, a widely used insecticide, has recently undergone label revisions requiring applicators to consult the "Bulletins Live! Two" website for area-specific application restrictions. In response, the Walla Walla Basin Watershed Council has elevated carbaryl as a pesticide of low concern, not due to over-benchmark detections, but to raise awareness of these regulatory changes. This designation supports a broader outreach effort aimed at helping applicators stay informed about evolving requirements and encouraging the adoption of best management practices.

Project Goals

The primary water quality objectives of this project are to reduce the environmental impact of pesticide use by:

- **Lowering the concentration** of pesticide active ingredients in surface waters,
- **Minimizing total pesticide load** entering water bodies through non-point source pathways such as runoff, drift, and leaching, and
- **Decreasing the frequency and severity of aquatic toxicity** events, particularly those exceeding EPA Aquatic Life Benchmarks for sensitive species.

This work is driven by detections of key compounds, such as imidacloprid and glyphosate, that have either exceeded toxicity thresholds or have high detection frequencies in prior monitoring seasons. Reducing these risks supports ecosystem health, aligns with voluntary Best Management Practices (BMPs) promoted since the PSP's formation, and helps protect beneficial species and downstream users.

5. Monitoring Methods and Locations

The WWBWC conducted targeted grab sampling at five strategic locations across the orchard district within the Walla Walla Valley, with laboratory analysis performed by the Oregon Department of Environmental Quality (ODEQ) in Hillsboro. This monitoring effort supports the region's Pesticide Stewardship Partnership (PSP) goals and provides critical data on pesticide presence and aquatic toxicity.

Role of the Walla Walla Basin Watershed Council (WWBWC)

Conduct water quality sampling described below, including surface water grab samples and field water quality measurements. ODEQ delivered and approved a Sampling and Analysis Plan (SAP and Quality Assurance Project Plan (QAPP) for Water Quality Toxics (DEQ05-LAB-0022-QAPP), which describes the specific procedures and data quality objectives required.

Water Quality Sampling

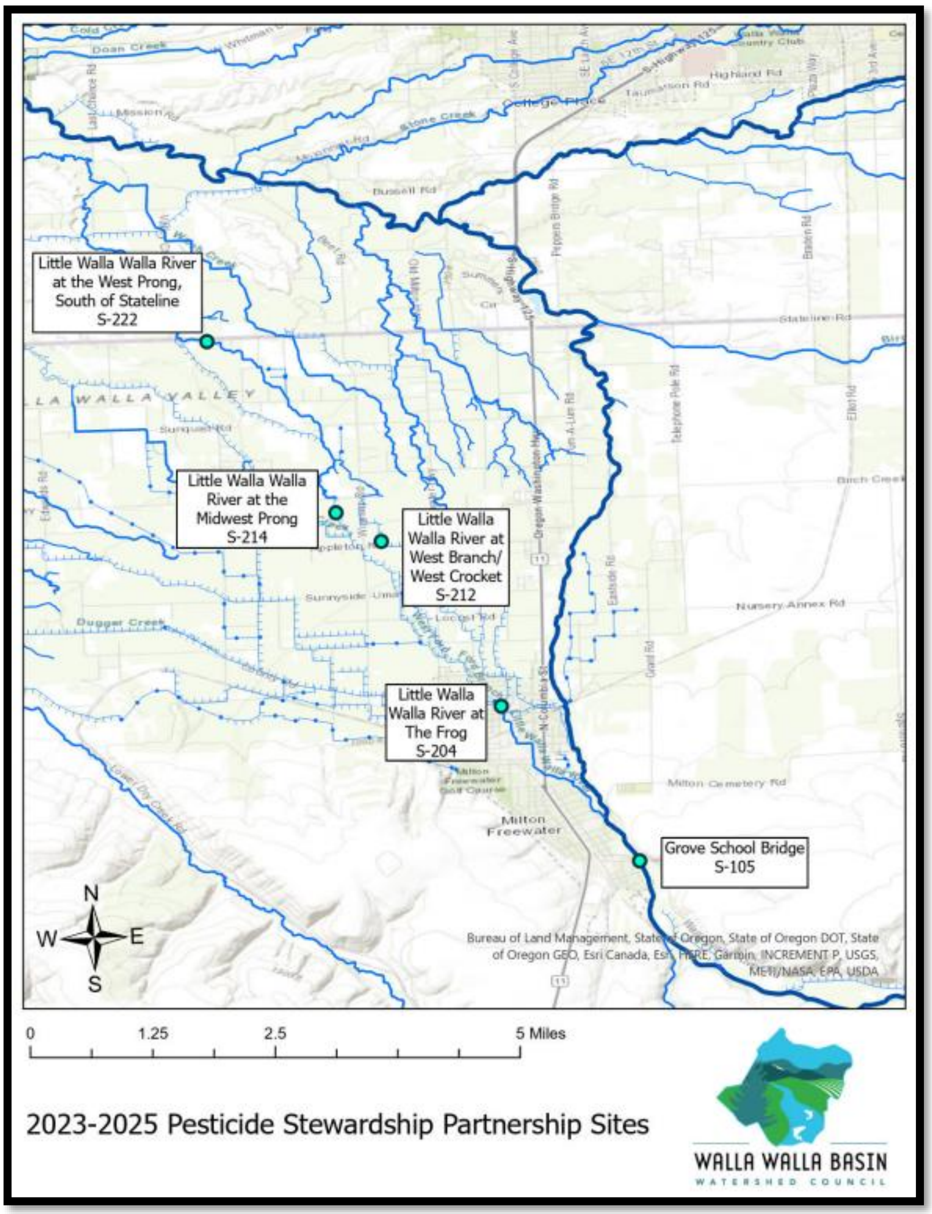
In 2023 through 2025, five primary locations along the Little Walla Walla River distributary system and mainstem Walla Walla River were sampled at regular intervals during peak agricultural pesticide application periods. Samples were analyzed for organophosphate insecticides, herbicides, and fungicides [2]. The monitoring locations represent streams influenced by orchards, dryland pea and wheat, and other agricultural uses of pesticides as well as urban and roadside use. The WWBWC uses all five grab sample locations for surface water data collection. Flow and water quality data from completed and ongoing studies are being used to complement the data collection of this study. The Walla Walla River Irrigation District controls flow in the Little Walla Walla River's distributaries that provide irrigation water to orchards in the lower valley. Because of water agreements currently in effect in the basin, flow is interrupted in the Little Walla Walla between the Little Walla Walla diversion and the springs areas, resulting in periods of no flow during the pesticide application period.

Sampling Days and Timing

The sampling events occurred concurrently with the application of pesticides to the local orchards and the availability of the ODEQ to process the collected samples. During this grant period, sampling began in late March, with the last water sample collected at the end of October for 2024 and 2025.

Sample Collection
Samples were collected in the morning once a week from Monday through Thursday. On each sampling day, WWBWC traveled to the selected sampling locations, collected required samples, conducted field measurements, completed laboratory paperwork, and shipped the water samples to the ODEQ laboratory. The collected water samples were packed in ice inside coolers and sent to the laboratory within 24 hours after the field sample was taken.

Sampling Locations



Map 2: Sampling Locations

Four of the five sites used to collect samples are also set up as near real-time gage stations with flow data available on the WWBWC website (https://wwbwc.org/index.php/streamflow). The Grove School Bridge site gage data is provided by the Oregon Water Resources Department (OWRD). Below are brief descriptions of each site:

- The Grove School Bridge site (LASAR # 32007) is on the mainstem Walla Walla River and serves as an upstream reference point, representing baseline water quality conditions prior to inputs from urbanized zones, orchards, and vineyards. This site reflects a mix of land uses including forested areas, livestock operations, dryland agriculture, and irrigated crops and pasture.

- The Frog site (LASAR # 32012) represents the water quality conditions downstream of urban stormwater inputs to the Little Walla Walla River, upstream of most lower valley orchard activity.

- The West Branch/West Crockett of the Little Walla Walla River site (LASAR # 33084) gathers information on pesticide concentrations in the Ford distributary subsystem on the West Branch before influence from the arc of springs but near the heart of the most orchard and vineyard activity.

- The Midwest Prong Little Walla Walla site (LASAR # 33083) gathers information on pesticide concentrations in the Ford distributary subsystem. This site is upstream of the collection site at Stateline Road comparing detections of these sites can help determine the "who, what, and when" of outreach needs.

- The West Prong Little Walla Walla at Stateline Road site (LASAR # 32010) gathers information on pesticide concentrations in the Ford distributary subsystem downstream of the arc of springs, near the likely lower boundary of fish habitat. Water quality here is very important as ditched systems turn back into natural streams when they cross the Washington border. Access to this site is on private property and requires written approval from the property owner.

Summary

From 2022 to 2024, the Walla Walla Basin Watershed Council (WWBWC) continued its proactive monitoring program to support cleaner waterways and healthier ecosystems. Through weekly grab sampling at five key sites, the Council and its partners, including the Oregon Department of Environmental Quality (ODEQ), gathered valuable data to better understand when, where, and how pesticides appear in local streams.

The results highlight meaningful progress and provide direction for future action. Notably, **chlorpyrifos**, once a frequent detection well above EPA aquatic life benchmarks, has not been detected in surface water samples since 2020. This alludes to the success of updated regulations and evolving pest management practices by local growers.

As growers shift toward newer products, monitoring helps identify and respond to emerging risks. In May 2024, **imidacloprid**, a neonicotinoid insecticide, was detected at a level above EPA's chronic

benchmark. While this was an isolated detection, it signals a timely opportunity to engage with growers, refine outreach, and promote targeted stewardship practices.

Between 2022 and 2024, the monitoring program flagged:

- **1 pesticide of high concern**:
    - *Imidacloprid* – Detected once in 187 samples, at a level that may affect aquatic species during sensitive life stages.
- **2 pesticides of moderate concern**:
    - *Glyphosate* – Detected in 31 of 66 samples, indicating a consistent presence.
    - *Pyriproxyfen* – Detected once in 187 samples, with one exceedance noted in 2022.
- **1 pesticide of low concern:**
    - *Carbaryl* – Detected at levels well below aquatic life benchmarks. However, the U.S. EPA has recently updated its label to include Endangered Species Protection Bulletin requirements. Applicators are now required to consult the "Bulletins Live! Two" website to check for location-specific restrictions before applying the product, ensuring protection of threatened and endangered species.

These findings emphasize the importance of continued sampling during high-use periods and confirm that current methods are effective at identifying both legacy and emerging concerns. Upstream sites like Grove School Bridge provide a water quality baseline, while other sites, such as West Prong and West Branch/Crockett, help focus outreach efforts in areas influenced by orchard activity.

Results will be shared publicly at the WWBWC board meeting on **June 16, 2025, at 7:00 p.m.** The findings support ongoing collaboration with growers, OSU and WSU Extension, and state regulators to advance *voluntary* **Best Management Practices (BMPs)** such as Integrated Pest Management (IPM), improved spray timing, and the use of lower-risk products. Together, these efforts strengthen the Walla Walla Basin's commitment to protecting water quality, fish habitat, and agricultural productivity.

Appendix 1

List of Pesticides Analyzed

Herbicide

2,4-D, 2,4,5-T, Acetochlor, Acifluorfen, Alachlor, Ametryn, Atrazine, Atraton, Bromacil, Butachlor, Butylate, Chlorpropham, Chlorthal-dimethyl, Cyanazine, Cycloate, Dacthal, Dicamba, Dichlobenil, Dichlorprop, Dichlorvos, Dinoseb, Diuron, Dimethenamid, Diphenamid, Deisopropylatrazine, EPTC (Eptam), Ethofumesate, Fluridone, Glyphosate, Hexazinone, Imazapyr, Linuron, Metribuzin, Metolachlor, Metsulfuron-methyl, Molinate, Napropamide, Neburon, Norflurazon, Oxyfluorfen, Pebulate, Pentachlorophenol, Pendimethalin, Picloram, Prometon, Prometryn, Pronamide, Propachlor, Propazine, Pyraflufen-ethyl, Siduron, Simazine, Simetryn, Silvex, Sulfometuron methyl, Tebuthiuron, Terbacil, Terbutryn, Terbutylazine, Triclopyr, Trifluralin, and Vernolate.

Insecticide

Acephate, Acetamiprid, Aldrin, alpha-BHC; Aminocarb, Azinophos Methyl, Baygon, beta-BHC, Bifenthrin, Carbaryl, Carbofuran, Chlorpyriphos (Dursban), cis-Chlordane, Chlorobenzilate, DEET, delta-BHC, Diazinon, Dichlorvos, Dieldrin, Dimethoate, Disulfoton, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Ethoprop, Ethoprophos, Fenamiphos, Fenvalerate + Esfenvalerate, Fipronil, Heptachlor, Imidacloprid, Imidan, Lindane, Malathion, Methyl paraoxon, Methyl parathion, Mexacarbate, Methomyl, Methoxychlor, Methiocarb, Mevinphos, Mirex, MGK-264, Oxyamyl, Permethrin, Parathion, Propoxur, Pyriproxyfen, Terbufos, Tetrachlorvinphos, trans-Chlordane, and trans-Nonachlor.

Fungicide

Azoxystrobin, Carboxin, Chloroneb, Chlorothalonil, Etridiazole, Fenarimol, Fluometuron, Fludioxonil, Propiconazole, Pyraclostrobin, Triadimefon, Tricyclazole, and Trifloxystrobin

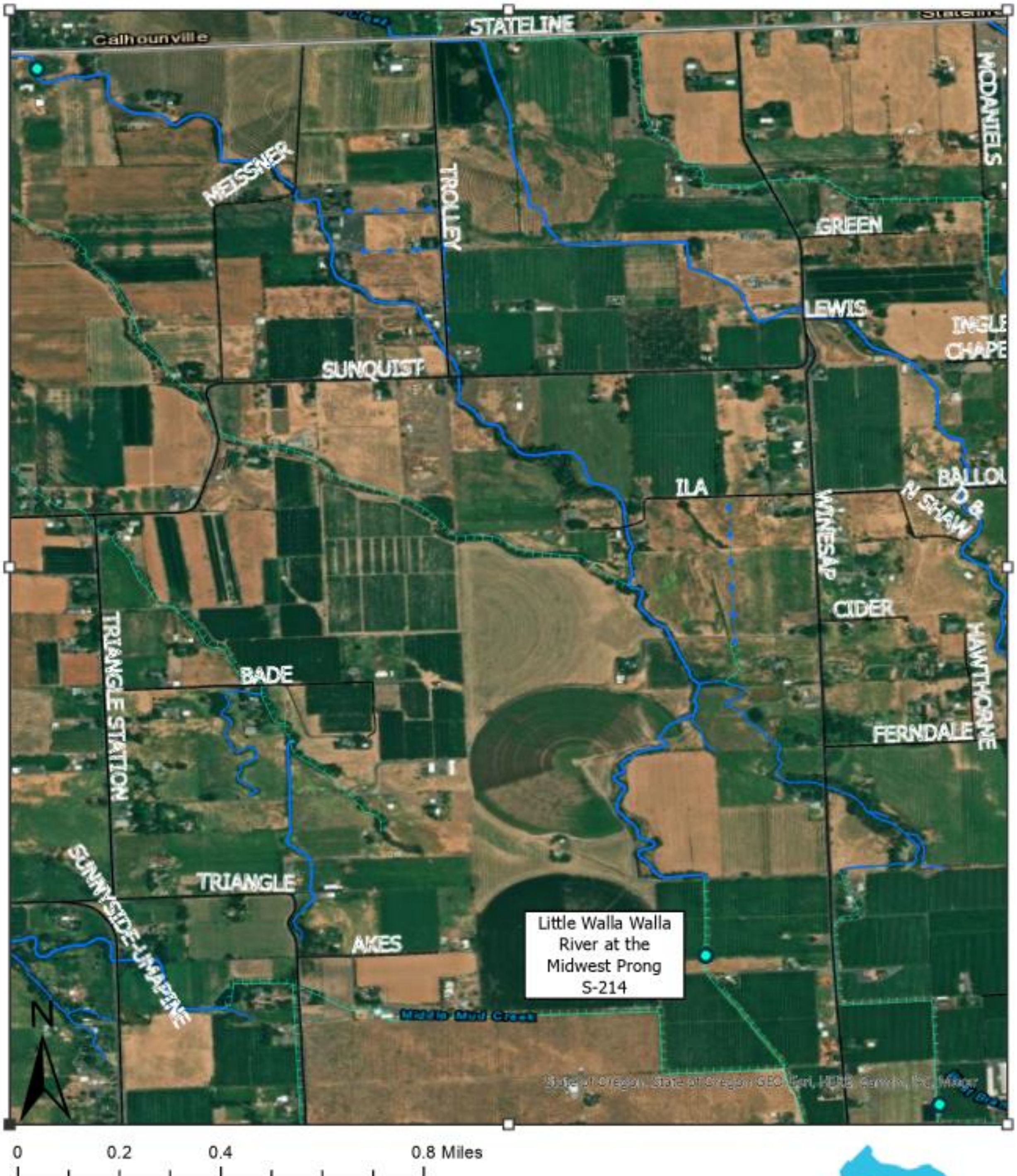
Metabolite/Degradation Product

4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Chlorobenzilate, Chlorthal monoacid and diacid degradates, Hexachlorobenzene, Hexachlorocyclopentadiene, (RS)-AMPA (Aminomethyl phosphonic acid), Hexachlorocyclohexane, Endosulfan,

Appendix 2

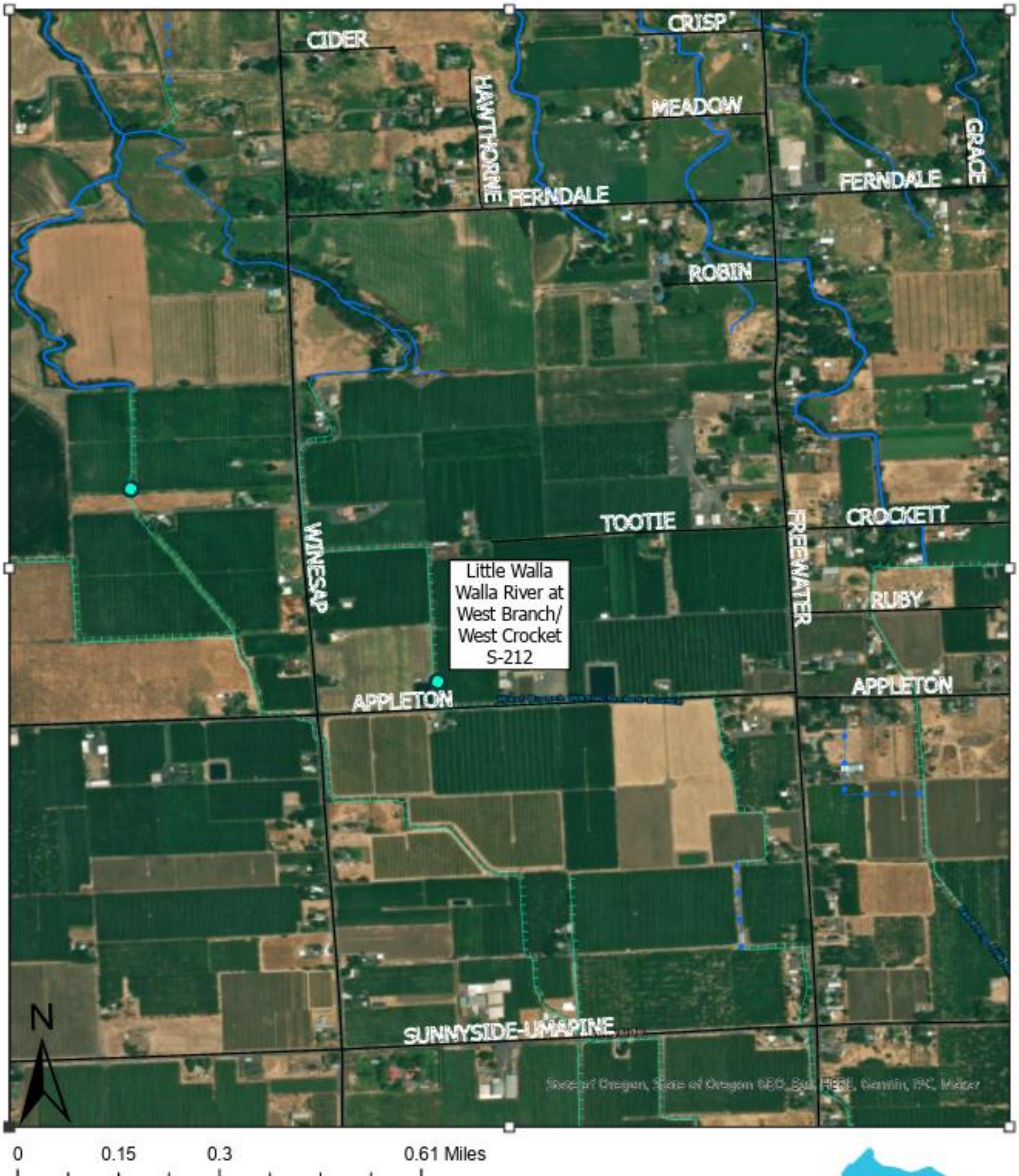
Site Location Maps

2023-2025 Pesticide Stewardship Partnership Sites



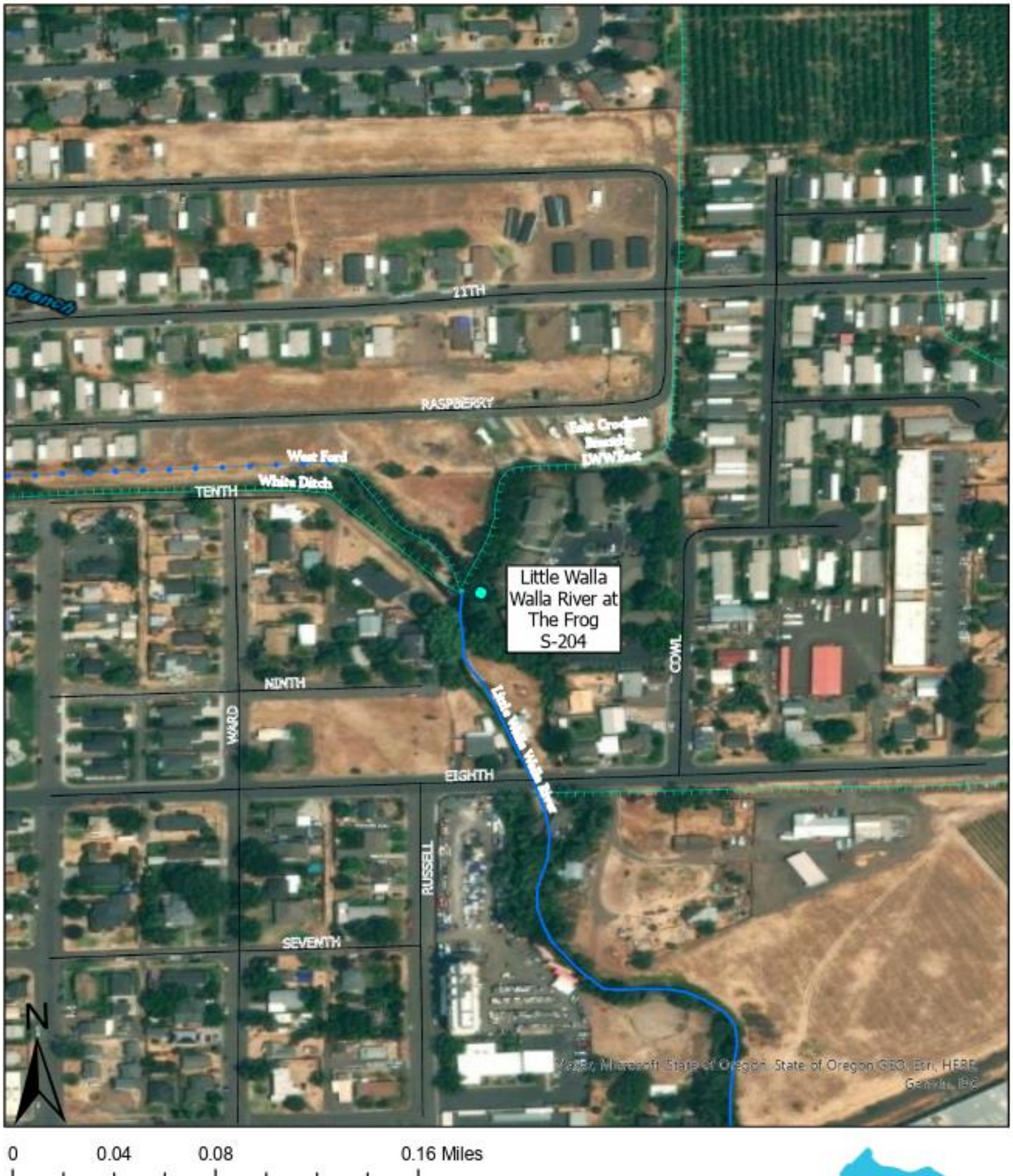
2023-2025 Pesticide Stewardship Partnership Sites

WALLA WALLA BASIN
WATERSHED COUNCIL



2023-2025 Pesticide Stewardship Partnership Sites

WALLA WALLA BASIN



2023-2025 Pesticide Stewardship Partnership Sites

WALLA WALLA BASIN

2023-2025 Pesticide Stewardship Partnership Sites

WALLA WALLA BASIN
WATERSHED COUNCIL

Appendix 4

Five-Year Strategic Plan

Walla Walla
Pesticide Stewardship Partnership
Strategic Plan

Prepared by the Walla Walla Basin Watershed Council

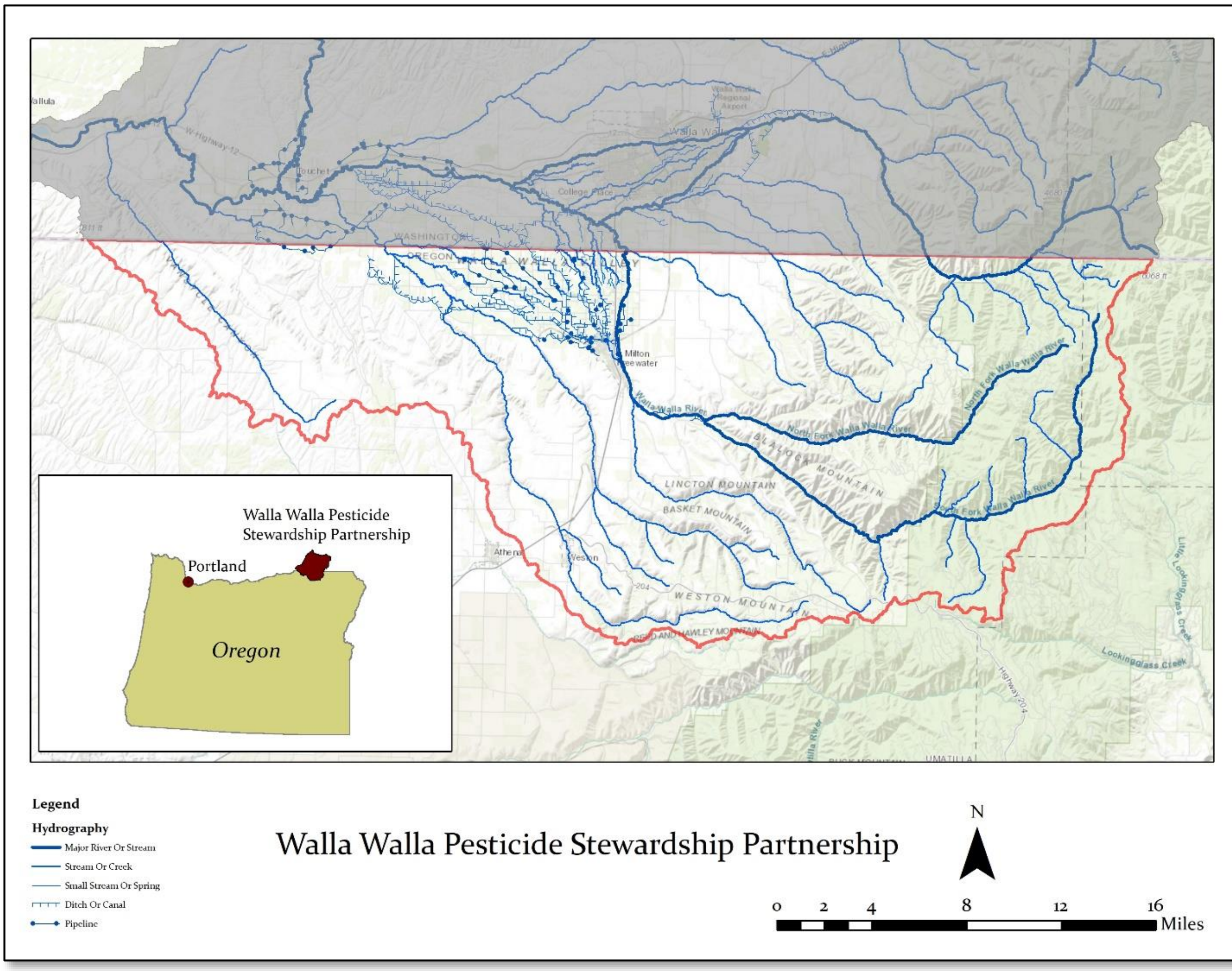
July 2020

Walla Walla Basin Watershed Council

Contents

1. Background and Context

The Walla Walla Basin in the vicinity of Milton-Freewater, Oregon (map 1) is primarily an agricultural area, with tree fruits such as apples and cherries comprising a significant proportion of the farming land in the area. The other major crops in the area include wheat, peas, wine grapes, and row crops. Typically, apple orchards use organophosphate pesticides in the spring and summer to control insects. These insecticides are toxic to fish and other aquatic life. In addition, organophosphate pesticide use in the Walla Walla Basin overlaps with mature wild steelhead upstream migration, spawning, early life stage development, and migration of smolts downstream.



Map 1. Walla Walla River Watershed (Oregon)

The Walla Walla Basin Watershed Council (WWBWC) has a history of monitoring water quality and quantity in the PSP project area. Multiple surface flow gauge sites are established on the major rivers and streams within the Oregon portion of the watershed to provide water quality baseline data and surface water trend data. The specified monitoring locations are crucial to the success of the PSP program in the Walla Walla Basin. The relationships built through establishing the monitoring locations formed the support for the Walla Walla PSP program.

1.1 Oregon's Pesticide Stewardship Partnership Program

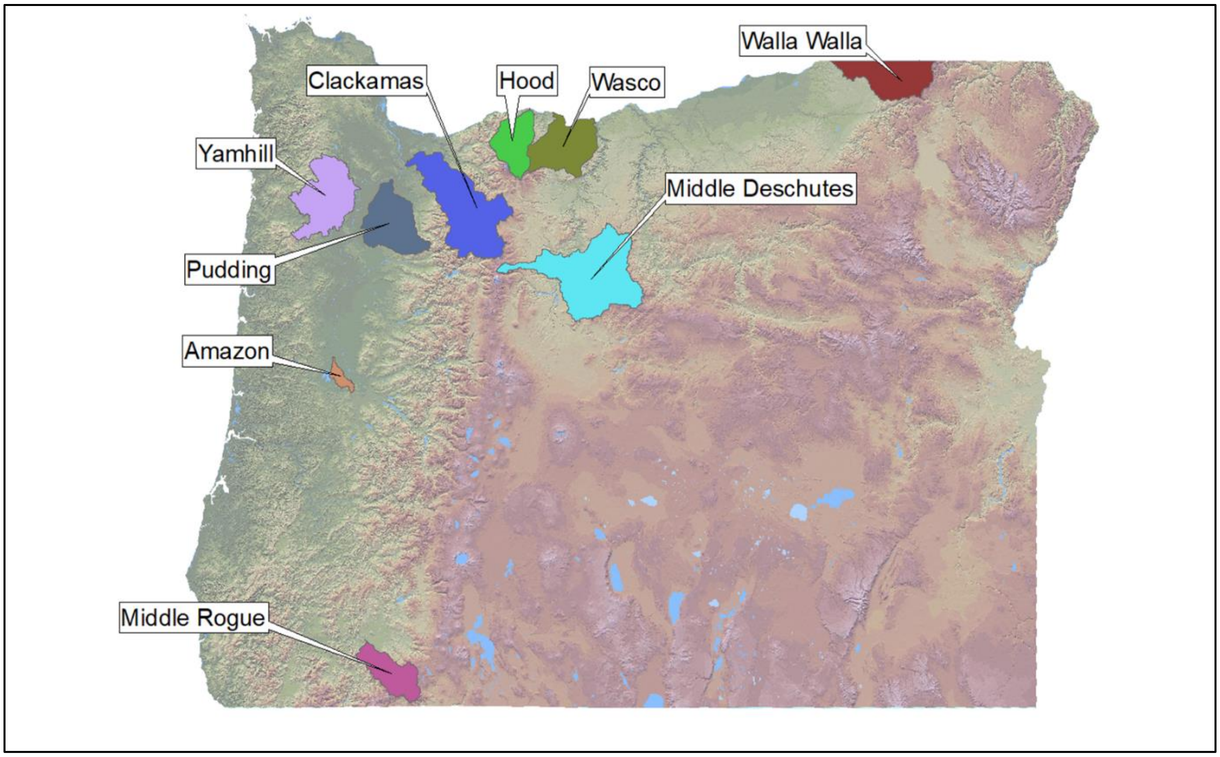
The Pesticide Stewardship Partnership (PSP) program began as a pilot project in Hood River in 2000 after current-use pesticides exceeded water quality standards. The Oregon Department of Environmental Quality (ODEQ) could have taken a regulatory approach under the Clean Water Act to address this problem. Instead, ODEQ partnered with local growers and watershed groups on a voluntary and collaborative new approach. This voluntary approach was successful in reducing pollution from current-use pesticides, producing measurable environmental results. It worked because of the tools, resources, and expertise in Oregon available for helping landowners and applicators to improve pesticide application and pest management practices.

The 2013 Oregon Legislature noticed the program's accomplishments and provided resources to continue the program and expand it to new areas with the Governor's support. The program is established in locations throughout the state, and the state has committed to the PSP program in addressing current-use pesticides. The voluntary approach is central to achieving the goals outlined in Oregon's Water Quality Pesticide Management Plan, a plan involving the Oregon Department of Agriculture, DEQ, the Department of Forestry, and the Oregon Health Authority.

The PSP program is committed to working with pesticide users and watershed groups in a voluntary way to address water quality exceedances in PSP watersheds. The program works because it relies mainly on our PSP partners' collaboration, communication, and cooperation.

Historically, pesticide monitoring data in some PSP basins has resulted in streams inclusion on the state's list of impaired waters, referred to as the 303(d) list. Rivers and streams identified as water quality impaired are not an indication that ODEQ is pursuing a regulatory approach. Instead, the PSP program remains the ODEQs chosen path to pesticide reduction. ODEQ has even used the impaired water listing as a source of information to identify basins for future PSP projects. ODEQ remains committed to the program, and the inclusion of a stream on the 303(d) list in no way contradicts or undermines that commitment.

While developing an estimated pollutant load, a water body can receive a Total Maximum Daily Load (TMDL) which is one way to achieve water quality standards. The Environmental Protection Agency (EPA) supports TMDL alternative approaches, such as the PSP program. In cases where alternative methods are expected to attain standards, a body of water can be removed from the list of impaired waters and into a separate category, known as Category 4B. The Category 4B designation acknowledges that an alternative approach other than a TMDL will be used. EPA has suggested that the program basins included in the PSP program are good candidates for inclusion in the 4B Category. DEQ will be working with EPA to determine the information needed to re-categorize the waters. As of January 2019, there are ten PSP projects and pilot study areas in Oregon (Map 2).

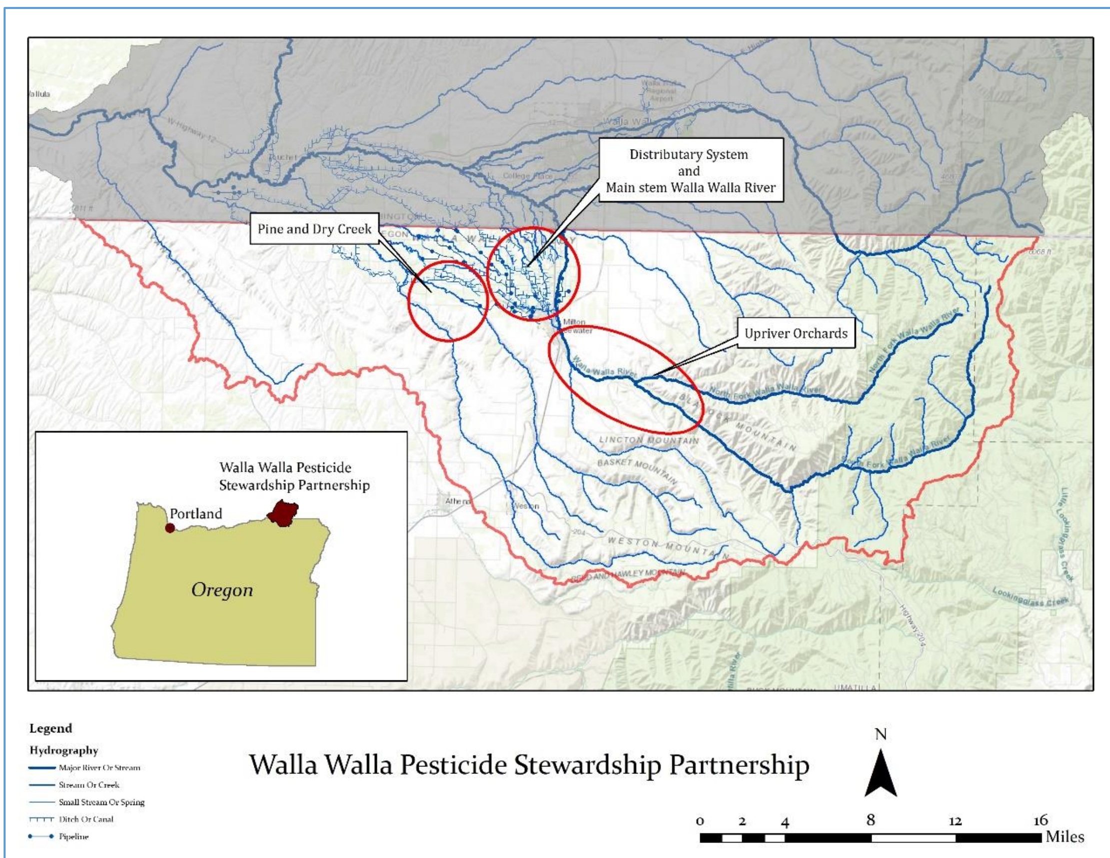


Map 2 PSP Projects and Pilot Areas, 2020

1.2 Walla Walla Pesticide Stewardship Project

The Walla Walla Pesticide Stewardship Partnership (PSP) began in 2005. The sizable amount of apple acreage in the Walla Walla Watershed near Milton-Freewater, and the use of organophosphates was a primary factor in initiating a PSP. The ODEQ approached the WWBWC, the local Oregon State Extension, and the Blue Mountain Horticultural Society, and the Walla Walla PSP was formed. Initially, monitoring was conducted in 2005 on the main stem Walla Walla River, South Fork Walla Walla River, and on the East and West Little Walla Walla Rivers at the Oregon and Washington state boundary. From the initial results from 2005, the WWBWC established multiple monitoring locations in the middle of distributaries to the Little Walla Walla River in 2006. Since 2015, in cooperation with pea and wheat growers interested in having their farms certified as Salmon-Safe, the WWBWC expanded monitoring further into the basin to include Pine and Dry Creeks, which encompasses pea wheat-growing areas. (Map x) Pesticide detections throughout the watershed have generally been decreasing over the past several years, with only one organophosphate insecticide (chlorpyrifos) being detected in the early spring within the distributaries.

The PSP project aims to assess, protect, and improve the water quality of the Walla Walla and Little Walla Walla River systems during periods of pesticide application. The most recent summary from the 2015 – 2017 biennium can be found in table 1.



Map 3. Areas of focus

Table 1. Water Quality Data Summary for All Sample Location 2015-17 Biennium

Pesticide	Type	Benchmark Value ug/L	No. of Samples	No. of Detections	Max. Conc. ug/L	Average Conc. ug/L	Percent Detections	Percent of Benchmark (Max. Conc.)
2,4-D	H	299.2	29	1	0.1	0	3.4	0
Acetamiprid	I	2.1	120	1	0.068	0.00012	0.8	3.2
AMPA	M	249500	29	7	0.848	0.0496	21.1	0
Carbaryl	I	0.5	120	11	0.0811	0.002	9.2	16.2
Chlorpyrifos	I	0.041	120	12	8.04	0.0761	10	19609.8
Desethylatrazine	M	NA	120	8	0.0079	0.00038	6.7	NA
Diuron	H	2.4	120	6	0.011	0.00041	5	0.5
Glyphosate	H	1800	29	4	1.23	0.0654	13.8	0.1
Imidacloprid	I	0.01	120	1	0.0293	0.00024	0.8	293
Metribuzin	H	8.1	120	3	0.0535	0.00058	0.8	0.7
Metsulfuron methyl	H	0.36	120	2	0.00678	0.00011	1.7	1.9
Pendimethalin	H	5.2	120	1	0.0375	0.00031	0.8	0.7
Propiconazole	F	21	120	1	0.0323	0.00027	0.8	0
Pyralostrobin	F	1.5	120	2	0.0127	0.00016	1.7	0.8
Simazine	H	2.24	120	1	0.00546	0.00005	0.8	0.2

F = fungicide, H = herbicide, I = insecticide, M = metabolite (breakdown product)

1.2.1 Latest Biennium Report Results

1.2.2 Surface Water Monitoring

Water quality monitoring during the 2015-17 biennium indicated the presence of numerous pesticides. Except for the insecticide chlorpyrifos, none of the detections exceeded established USEPA aquatic life benchmarks. Chlorpyrifos was detected at three sampling locations where the primary land use is currently orchards. The insecticide carbaryl was found in approximately 9% of the samples analyzed, with at least one sample at 16% of the aquatic life benchmark.

The detections of chlorpyrifos and carbaryl appear during pre-emergent periods running from late March until mid-June. No detections of either insecticide were noted outside this timeframe.

Imidacloprid was detected once during the biennium. The insecticide is highlighted as a pesticide of moderate concern because the EPA benchmark was lowered to .01 ug/L in 2017. Previously the EPA established a benchmark value at 1.05 ug/L, which would not have raised the detected value in the Walla Walla to a level of moderate concern.

1.2.3 Groundwater Studies

In 2016 the ODEQ investigated 60 wells within the Walla Walla basin, in which the study included the Walla Walla PSP area[1]. The results of that study indicated no exceedances of human health or aquatic life benchmarks for any currently used pesticide. However, several currently used pesticides were detected in both the winter and fall samplings. (Table 2)

[1] https://www.oregon.gov/deq/wq/Documents/gwWallaWallaBasinRep.pdf

Table 2. Groundwater Study Results

Pesticide	Winter (N=60)	Fall (N=60)	Total (N=120)
atrazine	4	4	8
carbaryl	1	0	1
DCPA metabolite	1	3	4
deisopropylatrazine	4	5	9
desethylatrazine	18	18	36
endosulfan II	1	0	1
metribuzin	1	0	1
metsulfuron-methyl	1	0	1
norfluron	1	0	1
simazine	3	5	8
Total Detections	**34**	**35**	**70**

1.2.4 Projects Funded and Improvements

The Walla Walla PSP is playing a vital role in identifying and implementing management measures designed to address the results of water quality analysis. In 2012 significant increases in the detection of the herbicide diuron were noted and traced to its application in irrigation canals. The irrigation district worked with the PSP partners and discontinued its use along ditch banks, resulting in a significant decrease in diuron detections (Figure 1).

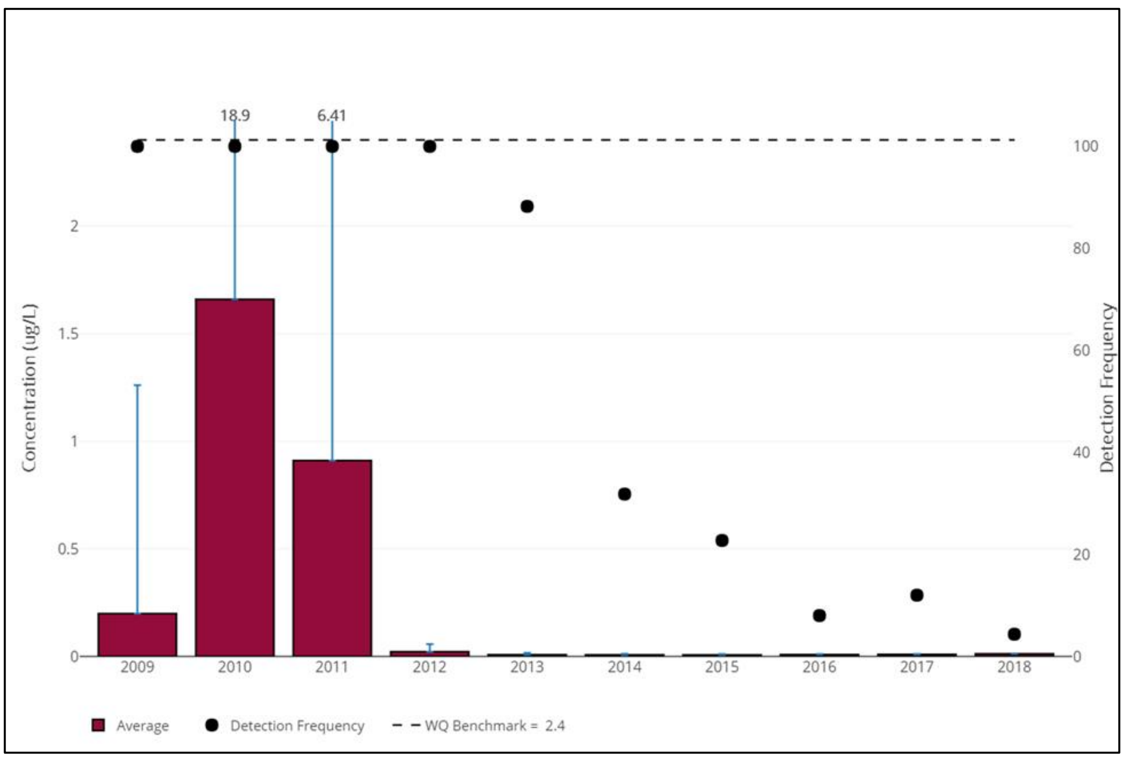


Figure 1. Diuron Detection Frequency and Concentrations (2009 - 2018)

In the spring of 2016 and 2017, detection spikes of chlorpyrifos were traced to lapses in application methodologies by a small number of applicators, who have since corrected practices. The monitoring results from 2019 and 2020 show the effects of the modifications (Figure 2). Installation of wind and weather stations in the PSP for growers has contributed to reducing spray drift, resulting in decreased detected pesticide residues in monitored waterbodies. During the 2015-17 biennium, the watershed council was awarded $ 4,800.00 to continue monitoring and maintenance of the weather station.

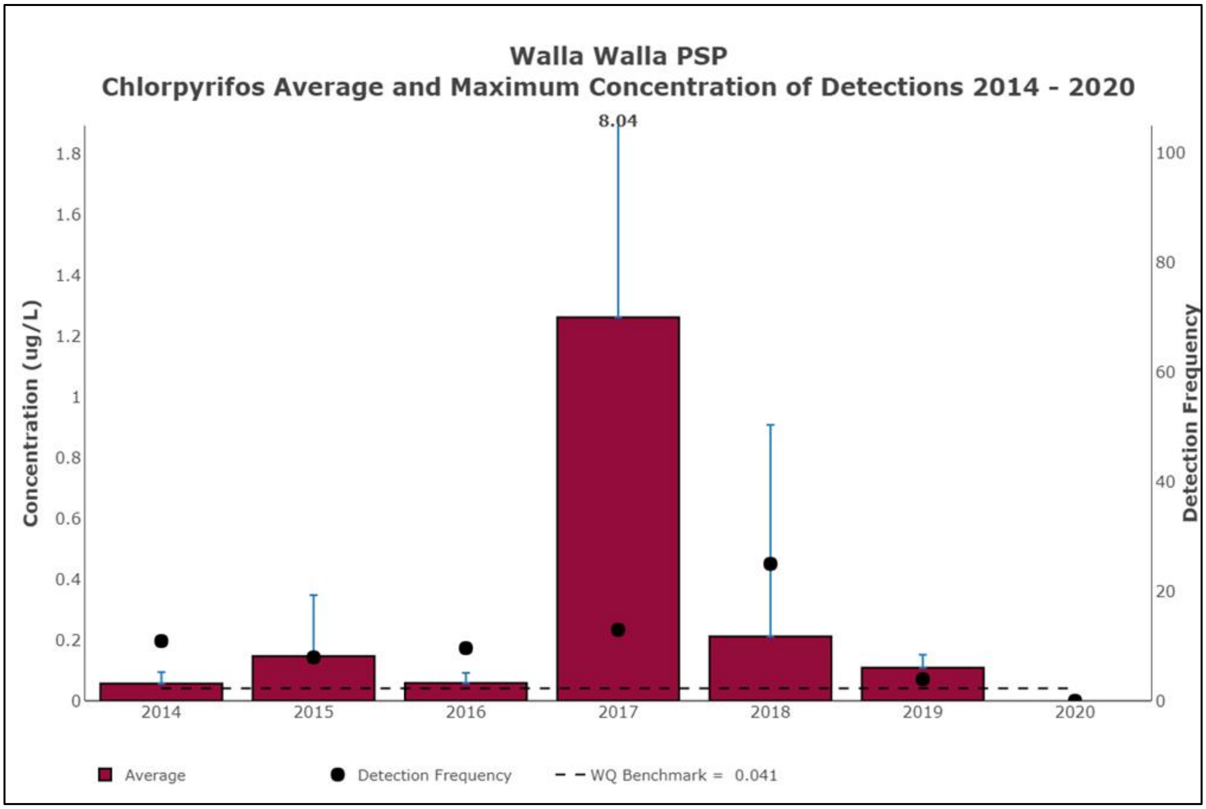


Figure 2. Chlorpyrifos Average and Max Concentration of Detections 2014 - 2020

In June of 2017, a pesticide waste collection event was held in Milton-Freewater, at which 10,340 lbs. of waste or unusable pesticides were removed from the watershed and legally disposed. During the 2015-17 biennium, the PSP program has pushed to add stream discharge monitoring to all WQ sampling stations. The streamflow monitoring will allow for a more thorough evaluation of WQ data. The Walla Walla PSP has installed discharge monitoring devices at all WQ monitoring locations, some of which provide near real-time surface flow data to local applicators as well.

Photo: 1. The West Branch/West Crockett near Real-time Gauge (Site # 33083)

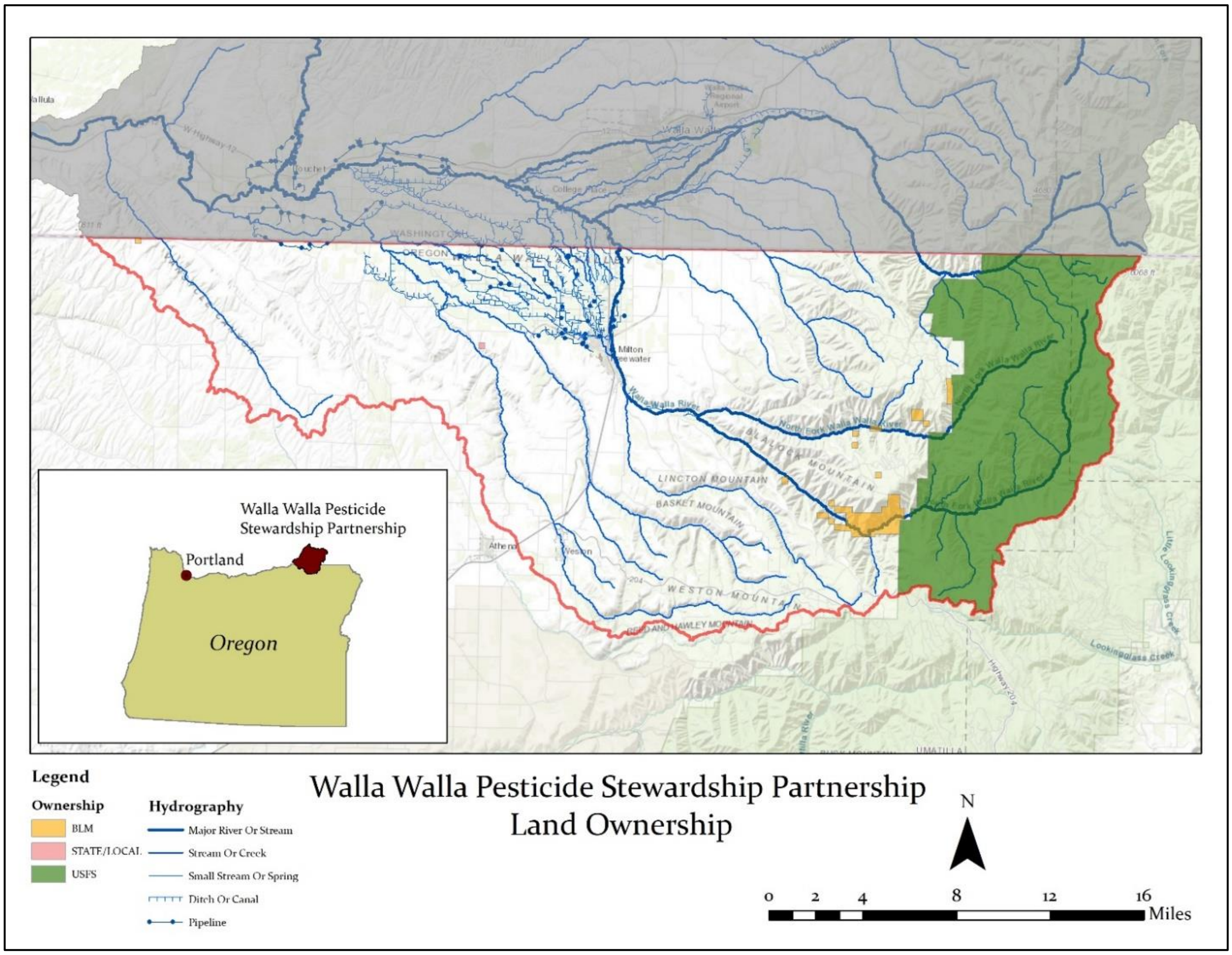
The Walla Walla PSP has strong local support and has shown the willingness to make significant changes or adjustments to decrease the potential of pesticides entering the local waterways through sampling results through the years.

Photo: 2. Mid-West Prong (Site #33084)

2. Description of the Project Area

2.1 Land Management

The Walla Walla PSP project encompasses 482 square miles and is dominated by private agriculture land use. The largest city within the watershed is Milton-Freewater, with a population of 7074 (US Census Estimate, 2019). The climate in the Walla Walla PSP ranges from the hottest month in July (24 °C Ave) to the coldest month in December (1.7 °C Ave). The average annual precipitation for the project area is 219 mm per year, with the wettest month in November.



Map 4. Walla Walla PSP Land Ownership

The basin's land management is a mixture of private and public (table 1). The western and center two-thirds of the project area is dominated by private land, while the eastern third is dominated by the US Forest Service (USFS) and Bureau of Land Management (BLM). (Map 3)

Table 3. Walla Walla PSP Land Management (Percent).

Land Management (Percent of Total Watershed Area)			
USFS	BLM	State / Local Governments	Private
19%	2%	0.02%	79%

Headwaters of the major rivers and streams originate in the Blue Mountains in the eastern part of the watershed. Water flows down from the Blue Mountains into the Walla Walla Valley then out to the Columbia River. As the Walla Walla River flows into the Walla Walla Valley, water is diverted into the Little Walla Walla River distributary system that provides water to local irrigators. The distributary system is also fed by springs located on the valley floor close to the Oregon/Washington boundary. The water from the distributary system flows back to the Walla Walla River across Stateline and back to the Walla Walla River in Washington.

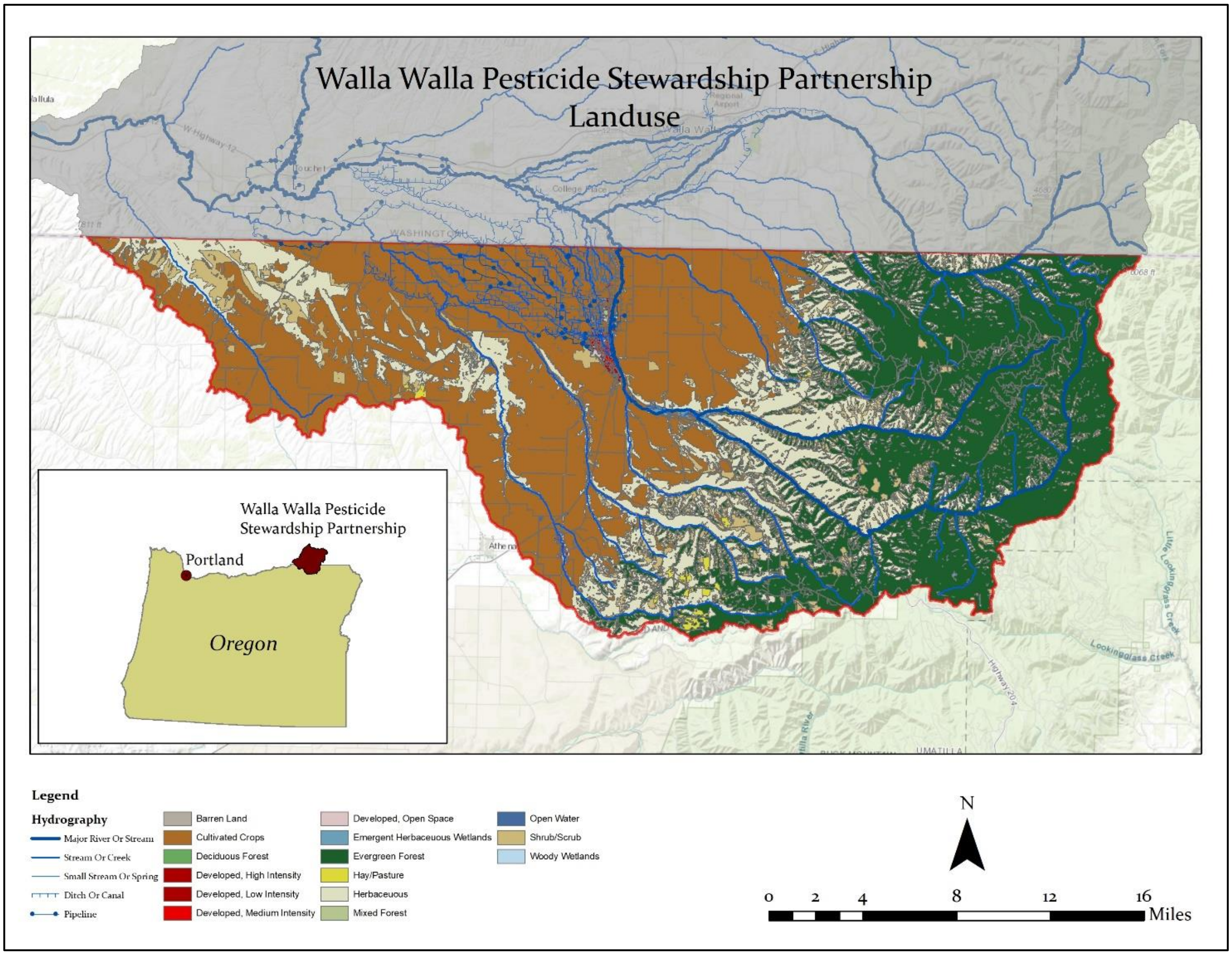
2.2 Land Use

Based on the 2016 National Land Coverage Data (NLCD), the breakdown of land use in the watershed is 3.6% Urban/Developed, 28.0% other, 30.7% Forest, and 37.8% agriculture. Additional land use category breakdown is available in table 2.

Table 4. Walla Walla PSP Project Land Use (percent)

Shrubland	Openwater	Grassland	Hay/Pasture	Forest	Wetland	Urban/Developed	Barren Land	Cultivated Crops
9.1%	0.02%	18.4%	0.4%	30.7%	0.5%	3.6%	0.003%	37.4%

The eastern and southeastern part of the Walla Walla PSP project area is dominated by forest, grassland, and shrubland. In contrast, the remaining project area is dominated by dryland agriculture, orchards, wine grapes, and row crops (Map 5).



Map 5. Walla Walla PSP Land Use

3. Pesticides of Concern and Pesticides of Interest

The ODEQ laboratory analyzes water quality samples collected by the Walla Walla PSP for approximately 130 pesticides. The primary factor considered is the concentration of a pesticide, and the frequency of detection, in water relative to a standard or benchmark. In-stream water quality standards do not exist for most current pesticides; therefore, analysis typically compares the lowest EPA Aquatic Life Benchmark. The EPA standards are part of the Statewide Pesticide Management Plan, 2011.

The EPA has developed pesticide aquatic life benchmarks for over 600 pesticides[2]. While the intent of aquatic life benchmarks is advisory and not regulatory, they provide a mechanism by which the

[2] https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/aquatic-life-benchmarks-and-ecological-risk

ODEQ and the Walla Walla PSP can evaluate and determine the local Pesticides of Interest (POI), Pesticides of Concern (POC), and in the case of the Walla Walla PSP, a Local Problem Pesticide (LPP).

Pesticides of Interest (POI) are those pesticides identified to have the potential to occur at concentrations approaching or exceeding Federal, State, or Tribal human health or ecological reference points.

Pesticides of Concern (POC) are a POI determined to approach or exceed, or known to approach or exceed, human health or environmental reference point in a local area. Also, the POI poses possible risks to human or ecological life (Pesticide Management Plan for Water Quality Protection, 2011).

Local Problem Pesticides (LPP) are POC detected at a higher frequency locally than the statewide frequency of detection.

Table 5. Walla Walla PSP Pesticides of Concern (2021)

Frequency of Detection in % Last 3 Years	Walla Walla PSP Reference Level Criteria (2018 - 2020)			
	≥ One detection at or above 50% of an acute ALB	≥ Thee detections at or above 50% of chronic ALB	One to two detections at or above 50% of a chronic ALB	No detections over 50% of any ALB
100 to 65.1	High Level of Concern *Diuron	High Level of Concern	High Level of Concern	Moderate Level of Concern
65 to 35.1	High Level of Concern	High Level of Concern	Moderate Level of Concern	Moderate Level of Concern *Glyphosate
35 to 0	High Level of Concern *Carbaryl, Chlorpyrifos, and Pyripoxyfen	High Level of Concern	Moderate Level of Concern	Low Level of Concern *See list below

Pesticides of Low Concern: AMPA, 2-Chloro-4-isopropylamino-6-amino-s-triazine, 2,4-D, Acetamiprid, Acifluorfen, Atrazine, Diuron, Metribuzin, Oxyfluorfen, Pendimethalin, Prometon, Pyraclostrobin, Trifloxystrobin

Pesticides detected within the Walla Walla PSP, using the state-approved protocol, are categorized by the ODEQ utilizing a decision matrix according to the detected concentration relative to aquatic life benchmarks and detection frequency. Detected pesticides are classified as Low, Moderate, or High Level of Concern (Table 5).

Table 6. Water Quality Data Summary for All Sample Locations 2015-17 Biennium

Pesticide	Type	Benchmark Value ug/L	No. of Samples	No. of Detections	Max. Conc. ug/L	Average Conc. ug/L	Percent Detections	Percent of Benchmark (Max. Conc.)
2,4-D	H	299.2	29	1	0.1	0	3.4	0
Acetamiprid	I	2.1	120	1	0.068	0.00012	0.8	3.2
AMPA	M	249500	29	7	0.848	0.0496	21.1	0
Carbaryl	I	0.5	120	11	0.0811	0.002	9.2	16.2
Chlorpyrifos	I	0.041	120	12	8.04	0.0761	10	19609.8
Desethylatrazine	M	NA	120	8	0.0079	0.00038	6.7	NA
Diuron	H	2.4	120	6	0.011	0.00041	5	0.5
Glyphosate	H	1800	29	4	1.23	0.0654	13.8	0.1
Imidacloprid	I	0.01	120	1	0.0293	0.00024	0.8	293
Metribuzin	H	8.1	120	3	0.0535	0.00058	0.8	0.7
Metsulfuron methyl	H	0.36	120	2	0.00678	0.00011	1.7	1.9
Pendimethalin	H	5.2	120	1	0.0375	0.00031	0.8	0.7
Propiconazole	F	21	120	1	0.0323	0.00027	0.8	0
Pyralostrobin	F	1.5	120	2	0.0127	0.00016	1.7	0.8
Simazine	H	2.24	120	1	0.00546	0.00005	0.8	0.2

F = fungicide, H = herbicide, I = insecticide, M = metabolite (breakdown product)

Water quality monitoring efforts in the Walla Walla PSP help guide the classification of Pesticides of Interest (POI) and Pesticides of Concern (POC), and Local Problem Pesticides (LPP) (Figure x). Typically, water quality sampling results are distributed in the winter following the sampling season. The Walla Walla PSP Technical Advisory Group (TAG) will meet every winter to discuss the previous year's water quality monitoring results. During the annual meeting, the TAG will:

1. Focus on identifying pesticide trends, both positive and or negative
2. Update the POI, POC, and LPP lists from monitoring results
3. Evaluate the progression toward the Walla Walla PSP goals
4. Evaluate the next season's monitoring locations and monitoring schedule
5. Allocate the following education and outreach resources

The annual evaluation and local distribution of monitoring results are vital to the success of the Walla Walla PSP.

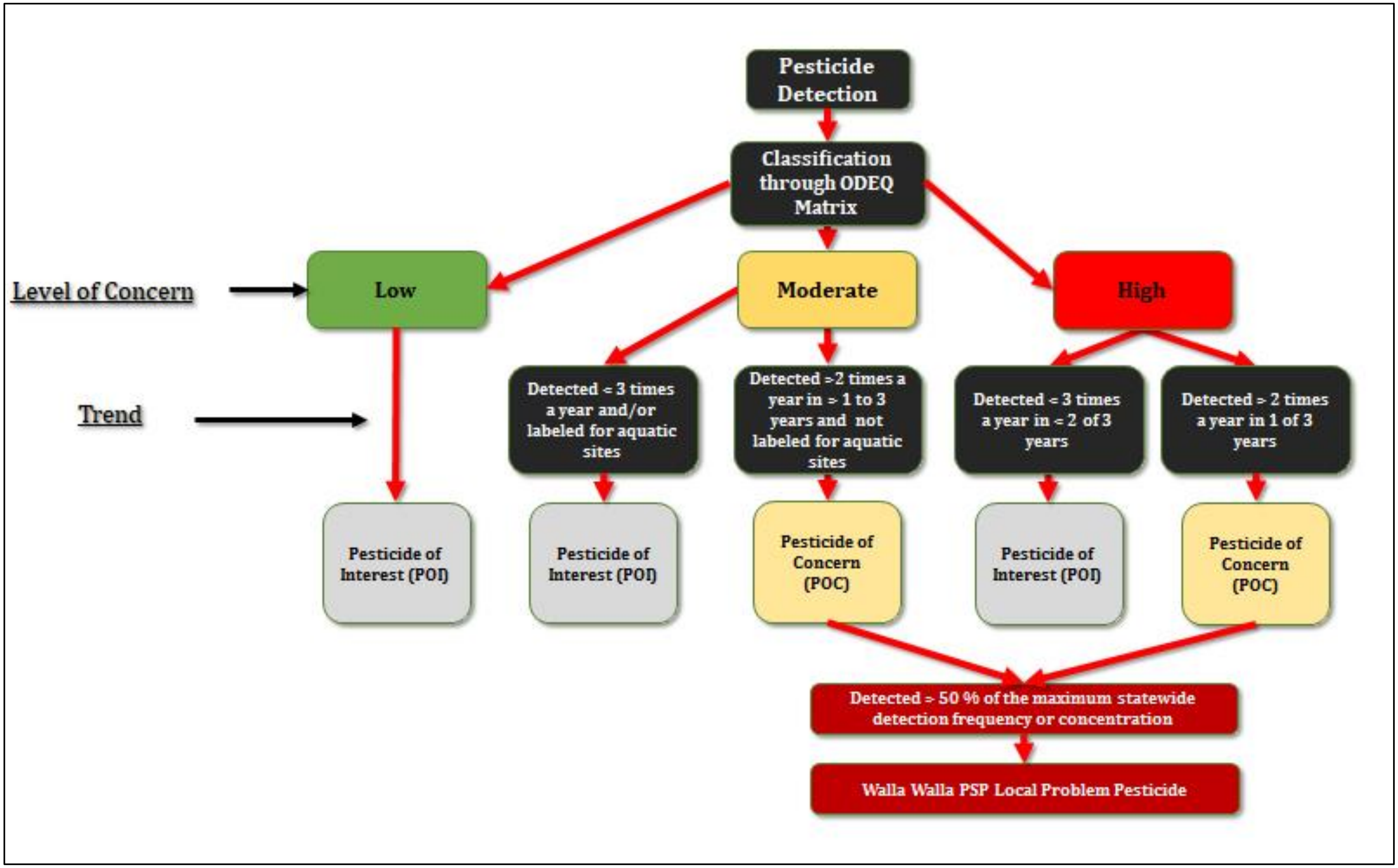


Figure 3. Matrix for determining POI, POC, and LPP

3.1 Monitoring Methods and Locations

Water quality monitoring for pesticide residues typically begins in March and continuing through October. All water grab samples are analyzed by the ODEQ laboratory and following established sampling and analysis plans approved by the ODEQ. The WWBWC staff collects water grab samples that ODEQ has trained through seasonal training events. To ensure proper sampling technique, the ODEQ periodically conducts field visits during monitoring events to ensure that the protocols are followed correctly.

The WWBWC conducts water quality sampling as described below, including surface water grab samples and field water quality measurements. ODEQ delivered to the watershed council and approved Sampling and Analysis Plan (SAP and Quality Assurance Project Plan (QAPP) for Water Quality Toxics (DEQ05-LAB-0022-QAPP) which describes the specific procedures and data quality objectives required.

3.1.1 Water Quality Sampling

In 2021 there are five primary locations on the Walla Walla and Little Walla River systems sampled at regular intervals during orchard pesticide application periods. Samples are analyzed for organophosphate insecticides, herbicides, and fungicides.[3] Sample stations are located to represent streams influenced by orchard and other agricultural uses of pesticides, streams affected by urban and stormwater inputs from the town of Milton-Freewater, and forested areas upstream of agricultural or urban activity. The WWBWC uses all sample locations for surface water data collection, water temperature, and conductivity. Flow and water quality data from completed and ongoing studies are being used to complement the data collection for the Walla Walla PSP.

The Walla Walla River Irrigation District (WWRID) controls flow in the Little Walla Walla River distributaries that provide irrigation water to orchards in the lower valley. Because of water agreements currently in effect in the basin, flow is interrupted in the Little Walla Walla between the Little Walla Walla diversion and the springs areas, resulting in no flow during the pesticide application period. Periods of no flow are documented when appropriate.

3.1.2 Sampling Days and Timing

Sampling events occur concurrently with the application of pesticides to the local orchards. Sampling typically begins in March, with the last sample collection typically in October.

3.1.3 Commencement of Sampling

The sampling in the lower basin begins with the Blue Mountain Horticultural Society (BMHS) assistance along with the Oregon State University (OSU) Extension Agent. The BMHS updates the degree-days and orchard pesticide application timing and informs the WWBWC when sampling should occur. Sampling event dates can be limited due to the ODEQs ability to process samples within the necessary time period.

[3] Appendix 1, List of analyzed compounds

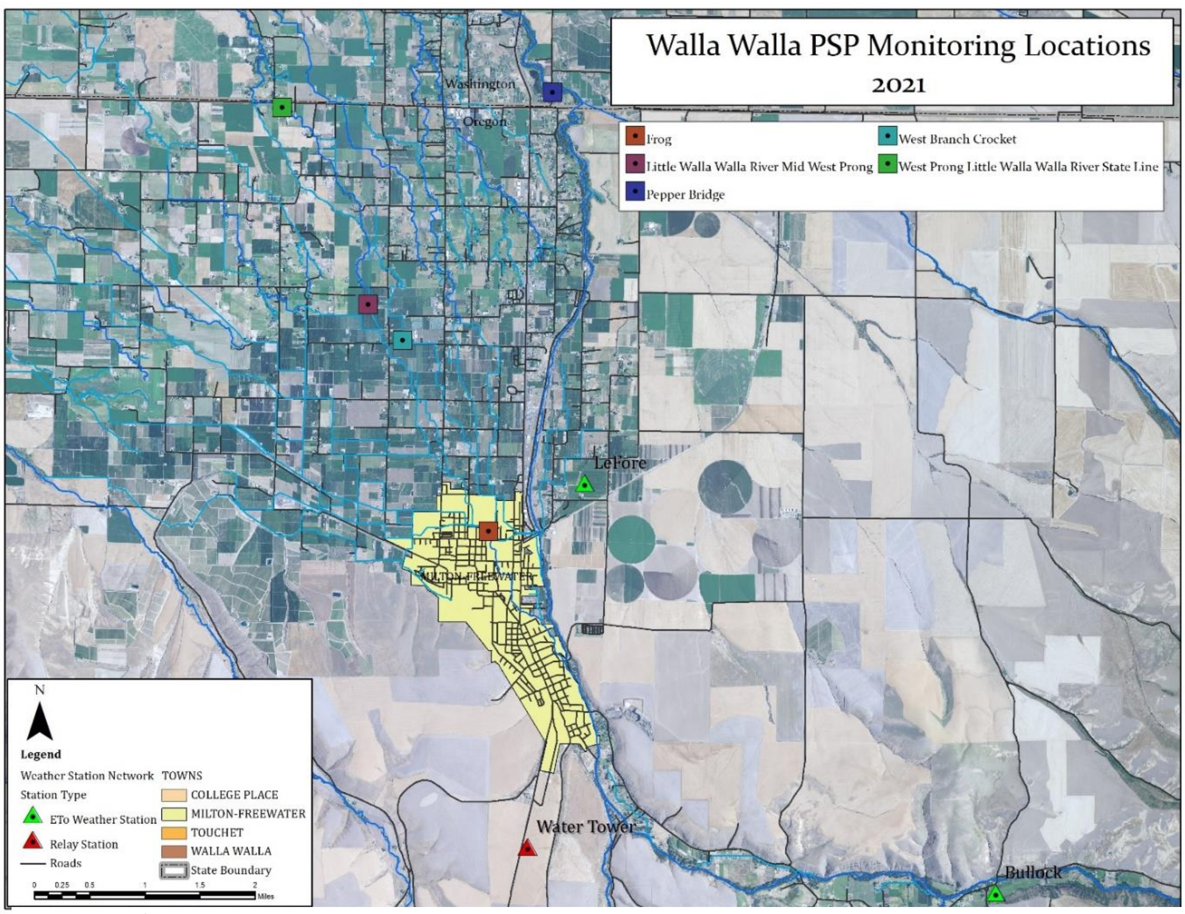
3.1.4 Sample Collection

Samples are typically collected in the morning once a week from Monday through Thursday. On each sampling day, WWBWC travels to the selected sampling locations, collects required samples, conducts field measurements, completes laboratory paperwork, and ships the samples to the ODEQ laboratory. Due to the Walla Walla PSP location from the ODEQ lab, the collected samples are packed in ice inside coolers and shipped to the laboratory within 24 hours after the field sample is taken.

3.1.5 Weather Station Network

As orchardists continue to move away from organophosphates to less toxic alternatives with a narrow atmospheric window for application, it's increasingly important to have accurate atmospheric data. The Walla Walla PSP collects and compiles atmospheric data, which was available for distribution to the local orchardists to increase the effectiveness of pesticide application and potentially decrease the number of additional cover sprays.

3.1.6 Site Descriptions



Map 6. Sampling Locations, 2021

The Frog site (LASAR # 32012)
This site represents the water quality conditions downstream of urban stormwater inputs to the Little Walla Walla River, upstream of the majority of lower valley orchard activity.

The Peppers Bridge site (LASAR # 32008)
This site is at the Oregon / Washington boundary on the main stem of the Walla Walla River. The site is used to evaluate pesticide influences on water quality in the context of the salmonid runs and reflects both urban and agricultural inputs. Also, this monitoring site evaluates the water quality as the river flows out of the state of Oregon into the state of Washington.

The West Prong Little Walla Walla at Stateline Rd. site (LASAR # 32010)
This site gathers information on pesticide concentrations in the Ford distributary subsystem below the springs, near the likely lower boundary of the fish habitat. Access to this site requires written private property owner approval.

The Midwest Prong Little Walla Walla site (LASAR # 33084)
This site gathers information on pesticide concentrations in the Ford distributary subsystem. This site is above the West Little Walla Walla collection site at Stateline Rd (#32010).

The West Branch/West Crockett of the Little Walla Walla River site (LASAR # 33083)
This site gathers information on pesticide concentrations in the Ford distributary subsystem on the West Branch below the springs.

The West Branch Crocket Upstream site (LASAR #34820)
This site is an alternate site to the West Crockett (LASAR # 33083) monitoring location. Samples are collected at this location when flow levels are below the ability to gather at the West Crockett Site.

The Grove School site (LASAR # 32007)
This site represents the water quality conditions in the main stem Walla Walla River downstream of Day Road and upstream inputs from the City of Milton-Freewater. Data collected here is used to help differentiate urban and agricultural influences. This location is currently an alternate location.[4] Due to the managed nature of the distributary system in which the LASAR sites #33084 and #33083 are located, the Grove School site (LASAR #32007) was used as an alternate location. When "no flow" conditions are reported at either LASAR sites #33084, #33083, samples are taken at the Grove School site.

[4] Individual maps for each sampling location are located in appendix 1

5. Pesticide Reduction Goals

The Walla Walla PSP aims to reduce the detection frequency of pesticides at concentrations greater than 50% of the aquatic life benchmark within the monitored area. The Walla Walla PSP allocates program resources, outreach, and technical assistance to measure the decreases in frequency and detections greater than 50% of the aquatic life benchmark.

Walla Walla PSP monitoring efforts, sampling analysis, and community outreach and education will provide the feedback needed to direct future decisions with the primary goal as a focus. If the program goal and the individual goals for the pesticides of concern listed below are met, the project would then enter a maintenance monitoring phase.

5.1 Reduction Targets of POC and LPP

Water quality monitoring from 2018 through 2020 indicated the presence of multiple pesticides and pesticide breakdown products. While the Walla Walla PSP has set goals and targets to measure progress, regulatory changes can affect the local goals. Changes in regional pests, labeling, and pesticide use over time can impact the success of the Walla Walla PSP. Locally replacement pesticides for chlorpyrifos are now being detected and are a local concern. Monitoring feedback will be vital in understanding the impacts of the replacement compounds for chlorpyrifos. The programmatic review will occur post-annual monitoring and analysis efforts.

5.2 Pesticides of Concern

5.2.1 Diuron

Diuron has been detected below the 50% of the acute aquatic life benchmark during 2018 – 2020. Diuron has also been seen at frequencies above the detection frequency threshold of 35.1%. The combined detection frequency and concentration rate results in the local Walla Walla PSP POC designation. The Walla Walla PSP's near-term goal is to reduce the frequency of detections of diuron to below 35.1% and, through continued outreach and technical assistance, continue to see concentration rates below 50% of the aquatic life benchmark. Diuron is a POC statewide in the Oregon PSP program.

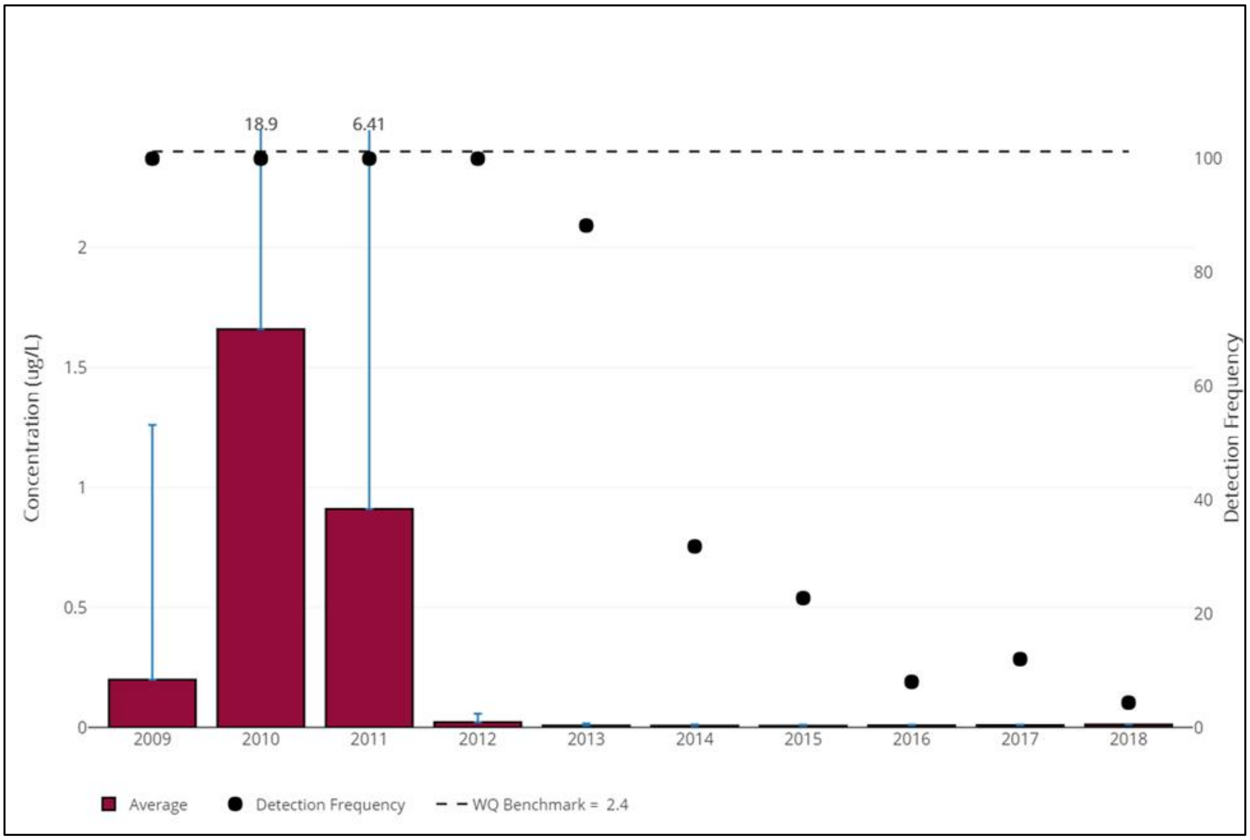


Figure 4. Diuron Detection Frequency and Concentrations (2009 - 2018)

5.2.2 Chlorpyrifos

Chlorpyrifos has been detected at monitoring locations in the Little Walla Walla River distributary system. In the past three years (2018 – 2020), the detection frequency and concentrations have been trending downward. There were zero detections in the 2020 water quality sampling period, the first time in 15 years that the Walla Walla PSP had zero detections of Chlorpyrifos (Figure 5). While the sampling data is trending in the right direction, chlorpyrifos is still categorized as a pesticide of high concern as it has been detected at or above 50% of the acute aquatic life benchmark for the past three years. Chlorpyrifos has also been detected at a frequency range of 0 to 35%. The goal of the Walla Walla PSP is to continue the trend seen in 2020 of zero detections for the next two years, which would eliminate the pesticide from the Pesticide of High Concern list for the basin.

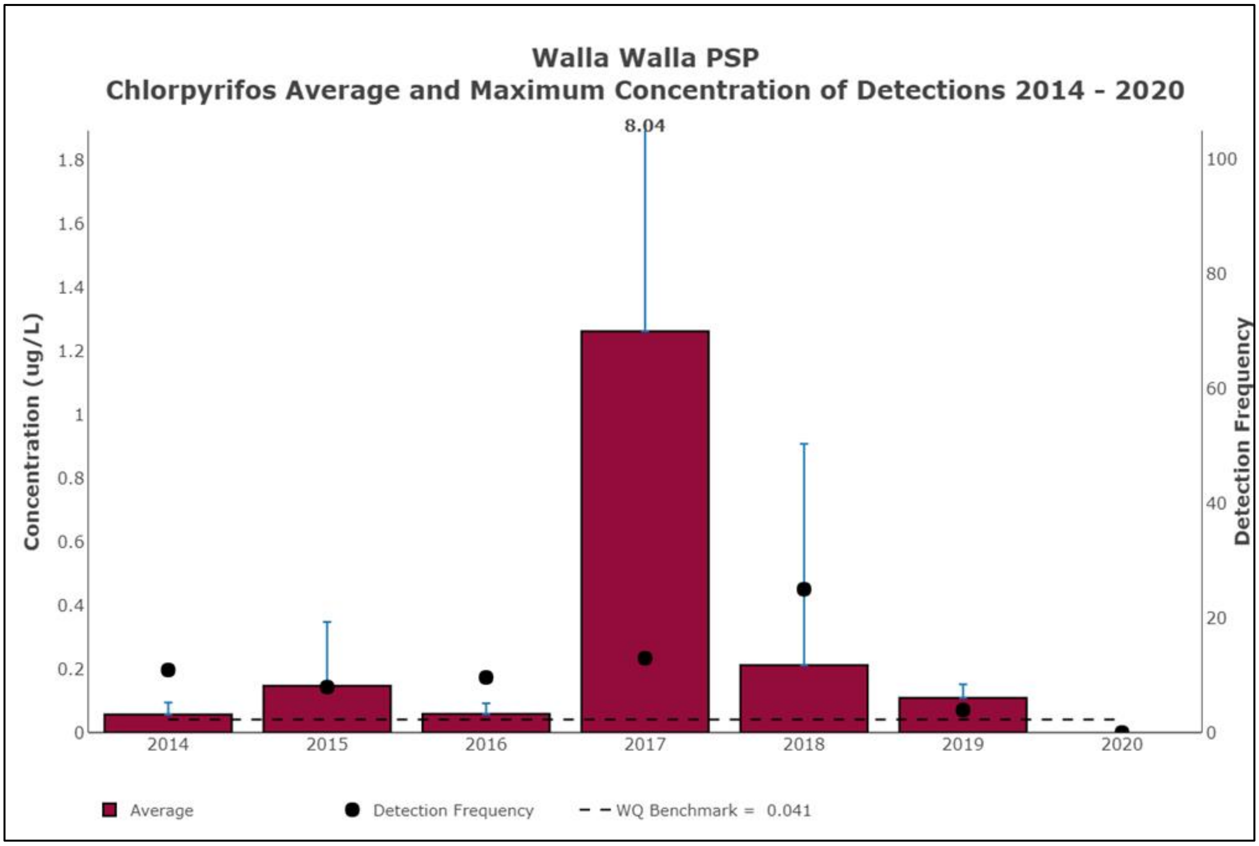


Figure 5. Chlorpyrifos Average and Maximum Concentration of Detections (2014 - 2020)

5.2.3 Carbaryl

Carbaryl has been detected at or above 50% of the acute aquatic life benchmark for the past three years in the Little Walla Walla River distributary system. Carbaryl has also been detected at a frequency range of 0 to 35%. Carbaryl is an alternative pesticide to chlorpyrifos and with the desire is to eliminate detections of chlorpyrifos, there is also a desire not to see increased detections of carbaryl. From 2018 – 2020 only the water quality sampling results from 2018 had a maximum detection above the water quality benchmark. Also, in 2018 the average detection frequency was below 35%. Before 2019 the detections of Carbaryl were all below the aquatic benchmark and at detection frequencies below 35% (Figure 6). Efforts by the Walla Walla PSP will concentrate on outreach strategies and technical assistance to address the concentration and detection frequency concerns to continue the recent decreasing trend of 2019 – 2020 trend of a decrease in the number of detections and maximum concentrations. Progress will be measured through the frequency of detection reductions and concentration reductions.

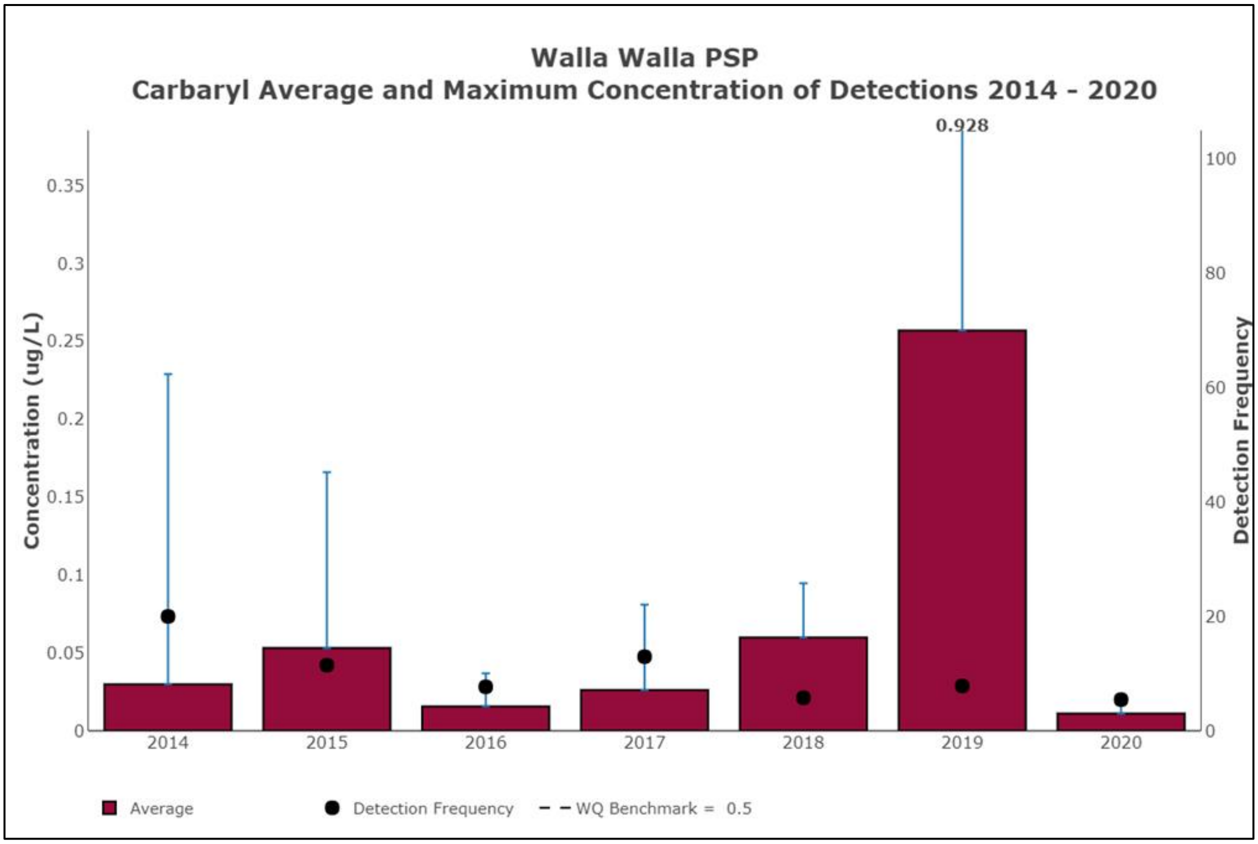


Figure 6. Carbaryl Average and Maximum Concentration of Detections (2014-2020)

5.2.3 Pyriproxyfen

Pyriproxyfen was detected for the first time by the Walla Walla PSP in the Little Walla Walla River distributary system at the Mid-West Prong (#33084) site. Pyriproxyfen is a replacement pesticide for chlorpyrifos; an increase in detections of Pyriproxyfen could replace a decrease in detections for chlorpyrifos. The 2020 detection of Pyriproxyfen was above 50% of the acute aquatic life benchmark, and the detection frequency was one detection in the past three-year period. Efforts by the Walla Walla PSP will concentrate on outreach strategies and technical assistance to address the concentration and detection frequency concerns to limit an increase in the number of detections and concentrations. Progress will be measured through the frequency of detection reductions and concentration reductions.

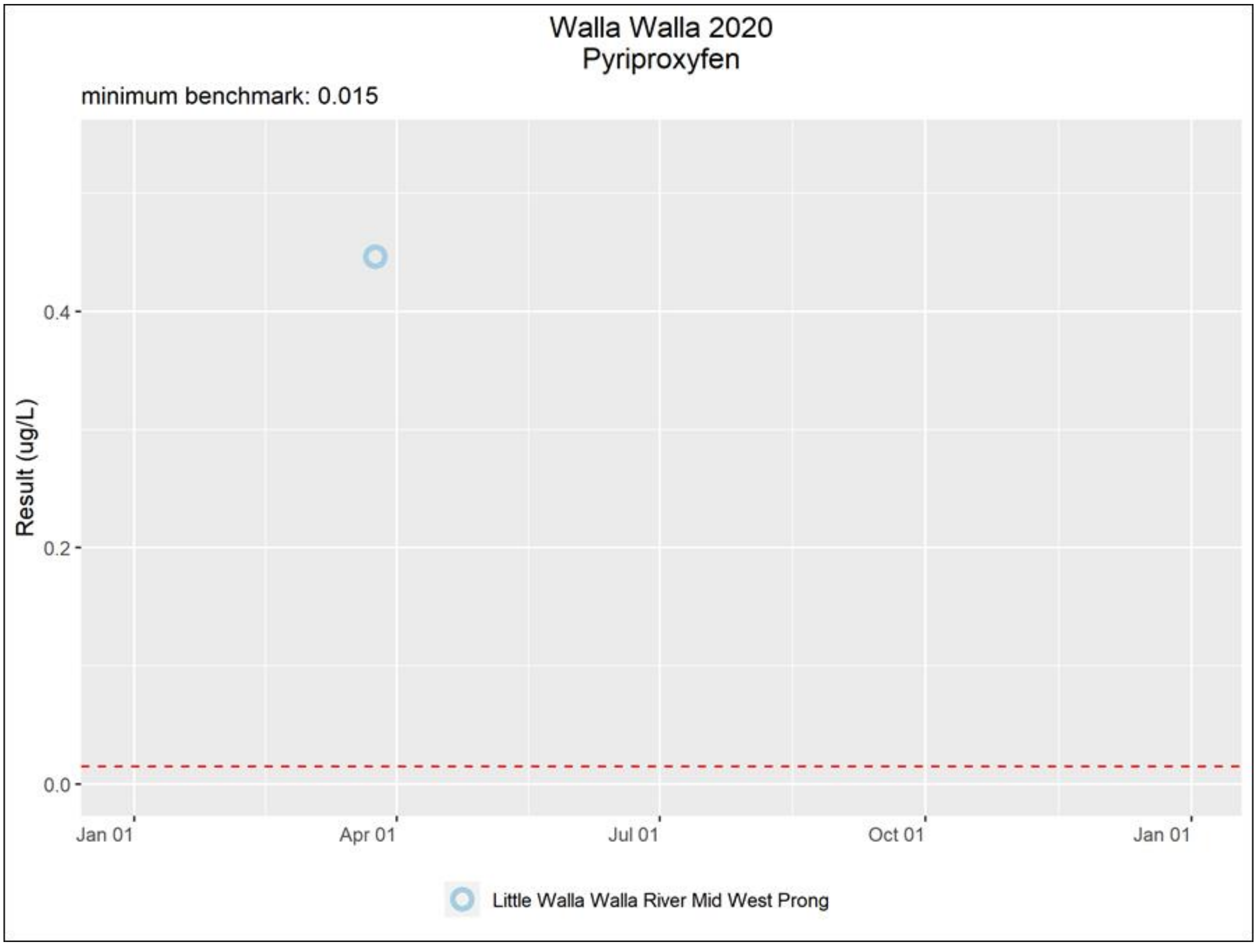


Figure 7. Pyriproxyfen detection at the West Prong monitoring location in 2020

6. Communication, Outreach, and Education

Five targeted sector groups have been identified to play a crucial role in the success of the Walla Walla PSP: Orchards, Vineyards, Right-of-Way, Pea and Wheat Growers, and to a lesser degree Urban. Historically the Walla Walla PSP has primarily targeted the groups focused on the Orchard areas and the Pea and Wheat Growers within the PSP boundary. The Pea and Wheat Growers and the Orchardist have established grower groups that help facilitate the dissemination of monitoring results and implement BMPs to promote positive change.

<u>The Walla Walla PSP Communication, Outreach, and Education Goals:</u>
1. Reduce pesticide detections or frequency of detections in local waterways
2. Increase implementation of Best Management Practices based upon PSP monitoring efforts;
3. Convey pesticide use patterns throughout the Walla Walla PSP area to the targeted sector groups. Figure 8 lists the objectives used to accomplish the stated communication, outreach, and education goals.

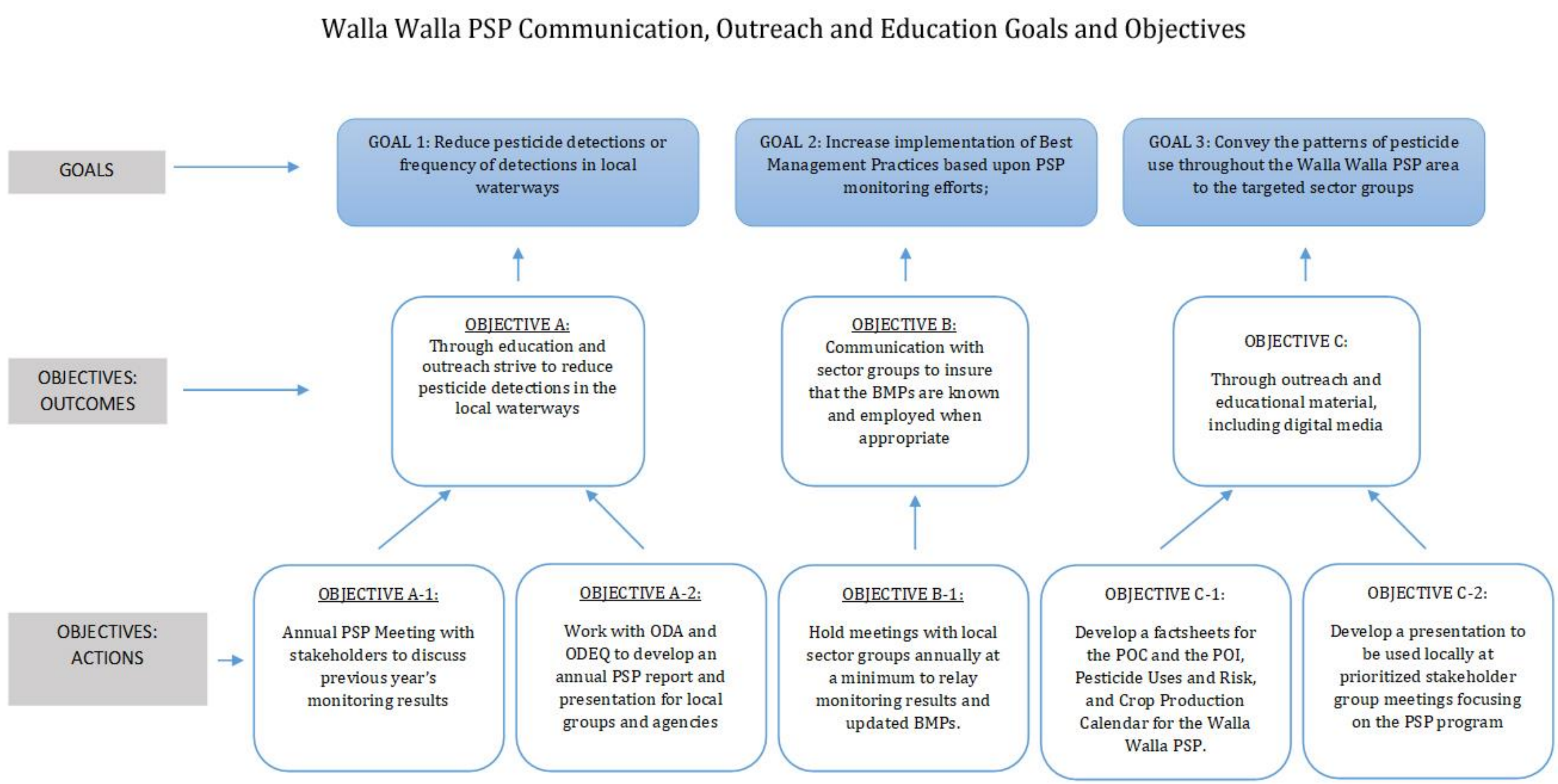


Figure 8. Communication, Outreach, and Education Goals and Objectives

7. Documentation of Improvements

While tracking improvements within specific sectors of the Walla Walla PSP is challenging, the presence of local active grower groups increases the ability to track progress. There are multiple components of the Walla Walla PSP that will provide the avenue for tracking specific improvements:

1. First and foremost, the PSP monitoring will supply data indicating whether or not the overall program is effective.
2. Communication, outreach, and education goals will be tracked through multiple measures
    a. Annual monitoring result presentation will be given, and attendance will be recorded
    b. Factsheets produced by the program will be available to download on the WWBWC website, and downloads will be tallied.
    c. Correspondence to the specified sector groups can be documented along with BMPs implemented.
    d. Stakeholder meeting minutes and attendance will be recorded, such as the Blue Mountain Horticultural Society Meetings, held multiple times of the year.
3. Programmatic biennium assessment of the Walla Walla PSP through local sector group surveys will help determine if the goals and objectives are being met.

8. Technical Assistance and Financial Needs

The Walla Walla PSP project partners are vital to ensuring coordination of efforts, maximizing opportunities to leverage resources, and effectively utilizing the strengths of each organization. Recent basin changes with key individuals will require additional individuals to step forward to play an active role in the Walla Walla PSP. Personnel changes in the ODEQ, ODA, and local OSU extension will challenge the local efforts in the immediate future. New relationships need to be cultivated, and the WWBWC will need to provide additional support to ensure the future success of the PSP.

The Walla Walla PSP will require technical assistance (TA) and ongoing financial support to achieve the goals outlined in the strategic plan. The project partners will also seek funds and help from diverse funding sources to ensure project success. The TAG will assess the financial and technical assistance needs of the Walla Walla PSP annually. The WWBWC has a track record of success in receiving funding to support the PSP. Oregon Watershed Enhancement (OWEB) funding is secured to support surface flow monitoring at most Walla Walla PSP monitoring locations (2019-2021). The WWBWC has also applied for additional funds to continue the flow monitoring efforts through 2023. The Walla Walla PSP relied on the Blue Mountain Horticultural Society (BMHS) to be the conduit for information distribution in the past. The BMHS is currently less active, and the PSP will rely on the WWBWC to lead outreach efforts for the project.

The Walla Walla PSP will continue to find additional funding to ensure its success; some potential funding sources are listed in table 7.

Table 7. Annual estimated Walla Walla PSP funding needs

Technical Assistance Needs	Notes	Cost *
Sample Shipping Costs	Historically provided by ODEQ	0
Monitoring Sample Analysis	Historically provided by ODEQ	0
Local PSP Monitoring	**Notes**	**Cost ***
Grab Sample Collection (staff and travel)	70 Samples	3000
Surface Flow and weather stations	Quarterly measurements and downloads (five sites)	2000
Partnership Coordination	1.5 days/month	5000
Development of technical handouts / white papers	40 hours	1500
Annual Reporting/Presentations	1 report	1500
	Total	13000
Communication, Education, and Outreach	**Notes**	**Cost ***
Stakeholder Engagement and Outreach	Two events / 8hrs per event	1000
Educational Event	One Event	1000
Development of materials and video	80 hours	3500
Outreach and Reporting Printing Cost		500
	Total	6000
	Annual Walla Walla PSP Budget	19000
Possible Funding Sources	**Website**	
Oregon Watershed Enhancement Board (OWEB)	https://oregon.gov/OWEB	
Environmental Protection Agency (EPA) 319 Program	https://www.oregon.gov/deq/wq/programs/Pages/Nonpoint-319-Grants.aspx	
Drinking Waters Providers Partnership (DWPP)	https://geosinstitute.org/initiatives/dwpp	
Oregon Department of Agriculture	https://oregon.gov/ODA	
Natural Resource Conservation Service	https://www.nrcs.gov	
* Local Walla Walla PSP costs do not include the shipping costs and analysis of samples that ODEQ typically covers.		

9. Coordinating Council Statement of Commitment

The Walla Walla PSP has a history of volunteer collaboration, and the creation of a local Coordinating Council is built off that foundation. The council will meet bi-annually to share information across diverse groups and organizations. The meetings will focus on ways to achieve the goals and objectives of the Walla Walla PSP by addressing the following components:

1. Provide local feedback and input to the direction of the Walla Walla PSP
2. Act in an advisory role for program decisions that include:
    a. Evaluation of annual monitoring efforts
    b. Future monitoring strategy
    c. Outreach, education, and communication
    d. Technical assistance or possible training opportunities
    e. Provide funding support through direct funding or match
    f. Identify possible future projects that fall in line with the goals and objectives.

The Walla Walla PSP Coordinating Council understands that the Walla Walla PSP Strategic Plan does not have any legal standing. The plan is a living document that will be maintained and updated when necessary by the council. The council agrees to work collaboratively toward the goals and objectives set forth by the plan. The document will be made available to the public through the WWBWC website for distribution.

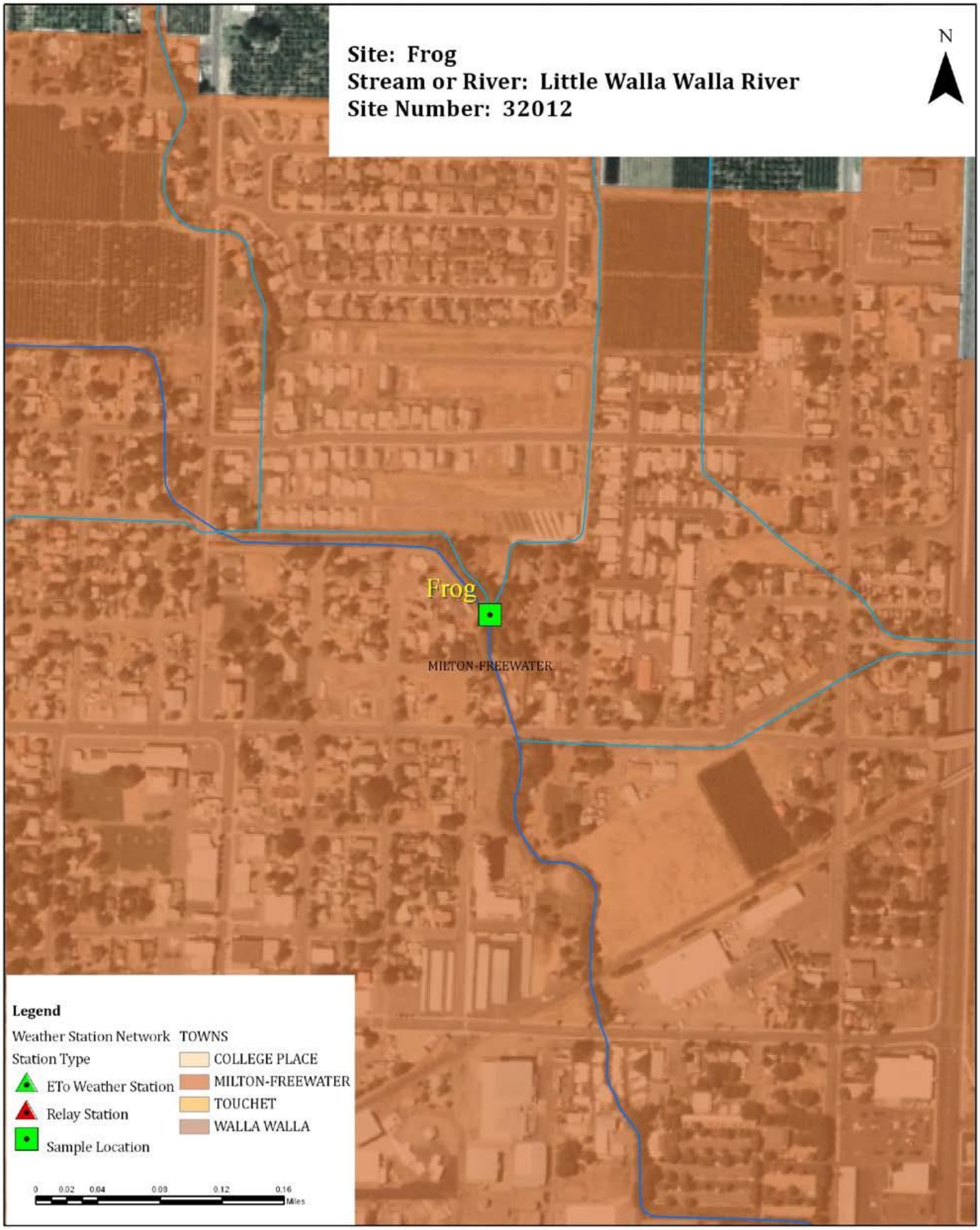
9.2. Walla Walla PSP Coordinating Council Representation

Organization	Name
Walla Walla Basin Watershed Council	Troy Baker (Executive Director)
Walla Walla Basin Watershed Council	Tara Patten (Monitoring Program Manager)
OSU Milton-Freewater Extension	Currently Vacant
Walla Walla River Irrigation District	Teresa Kilmer (District Manager)
Umatilla County Road Department	
Blue Mountain Horticultural Society	Vern Rodighero (Tresurer)
Pea and Wheat Growers	
Local Vineyards	Currently Vacant

Appendix 1

Site Location Maps


Site: Grove School Bridge
Stream or River: Walla Walla River
Site Number: 32007
N
Grove School Bridge
MILTON-FREEWATER
Legend
Weather Station Network
Station Type
ETo Weather Station
Relay Station
Sample Location
TOWNS
COLLEGE PLACE
MILTON-FREEWATER
TOUCHET
WALLA WALLA
0 0.02 0.04 0.08 0.12 0.16
Miles

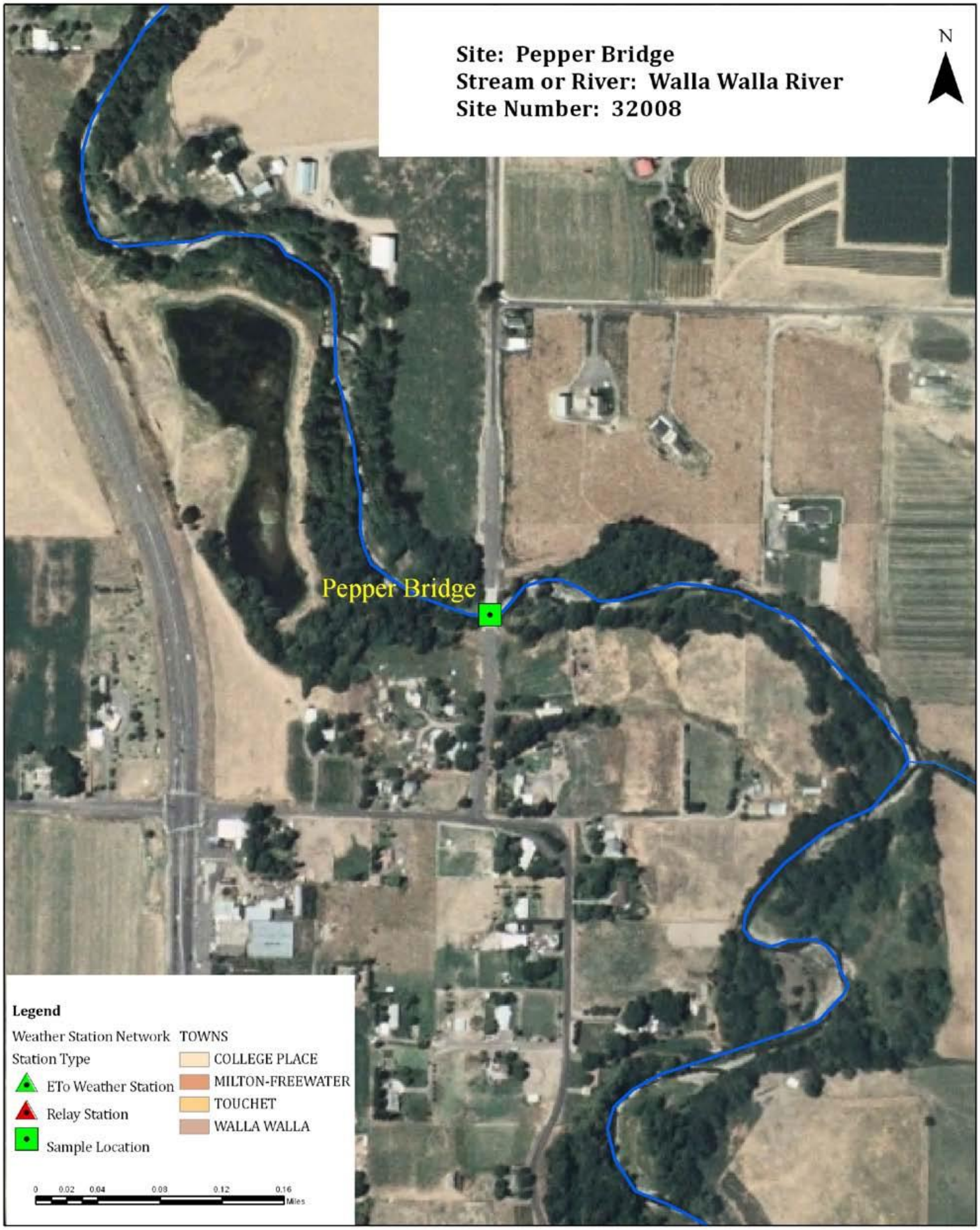


Site: Frog
Stream or River: Little Walla Walla River
Site Number: 32012
N
Frog
MILTON-FREEWATER
Legend
Weather Station Network
Station Type
ETo Weather Station
Relay Station
Sample Location
TOWNS
COLLEGE PLACE
MILTON-FREEWATER
TOUCHET
WALLA WALLA
0 0.02 0.04 0.08 0.12 0.16
Miles

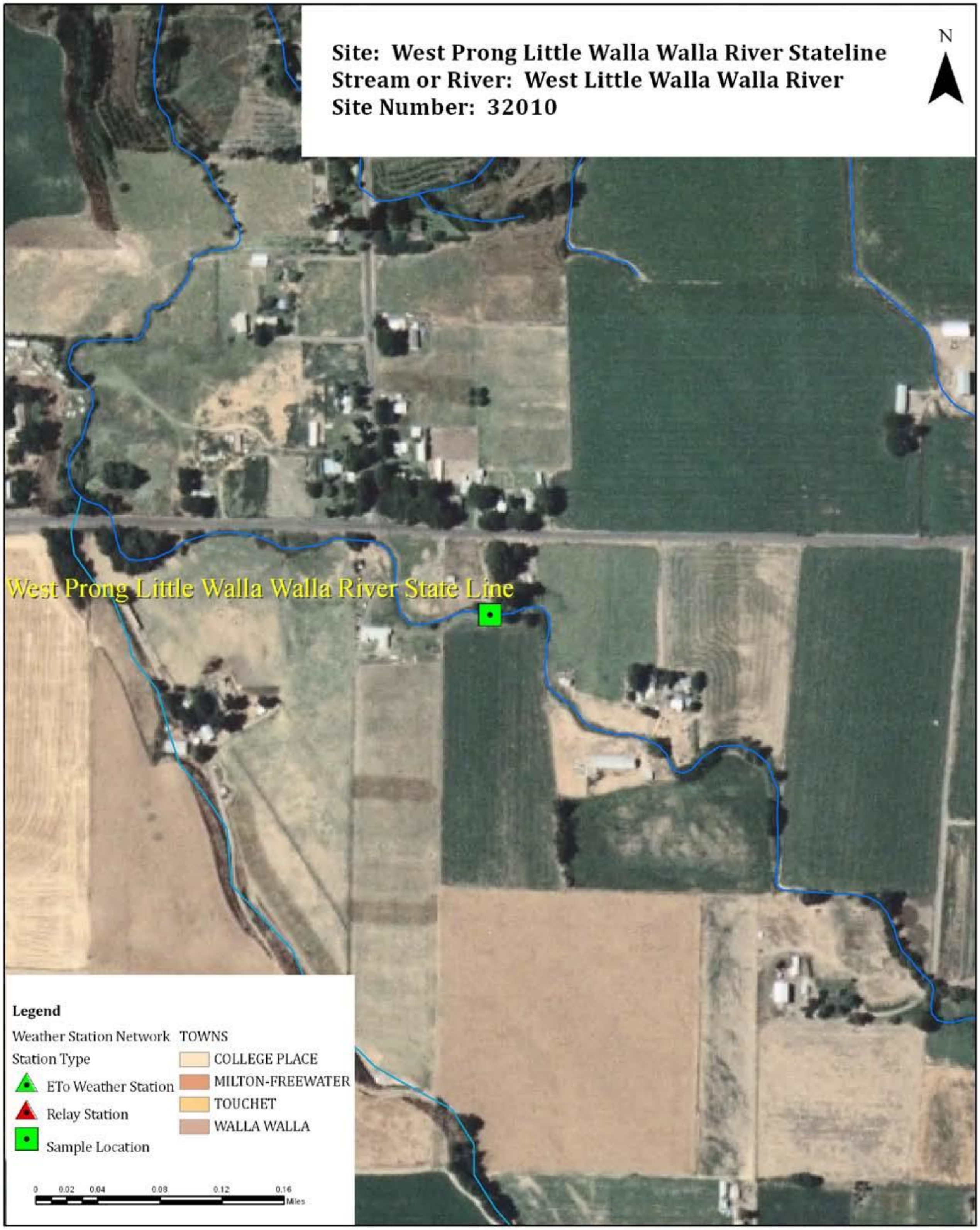

Site: West Branch Crocket
Stream or River: West Branch Crocket
Site Number: 33084
N
Little Walla Walla River Mid
West Branch Crocket
West Branch Crocket Upstream
Legend
Weather Station Network
Station Type
ETo Weather Station
Relay Station
Sample Location
TOWNS
COLLEGE PLACE
MILTON-FREEWATER
TOUCHET
WALLA WALLA
0 0.02 0.04 0.08 0.12 0.16
Miles


Site: West Branch Crocket Upstream
Stream or River: West Branch Crocket
Site Number: 34820
N
Little Walla Walla River Mid
West Branch Crocket
West Branch Crocket Upstream
Legend
Weather Station Network
Station Type
ETo Weather Station
Relay Station
Sample Location
TOWNS
COLLEGE PLACE
MILTON-FREEWATER
TOUCHET
WALLA WALLA
0 0.02 0.04 0.08 0.12 0.16
Miles


Site: Little Walla Walla River Mid West Prong
Stream or River: West Little Walla Walla River (West Ford)
Site Number: 33083
N
Little Walla Walla River Mid West Prong
West Branch Crocket
West Branch Crocket Upstream
Legend
Weather Station Network
Station Type
ETo Weather Station
Relay Station
Sample Location
TOWNS
COLLEGE PLACE
MILTON-FREEWATER
TOUCHET
WALLA WALLA
0 0.02 0.04 0.08 0.12 0.16
Miles



Site: Pepper Bridge
Stream or River: Walla Walla River
Site Number: 32008
N
Pepper Bridge
Legend
Weather Station Network
Station Type
ETo Weather Station
Relay Station
Sample Location
TOWNS
COLLEGE PLACE
MILTON-FREEWATER
TOUCHET
WALLA WALLA
0 0.02 0.04 0.08 0.12 0.16
Miles


Site: West Prong Little Walla Walla River Stateline
Stream or River: West Little Walla Walla River
Site Number: 32010
N
West Prong Little Walla Walla River State Line
Legend
Weather Station Network
Station Type
ETo Weather Station
Relay Station
Sample Location
TOWNS
COLLEGE PLACE
MILTON-FREEWATER
TOUCHET
WALLA WALLA
0 0.02 0.04 0.08 0.12 0.16
Miles