

# PESTICIDE STEWARDSHIP PARTNERSHIP PROGRAM

**2015-17**

**Biennial Report**

OREGON WATER QUALITY PESTICIDE MANAGEMENT TEAM  
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## ► 1.0 Introduction

This document summarizes the actions and accomplishments of the Pesticide Stewardship Partnership (PSP) Program for the period of July 1, 2015 through June 30, 2017. Under the 2011 U.S. Environmental Protection Agency approved Pesticide Management Plan for Water Quality Protection, the inter-agency Water Quality Pesticide Management Team (WQPMT) in collaboration with numerous local partners implement the PSP Program.

## ► 2.0 Program Overview

The PSP Program is a cooperative, voluntary process that is designed to identify potential concerns regarding surface and groundwater affected by pesticide use within Oregon. The PSP Program began with a small number of pilot projects in north Mid-Columbia watersheds in the late 1990s and early 2000s as an alternative to regulatory approaches for achieving reductions in current use pesticides from application activities. Since 2013, the Oregon Legislature has supported the implementation and expansion of the PSP Program, that now addresses pesticides applied in watersheds that encompass applications from urban, forested, agricultural and mixed land uses.

A number of state agencies are involved through membership in the WQPMT<sup>1</sup> including the Oregon Department of Environmental Quality (DEQ), Oregon Department of Agriculture (ODA) and the Oregon Department of Forestry (ODF), the Oregon Watershed Enhancement Board (OWEB) and the Oregon Health Authority (OHA); Oregon State University's (OSU) Extension Service also plays a critical role in supplying technical assistance to the WQPMT and PSP partners. The agencies and OSU work with diverse parties, including watershed councils and other natural resource groups, local landowners and growers, soil and water conservation districts, and tribal governments to find ways to reduce pesticide levels while measuring improvements in water quality and crop management. The partnerships combine local expertise and water quality sampling results to encourage voluntary changes in pesticide use and management practices.

The overall goal is measurable environmental improvements to enhance Oregon waters making them safer for humans and aquatic life. Specific watershed goals are developed by local stakeholders who use monitoring data to develop, implement, and measure effectiveness of management measures designed to reduce or eliminate pesticide loading to waters of the state.

The 2015-17 budget for the PSP Program totaled \$1,695,009.00. Half of these funds were allocated by the Oregon legislature (General Funds) and half are derived through pesticide registration fees collected by ODA. The allocation of these funds within the PSP are presented below in Table 1.

**TABLE 1: ALLOCATION OF PSP PROGRAM FUNDS (2015-17)**

Activity	Allocation
Water Quality Sample and Data Analysis (DEQ)	\$1,047,064.00
Program Administration (ODA)	\$247,945.00
Technical Assistance Grants	\$200,000.00
Waste Pesticide Collection Events	\$200,000.00
Additional Funding (MWC/ODF/DEQ)	\$25,000.00 <sup>2</sup>

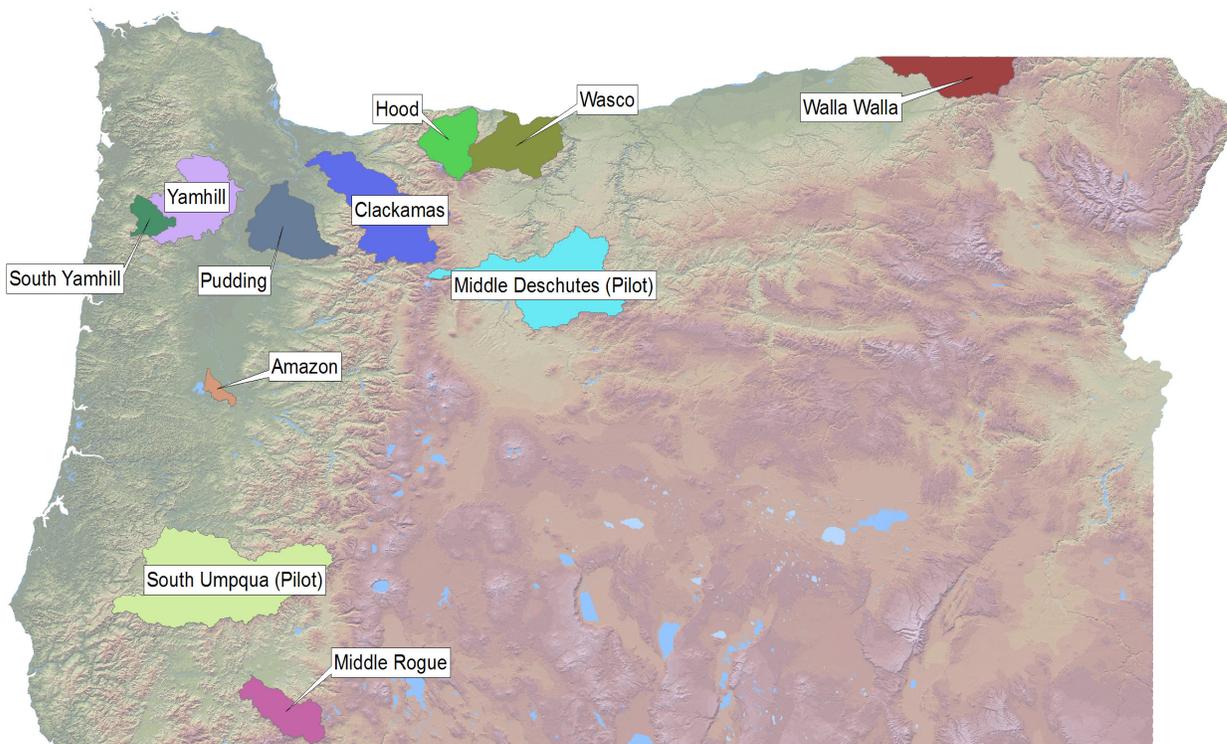
During the 2015-17 biennium, the WQPMT made several modifications to the number of watersheds participating in the program. Monitoring activities in South Yamhill were discontinued and monitoring was re-started in two pilot areas (South Umpqua near the City of Roseburg, and the Middle Deschutes near

<sup>1</sup>The Water Quality Pesticide Management Team was established by a Memorandum of Understanding between ODA, ODEQ, ODF, and the Oregon Department of Human Services in 2009

<sup>2</sup>\$15,000.00 was provided to the Program from the Medford Water Commission (MWC) to support a waste collection event in March 2015 and an additional \$10,000.00 was provided by the Oregon Department of Forestry to enhance outreach and education activities.

the City of Madras). The actions taken in the South Yamhill are cited later in this report. The pilot studies in the Middle Deschutes and South Umpqua were restarted due to renewed interest by local stakeholders, and results from previous water quality sampling that indicated a need for further investigation. A map of 2015-17 participating watersheds is presented in Figure 1.

**FIGURE 1: CURRENTLY PARTICIPATING PSP WATERSHEDS AND PILOT AREAS (2015-17)**



## ► 3.0 Pesticide Monitoring and Results

### SURFACE WATER SUMMARY

During the 2015-17 biennium approximately 1200 water samples were collected and analyzed across the nine PSP watersheds and two pilot areas. The DEQ laboratory analyzed all samples collected from these watersheds. Several pesticides were added to the analytical suite from the 2013-15 biennium based on evolving pesticide use patterns employed by applicators. The program analyzes for 89 currently registered pesticides, 26 non-registered pesticides<sup>3</sup>, and 18 pesticide metabolites.

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<sup>3</sup>Non-registered pesticides include those that have registrations cancelled by EPA or are not registered for use in the State of Oregon. Non-registered pesticides are included in the analyses due to several reasons including being part of a current analytical suite that also include current use pesticides, or have not yet been part of recent laboratory reviews to update established pesticides analyzed for in the PSP Program

**TABLE 2: 2015-17 WATER QUALITY SAMPLING DISTRIBUTION**

PSP and Pilot Areas	Number of Sampling Sites	Number of Samples Collected	Percentage of Total Samples Collected
Amazon	5	155	13
Clackamas	6	140	11.8
Hood River	10	122	10.3
Middle Deschutes (P)	5	39	3.3
Middle Rogue	9	153	12.9
Pudding-Molalla	3	51	4.3
South Umpqua (P)	5	55	4.6
South Yamhill	3	33	2.8
Walla Walla	7	120	10.1
Wasco	5	143	12.2
Yamhill (Greater)	6	175	14.7

(P) indicates pilot area status

A comparison of overall water quality data for each area indicates that there has been watershed-wide progress in many of the PSPs in the 2015-17 sampling period compared to pesticides detected during the 2013-15 sampling period. The analysis of data from individual stream monitoring locations needs to be considered when evaluating results, as some stream segments in a specific watershed have demonstrated improved water quality, while other monitoring locations in the same watershed indicated no measurable changes or experienced declines in pesticide water quality. The intent of the PSP program is to focus on areas that are most impacted by pesticides, and then track improvements over time as management measures are implemented.

This process can result in an initial set of water quality data (for the overall watershed) that indicates a low to moderate impact. Once initial data is evaluated, monitoring sites and the areas encompassed by those sites may be dropped from the sampling plan where little to no pesticide impacts are noted. Monitoring then shifts to other sites (generally encompassing smaller land areas) with demonstrated water quality issues where detections indicate a need for additional focus. In making these adjustments, overall watershed water quality data, alone, may indicate a decline in water quality when in fact a majority of the watershed does not demonstrate an issue with pesticide residues in water. To fully understand the status of water quality and pesticide occurrence, it is necessary to evaluate water quality on both a watershed and sub-watershed basis.

An evaluation of water quality results from individual sub-watersheds indicate an overall improvement above that indicated when reviewing all monitoring stations together within a single watershed. Figure 3 illustrates the distribution of progress for each individual sub-watershed represented by an individual monitoring location. Frequency of detection, number of detections and exceedances of a benchmark were considered when developing Figure 3.

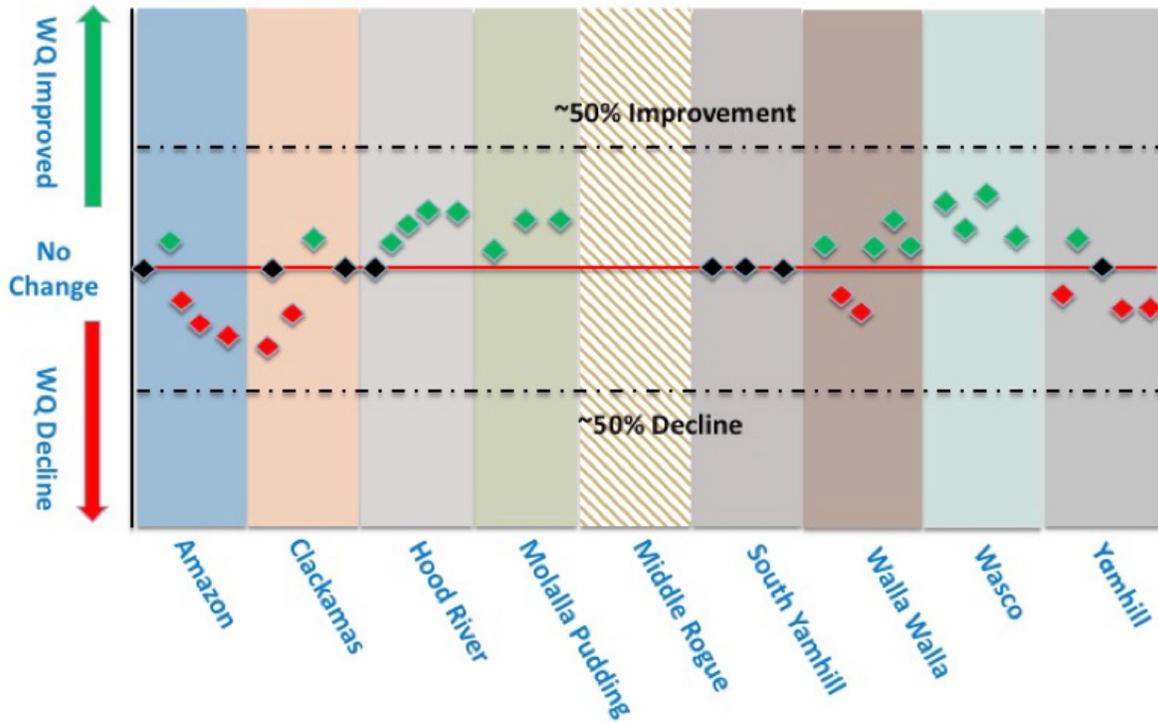
**FIGURE 2: WATER QUALITY MONITORING STATION LOCATION 32012**



*“The Frog” station in the Walla Walla pesticide stewardship partnership watershed.*

<sup>4</sup>Statistics regarding the PSP watersheds are based on compilation of all water quality data from all monitoring locations within the specific watershed. An examination of water quality results for individual monitoring stations (sub-watersheds) within each PSP watershed indicates a higher degree on improvement from the 2013-15 sampling period to the 2015-17 sampling period

**FIGURE 3: CHANGES IN PESTICIDE OCCURRENCES FOR INDIVIDUAL SUB-WATERSHEDS FROM 2013-15 TO 2015-17 SAMPLING PERIOD**



In Figure 3, each sub-watershed is indicated by a diamond. A red diamond indicates a decline in water quality from 2013-15 to 2015-17. A black diamond indicates no overall change and a green diamond indicates an improvement in water quality during those periods. The evaluations include changes in both frequency and percentage of an aquatic life benchmark for pesticides detected at that sub-watershed during the sampling periods. The evaluation conducted was done for all pesticides together and did not attempt to isolate any single chemical. The degree of improvement was based on overall changes using the 2013-15 period as a baseline. Water quality data for the Middle Rogue was not included because a very limited amount of data was collected during the 2013-15 sampling that could be used for comparison to 2015-17 data. The results of this analysis indicate that in a majority of sub-watersheds the overall pesticide occurrence has declined over the past two biennia.

Because of the varied nature of land uses within each PSP area, the amount of water quality data collected which to analyze, and on-going pesticide detections in some smaller geographical areas, beginning in the 2015 activities designed to improve water quality, become focused at the sub-watershed level within some PSPs. An example of this, is the focus on the Palmer Creek watershed within the Greater Yamhill PSP and the A1 Channel in the Amazon PSP. The move from focusing on the entire PSP area to sub-watersheds allows for better use of limited resources where they may have the greatest impact in reducing pesticide impacts to waterbodies.

### TRENDS IN WATER QUALITY

In an attempt to assess the overall impact, the Pesticide Stewardship Program has had on pesticide residues in water, a simple five-year liner trend analysis was conducted on the 25 most commonly detected pesticides in waterbodies within the PSP's or PSP study areas. In most cases, these are also the pesticides considered to be of greatest concern by PSP partners. In some cases, notably the Middle Deschutes, Middle Rogue, and the South Umpqua the dataset was less than five years. In those cases, the trend analysis was conducted on the existing data. The extent of the dataset used is provided in the Table 3.

For Table 3, areas marked with a “D” and in green indicate a downward trend in detected pesticide concentrations. Areas marked with an “NC” and in yellow indicate no significant change in detected concentrations. Areas marked with a “U” and in red indicate an upward trend. Areas in white indicate no detection of the indicated pesticide or too few detections to determine a trend.

In each watershed the analysis was done solely for the concentrations detected. This differs in the elements considered in Figure 3, where multiple factors were used to determine overall “ratings” for the individual sub-watersheds.

The results presented in Table 3 indicate a significant number of non-detections for many of the most common pesticides in numerous PSP areas. For many of the pesticides that have been of greatest concern, the five-year trend indicates positive improvement in water quality. The Table also indicates that within the PSP Program, there are areas that require increased attention in the form of outreach and education, and/or implementation of greater management measures to reverse upwards trends in detected pesticide concentrations.

**TABLE 3: FIVE-YEAR TRENDS IN PESTICIDE CONCENTRATIONS**

Pesticide	Amazon 2012-17	Clackamas 2012-17	Hood River 2012-17	Middle Deschutes 2014-17	Middle Rogue 2014-17	Molalla- Pudding 2012-17	South Yamhill 2012-16	South Umpqua 2014-17	Walla Walla 2012-17	Wasco 2012-17	Yamhill 2012-17
2,6-dichloroben- zamide	D	D	D		D	U				D	D
Atrazine	D					NC				D	NC
Deisopropyla- trazine	U	U	D			D				NC	D
Desethylatrazine	D	U				NC			U	D	U
Simazine	NC	U	NC			D			D	D	U
Bifenthrin		D									U
Carbaryl	U	U	D			D			D	U	D
Chlorpyrifos		D		U		D			U	D	U
Dimethenamid		D		U		U					U
Dimethoate				U		D					D
Diazinon		D									U
Diuron	NC	U	U	U	D	D		D	D	D	NC
Ethoprop		U				D					U
Imidacloprid		U			U	U					U
Linuron				U							
Melathion										D	
Metolachlor	D	D		U		U					NC
Metsulfuron methyl	D	D						D			D
Oxyfluorfen		D		U	U	D					D
Prometryn				D							
Propiconazole	D	D	U	U		U					U
Pyraclostrobin		D	D			D			D	NC	D
Sulfometuron- methyl	NC	D			U	D		D			U

Watersheds with time frames listed indicate range of available data. These may be due to start of pilot studies or modification of sampling schedule.

Since the inception of the PSP Program, several notable successes have been achieved. Below are some highlights of improving data trends.

## Amazon

- The total number of pesticide benchmark exceedances in the Amazon watershed decreased from 5 in 2015 to 1 in 2017.
- The median concentration of the fungicide propiconazole dropped from .56 µg/l in 2015 to .09 µg/l in 2017, an 83% reduction.

## Clackamas

- Overall detected concentrations of the insecticide chlorpyrifos appear to be on a downward trend over the past five years. Higher levels of the pesticide were detected during the 2015-16 sampling period but were confined to two sub-watersheds (Deep Creek and Noyer Creek). Recent sample results indicate that detected concentrations in focus areas have dropped. The median watershed concentration measured for chlorpyrifos in 2012 was .38 µg/l in 2017 that had dropped to .09 µg/l approximately a 75% decrease.
- Diazinon (a designated statewide pesticide of concern) concentrations continue to drop and are rarely detected in water quality monitoring results. The median watershed concentration measured for diazinon in 2012 was .29 µg/l in 2017 that had declined to .1 µg/l.

## Hood River

- Chlorpyrifos has not been detected in the Hood River watershed since 2014. Although decreasing trends in concentrations and frequency were first observed in the early 2000s, chlorpyrifos was still detected at least once almost every year since monitoring began in the watershed through 2014.
- There were no benchmark exceedances in 2016 or 2017 for any pesticides except for one detection of imidacloprid in each of those years.

## Walla Walla

- Between 2015 and 2017 in the Walla Walla watershed, the total number of pesticide detections in the watershed dropped from 58 to 24, and the total number of individual pesticide ingredients or degradates detected decreased from 18 to 7. These reductions occurred despite an expansion of the PSP to other agricultural areas of the watershed and increase in the number of pesticides analyzed by the DEQ Lab.
- No malathion was detected in the watershed in 2016 and 2017. Malathion was detected every year between 2010-15 (malathion applications ramped up in 2010 to control the Spotted Wing Drosophila pest arrived in Oregon and threatened cherry harvests).
- Average diuron concentrations in the watershed decreased from 1.53 µg/L in 2010 to .00914 µg/l in 2017 a 99.4% decrease. The local irrigation district discontinued the use of diuron and switched primarily to mechanical means of controlling ditch bank vegetation in 2012.

## Wasco

- The percentage of malathion detections above the Oregon water quality criterion of 0.1 µg/l in Wasco streams decreased from 86% in 2011 to 20% in 2017, and median water concentrations decreased by 95.6% during the same time frame.
- No chlorpyrifos was detected in 2016 or 2017. This insecticide was detected every spring (during “delayed dormant” tree fruit spraying periods) between 2010-2015, and average concentrations had actually increased between 2011 and 2014.

- The total number of detections of all pesticides or degradates dropped from 97 in 2012 to 63 in 2017, while the total number of pesticide benchmark exceedances decreased from 15 in 2012 to 4 in 2017.

For some of these positive trends, the WQPMT can link the results actions taken by growers or other pesticide applicators in response to the data and outreach. In other instances, the connections between outreach, management actions and improving trends is less certain or unknown.

## GROUNDWATER SUMMARY

During the 2015-17 biennium, ground water was sampled in two areas currently designated as PSP's, The Walla Walla and the Middle Rogue. This activity was conducted by DEQ as part of the statewide groundwater quality project. Even though these samplings were not conducted as part of the PSP program, the results provide added information by which to assess the overall quality of waters within these two watersheds in regards to pesticide occurrences.

In 2015, DEQ investigated 107 wells within the Middle Rogue basin in which the PSP area was included<sup>5</sup>. 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. Five pesticides and/or pesticide metabolites detected through surface water monitoring conducted through the PSP were detected in groundwater. These pesticides were diuron, acetamiprid, and triazines and degradates (either atrazine, simazine and /or deisopropylatrazine). The detected pesticides in both surface and groundwater have properties that classify them as having high to medium leachability potential (travel through soils to underlying groundwater easily).

In 2016, DEQ investigated 60 water supply wells within the Walla Walla basin in which the PSP area was included. The results of that study indicated no exceedances of human health or aquatic life benchmarks for any currently used pesticide. This report is currently being finalized by DEQ.

Specific result summaries are presented in the Middle Rogue and Walla Walla Pesticide Stewardship Partnership 2015-17 Biennial Summaries, referenced at the end of this report.

## UNCERTAINTIES ASSOCIATED WITH WATER QUALITY DATA

The sampling methods and techniques employed in the PSP are continually being evaluated for effectiveness and data quality. As improved methods and techniques become available and are within the financial constraints of the PSP, adjustments will be adopted to ensure the highest quality data is obtained. Water quality samples collected as part of the PSP program are generally obtained through the use of grab sample techniques. Grab sampling for pesticide residues is the predominate method employed by federal and state agencies for reconnaissance studies like those conducted as part of the PSP sampling activities. Due to the nature of grab samples capturing one point in time, there is some inherent uncertainties by using this sampling technique. Uncertainties can be reduced by the following:

- Include the measurement of stream flow at the time of sample collection to allow for loading measurements and for the ability to perform flow-weighted analysis on concentration data
- Schedule sampling events as close to pesticide application as possible to reduce or eliminate factors such as pesticide degradation and dilution

The WQPMT is currently evaluating how to decrease uncertainties with sampling in all PSP areas. Water quality sampling is conducted by PSP partners designated by ODEQ who provides technical

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<sup>5</sup>Goodwin, Kara and Evans, Paige: Statewide Groundwater Monitoring Program: Mid-Rogue Basin 2015, DEQ16-LAB-0042-TR, December 16, 2016

assistance in proper monitoring techniques. To ensure that data are collected per established protocols necessary to maintain high data quality and allow for data comparison, DEQ conducts annual audits of sampling staff. Results for audits conducted in 2016 and 2017 indicate that protocols are being followed ensuring that data quality is being protected at the point of sample collection within the individual PSP areas<sup>6</sup>.

## SEDIMENT SAMPLING RESULTS

Sediment sampling is periodically conducted as part of PSP activities within several select watersheds. During the 2015-17 biennium 18 sediment samples were collected at sites within the Amazon, Clackamas, Hood River, Molalla-Pudding, Wasco and Yamhill watersheds. Several pesticides and pesticide metabolites were detected. Among the currently used pesticides found in sediments were the insecticides bifenthrin and chlorpyrifos and the herbicides oxyfluorfen and trifluralin. Other detections included metabolites of legacy<sup>7</sup> pesticides DDT, dieldrin, and chlordane.

An evaluation of the currently used pesticides indicates that samples collected within (with the exception of a sample collected in the summer of 2015 in the Amazon watershed, and a sample collected in the Clackamas in the fall of 2016) were below the threshold that would negatively impact aquatic life. The two bifenthrin samples collected in the Amazon and Clackamas did exceed the LC50 threshold for benchmark organisms to impact aquatic life. The estimated sediment pore water concentration for the Clackamas bifenthrin sample exceeded the aquatic life benchmark of 0.0013 µg/L.

Sediment results for the Hood River study (which is conducted in cooperation with the Confederated Tribes of the Warm Springs) are presented in the DEQ publication 2016 Hood River Sediment Pesticide Monitoring Summary Report, August 2017.

Individual sediment sample results are presented in the summary reports referenced at the conclusion of this document.

## ► 4.0 Frequently Detected Pesticides of Concern

The WQPMT has developed a process to determine which frequently detected pesticides are of greatest concern to the State of Oregon. This process relies heavily on the frequency of detection and the highest concentration level (in the past five years) in relationship to U.S. Environmental Protection Agency's (EPA) aquatic life benchmarks and the year to year changes in these two parameters. A designation as a pesticide of concern is used by states and EPA to track progress in reducing the frequency and concentrations of pesticides in surface and groundwater bodies. The WQPMT also uses the designation to assist PSP partners in prioritizing outreach, education, and other efforts within the various watersheds to address major pesticide concerns.

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<sup>6</sup> The results of the 2016-17 individual audit can be found in the 2017 PSP Field Audit Summary Report on the Department of Environmental Quality's PSP web page under "Other Resources": <https://www.oregon.gov/deg/wq/programs/Pages/Pesticide.aspx>

<sup>7</sup> Legacy pesticides are chemicals that were once used in the US but are now canceled or banned because of health risks to humans, animals, or the environment

**TABLE 4: DESIGNATED PESTICIDES OF CONCERN IN CURRENT PSP AREAS 2015-17**

Pesticide	Category	Number of PSP Areas
Imidacloprid	Insecticide	9
Chlorpyrifos	Insecticide	5
Diuron	Herbicide	5
Diazinon	Insecticide	4
Carbaryl	Insecticide	3
Dimethenamid	Herbicide	3
Bifenthrin	Insecticide	1
Dimethoate	Insecticide	1
Ethoprop	Insecticide	1
Linuron	Herbicide	1
Malathion	Insecticide	1
Metolachlor	Herbicide	1
Metsulfuron methyl	Herbicide	1
Oxyfluorfen	Herbicide	1
Prometryn	Herbicide	1
Propiconazole	Fungicide	1
Sulfometuron-methyl	Herbicide	1

As indicated in Table 4, several pesticides meet the pesticide of concern criteria in only one currently designated PSP area. In those areas’ activities are underway to assess and address the events that may have led to the designation. In areas where sources have been determined and management measures have been enacted, the partner organizations and agencies are conducting water quality monitoring designed to access the effectiveness of those measures by evaluating changes in pesticide concentrations before and after measures are put in place.

In several PSP areas, a few pesticides have occurred and continue to occur at levels of concern on a regular basis and in some cases in increasing frequency and concentrations. In those areas, the WQPMT along with the watershed partners are developing strategies to address the root causes of the detections and better define the boundaries of the sub-watersheds most impacted.

## ► 5.0 Distribution of Grant Funding

During the 2015-17 biennium, the PSP Program funded five grant projects. This was an increase of two additional projects over the number funded during the 2013-15 biennium<sup>8</sup>. The project recipients were:

- Oregon State University for development and calibration of an established surface and groundwater model to predict the effects of land and pesticide use on water quality. The results of this project were less than anticipated due to difficulties encountered during project scoping. Initial areas for study had to be expanded due to existing hydrology. This required expansion of the area and increased the number of crops, soil types, pesticides used, and growers. While not achieving all goals of the project, significant information was collected that will assist in the development of future management measures that should improve water quality in sub-watershed areas of the State.
- Oregon State University for the development and implementation of a training program for applicators of pesticides to increase proficiency in spray equipment calibration and develop a management tool to improve pesticide application activities. This work was primarily focused in the Middle Rouge PSP area but can be replicated in other areas statewide.

<sup>8</sup> During the 2013-15 biennium the PSP Program did fund the purchase of two pieces of pesticide spray equipment that are currently on loan to local Extension and SWCD partners to enhance grower education and outreach efforts, in addition to supporting 3 separate technical assistance projects.

- Oregon State University for the development of conservation biological control management plans to enhance the presence of beneficial insects as an alternative to pesticide use. This project continued to build on the work funded during the previous biennium. These plans focused attention on the Christmas tree industry in the Clackamas and Molalla-Pudding watersheds to reduce pesticide use and employ alternatives. Success was partially gauged through documented grower participation in workshops and adoption of alternative practices. Current analysis of water quality data cannot verify environmental effects of the project. The Clackamas PSP has monitored three separate stream locations to capture pesticide residues from Christmas Tree growing lands, and all of the results have shown non-detects for pesticides. However, it can't be verified that these positive results are definitively correlated to the on-going OSU technical assistance efforts.
- Northwest Center for Alternatives to Pesticides for developing education and outreach materials providing growers and the general public with information on impacts to endangered salmon from pesticide management actions. This is focused on three PSP areas in Clackamas, Marion, and Yamhill Counties. Fact sheets for a variety of pesticides were developed. At the conclusion of the project, several of the fact sheets were modified to address concerns from agricultural stakeholders.
- Columbia Gorge Fruit Growers to demonstrate the use and effectiveness of recently developed tools for monitoring natural enemies of pear psylla. The project results verified the effectiveness of the developed tools and provided for the potential for expanded implementation to address the pear psylla pest.

The total funds awarded to these projects were \$165,188.77.

Additional funding was provided to individual PSP watershed partners to assist in the collection of water quality samples and promote special education and outreach activities within the individual watersheds<sup>9</sup>. These grants were termed “partner grants” and were non-competitive in nature. Nine such grants were awarded. The activities covered in the grants and the funding amount are presented in Table 5 below.

**TABLE 5: PARTNER GRANT FUND DISTRIBUTION**

PSP Watershed	Activities Funded	Funding Amount
Amazon	WQ Sampling, Discharge Measurements	\$ 7,897.00
Clackamas	WQ Sampling	\$ 6,250.00
Hood River	WQ Sampling	\$ 3,750.00
Mollala-Pudding	WQ Sampling, WQ Data Cataloging	\$ 8,250.00
Middle Deschutes	WQ Sampling	\$ 2,500.00
Middle Rogue	WQ Sampling, Groundwater Data Report	\$ 7,425.00
South Umpqua	WQ Sampling	\$ 3,250.00
Walla Walla	WQ Sampling, Weather Station Maintenance	\$ 4,800.00
Yamhill (Greater)	WQ Sampling, Data Collection Supporting OSU	\$ 8,250.00

A total of \$ 52,375.00 was awarded to the nine watersheds to continue water sampling and to enhance local programs in support of the PSP objectives.

As indicated in Table 4, several pesticides meet the pesticide of concern criteria in only one currently designated PSP area. In those areas’ activities are underway to assess and address the events that may have led to the designation. In areas where sources have been determined and management measures have been enacted, the partner organizations and agencies are conducting water quality monitoring designed to access the effectiveness of those measures by evaluating changes in pesticide concentrations before and after measures are put in place.

<sup>9</sup> These grants were originally developed to address shortfalls in funding from the Oregon Department of Environmental Quality non-point source grant program (CWA 319) that previously supported much of this activity.

In several PSP areas, a few pesticides have occurred and continue to occur at levels of concern on a regular basis and in some cases in increasing frequency and concentrations. In those areas, the WQPMT along with the watershed partners are developing strategies to address the root causes of the detections and better define the boundaries of the sub-watersheds most impacted.

## ► **6.0 Data Communication, and In-Kind Outreach and Services**

WQPMT members presented information about the PSP program at numerous forums throughout the state during the 2015-17 biennium. These included presentations at regional grower organizations, OSU pesticide re-certification course and other continuing education programs, farm fairs, and other meetings dealing with pesticide management. In addition, members of the WQPMT regularly attend meetings of PSP partner organizations to provide technical assistance or advice. The purpose of these presentations is to increase awareness and catalyze stewardship actions.

Members of the WQPMT presented the results of water quality monitoring data to every designated PSP and pilot area, generally twice per year. The purposes of these presentations are to help interpret the data and assist the partners in the development of management actions that should be considered as a result of the water quality findings.

During the summer of 2016, members of the WQPMT met with each PSP to begin the development of action plans for the 2017-19 biennium. These meetings included an in-depth discussion regarding both past and current monitoring results and the actions taken based on these data. In collaboration with PSP partners, an evaluation of the overall goals for each PSP was conducted and if necessary modified as needed to reflect changing conditions. Needs for additional grower technical assistance, changes in monitoring locations, new public outreach projects, funding, and waste pesticide collections were evaluated. Following local review and input, an action plan for the 2017-19 biennium was developed. A significant amount of in-field technical assistance was provided to PSP partners in the areas of hydrology and the establishment of stream discharge measurements. Additionally, data related to sediment analysis and the establishment of alternative monitoring locations (based on previous data results) was provided.

The PSP Program has benefitted from a significant amount of financial and in-kind services which has increased the state of Oregon's ability to provide services to the PSP partners, pesticide applicators, and the general public. For the 2015-17 biennium examples of these services include:

1. \$15,000.00 from the Medford Water Commission to support two waste pesticide collections events in Grants Pass and White City.
2. \$10,000.00 from the ODF to support local education and outreach in partner watersheds.
3. DEQ for making available three flow meters (valued at ~ \$5,000.00 each) and supplying technical assistance to watershed partner in their proper use. Additionally, supplying partners with staff gages for installation at numerous sampling locations.

## ► **7.0 Changes in Watershed Activities**

### **STREAM DISCHARGE MEASUREMENTS**

Several changes were made to PSP watershed activities during the 2015-17 biennium. The collection of stream discharge data was begun in the Amazon PSP to explore the value of this data in determining pesticide loading in streams. Stream discharge data will provide information, in addition to pesticide concentration to assist in evaluating whether management measures implemented in watersheds are resulting in reductions in pesticide loadings entering waterbodies. Discharge data collected at two locations in the Amazon PSP initially has provided a clearer picture of the relationship between discharge and concentration resulting in pesticide loading to a waterbody.

## SOUTH YAMHILL PESTICIDE STEWARDSHIP AREA

Water quality samples were collected from October 2010 to October 2016 in the South Yamhill watershed as part of an Oregon Pesticide Stewardship Partnership project. The data was collected at three locations established at the downstream ends of the Agency Creek, Gold Creek and Rogue River watersheds. At each of these locations approximately 54 water quality samples were collected. The Oregon Department of Environmental Quality (DEQ) conducted analysis for approximately 130 individual pesticides for each collected sample. Analytical results from the collected samples indicate that application of forest herbicides, used in the commercial forestry industry, resulted in detections of residues of 6 herbicides or herbicide degradates. Pesticide residues were detected in 0 to 5.2% of the samples analyzed. The concentrations detected combined with the frequency of detection indicated a low level of concern based on the WQPMT's pesticides of concern evaluation matrix. The results of the study will help to define data gaps that when addressed through future studies, could provide additional information regarding cause and effects related to herbicide application and potential impacts to nearby water quality. The South Yamhill PSP has concluded and the final evaluation report has been published and is available in the appendix.

## FUNDING TO PSP PARTNERS

As noted previously in section 5.0, beginning in 2015 some funding was diverted from technical assistance grants (competitive grants) to partner grants (non-competitive). This was done initially to provide funding for partners to collect water samples in each of the PSPs and pilot areas. Previously funding had been supplied by the DEQ through federal Clean Water Act non-point source 319 grants that became less available in 2015. In some areas, it was found to be advantageous to support additional activities that support PSP goals. In those cases, additional funds were provided to partners. It is anticipated that this funding will continue into the 2017-19 biennium in order to support the collection of stream discharge data and enhanced education and outreach activities that have a high potential for success.

## PILOT PROJECTS

Two pilot projects were continued during the 2015-17 biennium. Each of these were initiated during the previous biennium, and because of results obtained, it was considered prudent to continue water quality monitoring with adjustments. The two areas under pilot study are the Middle Deschutes and South Umpqua (Figure 1). As a result of these investigations, there is a high potential that one or both areas could be designated as a full PSP during the next biennium.

## ► 8.0 Waste Pesticide Collection

During the 2015-17 biennium, from July 2015 through June 2017, the PSP Program held 14 events and funded three additional events held by local stakeholder agencies.

The results of these actions removed 152,679 pounds of unused or unusable pesticides from sensitive watersheds. Table 6 provides information on participation and locations for events held during this time frame. These events are coordinated with local stakeholders (watershed councils, soil and water conservation districts, and solid waste management businesses). These stakeholders provide support to the program through publicizing the event via newspaper, radio, and posting on web pages.

**FIGURE 4: PESTICIDES COLLECTION**



*Off loading waste pesticides from a customer at the Harrisburg collection event in May 2016.*

During several collection events, surveys were conducted by local event sponsors to assess the effectiveness of various aspects of the program. Those elements include value of the program, effectiveness of publicizing, ease of accessing the event (distance), and types of material brought to the collection.

General responses regarding the program are:

- The public values the program and welcomes the ability to dispose of unwanted material in a safe, voluntary manner
- The majority of material being brought to the events are pesticide that are no longer registered for use, containers that have damaged labels or unreadable labels, and unknown pesticides that have been stored in compromised containers
- A large percentage of participants are first-time users of the program that operate farms, or are nurseries, and landscapers that would participate in the program again if needed
- The public and stakeholders value how the program moves collections to various areas of the state to provide access to the program to as many areas as possible.
- Supports the recycling of empty triple-rinsed plastic containers that are collected during events.

**TABLE 6: WASTE PESTICIDE COLLECTION ACTIVITIES 2015-17 BIENNIUM**

Location	Date	Pounds Collected	Participants
Klamath Falls	September 2015	2,526	8
Burns	October 2015	2,329	6
Ontario	October 2015	9,959	15
Grants Pass	March 2016	10,929	12
White City	March 2015	4,641	18
Pendleton	April 2016	6,246	11
Philomath	May 2016	17,000	21
Harrisburg	May 2016	7,200	18
Lakeview	June 2016	874	2
Roseburg	September 2016	1,963	5
Madras *	September 2016	344	1
Tillamook	October 2016	2,413	6
Clackamas *	October 2016	2,000	7
McMinnville	November 2016	47,784	48
Tri-County *	2016	13,824	34
Madras	Feb 2017	7,355	17
Milton-Freewater	June 2017	10,343	6

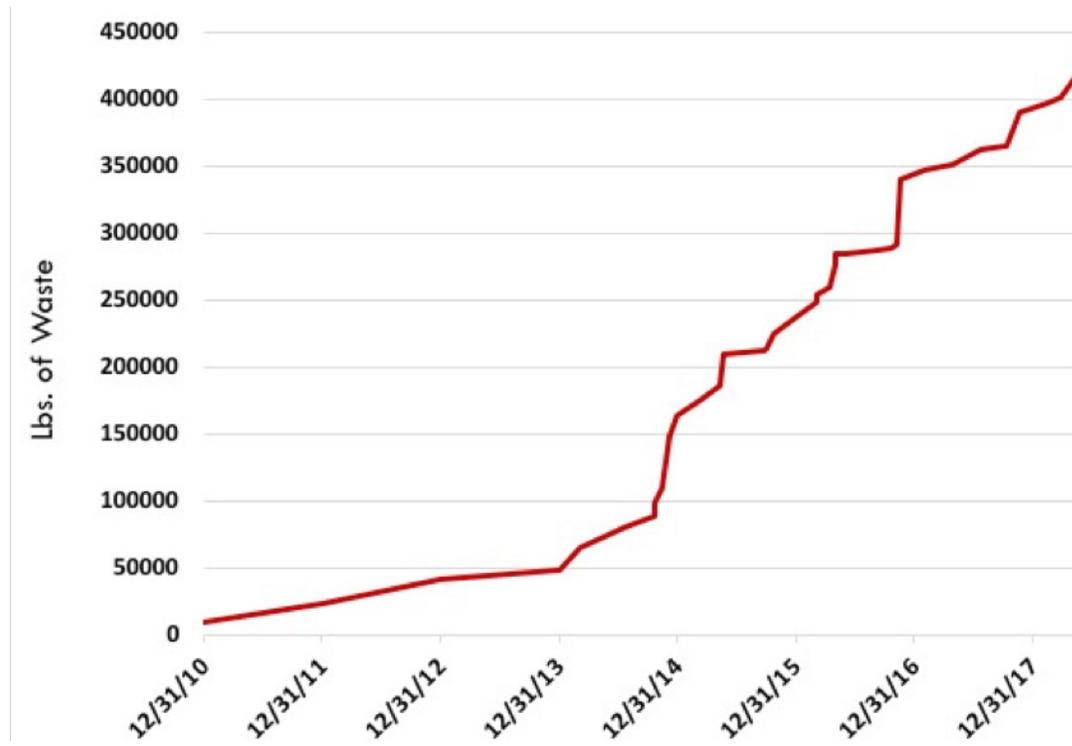
\* Indicates events held by other agencies but funded through PSP Program

Significant totals for the biennium are:

1. Number of collection events: 16 during the 2015-17 biennium as compared with 11 during the 2013-15 biennium.
2. Number of participants: 237 compared with 300 during the 2013-15 biennium.
3. Total pounds collected: 142,336 compared with 167,474 during the 2013-15 biennium.
4. Total cost: For events held during the 2015-17 biennium is 241,370.00. The average cost per event (less Tri-County grant activity) was \$14,752.00 An effort to coordinate with the Department of Environmental Quality's Household Hazardous Waste Collections allowed for contractor mobilization savings.

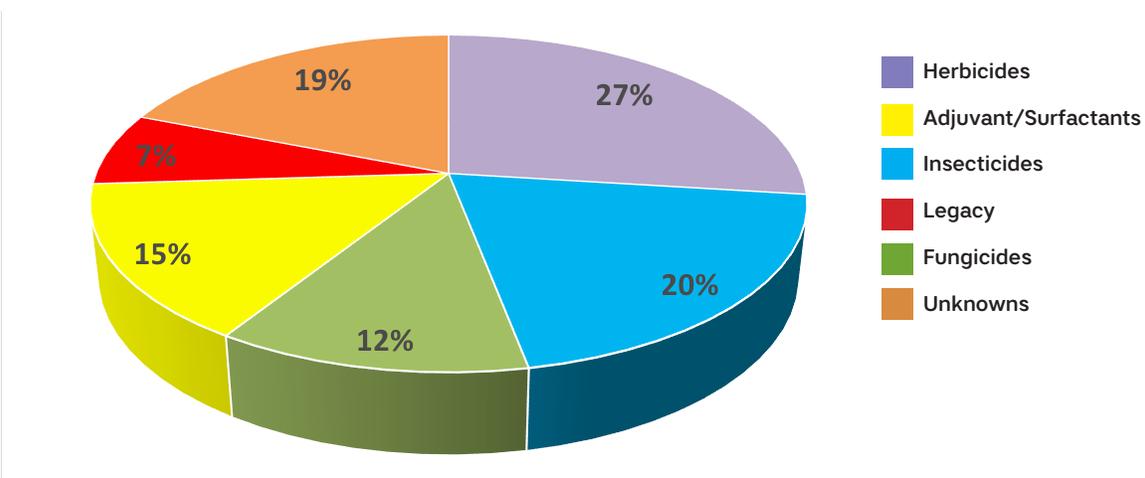
During the 2013-15 biennium, 11 events were held. There were five conducted on the west side of the state, and six events on the eastside. During the 2015-17 biennium, 16 events were held. There were 10 held on the westside of the state, and six held on the eastside. The program was made available to five additional communities from July 1, 2013 through June 30, 2015.

**FIGURE 5: WASTE PESTICIDE AMOUNTS COLLECTED BY PESTICIDE STEWARDSHIP PARTNERSHIP**



The Waste Pesticide Collection activities continue to remove a significant amount of pesticides from the environment. This trend is expected to continue as currently used pesticides are removed from registration and newer formulations emerge and enter the market. Pesticide that have been banned decades ago by the U.S. EPA continue to be collected during the collection events Figure 7 illustrates the types and amounts of pesticides collected during the 2015-17 biennium. Note that pesticides specified as “legacy” are those that have either been banned or are otherwise no longer registered for use in Oregon.

**FIGURE 6: WASTE PESTICIDE TYPES AND AMOUNTS COLLECTED BY PESTICIDE STEWARDSHIP: JULY 2015-JUNE 2017 (142,336 POUNDS)**



## ► Appendix One: Weblinks for Watershed Specific Summaries

- Amazon Creek Pesticide Stewardship Partnership 2015-2017 Biennial Summary:  
<https://oda.direct/AmazonSummary>
- Clackamas Pesticide Stewardship Partnership 2015-2017 Biennial Summary:  
<https://oda.direct/ClackamasSummary>
- Greater Yamhill Pesticide Stewardship Partnership 2015-2017 Biennial Summary:  
<https://oda.direct/GreaterYamhillSummary>
- Hood River Pesticide Stewardship Partnership 2015-2017 Biennial Summary:  
<https://oda.direct/HoodRiverSummary>
- Middle Rogue Pesticide Stewardship Partnership 2015-2017 Biennial Summary:  
<https://oda.direct/MiddleRogueSummary>
- Molalla-Pudding Pesticide Stewardship Partnership 2015-2017 Biennial Summary:  
<https://oda.direct/MolallaPuddingSummary>
- South Yamhill Pesticide Stewardship Partnership 2015-2017 Biennial Summary:  
<https://oda.direct/SouthYamhillSummary>
- Walla Walla Pesticide Stewardship Partnership 2015-2017 Biennial Summary:  
<https://oda.direct/WallaWallaSummary>
- Wasco Pesticide Stewardship Partnership 2015-2017 Biennial Summary:  
<https://oda.direct/WascoSummary>