Southern Willamette Valley Groundwater Management Area

Commercial & Industrial
Draft Action Plan
April 5, 2006

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Overview

The Willamette Valley is known worldwide for its productive agricultural area. The Southern Willamette Valley (SWV), the focus area for this Action Plan, is also home for approximately 18,000 people. The population growth of this area in Oregon is second only to that of the Bend area. The favorable climate and beauty of the SWV are two likely major factors in this growth pattern. In addition, the proximity to several large cities (Eugene, Corvallis, and Albany) and two major Universities present many employment opportunities for residents of the Valley.

Not as noticeable as the agricultural and the residential areas, but definitely part of the make-up of the SWV, are the many Commercial and Industrial facilities that dot the landscape. The numerous businesses in the Southern Willamette Valley range from golf courses to recreational vehicle manufacturers to pulp and paper industries. This section of the Action Plan will focus on those facilities that, due either to their business practices or the waste they must manage, could present a potential groundwater impact from nitrate.

The Commercial and Industrial Working Group is comprised of a mix of staff, public officials, technical experts, and commercial and industrial representatives. This group held two meetings and conducted much of the needed follow-up through the magic of email, individual meetings and by personal communication. During these activities group members discussed the need for appropriate actions to protect the groundwater resource, talked about the types of Commercial and Industrial facilities in the GWMA and what practices should be addressed in this document, and developed clear strategies and recommendations for the GWMA Committee to consider for inclusion into the Action Plan.

Commercial and Industrial Considerations

The Commercial and Industrial Working Group identified several pertinent classifications of businesses and/or practices to include in this section of the Action Plan, due to their potential for nitrate contamination of groundwater. Those classifications are:

- Fertilizers and Fertilization Practices
- Wastewater Treatment
  - Individual Large On-site Systems/Treatment Facilities
  - Public Wastewater Treatment Lagoons
- Land Application of Selected Wastes, Reclaimed Water & Biosolids

Fertilizers

Bulk Fertilizer Facilities

A Bulk Fertilizer facility generally offers commercial quantities of various custom-blended fertilizers, herbicides, and pesticides for the agricultural community. There are at least three bulk fertilizer facilities in the GWMA, one in Monroe and two in Harrisburg. A fourth facility lies just outside of the southern GWMA boundary that follows Route 36 near Junction City. DEQ has evaluated the potential risk from several bulk fertilizer facilities located outside of the GWMA, and found historical releases often were the cause of localized groundwater contamination. In general, current management and handling practices have greatly improved the situation. DEQ is currently evaluating the potential of conducting Preliminary Assessments for these facilities inside of the GWMA to determine if there have been any historical releases to the environment that need to be addressed. This evaluation would include an assessment of impacts to the aquifer from nitrate as well as other agricultural chemicals.

Fertilizer Practices

It was recognized that individuals, businesses, cities and counties all may use fertilizers from time to time. The actual use of a fertilizer is not necessarily a practice that will contribute nitrate to the groundwater. Rather, it is the amount, frequency and type of fertilizer, as well as the timing of irrigation relative to the application of fertilizers that can cause nitrate to be flushed beyond the root zone. Over-irrigation practices combined with over-fertilizing can exacerbate the problem, and be a cause for groundwater impacts.

Public Sector: Most of the Cities and Counties contacted indicated that because of budgetary concerns, fertilizing of green spaces (schools, parks, public lands, etc) either is done using a minimal amount of a slow release fertilizer, or is not conducted at all. Slow-release fertilizers, as their classification implies, release nutrients at a slower rate throughout the season. This allows plants to uptake most of the nutrients without wasting some of the fertilizer to leaching. As slow-release fertilizers are more convenient, less frequent applications are required.

Private Sector: Some businesses use landscaping companies while others use in-house staff to fertilize their lawns and grounds. Still others are not employing any fertilizer practices. At times, goals of those fertilizing can compete with the goals for protecting the groundwater resource. For example, some landscaping companies may make a significant portion of their summer income by mowing. Grass that is well-fertilized or uses a quick-release fertilizer will grow quicker than grass that has received either slow-release or a minimal amount of fertilizer.

The Shadow Hills Country Club is the only golf course within the GWMA boundary. This facility was given special consideration because of its size, location and the

perceived use of significant amounts of fertilizers. About 125 acres of Shadow Hills are maintained on a regular basis. Because of wear and tear, some grass growth is needed all year. The turf management goal is to create a firm surface for performance golf activity. Lush, green growth would mean more mowing, which is not desirable from the Shadow Hills perspective.

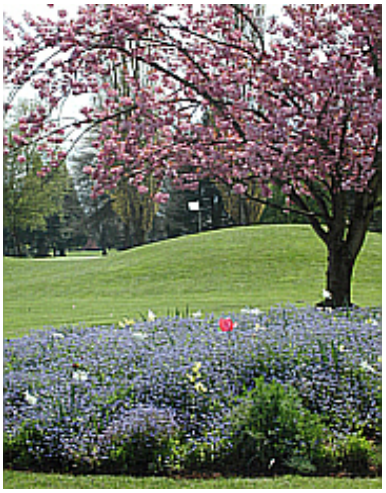

Figure 1: Shadow Hills Country Club, Junction City

As the greens are the putting surface, they are also the highest maintenance area on the golf course. A boom sprayer is used to "spoon feed" fertilizer to the greens surfaces. Because of the importance of delivering minute amounts of fertilizer, the sprayer can be calibrated to deliver 0.05 to 0.15 lbs of nitrogen per 1000 sq. ft. The table below shows Shadow Hills manages the fertilizer application of each section of their golf course.

	Tees	Greens	Fairways	Rough
Acreage	~2	~4	~25	~50
Fertilizer per 1000 ft^2	7.5 lbs	6.5 lbs	4 lbs *	4 lbs *
Type of fertilizer - Main Growing Season	Slow Release - 60-70%	Spoon fed + Soluble N	Slow Release - 60-70%	Slow Release - 60-70%
Type of Fertilizer - Oct-April	Granular Quick release	Granular Quick release	Granular Quick release	Granular Quick release

Table 1
Fertilizer Application for Shadow Hills Golf

Wastewater

Those commercial and industrial facilities that are within the urban growth boundaries (UGB) of Monroe, Junction City and Harrisburg, generally rely on the local public wastewater system to manage their human and kitchen wastes. In some situations, other liquid wastes are also permitted for discharge to the public wastewater treatment systems.

There are three major industrial facilities in the GWMA: the Weyerhaeuser Sawmill and Veneer plant near Coburg; and the Pope & Talbot and Georgia Pacific/Fort James pulp mills near Halsey. One of these facilities uses their own wastewater lagoons for the employee and kitchen wastes. The other two facilities are permitted to discharge their process wastewater, after treatment, to the Willamette River.

Individual Large On-site Systems/Treatment
Those commercial and industrial facilities outside of the above-mentioned UGB must manage their wastewater on an individual basis, usually by use of their own large on-site system, or with a wastewater treatment lagoon and some type of land application. These facilities receive individual permits from the Department of Environmental Quality, and are required not to impact groundwater above the drinking water standard for nitrate of 10 mg/L. Coburg has at least 4 of these large on-site/treatment systems. There is at least one other DEQ-permitted individual large on-site systems in the GWMA.

Public Wastewater Treatment Lagoons
This category includes those public wastewater treatment systems that may have a potential for some groundwater impact from a portion of their treatment facilities, very similar to those facilities mentioned in the above paragraph. These public treatment facilities may be located inside or outside of the UGB of the towns, and are permitted by the Department of Environmental Quality. There are four public wastewater treatment systems in the GWMA: three of these are for Harrisburg, Junction City and Monroe, and the fourth services a Springfield public school.

Figure 2: City of Eugene – Storage Lagoons and Drying Beds

Eugene/Springfield Wastewater Treatment System
Although not actually inside the GWMA, but located adjacent to and upgradient of the GWMA, is the Eugene/Springfield Water Pollution Control Facility (E/S WPCF) and the Eugene/Springfield Regional Biosolids Management Facility (E/S BMF). The E/S WPCF processes the wastewater from these cities. The E/S BMF receives the biosolids

generated at the E/S WPCF via 5.5-mile pipeline and utilizes four 6.25-acre facultative sludge lagoons and 24-acres of asphalt lined drying beds for additional biosolids processing. The biosolids are then land applied on nearby agricultural sites that have been authorized by the DEQ. In addition, there is a newly planted 596-acre hybrid-poplar tree farm, called the Biocycle Farm. Biocycle Farm is managed for the land application of biosolids to promote rapid tree growth and maximum nutrient uptake. Although not utilized now, reclaimed water may also be land applied at the Biocycle Farm in the future.

There are nineteen groundwater monitoring wells located throughout the E/S BMF and 6 monitoring wells at the Biocycle Farm that are sampled regularly to determine if the groundwater has been impacted from the management of biosolids at the site. For 2005, mean concentrations for Nitrate+Nitrite (as Nitrogen) in the upgradient wells range from 1.6 to 4.5 mg/L, and maxima from 1.8 to 5.3 mg/L; downgradient well means range from 0.95 to 4.6 mg/L, and maximum values range from 1.6 to 7.2 mg/L.

The former Seasonal Industrial Waste Site (SIWS) is located at the southern boundary of the GWMA. This site was designed and operated for the land application of seasonal high strength cannery wastewater. A grass hay crop was grown and harvested to remove the nutrients supplied with the high strength wastewater generated from the canning process. Multiple hay harvests throughout the growing season ensured a balance between nutrients applied and nutrients removed from the site. The SIWS has been mothballed for the past two seasons, but the harvesting of hay crops continues to remove any residual soil nutrients. For 2005, mean concentrations of Nitrate+Nitrite (as Nitrogen) in upgradient wells range from 2.5 to 4.0 mg/L, and maxima from 3.4 to 4.6 mg/L; downgradient well means range from 0.28 to 12.8 mg/L, and maximum values range from 0.39 to 14.0 mg/L.

Land Application of Waste, Reclaimed Water & Biosolids

Certain organic waste materials such as biosolids (processed municipal sewage sludge that meets specific quality controls standards), septage, reclaimed water, food processing wastes, and other similar materials may be recycled and land applied under DEQ regulations and permit. Such land applications can improve soil tilth, water-holding capacity, help maintain productive soils and stimulate plant growth while reducing the need to add other fertilizers. Some of these wastes may be high in nitrogen or nitrate, and must be properly managed through land application site authorization letters issued by DEQ in order to minimize the potential for groundwater contamination and surface runoff.

Figure 3: Land application of biosolids. Courtesy of New York D.E.C.

DEQ is currently reviewing the inventory of land application sites in the SWV. Although this information was not available before drafting the Action Plan, the lack of this data does not affect the recommended strategies.

Type of Water Quality Permit	Total Number	Number of Renewals before 12/2007
Large On-Site	5	2
Public Wastewater Treatment Lagoons	4	2
Other WQ Permits that allow discharges to groundwater	4	3

Table 2: DEQ Water Quality permits in the area.

Strategies are presented in the next section, and are within six goal areas that we need to address to achieve success. The six goals are:

Goal 1: Integrate the GWMA Action Level into DEQ Permitted Groundwater Pollution Control Efforts
Goal 2: Integrate the Protection of Groundwater in the GWMA by use of County and City Planning Actions
Goal 3: Education and Outreach
Goal 4: Monitor and Evaluate Ground Water Quality in Commercial and Industrial Areas
Goal 5: Evaluate Treatment Alternatives to Understand Effectiveness
Goal 6: Research Financial Resources to Fund the Installation and Implementation of Alternate Treatment Technologies

Goals and Strategy Recommendations

The following Goals and Strategy Recommendations outline how SWV Commercial and Industrial Facilities will continue to help decrease ground water nitrate levels and protect the water that our communities rely on for drinking and production uses. The goal for Commercial and Industrial facilities in the GWMA is to utilize technology and operate in a manner that supports the overarching goals of the Action Plan.

Goal 1: Integrate the GWMA Action Level into DEQ Permitted Groundwater Pollution Control Efforts

Integration Strategies

- Within the Southern Willamette Valley, DEQ-permitted point sources (lagoons, large on-site systems, land applications, etc.) should not be exceeding the GWMA *Action Level* for nitrate (7.0 milligrams/Liter) at their respective point of groundwater compliance.

Actions

- DEQ should review all permitted facilities inside the GWMA that have the potential to discharge nitrate to the groundwater, and determine if these facilities are having an adverse impact on groundwater quality.
- When writing a permit renewal or a new permit for a facility in the GWMA, DEQ should evaluate implementing groundwater pollution control efforts that are in concert with the GWMA Action Level (7.0 mg/L Nitrate-N).
- DEQ is encouraged to promote the education of wastewater treatment operators regarding the land application of wastewater and biosolids at agronomic rates that will be protective of the groundwater resource.
- Alternate treatment technologies for sewerage, such as the use of subsurface irrigation of treated effluent to provide nutrients for grassy and treed areas in lieu of fertilizers, are encouraged as methods to protect the groundwater resource.
- The GWMA Committee should support Coburg in their mission to install and/or implement a public wastewater treatment system, and thus removing many individual nitrate sources that have impacted the groundwater.

These actions should be accomplished throughout the duration of the Action Plan.

Implementation Responsibility

Primary: DEQ, and for last bullet - Coburg
Secondary: Permitted Facilities

Measurements of Effectiveness

- *Completed inventory of permitted facilities within GWMA and identification of those with a potential to contaminate groundwater by the second anniversary of the approval of the Action Plan (estimated Nov 2008.)*

- *Annual documentation of the number of new or renewed Water Quality permits for facilities in the GWMA that were written addressing the protection goals of the Action Plan.*
- *Annual documentation of the numbers of wastewater operators that received guidance for land application of wastewater and biosolids at agronomic rates that are protective of the groundwater resource.*
- *By the second anniversary of the Action Plan approval, (estimated Nov 2008) demonstrate an increase in the number of facilities utilizing alternative sewerage technologies that are protective of the groundwater resource.*
- *By Nov 2011, Coburg has connected the majority of homes and business inside the UGB to a permitted public wastewater treatment system.*

Goal 2: Integrate the Protection of Groundwater in the GWMA by using County and City Planning Actions

Planning Strategies

- Jurisdictions within the SWV GWMA should evaluate effective mechanisms for reducing future groundwater impacts originating from new Commercial or Industrial developments with large on-site systems planned to be built in "*high-risk*" areas.

Actions

- Cities and Counties are encouraged to establish an overlay zone that will require new Commercial and Industrial development with wastewater treatment (large on-site systems, lagoons or other similar treatment technologies) and a potential for an adverse impact to groundwater from nitrate discharges to meet a GWMA water quality standard.
- Counties and Cities in the GWMA should review all other options available to them when permitting new development in areas where there is a potential for an adverse nitrate impact to groundwater from such development.

Implementation Responsibility

Primary: Counties, Cities, LCOG, DEQ
Secondary: New Developers

Measurements of Effectiveness

- *By the second anniversary of the Action Plan approval, (estimated Nov 2008) one or more Counties will have evaluated the appropriateness of an overlay zone map that identifies sensitive groundwater areas with a potential for an adverse impact that may arise from nitrate-rich wastewater discharges.*
- *By the second anniversary of the Action Plan approval, (estimated Nov 2008) at least one County has conducted a review of available options for groundwater protection associated with new developments that have a potential for an adverse nitrate impact to groundwater.*

Goal 3: Education and Outreach

Education and Outreach Strategies

- Write and publish articles and brochures to promote/improve the awareness of the commercial and industrial community with regard to the Groundwater Management Area and relevant water quality issues.

Actions

- The Lead Agency should develop or make available outreach materials on how to prevent over-fertilizing and over-watering and other successful resource management practices. These materials should be useful for both the Commercial and Industrial facilities and for any hired grounds-maintenance companies.
- The Lead Agency or other involved Agencies should publish two website article or public service announcements per year in the major area newspapers (Corvallis, Eugene, Junction City, Coburg) or GWMA newsletter that provides an update on the status of the SWV GWMA.

Implementation Responsibility

Primary: DEQ (or current Lead Agency), OSU Extension
Secondary: Other Agencies involved

*Measurements of Effe*ctiveness

- *Annually, the Lead Agency should provide an update on the status of the SWV GWMA to the GWMA Committee identifying actions completed in the previous year, and associated water quality information developed and delivered to each Commercial or Industrial facility in the GWMA. This should begin in state fiscal year 2006-2007.*
- *Increase of the number of grounds maintenance enterprises using fertilizing, watering and mowing techniques to minimize or eliminate groundwater contamination.*
- *A minimum of two articles or public service announcements published annually on the website or in major GWMA newspapers.*

- Share information and coordinate with commercial and industrial facilities to promote groundwater quality.

Actions

- The Lead Agency is encouraged to attend, on an annual basis, at least one workshop or conference aimed at interested commercial and industrial facilities and/or wastewater treatment operators, to discuss the GWMA situation, present information or identify successful approaches.
- The Lead Agency and Commercial and Industrial representatives and organizations active in the SWV GWMA should meet to review the groundwater nitrate issue and share appropriate outreach materials from DEQ, LCOG, OSU Extension, and other appropriate sources.

- DEQ should provide Technical Assistance as needed to the Bulk Fertilizer Facilities, focusing on any assistance that may be necessary to help protect the groundwater resource from fertilizer releases.
- The Lead Agency should, in coordination with County Sanitarians and/or DEQ On-site or land application staff, promote Technical Assistance site visits to help property owners determine potential risks to groundwater from the wastewater management.

Implementation Responsibility

Primary: DEQ (or current Lead Agency), Counties
Secondary: Commercial and Industrial Facilities, Association of Clean Water Agencies (ACWA), Oregon Wastewater Association (OW2A), and Association of Oregon Industries (AOI.)

Measurements of Effectiveness

- *Lead Agency attends or presents GWMA information at a relevant conference or workshop once every year beginning in state fiscal year 2006-2007. This should occur once every two years.*
- *Lead Agency should make at least 100 groundwater quality contacts per year with Commercial/Industrial representatives and other interested parties and organizations once every two years to discuss GWMA issues and share appropriate information. This should begin in state fiscal year 2007.*
- *DEQ provide*s Technical Assistance to Bulk Fertilizer Facilities regarding relevant groundwater protection factors that may be relevant. This should occur in state fiscal year 2006-2007, and then as necessary i*n future years.*
- *DEQ and/or the Lead Agency should make at least 10 contacts each year with County and State staff or property owners to assist in assessing the potential risks to groundwater from the management of wastewater, biosolids and land application materials.*

- Recognize those Commercial and Industrial entities that set a good precedent of protecting the groundwater resources.

Actions

- The Agencies working with the GWMA Committee and the Commercial-Industrial Working Group should develop a recognition program for Commercial and Industrial landowners who manage their lawns, landscaping and/or wastewater/biosolids treatment in a manner that protects the groundwater resource.
- In conjunction with the recognition program for Commercial and Industrial entities, the Lead Agency or the responsible lead for the program should prepare project summaries that describe Best Management Practices (BMPs) these facilities have implemented to protect groundwater resources. These informational pamphlets should also list contacts to obtain additional information. These BMP pamphlets will serve as working examples and will assist others considering their implementation in similar industries.

- As development of industry-specific BMPs progress, those Agencies involved should consider development of a web site devoted to the how-to and technical aspects of the BMPs. The web site can also be used to provide periodic updates on specific projects and associated water quality trends.

Implementation Responsibility

Primary: DEQ (or current Lead Agency), Commercial and Industrial Working Group, others
Secondary: ACWA, OW2A, AOI, Cities and Counties

Measurements of Effectiveness

- *By December 2008, a recognition program has been developed and at least one Commercial or Industrial facility or grounds maintenance operation has been acknowledged for their efforts to protect the groundwater resource.*
- *At least 50 BMP pamphlets are distributed annually to appropriate Commercial and Industrial facilities and/or grounds maintenance companies.*
- *By December 2008, a website has been utilized or developed to house the industry specific BMP information, and to track progress on specific programs and display groundwater trend data.*

Goal 4: Monitor and Evaluate Groundwater Quality in Commercial and Industrial Areas

Groundwater Monitoring and Evaluation Strategies

- Gather accurate baseline ground water data in commercial and industrial areas.

Actions

DEQ should coordinate with ODA, LCOG, OSU Extension, WRD, DHS and other agencies or groups conducting groundwater monitoring to evaluate the completeness of existing programs and identify additional monitoring needs. All involved agencies and groups should agree on consistent protocols to gather baseline groundwater data. With the concurrence of the GWMA Committee, DEQ should implement a plan for monitoring groundwater quality that will accurately identify baseline conditions.

Implementation Responsibility

Primary: DEQ, ODA, WRD, LCOG, DHS, OSU Extension, GWMA Committee
Secondary: SWCDs, watershed councils

Measurements of Effectiveness

- *DEQ and other Agencies involved in the GWMA meet to discuss groundwater monitoring issues and identify GWMA monitoring needs. This should be accomplished by the end of 2006.*
- *A valid and acceptable method for determining baseline groundwater quality has been implemented by June 2007.*
- Monitor and evaluate groundwater improvements in areas impacted by commercial and industrial treatment facilities.

Actions

- The GWMA Committee should establish a plan for accurately monitoring groundwater trends and more clearly identifying sources of contamination. This should be accomplished in the first two years.
- Encourage Commercial and Industrial facilities to install and monitor passive capillary sampling (PCAPS) stations at large on-site facilities within the GWMA.
- The Lead Agency should implement a plan for long term monitoring of groundwater trends. This should be done before or during year three.

Implementation Responsibility

Primary: GWMA Committee, DEQ (or current Lead Agency), ODA, OSU, OSU Extension, Commercial and Industrial Facilities
Secondary: SWCDs, watershed councils

Measurements of Effectiveness

- *The GWMAC has established a long-term monitoring plan to determine groundwater monitoring trends and potential to assess sources of nitrate contamination. This should be accomplished by June 2007.*
- *The Lead Agency has implemented the measurements of groundwater trends by June 2007*
- *By June 2008, existing PCAPS have been sampled and new PCAPS have been installed at existing large on-site facilities within the GWMA.*

Goal 5: Evaluate Treatment Alternatives to Understand Effectiveness

Research and Reporting Strategies

- Research and document treatment technologies based on their effectiveness in minimizing nitrate discharges to groundwater. Emphasis should be placed on coordinating state, federal, and business efforts.

Actions

- In coordination with the Residential Working Group, the Lead Agency and the Commercial and Industrial Working Group should produce a scientific literature review of the impact of wastewater treatment technologies on groundwater quality, with a focus on reducing nitrate impacts to groundwater.
- Representatives of DEQ, EPA, AOI, OW2A and/or ACWA and other interested businesses should meet to discuss treatment technologies and create a list of ideas to evaluate the effectiveness of alternative treatment technologies.

Implementation Partners

Primary: DEQ (or current Lead Agency), OW2A, AOI, ACWA, Residential Working Group
Secondary: US EPA

Measurements of Effectiveness

- *Members and staff from the Residential and the Commercial-Industrial Working Groups have, in consultation with Lead Agency, documented a literature review of pertinent wastewater treatment technologies that reduce the nitrate impact to groundwater. This should occur by June 2008.*
- *DEQ,EPA, AOI, OW2A and/or ACWA and other interested businesses met to discuss treatment technologies and created a list of ideas to evaluate effectiveness of alternative treatment technologies.*

Goal 6: Research Financial Resources to Fund the Installation and Implementation of Alternative Treatment Technologies

Funding Research Strategies

- Evaluate funding options to support priority needs. Incorporate the scientific literature review in the process to prioritize research needs.

Actions

- The Lead Agency and the Commercial-Industrial Working Group should research and evaluate potential funding mechanisms available to Local Governments and Commercial and Industrial facilities. Potential funding sources include the DEQ 319 Program, the Pollution Abatement Tax Credit, CWRF, US EPA and other agencies and private organizations.

Implementation Responsibility

Primary: DEQ (or current Lead Agency), Commercial-Industrial Working Group
Secondary: US EPA

Measurements of Effectiveness

- Activation of a listserver or web page that is maintained as a clearing house for grant opportunities by June 2007. Efforts should continue each year as necessary.

ACRONYM	DEFINITION
ACWA	Association of Clean Water Agencies
AOI	Association of Oregon Industries
BMP	Best Management Practices
CWRF	Clean Water Revolving Fund
DEQ	Department of Environmental Quality
DHS	Department of Human Resources
E/S BMF	Eugene/Springfield Biosolids Management Facility
E/S WPCF	Eugene/Springfield Water Pollution Control Facility
EPA	Environmental Protection Agency
GWMA	Groundwater Management Area
LCOG	Lane Council of Governments
N	Nitrogen
OSU	Oregon State University
OW2A	Oregon Wastewater Association
PCAPS	Passive Capillary Sampling Stations
SIWS	Seasonal Industrial Waste Site
SWCD	Soil and Water Conservation Districts
SWV	Southern Willamette Valley
UGB	Urban Growth Boundary
WRD	Water Resources Department