




LEGEND

-  Existing Structure/Dwelling
-  34.9 Acres inside 150' no-spray setback
-  23.3 Acres restrictive no-spray setback

150' Setback From Existing KCL, Inc. Parcel Property Line T2S, R3W, Section 2, Tax Lot 100

26 foot setback
of neighbor's
property from
the applicant's
property



Red Line is the approximate location of the property
line dividing the two properties.

38 foot
setback of
neighbor's
property from
the
applicant's
property



Red Line is the approximate location of the property
line dividing the two properties.

Tualatin River Subbasin

603-095-0100

Purpose

(1) These rules have been developed to effectuate the implementation of a water quality management area plan for the Tualatin River subbasin pursuant to authorities vested in the department through ORS 568.900-568.933, due to a determination by the Environmental Quality Commission to establish Total Maximum Daily Loads and allocate a load to agricultural nonpoint sources. The area plan is known as the **Tualatin River Subbasin Agricultural Water Quality Management Area Plan**.

(2) The purpose of these rules is to outline requirements for landowners in the Tualatin River subbasin, for the prevention and control of water pollution from agricultural activities and soil erosion. Compliance with division 095 rules is expected to aid in the achievement of applicable water quality standards in the Tualatin River subbasin.

Stat. Auth.: ORS 568.909

Stats. Implemented: ORS 568.900 - ORS 568.933

Hist.: AD 3-1996, f. & cert. ef. 4-9-96

603-095-0120

Geographic and Programmatic Scope

(1) The Tualatin River subbasin includes the drainage area of the Tualatin River upstream from the confluence with the Willamette River near West Linn. The physical boundaries of the Tualatin River subbasin are indicated on the map included as **Appendix 1** of these rules.

(2) Operational boundaries for the land base under the purview of these rules include all lands within the Tualatin River subbasin in agricultural use and agricultural and rural lands which are lying idle or on which management has been deferred, with the exception of activities which are subject to the Forest Practices Act.

(3) Current productive agricultural use or profitability is not required for the provisions of these rules to apply. For example, highly erodible lands with no present active use are the purview of these rules.

(4) The provisions and requirements outlined in these rules may be adopted by reference by Designated Management Agencies with appropriate authority and responsibilities in other geographic areas of the Tualatin River subbasin.

(5) For lands in agricultural use within other Designated Management Agencies' or state agency jurisdictions, the department and the appropriate Local Management Agency shall work with

these Designated Management Agencies to assure that provisions of these rules apply, and to assure that duplication of any services provided or fees assessed does not occur.

[ED. NOTE: The Appendix referenced in this rule is not printed in the OAR Compilation. Copies are available from the agency.]

Stat. Auth.: ORS 568.909

Stats. Implemented: ORS 568.900 - ORS 568.933

Hist.: AD 3-1996, f. & cert. ef. 4-9-96

603-095-0140

Prohibited Conditions

All landowners or operators conducting activities on lands in agricultural use shall be in compliance with the following criteria. A land occupier shall be responsible for only those prohibited conditions caused by activities conducted on land managed by the landowner or occupier. Criteria do not apply to conditions resulting from unusual weather events or other exceptional circumstances which could not have been reasonably anticipated.

(1) Sheet and rill erosion:

(a) By January 1, 1998, no agricultural land management or soil disturbing activities shall be conducted in such a way that the estimated sheet and rill erosion rate exceeds five times the soil loss tolerance factor.

(b) By January 1, 2000, no agricultural land management or soil disturbing activities shall be conducted in such a way that the estimated sheet and rill erosion rate exceeds the soil loss tolerance factor, except as provided in subsection (c) of this section.

(c) The department shall establish an alternate sheet and rill erosion control standard for any lands in agricultural use which the department determines cannot practically or economically achieve the soil loss tolerance factor. Any alternate sheet and rill erosion control standard established by the department shall assure that delivery of sediment to adjacent watercourses is reduced to the maximum extent practicable. Any lands in agricultural use which the department determines cannot practically or economically achieve the soil loss tolerance factor shall meet the alternate sheet and rill erosion control standard by January 1, 2000.

(2) Active channel erosion: by January 1, 1996, no agricultural land management or soil disturbing activity shall cause active channel erosion. A land occupier shall be responsible for only that portion of the active channel erosion that is caused by agricultural land management or soil disturbing activities conducted on land managed by the landowner or occupier.

(3) Near-stream management area: by January 1, 1998:

(a) No agricultural land management or soil disturbing activities within near-stream management areas in agricultural use shall be conducted in a manner which results in the placement, delivery, or sloughing of suspended solids (i.e., nutrients, soil, sediment, manure) into waters of the state.

(b) The technical standards to be used to determine compliance with subsection (a) of this section are:

(A) The affected landowner shall establish and maintain an adequate vegetative buffer, or an equally effective pollution control practice, in the near-stream management area. When a vegetative buffer is established, the plant variety or seed mixture shall be one of those listed in field office technical guide standard 342 (Critical area planting). If any activity disturbs a vegetative buffer in the near-stream management area, the landowner shall replant or restore the disturbed area to an adequate vegetative buffer as soon as practicable.

(B) Activities associated with the establishment or reestablishment of a crop during the period of May through September annually are exempt from paragraph (b)(A) of this subsection provided that an adequate vegetative buffer or equally effective erosion control practice is provided during the months of October through April.

(C) Pastures shall comply with field office technical guide standard 311 (Pasture and hay land management) for pastureland and continuous grazing as applicable.

(D) Livestock barnyards, feedlots, drylots and other non-pasture areas cannot be located within the near-stream management area unless a barnyard runoff control system meeting field office technical guide standard 312 (Waste management system) is installed and maintained.

(E) Agricultural lands within the near-stream management area that receive manure and other nutrients through application of sludge, commercial fertilizer and other added nutrient inputs shall meet field office technical guide standard 590 (Nutrient management).

(c) Field office technical guide standards referred to in subsection (b) of this section are those standards which are current as of the date of the adoption of these rules. Copies shall be made available to the public upon request to the department through its central office location.

(d) A landowner shall not be considered out of compliance with subsection (b) of this rule if the department determines that a failure to meet the standards is a result of land use or actions by another landowner.

(e) Except for operations governed by the Forest Practices Act, no activities related to the conversion of woodland to non-woodland agricultural uses that require removal of the majority of woody material from a parcel of land such that the land no longer meets the definition of woodland, shall be conducted in a manner which results in the placement of soil, the delivery of sediment, the sloughing of soil into waters of the state, or the initiation or aggravation of streambank erosion.

(f) Limited duration activities related to construction, restoration, or maintenance may be exempted from section (3) of this rule subject to prior written approval by the department.

(4) Irrigation water discharges: By May 1, 1997, no activities shall result in irrigation water discharges to waters of the state during the period May 1 through October 31 annually, except as provided in this section. Irrigation water discharges may be allowed upon submittal and written approval by the department of a monitoring program to be conducted by the landowner or operator. Such monitoring program shall provide reasonable assurance that the quality of the irrigation water discharge meets all applicable water quality standards.

(5) Waste discharges: Effective upon adoption of these rules:

(a) No person conducting agricultural land management or earth disturbing practices shall cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.

(b) No person conducting agricultural land management or earth disturbing practices shall discharge any wastes into any waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule by the Environmental Quality Commission.

(c) No person conducting agricultural land management or earth disturbing practices shall violate the conditions of any waste discharge permit issued pursuant to ORS 468B or ORS 568.

Stat. Auth.: ORS 568.912

Stats. Implemented: ORS 568.900 - ORS 568.933

February 9, 2010

Washington County Planning Commission
C/O Dept of Land Use & Transportation
155 N. First Ave Suite 350-14
Hillsboro, OR 97124

Re: File No. 09-360-PA Policy 6

Dear Chairman Marc San Soucie and County Planning Commissioners:

Staff asked that the applicant comment on Policy 6 as it relates impacts on the water supply resulting from five additional residences should you approve this request. The following information provides a comparison of drip irrigation water usages for vine grapes to domestic water usage on the subject parcel. In providing the following information, the applicant is not suggesting intent to grow grapes. In fact, such an effort would not be practicable. Rather, this is simply a comparison of water usage to address Policy 6 for potential future development. This comparison also includes an assumption that the amount of land to be farmed would be 35 acres. This assumption is based on a 150-ft setback from the outside boundary of the parcel. This is a non-farmable area, and a no-spray zone given that neighboring setbacks are small coupled with EPA restrictions on use of specific herbicides or pesticides near dwellings.

The information below is based on a conversation with Bud Beck, Advanced Vineyard Systems in McMinnville and data provided by Cole Deamon, Assistant Water Master District 18.

Drip irrigation for wine grapes must occur during the first 2 years to establish the plants and thereafter as needed. The plants are irrigated during the hot summer months, June through August and sometimes through September. The average number of seedlings planted is approximately 1,245 vines per acre.

Each vine seedling is watered at 2 gal. per watering = 2,490 gal. X 4 times a week = 9960 gal. per week, per acre X an estimated 14 weeks = 139,440 gal. per acre per year.

Veronica Smith Land Use Consulting, LLC.

P.O. Box 1082 Astoria, OR 97103

503-325-4922 (Office) 503-349-2321 (Cell) vsmithland@gmail.com

139,440 X 35 acres (assumed acreage available to plant) = 4.880 million gal. per year .

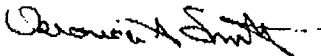
4.880 x 2-yrs = 9.76 million gal. plus additional intermittent watering as needed.

According to Cole Deamon, Assistant Water Master, domestic use for a family of 4 is estimated at 400 gal. per day X 365 X 5 potential homes = 730,000 gal. per year X 2 years = 1.460 million gal.

These numbers are estimates. Based on these estimates it would take approximately 7-years of domestic use to equal two years of drip irrigation use. During the 7-year period, there would be additional, periodic use of drip irrigation as needed. During the 7- years of only domestic use, typically an aquifer would naturally be replenished by seasonal rains and snow melt and recharged by the following summer. Whereas the use of the same aquifer for irrigation results in a 12 to 14 week period of intensive use of the aquifer during the driest part of the season. The irrigation would repeat again the 2nd year, and given the historical dry climate of this site, possibly a 3rd year. The large amount of summer usage for drip irrigation would potentially have greater impact to the quantity of water available during the summer than the somewhat consistent use from 5 domestic wells spread over a 12 month period. Commercial irrigation in a limited ground water area has a far greater impact on existing domestic wells served by the same aquifer than the addition of 5 homes. In addition, recovery of the aquifer from the quantity of water used by a commercial draw down during the dry, hot summer months would take longer than recovery under a domestic use scenario.

Please add this information to the record, for your consideration.

Sincerely,



Veronica A. Smith

Principal
Veronica Smith Land Use Consulting, LLC.

Veronica Smith Land Use Consulting, LLC.

P.O. Box 1082 Astoria, OR 97103

503-325-4922 (Office) 503-349-2321 (Cell) vsmithland@gmail.com

2.3 Table 1. Comparison of Adjacent Lands

Table I Comparison of Adjacent Parcels

Tax Map	Address	District	Parcel Size	Year House Built	Parcel Creation	Non-Farm Dwelling Approval
2S3020000101	33127 Larkins Mill	AF-20	35.80	1996	1/8/1979	Yes
2S3020000102	33660 Larkins Mill	AF-20	31.11	1983	1/8/1979	Yes
2S3020000103	34255 Larkins Mill	AF-20	10.87	1987	10/4/1979	Yes
2S3020000105	34340 Larkins Mill	AF-20	10.80	1988	10/4/1979	Yes
2S3020000106	33480 Larkins Mill	AF-20	13.13	1987	10/4/1979	Yes
2S3020000108	33635 Larkins Mill	AF-20	10.01	1994	10/4/1979	Yes
2S3020000109	33460 Larkins Mill	AF-20	10.86	1992	3/27/1980	Yes
2S3020000111	33865 Larkins Mill	AF-20	10.90	1988	3/27/1980	Yes
2S3020000112	None listed	AF-20	11.12	Vacant	3/27/1980	Vacant
2S3020000113	34405 Larkins Mill	AF-20	11.61	1980	4/14/1980	
2S3020000115	33090 Larkins Mill	AF-20	4.00	1975	4/18/1985	
2S3020000300	33562 Bald Peak Rd	AF-20	1.18	1937	Pre 1960	
2S3020000301	33630 Bald Peak Rd	AF-20	10.60	1981	5/13/1969	
2S3020000303	None listed	AF-20	10.20	Vacant	12/28/1977	Vacant
2S3020000304	34160 Peaks View Ln	AF-20	10.60	1999	7/12/1978	Yes
2S3020000305	12770 Brighton Ln	AF-20	10.20	1984	7/12/1978	Yes
2S3020000306	34175 Peaks View Ln	AF-20	10.13	1991	8/15/1978	Yes
2S3020000307	33720 Peaks View Ln	AF-20	10.20	1980	11/16/1978	Yes
2S3030000100	12635 Brighton Ln	AF-20	15.50	1989	9/9/1950	
2S3030000107	12729 Brighton Ln	AF-20	19.00	2008	10/2/1981	Yes

2S3020000100	Subject Parcel	AF-20	58.20	Vacant	Pre 1960	Vacant
Average Parcel Size:			12.89			
Proposed Subject Parcel - 5 lots each:			11.64			
T. No Adjacent Parcels						20
Non-farm dwellings approved in adjacent area:						13
Parcel Size Range: 1.18 to 58.20 acres						
Percentage Built Non-farm Dwelling: 65.00%						



January, 29, 2010

To: Mr. Marc San Soucie, Chairman,
Washington County Planning Commission

The following report concerns a 58.20 acre parcel in Washington County identified as Tax lot 100, Section 2, T2S R3W. The parcel is owned by KCL, Inc.

I have been asked to evaluate the site for the purpose of commercial timber production. The details are presented in the document by headings. My conclusion is this tract of land is impracticable for the purpose of growing and harvesting commercial tree species for economic and social reasons.

Qualifications:

- B.S. Forest Management, Oregon State University, 1976.
- Forester with the Oregon Dept. of Forestry, 32-years. Positions included: Timber Management and Sales, Reforestation, Small Woodland Owner Assistance, Fire Fighting and Forest Practices Law Enforcement
- Present employment: Forester for Mike Pihl Logging Co., Inc. assisting in logging job acquisition and facilitation, timber cruising and reforestation activities.

Tree Farming General Operations – Subject Site

The establishment, culturing, and harvesting of timber is a risky and complicated endeavor under the best of conditions. First the site must be prepared, this entails the eradication of any pathogens on site. As noted by Mr. Michael Ricks, (letter of Dec. 29, 2009), phytophthora and annosus root rot are present on the subject parcel. The stumps and root systems must be mediated for. They must be pulled from the soil and ground up and hauled away from the site or burned on site, if permissible. Estimated cost would be approximately \$3 500/acre (\$203,000). Competing vegetation must be also eradicated. Seedlings are then planted at a density of 400/acre. Dead trees are replaced over the next 3-6 years. At least two more herbicide applications will be made. A standard goal of having an "established" stand in six years is typical. In six years after planting you should have a fully stocked, brush and grass free, animal damage

1

free, stand of healthy trees. This site due to soil conditions will take 2-3 years longer, or eight to ten years to reach fully stocked conditions. A normal stand would then mature and be harvested about 50-years in age. This site would take a few years longer, at which point the harvestable timber will still be considerably less than is typical, estimate being 50% less the normal volume.

Subject Site Conditions and Impacts

In all my years as a professional Forester I find this site to be one of the most impracticable places to grow timber in both an economic and social sense, than any others I have worked on. The following bullet list explains the reasons that in my professional opinion, timber management on this tract would be a failure.

- History of seedling failure. In testimony you will/or have received from the previous owner Regan Bro. they state they replanted the site 3 times to achieve adequate stocking. This indicates that stocking Doug fir seedlings for timber would fail also.
- Deer browse on seedlings. I found deer signs on site. This is typical in any forested land. Deer forage heavily on Douglas fir seedlings. They don't on Nobles. Mitigation for damage from deer foraging on a small parcel significantly increases the cost of productivity on an already stressed site. This impact will require additional seedling plantings and replanting and other measures such as an approval from ODFW to haze the site, or if all else fails permits to shoot the deer. These last two measures have added increased safety risks to adjoining residential uses.
- Gophers and voles are present. These rodents kill seedlings by attacking the tree roots and stems. Eradication takes additional time and expense, increasing the costs of production.
- Heavy grasses and forb cover. Competing plants steal nutrients and water from seedlings and add to an environment that fosters gopher and vole habitat. Again eradication over time is needed, and it also increases the costs of production.
- Scotch Broom is present both on and off site. They foster millions of dormant seeds in the soil that will germinate when the soil is disturbed by management activity. This noxious weed is one of the most difficult plants to eradicate. The expense to eradicate will be ongoing as outside the parcel the impact will continue, especially through wildlife activities, or something as simple as human intrusion, neighbors pets, delivery trucks or residents cars/tires picking up and redistributing the seeds, especially on Larkins Mill Rd. Scotch Broom is highly competitive and aggressive.
- Madrone tree is present. There is much Madrone adjacent to the parcel, which is an indicator of a tough site, meaning soils are poor, dry in the summer. The poorly formed, slow growing Douglas fir trees present in the adjoining canopy are mixed with oaks. These trees exhibit the signs of a harsh growing environment. The presents of Madrones makes this site unsuitable for Douglas fir production.
- Neighbors and residential uses. I have much experience in the area of public relations in spraying or logging operations. I say with all certainty, there will be animosity and likely confrontation if an aerial or spraying or logging operation were to occur on this site. I have dealt with concerned neighbors in the venues of timber sale protests, forest fires and herbicide

application complaints. The complaints come; regardless of the "waiver" surrounding owners may have signed. In my opinion, this site is very likely to erupt into problems regarding:

- 1. Public safety. This is not a place suitable for helicopters, log trucks and heavy equipment. The private road accesses to this site are narrow and tightly curved. There are children, domestic animals and pets in this vicinity. The area has developed mostly residential, with very large beautiful homes. People in this area are not used to the impacts of forest operations, as few if any occur nearby. Keeping the site kid safe when there is equipment on site, is a concern. Therefore, the safety factor for a logging operation on this site increases significantly.
- 2. Noise. Loggers start work before daylight. People don't like that. The "waiver" limits their ability to make formal complaints, but on this site, neighbors have easy access to the property. As mentioned above, hazing is a common practice. People can retaliate and often do, in ways that slow the harvest, which impacts productivity and cost over runs. The site being so close to a large number of small parcels with residential uses will result in future conflicts in values. Small woodlots have huge indirect conflicts with neighbors who are not accustomed to living next to a forest operation. It is a PR nightmare to manage.
- 3. Herbicide applications. People are not knowledgeable in forest practices. When herbicides are applied near their homes and pets, neighbors get concerned, especially if applied by aerial application. Aerial spray is a common forest practice. In my experience, I deal with major complaints during spraying activities. They are taken seriously, given the risk of being sued for overspray.
- 4. Vineyard. There are several vineyards nearby, near Bald Peak Road. Grapes are very sensitive to 24D and Garlon, the two most commonly used forest herbicide. The likelihood of problems with overspray is so high, the helicopter company we use will NOT take a job in the Bald Peak mountain area.

Summary

In my professional opinion this parcel is highly impracticable to be managed as a timber tree farm based on the statements provided above and summarized as follows:

1. Expenses. The cost to prepare site for seedlings, increased costs to reseed, costs of additional maintenance due to prevailing site conditions. The site historically has been proven to be hostile. Conifer mortality rates are documented at 50% per planting. Wildlife foraging adds a significant increase in mortality on a small lot, plus additional costs to mitigate for and the higher risks to mitigate with hazing or shooting deer where neighbors' homes are close to the property lines.
2. The adjacent residential homes and vineyards make the site a significantly higher risk if not impossible to carry on the herbicide applications necessary for seedling survival. Logging in the future will also be problematic for ensuring safety for the neighbors.
3. Stressed trees will not reach prime market width and height. A relatively low volume of merchantable timber in 50 years, 50% less than normal, makes this site unlikely to be profitable.

4. Outside impacts. There are numerous parcels that abut this parcel. Different ownerships have different values in management of their land. The areas that are forested are not grown as merchantable timber. They are a mix of evergreens and deciduous trees, many are exhibiting signs of stress and poor health. I would characterize them as undermanaged, decaying natural areas for wildlife habitat and invasive species. These natural areas conflict with timber land production, especially to establish a small woodland lot due to the apparent lack of forest best management practices being utilized. Lack of herbicide, pesticide protection of the forest stalk and a mix of several invasive species, especially Scotch Broom. These off site impacts will contribute significantly to increased expenses for developing this site and keeping it healthy.

The combination of the on-site and off-site factors, render this parcel unsuitable for timber production. To grow and harvest timber on this parcel would be an unprofitable investment, and from a logging company perspective, a neighborhood relations nightmare.

Sincerely,



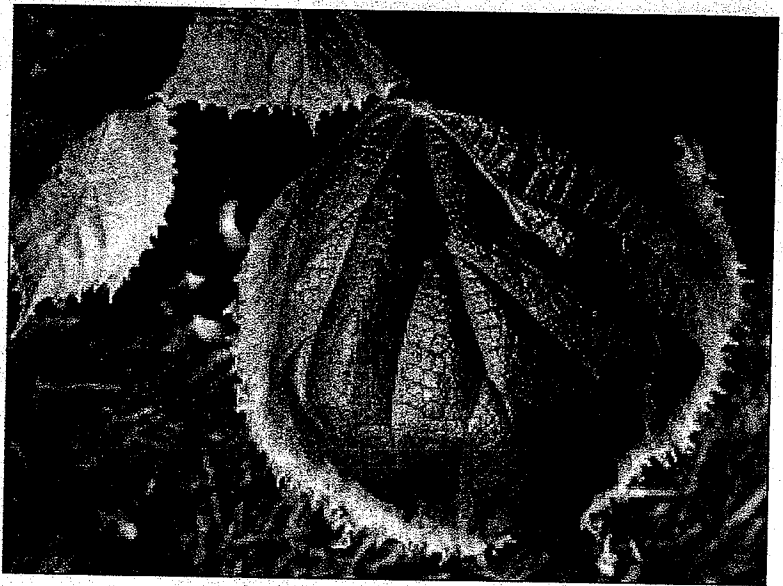
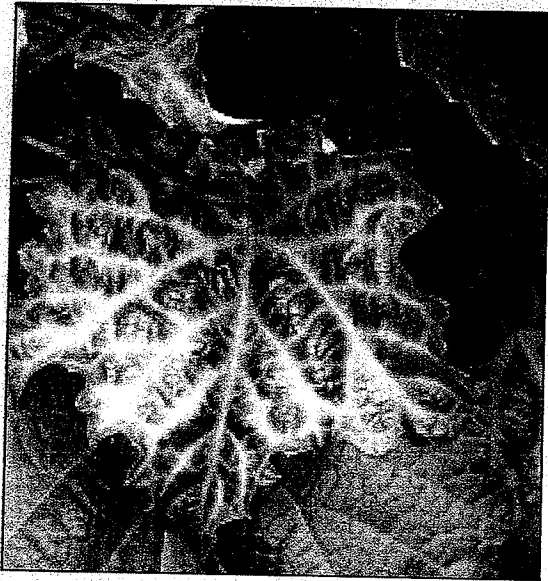
Jay P. Worley
Forester

Mike Pihl Logging Co., Inc.

EM 8860 • March 2004 • \$4.00

PREVENTING HERBICIDE DRIFT AND INJURY TO GRAPES

D.A. Ball, R. Parker, J. Colquhoun, and I. Dami



OREGON STATE UNIVERSITY
EXTENSION SERVICE

EXHIBIT 12
1 OF 8

Preventing Herbicide Drift and Injury to Grapes

During the past several years, grape acreages have increased significantly in Washington and Oregon (17 percent and 23 percent, respectively, from 1999 to 2002). Unfortunately, herbicide drift can pose a major threat to the growth and success of commercial grape production adjacent to areas of small grain, hay, grass seed, or corn production.

Grapes are especially sensitive to several herbicides used in agricultural crops, pasture, rangeland, forestry, and noncrop areas. When applied to nearby crops, herbicides can drift to vineyards and cause significant injury to grapevines.

Drift is defined as the movement of herbicides off the site where they were applied. Drift can occur either during herbicide application (particle spray drift) or after application to plants and soil when the herbicide volatilizes (vapor drift).

Herbicide drift can injure foliage, shoots, flowers, and fruits. If injury is severe enough, or occurs repeatedly, it can cause reduced yield, poor fruit quality, and, occasionally, vine death. Drift injury can result in a substantial economic loss. In addition, drift to grapes from misapplication of pesticides could result in illegal residues on the exposed crop.

Herbicide injury to grapevines can last several years after the occurrence of the drift; it may reduce vigor, increase susceptibility to diseases, reduce yield and fruit quality, and shorten the life of the vineyard.

Growth-regulator herbicides such as 2,4-D and dicamba are the herbicides most likely to injure grapes. Growth-regulator herbicides mimic auxins, which are plant hormones that regulate growth and development. Grapes are many times more sensitive to growth-regulator herbicides than are corn and wheat. Herbicide concentrations of 100 times below the recommended label rate have been reported to cause injury to grapes. Field observations indicate that drift from growth-regulator herbicides can injure grapes half a mile or more from the application site.

Growth-regulator herbicides are widely used for control of emerged broadleaf weeds (postemergence) in growing wheat, pasture, rangeland, grass seed, and corn. They also are commonly used in turf and by



railroads, utilities, highway departments, and municipalities to control unwanted woody plants and broadleaf vegetation on rights-of-way. A partial list of common growth-regulator herbicides and other herbicides that can injure grapes is found in Table 1.

Daniel A. Ball, weed scientist, Columbia Basin Agricultural Research Center, Oregon State University; Robert Parker, Extension weed scientist, Washington State University, Prosser; Jed Colquhoun, Extension weed specialist, Oregon State University; and Imed Dami, viticulturist, Ohio State University.

Table 1. Herbicides that have potential to injure grapes.

Growth regulators			ALS inhibitors			
2,4-D	Dicamba	Others	Glyphosate	Sulfonylurea	Imidazolinone	Others
Amine 4	Banvel	Bronate*	Roundup	Ally	Arsenal	Gramoxone
Barrage	Clarity	Crossbow*	Rodeo	Ally Extra	Assert	Aim
Esteron 99	Rave*	Curtail*	Roundup Ultra	Amber	Beyond	Boa
Formula 40		Landmaster*	Roundup	Canvas	Pursuit	
Hi Dep		MCPA	UltraMax	Cimarron	Raptor	
LV-4		RT Master	Roundup	Express	Plateau	
LV-6		Starane	WeatherMax	Finesse		
Saber		Tordon	Landmaster*	Glean		
Salvo		Turflon	Glyphos	Harmony Extra		
Savage		Trimec	Glypro	Harmony GT		
Tricep			RT Master	Oust		
Weedar 64			Touchdown	Peak		
Weed-B-Gon				Rave*		
Weedmaster						
Weedone						

This list is not all-inclusive; other herbicides also may injure grapes.

**A prepackage mixture containing a growth-regulator herbicide as at least one active ingredient.*

Types of herbicides most harmful to grapes

The herbicides of most concern for grape injury are discussed in this publication. Other herbicides with different modes of action also can drift and injure grapes, so care is needed during all herbicide applications.

Growth regulators

The most common growth-regulator herbicides used in the Pacific Northwest are 2,4-D and dicamba. The potential for vapor drift from 2,4-D and dicamba depends on the specific herbicide formulation. For example, vapor from the ester formulations of 2,4-D (e.g., Salvo, Weedone) is more likely to drift than that

from the amine formulations (e.g., Weedar 64). Ester formulations of 2,4-D are widely used because of their lower cost, greater absorption by plant tissues, and effectiveness in weed control. The greater drift potential of ester formulations has led to restrictions on their use in certain areas of Oregon and Washington.

Glyphosate

Glyphosate is the active ingredient in Roundup and similar products. Glyphosate can drift and injure grapes but usually is less of a problem than growth regulators because it is not volatile and grapes are not as sensitive to these herbicides. Nevertheless, glyphosate can drift in windy conditions and, because it is systemic, can translocate within grapevines and kill the growing points.

Glyphosate is applied prior to planting wheat, after harvest, and for maintenance of summer fallow. In addition, it is labeled for use in vineyards. Usually, injury in vineyards results when glyphosate applied under grapevines contacts green tissues of the vines. Glyphosate mist from sprayers also has been implicated in damage resembling that caused by growth-regulator herbicides.

ALS inhibitors

Acetolactate synthase (ALS) inhibitors are systemic and may cause injury similar to that caused by glyphosate. The ALS inhibitors include the sulfonylureas (e.g., Amber, Finesse, Harmony Extra, Peak, Express, Ally) and imidazolinones (e.g., Pursuit, Raptor, Beyond, Arsenal, and Plateau). ALS inhibitors are widely

EXHIBIT 12
3 OF 8

used in alfalfa, pea, and wheat production, and for noncropland weed control. They are applied both before planting (preemergence) and postemergence at extremely low rates. The high biological activity of ALS inhibitors increases the likelihood of drift injury to grapes, especially if temperature inversions

allow small spray particles to remain suspended in the air for extended periods. However, because of the low volatility of ALS-inhibitor herbicides, injury to grapes from this type of herbicide generally occurs only from nearby applications.

Herbicide drift injury

Spring applications of the herbicides described above often accumulate in the growing points of grapes, where injury symptoms appear first. Fall applications may accumulate in roots. The type and severity of injury to grapes depends on the concentration of the herbicide, time of exposure and corresponding vine growth stage, and grape variety.

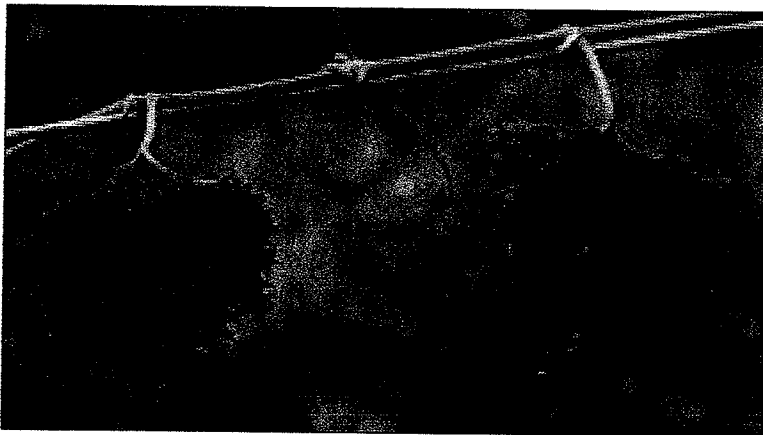
Time of exposure is important, as injury is much more severe during periods of rapid grape growth. The potential for injury can be reduced considerably if potentially injurious herbicides are applied in early spring when grapes are still dormant (prior to grape bud break). Bud break generally occurs around early to mid-April.

If exposure occurs between bud break and bloom, during the period of rapid shoot growth, grape injury can be severe. Field observations have indicated that herbicide drift exposure prior to bloom but after bud break can cause flower abortion, curling of shoot tips, cessation of shoot growth, and regrowth of deformed leaves after exposure.

Mid- and late-season exposure usually causes minor leaf deformation since most shoots are fully grown and few developing leaves are present to respond to the herbicide. However, exposure of developing berries to herbicides may greatly delay or even prevent ripening.

The sensitivity of grapevines to herbicide drift also depends on the grape cultivar. Nonetheless, with severe and repeated exposure to herbicide drift, all cultivars are vulnerable.

Figure 1.—2,4-D drift injury symptoms.



Fan-shaped leaves with small puckered spots between veins and sharp points (enations) at leaf margins (photo by I. Dami).



Zigzag shoot growth with shortened internodes (photo by I. Dami).

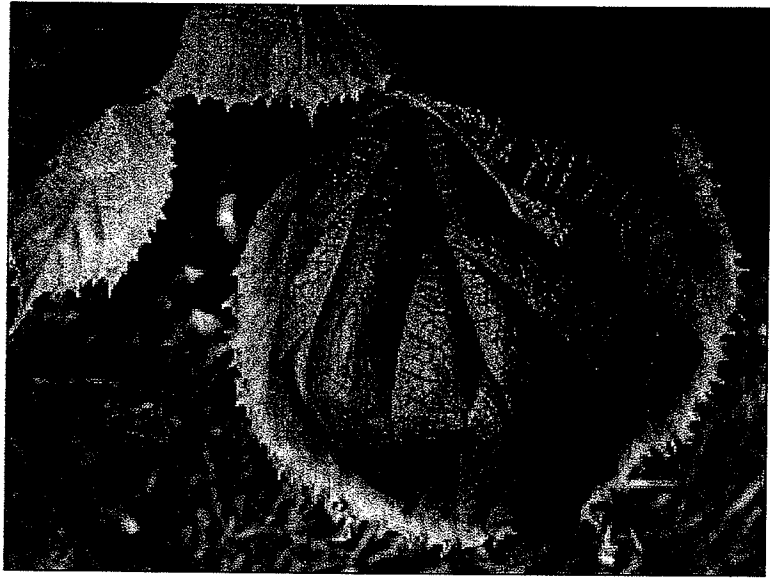
Growth regulator injury symptoms

Injury from growth-regulator herbicides usually appears within 2 days of the drift incident. Symptoms of 2,4-D injury include characteristic fan-shaped leaves with sharp points at leaf margins, epinasty (downward bending of leaves), leaf strapping with deep sinuses, and leaf puckering with constricted veins that may be slightly chlorotic (Figure 1). Research in Washington with Concord grapes has found that 2,4-D affects fruit quality, including fruit color, sugar levels, and acid content. Dicamba injury usually causes leaf cupping and a distinct marginal band of restricted growth (Figure 2).

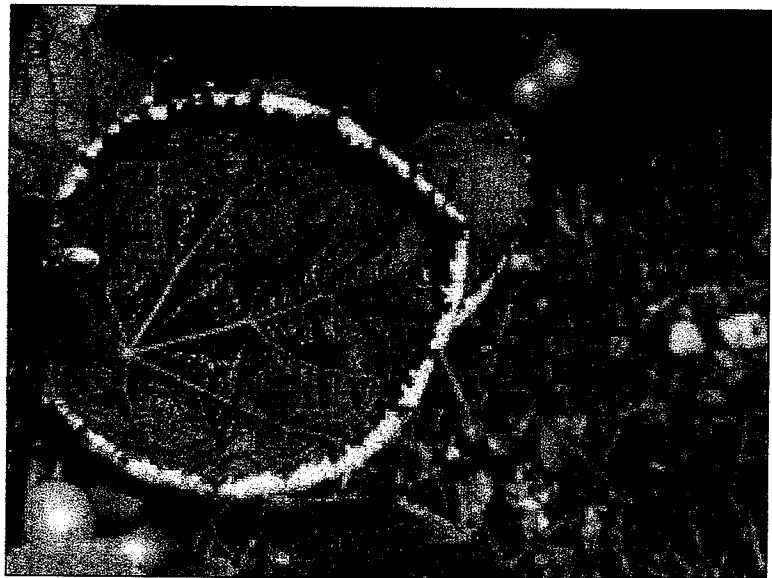
Shoot tips seldom resume growth after injury by growth-regulator herbicides, but laterals continue to grow. The result is a very bushy vine with a shade canopy and poor fruit exposure. Growth regulator injury is particularly severe when multiple incidents occur to the same grape planting over a period of years.

Symptoms of fanleaf degeneration, a viral disease, often resemble those caused by growth regulators.

Figure 2.—Dicamba drift injury symptoms.



Leaf cupping downward (photo by I. Dami).



Leaf cupping upward (photo by I. Dami).



Figure 3.—Glyphosate injury symptoms.



Distorted leaves.



Lateral shoot growth with unusual burst of latent buds on nodes, short internodes, and distorted leaves (photo by I. Dami).

Glyphosate and ALS inhibitor injury symptoms

Symptoms vary, depending on the time of application. During the growing season, grape injury from glyphosate and ALS inhibitors usually takes a couple of weeks to appear. The first symptom usually is yellowing of the growing points, followed by necrosis and death of the growing points (Figure 3). As a result, apical dominance may be broken, resulting in growth of numerous lateral shoots (bushy growth). Other symptoms include arrow-shaped, cupped, and upward-curved leaves, shortened internodes, and occasionally interveinal chlorosis (Figures 3 and 4).

Fall uptake of glyphosate may result in symptoms the following year, including stunting of early shoot growth, leaf chlorosis and distortion, very short internodes, abundant lateral shoots, and aborted flowers. These early-spring symptoms may be confused with viral or fungal diseases (e.g., Eutypa dieback).

Grape root injury can occur from either glyphosate or ALS inhibitors, although we are uncertain of the potential amount of root injury and its long-term implications. It generally is believed that root injury is more likely from ALS-inhibiting herbicides than from glyphosate.

Protection from herbicide drift injury

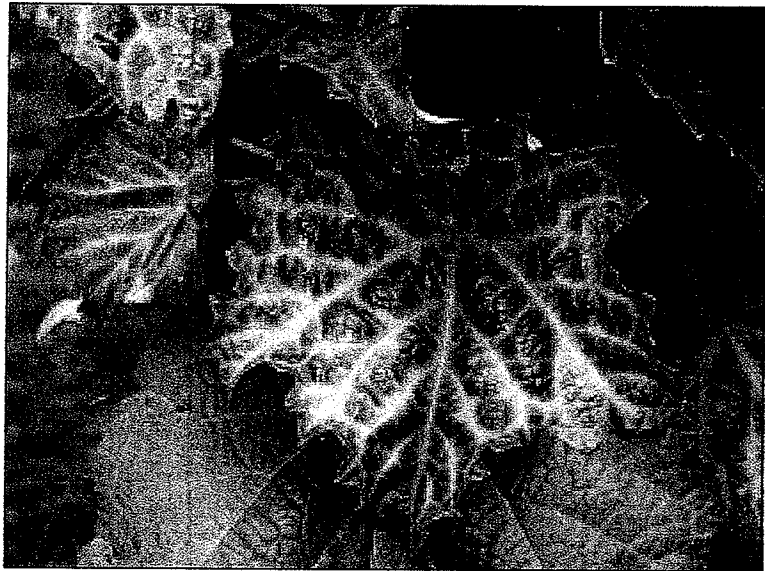
Both grape growers and nearby growers of other crops can take steps to reduce the risk of herbicide drift injury to grapevines.

Avoid making herbicide applications during sensitive periods of grape growth and development. All users of potentially injurious herbicide products should know where grapes are being grown in their vicinity and when grapes are in sensitive developmental stages.

Consider using products with a reduced potential for injury to off-target plants (see Table 2). These herbicides either affect emerging seedlings or cause contact injury to plants and are not translocated in grapes to growing points or fruit.

Maintain good relations with neighbors. Grape producers should make sure that neighbors in approximately a half-mile radius around the vineyard are aware that vines are very sensitive to herbicides. Communicate the presence of the vineyard to state and county highway departments, utilities, and other agencies that might spray rights-of-way or roadsides. If these areas run through your property, keep them free of weeds so they are less likely to be sprayed. Work with your neighbors by encouraging them to use drift-reduction spray nozzles that produce large droplets and to select herbicides that are less likely to injure grapes (Table 2).

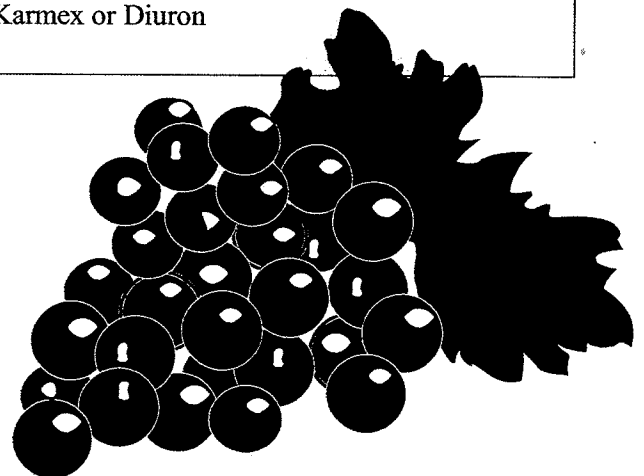
Figure 4.—ALS inhibitor injury symptoms from sulfonylurea herbicide spray drift.



Chlorosis of leaf veins and change in leaf appearance from smooth to crinkled (photo by I. Dami).

Table 2. Alternative herbicides for wheat less likely to injure grapes.

Achieve	Everest	Paramount
Avenge	Hoelon	Puma
Buctril	Maverick	Sencor
Discover	Karmex or Diuron	



Minimize drift injury from herbicides used in the vineyard.

Glyphosate is registered for use in grapes; however, if not applied properly, severe damage can occur. To avoid injury, grape growers should observe the following guidelines.

- Avoid glyphosate contact with any green parts of the vine or by drift.
- If possible, avoid summer and fall application when grapes are most susceptible to injury.
- Avoid glyphosate applications when shoots begin to trail, especially with downward shoot-training systems such as Single High Wire, Geneva Double Curtain, Smart-Dyson, and Scott Henry.
- Use a shield mounted to a wand for a backpack sprayer application or a commercial shielded sprayer such as a dome sprayer.
- Avoid spraying in windy conditions or during totally calm, temperature inversion conditions.
- Use drift-reduction nozzles (e.g., turbo flat-fan and air-atomizing types) that operate at lower pressure (15–30 psi) and produce large droplets, thus reducing the chance of drift.
- Use vine grow tubes to protect first-year vines from herbicide contact with green shoots.
- If chemical weed control is practiced in the vineyard, begin the weed management program with preemergence herbicides (check your local pesticide spray guide) and follow up with postemergence herbicides before bud break.
- In midseason, use a contact herbicide (not systemic) to treat weed escapes.
- If using 2,4-D in your vineyard, apply it before active shoot growth occurs, use low spray pressures, and be extremely careful to avoid treatment when weather conditions favor drift, such as during high temperatures, breezy conditions, and temperature inversions.

Additional herbicide drift resources

For more information about herbicide drift, see the following publications or Web sites.

- Washington Association of Wine Grape Growers Drift Monitoring information (http://www.wawgg.org/index.php?page_id=29)
- Kansas State University Drift Questions & Answers (<http://www.oznet.ksu.edu/library/hort2/MF2588.pdf>)
- Oregon State University Extension publication EM 8737, *Preventing Phenoxy Herbicide Damage to Grape Vineyards* (<http://eesc.oregonstate.edu/agcomwebfile/edmat/html/em/em8737/em8737.html>)

The Oregon Department of Agriculture (503-986-4653) and Washington Pesticide Management Division (Washington Department of Agriculture, 509-225-2647, toll-free 1-877-301-4555) direct investigations on suspected drift incidents in their respective states.

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from Veronica Smith <vsmithland@gmail.com>
to Veronica Smith <vsmithland@gmail.com>,
Anne Elvers <Anne_Elvers@co.washington.or.us>
cc Carrie Richter <crichter@gsblaw.com>
date Mon, Feb 1, 2010 at 3:46 PM
subject Water Master irrigation
mailed-by gmail.com
Re: 09-360-PA KCL, Inc.

Chairman Marc San Soucie and Planning Commissioners:

It was suggested by Washington County Planning Staff that we talk with the Water Master regarding irrigation rights.

I spoke with Darryl Hedin, Water Master District 18, on 1/29/10.

I made inquiry as to uses that would or would not require irrigation or a water right. He was clear to explain that only residential uses could have water for their domestic use to include one-half acre. The same well could be used for watering of personal livestock such as cows, horses, llamas, chickens, etc. and that watering for pasture was limited to one-half acre. Anything produced that requires water, used for the purpose of making a profit to include crops, animals, pasture for rent, or hay requires a water right. In addition he stated that typically in the area, grapes need drip irrigation for the first couple of years. Grape growers must then obtain a water right.

In our discussion with Staff, they concurred with our assumption that agricultural water rights are being strictly limited and it is highly unlikely that the subject parcel could obtain a water right.

Please consider this additional information in your review.

Regards,

Veronica A Smith
Principal
Veronica Smith Land Use Consulting, LLC.
P.O. Box 1082
Astoria, Or 97103

503-325-4922 (Office)
503-349-2321 (Cell)
vsmithland@gmail.com