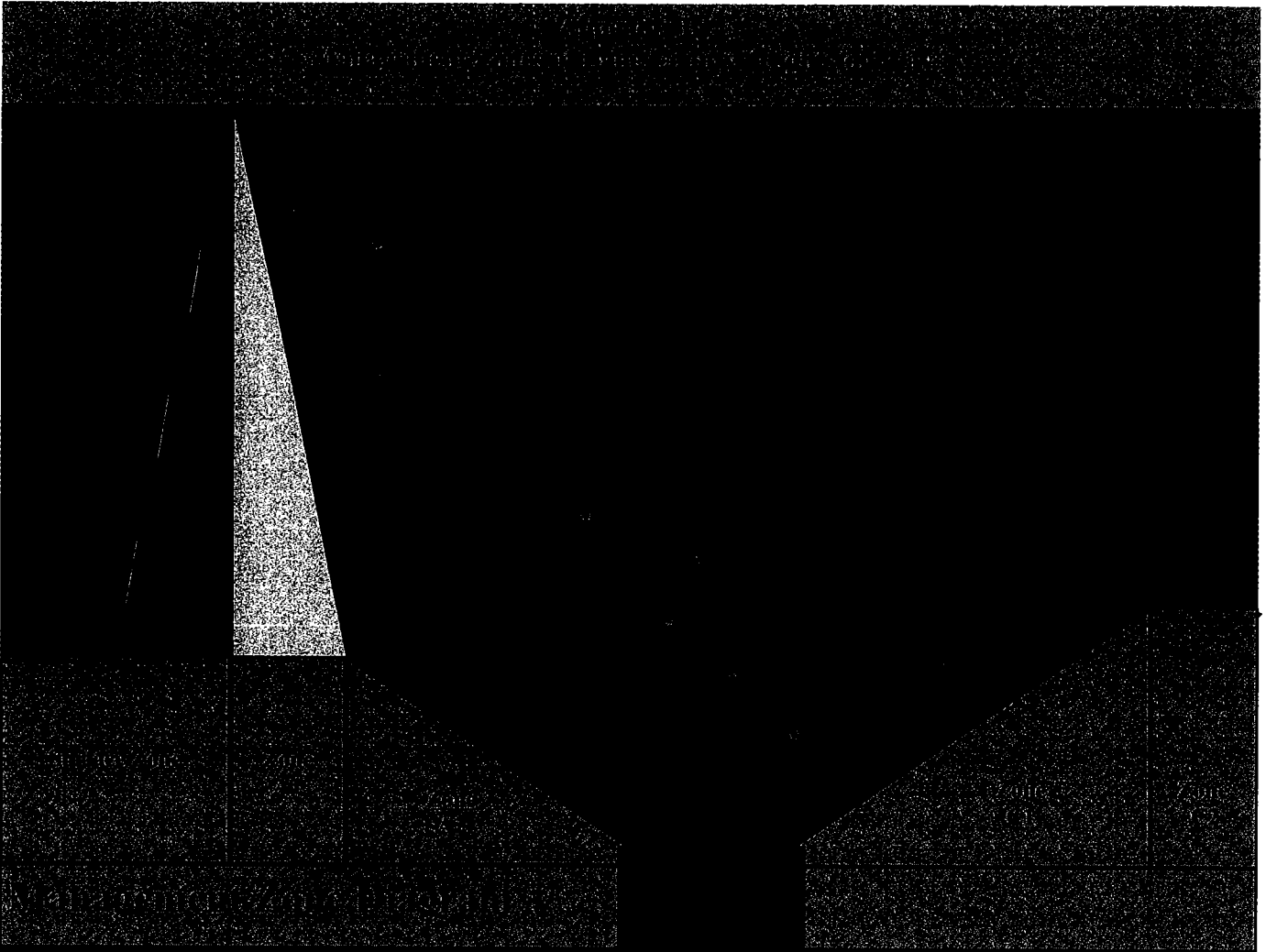


Appendix A
Definitions for Last Resort Policy & Management Prescriptions

- **Action Threshold:**
A specific description of conflicts of vegetation and management standards that, if exceeded, trigger a need to intervene.
- **Biological:**
Control of pest organisms using other organisms (usually introduced) as predators, parasites, or pathogens of the pest.
- **Cultural:**
Controlling vegetation or weed problems by changing the cultural practices such as fertilizing, mulching, soil amending, preferred planting, and fire prescriptions.
- **Herbicide:**
Any chemical, synthetic substance, or mixture of substances registered by the EPA intended for preventing, destroying, repelling, or mitigating any plant from growing where unwanted.
- **Invasive Species:**
1. Species that has moved into an area and reproduced so aggressively that it has replaced some of the original species. 2. Non-native species of plants or animals that out-compete native species in a specific habitat.
- **Management Feature:**
A specific site condition or fixture that requires vegetation management to maintain proper function and design.
- **Manual:**
1. Doing or requiring physical work; “manual labor.” 2. Of or relating to the hands, requiring human effort.
- **Mechanical:**
1. Pertaining to or accomplished by mechanical or physical forces. 2. Performed by means of some artificial mechanism.
- **Noxious Weed:**
Non-native (or alien) plant to the ecosystem, whose introduction causes or is likely to cause economic or environmental harm, or harm to human health.
- **Preferred Alternative:**
The alternative selected from a comprehensive evaluation of all alternatives considering efficacy, environmental impact, desired outcomes, and financial cost.
- **Prescription:**
A course of management action(s) prescribed for a particular area after specific assessments and evaluations have been made.
- **Rights-of-Way:**
Is a defined management area of Lane County-owned property that incorporates the road surface, road shoulder, drainage feature, and back slope bordering adjacent property ownership(s). The boundary of a typical “Right-of-Way” is detectable by power poles, fence lines, or other established features.
- **Technical:**
Involving the use of non-herbicide products, materials, equipment, or agents in vegetation management activities.



Zone Descriptions:

Road Zone. (Road surface from edge to edge, either gravel or paved)

Kept free of vegetation to facilitate road preservation, reduce maintenance costs, enhance driver safety, and protect the road surface from damage.

Zone A, Non-Selective Zone. (Area from road edge to existing natural or created drainage feature)

Low-growing grass and broadleaf vegetation area maintained for key operational needs, including safety, visibility, and pavement preservation needs. Kept free of woody vegetation and other problematic species.

Zone B, Non-Selective Drainage Zone. (Natural or created drainage feature)

Kept free of woody and problematic vegetation to facilitate proper drainage, visibility and base material preservation. This area is primarily maintained to preserve drainage feature function, and design.

Zone C1, Transition Zone. (Area from distal edge of drainage feature to safe distance within ROW)

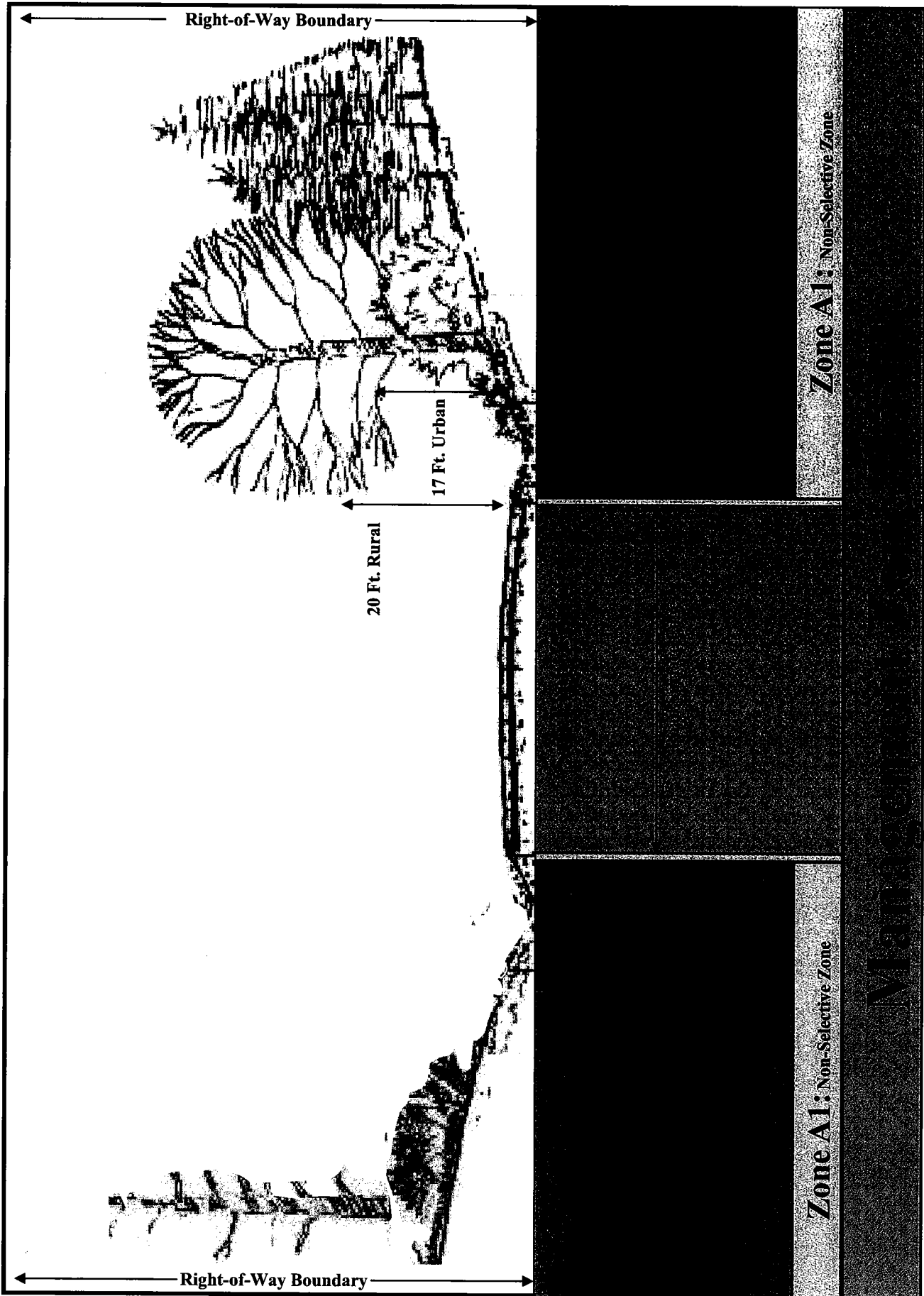
Transitional area maintained selectively for visibility and safety. Provides a buffer, or transition area between road facility and adjacent land uses. Kept free of large trees and problematic vegetation

Zone C2, Natural Zone. (Area may exist extending past zone C1 to ROW edge, if ROW is large enough for driver and public safety)

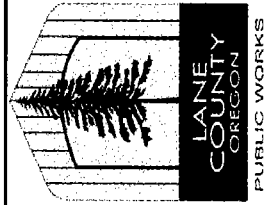
Area is maintained selectively, and to the greatest degree possible as a self-sustaining natural plant community.

** Certain zones may not exist based on "Right-of-Way size, design, and private land features.*

Appendix B. Management Zones of Lane County "Rights-of-Way"

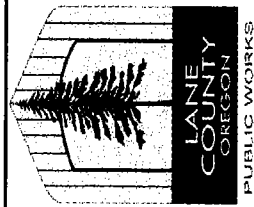


Appendix C
Noxious Invasive Weed List



Common Name	Scientific Name	Management Level	ODA Rating	NPSO Rating	Goal
Armenian Blackberry	<i>Rubus armeniacus</i>	L	B	H	Control
Black Locust	<i>Robinia psuedoacacia</i>	L	N/A	M-H	Control
Bull Thistle	<i>Cirsium vulgare</i>	L	B	N/A	Control
Butterfly Bush	<i>Buddleia davidii</i>	L	N/A	H	Control
Canada Thistle	<i>Cirsium arvense</i>	L	B	N/A	Control
Dalmatian Toadflax	<i>Linaria genitifolia ssp. dalmatica</i>	H	B	M	Eradicate
Diffuse Knapweed	<i>Centaurea diffusa</i>	M	B	N/A	Reduce
English Ivy	<i>Hedera helix</i>	L	B	H	Control
English Hawthorn	<i>Crataegus monogyna</i>	L	N/A	M-H	Control
English Holly	<i>Ilex aquifolium</i>	L	N/A	M	Control
Evergreen Blackberry	<i>Rubus laciniatus</i>	L	N/A	M	Control
False Brome	<i>Brachypodium sylvaticum</i>	H	B	H	Reduce
French Broom	<i>Cytisus monspessulanas</i>	H	B	N/A	Eradicate
Garlic Mustard	<i>Alliaria petiolata</i>	H	N/A	H	Eradicate
Giant Hogweed	<i>Heracleum mantegazzianum</i>	H	A,T	N/A	Eradicate
Giant Horsetail	<i>Equisetum telmateia</i>	L	B	N/A	Control
Giant Knotweed	<i>Polygonum sachalinense</i>	H	B	N/A	Eradicate
Gorse	<i>Ulex europaeus</i>	M	B,T	H	Reduce
Himalayan Knotweed	<i>Polygonum polystachyum</i>	H	B	N/A	Eradicate
Houndstongue	<i>Cynoglossum officinale</i>	H	B	N/A	Eradicate
Hybrid Knotweed	<i>Polygonum cuspidatum var. sachalinense</i>	H	N/A	H	Eradicate
Iberian Starthistle	<i>Centaurea iberica</i>	H	A,T	N/A	Eradicate
Italian Thistle	<i>Carduus phycnocephalus</i>	M	B	N/A	Reduce
Japanese Knotweed	<i>Polygonum cuspidatum</i>	H	B	H	Eradicate
Kudzu	<i>Pueraria lobata</i>	H	A,T	H	Eradicate
Meadow Knapweed	<i>Centaurea pratensis</i>	M	B,T	N/A	Reduce
Orange Hawkweed	<i>Aegilops ovata</i>	H	A,T	N/A	Eradicate

Appendix C
Noxious Invasive Weed List



Common Name	Scientific Name	Management Level	ODA Rating	NPSO Rating	Goal
Policemans Helmet	<i>Impatiens glandulifera</i>	H	N/A	M	Eradicate
Portuguese Broom	<i>Cystisus striatus</i>	H	B,T	N/A	Eradicate
Puncturevine	<i>Tribulus terrestris</i>	L	B	N/A	Control
Purple Loosestrife	<i>Lythrum salicaria</i>	H	B,T	H	Eradicate
Purple Starthistle	<i>Centaurea calcitrapa</i>	H	A,T	N/A	Eradicate
Reed Canary Grass	<i>Phalaris arundinacea</i>	L	N/A	H	Control
Russian Knapweed	<i>Acroptilon repens</i>	H	B	N/A	Eradicate
Scotch Broom	<i>Cystisus scoparius</i>	L	B	N/A	Control
Scotch thistle	<i>Onopordum acanthium</i>	L	B	N/A	Control
Spanish Broom	<i>Spartium junceum</i>	H	B	S	Eradicate
Spotted Knapweed	<i>Centaurea maculosa</i>	M	B,T	N/A	Reduce
Squarrose Knapweed	<i>Centaurea virgata</i>	H	A,T	N/A	Eradicate
Tree of Heaven	<i>Ailantus altissima</i>	L	N/A	M	Control
Yellow Flag Iris	<i>Iris pseudocarus</i>	H	N/A	H	Eradicate
Yellow Starthistle	<i>Centaurea solstitialis</i>	H	B,T	N/A	Eradicate
Yellow Toadflax	<i>Linaria vulgaris</i>	H	B	N/A	Eradicate

***Noxious Weed Control Rating System, ODA:** "A" **Designated** - A weed of known economic importance which occurs in the State in small enough infestations to make eradication or containment possible; or is not known to occur, but its presence in neighboring states make future occurrence in Oregon seem imminent. "B" **Designated** - A weed of economic importance which is regionally abundant, but which has limited distribution in some counties. "T" **Designated** - A priority noxious weed designated by the Oregon State Weed Board as a target on which the Oregon Department of Agriculture will develop and implement a statewide management plan. "T" designated weeds are species selected from either the "A" or "B" list.

****Noxious Weed Control Rating System, NPSO:** "H" **Designated** - High impact on native vegetation; frequently forms large monocultures (or near-monocultures); severely modifies natural habitats. "M" **Designated** - Medium impact on native vegetation; occasionally becomes a dominant in native plant communities, but is known to form large monocultures; significantly modifies natural habitat; may spread far from parent plants. "S" **Designated** - Suspected as a potential problem; not well documented in this area; many of these species are aggressive in landscaped areas, and move out into natural areas and may persist.

Management Level: "H" - Efforts directed at eradication and control of all known sites in Lane County. "M" - Attempt to eradicate new, small populations; monitor and/or control existing sites. "L" - Routine maintenance and monitoring; populations extensive in Lane County; control when feasible or infesting special habitat areas.

Appendix D
Lane County Department of Public Works / Noxious & Invasive Weed Management
Prescriptions

Management of Noxious & Invasive Weeds.

Noxious and Invasive weeds are a growing concern in Lane County and surrounding areas in the State that, if left unmanaged, may create both environmental and economic damage. The list provides direction to both field staff and managers to focus limited Lane County financial and labor resources to a targeted group where it will be most effective.

The Noxious and Invasive Weed Management List means that Lane County Department of Public Works will attempt to manage, eradicate, or control noxious weeds when feasible within our "Rights-of-Way." The list also means that we are aware of a growing problem, and that we plan to educate the public and our staff about noxious weeds so we can work together as good stewards and neighbors.

Management Prescriptions & Action Thresholds.

Listed Noxious and Invasive Weeds within Lane County "Rights-of-Way" maintain specific management prescriptions and action thresholds distinct from other vegetation management activities. Management activities directed at noxious weed concerns will follow guidelines listed in "Appendix D – Noxious and Invasive Weed Management Prescription Plan" and supersede both action thresholds and preferred alternatives listed in the general "Management Prescription Plan." Noxious weeds will be managed for their presence in County "Rights-of-Way" regardless of management features and associated action thresholds.

How the list was created.

The Noxious and Invasive Weed Management List was created based on historical data gathered from various public and private sector groups. Lane County Department of Public Works selected forty-three weed species for management efforts. The Noxious and Invasive Weed List includes weeds that are both common in our area, and others that are either new invaders or pose a real threat to invade the County.

Appendix D
Noxious and Invasive Weed Management Prescriptions

Noxious & Invasive Weed Management Prescriptions. Lane County Department of Public Works

Armenian Blackberry - *Rubus armeniacus* . Alternative A.

Zones	Action Threshold	Management	Method	Materials	Timing	
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, various other mechanical tools, and/or hand tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall

Armenian Blackberry - *Rubus armeniacus* . Alternative B.

Zones	Action Threshold	Management	Method	Materials	Timing	
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Mechanical mowing or brushing in conjunction with spot herbicide application.	Mechanical mowers and brushing equipment. Appropriate herbicide(s) from the Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall

Armenian Blackberry - *Rubus armeniacus* . Alternative C.

Zones	Action Threshold	Management	Method	Materials	Timing	
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Foliar herbicide application.	Appropriate herbicide(s) from the Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Black Locust - *Robinia pseudoacacia* . Alternative A

Zones	Action Threshold	Management	Method	Materials	Timing	
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushing equipment, chainsaws, handsaws, various other mechanical tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter

Appendix D
Noxious and Invasive Weed Management Prescriptions

Black Locust - <i>Robinia pseudoacacia</i> - Alternative B Zones: All Zones						
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Mow or brush plant to stump(s), followed by direct herbicide stump application(s).	Mechanical mowers, brushing equipment. Appropriate herbicide(s) from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter

Bull Thistle - <i>Cirsium vulgare</i> - Alternative A Zones: Action Threshold						
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, various other mechanical tools, and/or hand tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Bull Thistle - <i>Cirsium vulgare</i> - Alternative B Zones: Action Threshold						
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Spot herbicide application.	Appropriate herbicide(s) from the Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Butterfly Bush - <i>Buddleia davidii</i> - Alternative A Zones: Action Threshold						
Management			Method		Timing	
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, various other mechanical tools, and/or hand tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter

Appendix D
Noxious and Invasive Weed Management Prescriptions

Butterfly Bush - *Buddleja davidii* - Alternative B
Zones: Action Threshold

All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Mechanical plant reduction followed by spot herbicide treatment.	Mechanical or manual tools. Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter
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Canada Thistle - *Cirsium arvense*. Alternative A.

Zones: Action Threshold

All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical or manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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Canada Thistle - *Cirsium arvense*. Alternative B.

Zones: Action Threshold

All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Spot herbicide application.	Appropriate herbicide(s) from the Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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Dalmation Toadflax - *Linaria genisifolia*. Alternative A.

Zones: Action Threshold

		Management	Method	Materials	IVM Maintenance	Timing
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Hand-pulling and grubbing.	Appropriate hand tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Appendix D
Noxious and Invasive Weed Management Prescriptions

Dalmatian Toadflax - *Amma cernitifolia* - Alternative B
Zones: Action Threshold

All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Preferred planting.	Preferred plant materials and manual planting tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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Diffuse Knapweed - *Centaurea diffusa*. Alternative A.
Zones: Action Threshold

All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers and/or other mechanical or manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall
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Diffuse Knapweed - *Centaurea diffusa*. Alternative B.
Zones: Action Threshold

All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Spot application and/or foliar herbicide application.	Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring
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English Ivy - *Hedera helix* - Alternative A.
Zones: Action Threshold

All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Mechanical Mowing of ground growth form, manual or mechanical girdling of climbing growth form.	Mechanical mowers, brushes and manual tools for stem girdling.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter
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Appendix D
Noxious and Invasive Weed Management Prescriptions

English Hawthorn - *Crataegus monogyna*. Alternative A.

All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Mechanical brushing and/or other mechanical manual removal tools with stumpgrinding.	Mechanical brusher, chainsaws, pruning tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter
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English Hawthorn - *Crataegus monogyna*. Alternative B.

All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Mechanical brushing and/or other mechanical manual removal tools, with spot herbicide application.	Mechanical brusher, chainsaws, pruning tools. Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter
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English Holly - *Ilex aquifolium*. Alternative A.

All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mower, brusher, and/or other appropriate mechanical or manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter
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Evergreen Blackberry - *Rubus laciniatus*. Alternative A.

All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers and brushers.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall
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Appendix D
Noxious and Invasive Weed Management Prescriptions

Evergreen Blackberry - *Rubus laciniatus*. Alternative B.

All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Mechanical mowing and brushing followed by spot herbicide application.	Mechanical mower and brushers. Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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False Brome - *Brachypodium sylvaticum*. Alternative A

All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers and/or appropriate manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall
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False Brome - *Brachypodium sylvaticum*. Alternative B

All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Waipuna foam treatment.	Waipuna equipment and foam.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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False Brome - *Brachypodium sylvaticum*. Alternative C

All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Foliar herbicide treatment.	Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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Appendix D
Noxious and Invasive Weed Management Prescriptions

French Broom - *Cytisus monspessulanas*. Alternative A.

Zone All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical brusher, mowers and manual removal tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter
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French Broom - *Cytisus monspessulanas*. Alternative B.

Zone All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction through mechanical tools followed by spot herbicide treatment.	Mechanical mower and brushers. Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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Garlic Mustard - *Alliaria petiolata*. Alternative A.

Zone All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Hand tools and grubbing.	Appropriate hand tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Fall Winter Spring
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Garlic Mustard - *Alliaria petiolata*. Alternative B.

Zone All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Foliar herbicide application.	Appropriate herbicides from the Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Fall Winter Spring
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Appendix D
Noxious and Invasive Weed Management Prescriptions

Giant Hogweed - *Heracleum mantegazzianum*. Alternative A.

Zones: Action Threshold: Management						
All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Plant reduction and removal through mechanical and/or manual methods.	Appropriate mechanical and manual removal tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Giant Hogweed - *Heracleum mantegazzianum*. Alternative B.

Zones: Action Threshold: Management						
All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Hand or Mechanical pulling for entire plant removal including root system.	Appropriate hand and mechanical tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Giant Horsetail - *Equisetum telmateia*. Alternative A.

Zones: Action Threshold: Management						
Zone A	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Foliar herbicide application.	Appropriate herbicide from the Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Gorse - *Ulex europaeus*. Alternative A.

Zones: Action Threshold: Management						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Appropriate mechanical and manual removal tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter

Appendix D
Noxious and Invasive Weed Management Prescriptions

Corse - *Ulex europaeus*. Alternative B.

Zone: Action Threshold						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods followed by spot herbicide application.	Appropriate mechanical and manual removal tools and appropriate herbicides from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Himalayan Knotweed - *Polygonum polystachyum*. Alternative A

Zone: Action Threshold						
All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Injection and foliar herbicide application.	Appropriate herbicides from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Summer Fall

Houndstongue - *Cynoglossum officinale*. Alternative A.

Zone: Action Threshold						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Hand pulling and grubbing or mechanical tillage.	Appropriate hand and mechanical tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Houndstongue - *Cynoglossum officinale*. Alternative B.

Zone: Action Threshold						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Foliar herbicide application.	Appropriate herbicides from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring

Appendix D
Noxious and Invasive Weed Management Prescriptions

Hybrid Knotweed - *Polygala lutea* (L.) W. & A. (Alternative A)
Zones: Action Threshold

All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Injection and foliar herbicide application.	Appropriate herbicides from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Summer Fall
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Iberian Starthistle - *Centaurea iberica*. Alternative A.

Zones: Action Threshold

All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Grubbing and hand digging.	Appropriate hand tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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Iberian Starthistle - *Centaurea iberica*. Alternative B.

Zones: Action Threshold

All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Foliar herbicide application.	Appropriate herbicide from the Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring
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Italian Thistle - *Carduus phycnocephalus*. Alternative A

Zones: Action Threshold

All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Grubbing and hand digging.	Appropriate hand tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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Italian Thistle - *Cirsium discolor* - Alternative B
Zones: All Zones

All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Foliar herbicide application.	Appropriate herbicide from the Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring
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Japanese Knotweed - *Polygonum cuspidatum*. Alternative A.
Zones: Action Threshold

All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Injection and foliar herbicide application.	Appropriate herbicides from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Summer Fall
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Kudzu - *Pueraria lobata* - Alternative A
Zones: Action Threshold

All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Foliar herbicide application.	Appropriate Herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter
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Meadow Knapweed - *Centaurea pratensis*. Alternative A.
Zones: Action Threshold

All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Appropriate mechanical and manual removal tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall
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Noxious and Invasive Weed Management Prescriptions

Meadow Knapweed - *Centaurea pratensis*. Alternative B.

Zone: Action Threshold Management						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Foliar herbicide application.	Appropriate herbicide from the Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring

Orange Hawkweed - *Aegilops ovata*. Alternative A.

Zone: Action Threshold Management						
All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Plant reduction and removal through mechanical and/or manual methods.	Appropriate mechanical and manual removal tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Orange Hawkweed - *Aegilops ovata*. Alternative B.

Zone: Action Threshold Management						
All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Spot herbicide application.	Appropriate herbicide from the Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring

Policemans Helmet - *Impatiens glandulifera*. Alternative A.

Zone: Action Threshold Management						
All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Hand pulling and grubbing.	Appropriate hand tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

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Noxious and Invasive Weed Management Prescriptions

Policemans Helmet - *Impatiens glandulifera*. Alternative B.

Zones		Action Threshold				Management	
All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Mechanical mowing.	Mechanical Mower.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring	

Portuguese Broom - *Cystisus striatus*. Alternative A.

Zones		Action Threshold				Management	
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mower and other mechanical, manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter	

Portuguese Broom - *Cystisus striatus*. Alternative B.

Zones		Action Threshold				Management	
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods, followed by spot herbicide application.	Mechanical mower and other mechanical, manual tools and appropriate herbicides from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer	

PunctureVine - *Tribulus terrestris*. Alternative A.

Zones		Action Threshold				Management	
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mower and other mechanical, manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer	

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Noxious and Invasive Weed Management Prescriptions

Puncturevine - *Tribulus terrestris*. Alternative B.

Zones		Action Threshold		Management		Method		Timing	
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods, followed by cultural control methods.	Mechanical mower and other mechanical, manual tools with cultural supplies and equipment.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.			Spring Summer Fall	

PunctureVine - *Tribulus terrestris*. Alternative C.

Zones		Action Threshold		Management		Method		Timing	
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Foliar herbicide treatment.	Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.			Spring	

Purple Loosestrife - *Lythrum salicaria*. Alternative A.

Zones		Action Threshold		Management		Method		Timing	
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushers and manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.			Spring Summer Fall	

Purple Loosestrife - *Lythrum salicaria*. Alternative B.

Zones		Action Threshold		Management		Method		Timing	
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Foliar and spot herbicide application.	Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.			Spring Summer	

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Purple Loosestrife - <i>Lythrum salicaria</i> - Alternative C Zones: Action Threshold						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Biological control.	Approved biological control agent.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Purple Starthistle - <i>Centaurea calcitrapa</i> . Alternative A. Zones: Action Threshold						
All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushers and manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Purple Starthistle - <i>Centaurea calcitrapa</i> . Alternative B. Zones: Action Threshold						
All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Plant reduction and removal through mechanical and/or manual methods, followed by spot herbicide application.	Mechanical mowers, brushers and manual tool with appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring

Reed Canary Grass - <i>Phalaris arundinacea</i> - Alternative A Zones: Action Threshold						
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushers and manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall

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Red Canary Grass - <i>Phalaris arundinacea</i> - Management						
Zones	Action/Threshold	Management	Monitoring	Equipment	Timing	
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods, followed by cultural methods.	Mechanical mowers, brushers and manual tools with appropriate cultural control supplies and equipment.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall

Russian Knapweed - <i>Acroptilon repens</i> . Alternative A.						
Zones	Action/Threshold	Management	Monitoring	Equipment	Timing	
All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushers and manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall

Russian Knapweed - <i>Acroptilon repens</i> . Alternative B.						
Zones	Action/Threshold	Management	Monitoring	Equipment	Timing	
All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Spot and/or foliar herbicide application.	Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring

Scotch Broom - <i>Cystitis scoparius</i> - Alternative A.						
Zones	Action/Threshold	Management	Monitoring	Equipment	Timing	
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushers and manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Summer Spring Fall Winter

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Noxious and Invasive Weed Management Prescriptions

Scotch Broom - <i>Cystitis scoparium</i> . Alternative B						
Zones	Action	Management	Monitoring	Control	Timing	Notes
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods, followed by spot herbicide application.	Mechanical mowers, brushers and manual tool, with appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Scotch Broom - <i>Cystitis scoparium</i> . Alternative C						
Zones	Action	Management	Monitoring	Control	Timing	Notes
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Foliar herbicide Treatment.	Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Scotch Thistle - <i>Onopordum acanthium</i> . Alternative A.						
Zones	Action	Management	Monitoring	Control	Timing	Notes
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushers and manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Scotch Thistle - <i>Onopordum acanthium</i> . Alternative B.						
Zones	Action	Management	Monitoring	Control	Timing	Notes
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Spot and/or foliar herbicide application, followed by cultural control methods.	Appropriate herbicide from Permitted Products List, with appropriate cultural supplies and equipment.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring

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Noxious and Invasive Weed Management Prescriptions

Spanish Broom - <i>Spartium anglicum</i> - Alternative A						
Zones: Action Threshold: Management Method:						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushers and manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter

Spanish Broom - <i>Spartium anglicum</i> - Alternative B						
Zones: Action Threshold: Management Method:						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods, followed by spot herbicide application.	Mechanical mowers, brushers and manual tools, with appropriate cultural control supplies and equipment.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer

Spotted Knapweed - <i>Centaurea maculosa</i> - Alternative A.						
Zones: Action Threshold: Management Method:						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushers and manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall

Spotted Knapweed - <i>Centaurea maculosa</i> - Alternative B.						
Zones: Action Threshold: Management Method:						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Spot and/or foliar herbicide application.	Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring

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Noxious and Invasive Weed Management Prescriptions

Squarrose Knapweed - <i>Gallium aparine</i> - Alternative A						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushers and manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall

Squarrose Knapweed - <i>Gentiana virginica</i> - Alternative B						
All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Spot and/or foliar herbicide application.	Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring

Tree of Heaven - <i>Ailanthus altissima</i> - Alternative A						
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushers and manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall Winter

Tree of Heaven - <i>Ailanthus altissima</i> - Alternative B						
All Zones	Presence in Right-Of-Way	Subject to limited control and eradication efforts. Infestations will primarily be monitored and controlled through routine maintenance practices.	Plant reduction and removal through mechanical and/or manual methods, followed by spot herbicide application.	Mechanical mowers, brushers and manual tools with appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall

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Noxious and Invasive Weed Management Prescriptions

Yellow Flag Iris - *Iris pseudacatis* - Alternative A

All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical mowers, brushers and/or manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall
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Yellow Flag Iris - *Iris pseudacatis* - Alternative B

All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods, followed by cultural control methods.	Mechanical mowers, and/or other mechanical, manual tools, and cultural supplies such as mulch, native species and various other supplies.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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Yellow Flag Iris - *Iris pseudacatis* - Alternative C

All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Plant reduction and removal through mechanical and/or manual methods, followed by spot herbicide application.	Mechanical mowers, brushers and manual tools with appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Fall
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Yellow Starthistle - *Centaurea solstitialis*. Alternative A.

All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Plant reduction and removal through mechanical and/or manual methods.	Mechanical tools and/or manual tools.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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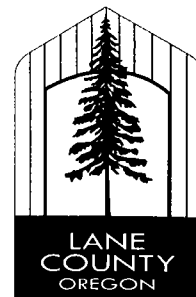
Appendix D
Noxious and Invasive Weed Management Prescriptions

Yellow Starthistle - *Centaurea solstitialis*. Alternative B.

All Zones	Presence in Right-Of-Way	Infestation may be subject to intensive control and eradication efforts where located.	Spot and/or foliar herbicide application.	Appropriate herbicide from Permitted Products List.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer
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Yellow Toadflax - *Linaria vulgaris*. Alternative A.

All Zones	Presence in Right-Of-Way	May be subject to extensive or limited control and eradication efforts to reduce spread of species.	Hand or mechanical removal followed by preferred species plantings.	Appropriate mechanical or hand tools with cultural planting supplies.	Monitor management activity to determine success or failure of alternative. Review activity efficacy, cost and impacts to adjust or maintain management alternatives.	Spring Summer Fall
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Agenda Date: April 26, 2006

TO: Lane County Board of Health

FM:  Rob Rockstroh, Director H&HS/Public Health Administrator

RE: Public Health Advisory Committee Comments on Proposed Permitted Products List

Under Lane Code 15.510 (3) the Board of Health (Board of County Commissioners) “shall solicit review and comment from the Vegetation Management Advisory Committee and the Public Health Administrator who will work with the Public Health Advisory Committee.” The Public Health Advisory Committee commends the Board of Commissioners for their commitment to public health and the principles of harm reductions through the adoption of the Last Resort Herbicide Policy. The Advisory Committee also wants to acknowledge the work of Public Work’s staff, Sonny Chickering and Orin Schumacher, on this process. They went out of their way to provide information, answer questions, and have a dialogue and with the Last Resort Subcommittee of the Public Health Advisory Committee.

The Public Health Advisory Committee supports Lane Code 15 where the clear spirit and intent of the ordinance is to use herbicides “as a last resort when other options have been proven ineffective.” The Committee is supportive of the efforts to develop clear action thresholds for each of the non-pesticide control methods, applied in the hierarchy of interventions, which if required, may lead to a last resort situation. Not everyone has seen eye to eye on what the Last Resort Policy really means when implemented, but the task for this meeting is to do the specific work of commenting on the Permitted Products list.

The Last Resort Subcommittee did not come to consensus statement. What I am attaching are the unedited individual committee member comments on the listed products. Attached you will find comments on the five proposed permitted products: Aquamaster, Garlon 3A, Habitat, Milestone, and Oust Extra. In the Garlon 3A comments there is a statement that “Ethanol a so-called ‘inert’ ingredient is listed as carcinogenic by IARC (EPA 4B).” I received a further piece of information that “Ethanol possesses properties that indicate a hazard for human health but these are manifest only at doses associated with consumption of alcoholic beverages.”

The Public Health Advisory Committee and I are supportive of the language in the adoption of Ordinance No. 12-03 that states “the County wishes to maintain a healthy environment for its current citizens, wildlife, and future generations” and we hope that the Last Resort Policy leads us in that direction.

**Comments on Lane County Public Works Permitted Products List 2006
As required in Lane County Ordinance 12-03 (LC15.500-530)**

AQUAMASTER Aquamaster is 53.8% glyphosate, 46.2% "inerts"
(formerly Rodeo aquatic herbicide)

The only herbicide information source listed by Public Works(PW) is Monsanto, the manufacturer of Aquamaster. Glyphosate is the "active ingredient." The "inert" ingredients are water & according to one source FD&C Blue #1.

The Public Works document shows noncompliance with the ordinance regarding soil half-life LC 15.510(5)(a). The PW document lists half-life at approximately 40 days. The Monsanto Material Safety Data Sheet lists soil half-life to be from 2-174 days.

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INDEPENDENT RESEARCH or research information from the EPA of Monsanto research that differs from that offered by Public Works.

Water Contamination Glyphosate is thought to be tightly bound by most soils, but in certain conditions "this herbicide can be extensively mobile in the soil environment (noncompliant with section 5b) if it is applied on soils unable to retain the molecule long enough for its microbial degradation."¹ Since shoulder soils are chosen to promote drainage, herbicides are problematic. Even when glyphosate binds to soil, it does move into water when this soil is eroded and washed into streams.² Many of our county roads follow waterways. Glyphosate has been found in Oregon and Washington streams.^{3 & 4} Glyphosate has been found to persist in pond sediments for over one year.⁵

Fish Toxicity Both glyphosate and the commercial products that contain glyphosate are acutely toxic to fish⁶, contradictory to labeling and section (5)(e). Acute toxicities of glyphosate vary widely: Median lethal concentrations LC50 (the concentrations killing 50% of a population of test animals) ranging from 10 ppm to over 200ppm have been reported depending on the species of fish and test conditions.⁷ (noncompliant with 5d)

¹ Piccolo, A. et al. 1994. Absorption and desorption of glyphosate in some European soils. J of Environ. Sci. Health B29(6):1105-1115

² U.S. EPA Office of Pesticide Programs. Special Review and Reregistration Division. 1993. Reregistration eligibility decision (RED): Glyphosate. Wash. D.C., Sept.

³ Oregon Dept. of Forestry. Forest Practices Program. 1992. Forest herbicide Application water sampling study. Salem, OR, Jan.

⁴ Bortleson, G.C. and D.A. Davis. 1997. Pesticides in small streams in the Puget Sound Basin, 1987-1995. U.S. Geological Survey. Fact Sheet 067-97. Tacoma, WA, June

⁵ Ref. #2

⁶ Folmar, L.C., H.O. Sanders, and A.M. Julin. 1979. Toxicity of the herbicide glyphosate and several of its formulations to fish and aquatic invertebrates. Arch. Environ. Contam. Toxicol. 8:269-278.

⁷ World Health Organization, U.N. Environment Programme, the International Labour Organization. 1994. Glyphosate. Environmental Health Criteria #159. Geneva, Switzerland.

**Comments on Lane County Public Works Permitted Products List
As required in Lane County Ordinance 12-03 (LC15.500-15.530)**

GARLON 3A Garlon is 44.4% triclopyr, 55.6% "inerts"
The only herbicide information source listed by Public Works(PW) is Dow Agrosciences,
the manufacturer of Garlon.
Triclopyr is the "active" ingredient, and as such is the only chemical ingredient required
to be tested(except for acute toxicity tests)according to U.S. pesticide law.
The so-called "inert" ingredients listed are ethanol, triethylamine, and
EDTA(ethylenediamine tetraacetic acid). A FOIA lawsuit also revealed polyglycol as an
ingredient. Dow asserts it is a confidential chemical additive.

The Public Works document itself shows 4 items of noncompliance with 12-03
Noncompliance to Ordinance 12-03-----acknowledged by PW.

1. Garlon does not meet soil half-life limits in LC 15.510 (5) (a)
2. Ethanol a so-called "inert" ingredient is listed as carcinogenic by IARC (EPA 4B).
IARC is the International Agency for Research on Cancer.* (note EPA equivocation)

Noncompliance to Ordinance 12-03----- as reported in the PW document but not
highlighted as noncompliant

3. Garlon does not meet soil mobility level limits in section (5) (b)
4. Garlon does not comply to section (5) (e) but is listed as slightly toxic to aquatic
organisms on acute basis. What is meant by slightly toxic?

INDEPENDENT RESEARCH or research information from the EPA of Dow research
that differs from that offered by Public Works.

Soil Persistence

A field study in western Oregon found that triclopyr remained in soil for a year.¹

Soil Mobility (noncompliant with section 5(b))

According to the EPA, triclopyr is very mobile in soil.²

Water Contamination

Because triclopyr is very mobile in soil, as well as persistent, the EPA "believes this
chemical has the potential to leach to ground water."³ Indeed wells have been found to
be contaminated.⁴ A USGS study of 10 urban watershed streams near Seattle, found
triclopyr at 90 percent of the sites sampled.⁵

¹ Norris, L.A., M.L. Montgomery, and L.E. Warren. 1987. Triclopyr persistence in
western Oregon hill pastures. Bull. Environ. Contam. Toxicol. 39: 134-141.

² U.S. EPA. Prevention, Pesticides and Toxic Substances. 1998 Reregistration eligibility
decision (RED): Triclopyr. Wash. D.C., Oct. p. 62.

³ Ibid. p. 62-64.

⁴ Ibid.

⁵ U.S. Geological Survey. 1999. Pesticides detected in urban streams during rainstorms
and relations to retail sales of pesticides in King Co., WA USGS Fact Sheet 097-99
Tacoma WA, Apr.

**Comments on Lane County Public Works Permitted Products List 2006
As required in Lane County Ordinance 12-03 (LC15.500-15.530)**

MILESTONE Milestone is 40.6% aminopyralid and 59.4% "inerts". The only information source listed by Public Works(PW) is DOW Agrosciences. U.S. Pesticide Law only requires testing of the "active" ingredient (except for acute toxicity which is required for all ingredients). Dow has not revealed ingredients other than aminopyralid. Many so-called known "inerts" have detrimental health effects and have even been found to be toxic by the EPA and other government agencies.

Milestone's aminopyralid was issued conditional EPA registration on August 10, 2005. Therefore little is known about this herbicide other than the testing submitted by Dow in their application for registration to the EPA. (see Data Gaps, below)

The Public Works document shows 2 items of noncompliance with 12-03 Noncompliance to Ordinance 12-03 acknowledged by PW

1. Aminopyralid exceeds soil half-life limits in LC15.510(5)(a).

Noncompliance to Ordinance 12-03 ----- as reported in the PW document but not highlighted as noncompliant

2. Section 5(e) compliance concerning toxicity to fish, birds, bees, wildlife, or domestic animals is not met.

(3.) Also carcinogenicity classifications are not conclusive. See PW 4(a)i "Not likely to be carcinogenic to humans", and 4(a)ii "Probably not carcinogenic to humans"

This shows the uncertainty because of lack of more information by the EPA conditional status. (see Data Gaps, below)

(4.) While the EPA toxicity class IV is "Caution" for Milestone, aminopyralid is in the most toxic class I, "Danger". (4)(d).

INDEPENDENT RESEARCH ----- NONE

The only source of information is the Pesticide Fact Sheet issued by the U.S. Office of Prevention, Pesticides Environmental Protection and Toxic Substances detailing testing done by Dow and their contractors in 2004 and 2005.

Soil Persistence

According to Dow's own tests on 5 different soils, half-lives ranged from 31.5 days to 533.2 days

Water Persistence

Aminopyralid's half-life in water systems was listed as 462 to 990 days.

(over)

**HAC Comments on Permitted Products List
As per Lane Code 15.510 (3) (a)**

Habitat

The active ingredient is isopropylamine salt of imazapyr 28.7% with inert ingredients comprising the other 71.3%. The actual inert ingredients are not listed in the available Public Works documents.

Habitat **does not meet the soil half-life requirement of 30 days or less** as per Lane Code 15.510 (5)(a). Soil half-life is listed as 60-120 days with an average of 90 days.

The Habitat listing for Lane Code 15.510 (5)(e) is “EPA Classification: Practically Non-Toxic”, this does not fully address potential toxicity to fish, bees, wildlife or domestic animals”.

Research Findings

Human Effects: Imazapyr is corrosive to the eye and has been shown to “cause irreversible eye damage”¹. Herbicides with Imazapyr were shown to swelling and redness of the skin following single exposure^{2,3}.

Animal Studies: While not lethal at maximum doses, acute toxicity included congestion in lungs, liver, intestine and kidney of subject animals. Chronic toxicity had differential effects by sex of subject animals and included fluid accumulation in lungs, increased incidence of kidney cysts, and abnormal blood formation I the spleen⁴. Imazapyr is classified by the EPA as Class E, “evidence of non-carcinogenicity”⁵. However this classification does not address concerns raised in a two year feeding study of rats and mice where concerns were raised regarding the increased incidence of brain , adrenal and thyroid tumors⁶.

Soil Persistence: Persistence in soil varies from 60⁷to 436⁸ days with considerable variance based on regional factors such as climate, weather and soil type.

Effect on Non-Target Plants: The Fish and Wildlife Service has identified 100 counties in 24 Southeastern states where endangered species may be at risk⁹. No such data is available for the Pacific Northwest.

Water Contamination: Several studies have noted water contamination due to imazapyr’s mobility in soil. Imazapyr was found in groundwater following a non-aerial forestry application¹⁰. One field study found between 40 and 70 percent of applied Imazapyr leached down to the lowest depth tested, 45cm. No know studies have examined the effects of Imazapyr water contamination on Salmon habitat.

References:

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**HAC Comments on Permitted Products List
As per Lane Code 15.510 (3) (a)**

OUST EXTRA

The active ingredients in Oust Extra are sulfometuron methyl 56.25% and metsulfuron methyl 15%. The compounds comprising the 28.75% inert ingredients are not listed in the Public Works document.

Oust Extra **does not meet the soil half-life requirement of 30 days or less** as per Lane Code 15.510 (5) (a). **Soil half-life is listed as approximately 45 days** in the Public Works document.

Oust Extra **does not meet the requirement of “extremely low or very low mobility in soil”** as per Lane Code 15.510 (5) (b). The Public Works information lists Oust Extra as “moderately mobile in soil”.

Research Findings

Contamination of Water: Use of sulfometuron can result in water contamination. In the state of Washington¹ water contamination has damaged desirable aquatic vegetation. This was reported by the E.P.A. in other states². The effects of sulfometuron methyl contamination on Salmon habitat have not been studied directly however run-off from rights-of-way application in Tennessee by the state department of transportation resulted in fish kills³. It is unknown if Oust Extra is compliant with Lane Code 15.510 (5)(d) .

Persistence in Soil: While the half-life of Oust Extra in soil is listed as 45 days it can persist in soil at levels which preclude agricultural use for a period ranging from 12-24 months depending on the specific geographic region involved. The label for Oust state *“If non-crop or forested areas treated with Oust XP are to be converted to food, feed, or fiber agricultural crop, or to a horticultural crop, do not plant the treated sites for at least one year after the Oust XP application”*⁴. Field testing for residual contamination is recommended even after one year⁴.

Effects on Plant Species: The U.S.W. Fish and Wildlife Service in conjunction with the E.P.A., as required by the Endangered Species Act, evaluated potential impact on endangered species in right of way and ditch use of Oust on 25 endangered plant species in 13 states that occur on or near rights-of-way. This study concluded that “because of the limited population size of many of these plant species, a local spraying program could virtually destroy the entire species”⁵

Wind Transport: Sulfometuron methyl is extremely potent at low concentrations. A concentration of 0.1ppb in soil kills sugar beets⁶ and 0.06ppb in water has been shown to inhibit growth of a common aquatic plant⁷. Oust damage due to wind transport was reported in Franklin County Washington as a result of Oust application to over 700 miles of roadside by state and county crews. Subsequent damage from wind transport caused over one million dollars damage, including 300,000 young trees at one nursery⁸.

Carcinogenicity/Mutagenicity: Earlier studies in animals showed that sulfometuron can break down into saccharin. In these earlier studies it was noted that saccharin caused DNA damage in laboratory animals. However, IARC has downgraded saccharin from 2B, “possibly carcinogenic to humans”, to its present classification of 3, “not classifiable as to carcinogenicity in humans”^{1,9}.

An ingredient used in Oust, polyvinyl pyrrolidone has been shown to produce sarcomas in rats, mice and rabbits but it is classified by IARC as a 3, "not classifiable as to carcinogenicity in humans"¹⁰.

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