

## **APPENDICES**



## **APPENDIX A - PHOTO EXHIBIT**

Steam and Smoke .....	1
Culvert Maintenance .....	3
Time Lapse photos of shoulder vegetation:	
Site 1 plot, 1B, Infrared-4.....	4
Site 1 plot, 5B, Infrared-6.....	6
Site 1 plot, 5H, Infrared-4 .....	6
Site 1, plot 1D, Control .....	8
Site 1, plot 2D, Control .....	8
Site 2, plot F, Herbicide .....	10
Site 2, plot E, Infrared-6.....	10
Site 3, plot B, Infrared-8.....	12
Site 3, plot E, Infrared-4.....	14
Site 3, plot G, Mowing.....	14
Site 3, plot A, Herbicide.....	16
Site 3, plot D, Control .....	16



## View of Infrared Equipment

- Right – Operation maneuvering around a sight post obstacle. Moving such devices outside the treatment area would increase the efficiency of the operation.
- Lower – Steam from treatment of moist plants and soils. A small amount of moisture aids in the transfer of heat to the plant issues. Smoke particles may also be present if vegetation ignites.





**Culvert Maintenance**  
**Site 3, Milepost 28.41, Rust Road**

- Right – May 1999. Three culverts, visible but becoming covered by grass.
- Lower – July 1999. All three culvert openings are clear after five treatments. Note height and density of reed grass in untreated areas nearby. First four feet of shoulder is clear after eight treatments.



## Time Lapse Photos of Test Plots

<b>Plot:</b> Site 1, Plot 1B <b>Treatment:</b> Infrared, 4 treatments per year <b>Highway:</b> 238 @ MP 0.75, westbound shoulder	<b>Reported coverage (all Ir-4 plots):</b> <div style="display: flex; justify-content: space-around;"> <span>0% (5/10/97)</span> <span>0% (10/25/97)</span> </div> <div style="display: flex; justify-content: space-around;"> <span>1% (11/10/98)</span> <span>4% (11/8/99)</span> </div>
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**Top Row:**

- Photo 1 (11/16/96): Berry vines turn brown after 11/8/96 treatment.  
 Photo 2 (4/9/97): Vines begin to recede or decay after 3/9/97 and 4/5/97 treatments.  
 Photo 3 (5/10/97): Vines continue to recede after 4/14/97 treatment. Note herbicide-treated area in foreground.  
 Photo 4 (8/9/97): Vines rooted outside treated area begin to spread toward road after treatment stops.
- 

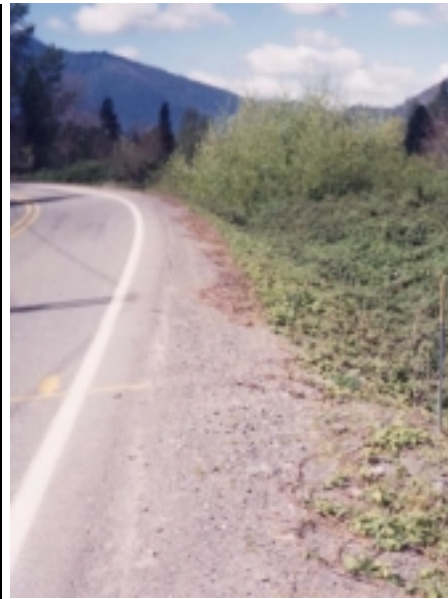
**Bottom Row:**

- Photo 5 (10/11/97): Vines continue to spread, some reaching road surface.  
 Photo 6 (11/8/97): Vegetation is eradicated after shoulder blading operation.  
 Photo 7 (8/5/98): Plot remains clear after shoulder blading and four treatments in 1998.  
 Photo 8 (12/17/98): Vines begin to spread slightly back towards road.





1. 11/16/96



2. 4/9/97



3. 5/10/97



4. 8/9/97

5. 10/11/97

6. 11/8/97

7. 8/5/98

8. 12/17/98



**Top Row:**

<b>Plot:</b> Site 1, Plot 5B	<b>Reported coverage (all Ir-6 plots):</b> 0% (5/10/97) 2.4% (11/8/99)
<b>Treatment:</b> Infrared, 6 treatments per year	
<b>Highway:</b> 238 @ MP 1.00, northbound shoulder	

Photo 1 (5/10/97): Vegetation condition near beginning of test. Last treatment was 5/3/97.

Photo 2 (11/1/99): Vegetation condition at end of test.

**Comments:** Sub-plot remained free of vegetation during entire test period.

**Bottom Row:**

<b>Plot:</b> Site 1, Plot 5H	<b>Reported coverage (all Ir-4 plots):</b>	
<b>Treatment:</b> Infrared, 4 treatments per year	0% (5/10/97)	0% (10/25/97)
<b>Highway:</b> 238 @ MP 0.25, southbound shoulder	1% (11/10/98)	4% (11/8/99)

Photo 1 (5/10/97): Vegetation condition near beginning of test.

Photo 2 (11/8/97): Vegetation condition at end of first year.

Photo 3 (12/17/98): Vegetation condition at end of second year.

Photo 4 (11/1/99): Vegetation condition at end of third and final year.

**Comments:** Vegetation remained consistently low during entire test period. The test plots appear to have missed the shoulder blading damage in 1997.

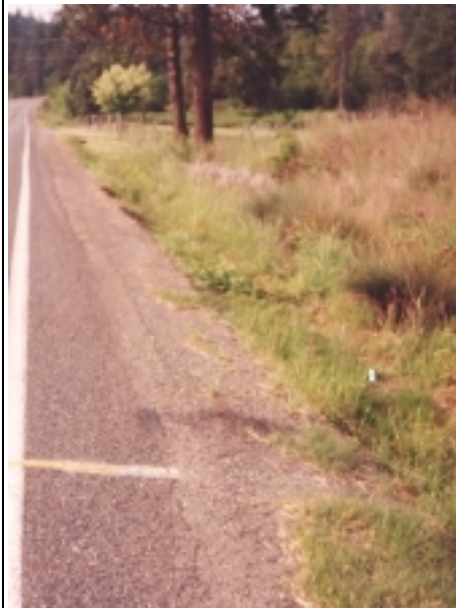


1. 5/10/97



2. 11/1/99

1. 5/10/97



2. 11/8/97



3. 12/17/97



4. 11/1/99



**Top Row:**

<b>Plot:</b> Site 1, Plot 1D	<b>Reported coverage (all control plots):</b>	
<b>Treatment:</b> Control	18% (3/8/97)	0.8% (10/25/97)
<b>Highway:</b> 238 @ MP 8.00, westbound shoulder	0.4 % (11/10/98)	13% (11/8/99)

Photo 1 (11/16/96): Shoulder is in good clean condition at beginning of test.

Photo 2 (10/11/97): Berry vines spread toward road.

Photo 3 (11/8/97): Vegetation is eradicated after shoulder blading operation.

Photo 4 (11/1/99): Two years later vines slowly spread back towards road.

**Bottom Row:**

<b>Plot:</b> Site 1, Plot 2D	<b>Reported coverage (all Ir-4 plots):</b>	
<b>Treatment:</b> Control	18% (3/8/97)	0.8% (10/25/97)
<b>Highway:</b> 238 @ MP 9.0, eastbound shoulder	0.4 % (11/10/98)	13% (11/8/99)

Photo 1 (11/16/96): Shoulder at beginning of test contains some grass and berry vines.

Photo 2 (10/11/97): Vegetation getting thicker.

Photo 3 (11/8/97): Vegetation is eradicated after shoulder blading operation.

Photo 4 (8/5/98): Vegetation returns nine months later. On 11/1/99 – 15 months later – vegetation remains relatively the same (photo not shown).



**Top Row (same page):**

<b>Plot:</b> Site 2, Plot F <b>Treatment:</b> Herbicide <b>Highway:</b> 226 @ MP 9.69, southbound shoulder	<b>Reported coverage (all herbicide plots):</b> 3% (11/2/99)
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Photo 1 (5/17/99): Before treatment.  
 Photo 2 (6/18/99): After treatment made on 6/2/99.  
 Photo 3 (10/29/99): Five months after treatment. Remaining dead foliage is not aesthetically pleasing.

**Bottom 2 Rows:**

<b>Plot:</b> Site 2, Plot E <b>Treatment:</b> Infrared, 6 treatments per year <b>Highway:</b> 226 @ MP 9.69, northbound shoulder	<b>Reported coverage (all Ir-6 plots):</b> 11% (11/3/98)      11% (11/2/99)
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Photo 1 (4/22/99): Before 1999 treatment.  
 Photo 2 (4/26/99): After one treatment made on 4/22/99.  
 Photo 3 (6/3/99): After three more treatments (4/30, 5/13, 5/27) vegetation is decaying.  
 Photo 4 (6/18/99): After one more treatment (6/10/99).  
 Photo 5 (7/26/99): One month after the last treatment on 6/23/99. Grass begins to recover.  
 Photo 6 (11/2/99): Four months after the last treatment. Grass is spreading.





1. 4/22/99



2. 4/26/99



3. 6/3/99

4. 6/18/99



5. 7/26/99



6. 11/2/99



<b>Plot:</b> Site 3, Plot B	<b>Reported coverage (all herbicide plots):</b>	
<b>Treatment:</b> Infrared, 8 treatments per year	9% (6/30/98)	58% (10/27/98)
<b>Highway:</b> 229 @ MP 28.41, westbound shoulder	7% (7/20/99)	30% (10/12/99)

Photo 1 (6/9/98): Just prior to 8<sup>th</sup> treatment. Equipment is in background. Plot was treated 7 times previously from 3/9/98 to 5/20/98.  
 Photo 2 (6/9/98): Just after the 8<sup>th</sup> and last treatment for 1998.  
 Photo 3 (7/22/98): Grass begins to reappear six weeks later. Coverage is 9%.

Photo 4 (11/10/98): Four months later coverage has increased to 58%.  
 Photo 5 (4/21/99): Vegetation still appears green just 30 minutes after first treatment in 1999.  
 Photo 6 (4/26/99): The effect of the 4/21/99 treatment is more apparent five days later.

Photo 7 (5/21/99): After two more treatments (4/30, 5/12) there are little signs of growth.  
 Photo 8 (5/24/99): Three days later, green recovers.  
 Photo 9 (6/3/99): Treatments on 5/27, 6/2 have eradicated the grass.  
 Photo 10 (7/30/99): After three more treatments (6/10, 6/24, 6/30) and one month growth, the coverage is at 7% on 7/20/99.







4. 11/10/98



5. 4/21/99



6. 4/26/99

7. 5/21/99



8. 5/24/99



9. 6/3/99



10. 7/30/99



**Top Row:**

<b>Plot:</b> Site 3, Plot E	<b>Reported coverage (all Ir-4 plots):</b>	
<b>Treatment:</b> Infrared 4 treatments per year	17% (6/30/98)	40% (10/27/98)
<b>Highway:</b> 229 @ MP 29.38, westbound shoulder	9% (7/20/99)	27% (10/12/99)

- Photo 1 (6/22/98): After all four treatments (last on 6/9/98) some green is visible.  
 Photo 2 (7/13/98): Four weeks later the weeds return.  
 Photo 3 (5/21/99): Next season after one treatment on 5/12/99.  
 Photo 4 (6/3/99): After another treatment on 5/27/99.  
 Photo 5 (7/30/99): After two more treatments (6/10, 6/24) and five weeks later, the vegetation coverage is at 9%, an improvement over the previous year of 17%.

**Bottom Row:**

<b>Plot:</b> Site 3, Plot G	<b>Reported coverage (all mow plots):</b>	
<b>Treatment:</b> Mowing	24% (6/30/98)	37% (10/27/98)
<b>Highway:</b> 229 @ MP 30.6, eastbound shoulder	43% (7/20/99)	34% (10/12/99)

- Photo 1 (6/16/98): Typical mowed test plot.  
 Photo 2 (11/10/98): Typical mowed test plot.



1. 6/22/98



2. 7/13/98



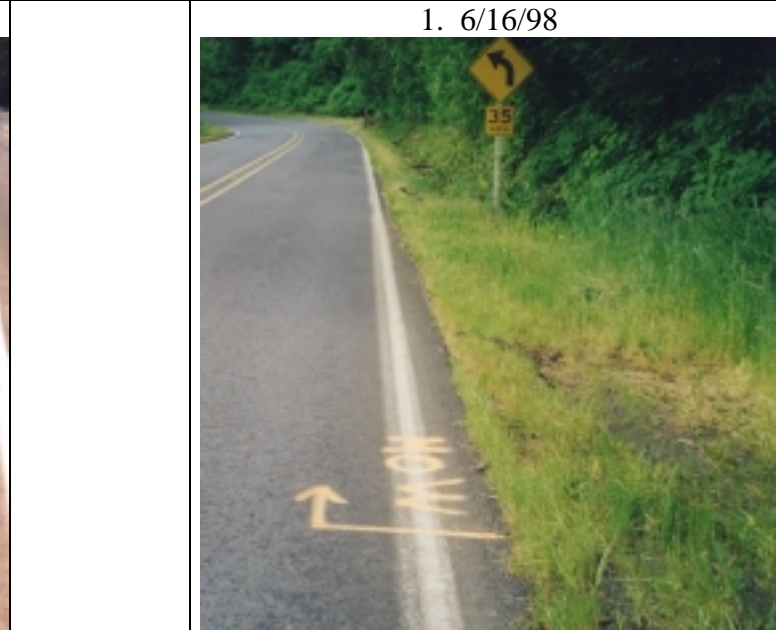
3. 5/21/99



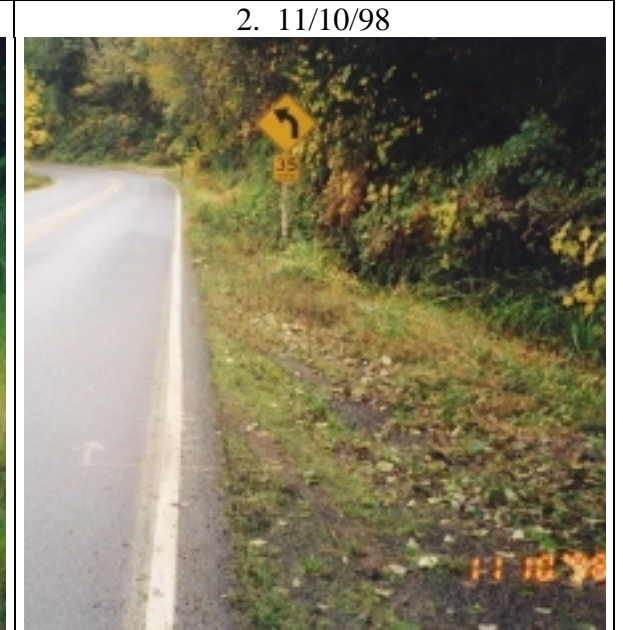
4. 6/3/99



5. 7/30/99



1. 6/16/98



2. 11/10/98

**Top Row:**

<b>Plot:</b> Site 3, Plot A	<b>Reported coverage (all herbicide plots):</b>	
<b>Treatment:</b> Herbicide	6% (7/20/99)	9% (10/12/99)
<b>Highway:</b> 229 @ MP 28.41, westbound shoulder		

Photo 1 (5/21/99): Two weeks after treatment made on 5/6/99.

Photo 2 (6/3/99): One month after treatment.

Photo 3 (7/30/99): Two months after treatment.

**Comments:** The photos show little change in appearance two weeks to two months after the herbicide treatment. Although there is significant foliage, most of it is dead and not included in the evaluated count. While the herbicide treatment may control the vegetation, the remaining dead foliage may not provide an aesthetically pleasing appearance.

**Bottom Row:**

<b>Plot:</b> Site 3, Plot D	<b>Reported coverage (all control plots):</b>	
<b>Treatment:</b> Control	28% (7/20/99)	33% (10/12/99)
<b>Highway:</b> 229 @ MP 29.00, westbound shoulder		

Photo 1 (5/10/99): Grass is still green on this date. Note the beginning of an infrared treatment (treated 4/40/99) is shown in the foreground.

Photo 2 (7/30/99): Grass has dried and vinca is flowering.

**Comments:** Control plots averaged 28% to 44% coverage through the test period.



1. 5/21/99



2. 6/3/99



3. 7/30/99

1. 5/10/99



2. 7/30/99





**APPENDIX B - ROADSIDE VEGETATION FOUND ON  
SHOULDER OF SITE 1 IN 1996**





**Roadside Vegetation Found on Shoulder of Site 1 in 1996**

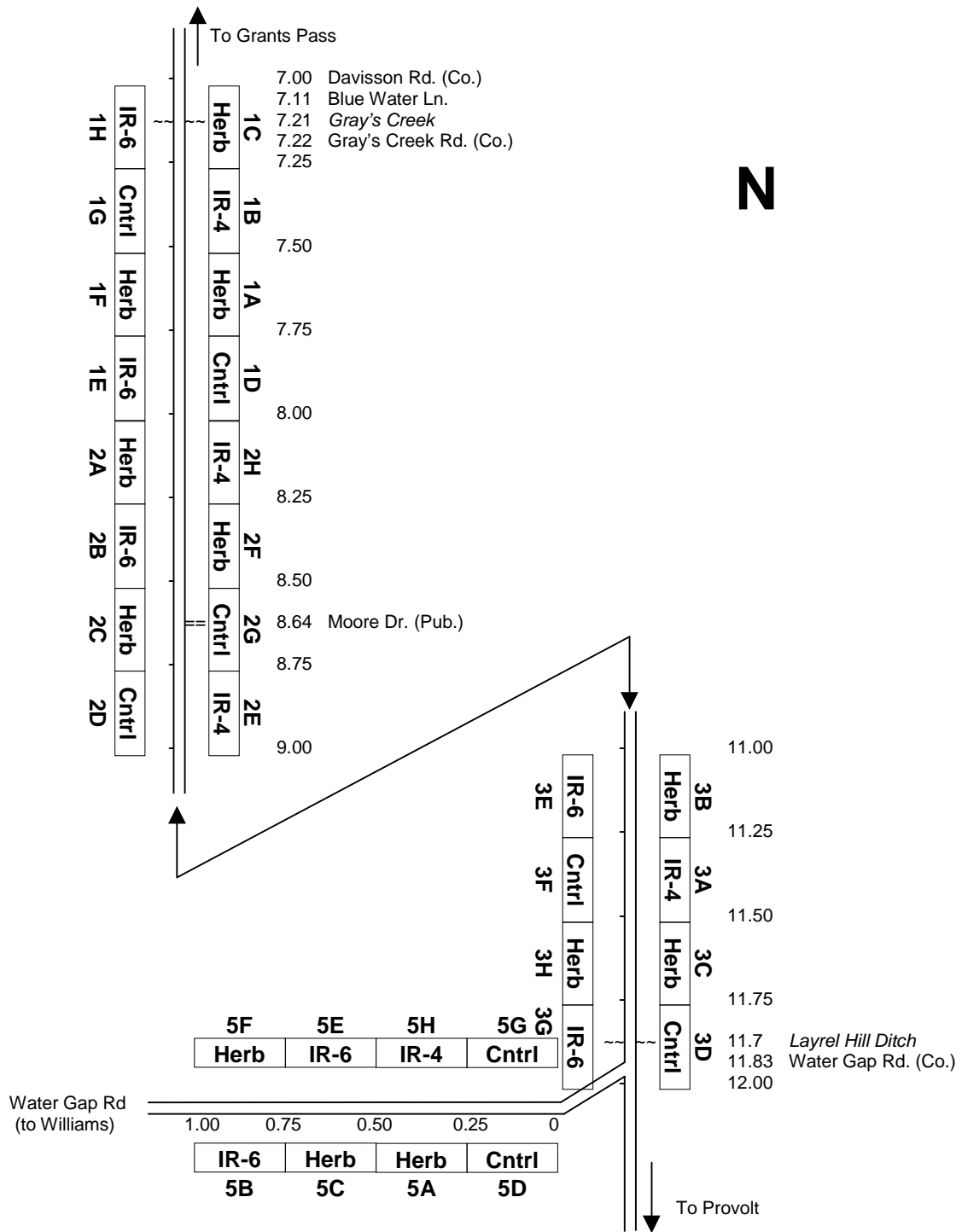
Type	Scientific Name	Common Name
Grasses	Avena fatua Bromus tectorum Hordeum jubatum Muhlenbergia spp Phalaris spp Poa bulbosa Poa agassizensis Phleum pratense Taeniatherum asperum Vulpia spp	Wild oats Cheatgrass, downey brome Foxtail barley  Reedgrass Bulbous bluegrass Kentucky bluegrass Timothy grass Medusahead Annual fescue
Forbs	Amsinckia spp Boraginaceae Brassica spp. Cardaria draba Centaurea cyanus Centaurea maculosa * Centaurea solstitialis * Chenopodium spp Cirsium arvense * Daucus carota Dipsacus silvestris Epilobium spp. Eschscholtzia californica Erodium spp Lactuca serriola Lamium purpureum Lathyrus tingitanus Matricaria matricarioides Montia parviflora Plantago lanceolata Rumex spp. Senecio jacobea Conchus spp Taraxacum officinale Tragopogon porrifolius Typha latifolia Trifolium pratense Urtica spp. Verbascum thapsus Vicia sativa Vicia villosa Lupinus spp.	Fiddleneck Borage Mustard White top Bachelor button Spotted knapweed * Yellow starthistle * Lamb's quarters Canadian thistle * Queen Anne's lace Teasel Fireweed California poppy Filaree Prickly lettuce Red dead nettle Sweet pea Pineapple weed Miner's lettuce Lance-leaf, english plantain Tansy ragwort * Dock, sorrel Sow thistle Dandelion Purple salsify Cat-tail Red clover Nettle Commun mullein Common vetch Hairy vetch Lupine
Ferns and fern-like	Equisetum arvense * Polystichum munitum Pteridium aquilinum	Giant horsetail * Western swordfern bracken
Woody vines, shrubs and trees	Acer spp. Artemisia douglastana Calocedrus decurrens Cytisus scoparius * Populus spp. Rosa spp. Rubus procerus Salix spp. Symphoricarpos albus Toxicodendron diversilobum Vinca major	Maple Mugwort Incense cedar Scotch broom * Cottonwood Wild rose Himalayan blackberry Willow Snowberry Poison oak Greater periwinkle

\* = Found on Oregon's Noxious Weed List (see Appendix)



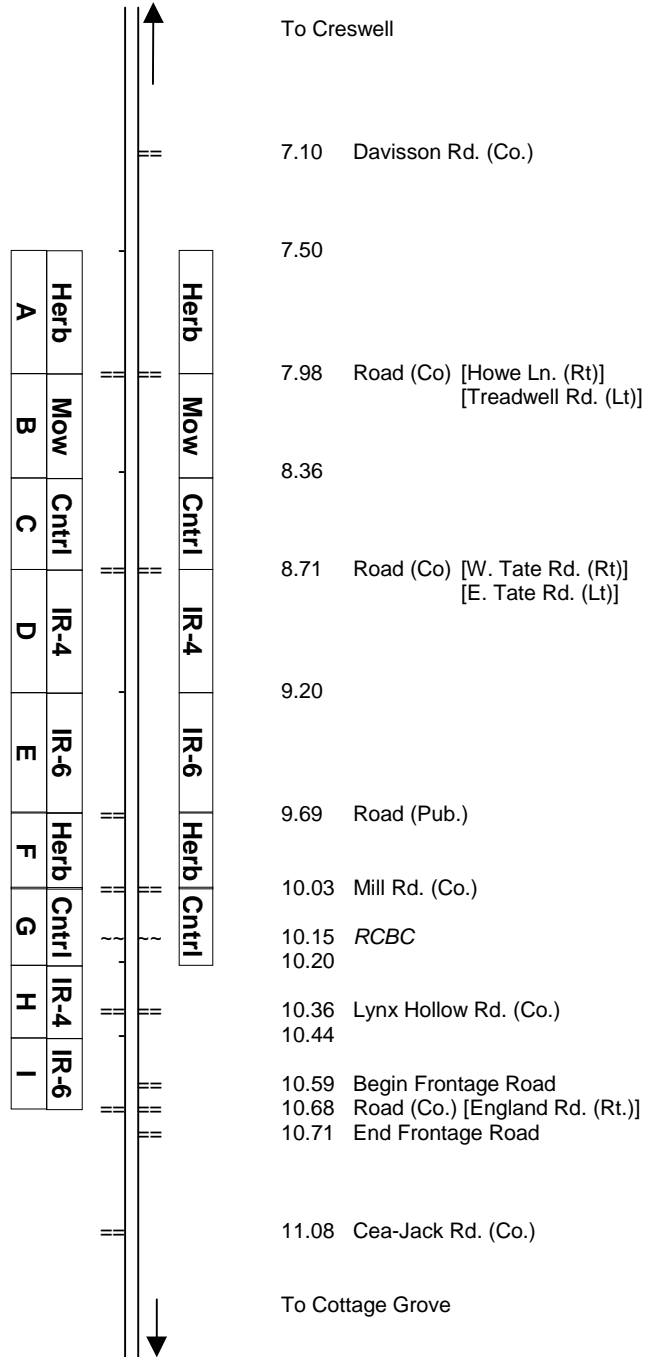
## **APPENDIX C -STRAIGHT LINE PLOT MAPS**





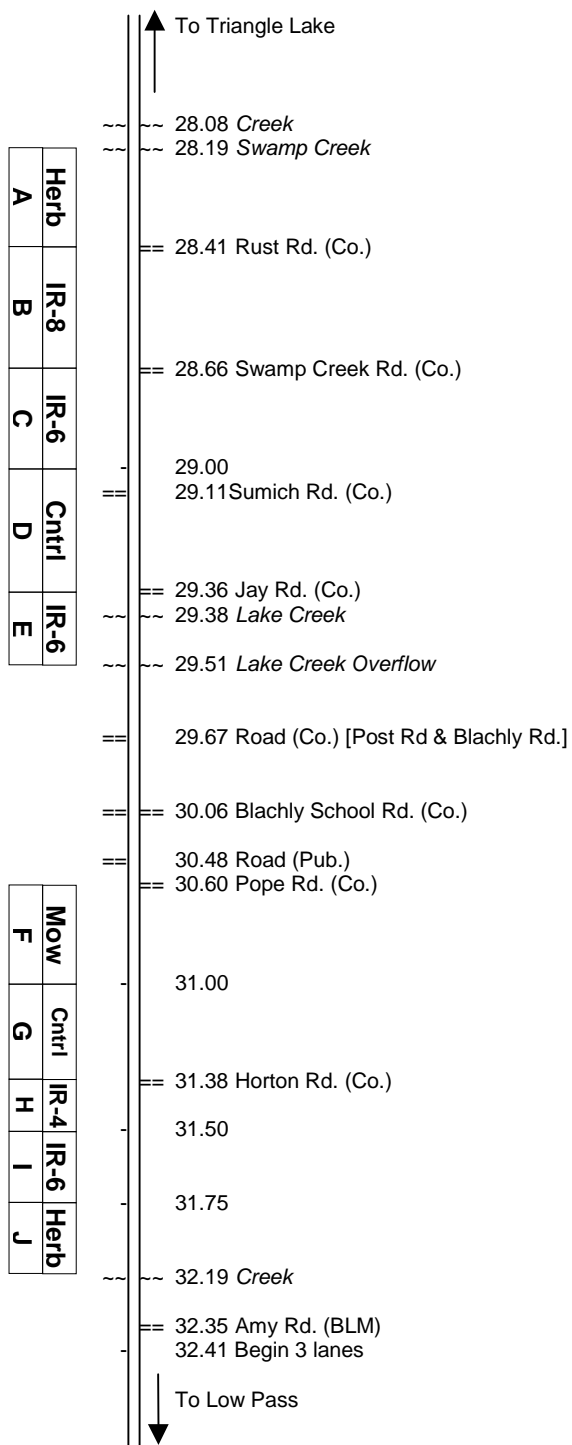
**Table 1 - Straight Line Plot Map: Jacksonville Highway No. 272**

**N**



**Table 2 - Straight Line Map: Goshen Divide Highway No 226**

**N**



**Table 3 - Straight Line Map: Mapleton – Junction City Highway No 229**





## **APPENDIX D -EVALUATION INSTRUCTIONS**



## Instructions for Evaluating Infrared Study Test Plots

1. At each painted reference point on the pavement (100 foot intervals), position tape as follows:

Offset -2: Position tape 2 feet back in milepoint from painted reference point

Offset -1: Position tape 1 feet back in milepoint from painted reference point

Offset 0: Position tape at painted reference point

Offset 1: Position tape 1 feet forwards in milepoint from painted reference point

Offset 2: Position tape 1 feet forwards in milepoint from painted reference point

Note: Offset will be determined on a random basis.

2. Place tape perpendicular to the highway, with the "0" cm marking of tape at edge of pavement.
3. Record all vegetation in contact with one edge of tape between the 15 and 60 cm markings. Either edge may be used as the reference.
4. Complete form as follows:

Cover: Record the total length of vegetation, in centimeters, touching one edge of the tape. For example, if 3 broadleaf's span 10 mm, 20 mm and 24 mm of the tape then record 5.4 cm under broadleaf's. For vegetation that branches out over the top of the tape, record the area that is projected downward to the tape

Height: Record average height of vegetation by type (broadleaf, grass, sedge).

Annual/Perennial: Place a check mark under the "A" or "P" if these type of species touches one edge of the tape.

Comments: Record any helpful remarks such as (1) common species, (2) species that have originated from outside the treated area and encroached into the evaluation area, or (3) shoulder damage caused by vehicles or weather that may have affected vegetation growth.

Questions regarding these instructions may be directed to Dave Humphrey at 986-3010 or Rob Edgar at 986-2846.



Example 1: Measurement shows 4cm of grass, 3cm high, representing a coverage of 9% (4cm coverage out of 45cm total). Note bare conditions in surrounding area. This measurement appears to over-estimate the surrounding area.

Right edge of measuring frame (“0” cm reference mark) is placed at the edge of pavement. Measurement begins 15cm from the right and ends at 60 cm (near left end of measuring frame) Total measured area is 45cm. Reference: site 3, MP29.38 + 500S on 10/12/99.

Example 2: Measurement shows 0.8cm of grass, 4cm high, representing 2% coverage. The measurement appears to under-estimate the surrounding area. Reference: site 3, MP29.38 + 150S on 10/12/99.





Example 3: Measurement shows 23cm of broadleaf, 11cm high, representing 51% coverage. Note dried dead grass that is not included in the measurement. Reference: site 3, MP29.11 + 100S on 10/12/99.



Example 4: Measurement shows 5cm of grass (11cm high) and 19 cm broadleaf (5cm high), representing 53% coverage. Note first 15 cm on right near road is not measured. Reference: site 3, MP29.51 + 140S on 10/12/99.



## **APPENDIX E - NOXIOUS WEED LIST**





STATE OF OREGON NOXIOUS WEED LIST

'A' RATED NOXIOUS WEEDS

('A' designated weed- a weed of known economic importance which occurs in the state in small enough infestations to make eradication/containment possible: or is not known to occur, but its presence in neighboring states make future occurrence in Oregon seem imminent.)

Table with 2 columns: Scientific Name and Common Name. Lists various weeds such as Aegilops ovata, Carthamus lanatus, and Centaurea virgata.

'B' DESIGNATED WEEDS

('B' designated weed - a weed of economic importance which is regionally abundant, but which may have limited distribution in some counties.)

Table with 2 columns: Scientific Name and Common Name. Lists weeds such as Abutilon theophrasti, Acaena novae-zelandiae, and Cardaria spp.

*Carduus nutans*.....Musk thistle  
*Carduus pycnocephalus*.....Italian thistle  
*Carduus tenuiflorus*.....Slender-flowered thistle  
*Centaurea diffusa*.....Diffuse knapweed  
*Centaurea maculosa*.....Spotted knapweed  
*Centaurea pratensis*.....Meadow knapweed  
*Centaurea repens*.....Russian knapweed  
*Centaurea solstitialis*.....Yellow starthistle  
*Chondrilla juncea*.....Rush skeletonweed  
*Cirsium arvense*.....Canada thistle  
*Cirsium vulgare*.....Bull thistle  
*Conium maculatum*.....Poison hemlock  
*Convolvulus arvensis*.....Field bindweed  
*Cuscuta* spp.....Dodder  
*Cynoglossum officinale*.....Houndstongue  
*Cyperus esculentus*.....Yellow nutsedge  
*Cytisus monspessulanus*.....French broom  
*Cytisus scoparius*.....Scotch broom  
*Cytisus striatus*.....Portugese broom  
*Elodea densa*.....South American waterweed (Elodea)  
*Equisetum arvense*.....Western horsetail  
*Equisetum telmateia*.....Giant horsetail  
*Euphorbia esula*.....Leafy spurge  
*Halogeton glomeratus*.....Halogeton  
*Hemizonia pungens*.....Spikeweed  
*Hypericum perforatum*.....St. Johnswort (Klamath weed)  
*Isatis tinctoria*.....Dyers woad  
*Kochia scoparia*.....Kochia  
*Lepidium latifolium*.....Perennial Pepperweed  
*Linaria dalmatica*.....Dalmatian Toadflax  
*Linaria vulgaris*.....Yellow toadflax  
*Lythrum salicaria*.....Purple loosestrife  
*Myriophyllum spicatum*.....Eurasian watermilfoil  
*Onopordum acanthium*.....Scotch thistle  
*Panicum milicaeum*.....Wild proso millet  
*Polygonum cuspidatum*.....Japanese knotweed (Fleece flower)  
*Polygonum polystachyum*.....Himalayan knotweed  
*Polygonum sachalinense*.....Giant knotweed  
*Potentilla recta*.....Sulfur cinquefoil  
*Rorippa sylvestris*.....Creeping yellow cress  
*Salvia aethiopis*.....Mediterranean sage  
*Spartina patens*.....Spartina  
*Spartium junceum*.....Spanish broom  
*Senecio jacobaea*.....Tansy ragwort  
*Silybum marianum*.....Milk thistle  
*Solanum rostratum*.....Buffaloburr  
*Sorghum halepense*.....Johnsongrass  
*Sphaerophysa salsula*.....Austrian peaweed (Swainsonpea)  
*Taeniatherum caput-medusae*.....Medusahead rye  
*Tribulus terrestris*.....Puncturevine  
*Ulex europaeus*.....Gorse  
*Xanthium spinsosum*.....Spiny cocklebur

## TARGET WEED LIST

*(Target Weed - a priority noxious weed designated by the State Weed Board as a target weed species on which the Department will implement a statewide management plan.)*

Carthamus lanatus.....Woolly distaff thistle  
Centaurea solstitialis.....Yellow starthistle  
Centaurea virgata.....Squarrose knapweed  
Chondrilla juncea.....Rush skeltonweed  
Euphorbia esuls.....Leafy spurge  
Senecio jacobaea.....Tansy ragwort  
Ulex europaeus..... Gorse

Current as of 1/1/96



**APPENDIX F - SPECIFICATIONS FOR INFRARED  
VEGETATION TREATMENT**



## Specifications for Infrared Vegetation Treatment

**1. Scope:** This work consists of treating vegetation along highway shoulders using infrared radiant energy to control the growth of vegetation and spread of noxious weeds.

This work is part of a research study. The study, which is under separate contract, will monitor the vegetation growth to determine the effectiveness of the infrared treatment.

**2. Method of treatment:** Infrared radiant energy shall be the only method used to treat the vegetation. The energy radiated to the vegetation shall be sufficient to damage the plant cells and reduce the vegetation growth rate.

**3. Equipment:** The equipment shall:

- use infrared radiant energy to treat the vegetation
- treat at least a 1.2 meter (4 foot) width per single pass
- operate at speeds no less than 4 kilometers per hour (2.5 mph) average
- for research purposes, provide a means to measure the infrared energy output
- produce no or little combustion of the treated vegetation

**4. Treatment area:** The infrared equipment shall treat the vegetation along the roadway shoulder and cover a 1.22 meter (4 foot) minimum width. The edge of the treatment area shall start where vegetation is first present, but no more than 0.46 meter (18 inches) from the edge of pavement. Where guardrail is present, the treatment area shall start where vegetation is first present past the guardrail posts, but no more than 0.5 meter from the post. Treatment beyond 1.68 meters (5.5 feet) from paved shoulder or guardrail post is not required.

The treatment area may be reduced where fixed obstructions prevent a full width treatment.

**5. Fire control:** Adequate measures shall be taken to prevent or control the combustion of any material ignited by the equipment. If ignition occurs, adequate equipment shall be present to completely extinguish the material.

**6. Traffic control:** All traffic control shall comply with the Departments “Traffic Control on State Highways for Short Term Work Zones.”

Traffic control will be provided by the Department providing the work progresses at speeds of no less than 4 kilometers per hour (2.5 mph). In addition, reasonable time delays will be allowed for equipment setup, adjustment, refueling and minor repair. The contractor shall provide for the traffic control at all other times.

**7. Research data:** A report shall be provided to the Project Manager following each treatment showing the quantity of infrared energy applied within each section. Acceptable data includes quantity of fuel used with fuel type, kilowatt hours, therms, Btu or joules. The data shall include the efficiency of the infrared unit (e.g. energy input vs. energy directed to treated surface).

**8. Treatment site and schedule:** The treatment site and schedule are identified in Table 1.

Schedules will vary according to weather conditions and vegetation growth within the test site. The treatment shall be performed within a 7-calendar day period as recommended by the contractor and approved by the Project Manager. The contractor shall notify the Project Manager at least one week in advance of the 7-day period.

**10. Measure:** Payment to mobilize workers, equipment and materials to each site will be made each time the Project Manager directs the contractor to perform a treatment at each of the sites shown above. One or more sections may be treated at the site for each mobilization.

Payment to treat the road shoulder vegetation will be made on a linear basis as measured longitudinally with the roadway and as accepted by the Project Manager. Acceptance of work will be by visual inspection 1 to 14 days following the treatment.

**11. Payment:** Payment for furnishing all labor, equipment, materials and doing all work called for by these specifications and contract provisions will be made at the contract amounts for the following pay items:

<u>Item No</u>	<u>Payment Item</u>	<u>Unit of Measurement</u>
(1)	Mobilization – site 1	each
(2)	Mobilization – site 2	each
(3)	Mobilization – site 3	each
(4)	Infrared treatment - site 1	meter
(5)	Infrared treatment - site 2	meter
(6)	Infrared treatment - site 3	meter

Payment items (1) through (3) above will comprise of full payment to mobilize workers, equipment and material to each site, costs to set up equipment and de-mobilize.

Payment items (4) through (6) above will comprise of full payment to treat one meter of shoulder area.

All other work necessary to perform the infrared treatment as specified above will be considered incidental. There will be no separate payment for traffic control work and incidental items, it being understood these costs will be included in the payment items listed above.



Oregon Department of Transportation  
 Research Unit  
 200 Hawthorne SE, Suite B-240  
 Salem, OR 97310  
 ATTN: Rob Edgar  
 Phone: (503) 986-2846 or 986-2700  
 Fax: (503) 986-2844

**REQUEST FOR QUOTATIONS  
 ITEM LIST**

Closing date: **9:00AM, 4/24/98**

*Note: Quotes must be received at the address by this time and date to be eligible. Late submittals will be considered non-responsive.*

**Project: Infrared Vegetation Treatment**

ITEM NO.:	PAYMENT ITEM: (see attached specifications)	UNIT OF MEASURE:	QUANTITY:	UNIT PRICE:	TOTAL PRICE:
1.	Mobilization – site 1	Each	12		
2.	Mobilization – site 2	Each	11		
3.	Mobilization – site 3	Each	11		
4.	Infrared treatment – site 1	Meter	30,706		
5.	Infrared treatment – site 2	Meter	32,992		
6.	Infrared treatment – site 3	Meter	34,601		

**THIS BID MUST BE SIGNED IN INK BY AN AUTHORIZED REPRESENTATIVE OF THE BIDDER; ANY ALTERATIONS OR ERASURES TO THE BID MUST BE INITIALED IN INK BY THE UNDERSIGNED AUTHORIZED REPRESENTATIVE.** The undersigned agrees and certifies that he/she; 1. has read and understands all bid instructions, specifications, and terms and conditions contained herein (Including the attachments listed in this document. 2. Is an authorized representative of the bidder, that the information provided in this bid is true and accurate, and that providing incorrect or incomplete information may be cause for bid rejection or contract termination. 3. Is bound by and will comply with all requirements, specifications, and terms and conditions contained herein; and 4. Will furnish the designated item(s) and/or services in accordance with the bid and the contract. ***I, the undersigned, agree to be bound by the form of agreement and all remaining contract documents, including instruction to Bidders, Standard Terms and Conditions, Special conditions, Federal Provisions, if applicable; specifications.***

<b>Company Name:</b>	<b>Address:</b>
<b>City:</b>	<b>State:</b> <b>Zip:</b>
<b>Phone:</b>	<b>Fax:</b>
<b>Bidder Name: (please print)</b>	<b>Signature:</b> <b>Date:</b>



## **APPENDIX G - FIRE PROTECTION STATUTES AND RULES**

*Note: This appendix contains excerpts of the Oregon Revised Statutes that may be of interest to potential users of infrared treatment devices. It does not contain all the applicable rules and regulations pertaining to fire hazards. Additional statutes can be found at <http://landru.leg.state.or.us/ors/>*



**EXCERPTS TO CHAPTER 477 OF  
THE OREGON REVISED STATUTES  
1999 EDITION  
Fire Protection of Forests and Vegetation**

**GENERAL PROVISIONS**

**477.001 Definitions.** As used in this chapter, unless the context otherwise requires:

- (1) "Additional fire hazard" means a hazard that has been determined to exist by the forester pursuant to ORS 477.580.
- (2) "Board" means the State Board of Forestry.
- (3) "Campfire" means any open fire used for cooking, personal warmth, lighting, ceremonial or aesthetic purposes that is hand built and that is not associated with any debris disposal activities.
- (4) "Department" means the State Forestry Department.
- (5) "District" means a forest protection district organized under ORS 477.225.
- (6) "Every reasonable effort" means the use of the reasonably available personnel and equipment under the supervision and control of an owner or operator usually and customarily used in the forest industry to fight fire, which are needed to fight the fire and which can be brought to bear on the fire in a timely fashion.
- (7) "Fire season" means a period designated pursuant to ORS 477.505.
- (8) "Fiscal year" means the period beginning on July 1 of any year and ending on June 30 of the next year.
- (9) "Forestland" means any woodland, brushland, timberland, grazing land or clearing that, during any time of the year, contains enough forest growth, slashing or vegetation to constitute, in the judgment of the forester, a fire hazard, regardless of how the land is zoned or taxed. As used in this subsection, "clearing" means any grassland, improved area, lake, meadow, mechanically or manually cleared area, road, rocky area, stream or other similar forestland opening that is surrounded by or contiguous to forestland and that has been included in areas classified as forestland under ORS 526.305 to 526.370.
- (10) "Forest patrol assessment" means the costs levied and assessed under ORS 477.270.
- (11) "Forest protective association" or "association" means an association, group or agency composed of owners of forestlands, organized for the purpose of protecting such forestlands from fire.
- (12) "Forest resource" means the various types of vegetation normally growing on Oregon's forestland, the associated harvested products and the associated residue, including but not limited to brush, grass, logs, saplings, seedlings, trees and slashing.
- (13) "Forester" means the State Forester or authorized representative.
- (14) "Governing body" of a county means the county court or board of county commissioners.
- (15) "Grazing land" is defined by ORS 477.205.
- (16) "Open fire" means any outdoor fire that occurs in such a manner that combustion air is not effectively controlled and combustion products are not effectively vented through a stack or chimney.
- (17) "Operation" means any industrial activity, any development or any improvement on forestland inside or within one-eighth of one mile of a forest protection district, including but not limited to the harvesting of forest tree species, the clearing of land, the use of power-driven machinery and the use of fire, excluding, however, the culture and harvesting of agricultural crops.
- (18) "Operation area" means the area on which an operation is being conducted and the area on which operation activity may have resulted in the ignition of a fire.
- (19) "Operation in progress" means that time when workers are on an operation area for the purpose of an operation, including the period of time when fire watches are required to be on the operation area pursuant to ORS 477.665.
- (20) "Operator" means any person who, either personally or through employees, agents, representatives or contractors, is carrying on or has carried on any operation.
- (21) "Owner" means an individual, a combination of individuals, a partnership, a corporation, the State of Oregon or a political subdivision thereof, or an association of any nature that holds an ownership interest in land.

- (22) "Political subdivision" includes, but is not limited to, counties, cities and special districts.
- (23) "Rangeland" is defined by ORS 477.315.
- (24) "Routine road maintenance" is defined by ORS 477.625.
- (25) "Side" means any single unit of a logging operation employing power-driven machinery.
- (26) "Slashing" means the forest debris or refuse on any forestland resulting from the cutting, killing, pruning, severing or removal of brush, trees or other forest growth.
- (27) "State Forester" means the person appointed State Forester pursuant to ORS 526.031 or the person serving in the position on an interim or delegated basis.
- (28) "Summit of the Cascade Mountains" is considered to be a line beginning at the intersection of the northern boundary of the State of Oregon and the western boundary of Wasco County; thence southerly along the western boundaries of Wasco, Jefferson, Deschutes and Klamath Counties to the southern boundary of the State of Oregon.
- (29) "Timberland" is defined by ORS 477.205.
- (30) "Warden" means a fire warden appointed under ORS 477.355. [1959 c.363 s.2 (enacted in lieu of 477.002); 1961 c.603 s.1; 1965 c.253 s.44; 1967 c.429 s.34; 1973 c.46 s.1; 1983 c.22 s.1; 1985 c.759 s.32; 1997 c.274 s.1; 1999 c.59 s.156; 1999 c.355 s.2]

**477.005 Policy.** (1) The preservation of the forests and the conservation of the forest resources through the prevention and suppression of forest fires hereby are declared to be the public policy of the State of Oregon.

(2) In order to accomplish the purposes of the policy stated in this section:

(a) The need for a complete and coordinated forest protection system is acknowledged and the primary mission of the State Forestry Department in such a system is protecting forest resources, second only to saving lives. Structural protection, though indirect, shall not inhibit protection of forest resources; and

(b) This chapter shall include all persons and activities designated in this chapter, irrespective as to whether or not such person or activity is concerned with the harvesting, cutting, removal or marketing of trees, timber or other forest products. [Formerly 477.022; amended by 1965 c.253 s.45; 1989 c.615 s.5]

## **FOREST PROTECTION DISTRICTS**

**477.205 Definitions for ORS 477.205 to 477.281.** As used in ORS 477.205 to 477.281, unless the context requires otherwise:

(1) "Grazing land" means forestland, within a forest protection district, that has been classified as Class 3, agricultural class, as provided by ORS 526.305 to 526.370.

(2) "Timberland" means forestland, within a forest protection district, that has not been classified as Class 3, agricultural class, under ORS 526.305 to 526.370. [1965 c.253 s.56]

**477.210 Duty of owner to protect forestland; forester's duty to provide protection upon noncompliance.** (1)

During the season of the year when there is danger of fire, every owner of forestland shall provide adequate protection against the starting or spread of fire thereon or therefrom, which protection shall meet with the approval of the State Board of Forestry.

(2) Subsection (1) of this section is considered to have been complied with if, on January 1 of each year, the owner (a) files with the forester a bona fide forest protection plan which meets with the approval of the board, or (b) is a member in good standing in a forest protective association maintaining a standard of protection approved by the board. The forester shall make periodic inspections of the protection facilities provided in order to ascertain compliance by the owner.

(3) In case any owner of forestland shall fail or neglect to file such a fire plan or maintain the standard of protection approved by the board, either through compliance with the fire plan or membership in an approved association, then the forester under the direction of the board shall provide forest protection pursuant to ORS 477.205 to 477.281.

(4) The forester shall provide protection pursuant to ORS 477.205 to 477.281 for forestland owned by the state or by a political subdivision located within a forest protection district, unless adequate protection as required by this section is otherwise provided. [Formerly 477.024]

**477.220 Lands not provided protection; lands not included within ORS 477.205 to 477.281.** (1) The forester is not required to provide protection for forestland that is either a small parcel or a tract isolated from a forest protection district and which land is found by the forester as not practicable to be included in a forest patrol system.

(2) ORS 477.205 to 477.281 do not apply to federal grazing land or federal timberland within this state for which adequate protection is provided unless the lands have been included within the boundaries of a forest protection district pursuant to a cooperative agreement with the federal government approved by the State Board of Forestry.

(3) Upon written request of the owner of lands which have been incorporated within a rural fire protection district, the forester shall determine whether such lands, or any part thereof, are forestland; thereafter, those lands which have been so determined shall be included within ORS 477.205 to 477.281 unless excluded pursuant to subsection (1) of this section. [Formerly 477.053]

**477.225 Establishment and change of forest protection districts.** The State Forester, by rule, shall designate areas of forestland within this state as forest protection districts within which the forester is required to provide protection pursuant to this chapter. In establishing new boundaries or changes in boundaries of the districts, the State Forester may, for the purposes of administrative convenience, designate mountain ranges, rivers, streams, roads or other recognizable landmarks as boundaries. Boundaries may be established or changed only after a public hearing. [Formerly 477.026; 1997 c.274 s.4]

## **FIRE PREVENTION**

### **(Fire Seasons)**

**477.505 State Forester may declare fire season in district.** (1) When conditions of fire hazard exist in a forest protection district or any part thereof, the State Forester may designate for that district or any part thereof the date of the beginning of a fire season for that year. The fire season shall continue for that district or part thereof until ended by order of the State Forester when conditions of fire hazard no longer exist in that district or part thereof.

(2) The State Forester may, during the same year and for the same district under circumstances similar to those described in subsection (1) of this section, designate one or more subsequent fire seasons. [1965 c.253 s.93; 1969 c.204 s.3; 1997 c.274 s.10]

**477.510 Acts prohibited during fire season.** It is unlawful, during a fire season inside or within one-eighth of one mile of a forest protection district, to:

- (1) Smoke while working in or traveling through any operation area.
- (2) Use fuse and caps for blasting unless approval is granted by the forester. [Formerly 477.165; 1997 c.274 s.11]

### **(Permits)**

**477.515 Permits required for fires on forestlands; waiver; permit conditions; cooperative agreements for permit administration.** (1) It is unlawful to set or cause to be set an open fire inside or within one-eighth of one mile of a forest protection district, either on one's own land or on the land of another, without first securing a written permit for burning from the forester and complying with the conditions of the permit. In granting permits for burning:

- (a) The forester may waive the requirement that permits be secured prior to burning, except during a fire season or when required under rules adopted pursuant to subsection (4) of this section.
  - (b) The forester shall prescribe conditions necessary to be observed in setting a fire and preventing it from spreading out of control.
  - (c) The forester may prescribe conditions necessary to be observed in maintaining air quality.
- (2) Any permit obtained through willful misrepresentation is void.
- (3) To avoid confusion or duplication of administration and to promote government efficiency, the forester may enter into a cooperative agreement with a county, a city or a rural fire protection district that:
- (a) Allows the forester to administer the requirements of this section, in conjunction with the enforcement authority of ORS 477.980 to 477.993, on lands not otherwise subject to the requirements of this chapter; or
  - (b) Allows the cooperating agency to administer the burning permit requirements of ORS chapter 476 or 478, as appropriate, including applicable enforcement authority, on lands otherwise subject to the requirements of this chapter.
- (4) All burning allowed under this section shall comply with applicable rules that may be adopted by the State Board of Forestry and the Department of Environmental Quality.
- (5) The provisions of this section do not apply to campfires. [1965 c.253 s.95; 1969 c.204 s.204; 1969 c.680 s.1; 1971 c.297 s.1; 1997 c.274 s.12; 1999 c.355 s.14]

**477.520 Refusal, suspension or revocation of permits.** The forester may refuse, suspend or revoke a permit authorized by or issued under ORS 477.515 (1), when necessary in the judgment of the forester to prevent danger to life, health, forest resources or property. The forester may also refuse, suspend or revoke a permit authorized by or issued under ORS 477.515 (1), when necessary in the judgment of the forester, and after consultation with the Environmental Quality Commission to prevent air pollution, as defined in ORS 468A.005. [1965 c.253 s.96; 1969 c.680 s.2; 1997 c.274 s.13]

**477.532 Regional air quality authority's functions limited.** None of the functions of the Environmental Quality Commission under ORS 477.013, 477.515 and 477.520 shall be performed by any regional air quality authority established pursuant to ORS 468A.105. [1969 c.680 s.5; 1997 c.274 s.49]

**(Restricted Uses)**

**477.535 Forester may proclaim forestland subject to restricted uses; coordination of state and federal land restrictions.** (1) If the forester determines that any forestland inside or within one-eighth of one mile of a forest protection district is particularly exposed to fire danger, by proclamation the forester may designate such forestland as an extra fire hazard and may restrict the use of such forestland.

(2) The proclamation shall designate the area to which and the period during which the restrictions apply, and require that the area be subject to use only upon the condition that entrants comply with all the restrictions for the area.

(3) The proclamation shall designate the type of closure as:

- (a) Regulated closure;
- (b) Permit closure; or
- (c) Absolute closure.

(4) For the purpose of consistency and coordination between all affected agencies in the administration of forestland restrictions, a plan shall be developed by the forester, in cooperation with federal, state and local governmental agencies, landowners and organizations affected by the restrictions. The primary objective of the plan is uniformity of regulations regardless of land ownership. The plan must recognize variation in fire danger and must specify levels of closure by unique but easily recognizable geographic boundaries. [Formerly 477.156; 1967 c.429 s.45; 1989 c.615 s.3; 1997 c.274 s.14]

**477.540 Notice of proclamation; suspension or termination; reinstatement.** (1) The forester shall cause a notice of the closure proclaimed under ORS 477.535 to be posted in conspicuous locations that are in or near the designated areas. The forester shall cause a notice of each proclamation to be published in at least one newspaper published in each forest protection district containing the designated areas. Each published notice shall describe the area, type, restrictions and effective date of closure, and the manner in which permits may be secured if the area is subject to a permit closure.

(2) The proclamation shall remain in force until the time designated therein expires or until the forester finds that the restricted use is no longer requisite and by order suspends or terminates it. A reinstatement of a closure after a suspension does not require the notices described in subsection (1) of this section. [Formerly 477.160; 1967 c.429 s.46; 1969 c.204 s.5; 1997 c.274 s.15; 1999 c.355 s.15]

**477.545 Restricted uses during closure.** (1) Regulated closures require entrants into designated areas to comply with the requirements set forth in the proclamation under ORS 477.535, which requirements in the judgment of the forester are necessary to prevent danger to life, forest resources or property.

(2) Permit closures make the area subject to entry only through permit issued by the forester. The permit shall contain requirements which in the judgment of the forester are necessary to prevent danger to life, forest resources or property. The forester may, during periods of fire hazard conditions, refuse, suspend, revoke or restrict such permits.

(3) Absolute closures restrict the areas to all forms of use and shall be designated only during periods of extreme fire hazard conditions endangering life, forest resources or property. [Formerly 477.158; 1967 c.429 s.47; 1969 c.204 s.6; 1997 c.274 s.16]

**477.550 Violation of restrictions; access for fire fighting permitted.** (1) Except as provided in subsection (2) of this section, it is unlawful to enter any restricted area except in compliance with ORS 477.535 and 477.545, or to violate any of the requirements or restrictions under such sections.

(2) Nothing in this section applies to an owner's right of entry upon the land of the owner or prohibits free access to any area by anyone for the sole purpose of preventing or extinguishing fires. [Formerly 477.162; 1967 c.429 s.48]



## **(Smoke Management)**

**477.552 Policy.** It is the policy of the State of Oregon:

- (1) To improve the management of prescribed burning as a forest management and protection practice; and
- (2) To minimize emissions from prescribed burning consistent with the air quality objectives of the Federal Clean Air Act and the State of Oregon Clean Air Act Implementation Plan developed by the Department of Environmental Quality under ORS 468A.035. [1989 c.920 s.2]

**477.554 Program establishment; content.** (1) With the advice and assistance of the advisory committee established under ORS 477.556, and subject to the review of the State Board of Forestry, the State Forester shall adopt and implement programs for meeting the objectives set forth in ORS 477.013 and 477.552 to 477.562. The programs shall include:

- (a) Collection, analysis and distribution of information regarding prescribed burning and other alternative slash management techniques;
- (b) Assistance to landowners wanting to evaluate alternative burning and nonburning slash management strategies and the collection of data regarding fuel conditions existing before and after slash treatment;
- (c) Aerial monitoring of prescribed burning activity;
- (d) Distribution of information to the Department of Environmental Quality on progress toward meeting federal and state air quality standards; and
- (e) Establishment of a system to track forest burning on a geographically specific basis.

(2) The programs shall be administered by the State Forestry Department. [1989 c.920 s.3; 1997 c.274 s.50]

**477.556 Advisory committee; membership; terms; staff.** (1) An advisory committee shall be created by the State Forester to advise and assist the State Forester in carrying out the programs required by ORS 477.013, 477.515 and 477.552 to 477.562. The advisory committee shall consist of five members as set forth in subsections (2) and (3) of this section.

(2) The following three members shall be appointed by the State Forester:

- (a) One member representing a nonindustrial forest landowner;
- (b) One member representing an industrial forest landowner; and
- (c) One member representing the public.

(3) In addition to the members designated in subsection (2) of this section, representatives of the following federal agencies shall be invited to serve as members of the advisory committee:

- (a) A representative of the United States Forest Service.
- (b) A representative of the United States Bureau of Land Management.

(4) Each member of the advisory committee shall serve for a term of two years.

(5) Members of the advisory committee are entitled to compensation as provided in ORS 292.495.

(6) A vacancy for any cause occurring before the expiration of a term shall be filled for the unexpired term by a person appointed by the State Forester.

(7) A staff member of the State Forestry Department shall be designated by the State Forester to serve as secretary for the committee. [1989 c.920 s.4; 1997 c.274 s.51]

**477.558 Functions for advisory committee.** The advisory committee created under ORS 477.556 shall:

- (1) Advise the State Forestry Department in collecting information about prescribed burning operations;
- (2) Advise the State Forestry Department on the collection, analysis and distribution of information required under ORS 477.554; and
- (3) Review and comment on the report required under ORS 477.560. [1989 c.920 s.5]

**477.560 Oregon Forest Smoke Management Account; moneys paid to account; use.** (1) The Oregon Forest Smoke Management Account is established separate and distinct from the General Fund in the State Treasury.

(2) The following moneys shall be credited to the Oregon Forest Smoke Management Account:

- (a) Nonrefundable registration fees received by the State Forestry Department for Class 1 forestland under ORS 526.324 to be burned lying within the restricted area described under ORS 477.013.

(b) Fees received by the State Forester for Class 1 forestland under ORS 526.324 treated by a prescription burn method under ORS 477.515 (1).

(c) Fees for federal forestland included within the restricted area under ORS 477.013 to be treated by any prescription burn method subject to the provisions of the State of Oregon Clean Air Act Implementation Plan and the Federal Clean Air Act received by the State Forester.

(3) The moneys in the Oregon Forest Smoke Management Account are appropriated continuously for and shall be used by the State Forester exclusively for the administration of the smoke management program approved under ORS 477.013 and 477.554. [1989 c.920 s.7; 1997 c.274 s.52]

**477.562 Registration fee; exemption.** (1) The State Forestry Department shall collect a nonrefundable registration fee for forestland to be burned lying within the restricted area described under ORS 477.013. However, the State Forester, by rule, shall provide an exemption from payment of the fee for burning of understory materials that occurs on forestland for which regular, periodic burning of understory materials is required for forest health.

(2) Any owner of Class 1 forestland under ORS 526.324 and any agency managing Class 1 forestland under ORS 526.324 lying within the restricted area as described in the plan required under ORS 477.013 shall register with the State Forester, in accordance with rules adopted by the State Forester, the number of acres to be burned prior to December 31 of the same year.

(3) The State Forester shall establish by rule the amount of fees to be collected under this section. The fees shall not exceed:

(a) Fifty cents per acre for registration.

(b) \$5 per acre for forestland classified as Class 1 under ORS 526.324 that has been treated by any prescription burn method authorized by the issuance of a permit under ORS 477.515 (1).

(4) Federal lands included within the restricted area under the provision of the smoke management plan approved under ORS 477.013 shall also be subject to the fees authorized under subsection (3) of this section for forestland to be treated by any prescription burn method subject to the provisions of the State of Oregon Clean Air Act Implementation Plan and the Federal Clean Air Act.

(5) Notwithstanding ORS 291.238, moneys collected under this section shall be deposited in the Oregon Forest Smoke Management Account established under ORS 477.560. [1989 c.920 s.8; 1991 c.919 s.15a; 1997 c.274 s.53]

## **MACHINERY REGULATIONS**

### **(Enjoining Violations)**

**477.605 Enjoining violations of ORS 477.615 and 477.645 to 477.655.** Any person violating any provisions of ORS 477.615 and 477.645 to 477.655 may be enjoined in an appropriate judicial proceeding from the further use of such equipment until the person complies with these sections. [Formerly 477.218; 1997 c.274 s.19]

**477.610 Standardization of fire-fighting equipment used to protect forestland.** (1) Notwithstanding any other law, the State Forester, in cooperation with other forest protection associations and agencies, shall carry on a continuous program for the standardization of equipment used for the protection of forestland from fire, and may issue rules, with the approval of the State Board of Forestry, for such standardization where it is the finding of the forester and board that such standardization is economically feasible.

(2) The provisions of ORS 476.410 to 476.440 shall not apply to equipment used for the protection of forestland from fire. [1965 c.76 ss.2,3; 1999 c.355 s.16]

### **(General Regulations)**

**477.615 Additional water supply and equipment.** (1) During a fire season inside or within one-eighth of one mile of a forest protection district, when, in the judgment of the forester, an operation is of sufficient size or so planned and operated as to justify additional protection from fire, the owner or operator, when so directed by the forester in writing, shall provide, within such time as is specified in the writing, additional water supply and equipment for use in fire suppression that is in conformity with rules promulgated by the State Forester.

(2) All such equipment shall be kept in constant readiness for instant use in fighting forest fires. However, nothing in this section prohibits the use of the equipment by the operator for sprinkling roads or other uses within the operation area.

(3) Rules promulgated under this section shall prescribe such water supply and equipment as reasonably are necessary to provide immediate and effective suppression of fires on forestland and may provide for the use of alternate methods and equipment. [Formerly 477.212; 1967 c.429 s.17; 1995 c.605 s.2; 1997 c.274 s.20]

**477.625 Permit to use fire or power-driven machinery; exception; conditions; waiver of permit.** (1) Every person conducting an operation inside or within one-eighth of one mile of a forest protection district that uses fire in any form or power-driven machinery shall first obtain from the forester a written permit, which shall require that the holder of the permit:

(a) Take reasonable precautions that in the judgment of the forester are necessary in the use of fire and power-driven machinery to prevent the spread of fire on or from an operation area.

(b) Designate a representative authorized to act on all matters having to do with fire control, which representatives shall be available at all times by direct means of communication with the forester.

(c) If operating west of the summit of the Cascade Mountains, close down any part or all of the operation during any period of time when notified that, in the judgment of the forester, conditions exist as described in ORS 477.670.

(2) Routine road maintenance is excepted from the requirement to obtain a permit to operate power-driven machinery under this section. As used in this subsection "routine road maintenance" means grading, cleaning ditches, culvert cleaning, spot rocking or mechanical brushing along the roadside to maintain visibility.

(3)(a) The forester may waive the requirement to obtain a written permit under this section when in the judgment of the forester the operation will not constitute a fire hazard sufficient to justify the requirement.

(b) Waiver of the requirement to obtain a written permit under this section does not relieve the owner and operator of the responsibility for complying with other applicable duties, requirements or penalties of this chapter. [Formerly 477.286; 1991 c.634 s.1; 1997 c.274 s.21]

**477.630 Information in permit.** (1) Each permit issued under ORS 477.625 shall include:

(a) The legal description of the area upon which any operation is to be conducted, or an alternate description of the area permitted by the forester;

(b) The name and address of the operator and owner; and

(c) Any other information considered by the forester to be necessary for the administration of the rules promulgated under this chapter.

(2) The information required in subsection (1) of this section shall be provided by the operator or owner, prior to issuance of the permit by the forester. [1965 c.253 s.108; 1975 c.185 s.1; 1997 c.274 s.22]

**477.635 Authority to issue, refuse, suspend or revoke permit.** The forester may issue the permits required in ORS 477.625 and suspend or revoke such permits because of violation of the terms thereof or noncompliance with this chapter. The forester shall refuse to issue a permit to any person for the conduct of an operation when, in the judgment of the forester, an excessive amount of forest debris in and around the operation area results in an extreme fire hazard that endangers life, forest resources or property. [Formerly 477.288; 1997 c.274 s.23]

#### **(Fire Season Regulations)**

**477.640 Use and refueling of portable power saws.** During a fire season, every person using, operating or fueling a saw powered by an internal combustion engine inside or within one-eighth of one mile of a forest protection district shall comply with the rules of the State Forester relating thereto, promulgated for the prevention and suppression of fire. [Formerly 477.290; 1997 c.274 s.24]

**477.645 Internal combustion engines.** (1) During a fire season every person operating an internal combustion engine inside or within one-eighth of one mile of a forest protection district shall equip and maintain the engine in conformity with rules promulgated by the State Forester. These rules shall prescribe such equipment as reasonably is necessary to prevent the escape of fire from such an engine.

(2) Escape of fire from any engine described in this section is prima facie evidence that it has not been equipped and maintained adequately in compliance with rules promulgated under this section. [Formerly 477.182; 1967 c.429 s.18; 1997 c.274 s.25]

**477.650 Stationary internal combustion engines; waiver.** (1) During a fire season every person operating a stationary internal combustion engine inside or within one-eighth of one mile of a forest protection district shall provide at each engine on an operation area a water supply, and equipment for its use in fire suppression, in conformity with rules promulgated by the State Forester. These rules shall prescribe such water supply and

equipment as reasonably are necessary to prevent the spread of fire and may provide for the use of alternate methods and equipment.

(2) When a person has equipped one engine as required by subsection (1) of this section, any additional engines operated by the person within 150 feet of the equipped engine shall be exempt from the requirements of subsection (1) of this section.

(3) For the purposes of this section, an internal combustion engine shall be considered stationary if it is operated for a period of more than two days exclusively at one location in an operation area.

(4) The forester in writing may waive any requirement of this section when an operation will not constitute a fire hazard sufficient to justify the requirement. [Formerly 477.184; 1967 c.429 s.19; 1997 c.274 s.26]

**477.655 Fire-fighting tools and equipment at operation area and on trucks.** During a fire season inside or within one-eighth of one mile of a forest protection district:

(1) Every person conducting an operation shall provide and maintain, at the operation area or at a location designated by the forester, fire-fighting tools that are in conformity with rules promulgated by the State Forester. The tools shall be used only for fighting fire and for no other purpose.

(2) Each internal combustion engine used in an operation area shall be equipped with fire-fighting tools and equipment that are in conformity with rules promulgated by the State Forester.

(3) All trucks driven over roads through forestland, excepting county roads and state highways, shall be equipped with fire-fighting tools and equipment that are in conformity with rules promulgated by the State Forester.

(4) For purposes of this section, the rules promulgated by the State Forester:

(a) Shall prescribe such type and number of tools and equipment for extinguishing fires as reasonably are necessary to suppress fires, and the manner of storing such tools when not in use.

(b) May provide for the use of alternate methods, tools and equipment.

(5) The tools and equipment prescribed by these rules shall be kept in constant repair and readiness for instant use. [Formerly 477.186; 1967 c.429 s.20; 1997 c.274 s.27]

**477.660 Additional protection facilities or services at operation area.** During a fire season when in the judgment of the forester any operation inside or within one-eighth of one mile of a forest protection district has a fire hazard requiring additional protection, the operator shall provide such other facilities or services as the forester by written notice may direct. [Formerly 477.187; 1967 c.429 s.21; 1997 c.274 s.28]

**477.665 Fire watch service; waiver.** (1) During a fire season inside or within one-eighth of one mile of a forest protection district, every operator using power-driven machinery in an operation area shall provide fire watch service on the operation area. The fire watch service shall consist of not less than one competent person, who shall be constantly on duty at times prescribed by rules promulgated by the State Forester. These rules shall require fire watch service at such times and at such places as the spread of fire on or from the operation area to forestland reasonably may be expected.

(2) The forester may modify or waive, in writing, any requirement of this section as to any operation whenever the fire hazard is not sufficient to justify the requirement. [Formerly 477.188; 1967 c.429 s.22; 1969 c.204 s.7; 1997 c.274 s.29; 1999 c.59 s.158]

**477.670 When use of fire or power-driven machinery prohibited.** During a fire season inside or within one-eighth of one mile of a forest protection district situated west of the summit of the Cascade Mountains, if the forestland in such district, or any part thereof, is susceptible in the judgment of the forester to damage by fire, the forester shall issue notice to that effect. Thereafter the use of fire in any form by any person in any operation area or the use of power-driven machinery for any operation, is unlawful unless approved by the forester. Approval shall be granted only when in the judgment of the forester the activity will not constitute a fire hazard sufficient to justify the requirement. [Formerly 477.282; 1993 c.415 s.3; 1997 c.274 s.30]

## **EXCERPTS TO DIVISION 43 OF THE OREGON ADMINISTRATIVE RULES**

### **629-043-0010**

#### **Additional Water Supply and Equipment**

(1) Pursuant to ORS 477.615, operators shall, when directed by the forester in written order, provide a motor vehicle which complies with the capacity, pump, hose, nozzle and readiness requirements set forth in OAR 629-043-0020.

(2) The forester may, in written order, reduce or waive any requirement of the order issued under this rule if, in the judgement of the forester, the conditions so warrant or to take advantage of alternate methods or equipment proposed by the operator which provide, in the judgement of the forester, equal or better suppression of fire.

Stat. Auth.: ORS 477.615

Stats. Implemented: ORS 477.615

Hist.: FB 17, f. & ef. 5-12-68; DOF 9-1998, f. & cert. ef. 6-3-98

### **629-043-0020**

#### **Water Supply and Equipment for Stationary Engines**

(1) Pursuant to ORS 477.650 operators shall comply with the following water supply and delivery requirements when operating stationary equipment:

(a) Water supply:

(A) A self-propelled motor vehicle which is equipped with a water tank containing not less than 300 gallons of water; or

(B) A pond, stream, tank, or sump containing not less than 500 gallons of water.

(b) Water delivery:

(A) Water pump: Size and capacity shall be such that the pump will provide a discharge of not less than 20 gallons per minute when pumping through 50 feet of hose equipped with a 1/4 inch inside diameter nozzle at pump level;

(B) Hose and nozzle: At least 500 feet of serviceable hose, of not less than 3/4 inch inside diameter, and a nozzle.

(2) All hose, motor vehicles, nozzles, pumps and tanks refereed to in this rule shall be kept ready for immediate use.

(3) The water supply, pump, not less than 250 feet of hose, and the nozzle, as required by this rule, shall be maintained as a connected, operating unit and kept ready for immediate use.

(4) The forester, in written order, may reduce or waive any requirement of this rule if, in the judgement of the forester, conditions so warrant or to take advantage of alternate methods or equipment proposed by the operator which provide, in the judgement of the forester, equal or better suppression of fire.

Stat. Auth.: ORS 477.650

Stats. Implemented: ORS 477.650

Hist.: FB 17, f. & ef. 5-12-68; DOF 9-1998, f. & cert. ef. 6-3-98

### **629-043-0025**

#### **Fire Tools and Fire Extinguishers**

Pursuant to ORS 477.655, operators shall comply with the following minimum fire tool and fire extinguisher requirements:

(1) Provide at the operation area, or at a location approved by the forester, the number of tools and tool boxes required by Table 1. An operation having more than 20 people shall use multiples of any of the columns in the table to arrive at a tool distribution equal to or in excess of the number of people in the operation.

(a) The tool boxes required by this rule shall be clearly identified as containing fire tools; and

(b) The tools required by this paragraph shall be used only for fighting fire and for no other use.

- (2) Provide at each internal combustion engine, except power saws, one 2-1/2 pound size A, B, C rated fire extinguisher approved by a nationally recognized testing laboratory.
- (3) Provide on each truck:
- (a) One 2-1/2 pound size A, B, C rated fire extinguisher approved by a nationally recognized testing laboratory; and
  - (b) One round pointed shovel which has a face not less than 8 inches wide and a handle not less than 26 inches long; and
  - (c) One pulaski or axe which has a handle not less than 26 inches long.
- (4) Provide at each block:
- (a) One pump equipped can or bladder containing not less than five gallons of water; and
  - (b) One round pointed shovel which has a face not less than 8 inches wide and a handle not less than 26 inches long.
- (5) All bladders, cans, pumps, tool boxes, tools and fire extinguishers referred to in this rule shall be kept ready for immediate use.
- (6) The forester may, in written order, modify, reduce or waive any requirement of this rule if, in the judgement of the forester, conditions so warrant or to take advantage of alternate methods or equipment proposed by the operator which provide equal or better suppression of fire.

[ED. NOTE: Copies of the Table referenced in this rule are available from the agency.]

Stat. Auth.: ORS 477.655

Stats. Implemented: ORS 477.655

Hist.: FB 17, f. & ef. 5-12-68; FB 4-1985(Temp), f. & ef. 6-17-85; FB 3-1986, f. & ef. 3-12-86; DOF 9-1998, f. & cert. ef. 6-3-98; DOF 2-1999, f. & cert. ef. 5-13-99

## **629-043-0026**

### **Operation Area Fire Prevention**

Pursuant to ORS 477.625(1)(a), operators shall comply with the following reasonable precautions that, in the judgement of the forester, are necessary to prevent the spread of fire on or from an operation area:

- (1) When conducting a cable logging operation during fire season:
- (a) Clear the ground of all flammable debris for not less than ten feet slope distance, from the point directly below any block.
  - (b) Do not permit moving lines to rub on rock or woody material in such a way to cause sparks or sufficient heat that may cause ignition of fire.
- (2) When conducting a operation during fire season which uses mobile equipment, provide a water supply which complies with the capacity, pump, hose, nozzle and readiness requirements set forth in OAR 629-043-0020.
- (3) When conducting a operation during fire season which uses power driven machinery, keep all power driven machinery free of excess flammable material which may create a risk of fire.
- (4) When using fire to dispose of slashing, develop for prior approval a plan which sets forth the personnel, equipment and procedures necessary to safely conduct the burning. The plan shall be developed in such a manner as to give due consideration to prevention of fire escape and protection of life, forest resources, property and air quality.
- (5) When conducting a operation during fire season which uses mobile equipment east of the summit of the Cascade Mountains and when directed by the forester in written order, comply with limitations on when mobile equipment may be used. The forester shall base such limitations on the fire danger in the operation area, on the risk of fire beginning in the operation area, or due to a combination of any such conditions.
- (6) The forester may, in written order, reduce or waive any requirement of this rule if, in the judgement of the forester, conditions so warrant or to take advantage of alternate methods or equipment proposed by the operator which provide, in the judgement of the forester, equal or better prevention or suppression of fire.

Stat. Auth.: ORS 526.016 & ORS 526.041

Stats. Implemented: ORS 477.625

Hist.: FB 4-1985(Temp), f. & ef. 6-17-85; FB 3-1986, f. & ef. 3-12-86; DOF 9-1998, f. & cert. ef. 6-3-98

**629-043-0030**

**Watchman Service**

(1) Pursuant to ORS 477.665, operators shall comply with the following watchman requirements. Watchman shall:

(a) Be constantly on duty for three hours after the power driven machinery used by the operator has been shut down for the day; and

(b) Visually observe all portions of the operation area on which operation activity occurred during the day.

(2) After a measurable amount of rain on the operation area, the forester may suspend the requirements of subsection (1) of this rule until such time as, in the judgement of the forester, conditions warrant reinstatement.

(3) The forester may, in written order, reduce or waive any requirement of subsection (1) of this rule if, in the judgement of the forester, conditions so warrant.

(4) Pursuant to ORS 477.625(1)(a):

(a) Operators shall comply with the following watchman requirements:

(A) Each watchman shall be a competent person.

(B) Each watchman shall have adequate facilities for transportation and communications in order to be able to summon fire fighting assistance in a timely manner.

(b) Watchman shall immediately proceed to control and extinguish any fire in the operation area, in a manner which is consistent with fire suppression safety practices, and shall summon all necessary fire fighting assistance.

Stat. Auth.: ORS 477.665

Stats. Implemented: ORS 477.665

Hist.: FB 17, f. & ef. 5-12-68; FB 23, f. 6-5-70, ef. 6-25-70; DOF 9-1998, f. & cert. ef. 6-3-98; DOF 2-1999, f. & cert. ef. 5-13-99





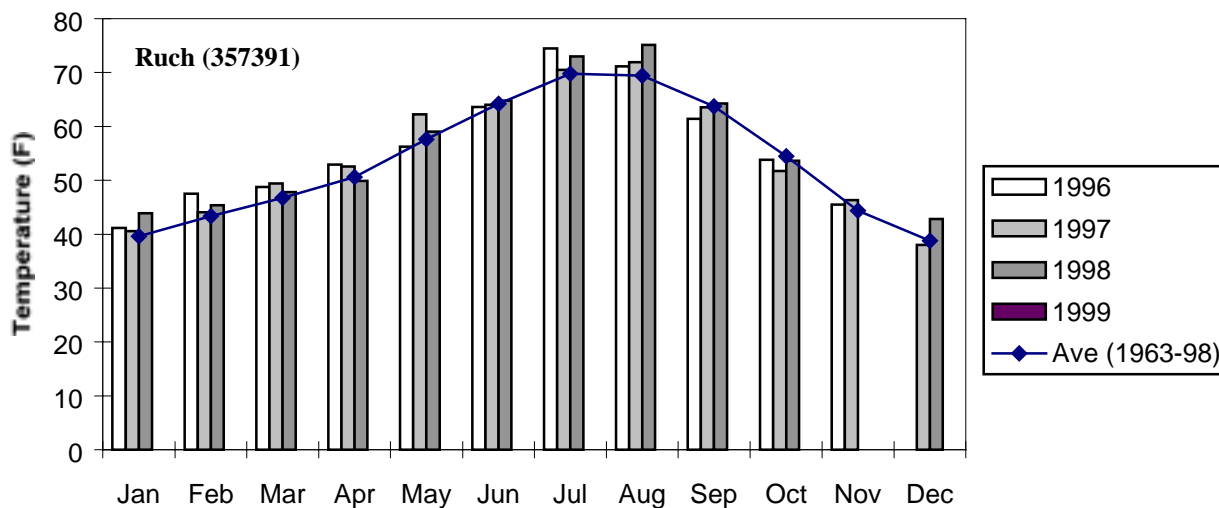
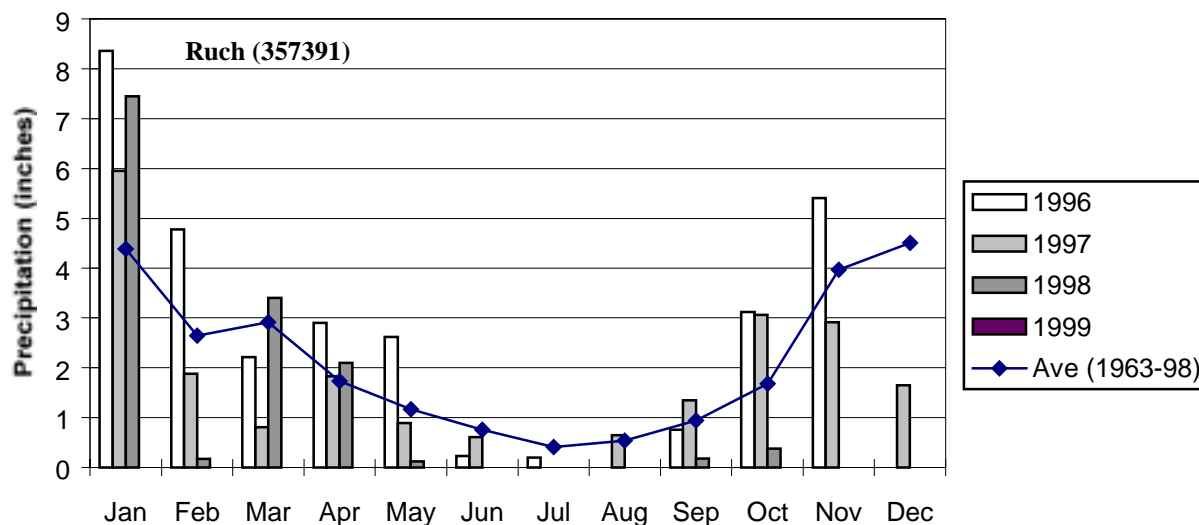
## **APPENDIX H - CLIMATOLGICAL DATA**



**Table 4 - Climatological Data for Ruch Station (357391)**

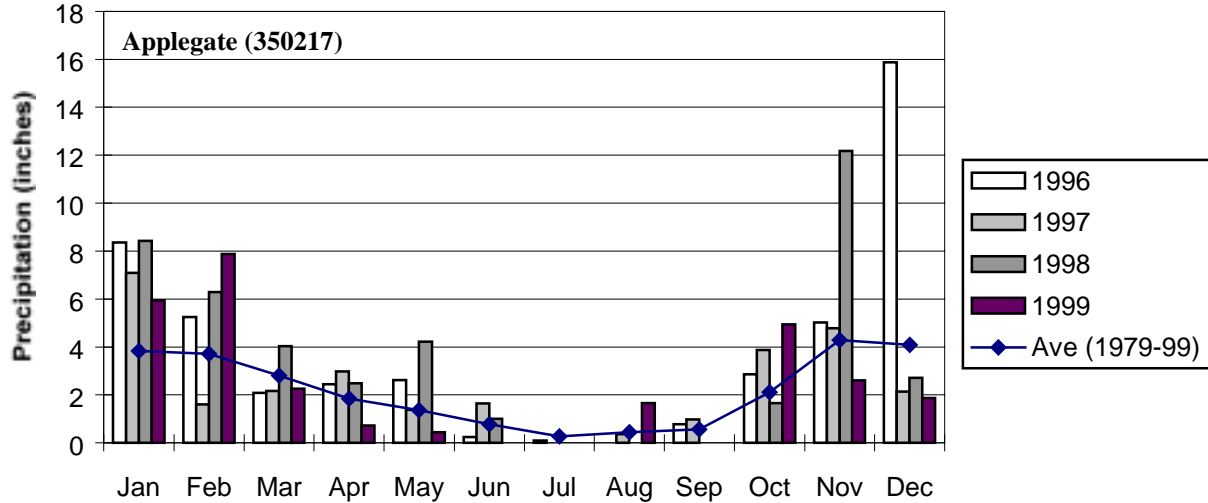
	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann	
Monthly Precip (in)	1996	8.36	4.78	2.21	2.90	2.62	0.23	0.20	0.00d	0.76	3.12a	5.41a	0.00z	30.59	
	1997	5.95	1.88	0.81b	1.83b	0.89	0.61	0.00	0.65	1.35	3.06a	2.91	1.65	21.59	
	1998	7.45	0.17	3.40	2.10	0.12	0.00	0.00	0.00	0.18	0.38	0.00	0.00	13.80	
	1999	Data not available													
	Ave (1963-98)	4.39	2.64	2.91	1.73	1.17	0.76	0.41	0.54	0.94	1.68	3.97	4.51	25.53	
	Std Dev	2.57	1.61	1.83	0.83	0.83	0.63	0.53	0.80	0.92	1.29	2.75	3.11	6.58	
Average Temp (F)	1996	41.15	47.50	48.77	52.90	56.27	63.60	74.48	71.18	61.42	53.81	45.47	-----z	56.05	
	1997	40.55	44.07	49.42	52.55	62.24	64.00	70.48	71.92	63.55	51.73	46.32	38.02	54.57	
	1998	43.89	45.38x	47.82q	49.87	59.06v	64.80y	73.00z	75.12k	64.29r	53.61v	-----z	42.80z	46.88	
	1999	Data not available													
	Ave (1963-98)	39.60	43.37	46.72	50.62	57.58	64.20	69.79	69.44	63.72	54.48	44.36	38.81	53.51	
	Std Dev	2.36	2.72	2.71	3.23	2.18	2.22	2.28	2.15	2.74	2.36	2.37	2.62	1.01	

Note: a = 1 day missing, b = 2 days missing, c = 3 days missing, ... etc ... , z = 26 or more days missing



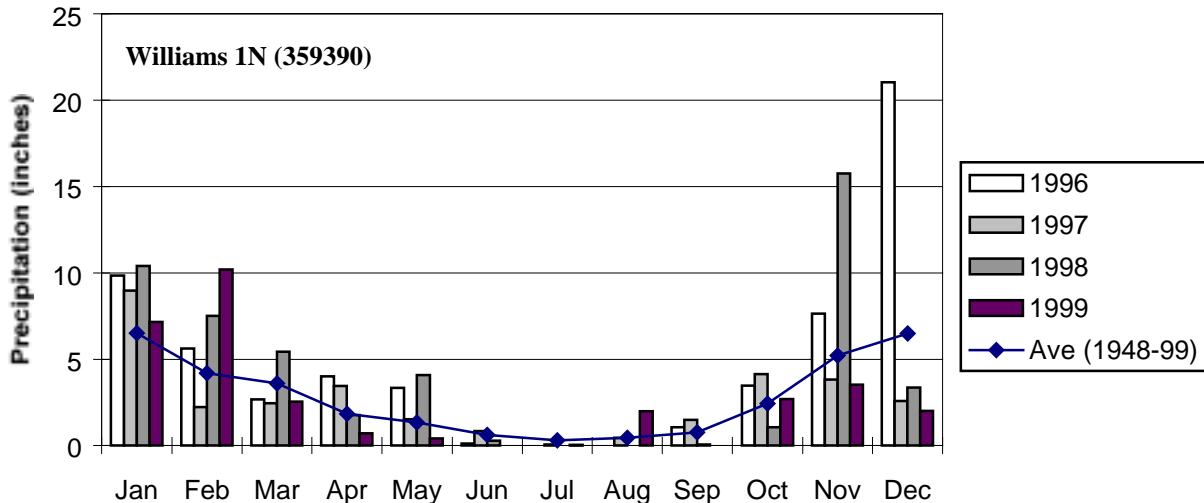
**Table 5 - Climatological Data for Applegate Station (350217) - Precipitation**

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1996	8.36	5.25	2.08	2.44	2.62	0.24	0.09	0.00	0.78	2.86	5.02	15.88	45.62
1997	7.10	1.60	2.16	2.98	1.37	1.64	0.00	0.36	0.97	3.87	4.78	2.14	28.97
1998	8.43	6.30	4.04	2.49	4.22	1.00	0.00	0.00	0.00	1.66	12.18	2.71	43.03
1999	5.95	7.89	2.26	0.72	0.44	0.00	0.00	1.66	0.00	4.94	2.60	1.87	28.33
Ave (1979-99)	3.83	3.72	2.80	1.85	1.36	0.78	0.27	0.44	0.56	2.11	4.29	4.09	28.32
Std Dev	2.77	2.14	1.62	1.00	1.05	0.67	0.41	0.64	0.73	1.73	3.00	3.11	10.02



**Table 6 - Climatological Data for Williams Station (359390) - Precipitation**

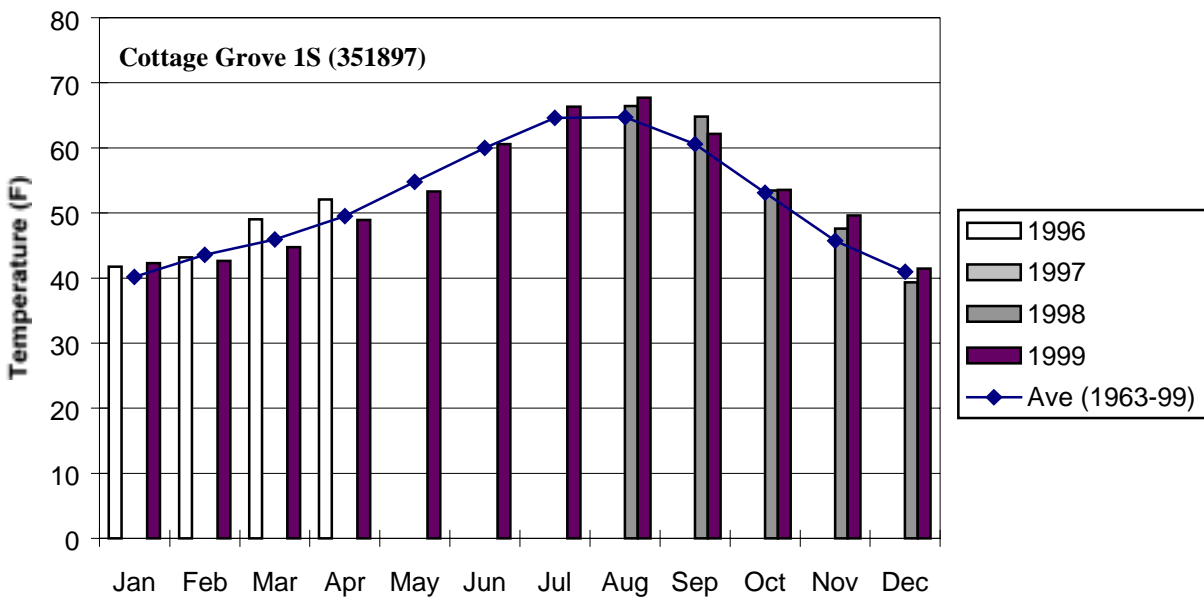
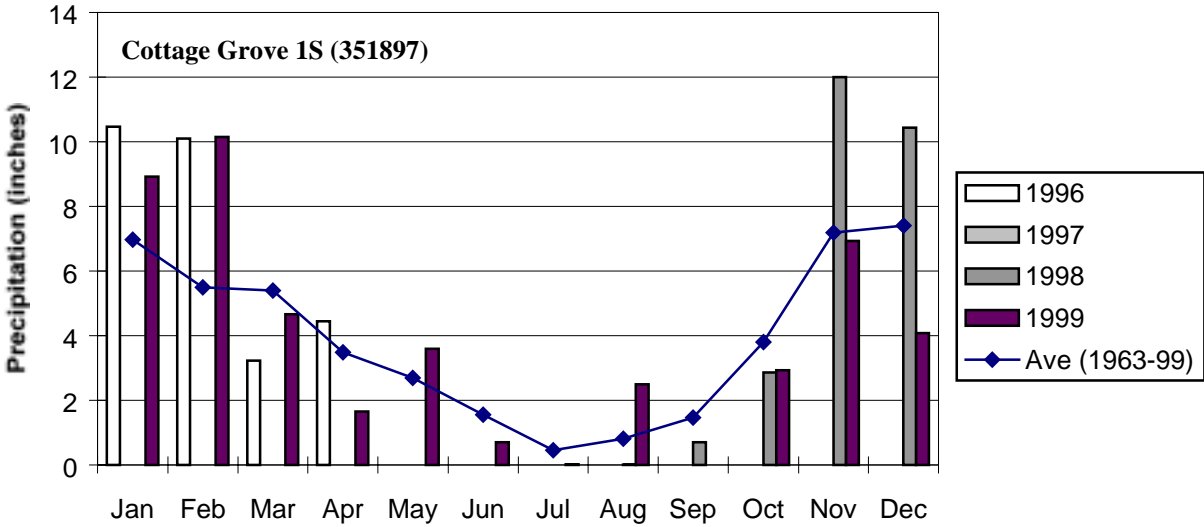
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1996	9.84	5.63	2.68	4.02	3.34	0.11	0.00	0.00	1.06	3.48	7.63	21.04	58.83
1997	8.98	2.22	2.46	3.46	1.53	0.84	0.06	0.44	1.48	4.15	3.82	2.58	32.02
1998	10.41	7.50	5.44	1.77	4.09	0.28	0.00	0.00	0.05	1.06	15.75	3.37	49.72
1999	7.17	10.19	2.54	0.71	0.41	0.00	0.04	1.98	0.00	2.70	3.53	2.01	31.28
Ave (1948-99)	6.52	4.20	3.60	1.84	1.34	0.62	0.29	0.45	0.76	2.44	5.21	6.50	34.21
Std Dev	3.80	2.80	2.23	1.32	1.08	0.62	0.49	0.65	0.88	2.34	3.79	4.70	9.27



**Table 7 Climatological Data for Cottage Grove Station (351897)**

	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Monthly Precip (in)	1996	10.47c	10.10c	3.23f	4.45g	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	20.57
	1997	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
	1998	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.01	0.70	2.86	12.00	10.44a	26.01
	1999	8.92	10.15	4.66	1.65	3.59	0.70	0.02	2.50	0.00	2.93	6.93	4.08	46.13
	Ave (1948-99)	6.97	5.50	5.40	3.49	2.69	1.53	0.45	0.81	1.47	3.80	7.19	7.41	45.91
	Std Dev	3.43	2.86	2.16	1.81	1.43	1.04	0.62	1.08	1.04	2.61	3.54	3.87	7.78
Average Temp (F)	1996	41.77	43.17	49.02i	52.08k	-----z	-----z	-----z	-----z	-----z	-----z	-----z	-----z	42.47
	1997	-----z	-----z	-----z	-----z	-----z	-----z	-----z	-----z	-----z	-----z	-----z	-----z	
	1998	-----z	-----z	-----z	-----z	-----z	-----z	-----z	66.42r	64.82	53.47	47.60	39.34	51.31
	1999	42.27	42.62	44.76	48.93	53.29	60.58	66.34	67.73	62.13	53.56	49.63	41.47	52.78
	Ave (1948-98)	40.18	43.58	45.93	49.52	54.76	60.00	66.34	64.73	60.59	53.08	45.71	40.96	51.97
	Std Dev	3.67	3.04	2.33	2.38	1.92	1.94	1.95	2.00	2.22	1.59	2.79	2.71	1.01

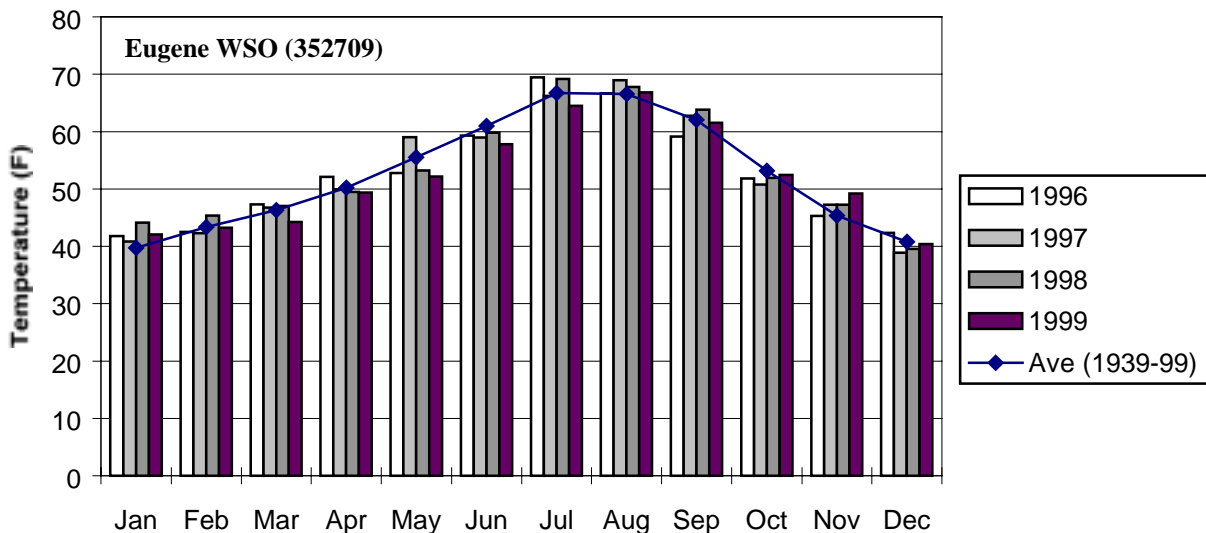
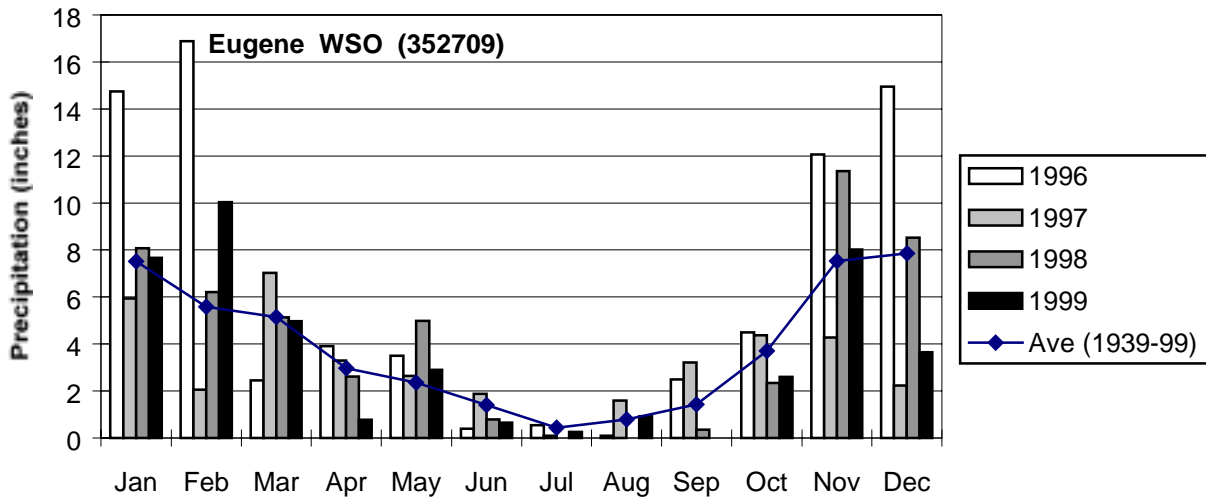
Note: a = 1 day missing, b = 2 days missing, c = 3 days missing, ... etc ... , z = 26 or more days missing



**Table 8 Climatological Data for Eugene WSO AP Station (352709)**

	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Monthly Precip (in)	1996	14.74a	16.89	2.45	3.91	3.50	0.39	0.54c	0.09	2.49	4.50	12.06	14.95	76.51
	1997	5.93	2.06	7.03	3.30	2.64	1.88	0.10	1.59	3.22	4.37	4.28	2.23	38.63
	1998	8.08	6.21	5.13	2.61	4.98	0.79	0.00	0.00	0.35	2.34	11.35	8.53a	50.37
	1999	7.66	10.03	4.97	0.77	2.90	0.66	0.26	0.92	0.00	2.60	8.02	3.65	42.44
	Ave (1939-99)	7.51	5.58	5.14	2.97	2.35	1.40	0.44	0.79	1.43	3.70	7.53	7.85	46.82
	Std Dev	4.02	3.26	2.58	1.81	1.42	1.07	0.62	1.05	1.07	2.50	3.86	4.77	9.87
Average Temp (F)	1996	41.81	42.52	47.31	52.13	52.76	59.30	69.45	66.65	59.16a	51.85	45.32	42.37	52.55
	1997	40.84	42.27	46.77	49.95	59.03	58.97	66.21	68.97	62.75	50.76	47.23	38.90	52.72
	1998	44.13	45.36	47.02	49.47	53.23	59.78	69.16	67.77	63.80	51.95	47.27	39.55	53.21
	1999	42.05	43.25	44.26	49.38	52.15	57.80	64.48	66.84	61.55	52.45	49.18	40.40	51.98
	Ave (1939-98)	39.74	43.34	46.31	50.19	55.50	60.97	66.74	66.55	62.04	53.17	45.36	40.77	52.55
	Std Dev	3.73	2.56	2.13	2.20	2.17	2.18	2.15	1.93	2.26	2.00	2.85	2.93	1.10

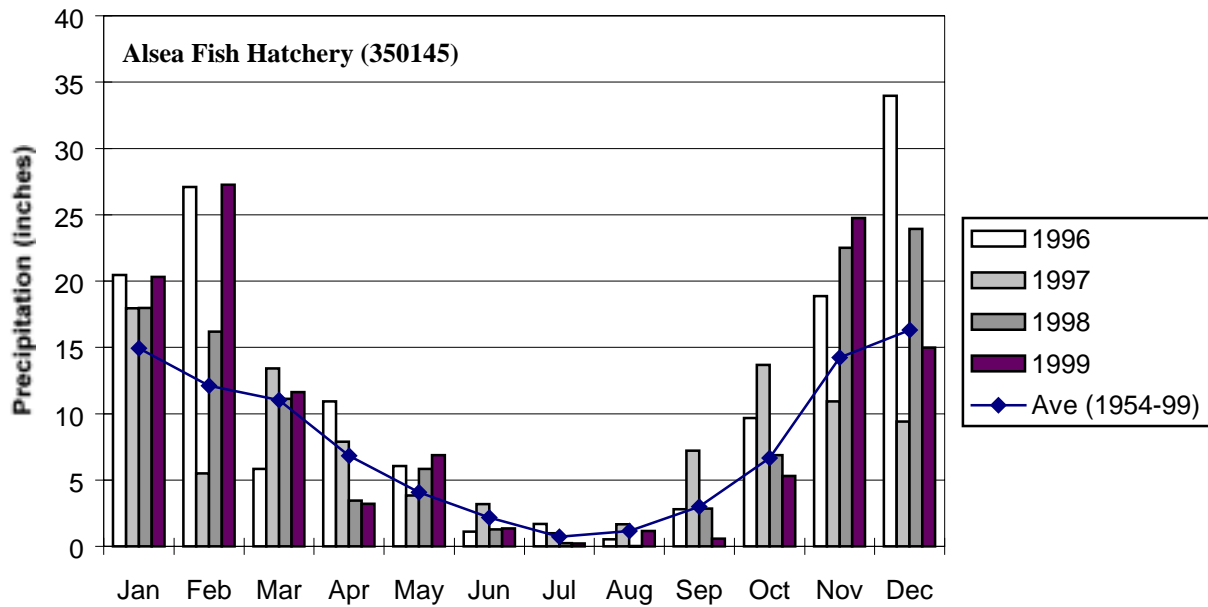
Note: a = 1 day missing, b = 2 days missing, c = 3 days missing, ... etc ... , z = 26 or more days missing



**Table 9 - Climatological Data for Alsea Fish Hatchery (350145)**

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Monthly Precip (in)	1996	20.47	27.09	5.83	10.94	6.05	1.11	1.68	0.53	2.80	9.68	18.87	33.97	139.02
	1997	17.95	5.51	13.41	7.90	3.83	3.18	0.99	1.66	7.22	13.67	10.93	9.42	95.67
	1998	17.97	16.18	11.11	3.44	5.85	1.29	0.25	0.03	2.84	6.87	22.50	23.93a	112.26
	1999	20.32b	27.27f	11.63	3.20	6.88	1.36b	0.21	1.17	0.57	5.30	24.75	14.97	90.36
	Ave (1954-99)	14.93	12.10	11.02	6.83	4.08	2.18	0.72	1.16	3.00	6.65	14.23	16.32	92.72
	Std Dev	6.98	5.43	4.54	3.24	1.91	1.33	0.75	1.27	2.35	3.54	6.40	7.19	17.25

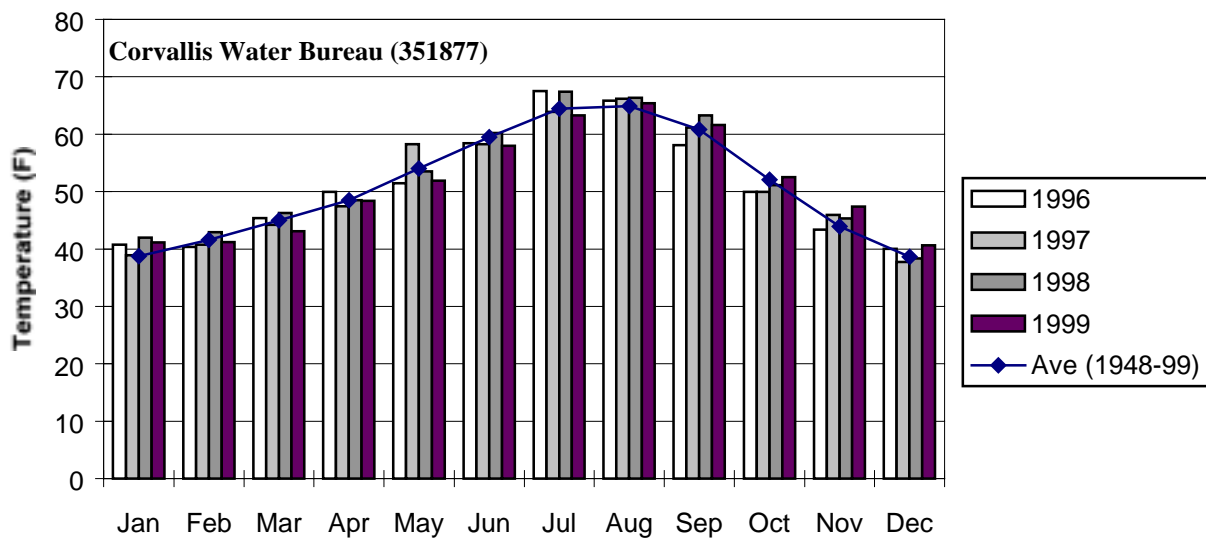
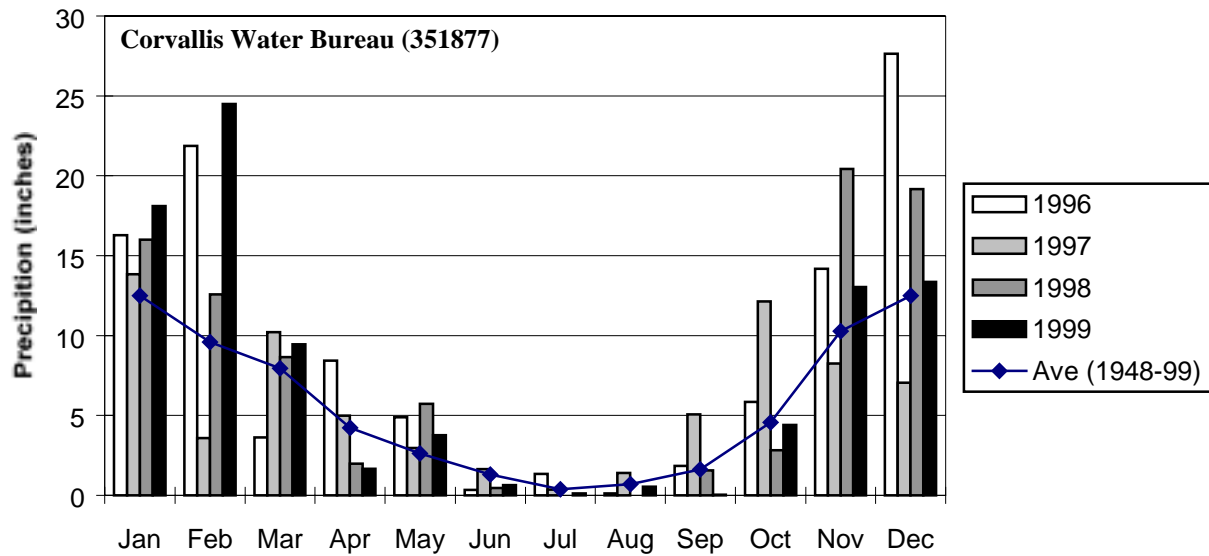
Note: a = 1 day missing, b = 2 days missing, c = 3 days missing, ... etc ... , z = 26 or more days missing



**Table 10 - Climatological Data for Corvallis Water Bureau (351877)**

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Monthly Precip (in)	1996	16.29	21.86	3.62	8.44	4.88	0.35	1.35	0.13	1.85	5.85	14.18	27.63	106.43
	1997	13.83	3.59	10.22	4.98	2.97	1.64	0.36	1.41	5.07	12.14	8.26	7.05	71.52
	1998	16.00	12.57	8.66	1.98	5.73	0.47	0.00	0.00	1.57	2.82	20.43	19.17a	89.40
	1999	18.11	24.49	9.46	1.66	3.76	0.64	0.12	0.55	0.04	4.41	13.03	13.35	89.62
	Ave (1948-99)	12.49	9.59	7.96	4.22	2.63	1.30	0.38	0.71	1.62	4.56	10.27	12.50	68.76
	Std Dev	6.52	5.22	3.56	2.34	1.49	0.98	0.43	0.95	1.41	3.24	5.26	5.71	15.56
Average Temp (F)	1996	40.74	40.36	45.39	49.95	51.48	58.40	67.53	65.82	58.07	49.97	43.35	40.05	50.93
	1997	38.92	40.73	44.21	47.47	58.27	58.23	63.89	66.19	61.13	49.97	45.93	37.77	51.06
	1998	42.00	42.91	46.27	48.52	53.52	60.23	67.42	66.34	63.30	51.13	45.32	38.37	52.11
	1999	41.13	41.20	43.08	48.38	51.92	57.98	63.26	65.39	61.62	52.52	47.40	40.65	51.21
	Ave (1948-99)	38.77	41.59	44.99	48.49	54.01	59.48	64.43	64.87	60.82	52.08	43.94	38.64	50.99
	Std Dev	2.70	2.68	2.18	2.06	2.24	2.09	2.13	2.04	2.50	1.91	2.60	2.81	0.87

Note: a = 1 day missing, b = 2 days missing, c = 3 days missing, ... etc ... , z = 26 or more days missing

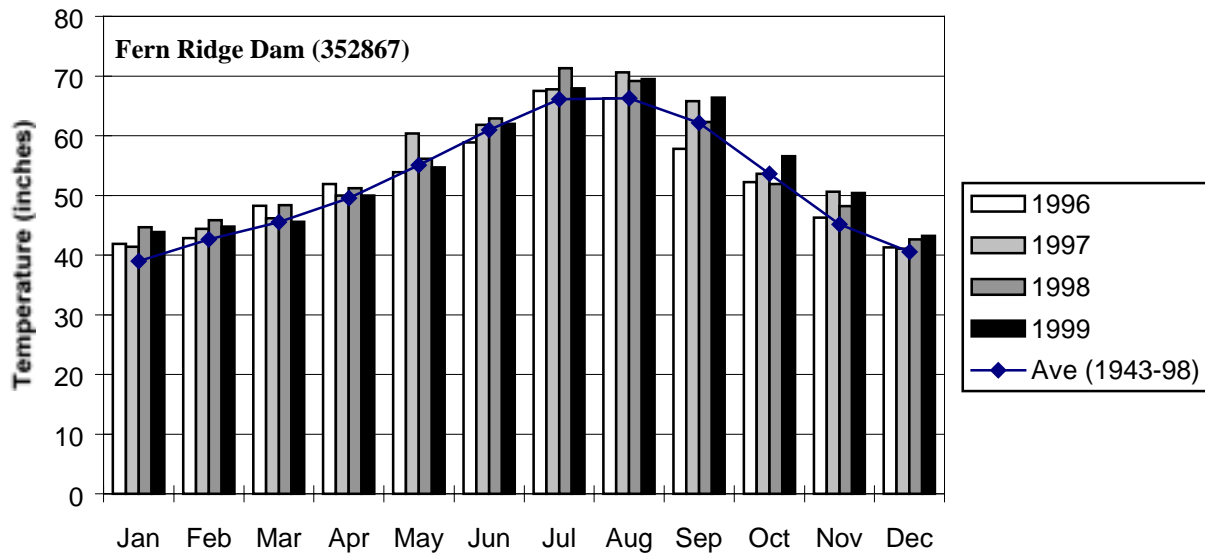
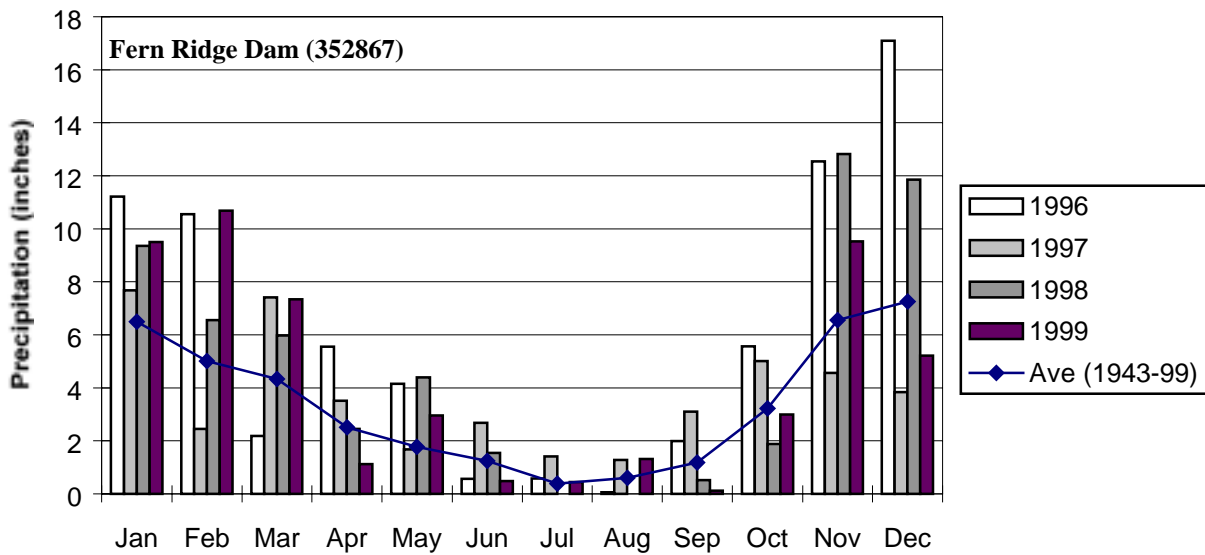




**Table 11 - Climatological Data for Fern Ridge Station (352867)**

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Monthly Precip (in)	1996	11.21k	10.55g	2.18h	5.55b	4.15i	0.57d	0.58	0.06d	1.99b	5.57j	12.54i	17.10k	8.75
	1997	7.68h	2.45g	7.41h	3.51h	1.68g	2.68e	1.41	1.28	3.10d	5.01j	4.56h	3.84k	8.47
	1998	9.36k	6.55h	5.97j	2.45d	4.40i	1.54b	0.00	0.00	0.52b	1.88j	12.82m	11.85g	4.51
	1999	9.50g	10.68g	7.34g	1.12d	2.96f	0.48f	0.45d	1.32d	0.12	2.99e	9.53 l	5.22i	6.00
	Ave (1943-99)	6.49	5.01	4.33	2.51	1.78	1.24	0.39	0.60	1.18	3.22	6.56	7.25	40.92
	Std Dev	3.37	2.50	1.92	1.44	1.01	0.92	0.54	0.80	0.90	2.33	3.43	3.93	7.30
Average Temp (F)	1996	41.86m	42.82j	48.26j	51.89k	53.88j	58.87k	67.50i	66.25i	57.78l	52.21j	46.25l	41.28m	
	1997	41.40k	44.42i	46.14j	49.95	60.38n	61.80j	67.75i	70.60j	65.79i	53.64j	50.64l	41.08l	49.95
	1998	44.68n	45.83j	48.37l	51.20	56.12k	62.87	71.32i	69.16l	62.31i	51.88k	48.19n	42.65n	57.03
	1999	43.86m	44.75l	45.55i	50.00k	54.68l	61.98h	67.95k	69.48i	66.36i	56.58k	50.39l	43.24j	
	Ave (1943-99)	38.98	42.63	45.52	49.56	55.09	60.98	66.11	66.30	62.15	53.63	45.16	40.53	52.13
	Std Dev	3.71	2.40	2.36	2.42	2.06	2.13	1.91	2.08	1.93	2.12	2.49	2.72	0.91

Note: a = 1 day missing, b = 2 days missing, c = 3 days missing, ... etc ... , z = 26 or more days missing





## **APPENDIX I - LEVELS OF SERVICE**



## Purpose

The levels of service described in the *Desired Conditions of Maintenance Features on State Highways* are intended to be objective descriptions of the desired and actual conditions of features on and around the State Highway System. Ideally, the definitions will be used both within ODOT and with the traveling public to explain how ODOT uses tax dollars.

The current (April 2000) version of the *Desired Conditions* represents changes made from the original 1997 draft and subsequent revisions. The maintenance feature level of service concept is essentially untested anywhere in the world. Further adjustments will likely be necessary to make the level of service descriptions and desired condition percentages objective and reflect prudent targets.

Meeting the desired conditions within existing funding is unlikely. While this is no doubt frustrating to Maintenance forces, it is none the less reality. Any gap between actual and desired conditions will be used to demonstrate how increased maintenance funds would be used.

*The Desired Conditions* document was developed using principles described in the *Role of Maintenance*. Desired conditions for those features identified as most critical in the *Role of Maintenance* are intended to be higher than the conditions for features identified as of lower importance. In this way, the desired conditions are a reflection, not a replacement of the *Role of Maintenance*.

The General Policy statements in this document were taken from the 1983 Maintenance Guide. The Maintenance Guide is in the process of being updated. When completed, the General Policy statements will be modified to conform to the revised Maintenance Guide.

In summary, the levels of service and desired conditions are intended to set consistent targets across the state, and to help the public understand where additional dollars are needed to deliver the product they want. Maintenance crews will be asked to rate their highways during September and October. The evaluation may be time consuming, particularly the first time. Pavement surface and bridge conditions have been removed from this analysis because they are evaluated as part of other programs. The target is to rate every mile of highway once every two years.

The descriptions of levels of service and desired conditions will get better with input. ODOT must have objective measures in place to be able to get funding that keeps up with or exceeds inflation in the future. The April 2000 version of the *Desired Conditions of Maintenance Features on State Highways* is another step to that end.

## Vegetation

Activities: 130, 131, 132, and 133

Maintenance Guide: Chapter 8

General Polic : Highway roadsides should be kept clean, neat, attractive, and safe. Proper sight distance, control of noxious weeds and invasive species, and danger tree removal should be of primary consideration. Raw highway cut and embankment slopes require vegetative cover to prevent erosion. Natural and seeded grasses, wild flowers, vines, shrubs, and small trees assist in the control of erosion, drifting sand and dust. Vegetation must be controlled, however, to prevent interference with the proper operation and maintenance of the highway.

Desired Conditions: Percent Shoulder Miles by Road Category

LOS	A	B	C	D	E
<b>Category 1W</b>	20%	70%	10%		
<b>Category 1E</b>	40%	60%			
<b>Category 2W</b>	10%	60%	20%	10%	
<b>Category 2E</b>	30%	50%	15%	5%	
<b>Category 3W</b>		45%	30%	20%	5%
<b>Category 3E</b>	20%	40%	30%	10%	
<b>Category 4W</b>		10%	40%	40%	10%
<b>Category 4E</b>		30%	30%	35%	5%

W = West of Cascades      E = East of Cascades

### Level of Service A

No vegetation for 2.5 m (8') from edge of pavement. Clear zone is unobstructed.



## Vegetation (cont.)

### Level of Service B

No vegetation for at least 1.25 m (4') from edge of pavement. Clear zone is unobstructed. Vegetation does not impede sight distance.



### Level of Service C

Vegetation less than 15 cm (T) high within 1.25 m (4') from edge of pavement. Few obstructions in the clear zone. Vegetation does not impede sight distance



## Vegetation (cont.)

### Level of Service D

Vegetation less than 30 cm (12") high within 1.25 m (4') from edge of pavement. Some obstructions in the clear zone. Sight distance occasionally impeded.



### Level of Service E

Vegetation obscures sight posts and/or guardrail. Many obstructions in clear zone. Sight distance impaired in several places.

