Introduction

The Washington State Department of Transportation’s (WSDOT) Olympic Region Area 4 manages vegetation within approximately 250 miles of state highway corridor in Grays Harbor, southwest Jefferson, and western portions of Mason and Thurston Counties. The major corridor in the area is State Route 8/US 12, which is the major connection between the Puget Sound metropolitan areas and the Washington Coast. Other corridors include 85 miles of US 101, State Routes 105, 107, 108, 109, and 115. A map of the area is included as Figure 1 on the following page.

The primary roadside vegetation management objectives are in relation to traffic safety and preservation of the highway infrastructure. Additionally, as a landowner WSDOT is required to control all listed noxious weeds that occur on the right-of-way by state law (RCW 17.10 and 15.15.010). It is important that WSDOT not only meet the legal requirements for weed control, but also consider the needs and concerns of adjacent landowners in this area.

In order to best manage roadsides with these priority objectives in mind, WSDOT practices an annually cycling process called Integrated Vegetation Management (IVM). Plans like this are maintained and updated annually for all areas of the state with an overall goal of establishing the most naturally self-sustaining roadsides vegetation possible. Adjustments are made year to year in each area plan based on monitoring the previous years’ accomplishments and results, available budget, and prioritization of other highway maintenance activities.

This plan serves as the guidance document for vegetation maintenance in Olympic Region Area 4 for the 2018 growing season. It identifies priority locations and prescribes treatments for accomplishing safety and weed control objectives through the use of a combination of seasonally-timed control measures. Each year’s actions are designed as part of a coordinated multi-year strategy to minimize roadside maintenance requirements wherever possible. This plan also accounts for specific locations where maintenance tactics are adjusted due to environmental issues, neighboring properties, local partnerships, or restoration work done through WSDOT design and construction.

As of the 2018 season, the information contained in this plan document can be geographically referenced by crews in the field using iPads and the Highway Activity Tracking System (HATS). Accomplishments and results will also be tracked geographically through this new system. This development in WSDOT maintenance management will greatly improve the agency’s success in properly executing planned actions, monitoring and documenting results of treatments, and in measuring cost and results over time.

WSDOT welcomes input from local public and private entities on its weed control and vegetation management activities. Wherever appropriate the agency is looking for opportunities to plan, cooperate, and partner with others in managing the roadside. Please direct any questions, comments or suggestions to the Olympic Region Area 4 Superintendent – Brent Schiller, Assistant Superintendent Ted Twigg, or the State’s Roadside Asset Manager – Ray Willard.

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Olympic Region, Area 4 Map
Figure 1
Olympic Region, Area 4 IVM Work Plan – 2018

This is an outline of the overall approach and geographic distribution of roadside vegetation management requirements throughout the maintenance area in 2018. Information is organized in relation to three groups of activities defined in the WSDOT Maintenance Accountability Program (MAP) for the performance of roadside vegetation maintenance activities: Control of Vegetative Obstructions, Noxious Weed Control, and Nuisance Weed Control. Specific locations as noted in this work plan are also mapped in the Highway Activity Tracking System (HATS) for reference by maintenance in the field.

Control of Vegetative Obstructions – MAP Activity 3A4
The work of this group of maintenance activities relates to the safety and operational requirements of the highway. These items are considered first priority in terms of the overall roadside maintenance needs. Vegetation management objectives and work activities in this category fall into four groups – Pavement Edge Maintenance/Zone 1, Safety Mowing/Zone 2, Tree and Brush Control/Zone 2 and 3, and Hazard Tree Removal/Zone 3.

Pavement Edge Maintenance/Zone 1
Work Operation: 1615
HATS Form: Pesticide Application
HATS Map Layer: Reference lines – Roadside Features/Spray Zone 1 Reference

This work includes the application of herbicides to road shoulders where necessary throughout the area. The objective of these applications is preserving of a band of gravel shoulder adjacent to the pavement that is free of vegetation. This treatment is necessary in the mapped locations described below to provide visibility and maintainability of roadside hardware and guideposts, allow room for vehicles to safely pull off on shoulders, facilitate stormwater drainage, and/or provide added visibility of wildlife approaching the highway.

Total Units of Planned Treatment
- Apply approximately 240 acres of herbicide treatment to road shoulders throughout the area.

Locations of Planned Treatments
- Planned treatment sites are mapped in HATS layer – Spray Zone 1 Reference
- All established gravel shoulders throughout the area will be treated annually with herbicides, except in the locations listed below.
- Locations where grasses are established to the edge of pavement and no residual herbicide treatments will be applied:
  - Hoquiam Watershed US 101 / MP 94.4 - 100.32
  - Select areas within the Olympic National Forest on US 101 between MP 118 - 130.8
  - Private property no spray agreements - All routes
  - Inside City Limits except limited access areas
- Locations where aquatically approved mixture of herbicides will be used to treat all shoulder include:
  - US 101 crossing Quinault tribal lands
  - SR109 MP32 to MP 40.41
- Steel plow is run periodically on all routes, in areas without guardrail to remove minor amounts of shoulder buildup.
- At intersections with local roads throughout the area, a wider bare gravel area will be established for improved sight distance and traffic safety. Areas where additional bare ground treatment will be applied include:
  - US 12 - Dunlap (24.50), Elma Gate West (30.14), Shelton (32.01)
Elma Gate East (34.53), Merry (35.79), Blockhouse (36.35)
Elma Gate East (37.44), Forstrom (40.68), Roseburg SW (42.89), Hilt (43.2), Denmark (43.49)
US 101 - Lund (74.01), Artic (74.8 / 75)
SR 107 - Lempie (1.79), Blue Slough (2.96), Melbourne (5.3 / 5.78), Minkler (6.76)
SR 108 - Eich (9.25), Hurley Waldrip (9.7)

Treatment Methods
- Herbicides are applied using a truck mounted power spray system calibrated to deliver a 2 - 4 ft. band of spray mixture on and adjacent to the paved shoulder. The resulting width of treated shoulder is intended to extend just beyond guardrail or guideposts, and may be wider than 4 ft. in areas with steeper shoulder slope.
- All noted locations will be treated in mid to late spring with the following mixture of herbicides and adjuvants in ounces (liquid or dry measure) per acre:
  - **Primary Treatment Mixture:**
    - 64 oz/acre AquaNeat or Roundup Custom
    - 2 oz/acre Telar
    - 16 oz/acre Insist 90
  - **Aquatic Sensitive Areas**
    - 64 oz/acre AquaNeat or Roundup Custom
    - 16 oz/acre Insist 90

Safety Mowing/Zone 2
Work Operation: 1625
HATS Form: Mowing Zone 2
HATS Map Layer: Reference lines – Roadside Features/Mowing Zone 2 Reference
This work includes routine mechanical cutting of all vegetation on the road shoulder in a band width immediately adjacent to pavement. Mowing is necessary in areas where taller growing grasses or other vegetation are present and must be annually or semi-annually cut back for visibility and maintenance of roadside hardware and delineators, to maintenance traffic sight distance at curves and intersections, and for improved visibility of wildlife approaching the highway. Mowing height for these operations is typically 6 to 8 inches above the ground.

Total Units of Planned Treatment
- Approximately **150 acres** will be mowed along the pavement edge throughout the area

Locations of Planned Treatments
- Planned routine mowing locations are mapped in HATS layer – **Mowing Zone 2 Reference**
- As the area establishes appropriate Zone 1 widths throughout the area, the need for mowing shoulders will be re-evaluated and minimized where possible.
- Areas mowed annually for special purposed included:
  - 2 pass (10’ wide) mowing - Olympic National Forest US 101 / MP 118 - 130.8
  - 2 pass (10’ wide) mowing - SR 109 MP 16.16 - 20.79 for Fire Over the Water Festival
  - City of Hoquiam mows US 101 / MP 94.4 - 100.32

Treatment Methods
- Side flail mower & sidearm rotary mower
- Hand held gas powered weed trimmers used as needed for spot treatment where sight distance is impacted.
Tree and Brush Control/Zone 2 and 3
Work Operations: 1622, 1625, 1626
HATS Forms: Pesticide Application for spray applications, and three sub-forms under Tree/Brush Control—Trimming Mechanical, Trimming Manual, and Mowing
HATS Map Layer: None
This includes safety and traffic operations related work in Zone 2, such as periodic side-trimming or pruning of brush and trees or tree branches behind guardrail, encroaching on or overhanging traffic operations, and/or impacting sign visibility. Also included is work in Zone 2 and 3 when selectively controlling emergent early succession tree species – to prevent them from growing into mature hazard trees within striking distance of the road.

Total Units of Planned Treatment
- An average of 100 acres per year are trimmed and/or controlled with mechanical cutting using tractor-mounted cutters
- Approximately 30 acres will be controlled with hand-held cutting tools
- Approximately 20 acres will be treated with herbicides (mostly through cut-stump treatment)

Locations of Planned Treatment
- SR 8 Median MP 9.7 - 12
- SR 109 MP 32.2 - 40.5

Treatment Methods
- Trim with side arm mower, mow with Brown Brush Monitor in areas with heavy seedling growth, stump treatments, hand work and selective herbicide applications

Hazard Tree Removal/Zone 3
Work Operation: 1628
HATS Forms: Hazard Tree Removal – Individual Tree Removal, Stand Removal, and Cleanup Fallen Trees
HATS Map Layer: None
Trees within and adjacent to the right of way are routinely monitored by maintenance staff for potential risk to the highway and/or neighboring structures. Individual and stands of mature trees identified as a potential imminent threat will be further evaluated and removed as soon as possible where needed. These activities also include clean up of wind blown limbs and debris if not part of a declared disaster.

Total Units of Planned Treatment
- Between 100 and 200 mature hazard trees are removed throughout the area in a typical year.

Locations of Planned Treatments
- Annual evaluation and removal of identified hazard trees is a year-round practice throughout the area.
- Through an agreement with the Forest Service, the forested area bordering the highway between US 101 MP 123.54 - 125.54 and 129 - 130.77 is cruised every year for hazard trees. Mutually identified hazard trees are removed.

Treatment Methods
- Crews are continuously looking for trees that exhibit structural defects and could strike the road or neighboring property if they come down. Any hazard trees identified at any time are removed as soon as possible.
- If trees growing outside WSDOT right of way are hazards, crews work with the neighboring property owner to negotiate removal.
- Cut and drop in place wherever possible
- Stump treat with herbicides to prevent re-growth when needed
Noxious Weed Control – 3A2
This group of activities includes control of non-native invasive weed species as defined by state law and individual county designation. This group of activities is second priority vegetation management work after safety related objectives have been addressed. While all Class A, B, and C noxious weed species as listed in RCW 17.10 are considered potential targets for WSDOT noxious weed control, the agency is currently not funded to achieve 100% control of all noxious weeds. Therefore, the top priorities for weed control are focused on locations and species that are more limited in distribution on the right of way – where there is a chance of successful eradication. To prioritize control of species that are already widespread in the area, WSDOT works with the local county noxious weed boards and coordinators, to annually review and determine which species and locations will be specifically targeted.

To prioritize, plan, and track noxious weed control, WSDOT maps and monitors weed infestations in three categories: **Priority**, **Planned Treatment**, and **General Reference**. **Priority** locations are where Class A noxious weed species exist on the right of way, and complete eradication is required by state law. **Planned Treatment** sites are locations where there are new, and/or limited distribution infestations of Class B and C noxious weed exist, and eradication is possible. **General Reference** sites are recorded for reference only to document the presence of noxious weed species which are more commonly occurring in the local area.

### Noxious Weed Control
**Work Operations:** 1616, 1618, 1641, 1699
**HATS Forms:** Pesticide Application (for spray applications,) and three sub-forms under Noxious Weed Control General– Manual/Mechanical, Seed/Fertilize/Mulch, and Biological
**HATS Map Layer:** Reference Points – Roadside Features/Noxious Weed Control Priority, Noxious Weed Control Planned Treatment, and Noxious Weed Control General Reference
Operations are prescribed throughout the season to prevent the spread of any legally designated noxious weed species, and to reduce or eliminate populations wherever possible. Integrated treatment plans combine field monitoring and an integral mixture of seasonally timed control methods with proven effectiveness on designated species. Successful plans are consistently implemented over a series of years and annually adjusted as necessary based on field observations. Care must be taken in all cases to avoid damage to surrounding desirable/native vegetation.

### Target Species Known to Exist on WSDOT Right of Way in Olympic Region Area 4

<table>
<thead>
<tr>
<th>Common Name/Botanical Name</th>
<th>Treatment Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butterfly bush/Buddleja davidii</td>
<td>Control where visible in conjunction with seasonal patrols</td>
</tr>
<tr>
<td>Gorse/Ulex europaeus</td>
<td>Target sites mapped and treated in spring prior to bloom</td>
</tr>
<tr>
<td>Hawkweed species/Hieracium sp.</td>
<td>Control where visible in conjunction with seasonal patrols</td>
</tr>
<tr>
<td>Himalayan knotweed/Polyginum polystachyum</td>
<td>Target sites have been mapped and controlled in previous seasons. Monitor for any regrowth for five years.</td>
</tr>
<tr>
<td>Japanese knotweed/Polyginum cuspidatum</td>
<td>Target sites mapped, and treated in late summer/fall</td>
</tr>
<tr>
<td>Knapweed sp./Centaurea sp.</td>
<td>Target sites mapped Control where visible in conjunction with summer seasonal patrols</td>
</tr>
<tr>
<td>Plant Species</td>
<td>Treatment Details</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Orange hawkweed/Hieracium aurantiacum</td>
<td>Target sites mapped and treated in early spring, additional treatments conducted if necessary in conjunction with seasonal patrols.</td>
</tr>
<tr>
<td>Poison hemlock/Conium aculatum</td>
<td>Target sites mapped and treated in spring prior to bolt.</td>
</tr>
<tr>
<td>Purple loosestrife/Lythrum salicaria</td>
<td>Target sites mapped and treated at early flower stage in summer.</td>
</tr>
<tr>
<td>Ragwort tansy/Senecio jacobaea</td>
<td>Occurs sporadically throughout the area. All visible plants are sprayed in the spring prior to bud/seed set, any remaining plants visible in flower are hand pulled with seed heads removed, bagged, and disposed of.</td>
</tr>
<tr>
<td>Reed canary grass/Phalaris arundinacea</td>
<td>Only targeted in mapped locations agreed upon with county noxious weed control.</td>
</tr>
<tr>
<td>Rush skeletonweed/Chondrilla juncea</td>
<td>Target sites mapped and treated in spring prior to bolt.</td>
</tr>
<tr>
<td>Shiny geranium/Geranium lucidum</td>
<td>Target sites mapped and treated several times throughout the growing season as needed.</td>
</tr>
<tr>
<td>Teasel/Dipsacus fullonum</td>
<td>Target pioneer infestations are mapped and treated in spring.</td>
</tr>
<tr>
<td>Wild chervil/Anthriscus sylvestris</td>
<td>Target sites mapped and treated in early spring.</td>
</tr>
<tr>
<td>Yellow flag iris/Iris pseudacorus</td>
<td>Target sites have been mapped and controlled in previous seasons. Monitor for regrowth.</td>
</tr>
</tbody>
</table>

**Total Units of Planned Treatment**
- Approximately **150 acres** will be treated with herbicides.
- Less than **20 acres** will be cut mechanically, or pulled by hand.

**Locations of Priority Treatments**
- Technicians will develop location maps for species below and described in the table above, for future reference of priority treatments in early spring and late summer during the 2018 growing season.
- Priority treatment sites for the 2018 season include:
  - Tansy Ragwort - SR 8 & US 12 in Thurston County
  - Gorse - SR 109 MP 24.5
  - Spotted Knapweed - SR 101 MP 114.1-114.2
  - Spotted Knapweed - SR 105 MP 45.90
  - Yellow Hawkweed - SR 109 MP 12-12.2
  - Mouse ear Hawkweed - SR 109 MP 29.8 - 30.1
  - Yellow Flag Iris - US 12 MP 20.35
  - Skelton Weed - US 12 MP 42.6- 42.9
  - Knotweed - various locations

**Treatment Methods and Timing**
- A broad spectrum mixture of herbicides will be utilized in the late-spring/early-summer treatment window:
  - Element 3A @ 32 ozl/acre
  - Milestone @ 4.5 to 6 ozl/acre
  - Metcel @ 1 ozd/acre
  - Insist 90 @ 16 ozl/acre
- Hand pulling will be utilized for some species control where necessary.

**Nuisance Vegetation Control – 3A3**
Nuisance vegetation control takes place only in a select set of carefully prioritized locations along the wider areas of right of way throughout the state. These locations are delineated on maps in HATS as polygon outlines where right of way is wide enough for Zone 3 to exist.
Locations are prioritized to receive treatments where there is heightened local interest in a more controlled visual appearance and highly maintained condition. Typical locations include: wider areas along limited access freeways in urban and suburban areas, freeway interchanges for local urban centers, environmentally sensitive areas, and areas where neighbors are willing to partner with WSDOT on management efforts. Because nuisance weed control activities are not related to safety or legal requirements, and are primarily undertaken to improve the visual appearance of the roadside, they are considered the lowest priority vegetation management needs.

For all areas designated to receive Nuisance Vegetation Control, multi-year treatment plans have been developed. The actions contained in these plans will be executed and tracked in relation to specific Zone 3 polygons for **Nuisance Vegetation Control Zone 3**, referenced on HATS maps and described below.

### Nuisance Vegetation Control Zone 3

**Work Operations:** 1611, 1612, 1641, 1699  
**HATS Forms:** Pesticide Application (for all spray applications), and 3 sub-forms under Nuisance Veg. Control General – Manual/Mechanical, Biological, and Seed/Fertilize/Mulch  
**HATS Map Layer:** Reference polygons – Zone 3 Nuisance Reference

Maintenance activities in each identified location are planned and tracked as multi-year treatment strategies utilizing monitoring and the most effective combination of control methods – with a goal of establishing desirable vegetation that requires only minimal maintenance. Undesirable species are identified and specifically targeted while care is be taken to avoid damage to surrounding desirable/native vegetation. In some cases, soil enhancements may be used as well as seeding or planting of beneficial competition species. Successful plans are consistently implemented over a series of years and annually adjusted as necessary based on field observations.

**Total Units of Planned Treatment**

- Approximately **25 acres** of nuisance weed control will be conducted with a combination of spraying and mowing in designated priority locations

**Locations of Priority Treatments**

- Polygons will be mapped during the 2018 season for Nuisance Vegetation Control in the following areas:
  - US 12 Devonshire Interchange
  - US 12/SR 8 Interchange
  - Select locations along US12/SR8

**Treatment Methods and Timing**

- Mow scotch broom and blackberries with Brown Brush Monitor on a two to three year cycle depending on rate of regrowth. Once infestations have been minimized areas will be spot treated as needed annually to prevent weed seed production.
- Steep areas will be mowed with arm mounted mowing heads and/or hand tools. If not stump treated, regrowth will be treated with foliar herbicides in the fall or in the following spring.