Appendix J

Regional Analysis of Priority Highway Segments (PHS)

Introduction

The Priority Highway Segments (PHSs) were developed as part of the Oregon Deer and Elk Crossing Prioritization Project (ODECPP) to support a ranking system that helps decision makers identify high priority locations for transportation mitigation on a per highway basis. The PHSs incorporate both the degree of Top 1% Priority Milepost (TPM) clustering within a given highway and the highest scoring TPM along that highway to generate an overall prioritization value (see Priority Highway Segment Determination for methodological details).

Because each highway analyzed has distinct environmental and traffic-related characteristics, the PHSs were intentionally designed to be compared on a per highway basis rather than on a regional or statewide basis. This approach preserves the idiosyncrasies of each corridor and allows the relative importance of a PHS to be grounded in the specific conditions of that highway. However, we also recognize the need for a regional ranking framework that identifies the highest value PHS on each highway within a region to support decision making. In an effort to fill this gap, the PHS equation was adjusted to normalize the PHS scores by employing the number of TPMs per region.

Methods

To evaluate the PHSs on a regional basis opposed to a per highway basis, the denominator in the PHS equation was modified. Instead of applying the differing number of TPMs per highway, the revised calculation uses the static number of TPMs within each region derived from the TPM results generated for the ODECPP (Figures A.J.1 and A.J.2). This specified 55 total TPMs in the PHS_b calculation for the west Cascades region and 78 for the east Cascades region (Figure A.J.2).

$$PHS_a = \frac{Total\ Number\ of\ TPMs\ Per\ Segment}{Total\ Number\ of\ TPMs\ per\ Highway} * Highest\ ranked\ TPM\ within\ Segment$$

Figure A.J. 1. Priority Highway Segment (PHS) equation employed in the Oregon Deer and Elk Crossing Prioritization Project (ODECPP). This equation allowed for comparison of PHSs along a discrete ODOT Highway of Analysis Interest (OHAI).

$$PHS_b = \frac{Total\ Number\ of\ TPMs\ Per\ Segment}{Total\ Number\ of\ TPMs\ per\ Region} * Highest\ ranked\ TPM\ Within\ Segment$$

Figure A.J. 2. Priority Highway Segment (PHS) equation employed in supplementary regional analysis in the Oregon Deer and Elk Crossing Prioritization Project (ODECPP). The changes to the equation allow for the regional comparison of PHSs.

Results

Priority Highway Segment (PHS) scores ranged from a high of 0.75 to a low of 0.02. West of the Cascade Mountains, the highest scoring PHS values per highway ranged from 0.75 on the Oregon Coast Highway to 0.41 on Santiam West (μ = 0.54 ± 0.19 SE) (Table A.J.1). East of the Cascades, PHS values ranged from 0.29 on Wallowa Lake Highway to 0.02 on Santiam East (μ = 0.20 ± 0.11 SE) (Table A.J.2). The ranked order of PHSs per highway did not change when the PHS_b calculation was applied, including the top value PHSs for each highway (Figure A.J.3). All highest value PHS scores decreased under the PHS_b equation compared to PHS_a as a result of the increase in denominator value.

Table A.J. 1. Highest scoring Priority Highway Segments (PHSs) analyzed per region and organized by decreasing value on the Oregon Highways of Analysis Interest (OHAI) west of the Cascade Mountains.

Highway Name	Highest Value (HV) PHS	PHS_a Score	PHS_b Score
Oregon Coast	OC-a	1.65	0.75
Pacific	P-g	1.12	0.45
Santiam West	SW-a	2.84	0.41

Table A.J. 2. Highest scoring Priority Highway Segments (PHSs) analyzed per region and organized by decreasing value on the Oregon Highways of Analysis Interest (OHAI) east of the Cascade Mountains.

Highway Name	Highest Value (HV) PHS	PHS_a Score	PHS_b Score
Wallowa Lake	WL-c	3.28	0.29
Central Oregon	CO-f	0.78	0.26
Old Oregon Trail	OOT-n	0.94	0.23
The Dalles-California	TDC-i	0.94	0.18
Santiam East	SE-b	0.91	0.02

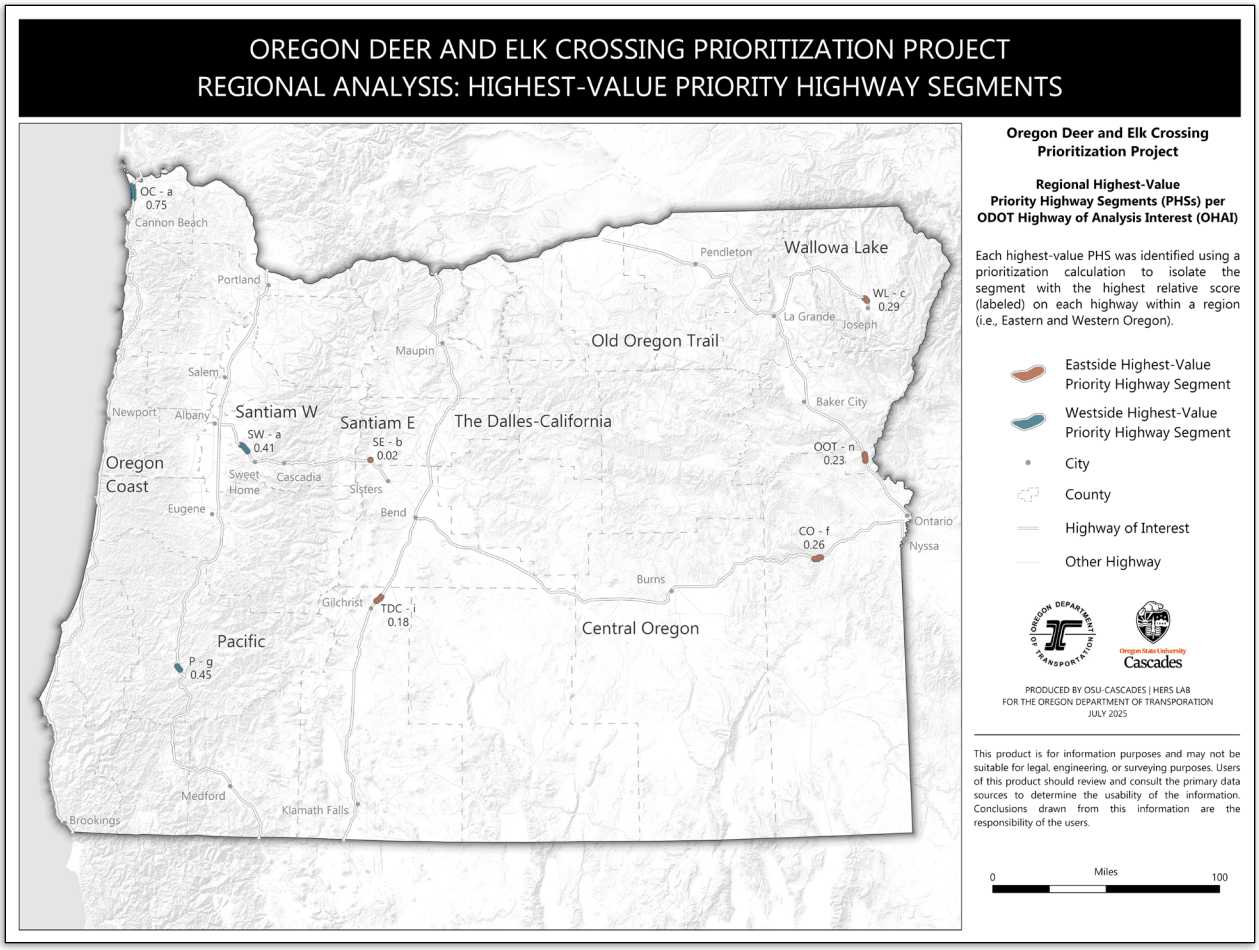


Figure A.J. 3. Highest scoring Priority Highway Segments (PHSs) per region on the ODOT Highways of Analysis Interest (OHAI).

Discussion

Despite modifications to the PHS relative importance equation, in which the denominator was changed from the number of TPMs per highway to the number of TPMs per region, the ranked order of the highest value PHSs for each highway remained unchanged. Overall PHS values were reduced as a result of applying a regional denominator; however, relative priority among top PHSs was preserved.

This adjustment allows PHSs to be evaluated on a regional basis, such as east and west of the Cascade Mountains, and facilitates comparisons across highways. While this method of standardization improves interpretability at a regional level, the PHS value alone should not be used as the sole basis for mitigation support or project planning decisions. Instead, PHS values should be interpreted as indicators of areas where higher opportunity for mitigation may exist, based on the combined factor scores and subsequent normalization applied within the ODECPP framework.

Additional evaluation, including site visits and assessment of site-level factors, should be completed prior to determining mitigation suitability or developing final project rankings for individual PHSs. Importantly, the highest value PHSs identified under the regional analysis are consistent with those identified using a per-highway approach, indicating that these locations remain priorities regardless of the evaluation scale.

Table A.J. 3. Priority Highway Segment (PHS) scores for all Oregon Highways of Analysis Interest (OHAI), based on the PHS_a and PHS_b equations for highway-level and regional analyses, respectively, as shown in Figures A.J.1 and A.J.2. Blue highlight indicates highest value PHS for each OHAI.

Highway Name	PHS Name	PHS_a Score	PHS_b Score
Pacific	P-a	0.29	0.12
	P-b	0.81	0.32
	P-c	0.33	0.13
	P-d	0.29	0.12
	P-e	0.24	0.10
	P-f	0.36	0.14
	P-g	1.12	0.45
	P-h	0.24	0.10
	P-i	0.63	0.25
	P-j	0.30	0.12
	P-k	0.29	0.12
	P-l	0.63	0.25
	P-m	0.29	0.12
	P-n	0.48	0.19
	P-o	0.34	0.14
	P-p	0.24	0.10
The Dalles-California	TDC-a	0.12	0.04
	TDC-b	0.11	0.03
	TDC-c	0.13	0.04
	TDC-d	0.13	0.04
	TDC-e	0.22	0.07
	TDC-f	0.16	0.05
	TDC-g	0.12	0.04
	TDC-h	0.37	0.11
	TDC-i	0.57	0.18
	TDC-j	0.15	0.05
	TDC-k	0.15	0.05
	TDC-l	0.12	0.04
	TDC-m	0.13	0.04
	TDC-n	0.28	0.08
	TDC-o	0.13	0.04
	TDC-p	0.12	0.04
	TDC-q	0.54	0.17
	TDC-r	0.13	0.04
Old Oregon Trail	OOT-a	0.20	0.05
	OOT-b	0.31	0.08
	OOT-c	0.20	0.05

Old Oregon Trail	OOT-d	0.19	0.05
	OOT-e	0.30	0.07
	OOT-f	0.18	0.04
	OOT-g	0.21	0.05
	OOT-h	0.45	0.11
	OOT-i	0.37	0.09
	OOT-j	0.29	0.07
	OOT-k	0.23	0.06
	OOT-l	0.21	0.05
	OOT-m	0.20	0.05
	OOT-n	0.94	0.23
	OOT-o	0.24	0.06
Central Oregon	CO-a	0.10	0.03
	CO-b	0.31	0.10
	CO-c	0.26	0.09
	CO-d	0.20	0.07
	CO-e	0.71	0.24
	CO-f	0.78	0.26
	CO-g	0.10	0.03
	CO-h	0.10	0.03
	CO-i	0.37	0.12
	CO-j	0.10	0.03
	CO-k	0.09	0.03
	CO-l	0.30	0.10
Oregon Coast	OC-a	1.65	0.75
	OC-b	0.10	0.05
	OC-c	0.12	0.06
	OC-d	0.10	0.05
	OC-e	0.71	0.32
	OC-f	0.10	0.04
	OC-g	0.59	0.27
	OC-h	0.09	0.04
	OC-i	0.09	0.04
	OC-j	0.20	0.09
	OC-k	0.11	0.05
	OC-l	0.11	0.05
Santiam East	SE-a	0.90	0.02
	SE-b	0.91	0.02
Santiam West	SW-a	2.84	0.41
	SW-b	0.83	0.12
Wallowa Lake	WL-a	1.05	0.09
	WL-b	2.13	0.19
	WL-c	3.28	0.29
	WL-d	0.74	0.07

Table A.J.4. Top 10% Priority Highway Segments (PHSs) analyzed per region derived from the PHS_b equation and organized by decreasing PHS_b Score value on the Oregon Highways of Analysis Interest (OHAI) west of the Cascade Mountains.

Highway Name	PHS Name	PHS_a Score	PHS_b Score
Oregon Coast	OC-a	1.65	0.75
Pacific	P-g	1.12	0.45
Santiam West	SW-a	2.84	0.41

Table A.J. 5. Top 10% Priority Highway Segments (PHSs) analyzed per region derived from the PHS_b equation and organized by decreasing PHS_b Score value on the Oregon Highways of Analysis Interest (OHAI) east of the Cascade Mountains.

Highway Name	PHS Name	PHS_a Score	PHS_b Score
Wallowa Lake	WL-c	3.28	0.29
Central Oregon	CO-f	0.78	0.26
Central Oregon	CO-e	0.71	0.24
Old Oregon Trail	OOT-n	0.94	0.23
Wallowa Lake	WL-b	2.13	0.19