WASHINGTON NATURAL HERITAGE PROGRAM SITE SURVEY

Tiger Stripes Timber Sale

December 9, 2025

Erin Burke
(Natural Heritage Program State Lands Ecologist)
&
Tynan Ramm-Granberg
(Natural Heritage Program Lead Vegetation Ecologist)

Assisted by the following Olympic Region staff:
Sophia Kast
(State Lands Ecologist, Olympic Region)

Executive Summary

The primary purpose of this inventory effort was to survey Tiger Stripes timber sale for rare plant and ecosystem element occurrences (EOs). Natural Heritage methodology was used to survey rare plants, identify ecosystems, and assess their ecological integrity. One state endangered ecosystem (G1/S1), two state threatened ecosystems (G2G3/S2 and G2/S2) and one state sensitive plant (G4/S2) were identified and assessed: stands of *Thuja plicata - Pseudotsuga menziesii - Abies grandis / Mahonia nervosa / Polystichum munitum* Forest (G1/S1) and *Pseudotsuga menziesii / Holodiscus discolor - Rosa gymnocarpa / Festuca occidentalis* Forest (G2G3/S2) were found to have sufficient ecological integrity to represent new EOs. Stands of *Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon - Holodiscus discolor* Forest (G2/S2) did not have sufficient ecological integrity and were not extensive enough to clear the threshold necessary for an EO. State sensitive Whipple-vine (*Whipplea modesta,* G4/S2) was also observed, often within these threatened ecosystems.

Introduction

Erin Burke began surveys within Tiger Stripes timber sale and adjacent suitable habitat in January 2025 and completed fieldwork in November of 2025, with assistance from Sophia Kast. Surveys included the assessment of rare plant and ecosystem (i.e., plant association) element occurrences (EOs). When potential ecosystem EOs were found, their ecological integrity and overall conservation value were assessed. Timber Sale surveys were conducted at the request of the DNR Olympic Region Manager.

Methods

Site Survey Approach

For rare plant taxa, a guided intuitive survey is conducted based on suitable habitat characteristics. Locations reported by the public are also confirmed and mapped. Additional populations are opportunistically detected while walking or driving outside of the survey area.

For ecosystems, a site walkthrough approach was used to observe the ecological variation within the timber sale units and beyond. This approach ensured that the topographic variability of each unit was surveyed. The surveyor stopped frequently to classify and confirm the plant association (= ecosystem) using Ramm-Granberg (2025) and Chappell (2006a).

Conservation Status of Vascular Plants

WNHP uses NatureServe's Conservation Status Assessment methodology (Faber-Langendoen et al., 2012; Master et al., 2012) to assess the conservation status of each plant taxa in the Washington flora (Fertig, 2021). Taxa are assigned global (G) and subnational(= State, S) conservation status ranks on a scale from 1 to 5 (from highest to lowest conservation concern). Where applicable, ranks are assigned to infraspecific taxon (T). These ranks incorporate rarity, threats, and other factors. Conservation Status Ranks are simplified into a Washington State Conservation Status based on the matrix in Table 1.

Table 1. Assignment of State Conservation Status for Rare Plants from (WADNR, 2025).

Natural Heritage Conservation Status Rank	State Conservation Status
G1S1, G2S1, G3S1 T1S1, T2S1, T3S1	Endangered
G2S2, G3S2 T2S2, T3S2	Threatened
G3S3, G4S1, G4S2, G4S3**, G5S1, G5S2, G5S3** T3S3, T4S1, T4S2, T4S3*, T5S1, T5S2, T5S3*	Sensitive
SH, SX	Extirpated
G4S3**, G4S4, G5S3**, G5S4, G5S5 T4S3*, T4S4, T5S3*, T5S4, T5S5	No Concern

*G = global conservation status rank; T = trinomial conservation status rank, which are assigned to subspecies and varieties; S = subnational conservation status rank

**S3 taxa evaluated on a case-by-case basis

Ecosystem Classification

WNHP uses the U.S. National Vegetation Classification (USNVC, 2022) to document the terrestrial ecosystems that occur in the state. Numerous regional classifications that overlap with this project area have contributed to the USNVC (Chappell, 2006a, 2006b; Crawford et al., 2009; Ramm-Granberg et al., 2021)—these documents were supplemented by vegetation keys such as Ramm-Granberg (2025) and Ramm-Granberg et al. (2025) to identify the ecosystems occurring within the targeted survey areas. Finally, ecosystem descriptions were cross-referenced with NatureServe Explorer (https://explorer.natureserve.org/) to check for any revisions that may have occurred since publication.

Ecosystem Conservation Status

Like plant species, ecosystems are assigned global (G) and subnational (= State, S) conservation status ranks using NatureServe's Conservation Status Assessment Methodology (Faber-Langendoen et al., 2012; Master et al., 2012). A conservation status rank represents an assessment of a specific ecosystem's risk of elimination. Conservation status ranks have been assigned to each element (ecosystem type) for its entire range, incorporating rarity, threats, and other factors. Conservation Status Ranks may be simplified into a Washington State Conservation Status based on the matrix in Table 2.

Table 2. Assignment of State Conservation Status for Ecosystems from (WADNR, 2025).

Natural Heritage Conservation Status Rank*	State Conservation Status**
G1S1, G2S1, GNRS1, GUS1	Endangered
G2S2, G3S1, G3S2, G2SNR, G2SU, GNRS2, GUS2	Threatened
G3S3, G3SNR, G3SU, G4S1, G4S2, G4S3**, G5S1, G5S2, G5S3**, GNRS3**, GUS3**	Sensitive***
G4S4, G5S4, G5S5	No Concern
GNRSNR, GUSU, G4SNR, G4SU, G5SNR, G5SU	Review****

*G = global conservation status rank; S = subnational conservation status rank. If a rank spans two ranks (e.g., S1S2), the most conservative rank (S1) is used. If range spans three ranks (e.g., S1S3), the midpoint (S2) is used.
**If S3 rank is rounded from a range rank (e.g., S3S4) or includes a '?' modifier (e.g., G4S3?), element has a Review status instead of Sensitive.
***If element would be ranked as Sensitive, but has a "Q" modifier (e.g., G4QS3, representing classification uncertainty), element has a Review status instead.
****Consult with Natural Heritage for more information about how to treat individual elements with Review status.

Ecological Integrity of Ecosystem Stands

The Ecological Integrity Assessment (EIA) methodology provides a rapid, standardized assessment of the current ecological integrity of a stand of a given ecosystem (Faber-Langendoen et al., 2019; Rocchio et al., 2024a, 2024b). The EIA results in an EIA rank ranging from 'A' to 'D', with 'A' indicating excellent ecological integrity and 'D' indicating poor ecological integrity. A size metric is then integrated to produce an element occurrence rank (EO rank), which is an estimate of the overall conservation value of the stand. More information about size metrics and their role in calculating EO Ranks can be found in Sections 3.10 'Size' (p. 80-83) and 4.5 'Calculate the Element Occurrence Rank' (p. 87-88) of Rocchio et al., 2024a.

If an ecosystem with conservation status rank of G1 or G2 was located, its extent was mapped, and then an EIA was conducted to determine its current ecological condition (landscape context, native plant composition, invasive weed cover, vegetation structure, surficial soil condition, overall size, etc.). We also

used DNR forest inventory data, historical aerial imagery, and timber harvest records to determine the stand age, corroborated by keys from Van Pelt (2007) (also used to assess old-growth characteristics of individual trees). This information was used to help score EIA metrics related to vegetation structure.

Element Occurrence Criteria

For rare plant taxa, the minimum criteria for an EO is simply a natural population of at least a single persisting, recurring, or potentially persisting or recurring individual (NatureServe, 2020). NatureServe's Habitat-based Plant Element Occurrence Delimitation Guidance (NatureServe, 2020)provides instruction on whether separate populations should be treated as one or multiple EOs. Occurrences within 1 kilometer of each other may be mapped as separate "source features" (sub-populations) of the same EO.

Element occurrences are entered into the Washington Natural Heritage Program's Biotics database and used for a variety of conservation and management outcomes. For more information, please see the Washington Natural Heritage Program website (http://www.dnr.wa.gov/natural-heritage-program).

For ecosystems, WNHP uses the combination of an ecosystem's conservation status rank and its EO rank to determine whether a stand of a given ecosystem is an "element occurrence". Element occurrences (EOs) are populations of species or specific examples of ecosystems with significant conservation value that contribute to the survival or persistence of the element (i.e. the species or ecosystem) (NatureServe, 2002). We use NatureServe's Element Occurrence data standards to guide our delineation of ecosystem occurrences (see https://www.natureserve.org/products/element-occurrence-data-standard). The EO data standards provide guidelines for decisions such as whether a particular patch of a given ecosystem is large enough to be considered an element occurrence. The standard also provides guidance on whether two distinct stands of the same ecosystem should be lumped as a single EO or split into two occurrences. The EO rank is determined by completing an EIA of the specific stand of the ecosystem in question. Common ecosystems with relatively few threats (e.g. conservation status rank of G5/S5) must be in excellent condition (EO rank 'A+' or 'A-') to be considered EOs, while all nearly occurrences of the most endangered ecosystems (e.g., G1/S1)—even in poor condition (D)—have significant conservation value (Table 3).

Table 3. Decision Matrix for Ecosystem Element Occurrences. Element conservation status ranks vary from 1 (critically imperiled) to 5 (common/secure), calculated across the element's global (G) and subnational/state (S) range. 'NR' = not ranked.

<table>
<tr><th rowspan="2" colspan="2"></th><th colspan="4">Element Conservation Status Rank</th></tr>
<tr><th>EORANK</th><th>Global Rank
State Rank</th><th>G1S1, G2S1, GNRS1, GUS1</th><th>G2S2, GNRS2, G3S1, G3S2, GUS2</th><th>GUS3, GNRS3, G3S3, G4S1, G4S2, G5S1, G5S2, any SNR</th><th>G4S3, G4S4, G5S3, G5S4, G5S5, GNRS4, GNRS5, GUS4, GUS5</th></tr>
<tr><td colspan="2">A+ (3.8 to 4.0)</td><td>EO</td><td>EO</td><td>EO</td><td>EO</td></tr>
<tr><td colspan="2">A- (3.5 to 3.79)</td><td>EO</td><td>EO</td><td>EO</td><td>EO</td></tr>
<tr><td colspan="2">B+ (3.0 to 3.49)</td><td>EO</td><td>EO</td><td>EO</td><td rowspan="5">Not an Element Occurrence</td></tr>
<tr><td colspan="2">B- (2.5 to 2.99)</td><td>EO</td><td>EO</td><td>EO</td></tr>
<tr><td colspan="2">C+ (2.0 to 2.49)</td><td>EO</td><td>EO</td><td rowspan="3">Not an Element Occurrence</td></tr>
<tr><td colspan="2">C- (1.5 to 1.99)</td><td>EO</td><td rowspan="2">Not an Element Occurrence</td></tr>
<tr><td colspan="2">D (1.0 to 1.49)</td><td>EO</td></tr>
</table>

Element occurrences are entered into the Washington Natural Heritage Program's Biotics database used for a variety of conservation and management outcomes. For more information, please see the Washington Natural Heritage Program website (http://www.dnr.wa.gov/natural-heritage-program).

Results

One state endangered ecosystem (G1/S1), two state threatened ecosystems (G2G3/S2 and G2/S2), and one state sensitive plant (G4/S2) were found during surveys.

Ecosystems

One state endangered (G1/S1) and two state threatened (G2G3/S2 and G2/S2) plant associations were identified in Tiger Stripes units and adjacent areas (Figure 1, Table 4, Table 5).

Thuja plicata - Pseudotsuga menziesii - Abies grandis / Mahonia nervosa / Polystichum munitum Forest (G1/S1) was found in a portion of Tiger Stripes Unit 1. This plant association was never common throughout its range and is typically found at lower elevations within the rainshadow of the Olympic and Vancouver Island mountains (NatureServe, 2025a).

Pseudotsuga menziesii / Holodiscus discolor – Rosa gymnocarpa / Festuca occidentalis Forest (G2G3/S2) was found in Tiger Stripes Unit 2, 4, and elsewhere on south-facing dry ridges with shallow soils. This plant association is restricted to the rainshadow of the Olympic Mountains in Washington (NatureServe, 2025b). Areas mapped are often adjacent to (or occur in a mosaic with) *Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon - Holodiscus discolor* Forest (G2/S2).

The *Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon - Holodiscus discolor* (G2/S2) Forest is considered a matrix ecosystem type (NatureServe, 2015) that historically occurred over larger portion of the landscape (NatureServe, 2025c). This plant association was mapped In Units 2, 3, and 4 of Tiger Stripes timber sale. Given the condition and landscape context, the amount observed (87 acres) was too small on its own to meet EO specifications. An expanded search for this plant association in surrounding DNR trust land did not identify enough additional acreage to warrant expanding the assessment area.

Table 4. Ecosystems assessed in Tiger Stripes timber sale and adjacent areas on Striped Peak.

USNVC Plant Association	EL Code	State Conservation Status (G/S Rank)	Element Occurrence?
Thuja plicata - Pseudotsuga menziesii - Abies grandis / Mahonia nervosa / Polystichum munitum Forest Western Red-cedar - Douglas-fir - Grand Fir / Cascade Barberry / Western Swordfern Forest	CEGL002848	Endangered (G1/S1)	Yes
Pseudotsuga menziesii / Holodiscus discolor - Rosa gymnocarpa / Festuca occidentalis Forest Douglas-fir /Oceanspray – Baldhip Rose / Western Fescue Forest	CEGL000456	Threatened (G2G3/S2)	Yes
Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon - Holodiscus discolor Forest Douglas-fir - Western Hemlock / Salal – Oceanspray Forest	CEGL005537	Threatened (G2/S2)	No

Table 5. United States National Vegetation Classification (USNVC) hierarchy for ecosystem element occurrences in Tiger Stripes timber sale and nearby areas on Striped Peak.

TT2 Temperate-Boreal Forest & Woodland Biome	
TT2.b Cool Temperate Forest & Woodland Subbiome	
TT2.b2 Oceanic Cool Temperate Rainforest Ecobiome	
TT2.b2.Na North American Pacific Coast Temperate Rainforest Division	
M024 North Pacific Coastal Rainforest Macrogroup	
G240 Coastal Douglas-fir - Western Hemlock Rainforest Group	
A3378 *Tsuga heterophylla - Pseudotsuga menziesii / Cornus unalaschkensis* Mesic Forest Alliance	
CEGL002848	Thuja plicata - Pseudotsuga menziesii - Abies grandis / Mahonia nervosa / Polystichum munitum Forest Association
A3379 Tsuga heterophylla - Pseudotsuga menziesii / Holodiscus discolor Dry Forest Alliance	
CEGL005537	Pseudotsuga menziesii – Tsuga heterophylla / Gaultheria shallon – Holodiscus discolor Forest Association
TT2.b3 Temperate Continental Conifer Forest & Woodland Ecobiome	
TT2.b3.Nc Californian-North Pacific Foothills Forest & Woodland Division	
M886 Californian-North Pacific Dry Foothill Forest & Woodland Macrogroup	
G800 North Pacific Douglas-fir - Madrone Dry Woodland Group	
A3716 Pseudotsuga menziesii - Abies grandis - Arbutus menziesii Forest & Woodland Alliance	
CEGL000456	Pseudotsuga menziesii / Holodiscus discolor – Rosa gymnocarpa / Festuca occidentalis Forest Association

Ecological Integrity Assessment

Sale units and additional nearby areas were assessed as EOs using standard EIA methodology. Results are below.

Thuja plicata - Pseudotsuga menziesii - Abies grandis / Mahonia nervosa / Polystichum munitum Forest

The stand in Tiger Stripes Unit 1 received an overall Element Occurrence (EO) rank of 'C+' (2.03). The stand received a 'B-' (2.57) for Condition and a 'C+' (2.11) for Landscape Context, resulting in an EIA Score of C+ (2.36) for this large-patch type (Figure 1, Table A- 1). The overall size of the documented stands is approximately 16 acres, resulting in a size rank of 'C' (2.0). A complete breakdown of EIA metrics may be found in Appendix A, Table A- 1.

Pseudotsuga menziesii / Holodiscus discolor – Rosa gymnocarpa / Festuca occidentalis Forest

The stands in Tiger Stripes Units 2, 4 , and near Unit 3 received an overall EO rank of 'C+' (2.02). The stand was assigned an 'A-' (3.67) for Condition and a 'C+' (2.24) for Landscape Context resulting in an EIA Score of 'B+' (3.02) for this large-patch type (Figure 1, Table A- 2. The overall size of the documented stands is approximately 3 acres, resulting in a size rank of 'D' (1.0). A complete breakdown of EIA metrics may be found in Appendix A, Table A- 2.

Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon - Holodiscus discolor Forest

The stands in and near Tiger Stripes Units 2, 3, and 4 received an overall EO rank of 'D' (1.03). The stand received a 'B+' (3.40) for Condition and a 'D' (1.46) for Landscape Context, resulting in an EIA Score of B- (2.53) for this matrix ecosystem (Figure 1, Table A- 3). The overall size of documented stands is

approximately 87 acres with largest contiguous patch of 52 acres, resulting in a size rank of a 'D' (1.0). A complete breakdown of EIA metrics may be found in Appendix A, Table A- 3.

Rare Plants

Whipple-vine (*Whipplea modesta*) was found scattered in small populations in all units of Tiger Stripes. Denser patches were found along roads in or near the sale and within Units 2, 3, and 4. While this species is often found associated with rocky, open forests and roadsides on south- and west-facing slopes, it was also found in locations that do not meet these search criteria (e.g., in denser forests and away from obvious glacially scoured ridges).

These observations represent an expansion of the existing Whipple-vine EO (EO ID 10438). Further surveys may result in additional mapping of this species.

Conclusion

The stands of *Pseudotsuga menziesii / Holodiscus discolor – Rosa gymnocarpa / Festuca occidentalis* Forest (G2G3/S2) and *Thuja plicata - Pseudotsuga menziesii - Abies grandis / Mahonia nervosa / Polystichum munitum* Forest (G1/S1) have sufficient ecological integrity to represent new EOs. Stands of *Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon - Holodiscus discolor* Forest (G2/S2) did not have sufficient ecological integrity (due to its small size and poor condition of the surrounding landscape) to represent a new EO.

Additional mapping of Whipple-vine represents an expansion of an existing EO (EO ID 10438) for this species.

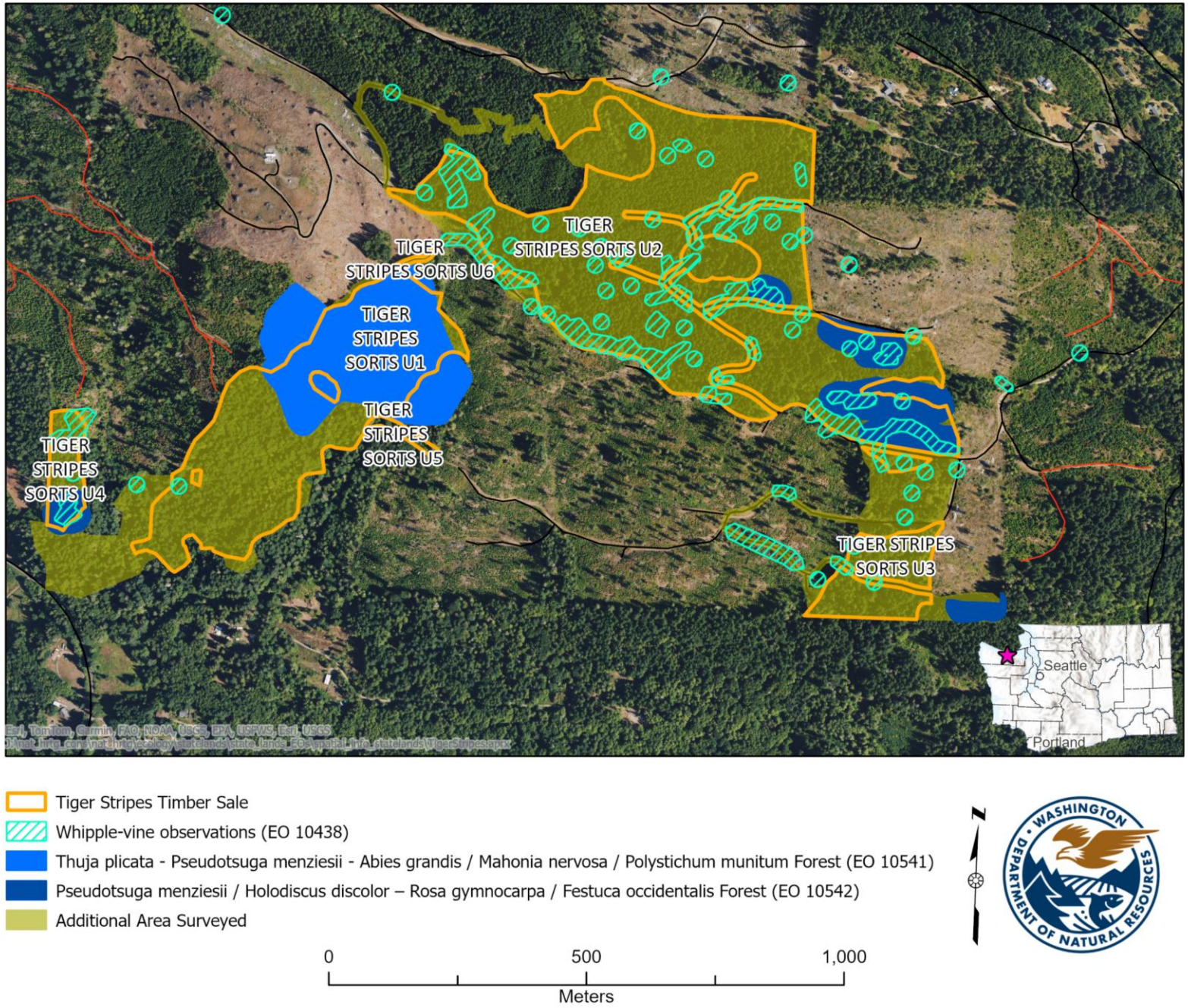

Figure 1. Overview of areas surveyed in and near Tiger Stripes Timber Sale.

References

Chappell C.B. 2006a. Upland plant associations of the Puget Trough ecoregion, Washington. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.

Chappell C.B. 2006b. Plant associations of balds and bluffs of western Washington. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA. NHR-2006-02.

Crawford R.C., C.B. Chappell, C.C. Thompson, and F.J. Rocchio. 2009. Vegetation classification of Mount Rainier, North Cascades, and Olympic National Parks. US Department of the Interior, National Park Service, Fort Collins, CO. NPS/NCCN/NRTR—2009/211.

Faber-Langendoen, J.N. D., L. Master, K. Snow, A. Tomaino, R. Bittman, G. Hammerson, B. Heidel, L. Ramsay, A. Teucher, and B. Young. 2012. NatureServe Conservation Status Assessments: methodology for assigning ranks. NatureServe, Arlington, VA.

Faber-Langendoen D., J. Lemly, W. Nichols, F.J. Rocchio, K. Walz, and R. Smyth. 2019. Development and evaluation of NatureServe's multi-metric Ecological Integrity Assessment for wetland ecosystems. *Ecological Indicators* 104(9):764–775.

Fertig W. 2021. 2021 Washington Vascular Plant Species of Conservation Concern. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA. Online: https://www.dnr.wa.gov/publications/amp_nh_vascular_ets.pdf

Master L.L., D. Faber-Langendoen, R. Bittman, G.A. Hammerson, B. Heidel, L. Ramsay, K. Snow, A. Teucher, and A. Tomaino. 2012. NatureServe Conservation Status Assessments: factors for evaluating species and ecosystem risk. NatureServe, Arlington, VA.

NatureServe. 2002. Element Occurrence data standard. NatureServe, Arlington, VA.

NatureServe. 2015. Spatial pattern for ranking. https://help.natureserve.org/biotics/content/record_management/Element_Files/Element_Ranking/ERANK_Spatial_Pattern_Ranking.htm. Accessed: July 31, 2025.

NatureServe. 2020. Habitat-based Plant Element Occurrence delimitation guidance. NatureServe, Arlington, VA.

NatureServe. 2025a. Association: *Thuja plicata - Pseudotsuga menziesii - Abies grandis / Mahonia nervosa / Polystichum munitum* Forest. Online: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.787997/Thuja_plicata_-_Pseudotsuga_menziesii_-_Abies_grandis_-_Mahonia_nervosa_-_Polystichum_munitum_Forest

NatureServe. 2025b. Association: *Pseudotsuga menziesii / Holodiscus discolor - Rosa gymnocarpa / Festuca occidentalis* Forest. Online: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.685510/Pseudotsuga_menziesii_-_Holodiscus_discolor_-_Rosa_gymnocarpa_-_Festuca_occidentalis_Forest.

NatureServe. 2025c. Associaton: *Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon -*

Holodiscus discolor Forest. Online: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.942449/Pseudotsuga_menziesii_-_Tsuga_heterophylla_-_Gaultheria_shallon_-_Holodiscus_discolor_Forest

Ramm-Granberg T. 2025. Key to the Plant Associations of the Puget Sound Drainage Basin (Internal Draft 2025-07-10). Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.

Ramm-Granberg T., F.J. Rocchio, R. Brunner, and E. Nielsen. 2021. Revised vegetation classification for Mount Rainier, North Cascades, and Olympic National Parks: descriptions and identification keys for plant associations and wetland alliances. North Coast and Cascades Network, National Park Service, Port Angeles, WA.

Ramm-Granberg T., F.J. Rocchio, and R.C. Crawford. 2025. Key to wetland and riparian plant associations of Washington State (Draft Version 2.5). Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA. NHR-20XX-XX.

Rocchio F.J., Rex C. Crawford, and Tynan Ramm-Granberg. 2024a. Field manual for applying rapid Ecological Integrity Assessments in upland plant communities of Washington State (Version 1.5). Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA. NHR-2024-04. Online: https://www.dnr.wa.gov/publications/amp_nh_eia_protocol_upland_ver1_5.pdf

Rocchio F.J., Rex C. Crawford, and Tynan Ramm-Granberg. 2024b. Field manual for applying rapid Ecological Integrity Assessments in wetlands and riparian areas in Washington State (Version 1.5). Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA. NHR-2024-05. Online: https://www.dnr.wa.gov/publications/amp_nh_eia_protocol_wetland_ver1_5.pdf

United States National Vegetation Classification (USNVC). 2022. United States National Vegetation Classification Database, v2.04. usnvc.org. Accessed: April 6, 2023.

Van Pelt R. 2007. *Identifying mature and old forests in western Washington*. Washington State Department of Natural Resources, Olympia, WA.

Washington Department of Natural Resources (WADNR). 2025. State of Washington Natural Heritage Plan. Olympia, WA. Online: https://www.dnr.wa.gov/publications/amp_nh_plan_2025.pdf

Appendix A: Ecological Integrity Assessment (EIA) Calculations

Ecological Integrity varied over the timber sale units and neighboring parcels. The table below presents the range of metric ranks and major ecological factors, followed by the weighted average of primary factors, EIA scores, and the overall EO rank.

Table A- 1. EIA Calculations for recently assessed areas *of Thuja plicata - Pseudotsuga menziesii - Abies grandis / Mahonia nervosa / Polystichum munitum* Forest (G1/S1). See Figure 1 for extent.

Roll-up Calculations	Rating	Score	Comments
LAN1. Contiguous Natural Land Cover	C	2	~40% natural habitat adjacent to AA
LAN2. Land Use Index	C	2	LUI=5.34
LAN MEF Score = (LAN1+LAN2)/2	C+	2.00	
EDG1. Perimeter with Natural Edge	B	3	77% natural edge. Score may go down if surrounding area is logged..
EDG2. Width of Natural Edge	C	2	Average 64 m
EDG3. Condition of Natural Edge	C	2	Recent logging and logging roads around approximately 3/4 of AA.
EDG MEF Score = $(((EDG1*EDG2)^{1/2})*EDG3)^{1/2}$ [Note: ½ exponent = square root]		2.21	
LANDSCAPE CONTEXT PRIMARY FACTOR SCORE = (EDG Score*0.67)+(LAN Score*0.33)	Large		
Matrix = (EDG Score*0.33)+(LAN Score*0.67)	**C+**	**2.11**	
Large-Patch = (EDG Score*0.50)+(LAN Score*0.50)			
Small-Patch = (EDG Score*0.67)+(LAN Score*0.33)			
VEG1. Native Plant Species Cover	A-	3.5	In addition to invasives listed in VEG2, exotics *Myrica muralis* (0-1%), *Epipactis helleborine* (0-1%), *Cirsium vulgare* (trace). Relative native cover > 97%.
VEG2. Invasive Nonnative Plant Species Cover	B	3	*Ilex aquifolium* (0-1%), *Geranium robertianum* (1-2%)

VEG3. Native Plant Species Composition	B	3	Diagnostics somewhat challenging to assess due to limited understory regeneration, but within NRV for this ecosystem. Diversity may also be somewhat reduced due to increasers and non-native species. *Polystichum munitum* and *Rubus ursinus* increasers on edge and old roads within AA.
VEG4. Vegetation Structure	C	2	Dominant age cohort is Maturation 1. Structure is within NRV for this stand development stage (SDS), however very few large live trees remain and abundant OG stumps.
VEG5. Woody Regeneration	A	4	Within NRV; does not appear to be replanted.
VEG6. Coarse Woody Debris	D	1	CWD and snags both significantly reduced from expected state due to logging.
VEG MEF Score = (VEG4+VEG6)/2*0.7+(VEG1+VEG2+VEG3+VEG5)/4*0.3	B-	2.67	
SOI1. Soil Condition	C	2	Old logging roads cross unit.
SOI MEF Score = SOI1	C+	2.00	
CONDITION PRIMARY FACTOR SCORE = (VEG Score*0.85)+(SOI Score*0.15)	B-	2.57	
ECOLOGICAL INTEGRITY (EIA) SCORE	C+	2.36	
Matrix/Large-Patch = (CONDITION SCORE*0.55)+(LANDSCAPE CONTEXT SCORE*0.45)			
Small-Patch = (CONDITION SCORE*0.7)+(LANDSCAPE CONTEXT SCORE*0.3)			
SIZ1. Comparative Size	C	2	Large patch. 16 acres (C).
SIZ2. Change in Size (optional)	Not Scored		Original stand extent not known at this time.
SIZ MEF Score = SIZ1 OR (SIZ1+SIZ2)/2	C+	2.00	
SIZE Points		-0.33	
CALCULATED EO RANK = EIA Score + SIZE Points	C+	2.03	
ASSIGNED EO RANK	C+		

Table A- 2. EIA Calculations for recently assessed areas of *Pseudotsuga menziesii / Holodiscus discolor – Rosa gymnocarpa / Festuca occidentalis Forest* (G2G3/S2). See Figure 1 for extent.

Roll-up Calculations	Rating	Score	Comments
LAN1. Contiguous Natural Land Cover	B or D	1.23	Sub-AAs enveloped by 5 to 69% natural land cover. Landscape fragmented by logging roads, recently cut stands, and rural homes on adjacent private land. Score may go down when surrounding units are logged.
LAN2. Land Use Index	C	2	LUI=5.64. Score may go down when surrounding area is logged.
LAN MEF Score = (LAN1+LAN2)/2	C-	1.62	
EDG1. Perimeter with Natural Edge	A to C	3.17	Sub-AAs natural edge varied from 60-100%. Score may go down when surrounding units are logged.
EDG2. Width of Natural Edge	B to C	2.05	Sub-AAs average natural edge width varied from 45 to 90 m. Score may go down when surrounding units are logged.
EDG3. Condition of Natural Edge	A to C	3.22	Clearcut and logging roads adjacent to some sub-AAs; others enveloped in native vegetation. Scores may go down when surrounding areas are logged.
EDG MEF Score = $(((EDG1*EDG2)^{1/2})*EDG3)^{1/2}$ [Note: ½ exponent = square root]	B-	2.87	
LANDSCAPE CONTEXT PRIMARY FACTOR SCORE = (EDG Score*0.67)+(LAN Score*0.33)	Large		
Matrix = (EDG Score*0.33)+(LAN Score*0.67)	C+	2.24	
Large-Patch = (EDG Score*0.50)+(LAN Score*0.50)			
Small-Patch = (EDG Score*0.67)+(LAN Score*0.33)			
VEG1. Native Plant Species Cover	A	4.0	Few exotics recorded. Relative native cover > 99%.
VEG2. Invasive Nonnative Plant Species Cover	A	4.0	*Crataegus monogyna* (0-1%), trace *Leucanthemum vulgare.*
VEG3. Native Plant Species Composition	A to B	4 to 3	Even though understory variable, keys out well & description allows for variation. Overall diverse shrub composition. Where *Mahonia nervosa* dominates the shrub layer, the herbaceous layer is naturally less developed. Where *Holodiscus discolor* and feather moss are prominent, herb diversity is higher but low in cover. Surveys occurred in fall/winter conditions so may be missing some ephemeral species.

VEG4. Vegetation Structure	A to C	4 to 2	Structure within NRV for Maturation 1. Large, live trees submetric varied: some sub-AAs were thinned, one was clearcut. Most large live OG remain (few scattered stumps). Areas generally probably were not worth salvage logging due to high fire severity.
VEG5. Woody Regeneration	A	4	Natural regeneration post fire.
VEG6. Coarse Woody Debris	A to D	4 to 1	Except in previously clearcut sub-AA, CWD and snags within NRV. Area burned hot, but most OG snags remain (few stumps). Some have fallen and are now providing full range of CWD size & decay.
VEG MEF Score = (VEG4+VEG6)/2*0.7+(VEG1+VEG2+VEG3+VEG5)/4*0.3	A-	3.61	
SOI1. Soil Condition	A	4	No roads or trails.
SOI MEF Score = SOI1	A+	4.0	
CONDITION PRIMARY FACTOR SCORE = (VEG Score*0.85)+(SOI Score*0.15)	A-	3.67	
ECOLOGICAL INTEGRITY (EIA) SCORE	B+	3.02	
Matrix/Large-Patch = (CONDITION SCORE*0.55)+(LANDSCAPE CONTEXT SCORE*0.45)			
Small-Patch = (CONDITION SCORE*0.7)+(LANDSCAPE CONTEXT SCORE*0.3)			
SIZ1. Comparative Size	D	1	Large patch. 3 acres total (D)
SIZ2. Change in Size (optional)	Not Scored		Original stand extent not known at this time.
SIZ MEF Score = SIZ1 OR (SIZ1+SIZ2)/2	D	1.0	
SIZE Points	D	-1	
CALCULATED EO RANK = EIA Score + SIZE Points	C+	2.02	
ASSIGNED EO RANK	C+		

Table A- 3. EIA Calculations for recently assessed areas of *Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon - Holodiscus discolor* Forest (G2/S2). See Figure 1 for extent.

Roll-up Calculations	Rating	Score	Comments
LAN1. Contiguous Natural Land Cover	B or D	1.23	Sub-AAs enveloped by 3 to 63% natural land cover. Landscape fragmented by logging roads, recently cut stands, and rural homes on adjacent private land. Score may go down when surrounding units are logged.
LAN2. Land Use Index	C	2	LUI=5.14
LAN MEF Score = (LAN1+LAN2)/2	C-	1.62	
EDG1. Perimeter with Natural Edge	A to D	1.39	Sub-AAs natural edge varied from trace to 100%.
EDG2. Width of Natural Edge	B to D	1.23	Averaged wldth of sub-AAs ranged from 0-85 meters.
EDG3. Condition of Natural Edge	A to D	1.30	Few sub-AAs with significant forest adjacent, most adjacent to roads or recent cuts. Score may go down when surrounding units are logged.
EDG MEF Score = $(((EDG1*EDG2)^{1/2})*EDG3)^{1/2}$ [Note: ½ exponent = square root]	D	1.30	
LANDSCAPE CONTEXT PRIMARY FACTOR SCORE = (EDG Score*0.67)+(LAN Score*0.33)	Matrix		
Matrix = (EDG Score*0.33)+(LAN Score*0.67)	**D**	**1.46**	
Large-Patch = (EDG Score*0.50)+(LAN Score*0.50)			
Small-Patch = (EDG Score*0.67)+(LAN Score*0.33)			
VEG1. Native Plant Species Cover	A	4	Only trace cover of exotic species (*Mycelis muralis, Erechtites minimus*). Relative native cover > 99%.
VEG2. Invasive Nonnative Plant Species Cover	A to B	4 to 3	*Ilex aquifolium* = trace cover.
VEG3. Native Plant Species Composition	A to B	4 to 3	Somewhat challenging to distinguish between this association and a similar, drier association that lacks shade tolerant tree species (CEGL005531) due to stand development stage (SDS). In some sub-AAs, this is largely due to natural regeneration following high intensity fire. Other areas have abundant evidence of post-harvest regeneration (old growth and second

			growth stumps), so the sub-metric diagnostics was lowered in these areas. Diversity within natural range of variation (NRV). Herbaceous layer naturally sparse and not highly diverse due to dense shrub layer. *Whipplea modesta* present in mossy patches in dense shrub layer.
VEG4. Vegetation Structure	A to C	4 to 2	Two-cohort stand, post-fire regen. Dominant cohort is Maturation 1. Structure within NRV for current SDS. Large live submetric varied from A to D based on previous logging practices, which ranged from small areas that appear unlogged to areas where dominant cohort was thinned (15-30%), to areas that were both salvage logged (leaving old growth stumps). Small portions of stand appear to be unlogged and initiated via natural post-fire regeneration. Some areas had a mix of scattered large live OG (survivors of high severity natural fire) and the regenerating stand was also harvested (smaller machine cut stumps prevalent).
VEG5. Woody Regeneration	A	4	Within NRV; does not appear to be replanted.
VEG6. Coarse Woody Debris	A to D	4 to 1	CWD and snags decay and size diversity vary. Where cut stumps are abundant (old growth and more recent machine cut), CWD and snags are extremely altered from expected levels. Thinned areas have moderately altered CWD and few to no older snags. Areas with old growth relics that appear unlogged have the natural range of CWD and snags given fire severity.
VEG MEF Score = (VEG4+VEG6)/2*0.7+(VEG1+VEG2+VEG3+VEG5)/4*0.3	B+	3.38	
SOI1. Soil Condition	A	4.0	Hiking trail through the northern portion of Unit 2; minimal old roads from prior logging.
SOI MEF Score = SOI1	A+	4.0	
CONDITION PRIMARY FACTOR SCORE = (VEG Score*0.85)+(SOI Score*0.15)	**B+**	**3.40**	
ECOLOGICAL INTEGRITY (EIA) SCORE	**B-**	**2.53**	
Matrix/Large-Patch = (CONDITION SCORE*0.55)+(LANDSCAPE CONTEXT SCORE*0.45)			
Small-Patch = (CONDITION SCORE*0.7)+(LANDSCAPE CONTEXT SCORE*0.3)			
SIZ1. Comparative Size	D	1.0	Matrix ecosystem. 87 acres (D) total with largest patch 52 acres (D).
SIZ2. Change in Size (optional)	Not Scored		Original stand extent not known at this time.

SIZ MEF Score = SIZ1 OR (SIZ1+SIZ2)/2	D	1.0	
SIZE Points	D	-1.5	
CALCULATED EO RANK = EIA Score + SIZE Points	D	1.03	
ASSIGNED EO RANK	D		

Table A- 4. Metric Rank / Score Conversions

Rank	A	A-	B	C	C-	D
Score	4	3.5	3	2	1.5	1

Table A- 5. Score / Rank Conversions for MEF, EIA, and EORANK calculations

Rank	A+	A-	B+	B-	C+	C-	D
Score	3.8 - 4.00	3.5 - 3.79	3.0 - 3.49	2.5 - 2.99	2.0 - 2.49	1.5 - 1.99	1 - 1.49

Table A- 6. Point Contribution of Size Primary Factor Score

Size Primary Factor Rating	Very Small/Small Patch	Large Patch	Matrix
A = Size meets A ranked rating	+ 0.75	+ 1.0	+1.5
B = Size meets B ranked rating	+ 0.25	+ 0.33	+0.5
C = Size meets C ranked rating	- 0.25	- 0.33	-0.5
D = Size meets D ranked rating	- 0.75	-1.0	-1.5